

कर्नाटक राज्य के चिकमगलूर, कूर्ग, दक्षिण कन्नडा, उडुपी एवं शिमोगा
जिलों में घाट मार्गों के किनारे भूस्खलन तालिका पर प्रतिवेदन

(क्षेत्र सत्र 2009-10 का प्रगति प्रतिवेदन)

कूट सं. : ई.जी./एस.आर./के.जी./2009/043

द्वारा

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सारांश

भूस्खलन आपद एवं जोखिम न्यूनीकरण पर राष्ट्रीय महाविपदा प्रबन्धन प्राधिकरण (एन.एम.डी.ए.) द्वारा प्रस्तावित कार्रवाई योजना के कार्यान्वयन करने के लक्ष्य से एवं भविष्य में भूस्खलन अध्ययन के लिए भूस्खलन डाटाबेस को तैयार करने के लक्ष्य से कर्नाटक राज्य के भागों में पश्चिमी घाट के घाट परिच्छेद में भूस्खलन तालिका का कार्य आरंभ किया गया था. डाटाबेस के नवीकरण के लिए, मिशन-IV: अभियान्त्रिकी भूविज्ञान एवं भूतकनीकी अन्वेषण कार्यक्रम: भूस्खलन आपदा आकलन के अन्तर्गत घाट परिच्छेद में राष्ट्रीय मार्ग (एन.एच) एवं राज्य मार्ग (एस.एच.) से सम्बन्धित एक मद् का कार्य किया गया था. भूस्खलन तालिका का कार्यक्रम कूर्ग, दक्षिण कन्नडा एवं चिकमगलूर जिलों में पश्चिमी घाट के घाट मार्गों में किया गया जो भूआकृति सं. 48 O/7,8 एवं 11; 48 P/7, 11 एवं 15 के क्षेत्र है.

क्षेत्र सत्र 2009-2010 के दौरान निम्नलिखित घाट परिच्छेद (एस.एच. मार्ग एवं मुख्य जिला मार्ग) को शामिल किया गया.

- चिकमगलूर जिला सीमा एवं बेल्टनगाडी परिच्छेद के बीच एस.एच.-64: 29 भूस्खलन
- विभिन्न एस.एच. एवं जिला मार्गों में मडिकेरी शहर के आसपास: 26 भूस्खलन
- मडिकेरी-भागमन्डला मार्ग परिच्छेद: 2 भूस्खलन
- भागमन्डला-करिके मार्ग परिच्छेद: 34 भूस्खलन
- भागमन्डला-तलकावेरी मार्ग परिच्छेद: 6 भूस्खलन
- एस.एच.-27 अल्डूर-बलेहोन्नूर मार्ग परिच्छेद: 5 भूस्खलन
- एस.एच.27 बलेहोन्नूर-कोप्पा मार्ग परिच्छेद: 8 भूस्खलन

वर्तमान अध्ययन से यह निष्कर्ष निकलता है कि ज्यादातर भूस्खलन (< 2 मी चौड़ाई) के छिछले मलबे स्खलन/अवर्सपण है. “कट” ढाल ऊँचाई एवं ढाल कोण भूस्खलन में प्रधान भूमिका अदा करते हैं क्योंकि स्खलन क्रौण से टो तक “कट” ढाल है. यह देखा गया है कि ज्यादातर स्खलन ऐसे “कट” ढालों में सीमित है जिनकी ऊँचाई 10 मी से ज्यादा है एवं ढाल कोण 70° - 90° के बीच में परिवर्तित होता है. सभी परिच्छेदों में “कट” ढाल का आपेक्षिक उच्चावच निम्न से सामान्य (5-20 मी) है एवं उपरिभार की गहराई 0.5-10 मी है. पश्चिमी घाट में भूस्खलन प्रक्रिया के मुख्य कारण ये हैं: सडक निर्माण के लिए गिरि ढाल के टो कटिंग, मानवीय बस्ती के लिए ढाल परिवर्द्धन, अपरिवर्तन अपक्षीण चट्टान पिण्ड एवं बारम्बार वर्षा. चट्टानों के तीव्र अपक्षीण स्वभाव के लिए जल की बहुव्यापी उपस्थिति हितकारी है जिससे उनके अपक्षीण प्रतिरोध में गिरावट पैदा होते हैं. मनसून के दौरान भारी वर्षा लगभग सभी भूस्खलन को उत्प्रेरित कर देती है.

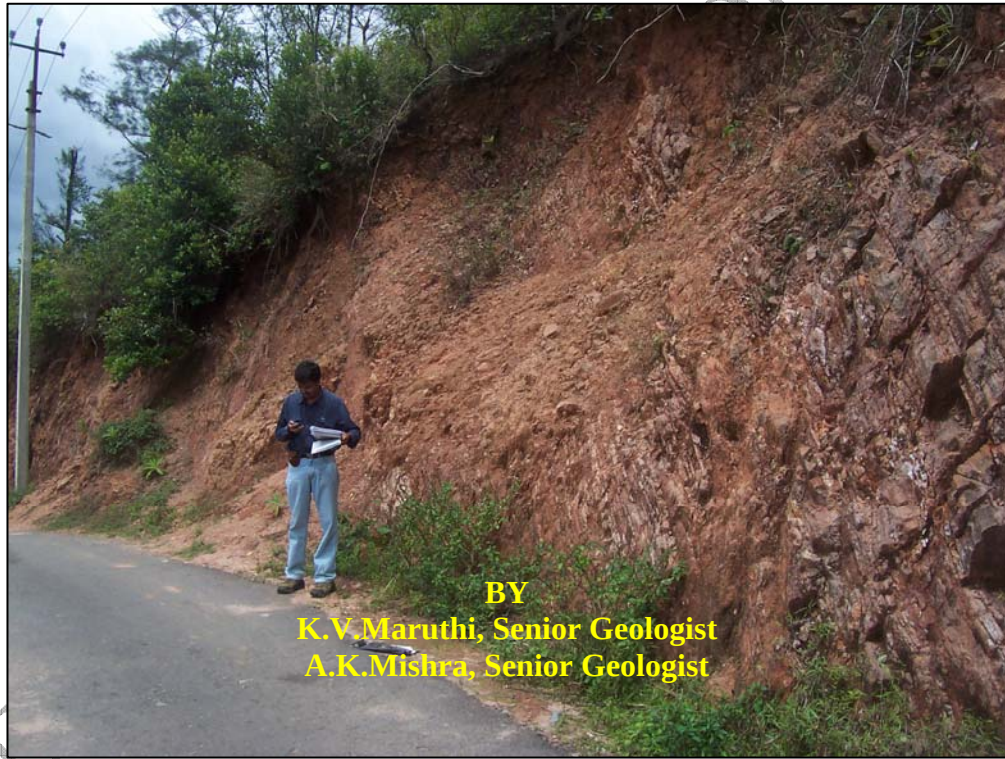
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GEOLOGICAL SURVEY OF INDIA**



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ROADS IN CHIKMAGALUR, COORG, DAKSHINA KANNADA,
UDUPI AND SHIMOGA DISTRICTS, KARNATAKA**

(Progress Report for the Field Season 2009-10)

Code No.: EG/SR/KG/2009/043



BY

K.V.Maruthi, Senior Geologist

A.K.Mishra, Senior Geologist

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ABSTRACT

In order to implement the proposed action plan 2006 of the National Disaster Management Authority (NDMA) on landslide hazard and risk mitigation and to prepare a landslide database for future landslide studies, landslide inventory of the Ghat section of Western Ghat in parts of Karnataka state has been taken up. To update the database, an item pertaining to the landslide inventory along National highway (NH) and State highway (SH) roads in ghat sections was taken up under Mission-IV Engineering geology and Geotechnical investigation programme: Landslide Hazard Evaluation. The landslide inventory was carried out along the Ghat roads of the Western Ghat in Coorg, Dakshina Kannada and Chikmagalur districts covering parts of toposheet nos.48 O/7, 8 & 11; 48P/ 7,11&15;.

The following Ghat sections (SH roads and main district roads) were covered during the FS 2009-10.

- a) SH-64 between Chikmagalur district boundary- Beltangady road section: 29 landslides,
- b) In and around Madikeri town along different SH and district roads: 26 landslides
- c) Madikeri-Bhagamandala road section: 2 landslides.
- d) Bhagamandala-Karika road section: 34 landslides.
- e) Bhagamandala-Taleauvery road section: 6 landslides
- f) SH-27 Aldur-Balehonnur road section: 5 landslides
- g) SH-27 Balehonnur-Koppa road section: 8 landslides

The present study reveals that most of the landslides are shallow (<2m depth) debris slides/slumps. The cut slope height and angle plays a major role in all the slides as the sliding events from crown to toe are restricted between the cut slopes. It was observed that majority of the slides are restricted to the cut slopes having height more than 10m and slope angle varying from 70°- 90°. The relative relief from the cut slope is low to moderate at all the section and varies from 5m to 20m with depth of overburden varying from 0.5-10m. The main causes of landsliding in the Western Ghat are: toe cutting of hill slopes for the construction of roads, slope modification for human settlements, highly weathered rock mass and frequent rain. The ubiquitous presence of water is favorable for intense weathering of rocks causing drop in their shearing resistance. The heavy rainfall during monsoon triggers almost all Landslides.

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I. INTRODUCTION

Geological Survey of India, after being recognised as the Nodal Agency for Landslides in India (declared during 2004), vigorously and swiftly started multipoint approach towards landslide hazard studies which included site specific Landslide studies, landslide hazard zonation along corridors and townships and preparation of landslide inventory. As far as State unit: Karnataka and Goa of Geological Survey of India is concerned Landslide inventory was first carried out during FS 2007-08 in the states of Karnataka and Goa separately.

In order to implement the proposed action plan 2006 of the National Disaster Management Authority (NDMA) on landslide hazard and risk mitigation and to prepare a landslide database for future landslide studies, landslide inventory of the Ghat section of Western Ghat in parts of Karnataka state has been taken up. Engineering Geology division, State unit: Karnataka and Goa has been preparing systematically landslide database in Karnataka from 2007-08. To update the landslide database an item for landslide inventory along NH and SH in ghat sections was taken up under the annual programme EG/SR/KG/2009/043, Mission Engineering geology and Geotechnical investigation programme of Landslide Hazard Evaluation. The landslide inventory was carried out along the Ghat roads of the Western Ghat in Coorg, Dakshina Kannada and Chikmagalur districts covering parts of toposheet nos.48 O/7, 8 & 11; 48P/ 7, 11&15.

I.1 LOCATION

The Karnataka state is bounded by the Arabian Sea in the west, Goa and Maharashtra in the northwest and north, respectively and Tamilnadu and Kerala states to the South (Plate-1) .During the FS 2009-10, landslide inventory was carried out along the ghat roads in the Western Ghat belt. The Western Ghat belt which is known for its thickly vegetated forests and mineralisation is an irregularly elongated northwest southeast trending belt. In Karnataka, the Western Ghats extend from Coorg district in the south to Uttara Kannada district in the north.

I.2. PRESENT WORK

During the FS 2009-10, landslide inventory was carried out along ghat roads in the Western Ghat belt. A total of 204 line km was covered and 110 incidences of landslides were studied.

The following Ghat sections (SH roads and main district roads) were covered.

- A) Landslides recorded along SH-64 between Chikmagalur district boundary- Beltangady road section: 29 landslides (Plate3).
- B) Landslides recorded in and around Madikeri town along different SH and district roads: 26 landslides (Plate 4 & 5).
- C) Landslides recorded between Madikeri-Bhagamandala road section: 2 landslides (Plate 4).
- D) Landslides recorded between Bhagamandala-Karike road section: 34 landslides (Plate 4 & 6).
- E) Landslides recorded between Bhagamandala-Talcuvery road section: 6 landslides (Plate 4 & 6).
- F) Landslides along SH-27 Aldur-Balehonnur road section: 5 landslides (Plate 7).
- G) Landslides along SH-27 Balehonnur-Koppa road section: 8 landslides (Plate 8).

I.3. METHODOLOGY FOR LANDSLIDE INVENTORY

1. The historical landslide data were collected from the offices of the District Commissioners, PWDs and other district authorities of different districts.
2. Prioritization of the landslides for inventory was carried out i.e., the road sections, where there are more number of landslide incidences reported, were taken on priority basis.
3. As a large number of landslides were reported (A.K.Mishra et.al 2007) along major district roads in Coorg district they were given priority ahead of SH and NH roads
4. No data could be obtained from aerial photo/imagery as the landslides are small in size and temporal data was not available.
5. The most important characters and the important data to be collected were discerned as the data sheet provided by the CHQ was inadequate in many respects. The data sheet prepared by EG division for Landslide inventory studies was used.(Appendix 1)
6. The check list table was prepared i.e., which road section to be carried out first, whether any data of reported landslides are available, consultation of aerial photos etc.,
7. Each slide site was studied and the measurements of various dimensions made by using measuring tape.
8. During the field season 2007-08(Mishra & Pradhan, 2010) the slides were given a unique ID number to distinguish them from each other. As for Karnataka state the slides were named as KA 01, KA02, etc. During 2008-09 first slide studied was numbered KA-65 and the last slide studied assigned the number KA-278 (Maruthi et.al, 2011). In continuation, the first slide studied during the current study the first slide was assigned the number KA-279 with a view that each slide will have unique ID and can be stored in the landslide inventory database.

9. As many of the landslides lack data on date of occurrence, the date on which landslide data collected takes preference over date of occurrence, any other morphometric or independent criteria
10. Photo graphs taken are more than what is provided in the report and the numbering is done as Slide no: KA01 (1), Slide no: KA01 (2)... etc and is stored in the landslide inventory database file in .jpeg format for future reference.
11. Data are entered in excel format according to check list and stored as in soft copy. The soft copy is provided to the Dy.DG, SU: Karnataka and Goa and the Director EG for safe custody till viable software are developed to keep the database for future reference.

I.4. CONSTRAINTS, LIMITATIONS & ASSUMPTIONS

1. Data of many landslides were incomplete and many places these are inferred because of inaccessibility to the crown/ head portions of landslides and hence some measurements like scarp depth/width was visually estimated.
2. Scarp radius was visually estimated
3. Angle of repose and angle of failure were taken at the present slope even though slided surface might be different
4. Vertical interval and horizontal extension components were calculated from slide length and failure angle.
5. The size of slides in Western Ghats is small hence were difficult to pick up from the satellite imagery or Aerial photo of 1:50,000 scale
6. The recent Aerial photos and temporal imagery are not available
7. Weathering depth at the slide site or nearby *nala* sections were studied.

NATURE AND QUANTUM OF WORK

Nature of Work	Total work envisaged	Work proposed for FS: 2009-10	Work completed
Aerial photo/ High resolution image interpretation and checking of incidences given by state government and other incidences enroute.	200 L km	200 L km	204 L Km (110 incidences)

I.5. ACKNOWLEDGEMENTS

The authors are sincerely thankful to Dy. D. G, SU: Karnataka and Goa for support and guidance. They are thankful to Shri. R. Panduranga, then Director, Engineering Geology Division for his technical guidance and present Director Dr.S.S.Nayak for scrutiny of the report. Without the data provided by the district authorities, locating slides would have been a difficult task. In this regard authors are grateful to the District Commissioners, officials from PWD and officials from Revenue Department Govt. of Karnataka.

II. REGIONAL GEOLOGY

The western ghat belt preserves an ideal succession of Bababudan Group, which is exposed in the mountainous region of Kudremukh, Agumbe and Kodchadri. The Sargur Group is represented by a number of enclaves and the enclaves are quartzite, amphibolite, iron formation, garnetiferous mica schist, kyanite-staurolite schist, silimanite-garnet schist, calc-silicate rock and ultramafics within gneisses and granites. The Peninsular Gneiss of this region is a complex of migmatitic gneiss and granitoids and includes biotite gneiss, hornblende-biotite gneisses and hornblende gneiss. The peninsular gneiss is unconformably overlain by the Dharwar Supergroup (Bababudan Group of rocks). Bababudan Group is represented by four formations, namely (a) Walkunje Formation, (b) Kudremukh Formation, (c) Kodachadri Formation, and d) Narasiparvata Formation. The Walkunje Formation represents the lower arenaceous and argillaceous members of the Bababudan Group. Other rock members associated with it are quartzites, quartz-sericite schist, greywacke, arkose and quartz-biotite-chlorite schist. Kudremukh formation comprises amygdular metavolcanics, amphibolite, actinolite-chlorite schist, meta gabbro and ultramafics with interbeds of quartzites, quartz-sericite schist and chlorite schist. Kodchadri Formation comprises of Banded magnetite quartzite and quartz-chlorite-sericite schist. The Narasiparvata formation comprises of acid porphyry, chlorite quartz schist and iron stones. Numerous dykes, varying in texture from coarse to fine grained, are reported from various localities. The laterite cover is extensive in the area between the coastal plains and the intermediate range of hills below the Western Ghats (Awasthi, 1980; Davay, 1968; Gopal Reddy et.al 1984; Jagannathan et.al 1983).

IV. CHARACTERISTICS OF LANDSLIDES STUDIED IN 2009-10

IV.1.Type of landslides: Out of the Total 110 landslides studied in 2009-10 majority are debris slides (60 landslides or 54.55% of the total) followed by slumps, including both debris slump and earth slumps (42 landslides or 38.18% of the total) followed by rock slides (4 landslides or 3.64% of the total) and complex or composite slides (4 landslides or 3.64% of the total).(Table 1 & Fig 1)

Table 1: Type of landslides observed in 2009-10.

Type of slides	No of slide	%
Debris slide	60	54.55
Debris slump	30	27.27
Earth slump	12	10.91
Rockslide	4	3.64
Complex/Composite slide	4	3.64
Total	110	100

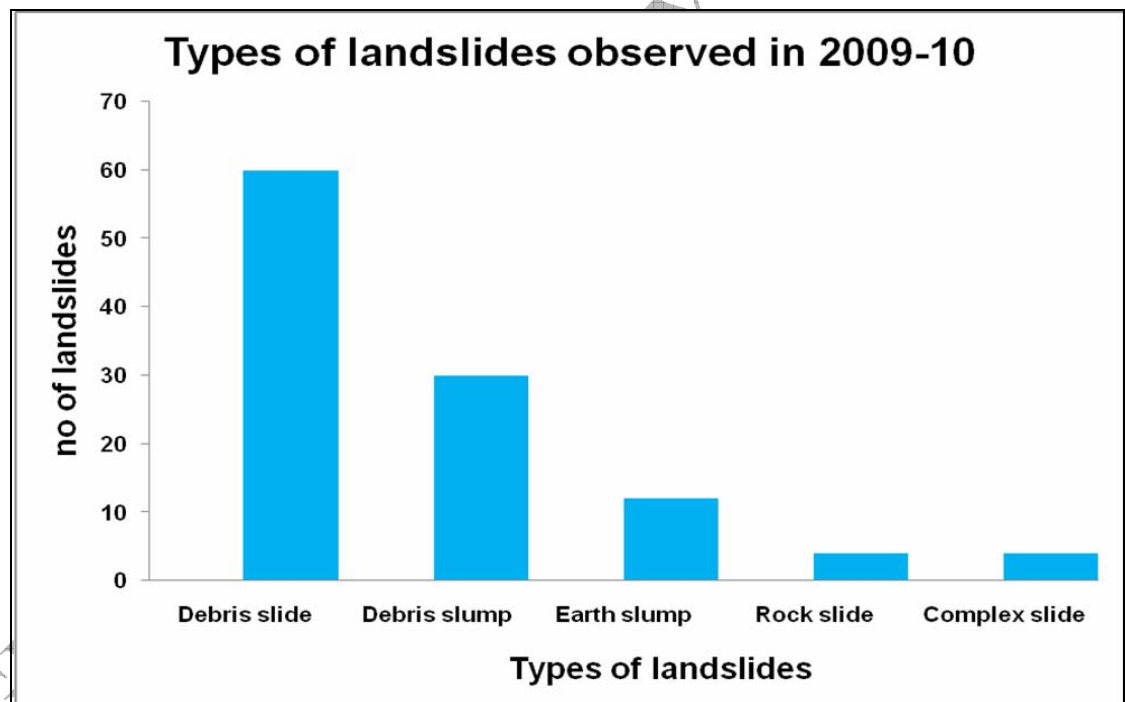


Fig 1: Type of landslides in each section.

Section wise analysis on the type of landslide revealed that Bhagamandala- Karike and around Madikeri sections are having maximum number of debris slides (16 no in each section) closely followed by Charmudi ghat section (15 no). Bhagamandala-Karike and around Madikeri sections are also having maximum number of debris slumps (10 no in each section). Earth slumps were noticed only in Bhagmandala-Karike and Charmudi ghat sections (6 no in each section). Out of

four rock slides three were observed in Charmudi ghat section and one in Aldur- Balehoonur section. Of the four complex slides where both rock slides and debris slides were noticed together are two in Bhagamandala-Karrike section and two in Balehonnur-Koppa section. (Table 2, 3).

Table 2: Type of landslides in each section.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karrike	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
Debris slide	15	16	2	16	5	1	5
Debris slump	5	10	0	10	1	3	1
Earth slump	6	0	0	6	0	0	0
Rock slide	3	0	0	0	0	1	0
Complex slide	0	0	0	2	0	0	2
Total	29	26	2	34	6	5	8

Table 3: Percentage distribution of type of slides in each section.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karrike	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
Debris slide	51.72	61.54	100.00	47.06	83.33	20.00	62.50
Debris slump	17.24	38.46	0.00	29.41	16.67	60.00	12.50
Earth slump	20.69	0.00	0.00	17.65	0.00	0.00	0.00
Rock slide	10.34	0.00	0.00	0.00	0.00	20.00	0.00
Complex slide	0.00	0.00	0.00	5.88	0.00	0.00	25.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

IV. 2. Dimensions of landslides: The length, width and depth of the slides studied in 2009-10 with respective percentages are presented in (Table 4, 5 and Fig 2a, 2b and 2c). It can be noted from the length and width that most of the landslides have length and width < 20.0 m. 77.28% of the slides have length < 20.0 m and 60.0% of the slides have width < 20.0 m. With regard to depth most of the slides are shallow with ≤ 1.0 m depth (79.09% of the total). The dimensions of slides in each road sections are also represented in Table 6, 7, 8, 9, 10 and 11 with corresponding percentage distribution.

Table 4: Dimensions of landslides (length and widthwise) with percentage distribution observed in 2009-10

	Length	% distribution	Width	% distribution
$\leq 10\text{m}$	38	34.55	20	18.18
$>10 \leq 20\text{m}$	47	42.73	46	41.82
$>20\text{m} \leq 30\text{m}$	19	17.27	28	25.45
$>30\text{m} \leq 40\text{m}$	3	2.73	10	9.09
$>40\text{m} \leq 50\text{m}$	1	0.91	2	1.82
$>50\text{m}$	2	1.82	4	3.64
Total	110	100.00	110	100.00

Table 5: Dimensions of landslides (Depth wise) with percentage distribution observed in 2009-10

	Depth	% distribution
$\leq 1.0\text{m}$	87	79.09
$>1.0\text{m} \leq 2.0\text{m}$	19	17.27
$>2.0\text{m} \leq 5.0\text{m}$	4	3.64
$>5.0\text{m}$	0	0.00
Total	110	100

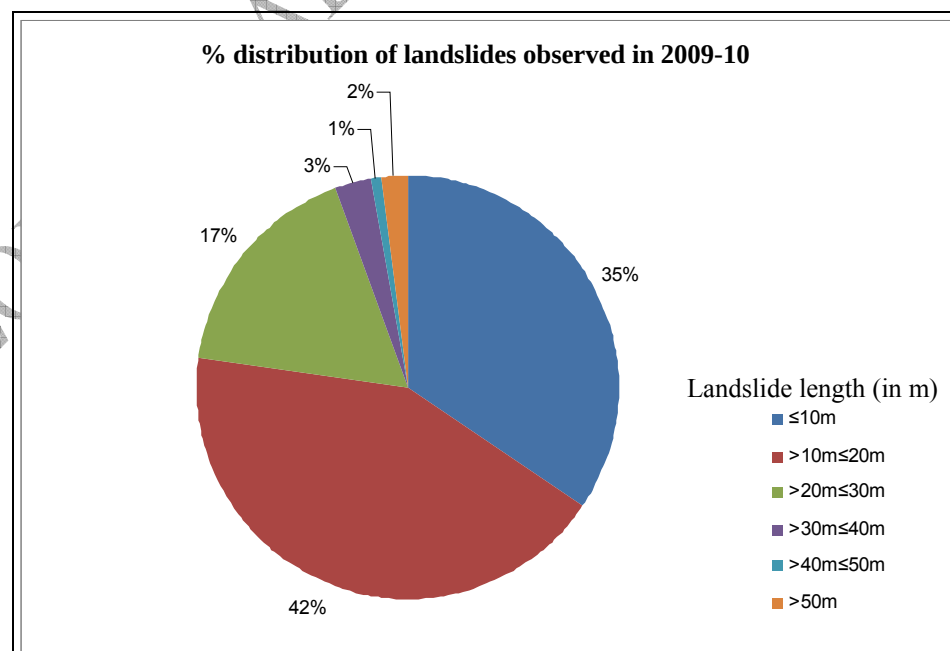


Fig 2a: Percentage distribution of landslides with respect to their length.

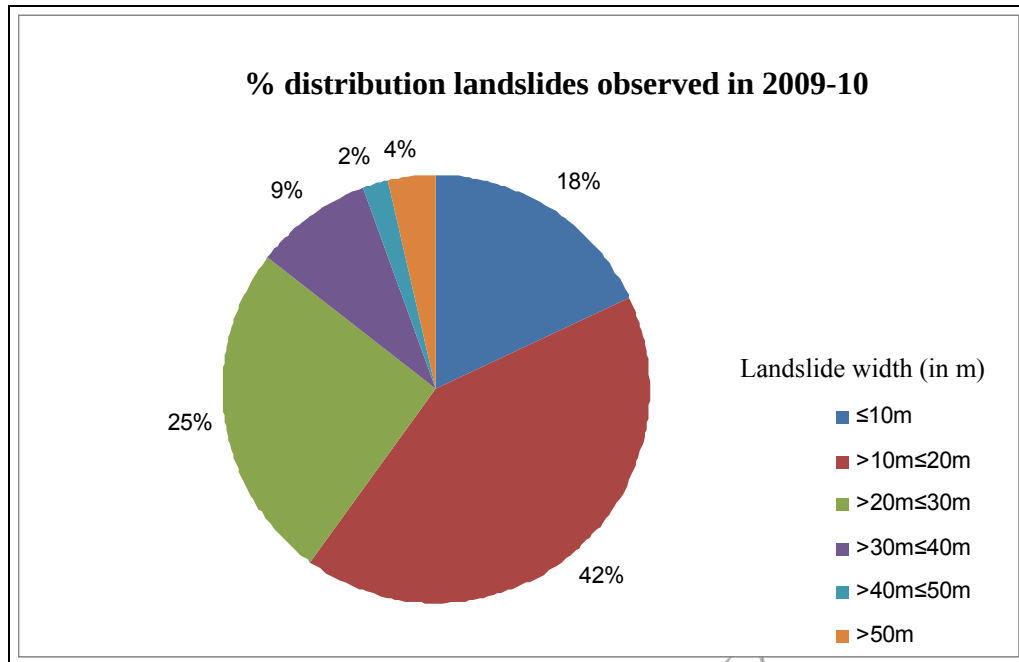


Fig 2b: Percentage distribution of landslides with respect to their width.

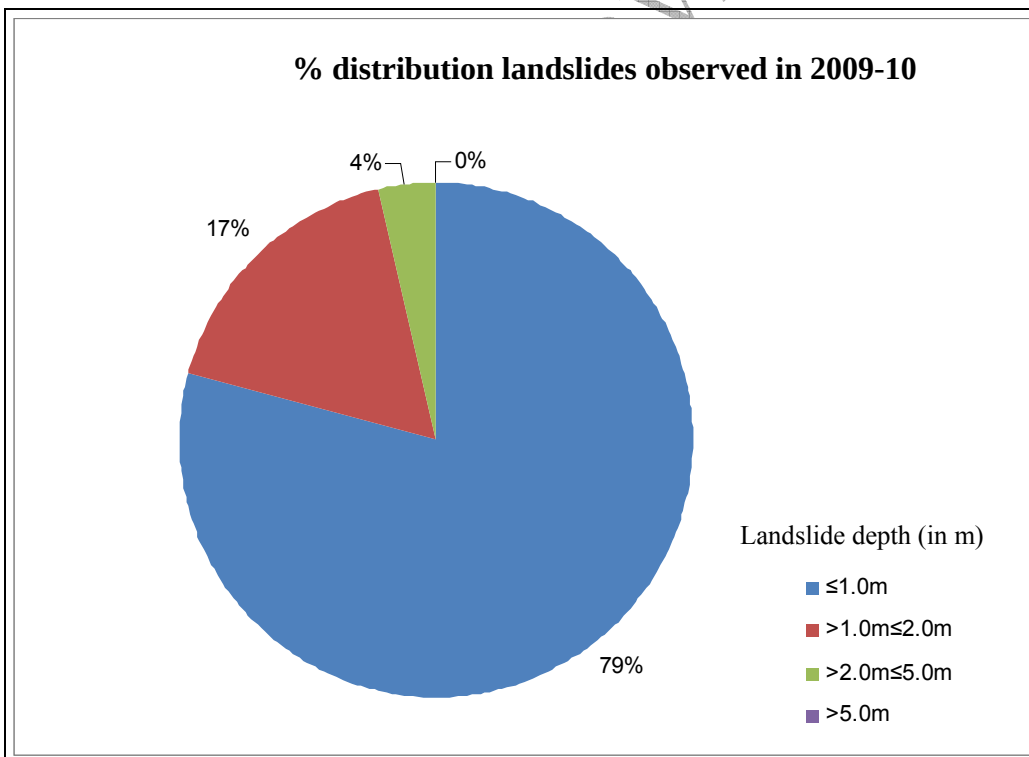


Fig 2c: Percentage distribution of landslides with respect to their depth.

Table 6: Number of landslides in each section with different slide length.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karika	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
≤10m	10	12	1	8	2	3	2
>10m≤20m	15	8	0	17	1	1	5
>20m≤30m	3	5	1	7	1	1	1
>30m≤40m	0	1	0	1	1	0	0
>40m≤50m	0	0	0	1	0	0	0
>50m	1	0	0	0	1	0	0
Total	29	26	2	34	6	5	8

Table 7: Percentage distribution of landslides in each section with different slide length.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karika	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
≤10m	34.48	46.15	50.00	23.53	33.33	60.00	25.00
>10m≤20m	51.72	30.77	0.00	50.00	16.67	20.00	62.50
>20m≤30m	10.34	19.23	50.00	20.59	16.67	20.00	12.50
>30m≤40m	0.00	3.85	0.00	2.94	16.67	0.00	0.00
>40m≤50m	0.00	0.00	0.00	2.94	0.00	0.00	0.00
>50m	3.45	0.00	0.00	0.00	16.67	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 8: Number of landslides in each section with different slide width.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karike	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
≤10m	6	13	0	0	0	1	0
>10m≤20m	12	10	1	16	3	1	3
>20m≤30m	8	3	0	11	2	2	2
>30m≤40m	0	0	1	6	0	0	3
>40m≤50m	1	0	0	0	1	0	0
>50m	2	0	0	1	0	1	0
Total	29	26	2	34	6	5	8

Table 9: Percentage distribution of landslides in each section with different slide width.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karike	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
≤10m	20.69	50.00	0.00	0.00	0.00	20.00	0.00
>10m≤20m	41.38	38.46	50.00	47.06	50.00	20.00	37.50
>20m≤30m	27.59	11.54	0.00	32.35	33.33	40.00	25.00
>30m≤40m	0.00	0.00	50.00	17.65	0.00	0.00	37.50
>40m≤50m	3.45	0.00	0.00	0.00	16.67	0.00	0.00
>50m	6.90	0.00	0.00	2.94	0.00	20.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 6: Number of landslides in each section with different slide depth.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karika	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
≤1.0m	20	18	2	31	3	5	8
>1.0m≤2.0m	6	7	0	3	3	0	0
>2.0m≤5.0m	3	1	0	0	0	0	0
>5.0m	0	0	0	0	0	0	0
Total	29	26	2	34	6	5	8

Table 7: Percentage distribution of landslides in each section with different slide length.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karika	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
≤1.0m	68.97	69.23	100.00	91.18	50.00	100.00	100.00
>1.0m≤2.0m	20.69	26.92	0.00	8.82	50.00	0.00	0.00
>2.0m≤5.0m	10.34	3.85	0.00	0.00	0.00	0.00	0.00
>5.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

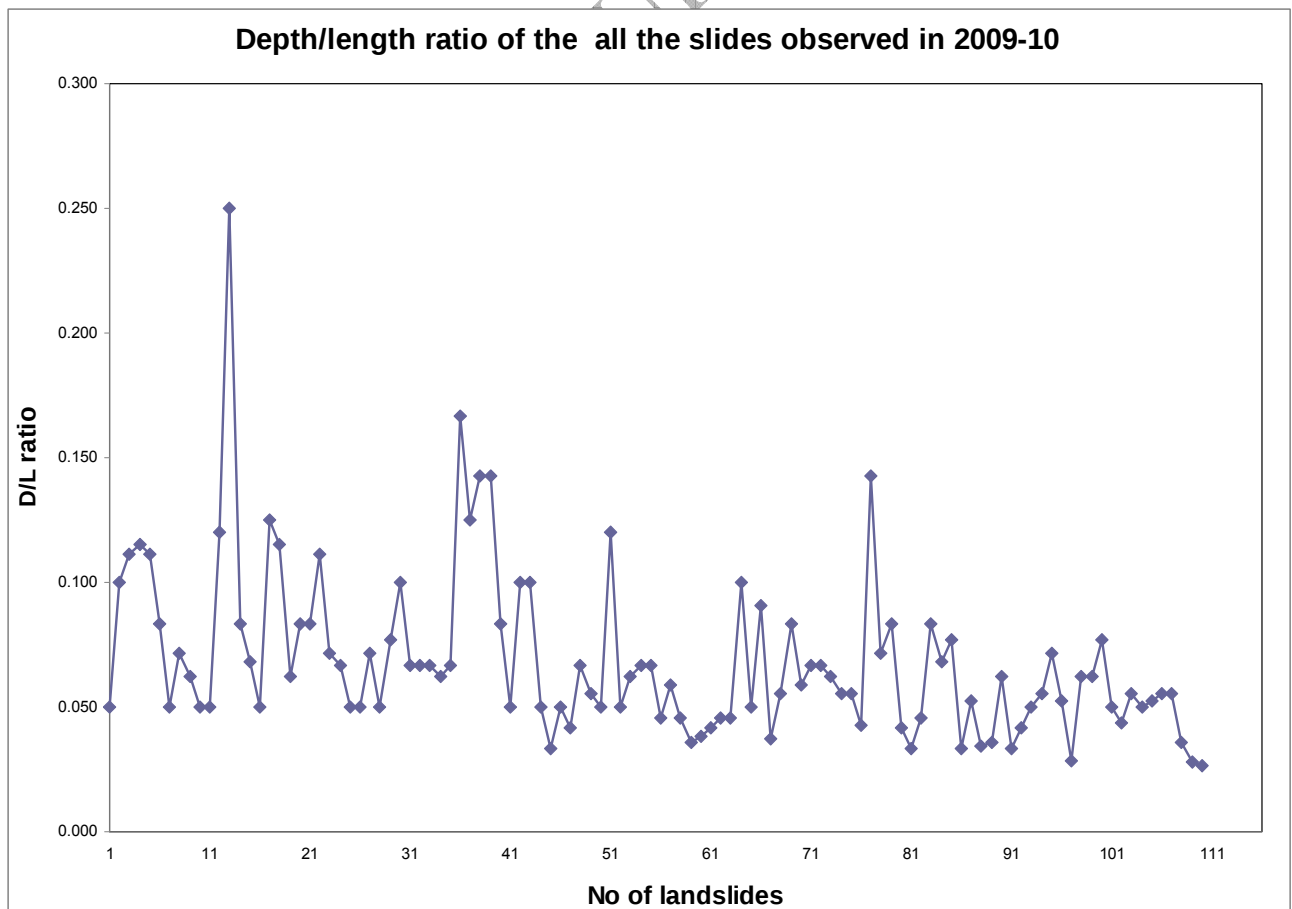
Bed rock Geology: The geology of the bed rock of the landslides observed in 2009-10 shows that majority of the landslides have occurred where bed rock is weathered granite or granite (59 slides or 53.64 % of the total). This is followed by weathered gneiss (50 slides or 45.45%) and a rock slide was noticed on basic dyke. (Table 12)

Table 12: Bed rock Geology of slides observed in 2009-10.

Bed rock geology	No of slides	%
Weathered Gneiss	50	45.45
Weathered Granite	55	50.00
Granite	04	3.64
Basic dyke	1	0.91
Total	110	100.00

IV. 4. Depth/length (D/L) ratio : The depth to Length ratio (D/L) for most of the slides fall in between 0.03 to 0.15 indicating shallow depth of the landslides. One slide in Charmudi ghat is a quite deep landslide with D/L ratio going beyond 0.2(Fig 3)

Fig 3: Depth/length ratio of all sides observed in 2009-10.



IV. 5. History of landslides: Due to the lack of data on the date of occurrence of landslides the age of landslide is difficult to arrive at, therefore history was taken on the morphological features observed on hill slopes. The landslides with fresh surface having less plant growth on debris categorized as new slides and rest are grouped as old slides. As regard to reactivated ones the old slides wherein new slides are developed are considered along with the slides wherein authorities have provided some remedial measures but still then failed are also grouped under reactivated ones.

Most of the landslides are grouped as new slides (76 slides or 69.09% of the total) followed by old slides (30 slides or 27.27% of the total) and reactivated slides (4 slides or 3.64% of the total). (Table 13)

Table 13: Number of landslides observed in 2009-10 according to their ages.

History of slides	No of slide	%
New	76	69.09
Old	30	27.27
Reactivated	4	3.64
Total	110	100.00

Table 14: Number of landslides in each section observed in 2009-10 according to their ages.

History of landslides	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karika	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
New	23	15	1	24	6	3	4
Old	5	10	0	9	0	2	4
Reactivated	1	1	1	1	0	0	0
Total	29	26	2	34	6	5	8

Table 15: Percentage distribution of landslides according to their ages in each section observed in 2009-10.

History of landslides	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karika	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
New	79.31	57.69	50.00	70.59	100.00	60.00	50.00
Old	17.24	38.46	0.00	26.47	0.00	40.00	50.00
Reactivated	3.45	3.85	50.00	2.94	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

History of slides in each road section reveals majority of new slides have occurred in Bhagamandala- Talcauvery section (6 slides or 100% of total slides in this section) closely followed by Charmudi ghat section (23 slides or 79.31% of total slides in this section). Old slides are mostly seen in around Madikeri section (10 slides or 38.46% of total slides in this section) and Bhagamandala-Karika section (9 slides or 26.47% of total slides in this section) (Table 14, 15).

IV. 6. Cut slope heights: Majority of the new slides observed in 2009-10 have cut slope heights ranging between 5 m and 15 m (87 slides or 79.1% of total slides) followed by <5 m cut slope height (14 slides or 12.73% of total slides) followed by cut slope heights >15m m to ≤ 20 m m (5 slides or 4.55% of total slides) and >20 m (4 slides or 3.64% of total slides)(Table 16, 17 and 18).

Table 17: number of landslides observed in 2009-10 in different cut slope height.

Cut slope Heights	No of slides	%
≤ 5 m	14	12.73
$>5\text{m}\leq 10\text{m}$	49	44.55
$>10\text{m}\leq 15\text{m}$	38	34.55
$>15\text{m}\leq 20\text{m}$	5	4.55
$>20\text{m}\leq 25\text{m}$	2	1.82
$>25\text{m}$	2	1.82
Total	110	100.00

Table 18: number of landslides in each section observed in 2009-10 in different cut slope height.

Cut slope heights	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karikeri	Bhagamandala-Talcauvery	Aldur-Balehoornur	Balehoornur-Koppa
≤ 5 m	3	11	0	0	0	0	0
$>5\text{m}\leq 10\text{m}$	17	10	0	13	5	3	1
$>10\text{m}\leq 15\text{m}$	9	5	2	14	0	2	6
$>15\text{m}\leq 20\text{m}$	0	0	0	3	1	0	1
$>20\leq 25\text{m}$	0	0	0	2	0	0	0
$>25\text{m}$	0	0	0	2	0	0	0
Total	29	26	2	34	6	5	8

Table 19: Percentage distribution of cut slope heights of slides in each section observed in 2009-10.

Cut slope heights	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karikeri	Bhagamandala-Talcauvery	Aldur-Balehoornur	Balehoornur-Koppa
≤ 5 m	10.34	42.31	0.00	0.00	0.00	0.00	0.00
$>5\text{m}\leq 10\text{m}$	58.62	38.46	0.00	38.24	83.33	60.00	12.50
$>10\text{m}\leq 15\text{m}$	31.03	19.23	100.00	41.18	0.00	40.00	75.00
$>15\text{m}\leq 20\text{m}$	0.00	0.00	0.00	8.82	16.67	0.00	12.50
$>20\leq 25\text{m}$	0.00	0.00	0.00	5.88	0.00	0.00	0.00
$>25\text{m}$	0.00	0.00	0.00	5.88	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

V. SUMMARY AND CONCLUSIONS

A) Landslides recorded along SH-64 between Chikmagalur district boundary-Beltangady road section: 29 landslides are recorded along 34 km stretch of this ghat section. The majority of slides were found to be debris slides and slumps caused mainly due to tampering of the natural slope for making road. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 35° . The slopes are moderately vegetated. The overburden thickness varies from 1-5m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m. The cut slopes have failed due to heavy rain in the Ghat section during monsoon. Geologically the area comprises of granite and gneisses.

B) Landslides recorded in and around Madikeri town along different SH and district roads: The different state highways connecting to Madikeri including SH-27 and major roads in and around Madikeri town were studied. 26 landslides are recorded in nearly 31 km stretch as whole. The majority of slides were found to be debris slides and slumps caused mainly due to tampering of the natural slope for making road and settlements. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 30° . The slopes are moderately vegetated. The overburden thickness is less than 5 m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m. The cut slopes have failed due to heavy rain during monsoon. Geologically the area comprises of weathered granite and gneisses.

C) Landslides recorded between Madikeri-Bhagamandala road section: 2 landslides are recorded along 26 km stretch of this ghat section. The slides were found to be debris slides caused mainly due to tampering of the natural slope for making road. Geologically the area comprises of weathered granite. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 30° . The slopes are moderately vegetated. The overburden thickness is less than 5 m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m.

D) Landslides recorded between Bhagamandala-Karika road section: 34 landslides are recorded along 40 km stretch of this ghat section. The majority of slides were found to be debris slides and slumps caused mainly due to tampering of the natural slope for making road. Geologically the area comprises of weathered granite, granite and gneisses. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 30° . The slopes are thickly vegetated. The overburden thickness is less than 5 m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m. The vertical cut slopes for making road have increased the instability of the hill slopes. The loose and non-cohesive material formed due to prolonged weathering failed due to increase in pore water pressure during heavy rain in monsoon experienced in the Ghat section.

E) Landslides recorded between Bhagamandala to Talcavery road section: 6 landslides are recorded along 8 km stretch of this ghat section. The majority of slides were found to be debris slides and slumps caused mainly due to tampering of the natural slope for making road. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 30°. The slopes are moderately vegetated. The overburden thickness is less than 5 m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m. The cut slopes have failed due to heavy rain in the Ghat section during monsoon. Geologically the area comprises of weathered granite and gneisses.

F) Landslides along SH-27 Aldur-Balehonnur road section: 5 landslides are recorded along 35 km stretch of this ghat section. The majority of slides were found to be debris slides and slumps caused mainly due to tampering of the natural slope for making road. one rock slide was also found. Geologically the area comprises of weathered granite. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 30°. The slopes are thickly vegetated mainly tea and coffee plantations. The overburden thickness is less than 5 m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m. The vertical cut slopes for making road have increased the instability of the hill slopes. The loose and non-cohesive material formed due to prolonged weathering failed due to increase in pore water pressure during heavy rain in monsoon experienced in the Ghat section.

G) Landslides along SH-27 Balehonnur-Koppa road section: 8 landslides are recorded along 30 km stretch of this ghat section. The majority of slides were found to be debris slides and slumps caused mainly due to tampering of the natural slope for making road. Two composite slides were also found. Geologically the area comprises of weathered granite. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 30°. The slopes are thickly vegetated mainly tea and coffee plantations. The overburden thickness is less than 5 m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m. The vertical cut slopes for making road have increased the instability of the hill slopes. The loose and non-cohesive material formed due to prolonged weathering failed due to increase in pore water pressure during heavy rain in monsoon experienced in the Ghat section.

CONCLUSIONS

1. All slides studied were caused due to the human interference with the natural slopes. The main causes of landslides in Western Ghat are toe cutting of hill slopes for the construction of road, modification for human settlement, highly weathered rock mass and frequent rain.
2. All slides are triggered by heavy rainfall mainly in rainy seasons extending for 4 months from May to August. The ubiquitous presence of water is favorable for intense weathering of rocks causing appreciable drop in their shearing resistance. The heavy rainfall during monsoon is the major trigger for all the slides.

3. Majority of the slides observed in 2009-10 are debris slides (60 landslides or 54.55% of the total) followed by slumps, including both debris slump and earth slumps (42 landslides or 38.18% of the total). Debris slides were mainly noticed in and around Madikeri town wherein for human settlement construction purpose huge cutting of slopes were made in an unscientific way. Debris slides were also noticed in higher number in Charmudi ghat road section and Madikeri-Karikeri road section where cut slope height is relatively higher than rest of the sections we can see the dominance of debris slides. Similarly small cut slope height and almost vertical to sub vertical slope angle may be attributed for occurrence of debris slump and earth slumps.
4. Majority of the slides are small in dimension viz., 94.55%, 85.45% of the slides observed were having less than 30 m in length, width respectively. Interesting to notice that almost all slides are shallow depth with less than 2m. The width of the slides vary between a long ranges because of the fact that multiple source, lateral grading of slides and slides are juxtaposed and difficult to delimit.
5. Majority of the landslides have occurred where bed rock is weathered granite or granite (59 slides or 53.64 % of the total). This is followed by weathered gneiss (50 slides or 45.45%) and a rock slide was noticed on basic dyke.
6. Majority of the slides have cut slope heights ranging between $>5\text{m}$ to $\leq 15\text{ m}$ (87 slides, 79.1% of total slides) with nearly vertical slope angle.
7. Majority of the slides falls in new slide category (76 slides or 69.09% of the total) followed by old slides (30 slides or 27.27% of the total) and reactivated slides (4 slides or 3.64% of the total).
8. The depth to length ratio (D/L) for all the slides show that most of the slides fall in between 0.03 to 0.15 indicating shallow depth of the landslides. One slide in Charmudi ghat is a quite deep landslide with D/L ratio going beyond 0.2.
9. The convex slopes were found to be more prone /susceptible to sliding than the concave and irregular slopes. Therefore cut slopes should be made as a plane or with a little concavity with the top edge a plane at an angle less than the over angle of concavity.
10. Cut slope angle and height plays a major role in landsliding. Prograding of the slide is more towards both the flanks rather than towards back of the crown.
11. Overburden thickness is around 4-5m consisting of mostly soil and weathered rocks.

VI. RECCOMENDATIONS

- 1 Management of drainages is not properly carried out in the study area. Blockage of drainage is observed in 60% of the slided area. Water from up hill slope may be diverted in the following ways in order to minimize sliding.
 - i. Provision of contour drainage above the crown of landslides,
 - ii. Catch water drains in the sections,
 - iii. Insertion of horizontal perforated pipes into the slopes which will act as weep holes in the vertical slopes, thus reducing the pore pressure by draining out the excess water. This has to be given at suitable interval as per the site condition.

2. Vertical cut slopes should be avoided in future as it does not give stability in such terrain.
3. Retaining structures like retaining wall, stone pitching and gabions are recommended as per the site condition.
4. Efforts should be made to make it mandatory for the district authorities to provide each and every landslide details to GSI in the provided format.
5. The date of occurrence of slide and rainfall data to be provided by the dist. authority.

Sd/- (K.V.MARUTHI) Senior Geologist	Sd/- (A.K.MISHRA) Senior Geologist
SCRUTINIZED BY Sd/- (Dr. S.S.NAYAK) Director	

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SYNOPSIS OF WORK DONE

1.	Title of the report	A REPORT ON LANDSLIDE INVENTORY ALONG NH & SH OF GHAT ROADS IN CHIKMAGLUR, COORG, DAKSHINA KANNADA, UDUPI AND SHIMOGA DISTRICTS KARNATAKA		
2.	Item No.	EG/SR/KG/2009/043		
3	Field Season	2009-10		
4	Date of commencement	October 2009		
5	Date of completion	September 2010		
6	Officers Associated with investigation and No. of days spent in the field	K.V.MARUTHI, SENIOR GEOLOGIST A.K.MISHRA, SENIOR GEOLOGIST		
7	Quantum of work done			
	Nature of Work	Total work envisaged	Work proposed for FS: 2008-09	Work completed
	Aerial photo/ High resolution image interpretation and checking of incidences given by state governments and other incidences enroute.	200 L km	200 L km	204 L km (110 incidences)
8	Expenditure (1) POL (2) Wages (3) Misc.	Rs.13,925=00 Rs. 3633=92 Rs. 5910=00		
9	Other information if any	----		

Sd/- (K.V.MARUTHI) Senior Geologist	Sd/- (A.K.MISHRA) Senior Geologist
Sd/- (Dr. S.S.NAYAK) Director	

Slide No	Slide No	Location	Toposheet no	Latitude			Longitude			ELEVATION (M)	Taluk	District	State	Landmarks	Date of occurrence	Time of occurrence	Dimension of slide			Base length (Toe length)
				degree	Min	Sec	Deg	Min	Sec								Length (in m)	Width (in m)	Depth(in m)	

GEOLOGICAL SURVEY OF INDIA

Type of slide	History	Overburden		Material involved	Depth of weathering	Volume of material(cu m)
		Type	depth			

GEOLOGICAL SURVEY OF INDIA

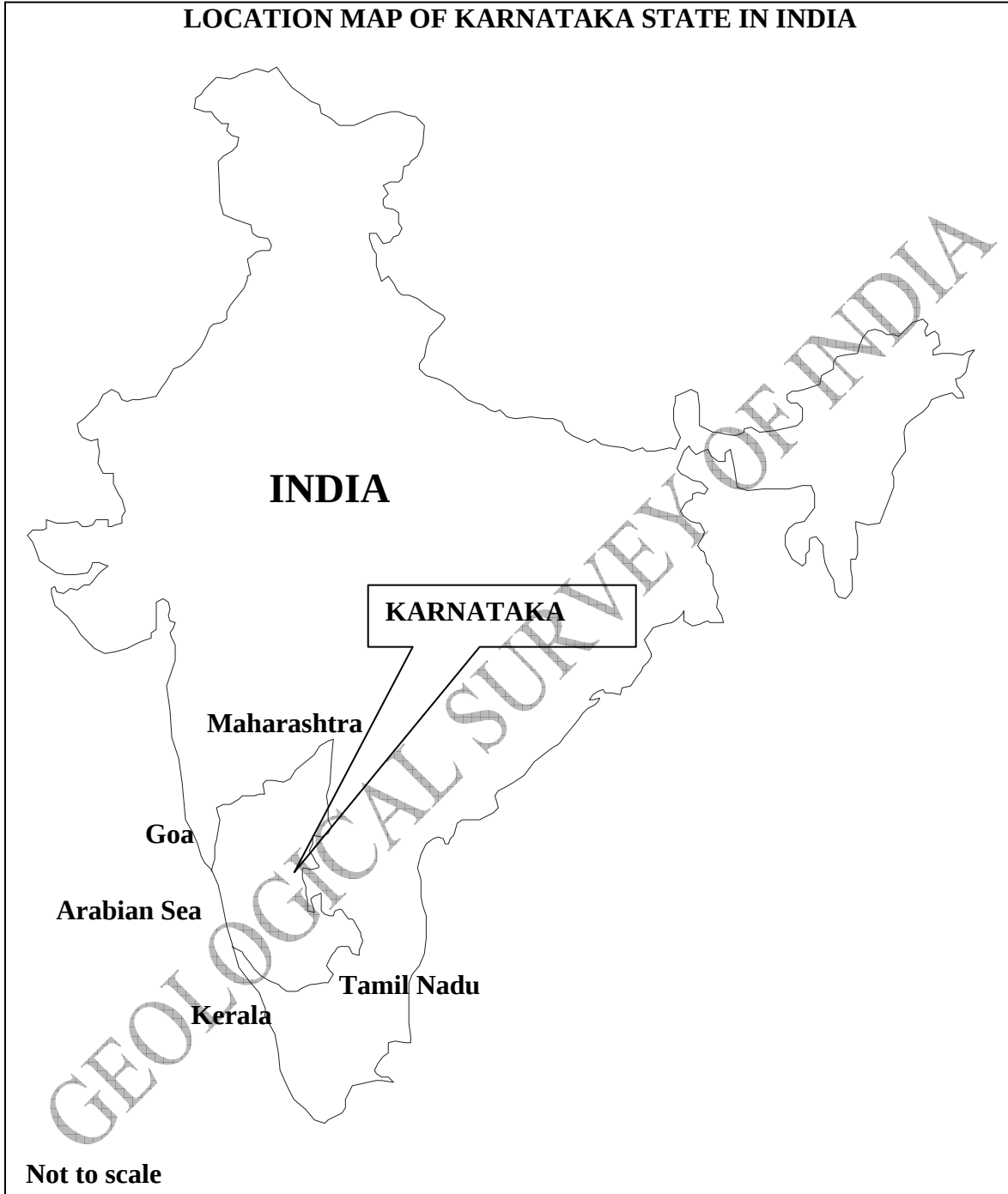
whether road	Structures	Run out	Up to	Casualties	Rainfall	Type of	Local geology	Regional	Structure				Cutslope	Type of failure	Slope morphometry				Repose angle
cutting	affected	Distance(m)	Location			Bedrock		geology	Joint orientation	spacing	opening	filling	height	surface	Slope pre failure	Slope post failure	Slide Direction	General slope gradient	

GEOLOGICAL SURVEY OF INDIA

Failure angle	horizontal extent	vertical interval

GEOLOGICAL SURVEY OF INDIA

LOCATION MAP OF KARNATAKA STATE IN INDIA



III. 6. Landslides along SH-27 Aldur-Balehonnur road section

SLIDE NO: KA-376

LOCATION: The slide is located at latitude 13° 16' 13.7" N and longitude 75° 37' 26.3" E in Survey of India toposheet No 48 O/11 along SH-27 between Aldur-Balehonnur road section, Mudigere Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >6.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 3.0 m and vertical interval of 8.0 m (Photo 112).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 8.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 10.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 20.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 10.0m/ SH-27 |
| i. Cut slope Height | : | 7.0 m |
| j. Direction of slide | : | N25°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Old slide almost stabilised.

SLIDE NO: KA-377

LOCATION: The slide is located at latitude 13° 16' 15.5" N and longitude 75° 37' 21.5" E in Survey of India toposheet No 48 O/11 along SH-27 between Aldur-Balehonnur road section (200 m from slide no KA-376 towards Balehonnur), Mudigere Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >6.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 113).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 8.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 24.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 48.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 10.0m/ SH-27 |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N25°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Old slide almost stabilised. Slide on the bend of the road, removal of debris with slope easening is recommended to arrest reactivation.

SLIDE NO: KA-378

LOCATION: The slide is located at latitude 13° 16' 18.9" N and longitude 75° 37' 25.9" E in Survey of India toposheet No 48 O/11 along SH-27 between Aldur-Balehonnur road section (300 m from slide no KA-377 towards Balehonnur), Mudigere Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is >8.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 14.0 m (Photo 114).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 13.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 22.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 143.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 15.0m/ SH-27 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N35°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECOMMENDATION: Removal of debris material, proper drainage and slope grading/slope easening are recommended.

SLIDE NO: KA-379

LOCATION: The slide is located at latitude 13° 16' 20.1" N and longitude 75° 37' 24.8" E in Survey of India toposheet No 48 O/11 along SH-27 between Aldur-Balehonnur road section (50 m from slide no KA-378 towards Balehonnur), Mudigere Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new rock slide. The debris consists of rock fragments mainly weathered granitic material. Two sets of joints are noticed J1- EW/46°NE with 10-15 cm spacing and is tight and J2- N55°W/vertical with 10-50 cm spacing and is tight. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown part of the slide is stable and head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 8.0 m (Photo 115).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 19.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 47.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 12.0m/ SH-27 |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Removal of debris material, proper drainage and slope grading/slope easening are recommended.

SLIDE NO: KA-380

LOCATION: The slide is located at latitude 13° 16' 10.2" N and longitude 75° 36' 59.7" E in Survey of India toposheet No 48 O/11 along SH-27 between Aldur-Balehonnur road section (1 km from slide no KA-379 towards Balehonnur), Mudigere Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. Three slides adjacent to each other taken as one slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 25.0 m (Photo 116 and 117).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 23.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 58.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 667.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 26.0m/ SH-27 |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N40°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Removal of debris material, proper drainage and slope grading/slope easening are recommended.

III.2. Landslides recorded in and around Madikeri town along different SH and district roads

SLIDE NO: KA-308

LOCATION: The slide is located at latitude 12° 24' 43.3" N and longitude 75° 44' 51.5" E in Survey of India toposheet No 48 P/11 in Mangaladevi nagar, Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during June-2007. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. Construction of houses/settlements is the main land use. Circular crown cracks are noticed which are 5-10 cm in length, 10-20 cm opening and having radial pattern. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 35).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 40.0 m ³ |
| e. Slope angle post failure | : | 45° |
| f. Slope angle pre failure | : | 70° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | S50°E |

CAUSES: Human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main cause for the slide.

NATURE OF DAMAGE: Settlements in Mangaladevi nagar affected.

RECCOMENDATION: The debris should be removed from the slided zone. Retaining wall should be provided as no space is available between the slope and the houses (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-309

LOCATION: The slide is located at latitude 12° 24' 43.7" N and longitude 75° 44' 49.6" E in Survey of India toposheet No 48 P/11 in Mangaladevi nagar, Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during July-2007. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. Construction of houses/settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 36).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 30.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 2.0 m |
| d. Volume of failed mass above the failure surface | : | 240.0 m ³ |
| e. Slope angle post failure | : | 45° |
| f. Slope angle pre failure | : | 70° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 6.0 m |
| j. Direction of slide | : | N55°W |

CAUSES: Effect of human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main causes for the slide.

NATURE OF DAMAGE: This slide occurred in the northern end of the spur trending N55°E-S55°W in the left bank slope without causing any damage to structure.

RECCOMENDATION: The debris should be removed from the slided zone (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-310

LOCATION: The slide is located at latitude 12° 24' 43.5" N and longitude 75° 44' 50.7" E in Survey of India toposheet No 48 P/11 in Mangaladevi nagar, Madikeri town, Madikeri Taluk, Coorg district (The slide occurred in the left side slope of the valley in the N55°E trending hillock. The slided debris consisting of earlier dumped material in the slope slid along the narrow gap between the two houses in the valley floor.)

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during June-2007. The slided debris consisting of earlier dumped material in the slope. The slided area has an overburden thickness of nearly 2.0 m. Construction of houses/settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 37).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 40.0 m ³ |
| e. Slope angle post failure | : | 45° |
| f. Slope angle pre failure | : | 70° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | S50°E |

CAUSES: Human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main causes for the slide.

NATURE OF DAMAGE: No major structures affected.

RECCOMENDATION: The debris should be removed from the slided zone (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-311

LOCATION: The slide is located at latitude 12° 24' 44.5" N and longitude 75° 44' 54.0" E in Survey of India toposheet No 48 P/11 in Mangaladevi nagar, Madikeri town, Madikeri Taluk, Coorg district . The slide is located in the left bank slope of the valley of the spur trending N85E.

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during July-2007. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. Construction of houses/settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The boundary wall and pavement of the house constructed in the hill top located at the edge of the slope facing the valley slid down slope. The 15 cm vertical displacement of the crack in the intact boundary wall indicates that the slope to be still unstable and further movement is expected (Photo 38).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|------------------------|
| a. Length of failed mass from crown to foot | : 30.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 2.0 m |
| d. Volume of failed mass above the failure surface | : 240.0 m ³ |
| e. Slope angle post failure | : 45° |
| f. Slope angle pre failure | : 70° |
| g. General slope gradient | : 30° |
| h. Run out distance / up to | : -/- |
| i. Cut slope Height | : 5.0 m |
| j. Direction of slide | : N55°W |

CAUSES: Human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main cause for the slide.

NATURE OF DAMAGE: Boundary wall and pavement of the house constructed in the hill top located at the edge of the slope are damaged.

RECCOMENDATION: The debris should be removed from the slided zone with proper drainage (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-312

LOCATION: The slide is located at latitude 12° 24' 44.5" N and longitude 75° 44' 54.0" E in Survey of India toposheet No 48 P/11 in Mangaladevi nagar, Madikeri town, Madikeri Taluk, Coorg district . The slide is located nearly 100 m west of slide no KA-311 in the same area. The debris material from below the foundation of the house in the top of the hillock slid down slope damaging one house in flow path.

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during July-2007. The debris consists of rock fragments, clay and weathered granitic material. The crown cracks with >5 cm opening are observed on the ground indicating persisting instability .The slid area has an overburden thickness of nearly 1.0 m. The depth of weathering is 5.0 m. Construction of houses/settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 39).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|------------------------|
| a. Length of failed mass from crown to foot | : 32.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 9.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 2.0 m |
| d. Volume of failed mass above the failure surface | : 288.0 m ³ |
| e. Slope angle post failure | : 45° |
| f. Slope angle pre failure | : 70° |
| g. General slope gradient | : 30° |
| h. Run out distance / up to | : -/- |
| i. Cut slope Height | : 5.0 m |
| j. Direction of slide | : N45°W |

CAUSES: Human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Settlements in Mangaladevi nagar affected.

RECCOMENDATION: Both the houses have to be vacated. The dumped material in the slopes should be removed as the lower contours have many houses (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-313

LOCATION: The slide is located at latitude 12° 24' 44.5" N and longitude 75° 44' 54.0" E in Survey of India toposheet No 48 P/11 in Mangaladevi nagar, Madikeri town, Madikeri Taluk, Coorg district . The slide occurred in the right bank slope of the valley of the spur trending N85°E.

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during July-2007. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is 5.0 m. Construction of houses/settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 40).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 30.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 9.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 2.0 m |
| d. Volume of failed mass above the failure surface | : | 270.0 m ³ |
| e. Slope angle post failure | : | 45° |
| f. Slope angle pre failure | : | 70° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | N52°E |

CAUSES: Human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main cause for the slide.

NATURE OF DAMAGE: No damage to structures caused by the slide.

RECCOMENDATION: Removal of slided material and provision of proper drainage are recommended (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-314

LOCATION: The slide is located at latitude 12° 25' 10.7" N and longitude 75° 43' 41.5" E in Survey of India toposheet No 48 P/11 in Jyothinagar (sloping depression nala section at Jyothinagar), Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during July-2007. The debris consists of rock fragments, clay and weathered granitic material. The slided debris moved nearly 30 m down the slope without damaging two houses near the left bank of the nala no other structure is seen in the slide zone. This slide is vulnerable for further prograding as huge crack has developed with 30-50 cm horizontal a 30cm-1m vertical displacement. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of houses/settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 41).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 12.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 2.0 m |
| d. Volume of failed mass above the failure surface | : | 96.0 m ³ |
| e. Slope angle post failure | : | 60° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | N52°E |

CAUSES: Human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main cause for the slide.

NATURE OF DAMAGE: No damage to structures caused by the slide.

RECCOMENDATION: Removal of slided material and proper drainage are recommended and the slope should be left as it is and in future no construction should be allowed (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-315

LOCATION: The slide is located at latitude 12° 25' 42.3" N and longitude 75° 42' 56.2" E in Survey of India toposheet No 48 P/11 in Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of local road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 42).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 8.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 16.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 64.0 m ³ |
| e. Slope angle post failure | : | 60° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N49°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local road is affected.

RECCOMENDATION: Removal of debris and slope easening are recommended.

SLIDE NO: KA-316

LOCATION: The slide is located at latitude 12° 25' 35.2" N and longitude 75° 43' 8.0" E in Survey of India toposheet No 48 P/11 in Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.5 m. The depth of weathering is >10.0 m. Construction of local road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 43).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 7.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 28.0 m ³ |
| e. Slope angle post failure | : | 65° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 7.0m/local road |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N20°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local road is affected.

RECCOMENDATION: Removal of debris and slope easening are recommended.

SLIDE NO: KA-317

LOCATION: The slide is located at latitude 12° 25' 31.7" N and longitude 75° 43' 17.6" E in Survey of India toposheet No 48 P/11 in Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of local road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 44).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 7.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 10.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 35.0 m ³ |
| e. Slope angle post failure | : | 60° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 7.0m/local road |
| i. Cut slope Height | : | 6.0 m |
| j. Direction of slide | : | N16°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local road is affected.

RECOMMENDATION: Removal of debris and slope easening are recommended.

SLIDE NO: KA-318

LOCATION: The slide is located at latitude 12° 25' 0.4" N and longitude 75° 43' 51.5" E in Survey of India toposheet No 48 P/11 in Indiranagar Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. The Construction settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 45).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--------------------|
| a. Length of failed mass from crown to foot | : | 6.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 6.4 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 9.6 m ³ |
| e. Slope angle post failure | : | 85° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 80° |
| h. Run out distance / up to | : | 10.0m/local house |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of settlements and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local house is affected.

RECCOMENDATION: Proper drainage and slope easening are recommended. Removal of polythene sheet spread over the slide material is suggested as it may reactivate the slide as there is no proper drainage.

SLIDE NO: KA-319

LOCATION: The slide is located at latitude 12° 25' 0.7" N and longitude 75° 43' 57.7" E in Survey of India toposheet No 48 P/11 in Indiranagar Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. Three sets of Joints are noticed J1- N30°W/16°NE with 5-6 cm spacing and is tight, J2- N50°W/76°NE with 30 cm spacing and is tight(day lighted plane) and J3- N18°E/81°W with 1 m spacing and is tight. The depth of weathering is >10.0 m. Construction settlements and local road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 46).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 20.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 60° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 13.0 m |
| j. Direction of slide | : | S25°W |

CAUSES: Human interference by cutting of the slope for construction of settlements/road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local house/road was affected.

RECCOMENDATION: Old slump almost stabilised.

SLIDE NO: KA-320

LOCATION: The slide is located at latitude 12° 24' 55.6" N and longitude 75° 44' 3.7" E in Survey of India toposheet No 48 P/11 in Indiranagar Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. One set of joints is noticed N10°E/66°E with 3 cm spacing and is tight. The depth of weathering is >10.0 m. Construction settlements and local road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 47).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 5.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 9.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 11.3 m ³ |
| e. Slope angle post failure | : | 60° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 50° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | S55°W |

CAUSES: Human interference by cutting of the slope for construction of settlements/road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local house/road was affected.

RECCOMENDATION: Slope easening is recommended.

SLIDE NO: KA-321

LOCATION: The slide is located at latitude 12° 24' 51.4" N and longitude 75° 44' 0.9" E in Survey of India toposheet No 48 P/11 in Indiranagar Madikeri town, Madikeri Taluk, Coorg district

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during June-2007. The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 1.0 m. The depth of weathering is > 10.0 m. Construction settlement is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 48).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 20.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 18.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 2.0 m |
| d. Volume of failed mass above the failure surface | : | 360.0 m ³ |
| e. Slope angle post failure | : | 65° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | N85°W |

CAUSES: Human interference by cutting of the slope for construction of settlements/road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local houses/road was affected.

RECCOMENDATION: The ground fissures are to be covered with polythene to avoid the percolation of surface water and the debris has to be removed from the slope and the slope to be graded or terraced. Long term preventive measures include construction of retaining structures at the base of the vertical cuts and providing proper drainage system in the area to divert the surface water (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-322

LOCATION: The slide is located at latitude 12° 25' 7.7" N and longitude 75° 42' 59.6" E in Survey of India toposheet No 48 P/11 , 500 mts from Madikeri town on Madikeri-Kushalnagar SH-88 road, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is >10.0 m. The Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 49).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 11.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 27.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 11.0m/SH-88 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | Towards N |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: SH-88 road was affected.

RECCOMENDATION: Slope easening is recommended.

SLIDE NO: KA-323

LOCATION: The slide is located at latitude 12° 25' 50.2" N and longitude 75° 45' 26.6" E in Survey of India toposheet No 48 P/15 on Madikeri-Kushalnagar SH-88 road, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 12.0 m (Photo 50).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 15.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 52.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 12.0m/SH-88 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N12°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: SH-88 road was affected.

RECCOMENDATION: Slope easening is recommended.

SLIDE NO: KA-324

LOCATION: The slide is located at latitude 12° 25' 45.4" N and longitude 75° 46' 45.2" E in Survey of India toposheet No 48 P/15 on Madikeri-Kushalnagar SH-88 road, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is >10.0 m. The Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 8.0 m (Photo 51).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 12.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 30.0 m ³ |
| e. Slope angle post failure | : | 65° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 14.0m/SH-88 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N50°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: SH-88 road was affected.

RECCOMENDATION: Slope easening is recommended.

SLIDE NO: KA-325

LOCATION: The slide is located at latitude 12° 26' 11.3" N and longitude 75° 46' 45.2" E in Survey of India toposheet No 48 P/11 on Madikeri-Abbefalls road, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slump. Multiple slide may prograded laterally. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 10.0 m (Photo 52).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---------------------------------------|
| a. | Length of failed mass from crown to foot | : | 12.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 25.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 75.0 m ³ |
| e. | Slope angle post failure | : | 70° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 12.0m/
Madikeri-
Abbefalls road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Madikeri-Abbefalls road affected.

RECCOMENDATION: Slope easening is recommended.

SLIDE NO: KA-326

LOCATION: The slide is located at latitude 12° 26' 12.4" N and longitude 75° 44' 2.0" E in Survey of India toposheet No 48 P/11 on Madikeri-Abbefalls road, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as an old and reactivated debris slump. Multiple slide may prograded laterally. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 12.0 m (Photo 53).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---------------------------------------|
| a. | Length of failed mass from crown to foot | : | 15.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 105.0 m ³ |
| e. | Slope angle post failure | : | 70° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 12.0m/
Madikeri-
Abbefalls road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Madikeri-Abbefalls road affected.

RECCOMENDATION: Grading of slope/slope easening is recommended as slide is old one which is reactivated and may prograde laterally. Proper drainage is also to be provided.

SLIDE NO: KA-327

LOCATION: The slide is located at latitude 12° 26' 49.2" N and longitude 75° 42' 51.4" E in Survey of India toposheet No 48 P/11 on Madikeri-Galibeedu road, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 10.0 m (Photo 54).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------------------------|
| a. Length of failed mass from crown to foot | : | 18.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 15.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 135.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 20.0m/
Madikeri-
Galibeedu road |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N62°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Madikeri- Galibeedu road affected.

RECCOMENDATION: Grading of slope/slope easening, plantation on the slope and proper drainage are recommended.

SLIDE NO: KA-328

LOCATION: The slide is located at latitude 12° 26' 42.2" N and longitude 75° 44' 7.4" E in Survey of India toposheet No 48 P/11 on Madikeri-Galibeedu road(50m before Abbefalls cross road), Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 8.0 m (Photo 55).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 20.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 11.0m/
Madikeri-
Abbefalls road |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N10°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Madikeri- Abbefalls road affected.

RECCOMENDATION: Grading of slope/slope easening, plantation on the slope and proper drainage are recommended.

SLIDE NO: KA-329

LOCATION: The slide is located at latitude 12° 26' 42.7" N and longitude 75° 44' 13.0" E in Survey of India toposheet No 48 P/11 on Madikeri-Galibeedu road (200m from slide no KA-328), Madikeri Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The slide scarp is 3 m in height and is vertical. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 7.0 m and vertical interval of 10.0 m (Photo 56).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---------------------------------------|
| a. | Length of failed mass from crown to foot | : | 25.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 3.0 m |
| d. | Volume of failed mass above the failure surface | : | 525.0 m ³ |
| e. | Slope angle post failure | : | 70° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 30° |
| h. | Run out distance / up to | : | 50.0m/
Madikeri-
Abbefalls road |
| i. | Cut slope Height | : | 5.0 m |
| j. | Direction of slide | : | N20°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Madikeri- Abbefalls road affected.

RECCOMENDATION: Grading of slope/slope easening, removal of debris material and proper drainage are recommended.

SLIDE NO: KA-330

LOCATION: The slide is located at latitude 12° 26' 43.6" N and longitude 75° 44' 15.4" E in Survey of India toposheet No 48 P/11 on minor road near Madikeri-Abbefalls road (500m from slide no KA-329), Madikeri Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay. The slided area has an overburden thickness of nearly 4.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 5.0 m (Photo 57).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 10.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 25.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 62.5 m ³ |
| e. | Slope angle post failure | : | 45° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 30° |
| h. | Run out distance / up to | : | 12.0m/ minor road near Madikeri-Abbefalls road |
| i. | Cut slope Height | : | 5.0 m |
| j. | Direction of slide | : | N10°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Minor road near Madikeri-Abbefalls road affected.

RECCOMENDATION: Grading of slope/slope easening, removal of debris material and proper drainage are recommended.

SLIDE NO: KA-331

LOCATION: The slide is located at latitude 12° 26' 43.6" N and longitude 75° 44' 15.4" E in Survey of India toposheet No 48 P/11 on minor road near Madikeri-Abbefalls road (Near slide no KA-330), Madikeri Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay. The slided area has an overburden thickness of nearly 0.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 8.0 m (Photo 58).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 8.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 11.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 22.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 30° |
| h. | Run out distance / up to | : | 10.0m/ minor road near Madikeri-Abbefalls road |
| i. | Cut slope Height | : | 4.0 m |
| j. | Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide and saturation of strata.

NATURE OF DAMAGE: Minor road near Madikeri-Abbefalls road affected.

RECCOMENDATION: Grading of slope/slope easening, removal of debris material and proper drainage are recommended.

SLIDE NO: KA-332

LOCATION: The slide is located at latitude 12° 27' 45.6" N and longitude 75° 45' 47.7" E in Survey of India toposheet No 48 P/15 on local road near Makundur west of Madikeri town, Madikeri Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay. The slid area has an overburden thickness of nearly 0.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 10.0 m (Photo 59).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---------------------------------|
| a. | Length of failed mass from crown to foot | : | 15.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 25.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 187.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 20° |
| h. | Run out distance / up to | : | 15.0m/ local road near Makundur |
| i. | Cut slope Height | : | 4.0 m |
| j. | Direction of slide | : | N75°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide and saturation of strata.

NATURE OF DAMAGE: local road near Makundur affected.

RECCOMENDATION: Grading of slope/slope easening, removal of debris material and proper drainage are recommended.

SLIDE NO: KA-333

LOCATION: The slide is located at latitude 12° 28' 50.3" N and longitude 75° 45' 31.9" E in Survey of India toposheet No 48 P/15 on local road near Makundur west of Madikeri town, Madikeri Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay. The slided area has an overburden thickness of nearly 0.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 60).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---------------------------------|
| a. | Length of failed mass from crown to foot | : | 15.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 17.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 127.5 m ³ |
| e. | Slope angle post failure | : | 65° |
| f. | Slope angle pre failure | : | 70° |
| g. | General slope gradient | : | 30° |
| h. | Run out distance / up to | : | 12.0m/ local road near Makundur |
| i. | Cut slope Height | : | 11.0 m |
| j. | Direction of slide | : | N70°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide and saturation of strata.

NATURE OF DAMAGE: local road near Makundur affected.

RECCOMENDATION: Grading of slope/slope easening, removal of debris material and proper drainage are recommended.

III. 7. Landslides along SH-27 Balehonnur-Koppa road section

SLIDE NO: KA-381

LOCATION: The slide is located at latitude 13° 22' 41.2" N and longitude 75° 23' 37.5" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section, Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 2.0 m and vertical interval of 11.0 m (Photo 118).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 9.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 20.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 45.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 10.0m/ SH-27 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N45°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Old slide almost stabilised. Removal of fallen debris to arrest any reactivation.

SLIDE NO: KA-382

LOCATION: The slide is located at latitude 13° 22' 45.2" N and longitude 75° 23' 35.4" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (50 m from slide no KA-381 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new composite slide (half debris half rock, left side debris right side rock). The debris consists of rock fragments, clay and weathered granitic material. Three sets of joints are noticed J1- N30°E/85°NE with 2-30 cm spacing and is tight, J2- N45°W/78°NE with 30 cm spacing and is tight and J3- N20°E/Horizontal which is foliation plane also. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown part of the slide is stable where as head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 12.0 m (Photo 119).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 32.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 80.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 12.0m/ SH-27 |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | N55°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Nala is flowing right in the middle of the slide. Proper drainage and slope modification/ slope easening are recommended.

SLIDE NO: KA-383

LOCATION: The slide is located at latitude 13° 22' 55.4" N and longitude 75° 23' 7.1" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (1 km from slide no KA-382 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 3.0 m and vertical interval of 21.0 m (Photo 120).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|------------------------|
| a. Length of failed mass from crown to foot | : 19.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 34.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 1.0 m |
| d. Volume of failed mass above the failure surface | : 323.0 m ³ |
| e. Slope angle post failure | : 65° |
| f. Slope angle pre failure | : 70° |
| g. General slope gradient | : 20° |
| h. Run out distance / up to | : 22.0m/ SH-27 |
| i. Cut slope Height | : 14.0 m |
| j. Direction of slide | : N10°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Old slide almost stabilised. Tea plantations are seen on debris. Proper drainage and slope modification/ slope easening are recommended for arresting reactivation.

SLIDE NO: KA-384

LOCATION: The slide is located at latitude 13° 23' 27.4" N and longitude 75° 22' 47.9" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (2 km from slide no KA-383 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 4.0 m and vertical interval of 34.0 m (Photo 121).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|------------------------|
| a. Length of failed mass from crown to foot | : 18.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 32.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 1.0 m |
| d. Volume of failed mass above the failure surface | : 288.0 m ³ |
| e. Slope angle post failure | : 75° |
| f. Slope angle pre failure | : 80° |
| g. General slope gradient | : 25° |
| h. Run out distance / up to | : 20.0m/ SH-27 |
| i. Cut slope Height | : 15.0 m |
| j. Direction of slide | : Towards W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Old slide stabilised. Plants growth seen on debris.

SLIDE NO: KA-385

LOCATION: The slide is located at latitude 13° 23' 56.7" N and longitude 75° 22' 24.2" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (2 km from slide no KA-384 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as an old composite slide (half debris half rock slide, left side debris right side rock). The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 2.0 m and vertical interval of 19.0 m (Photo 122).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 18.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 17.5 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 157.5 m ³ |
| e. Slope angle post failure | : | 75° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 20.0m/ SH-27 |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N85°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Proper drainage and slope modification/ slope easening are recommended.

SLIDE NO: KA-386

LOCATION: The slide is located at latitude 13° 23' 51.1" N and longitude 75° 22' 23.2" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (50m from slide no KA-385 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >12.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 30.0 m (Photo 123 and 124).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 28.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 196.0 m ³ |
| e. | Slope angle post failure | : | 70° |
| f. | Slope angle pre failure | : | 80° |
| g. | General slope gradient | : | 20° |
| h. | Run out distance / up to | : | 35.0m/ SH-27(debris fallen on road has been removed) |
| i. | Cut slope Height | : | 16.0 m |
| j. | Direction of slide | : | N35°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Debris flown up to road. Removal of debris, slope grading/ slope easening, proper drainage are recommended. Slide may prograde laterally.

SLIDE NO: KA-387

LOCATION: The slide is located at latitude 13° 27' 37.0" N and longitude 75° 20' 32.7" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (2 km from slide no KA-386 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown part of the slide is stable where as head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 20.0 m (Photo 125).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 18.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 24.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 108.0 m ³ |
| e. Slope angle post failure | : | 75° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 20.0m/ SH-27 |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N75°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Slope modification/ slope easening with proper drainage and removal of debris are recommended.

SLIDE NO: KA-388

LOCATION: The slide is located at latitude 13° 27' 35.2" N and longitude 75° 20' 32.3" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (50 m from slide no KA-387 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown part of the slide is stable where as head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 20.0 m (Photo 126).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 19.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 142.5 m ³ |
| e. Slope angle post failure | : | 75° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 20.0m/ SH-27 |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Slope modification/ slope easening with proper drainage and removal of debris are recommended.

III. 5. Landslides recorded between Bhagamandala to Talcauvery road section

SLIDE NO: KA-370

LOCATION: The slide is located at latitude 12° 22' 42.6" N and longitude 75° 30' 57.4" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Talcauvery road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 10.0 m (Photo 105).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 12.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 18.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 54.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 13.0m/
Bhagamandala-
Talcauvery road |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | Towards E |

CAUSES: Human interference by cutting of the slope for construction of road and ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: Madikere-Bhagamandala road affected.

RECCOMENDATION: Removal of debris material, proper drainage and slope modification with plantation on slope are recommended.

SLIDE NO: KA-371

LOCATION: The slide is located at latitude 12° 23' 10.8" N and longitude 75° 29' 35.0" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Talcauvery road(near Talcauvery gate), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 28.0 m (Photo106 and 107).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 30.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 42.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. | Volume of failed mass above the failure surface | : | 945.0 m ³ |
| e. | Slope angle post failure | : | 70° |
| f. | Slope angle pre failure | : | 80° |
| g. | General slope gradient | : | 20° |
| h. | Run out distance / up to | : | 35.0m/
Bhagamandala-
Talcauvery road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N20°E |

CAUSES: Human interference by cutting of the slope for construction of road high rainfall coupled with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: Madikere-Bhagamandala road affected.

RECCOMENDATION: Large slide. Temporary structure on the toe part of the slide should be removed, slope grading/ slope easening with proper drainage are recommended.

SLIDE NO: KA-372

LOCATION: The slide is located at latitude 12° 23' 3.2" N and longitude 75° 30' 4.9" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Talcuvery road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.5 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 7.0 m (Photo 108).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---|
| a. | Length of failed mass from crown to foot | : | 9.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 26.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 58.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 10.0m/
Bhagamandala-
Talcuvery road |
| i. | Cut slope Height | : | 8.0 m |
| j. | Direction of slide | : | N40°W
(Variable as on
a road bend) |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: Madikere-Bhagamandala road affected.

RECCOMENDATION: Slide caused due to road widening. Removal of debris and proper drainage with slope modification are recommended.

SLIDE NO: KA-373

LOCATION: The slide is located at latitude 12° 23' 7.3" N and longitude 75° 30' 4.4" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Talcauvery road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. Old slide on the left is laterally spreading on right side due to construction of road. The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 1.5 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 5.0 m (Photo 109).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 7.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 20.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 35.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 10.0m/
Bhagamandala-
Talcauvery road |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Madikere-Bhagamandala road affected.

RECCOMENDATION: Proper slope grading/slope easening with good drainage is recommended.

SLIDE NO: KA-374

LOCATION: The slide is located at latitude 12° 22' 52.6" N and longitude 75° 30' 43.4" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Talcauvery road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 35.0 m (Photo 110).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 38.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 2.0 m |
| d. | Volume of failed mass above the failure surface | : | 532.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 40.0m/
Bhagamandala-
Talcauvery road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N55°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: Madikere-Bhagamandala road affected.

RECCOMENDATION: Slide is located right on a nala. It is laterally prograding at crown/head portion. The road on crown part is in grave danger. Back filling/stone pitching and proper drainage with plantation on slope are recommended.

SLIDE NO: KA-375

LOCATION: The slide is located at latitude 12° 22' 51.8" N and longitude 75° 30' 48.0" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Talcauvery road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 68.0 m (Photo 111).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 70.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 26.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 2.0 m |
| d. Volume of failed mass above the failure surface | : | 1820.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 78.0m/
Bhagamandala-
Talcauvery road |
| i. Cut slope Height | : | 20.0 m |
| j. Direction of slide | : | N25°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: Madikere-Bhagamandala road affected.

RECCOMENDATION: Huge slide. Remedial measures are being taken up (Work on remedial measures like stone pitching and construction of cladding wall is in progress).

III. DESCRIPTION OF INDIVIDUAL SLIDE

III.1. Landslides recorded along SH-64 between Chikmagalur-Dakshina Kannada district boundary- Beltangady road section

SLIDE NO: KA-279

LOCATION: The slide is located at latitude 13° 04' 39.9" N and longitude 75° 28' 21.3" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (10 m from Chikmagalur-Dakshina Kannada Dist boundary towards Beltangady) .

SLIDE DESCRIPTION: The slide is classified as an old and reactivated debris slide. The debris consists of mostly clay minerals and highly weathered rock particles. The slid area has an overburden thickness of nearly 4.0 m. The depth of weathering is > 10 m. Scarp height is 1.0 m with a width of 5.0 m and Scarp angle is vertical. The slope forming material is weak and loose. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The head part, toe and crown parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 15.0 m (Photo 1).

MORPHOLOGICAL PARAMETER OF SLIDE:

a. Length of failed mass from crown to foot	: 20.0 m
b. Maximum width of failed mass from the left flank to the right flank boundary	: 50.0 m
c. Maximum depth of the failed mass from the surface of the slide to the failure surface	1.0 m
d. Volume of failed mass above the failure surface	: 500.0 m ³
e. Slope angle post failure	: 80°
f. Slope angle pre failure	: 90°
g. General slope gradient	: 30°
h. Run out distance / up to	: 25.0 m/SH-64
i. Cut slope Height	: 15.0 m
j. Direction of slide	: S45°E

CAUSES: The cutting of the slope for construction of road has increased the gradient. The pore pressure development during monsoon triggered this slide as the slope forming debris material was highly saturated with rain water.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Old slide reactivated. Easening of slope is recommended.

SLIDE NO: KA-280

LOCATION: The slide is located at latitude 13° 04' 34.3" N and longitude 75° 28' 17.3" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (100 m from slide no KA-279 towards Beltangady) .

SLIDE DESCRIPTION: The slide is classified as an old and reactivated debris slide. The debris consists of mostly clay minerals and highly weathered rock particles. The slid area has an overburden thickness of nearly 1.0 m. The depth of weathering is > 10 m. Scarp height is 1.0 m with a width of 5.0 m and scarp angle is vertical. The slope forming material was weak and loose. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The head part and toe parts are unstable where as crown part of the slide is stable. The slide has a horizontal extent of 3.0 m and vertical interval of 8.0 m (Photo 2).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 70.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 350.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 25.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S20°E |

CAUSES: The cutting of the slope for construction of road has increased the gradient. The pore pressure development during monsoon triggered this slide as the slope forming debris material was highly saturated with rain water.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Old slide reactivated. Easening of slope/ Grading or benching is recommended.

SLIDE NO: KA-281

LOCATION: The slide is located at latitude 13° 04' 33.5" N and longitude 75° 28' 13.4" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near 10th hair pin curve towards Beltangady) .

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of mostly clay minerals and highly weathered rock particles. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 7.0 m. The slope forming material was weak and loose. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The head part and toe parts are unstable where as crown part of the slide is stable. The slide has a horizontal extent of 2.0 m and vertical interval of 9.0 m (Photo 3).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 9.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 12.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 54.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 10° |
| h. Run out distance / up to | : | 9.0 m/SH-64 |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | S20°E |

CAUSES: The cutting of the slope for construction of road has increased the gradient. The pore pressure development during monsoon triggered this slide as the slope forming debris material was highly saturated with rain water.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and easening of slope/ grading or benching is recommended.

SLIDE NO: KA-282

LOCATION: The slide is located at latitude 13° 04' 33.5" N and longitude 75° 28' 17.3" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near 9th hair pin curve towards Beltangady) .

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 3.0 m. The depth of weathering is 10.0 m. Scarp height is 2.0 m with a width of 6.0 m and scarp angle is 32°. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. Remedial measures in the form of cladding wall have been provided at the toe portion. The head part and crown parts are unstable where as toe part of the slide is stable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 4).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 13.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 292.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 85° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 15.0 m/SH-64 |
| i. Cut slope Height | : | 14.0 m |
| j. Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This slope modification coupled with high rain fall has triggered the slide. The remedial measures provided in the form of cladding wall has stabilised only the toe part.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Cladding wall should be extended to head and crown parts also.

SLIDE NO: KA-283

LOCATION: The slide is located at latitude 13° 04' 32.6" N and longitude 75° 28' 11.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near 100 km stone-13 km to Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 3.0 m. The depth of weathering is 10.0 m. Scarp height is 1.0 m with a width of 5.0 m and scarp angle is 90°. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown part is stable where as toe and head parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 10.0 m (Photo 5).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 9.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 23.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 103.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 10.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S40°W |

CAUSES: The debris slide is caused due to slope cutting during construction of the road.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Debris slide at the curve of the road, care should be taken to arrest any progradation. Removal of debris and grading of slope in the form of benching is recommended.

SLIDE NO: KA-284

LOCATION: The slide is located at latitude 13° 04' 41.7" N and longitude 75° 28' 1.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-283 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is 10.0 m. Scarp height is 1.0 m with a width of 5.0 m and scarp angle is 90°. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown and head parts of the slide are stable where as toe part of the slide is unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 8.0 m (Photo 6).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 12.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 48.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 12.0 m/SH-64 |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | S63°W |

CAUSES: The debris slide is caused due to slope cutting during construction of the road.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and grading of slope in the form of benching is recommended.

SLIDE NO: KA-285

LOCATION: The slide is located at latitude 13° 04' 42.8" N and longitude 75° 28' 0.4" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-284 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as an old debris slide (plantation growth seen on slide). The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 9.0 m. Scarp height is 1.0 m with a width of 5.0 m and scarp angle is 90°. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 4.0 m and vertical interval of 22.0 m (Photo 7).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 20.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 10.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 100.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 22.0 m/SH-64 |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | S46°W |

CAUSES: The debris slide was caused due to slope cutting during construction of the road.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Old slide almost stabilised.

SLIDE NO: KA-286

LOCATION: The slide is located at latitude 13° 04' 44.8" N and longitude 75° 27' 58.5" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-285 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slide is translational one with two stages of sliding is seen. The slided area has an overburden thickness of nearly 3.0 m. Scarp height is 1.0 m with a width of 5.0 m and scarp angle is 90°. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 3.0 m and vertical interval of 12.0 m (Photo 8 and 9).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 14.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 20.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 140.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 16.0 m/SH-64 |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | S55°W |

CAUSES: The debris slide is caused due to slope cutting during construction of the road.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Old slide almost stabilised.

SLIDE NO: KA-287

LOCATION: The slide is located at latitude 13° 04' 46.1" N and longitude 75° 27' 56.5" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-286 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as an old debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 3.0 m. Scarp height is 1.0 m with a width of 5.0 m and scarp angle is 90°. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 4.0 m and vertical interval of 15.0 m (Photo 10 and 11).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 16.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 22.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 160.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 18.0 m/SH-64 |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | S10°W |

CAUSES: The debris slide is caused due to slope cutting during construction of the road.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Old slide caused due to cutting of spur almost stabilised.

SLIDE NO: KA-288

LOCATION: The slide is located at latitude 13° 04' 47.5" N and longitude 75° 27' 55.1" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-287 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide (three slides side by side one big debris slide and two small slumps, data of big slide is taken). The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 12.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 18.0 m (Photo 12 and 13).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 20.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 26.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 260.0 m ³ |
| e. Slope angle post failure | : | 85° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 22.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S25°W |

CAUSES: The debris slide was caused due to slope cutting during construction of the road.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and easening of slope/ grading or benching is recommended.

SLIDE NO: KA-289

LOCATION: The slide is located at latitude 13° 04' 47.1" N and longitude 75° 27' 53.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150-200 m from slide no KA-288 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide. Translational slide, two slides I) long debris slide ii) slump; slump occurred first. The slided material has gone below SH_64 to valley side. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 4.0 m. The depth of weathering is 12.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 8.0 m and vertical interval of 60.0 m (Photo 14).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 60.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 10.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 3.0 m |
| d. Volume of failed mass above the failure surface | : | 900.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 60.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S45°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This slope modification coupled with high rain fall has triggered the slide. First the slump has occurred which prograded in to big debris slide. Slide has occurred along a nala course.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and easening of slope/ grading or benching is recommended. Proper drainage should be maintained as nala is flowing on the debris.

SLIDE NO: KA-290

LOCATION: The slide is located at latitude 13° 04' 46.2" N and longitude 75° 27' 52.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (25 m from slide no KA-289 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide which is translational in nature. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 12.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 12.0 m and vertical interval of 20.0 m (Photo 15 and 16).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 25.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 16.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 3.0 m |
| d. Volume of failed mass above the failure surface | : | 600.0 m ³ |
| e. Slope angle post failure | : | 60° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 28.0 m/SH-64 |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | S45°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This slope modification coupled with high rain fall has triggered the slide. The slide is translational in nature.

NATURE OF DAMAGE: SH-64 road was affected.

RECOMMENDATION: Removal of debris and construction of retaining wall for 18.0 m length and 3.5 m height with back filling is recommended.

SLIDE NO: KA-291

LOCATION: The slide is located at latitude 13° 04' 44.8" N and longitude 75° 27' 50.5" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (100 m from slide no KA-290 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 3.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 9.0 m and vertical interval of 14.0 m (Photo 17).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 12.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 28.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 3.0 m |
| d. Volume of failed mass above the failure surface | : | 504.0 m ³ |
| e. Slope angle post failure | : | 75° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 14.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S15°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This slope modification coupled with high rain fall has triggered the slide. Intense water action has caused high degree of weathering resulting in formation of clay patches as seen in the debris. This has resulted in drop in the shearing resistance of the material.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and soil nailing with proper drainage facilities is recommended.

SLIDE NO: KA-292

LOCATION: The slide is located at latitude 13° 04' 40.6" N and longitude 75° 27' 43.0" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (250 m from slide no KA-291 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 10.0 m (Photo 18).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 12.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 80.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 480.0 m ³ |
| e. Slope angle post failure | : | 75° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 14.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S20°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This slope modification coupled with high rain fall has triggered the slide. Intense water action has caused high degree of weathering resulting in formation of clay patches as seen in the debris. This has resulted in drop in the shearing resistance of the material.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Slide is widening sideways, slope grading/ slope easening and removal of debris is recommended.

SLIDE NO: KA-293

LOCATION: The slide is located at latitude 13° 04' 35.4" N and longitude 75° 27' 27.0" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near 102 km stone- Charmudi 8 km towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 20.0 m (Photo 19).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 22.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 12.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 198.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 14.0 m/SH-64 |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This slope modification coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening is recommended. Trees which are precariously hanging should be removed.

SLIDE NO: KA-294

LOCATION: The slide is located at latitude 13° 04' 32.5" N and longitude 75° 27' 24.6" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (100 m from slide no KA-293 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new earth slump. The debris consists of clay and highly weathered material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is 8.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 9.0 m and vertical interval of 14.0 m (Photo 20).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 20.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 10.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | Towards W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening with proper drainage facilities is recommended.

SLIDE NO: KA-295

LOCATION: The slide is located at latitude 13° 04' 29.8" N and longitude 75° 27' 27.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (100 m from slide no KA-294 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new earth slump. The debris consists of clay and highly weathered material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 8.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 8.0 m (Photo 21).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 8.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 10.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 40.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 7.0 m/SH-64 |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | S30°E |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening with proper drainage facilities is recommended. Trees precariously hanging should be removed.

SLIDE NO: KA-296

LOCATION: The slide is located at latitude 13° 04' 31.4" N and longitude 75° 27' 31.4" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near 8th hair pin curve, 150 m from slide no KA-295 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 12.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 12.0 m (Photo 22 and 23).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 13.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 22.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 214.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 15.0 m/SH-64 |
| i. Cut slope Height | : | 7.0 m |
| j. Direction of slide | : | S19°E |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening with proper drainage facilities is recommended.

SLIDE NO: KA-297

LOCATION: The slide is located at latitude 13° 04' 29.1" N and longitude 75° 27' 23.7" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (200 m from slide no KA-296 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slump(part of the slide is earth slum also, basic gabbro body has weathered in to soil) . The debris consists of clay and highly weathered rock material. The slided area has an overburden thickness of nearly 3.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is basic weathered gabbro. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 24).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 8.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 10.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 20.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 10.0 m/SH-64 |
| i. Cut slope Height | : | 7.0 m |
| j. Direction of slide | : | S46°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening is recommended.

SLIDE NO: KA-298

LOCATION: The slide is located at latitude 13° 04' 35.1" N and longitude 75° 27' 20.3" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (300 m from 8th hair pin curve, 400 m from slide no KA-297 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new Rock slide. One set of joint is noticed which is parallel to foliation plane in gneiss trending N74°W/49°NE with 2-10 cm spacing and is tight. Composite failure both planar and wedge failure are noticed. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 14.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 20.0 m (Photo 25).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 18.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 26.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 351.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 20.0 m/SH-64 |
| i. Cut slope Height | : | 14.0 m |
| j. Direction of slide | : | N65° W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of rock debris and slope easening with proper drainage.

SLIDE NO: KA-299

LOCATION: The slide is located at latitude 13° 04' 34.1" N and longitude 75° 27' 19.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (20 m from slide no KA-298 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new Rock slide. Composite failure both planar and wedge failure are noticed. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 14.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 20.0 m (Photo 26).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 18.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 189.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 20.0 m/SH-64 |
| i. Cut slope Height | : | 14.0 m |
| j. Direction of slide | : | N20° W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of rock debris and slope easening with proper drainage

SLIDE NO: KA-300

LOCATION: The slide is located at latitude 13° 04' 10.2" N and longitude 75° 26' 35.6" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Between 108 & 107 km stone towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as an old Rock slide which is stabilised. One set of joint is noticed which is parallel to foliation plane in granite trending N49°E/41°NW. Planar failure is noticed. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 20.0 m (Photo 27).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 9.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 20.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 90.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 12.0 m/SH-64 |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N57°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening is recommended. As nala is flowing on the left flank proper drainage is also to be provided to arrest any reactivation.

SLIDE NO: KA-301

LOCATION: The slide is located at latitude 13° 04' 29.0" N and longitude 75° 26' 57.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-300 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new earth slump. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 8.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 8.0 m and vertical interval of 13.0 m (Photo 28).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 21.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 15.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 236.3 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 8.0 m/SH-64 |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N25°E |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening is recommended.

SLIDE NO: KA-302

LOCATION: The slide is located at latitude 13° 04' 33.3" N and longitude 75° 27' 2.5" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (200 m from slide no KA-301 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide which is almost stabilised. (debris slump prograded in to debris slide). The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 5.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 13.0 m (Photo 29).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 15.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 105.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 17.0 m/SH-64 |
| i. Cut slope Height | : | 9.0 m |
| j. Direction of slide | : | Towards N |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening is recommended.

SLIDE NO: KA-303

LOCATION: The slide is located at latitude 13° 04' 33.2" N and longitude 75° 27' 8.6" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (500-600 m from slide no KA-302 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 4.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 30).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 75.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 12.0 m/SH-64 |
| i. Cut slope Height | : | 6.0 m |
| j. Direction of slide | : | N25°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Slope easening with proper drainage is recommended.

SLIDE NO: KA-304

LOCATION: The slide is located at latitude 13° 04' 34.7" N and longitude 75° 27' 11.1" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (300 m from slide no KA-303 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new Earth slump. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 6.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown and head parts of the slide are stable and toe part of the slide is unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 31).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 22.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 55.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 12.0 m/SH-64 |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N53°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Slope easening with proper drainage is recommended.

SLIDE NO: KA-305

LOCATION: The slide is located at latitude 13° 04' 33.6" N and longitude 75° 27' 19.0" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-304 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new Debris slide which is translational in nature. The debris consists of rock fragments, clay and weathered gneissic material. One set of joint is noticed trending N81°E/49°NW with 2-5 cm spacing and tight in nature. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is 12.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 12.0 m (Photo 32).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 14.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 13.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 91.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 16.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S80°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris, soil nailing with 1m concrete apron or shotcreting with proper drainage is recommended.

SLIDE NO: KA-306

LOCATION: The slide is located at latitude 13° 04' 42.9" N and longitude 75° 27' 22.0" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near 8th hair pin curve)

SLIDE DESCRIPTION: The slide is classified as a new Earth slump. The debris consists of clay and highly weathered rock material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is 12.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown and head parts of the slide are stable and toe part of the slide is unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 12.0 m (Photo 33).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|-----------------------|
| a. Length of failed mass from crown to foot | : 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 20.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 0.5 m |
| d. Volume of failed mass above the failure surface | : 50.0 m ³ |
| e. Slope angle post failure | : 70° |
| f. Slope angle pre failure | : 80° |
| g. General slope gradient | : 20° |
| h. Run out distance / up to | : 12.0 m/SH-64 |
| i. Cut slope Height | : 7.0 m |
| j. Direction of slide | : S54°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris, slope easening with proper drainage is recommended.

SLIDE NO: KA-307

LOCATION: The slide is located at latitude 13° 04' 30.6" N and longitude 75° 27' 22.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near slide no KA-306)

SLIDE DESCRIPTION: The slide is classified as a old Earth slump which is almost stabilised. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 4.0 m and vertical interval of 12.0 m (Photo 34).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|------------------------|
| a. Length of failed mass from crown to foot | : 13.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 18.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 1.0 m |
| d. Volume of failed mass above the failure surface | : 117.0 m ³ |
| e. Slope angle post failure | : 80° |
| f. Slope angle pre failure | : 90° |
| g. General slope gradient | : 25° |
| h. Run out distance / up to | : 15.0 m/SH-64 |
| i. Cut slope Height | : 7.0 m |
| j. Direction of slide | : N75°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Old slide almost stabilised.

III. 3. Landslides recorded between Madikeri-Bhagamandala road section

SLIDE NO: KA-334

LOCATION: The slide is located at latitude 12° 21' 19.7" N and longitude 75° 38' 53.3" E in Survey of India toposheet No 48 P/11 on Madikeri-Bhagamandala road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 3.0 m. The depth of weathering is >10.0 m. Two sets of joints noticed J1- NS/vertical with 30 cm spacing and is tight and J2- N65°E/78°NW with 20 cm spacing and is tight. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 16.0 m (Photo 61 and 62).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---|
| a. | Length of failed mass from crown to foot | : | 22.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 15.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 165.0 m ³ |
| e. | Slope angle post failure | : | 65° |
| f. | Slope angle pre failure | : | 70° |
| g. | General slope gradient | : | 30° |
| h. | Run out distance / up to | : | 24.0m/
Madikeri-
Bhagamandala
road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N30°E |

CAUSES: Human interference by cutting of the slope for construction of road and ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: Madikeri-Bhagamandala road affected.

RECCOMENDATION: Grading of slope/slope easening, proper drainage are recommended.

SLIDE NO: KA-335

LOCATION: The slide is located at latitude 12° 21' 25.8" N and longitude 75° 38' 40.8" E in Survey of India toposheet No 48 P/11 on Madikeri-Bhagamandala road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old and reactivated debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 5.0 m (Photo 63).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------------------|
| a. Length of failed mass from crown to foot | : | 8.5 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 31.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 65.9 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 35° |
| h. Run out distance / up to | : | 9.0m/ Madikeri-Bhagamandala road |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | N38°E |

CAUSES: Human interference by cutting of the slope for construction of road and ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: Madikeri-Bhagamandala road affected.

RECCOMENDATION: Grading of slope/slope easening and proper drainage are recommended.

III. 4. Landslides recorded between Bhagamandala–Karike road section

SLIDE NO: KA-336

LOCATION: The slide is located at latitude 12° 28' 50.3" N and longitude 75° 45' 31.9" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Karika road, 2km from Bhagamandala towards Karika, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide which is almost stabilised. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 4.0 m and vertical interval of 9.0 m (Photo 64).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 11.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 18.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 49.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 13.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 12.0 m |
| j. | Direction of slide | : | N60°E |

CAUSES: Human interference by cutting of the slope for construction of road.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised as observed from the growth of plantation seen on debris material. Slope easening and proper drainage are recommended to arrest any reactivation in future.

SLIDE NO: KA-337

LOCATION: The slide is located at latitude 12° 24' 20.8" N and longitude 75° 31' 4.7" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Karika road (500 m from slide no KA-336 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide which is almost stabilised. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 10.0 m (Photo 65).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 14.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 22.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 77.0 m ³ |
| e. | Slope angle post failure | : | 75° |
| f. | Slope angle pre failure | : | 85° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 16.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 12.0 m |
| j. | Direction of slide | : | N80°E |

CAUSES: Human interference by cutting of the slope for construction of road.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised as observed growth of plantation seen on debris material. Slope easening and proper drainage are recommended to arrest any reactivation in future.

SLIDE NO: KA-338

LOCATION: The slide is located at latitude 12° 24' 22.3" N and longitude 75° 30' 59.8" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Karika road (500 m from slide no KA-337 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 10.0 m and vertical interval of 22.0 m (Photo 66).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 26.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 390.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 30.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | Towards W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: New slide and one more slide is developing on left flank may reactivate. Removal of debris, slope modification and proper drainage are recommended.

SLIDE NO: KA-339

LOCATION: The slide is located at latitude 12° 24' 23.4" N and longitude 75° 30' 59.8" E in Survey of India toposheet No 48 P/11 On Bhagamandala-Karika road (50 m from slide no KA-338 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slump which is almost stabilised. The debris consists of rock fragments and clay. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 10.0 m (Photo 67).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 12.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 17.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 51.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 14.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 12.0 m |
| j. | Direction of slide | : | N65°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and poor drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised, slope grading/ slope easening is recommended to arrest any reactivation.

SLIDE NO: KA-340

LOCATION: The slide is located at latitude 12° 24' 31.5" N and longitude 75° 30' 36.7" E in Survey of India toposheet No 48 P/11 On Bhagamandala-Karika road(500 m from slide no KA-339 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide which is almost stabilised. The debris consists of rock fragments and clay. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 8.0 m (Photo 68 and 69).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 11.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 82.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 13.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N44°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and poor drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised. Plants are grown on debris material hence no remedial measures suggested.

SLIDE NO: KA-341

LOCATION: The slide is located at latitude 12° 24' 37.5" N and longitude 75° 30' 10.3" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. Two slides are taken as one slid (old slide on right flank). Limonitic clay patches seen on debris. The debris consists of clay, rock fragments and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 9.0 m (Photo70 and 71).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 11.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 34.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 93.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 85° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 12.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N10°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and poor drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Fallen trees on debris should be removed. Proper drainage and slope grading/ slope easening are recommended.

SLIDE NO: KA-342

LOCATION: The slide is located at latitude 12° 24' 37.4" N and longitude 75° 30' 7.6" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new earth slump. Limonitic clay patches seen on debris. The debris consists of clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 8.0 m (Photo 72).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 10.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 15.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 75.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 85° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 14.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N50°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Slide perpendicular to road. Removal of the trees fallen on debris material, slope grading/slope easening and proper drainage are recommended.

SLIDE NO: KA-343

LOCATION: The slide is located at latitude 12° 24' 31.9" N and longitude 75° 30' 1.3" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slump which is almost stabilised. Limonitic clay patches seen on debris. Two adjoining slides are considered as one slide. The debris consists of clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 3.0 m and vertical interval of 8.0 m (Photo 73).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 28.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 70.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 12.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N24°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised.

SLIDE NO: KA-344

LOCATION: The slide is located at latitude 12° 24' 44.4" N and longitude 75° 29' 59.0" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old and reactivated earth slump. The debris consists of clay and weathered granitic material. The slid area has an overburden thickness of nearly 1.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 8.0 m (Photo 74).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 11.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 13.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 71.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 12.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris, tree trunks fallen on debris material, and slope easening are recommended.

SLIDE NO: KA-345

LOCATION: The slide is located at latitude 12° 25' 0.4" N and longitude 75° 29' 55.4" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new earth slump. The debris consists of clay and weathered granitic material. The slid area has an overburden thickness of nearly 1.5 m. The depth of weathering is 2.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 11.0 m (Photo 75).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 13.5 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 12.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 40.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 15.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | N10°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Slope easening, removal of boulders from the crown, proper drainage and plantation on the slope are recommended.

SLIDE NO: KA-346

LOCATION: The slide is located at latitude 12° 25' 0.2" N and longitude 75° 29' 50.8" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new earth slump. The debris consists of clay and weathered gneissic material. The slid area has an overburden thickness of nearly 1.0 m. The depth of weathering is 5.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 7.0 m (Photo 76).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 9.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 13.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 29.3 m ³ |
| e. | Slope angle post failure | : | 75° |
| f. | Slope angle pre failure | : | 80° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 10.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Proper drainage and slope grading/ slope easening are recommended.

SLIDE NO: KA-347

LOCATION: The slide is located at latitude 12° 25' 7.9" N and longitude 75° 29' 33.4" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new earth slump. The debris consists of clay and weathered gneissic material. The slid area has an overburden thickness of nearly 1.0 m. The depth of weathering is 5.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 77 and 78).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 12.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 180.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 14.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 12.0 m |
| j. | Direction of slide | : | N50°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Slope modification/ slope easening, removal of debris, tree trunks fallen on debris and proper drainage are recommended.

SLIDE NO: KA-348

LOCATION: The slide is located at latitude 12° 25' 9.1" N and longitude 75° 29' 30.4" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. Two slides side by side taken as one slide. The debris consists of clay, rock particles and weathered gneissic material. The slid area has an overburden thickness of nearly 1.0 m. The depth of weathering is 5.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 7.0 m (Photo 79).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---------------------------------------|
| a. | Length of failed mass from crown to foot | : | 8.5 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 15.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 31.9 m ³ |
| e. | Slope angle post failure | : | 70° |
| f. | Slope angle pre failure | : | 80° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 9.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 9.0 m |
| j. | Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Slope modification/ slope easening, removal of fallen debris, tree trunks fallen on debris and proper drainage are recommended.

SLIDE NO: KA-349

LOCATION: The slide is located at latitude 12° 25' 10.6" N and longitude 75° 29' 27.6" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(800 m from slide no KA-348 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. Three adjacent slides taken as one slide. The debris consists of rock fragments, clay and weathered gneissic material. The slide scarp has width of 10 m with 3 m height and is vertical. The slid area has an overburden thickness of nearly 1.5 m. The depth of weathering is 6.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 13.0 m (Photo 80 and 81).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---|
| a. Length of failed mass from crown to foot | : | 15.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 75.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 562.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 18.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N60°E(variable
as slide is on
road bend) |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Slope modification/ slope easening, removal of debris and proper drainage are recommended.

SLIDE NO: KA-350

LOCATION: The slide is located at latitude 12° 25' 11.9" N and longitude 75° 29' 22.6" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karike road(500 m from slide no KA-349 towards Karike) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. Three adjacent slides taken as one slide. The debris consists of rock fragments, clay and weathered gneissic material. The slide scarp has width of 12 m with 5 m height and is vertical. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 12.0 m (Photo 82 and 83).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 15.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 225.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 17.0m/
Bhagamandala-
Karike road |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N22°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karike road was affected.

RECCOMENDATION: Slope modification/ slope easening, removal of debris and proper drainage are recommended.

SLIDE NO: KA-351

LOCATION: The slide is located at latitude 12° 25' 13.0" N and longitude 75° 29' 21.2" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(20 m from slide no KA-350 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new earth slump. Two adjacent slides taken as one slide. The debris consists of rock fragments, clay material. The slide scarp has width of 8.0 m with 2.0m height and is vertical. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 6.0 m (Photo 84).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 8.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 13.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 26.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 10.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N45°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Slope modification, removal of debris and proper drainage are recommended. (Very close to slide no KA-350 so both the slides maybe given remedies in one go)

SLIDE NO: KA-352

LOCATION: The slide is located at latitude 12° 25' 15.6" N and longitude 75° 29' 18.5" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(500 m from slide no KA-351 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old earth slump. The debris consists of rock fragments, clay material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 2.0 m and vertical interval of 6.0 m (Photo 85).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 9.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 18.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 40.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 85° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 11.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N35°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Old slide almost stabilised as plant growth seen on the debris material.

SLIDE NO: KA-353

LOCATION: The slide is located at latitude 12° 25' 61.3" N and longitude 75° 29' 17.8" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(20 m from slide no KA-352 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown and head parts of the slide are stable and toe part of the slide is unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 6.0 m (Photo 86).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 9.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 19.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 42.8 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 85° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 12.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N55°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Slide may reactivate. Removal of debris and proper drainage are recommended.

SLIDE NO: KA-354

LOCATION: The slide is located at latitude 12° 25' 38.9" N and longitude 75° 29' 7.7" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 2.0 m and vertical interval of 33.0 m (Photo 87).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 35.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 12.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 315.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 38.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 40.0 m |
| j. Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised may reactivate with rain in monsoon. Proper drainage with slope easening is recommended.

SLIDE NO: KA-355

LOCATION: The slide is located at latitude 12° 25' 30.9" N and longitude 75° 29' 7.2" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new Composite slide left side earth/debris slide right side rock fall. The debris consists of rock fragments, clay and weathered granitic material. Two sets of joints are noticed J1-N30°W/70°NE with 20cm-150 cm spacing and is tight, J2- N10°E/78°NW with 100 cm spacing and is tight. Limonitic clay patches seen on debris. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.5 m and vertical interval of 5.0 m (Photo 88).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 7.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 12.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 42.0 m ³ |
| e. | Slope angle post failure | : | 70° |
| f. | Slope angle pre failure | : | 80° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 10.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | Towards W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: One huge tree precariously hanging on the crown part should be removed otherwise the tree will fall and Road may be blocked. Easening of slope, removal of boulders and debris and proper drainage are recommended.

SLIDE NO: KA-356

LOCATION: The slide is located at latitude 12° 25' 33.1" N and longitude 75° 29' 6.0" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(100 m from slide no KA-355 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown and head and parts of the slide are unstable and toe part is stable. The slide has a horizontal extent of 4.0 m and vertical interval of 12.0 m (Photo 89).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 14.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 22.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 154.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 17.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N34°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised. Proper drainage, slope grading and removal of debris may prevent reactivation.

SLIDE NO: KA-357

LOCATION: The slide is located at latitude 12° 25' 34.1" N and longitude 75° 29' 0.2" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(Near 10 KM stone towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 1.5 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 90).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 12.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 21.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 126.0 m ³ |
| e. | Slope angle post failure | : | 60° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 20° |
| h. | Run out distance / up to | : | 14.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N35°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old debris slump almost stabilised.

SLIDE NO: KA-358

LOCATION: The slide is located at latitude 12° 25' 39.2" N and longitude 75° 28' 55.9" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(600 m from slide no KA-357 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 9.0 m (Photo 91).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 12.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 18.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 54.0 m ³ |
| e. | Slope angle post failure | : | 75° |
| f. | Slope angle pre failure | : | 80° |
| g. | General slope gradient | : | 20° |
| h. | Run out distance / up to | : | 14.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | Towards N |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris material, proper drainage and slope grading/slope easening are recommended.

SLIDE NO: KA-359

LOCATION: The slide is located at latitude 12° 25' 38.6" N and longitude 75° 28' 56.9" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(30 m from slide no KA-358 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 28.0 m (Photo 92 and 93).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 30.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 15.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 225.0 m ³ |
| e. Slope angle post failure | : | 85° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 35.0m/ Bhagamandala-Karika road (debris fallen on road has been removed) |
| i. Cut slope Height | : | 20.0 m |
| j. Direction of slide | : | N15°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Removal of debris material, proper drainage and slope modification are recommended.

SLIDE NO: KA-360

LOCATION: The slide is located at latitude 12° 25' 47.2" N and longitude 75° 28' 55.5" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(30 m from slide no KA-359 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 19.0 m (Photo 94).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 22.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 24.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 264.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 25.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris material, providing proper drainage and slope modification are recommended.

SLIDE NO: KA-361

LOCATION: The slide is located at latitude 12° 25' 49.8" N and longitude 75° 28' 52.8" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(500 m from slide no KA-360 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 10.0 m (Photo 95).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 12.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 17.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 102.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 15.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N25°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Nala is flowing on the slide material, providing proper drainage and debris removal are recommended.

SLIDE NO: KA-362

LOCATION: The slide is located at latitude 12° 25' 49.3" N and longitude 75° 28' 52.1" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(Near 11 KM stone towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 20.0 m (Photo 96).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 22.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 31.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 511.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 26.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 20.0 m |
| j. Direction of slide | : | N20°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris material, providing proper drainage and slope modification with plantation on debris are recommended.

SLIDE NO: KA-363

LOCATION: The slide is located at latitude 12° 25' 49.1" N and longitude 75° 28' 50.9" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(50 m from slide no KA-362 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 10.0 m (Photo 97).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 13.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 18.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 17.0 m ³ |
| e. | Slope angle post failure | : | 70° |
| f. | Slope angle pre failure | : | 80° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 15.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N40°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris material, providing proper drainage and slope modification are recommended.

SLIDE NO: KA-364

LOCATION: The slide is located at latitude 12° 25' 51.4" N and longitude 75° 28' 49.5" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(20 m from slide no KA-363 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 42.0 m (Photo 98).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 45.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. | Volume of failed mass above the failure surface | : | 1012.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 48.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 1532.0 m |
| j. | Direction of slide | : | Towards W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris material, proper drainage and slope modification are recommended. (Over a stretch of 200 m four slides are recorded all slides may be treated simultaneously)

SLIDE NO: KA-365

LOCATION: The slide is located at latitude 12° 25' 50.9" N and longitude 75° 28' 46.6" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(250 m from slide no KA-364 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 17.0 m (Photo 99 and 100).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---|
| a. Length of failed mass from crown to foot | : | 19.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 32.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 304.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 25.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N10°E(variable
as slide is on
road bend) |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Highly weathered material (gneiss) on debris should be removed; proper drainage and slope modification are recommended.

SLIDE NO: KA-366

LOCATION: The slide is located at latitude 12° 25' 56.7" N and longitude 75° 28' 34.6" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(800 m from slide no KA-365 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. Gullies formed on debris material due to water action and limonitic clay seen on debris. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 26.0 m (Photo 101).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 29.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 35.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 507.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 35.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 25.0 m |
| j. Direction of slide | : | N35°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Debris removal, proper drainage, plantations on slopes, slope grading/ slope easening are recommended.

SLIDE NO: KA-367

LOCATION: The slide is located at latitude 12° 26' 5.1" N and longitude 75° 28' 21.0" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(1 km from slide no KA-366 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new composite slide (left flank rock slide right flank debris slide). The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 25.0 m (Photo 102).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 28.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 32.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 448.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 35.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 20.0 m |
| j. | Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris material, proper drainage and slope modification with plantation on slope are recommended.

SLIDE NO: KA-368

LOCATION: The slide is located at latitude 12° 26' 11.3" N and longitude 75° 27' 52.3" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(2 km from slide no KA-367 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 3.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 14.0 m (Photo 103).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 16.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 40.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 320.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 20.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N35°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Slide is spreading laterally. Proper drainage, removal of trees from the crown part and slope grading/ slope easening are recommended.

SLIDE NO: KA-369

LOCATION: The slide is located at latitude 12° 26' 9.9" N and longitude 75° 27' 45.8" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(800 m from slide no KA-368 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 28.0 m (Photo 104).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 30.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 29.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 435.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 32.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 25.0 m |
| j. | Direction of slide | : | N30°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Removal of debris material, proper drainage and slope modification with plantation on slope are recommended.

कर्नाटक राज्य के चिकमगलूर, कूर्ग, दक्षिण कन्नडा, उडुपी एवं शिमोगा जिलों में घाट मार्गों के किनारे भूस्खलन तालिका पर प्रतिवेदन

(क्षेत्र सत्र 2009-10 का प्रगति प्रतिवेदन)

कूट सं. : ई.जी./एस.आर./के.जी./2009/043

द्वारा

के.वी.मारुति, वरिष्ठ भूविज्ञानी

ए.के.मिश्रा, वरिष्ठ भूविज्ञानी

सारांश

भूस्खलन आपद एवं जोखिम न्यूनीकरण पर राष्ट्रीय महाविपदा प्रबन्धन प्राधिकरण (एन.एम.डी.ए.) द्वारा प्रस्तावित कार्रवाई योजना के कार्यान्वयन करने के लक्ष्य से एवं भविष्य में भूस्खलन अध्ययन के लिए भूस्खलन डाटाबेस को तैयार करने के लक्ष्य से कर्नाटक राज्य के भागों में पश्चिमी घाट के घाट परिच्छेद में भूस्खलन तालिका का कार्य आरंभ किया गया था. डाटाबेस के नवीकरण के लिए, मिशन-IV: अभियान्त्रिकी भूविज्ञान एवं भूतकनीकी अन्वेषण कार्यक्रम: भूस्खलन आपदा आकलन के अन्तर्गत घाट परिच्छेद में राष्ट्रीय मार्ग (एन.एच.) एवं राज्य मार्ग (एस.एच.) से सम्बन्धित एक मद् का कार्य किया गया था. भूस्खलन तालिका का कार्यक्रम कूर्ग, दक्षिण कन्नडा एवं चिकमगलूर जिलों में पश्चिमी घाट के घाट मार्गों में किया गया जो भूआकृति सं. 48 O/7,8 एवं 11; 48 P/7, 11 एवं 15 के क्षेत्र है.

क्षेत्र सत्र 2009-2010 के दौरान निम्नलिखित घाट परिच्छेद (एस.एच. मार्ग एवं मुख्य जिला मार्ग) को शामिल किया गया.

- चिकमगलूर जिला सीमा एवं बेल्टनगाडी परिच्छेद के बीच एस.एच.-64: 29 भूस्खलन
- विभिन्न एस.एच. एवं जिला मार्गों में मडिकेरी शहर के आसपास: 26 भूस्खलन
- मडिकेरी-भागमन्डला मार्ग परिच्छेद: 2 भूस्खलन
- भागमन्डला-करिके मार्ग परिच्छेद: 34 भूस्खलन
- भागमन्डला-तलकावेरी मार्ग परिच्छेद: 6 भूस्खलन
- एस.एच.-27 अल्डूर-बलेहोन्नूर मार्ग परिच्छेद: 5 भूस्खलन
- एस.एच.27 बलेहोन्नूर-कोप्पा मार्ग परिच्छेद: 8 भूस्खलन

वर्तमान अध्ययन से यह निष्कर्ष निकलता है कि ज्यादातर भूस्खलन (< 2 मी चौड़ाई) के छिछले मलबे स्खलन/अवर्सपण है. “कट” ढाल ऊँचाई एवं ढाल कोण भूस्खलन में प्रधान भूमिका अदा करते हैं क्योंकि स्खलन क्रौण से टो तक “कट” ढाल है. यह देखा गया है कि ज्यादातर स्खलन ऐसे “कट” ढालों में सीमित है जिनकी ऊँचाई 10 मी से ज्यादा है एवं ढाल कोण 70° - 90° के बीच में परिवर्तित होता है. सभी परिच्छेदों में “कट” ढाल का आपेक्षिक उच्चावच निम्न से सामान्य (5-20 मी) है एवं उपरिभार की गहराई 0.5-10 मी है. पश्चिमी घाट में भूस्खलन प्रक्रिया के मुख्य कारण ये हैं: सडक निर्माण के लिए गिरि ढाल के टो कटिंग, मानवीय बस्ती के लिए ढाल परिवर्द्धन, अपरिवर्तन अपक्षीण चट्टान पिण्ड एवं बारम्बार वर्षा. चट्टानों के तीव्र अपक्षीण स्वभाव के लिए जल की बहुव्यापी उपस्थिति हितकारी है जिससे उनके अपक्षीण प्रतिरोध में गिरावट पैदा होते हैं. मनसून के दौरान भारी वर्षा लगभग सभी भूस्खलन को उत्प्रेरित कर देती है.

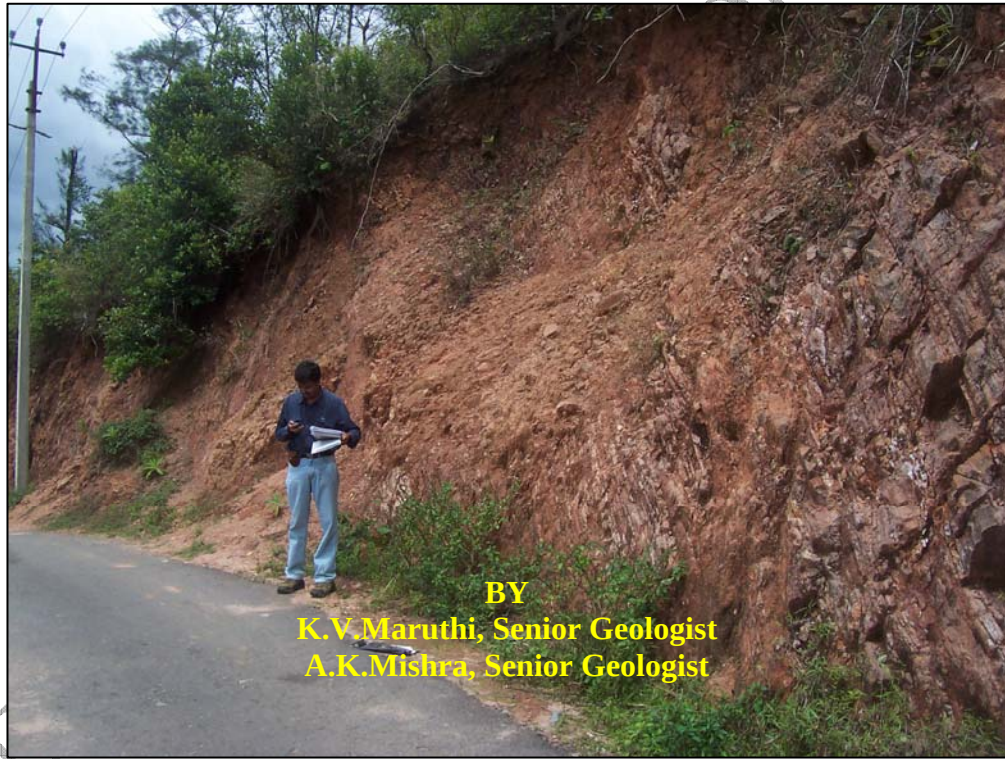
**GOVERNMENT OF INDIA
GEOLOGICAL SURVEY OF INDIA**



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ROADS IN CHIKMAGALUR, COORG, DAKSHINA KANNADA,
UDUPI AND SHIMOGA DISTRICTS, KARNATAKA**

(Progress Report for the Field Season 2009-10)

Code No.: EG/SR/KG/2009/043



BY

K.V.Maruthi, Senior Geologist

A.K.Mishra, Senior Geologist

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The Director General, Geological Survey of India**

**Project: ENGINEERING GEOLOGY
State Unit: Karnataka and Goa
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ABSTRACT

In order to implement the proposed action plan 2006 of the National Disaster Management Authority (NDMA) on landslide hazard and risk mitigation and to prepare a landslide database for future landslide studies, landslide inventory of the Ghat section of Western Ghat in parts of Karnataka state has been taken up. To update the database, an item pertaining to the landslide inventory along National highway (NH) and State highway (SH) roads in ghat sections was taken up under Mission-IV Engineering geology and Geotechnical investigation programme: Landslide Hazard Evaluation. The landslide inventory was carried out along the Ghat roads of the Western Ghat in Coorg, Dakshina Kannada and Chikmagalur districts covering parts of toposheet nos.48 O/7, 8 & 11; 48P/ 7,11&15;.

The following Ghat sections (SH roads and main district roads) were covered during the FS 2009-10.

- a) SH-64 between Chikmagalur district boundary- Beltangady road section: 29 landslides,
- b) In and around Madikeri town along different SH and district roads: 26 landslides
- c) Madikeri-Bhagamandala road section: 2 landslides.
- d) Bhagamandala-Karika road section: 34 landslides.
- e) Bhagamandala-Taleauvery road section: 6 landslides
- f) SH-27 Aldur-Balehonnur road section: 5 landslides
- g) SH-27 Balehonnur-Koppa road section: 8 landslides

The present study reveals that most of the landslides are shallow (<2m depth) debris slides/slumps. The cut slope height and angle plays a major role in all the slides as the sliding events from crown to toe are restricted between the cut slopes. It was observed that majority of the slides are restricted to the cut slopes having height more than 10m and slope angle varying from 70°- 90°. The relative relief from the cut slope is low to moderate at all the section and varies from 5m to 20m with depth of overburden varying from 0.5-10m. The main causes of landsliding in the Western Ghat are: toe cutting of hill slopes for the construction of roads, slope modification for human settlements, highly weathered rock mass and frequent rain. The ubiquitous presence of water is favorable for intense weathering of rocks causing drop in their shearing resistance. The heavy rainfall during monsoon triggers almost all Landslides.

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I. INTRODUCTION

Geological Survey of India, after being recognised as the Nodal Agency for Landslides in India (declared during 2004), vigorously and swiftly started multipoint approach towards landslide hazard studies which included site specific Landslide studies, landslide hazard zonation along corridors and townships and preparation of landslide inventory. As far as State unit: Karnataka and Goa of Geological Survey of India is concerned Landslide inventory was first carried out during FS 2007-08 in the states of Karnataka and Goa separately.

In order to implement the proposed action plan 2006 of the National Disaster Management Authority (NDMA) on landslide hazard and risk mitigation and to prepare a landslide database for future landslide studies, landslide inventory of the Ghat section of Western Ghat in parts of Karnataka state has been taken up. Engineering Geology division, State unit: Karnataka and Goa has been preparing systematically landslide database in Karnataka from 2007-08. To update the landslide database an item for landslide inventory along NH and SH in ghat sections was taken up under the annual programme EG/SR/KG/2009/043, Mission Engineering geology and Geotechnical investigation programme of Landslide Hazard Evaluation. The landslide inventory was carried out along the Ghat roads of the Western Ghat in Coorg, Dakshina Kannada and Chikmagalur districts covering parts of toposheet nos.48 O/7, 8 & 11; 48P/ 7, 11&15.

I.1 LOCATION

The Karnataka state is bounded by the Arabian Sea in the west, Goa and Maharashtra in the northwest and north, respectively and Tamilnadu and Kerala states to the South (Plate-1) .During the FS 2009-10, landslide inventory was carried out along the ghat roads in the Western Ghat belt. The Western Ghat belt which is known for its thickly vegetated forests and mineralisation is an irregularly elongated northwest southeast trending belt. In Karnataka, the Western Ghats extend from Coorg district in the south to Uttara Kannada district in the north.

I.2. PRESENT WORK

During the FS 2009-10, landslide inventory was carried out along ghat roads in the Western Ghat belt. A total of 204 line km was covered and 110 incidences of landslides were studied.

The following Ghat sections (SH roads and main district roads) were covered.

- A) Landslides recorded along SH-64 between Chikmagalur district boundary- Beltangady road section: 29 landslides (Plate3).
- B) Landslides recorded in and around Madikeri town along different SH and district roads: 26 landslides (Plate 4 & 5).
- C) Landslides recorded between Madikeri-Bhagamandala road section: 2 landslides (Plate 4).
- D) Landslides recorded between Bhagamandala-Karike road section: 34 landslides (Plate 4 & 6).
- E) Landslides recorded between Bhagamandala-Talcuvery road section: 6 landslides (Plate 4 & 6).
- F) Landslides along SH-27 Aldur-Balehonnur road section: 5 landslides (Plate 7).
- G) Landslides along SH-27 Balehonnur-Koppa road section: 8 landslides (Plate 8).

I.3. METHODOLOGY FOR LANDSLIDE INVENTORY

1. The historical landslide data were collected from the offices of the District Commissioners, PWDs and other district authorities of different districts.
2. Prioritization of the landslides for inventory was carried out i.e., the road sections, where there are more number of landslide incidences reported, were taken on priority basis.
3. As a large number of landslides were reported (A.K.Mishra et.al 2007) along major district roads in Coorg district they were given priority ahead of SH and NH roads
4. No data could be obtained from aerial photo/imagery as the landslides are small in size and temporal data was not available.
5. The most important characters and the important data to be collected were discerned as the data sheet provided by the CHQ was inadequate in many respects. The data sheet prepared by EG division for Landslide inventory studies was used.(Appendix 1)
6. The check list table was prepared i.e., which road section to be carried out first, whether any data of reported landslides are available, consultation of aerial photos etc.,
7. Each slide site was studied and the measurements of various dimensions made by using measuring tape.
8. During the field season 2007-08(Mishra & Pradhan, 2010) the slides were given a unique ID number to distinguish them from each other. As for Karnataka state the slides were named as KA 01, KA02, etc. During 2008-09 first slide studied was numbered KA-65 and the last slide studied assigned the number KA-278 (Maruthi et.al, 2011). In continuation, the first slide studied during the current study the first slide was assigned the number KA-279 with a view that each slide will have unique ID and can be stored in the landslide inventory database.

9. As many of the landslides lack data on date of occurrence, the date on which landslide data collected takes preference over date of occurrence, any other morphometric or independent criteria
10. Photo graphs taken are more than what is provided in the report and the numbering is done as Slide no: KA01 (1), Slide no: KA01 (2)... etc and is stored in the landslide inventory database file in .jpeg format for future reference.
11. Data are entered in excel format according to check list and stored as in soft copy. The soft copy is provided to the Dy.DG, SU: Karnataka and Goa and the Director EG for safe custody till viable software are developed to keep the database for future reference.

I.4. CONSTRAINTS, LIMITATIONS & ASSUMPTIONS

1. Data of many landslides were incomplete and many places these are inferred because of inaccessibility to the crown/ head portions of landslides and hence some measurements like scarp depth/width was visually estimated.
2. Scarp radius was visually estimated
3. Angle of repose and angle of failure were taken at the present slope even though slided surface might be different
4. Vertical interval and horizontal extension components were calculated from slide length and failure angle.
5. The size of slides in Western Ghats is small hence were difficult to pick up from the satellite imagery or Aerial photo of 1:50,000scale
6. The recent Aerial photos and temporal imagery are not available
7. Weathering depth at the slide site or nearby *nala* sections were studied.

NATURE AND QUANTUM OF WORK

Nature of Work	Total work envisaged	Work proposed for FS: 2009-10	Work completed
Aerial photo/ High resolution image interpretation and checking of incidences given by state government and other incidences enroute.	200 L km	200 L km	204 L Km (110 incidences)

I.5. ACKNOWLEDGEMENTS

The authors are sincerely thankful to Dy. D. G, SU: Karnataka and Goa for support and guidance. They are thankful to Shri. R. Panduranga, then Director, Engineering Geology Division for his technical guidance and present Director Dr.S.S.Nayak for scrutiny of the report. Without the data provided by the district authorities, locating slides would have been a difficult task. In this regard authors are grateful to the District Commissioners, officials from PWD and officials from Revenue Department Govt. of Karnataka.

II. REGIONAL GEOLOGY

The western ghat belt preserves an ideal succession of Bababudan Group, which is exposed in the mountainous region of Kudremukh, Agumbe and Kodchadri. The Sargur Group is represented by a number of enclaves and the enclaves are quartzite, amphibolite, iron formation, garnetiferous mica schist, kyanite-staurolite schist, silimanite-garnet schist, calc-silicate rock and ultramafics within gneisses and granites. The Peninsular Gneiss of this region is a complex of migmatitic gneiss and granitoids and includes biotite gneiss, hornblende-biotite gneisses and hornblende gneiss. The peninsular gneiss is unconformably overlain by the Dharwar Supergroup (Bababudan Group of rocks). Bababudan Group is represented by four formations, namely (a) Walkunje Formation, (b) Kudremukh Formation, (c) Kodachadri Formation, and d) Narasiparvata Formation. The Walkunje Formation represents the lower arenaceous and argillaceous members of the Bababudan Group. Other rock members associated with it are quartzites, quartz-sericite schist, greywacke, arkose and quartz-biotite-chlorite schist. Kudremukh formation comprises amygdular metavolcanics, amphibolite, actinolite-chlorite schist, meta gabbro and ultramafics with interbeds of quartzites, quartz-sericite schist and chlorite schist. Kodchadri Formation comprises of Banded magnetite quartzite and quartz-chlorite-sericite schist. The Narasiparvata formation comprises of acid porphyry, chlorite quartz schist and iron stones. Numerous dykes, varying in texture from coarse to fine grained, are reported from various localities. The laterite cover is extensive in the area between the coastal plains and the intermediate range of hills below the Western Ghats (Awasthi, 1980; Davay, 1968; Gopal Reddy et.al 1984; Jagannathan et.al 1983).

IV. CHARACTERISTICS OF LANDSLIDES STUDIED IN 2009-10

IV.1.Type of landslides: Out of the Total 110 landslides studied in 2009-10 majority are debris slides (60 landslides or 54.55% of the total) followed by slumps, including both debris slump and earth slumps (42 landslides or 38.18% of the total) followed by rock slides (4 landslides or 3.64% of the total) and complex or composite slides (4 landslides or 3.64% of the total).(Table 1 & Fig 1)

Table 1: Type of landslides observed in 2009-10.

Type of slides	No of slide	%
Debris slide	60	54.55
Debris slump	30	27.27
Earth slump	12	10.91
Rockslide	4	3.64
Complex/Composite slide	4	3.64
Total	110	100

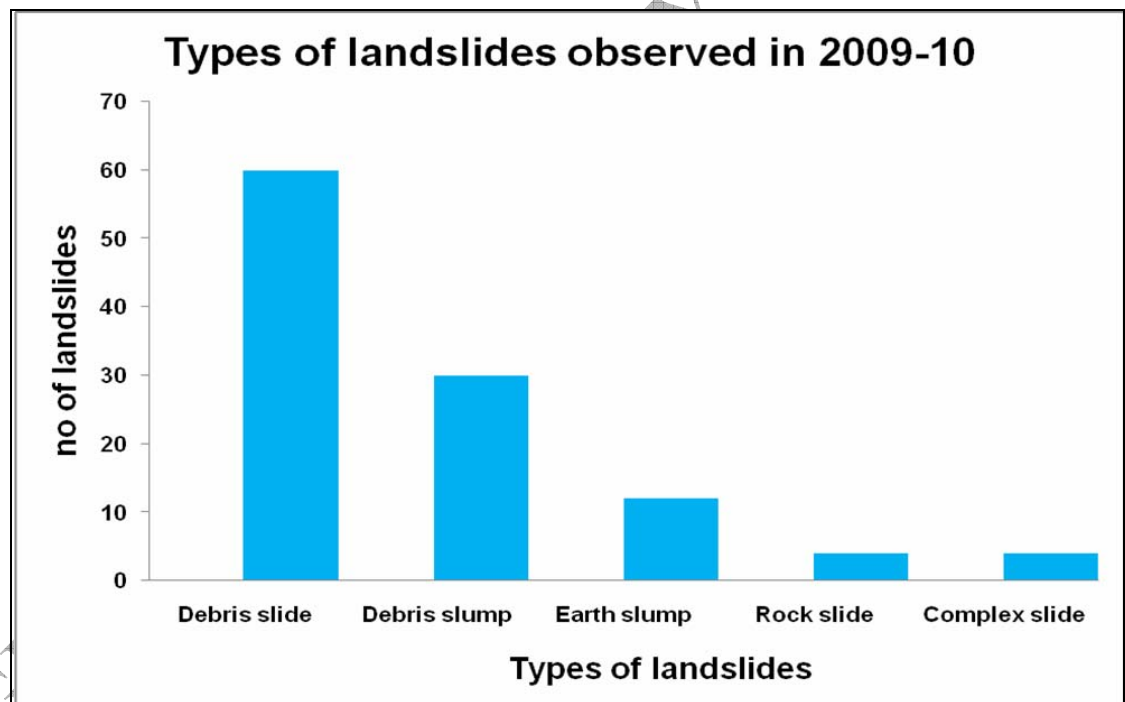


Fig 1: Type of landslides in each section.

Section wise analysis on the type of landslide revealed that Bhagamandala- Karike and around Madikeri sections are having maximum number of debris slides (16 no in each section) closely followed by Charmudi ghat section (15 no). Bhagamandala-Karike and around Madikeri sections are also having maximum number of debris slumps (10 no in each section). Earth slumps were noticed only in Bhagmandala-Karike and Charmudi ghat sections (6 no in each section). Out of

four rock slides three were observed in Charmudi ghat section and one in Aldur- Balehoonur section. Of the four complex slides where both rock slides and debris slides were noticed together are two in Bhagamandala-Karrike section and two in Balehonnur-Koppa section. (Table 2, 3).

Table 2: Type of landslides in each section.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karrike	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
Debris slide	15	16	2	16	5	1	5
Debris slump	5	10	0	10	1	3	1
Earth slump	6	0	0	6	0	0	0
Rock slide	3	0	0	0	0	1	0
Complex slide	0	0	0	2	0	0	2
Total	29	26	2	34	6	5	8

Table 3: Percentage distribution of type of slides in each section.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karrike	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
Debris slide	51.72	61.54	100.00	47.06	83.33	20.00	62.50
Debris slump	17.24	38.46	0.00	29.41	16.67	60.00	12.50
Earth slump	20.69	0.00	0.00	17.65	0.00	0.00	0.00
Rock slide	10.34	0.00	0.00	0.00	0.00	20.00	0.00
Complex slide	0.00	0.00	0.00	5.88	0.00	0.00	25.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

IV. 2. Dimensions of landslides: The length, width and depth of the slides studied in 2009-10 with respective percentages are presented in (Table 4, 5 and Fig 2a, 2b and 2c). It can be noted from the length and width that most of the landslides have length and width < 20.0 m. 77.28% of the slides have length < 20.0 m and 60.0% of the slides have width < 20.0 m. With regard to depth most of the slides are shallow with ≤ 1.0 m depth (79.09% of the total). The dimensions of slides in each road sections are also represented in Table 6, 7, 8, 9, 10 and 11 with corresponding percentage distribution.

Table 4: Dimensions of landslides (length and widthwise) with percentage distribution observed in 2009-10

	Length	% distribution	Width	% distribution
$\leq 10\text{m}$	38	34.55	20	18.18
$>10 \leq 20\text{m}$	47	42.73	46	41.82
$>20\text{m} \leq 30\text{m}$	19	17.27	28	25.45
$>30\text{m} \leq 40\text{m}$	3	2.73	10	9.09
$>40\text{m} \leq 50\text{m}$	1	0.91	2	1.82
$>50\text{m}$	2	1.82	4	3.64
Total	110	100.00	110	100.00

Table 5: Dimensions of landslides (Depth wise) with percentage distribution observed in 2009-10

	Depth	% distribution
$\leq 1.0\text{m}$	87	79.09
$>1.0\text{m} \leq 2.0\text{m}$	19	17.27
$>2.0\text{m} \leq 5.0\text{m}$	4	3.64
$>5.0\text{m}$	0	0.00
Total	110	100

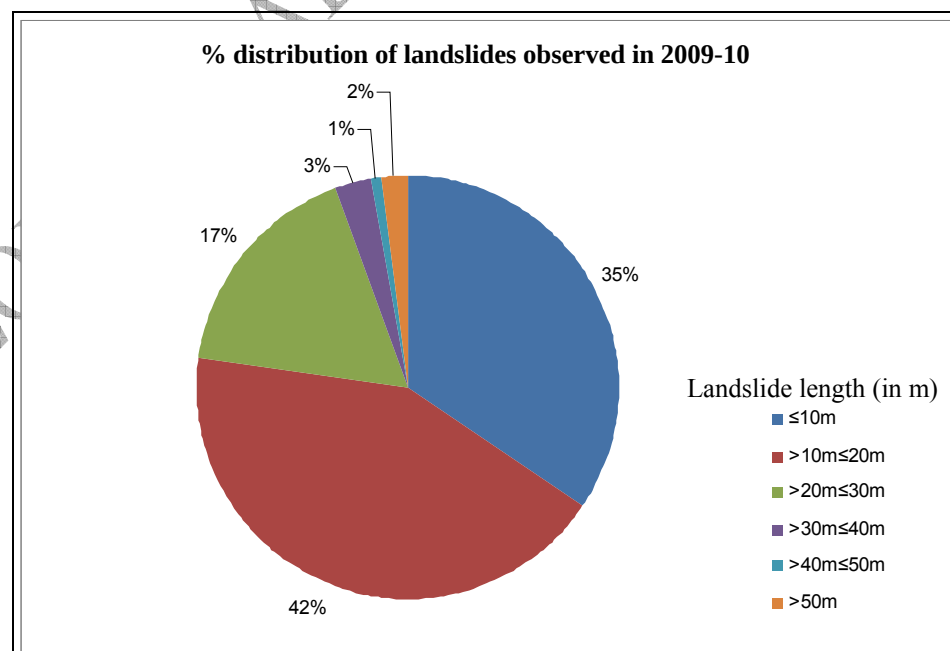


Fig 2a: Percentage distribution of landslides with respect to their length.

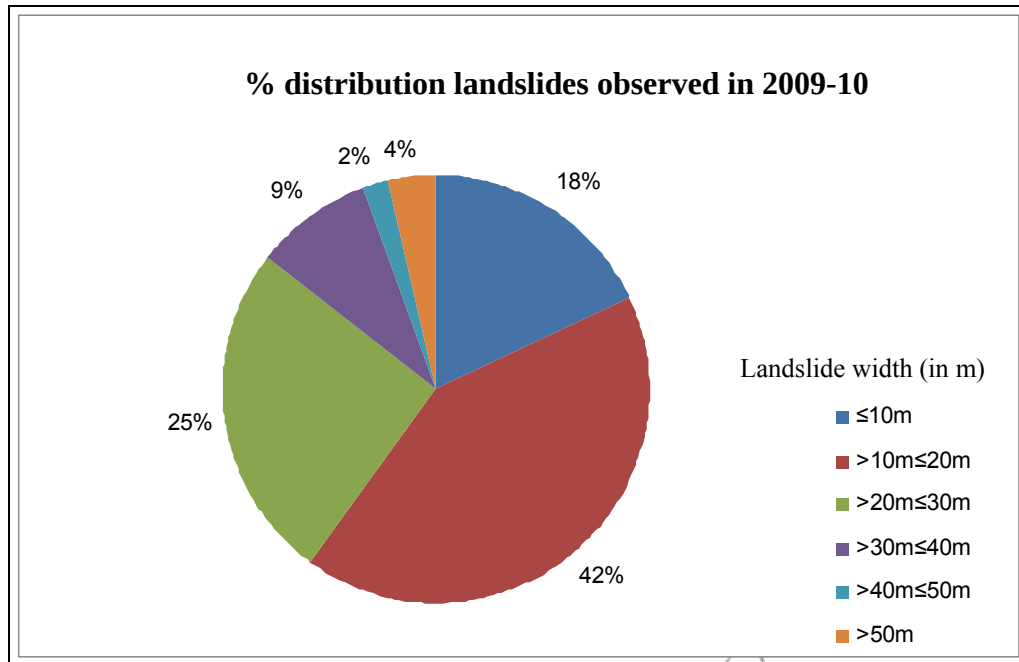


Fig 2b: Percentage distribution of landslides with respect to their width.

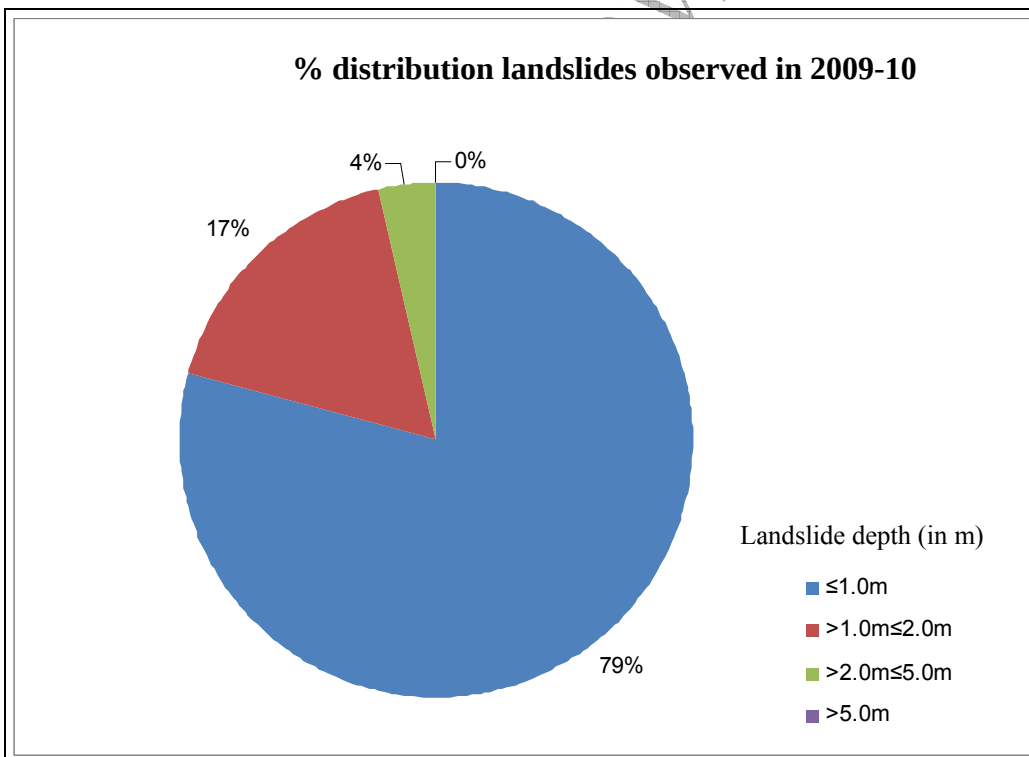


Fig 2c: Percentage distribution of landslides with respect to their depth.

Table 6: Number of landslides in each section with different slide length.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karika	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
≤10m	10	12	1	8	2	3	2
>10m≤20m	15	8	0	17	1	1	5
>20m≤30m	3	5	1	7	1	1	1
>30m≤40m	0	1	0	1	1	0	0
>40m≤50m	0	0	0	1	0	0	0
>50m	1	0	0	0	1	0	0
Total	29	26	2	34	6	5	8

Table 7: Percentage distribution of landslides in each section with different slide length.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karika	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
≤10m	34.48	46.15	50.00	23.53	33.33	60.00	25.00
>10m≤20m	51.72	30.77	0.00	50.00	16.67	20.00	62.50
>20m≤30m	10.34	19.23	50.00	20.59	16.67	20.00	12.50
>30m≤40m	0.00	3.85	0.00	2.94	16.67	0.00	0.00
>40m≤50m	0.00	0.00	0.00	2.94	0.00	0.00	0.00
>50m	3.45	0.00	0.00	0.00	16.67	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 8: Number of landslides in each section with different slide width.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karike	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
≤10m	6	13	0	0	0	1	0
>10m≤20m	12	10	1	16	3	1	3
>20m≤30m	8	3	0	11	2	2	2
>30m≤40m	0	0	1	6	0	0	3
>40m≤50m	1	0	0	0	1	0	0
>50m	2	0	0	1	0	1	0
Total	29	26	2	34	6	5	8

Table 9: Percentage distribution of landslides in each section with different slide width.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karike	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
≤10m	20.69	50.00	0.00	0.00	0.00	20.00	0.00
>10m≤20m	41.38	38.46	50.00	47.06	50.00	20.00	37.50
>20m≤30m	27.59	11.54	0.00	32.35	33.33	40.00	25.00
>30m≤40m	0.00	0.00	50.00	17.65	0.00	0.00	37.50
>40m≤50m	3.45	0.00	0.00	0.00	16.67	0.00	0.00
>50m	6.90	0.00	0.00	2.94	0.00	20.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 6: Number of landslides in each section with different slide depth.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karika	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
≤1.0m	20	18	2	31	3	5	8
>1.0m≤2.0m	6	7	0	3	3	0	0
>2.0m≤5.0m	3	1	0	0	0	0	0
>5.0m	0	0	0	0	0	0	0
Total	29	26	2	34	6	5	8

Table 7: Percentage distribution of landslides in each section with different slide length.

	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karika	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
≤1.0m	68.97	69.23	100.00	91.18	50.00	100.00	100.00
>1.0m≤2.0m	20.69	26.92	0.00	8.82	50.00	0.00	0.00
>2.0m≤5.0m	10.34	3.85	0.00	0.00	0.00	0.00	0.00
>5.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

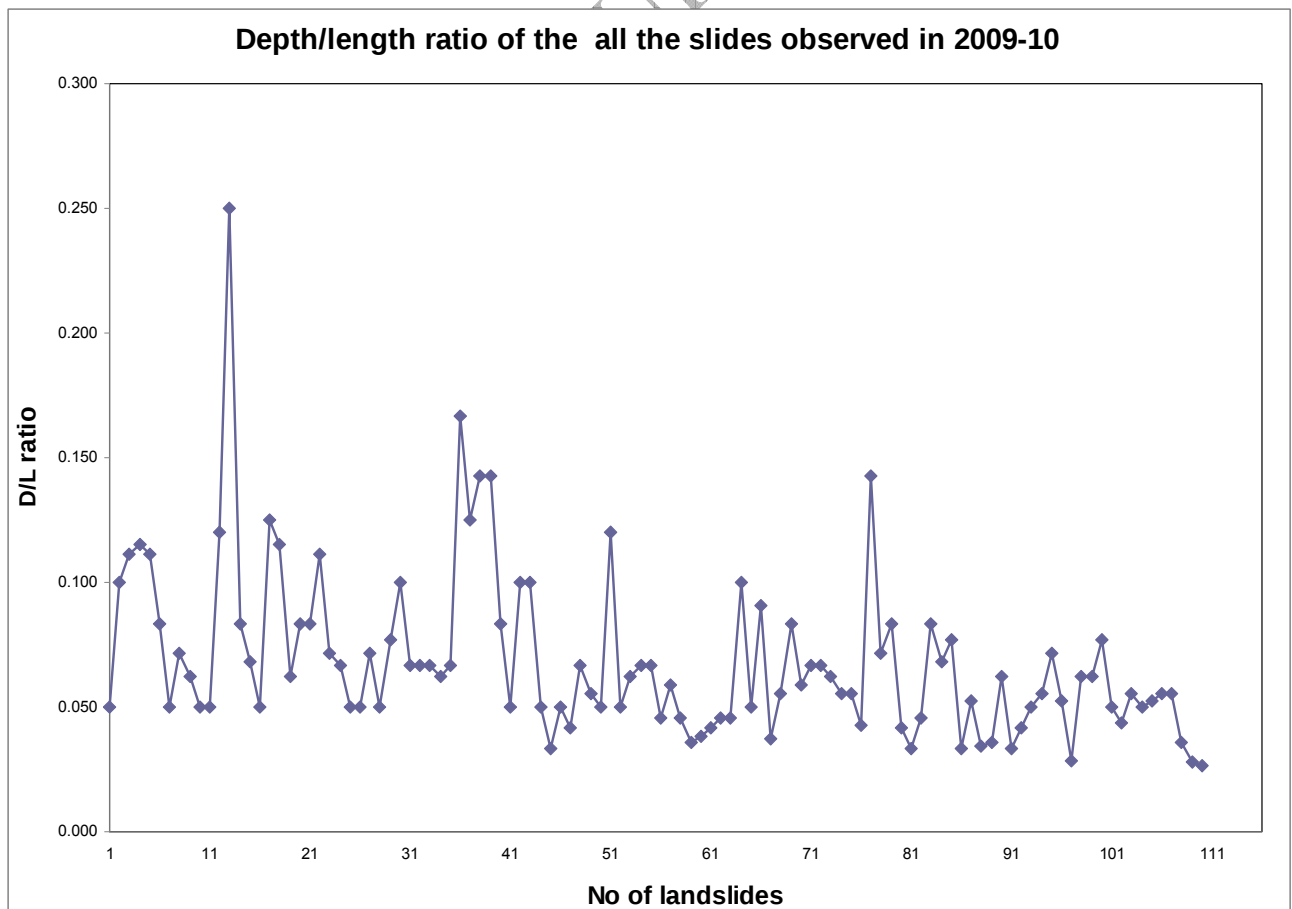
Bed rock Geology: The geology of the bed rock of the landslides observed in 2009-10 shows that majority of the landslides have occurred where bed rock is weathered granite or granite (59 slides or 53.64 % of the total). This is followed by weathered gneiss (50 slides or 45.45%) and a rock slide was noticed on basic dyke. (Table 12)

Table 12: Bed rock Geology of slides observed in 2009-10.

Bed rock geology	No of slides	%
Weathered Gneiss	50	45.45
Weathered Granite	55	50.00
Granite	04	3.64
Basic dyke	1	0.91
Total	110	100.00

IV. 4. Depth/length (D/L) ratio : The depth to Length ratio (D/L) for most of the slides fall in between 0.03 to 0.15 indicating shallow depth of the landslides. One slide in Charmudi ghat is a quite deep landslide with D/L ratio going beyond 0.2(Fig 3)

Fig 3: Depth/length ratio of all sides observed in 2009-10.



IV. 5. History of landslides: Due to the lack of data on the date of occurrence of landslides the age of landslide is difficult to arrive at, therefore history was taken on the morphological features observed on hill slopes. The landslides with fresh surface having less plant growth on debris categorized as new slides and rest are grouped as old slides. As regard to reactivated ones the old slides wherein new slides are developed are considered along with the slides wherein authorities have provided some remedial measures but still then failed are also grouped under reactivated ones.

Most of the landslides are grouped as new slides (76 slides or 69.09% of the total) followed by old slides (30 slides or 27.27% of the total) and reactivated slides (4 slides or 3.64% of the total). (Table 13)

Table 13: Number of landslides observed in 2009-10 according to their ages.

History of slides	No of slide	%
New	76	69.09
Old	30	27.27
Reactivated	4	3.64
Total	110	100.00

Table 14: Number of landslides in each section observed in 2009-10 according to their ages.

History of landslides	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karika	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
New	23	15	1	24	6	3	4
Old	5	10	0	9	0	2	4
Reactivated	1	1	1	1	0	0	0
Total	29	26	2	34	6	5	8

Table 15: Percentage distribution of landslides according to their ages in each section observed in 2009-10.

History of landslides	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karika	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehonnur-Koppa
New	79.31	57.69	50.00	70.59	100.00	60.00	50.00
Old	17.24	38.46	0.00	26.47	0.00	40.00	50.00
Reactivated	3.45	3.85	50.00	2.94	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

History of slides in each road section reveals majority of new slides have occurred in Bhagamandala- Talcauvery section (6 slides or 100% of total slides in this section) closely followed by Charmudi ghat section (23 slides or 79.31% of total slides in this section). Old slides are mostly seen in around Madikeri section (10 slides or 38.46% of total slides in this section) and Bhagamandala-Karika section (9 slides or 26.47% of total slides in this section) (Table 14, 15).

IV. 6. Cut slope heights: Majority of the new slides observed in 2009-10 have cut slope heights ranging between 5 m and 15 m (87 slides or 79.1% of total slides) followed by <5 m cut slope height (14 slides or 12.73% of total slides) followed by cut slope heights >15m m to ≤ 20 m m (5 slides or 4.55% of total slides) and >20 m (4 slides or 3.64% of total slides)(Table 16, 17 and 18).

Table 17: number of landslides observed in 2009-10 in different cut slope height.

Cut slope Heights	No of slides	%
≤ 5 m	14	12.73
$>5\text{m}\leq 10\text{m}$	49	44.55
$>10\text{m}\leq 15\text{m}$	38	34.55
$>15\text{m}\leq 20\text{m}$	5	4.55
$>20\text{m}\leq 25\text{m}$	2	1.82
$>25\text{m}$	2	1.82
Total	110	100.00

Table 18: number of landslides in each section observed in 2009-10 in different cut slope height.

Cut slope heights	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karikeri	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehoonur-Koppa
≤ 5 m	3	11	0	0	0	0	0
$>5\text{m}\leq 10\text{m}$	17	10	0	13	5	3	1
$>10\text{m}\leq 15\text{m}$	9	5	2	14	0	2	6
$>15\text{m}\leq 20\text{m}$	0	0	0	3	1	0	1
$>20\leq 25\text{m}$	0	0	0	2	0	0	0
$>25\text{m}$	0	0	0	2	0	0	0
Total	29	26	2	34	6	5	8

Table 19: Percentage distribution of cut slope heights of slides in each section observed in 2009-10.

Cut slope heights	Charmudi Ghat	Around Madikeri	Madikeri-Bhagamandala	Bhagamandala-Karikeri	Bhagamandala-Talcauvery	Aldur-Balehoonur	Balehoonur-Koppa
≤ 5 m	10.34	42.31	0.00	0.00	0.00	0.00	0.00
$>5\text{m}\leq 10\text{m}$	58.62	38.46	0.00	38.24	83.33	60.00	12.50
$>10\text{m}\leq 15\text{m}$	31.03	19.23	100.00	41.18	0.00	40.00	75.00
$>15\text{m}\leq 20\text{m}$	0.00	0.00	0.00	8.82	16.67	0.00	12.50
$>20\leq 25\text{m}$	0.00	0.00	0.00	5.88	0.00	0.00	0.00
$>25\text{m}$	0.00	0.00	0.00	5.88	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

V. SUMMARY AND CONCLUSIONS

A) Landslides recorded along SH-64 between Chikmagalur district boundary-Beltangady road section: 29 landslides are recorded along 34 km stretch of this ghat section. The majority of slides were found to be debris slides and slumps caused mainly due to tampering of the natural slope for making road. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 35° . The slopes are moderately vegetated. The overburden thickness varies from 1-5m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m. The cut slopes have failed due to heavy rain in the Ghat section during monsoon. Geologically the area comprises of granite and gneisses.

B) Landslides recorded in and around Madikeri town along different SH and district roads: The different state highways connecting to Madikeri including SH-27 and major roads in and around Madikeri town were studied. 26 landslides are recorded in nearly 31 km stretch as whole. The majority of slides were found to be debris slides and slumps caused mainly due to tampering of the natural slope for making road and settlements. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 30° . The slopes are moderately vegetated. The overburden thickness is less than 5 m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m. The cut slopes have failed due to heavy rain during monsoon. Geologically the area comprises of weathered granite and gneisses.

C) Landslides recorded between Madikeri-Bhagamandala road section: 2 landslides are recorded along 26 km stretch of this ghat section. The slides were found to be debris slides caused mainly due to tampering of the natural slope for making road. Geologically the area comprises of weathered granite. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 30° . The slopes are moderately vegetated. The overburden thickness is less than 5 m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m.

D) Landslides recorded between Bhagamandala-Karika road section: 34 landslides are recorded along 40 km stretch of this ghat section. The majority of slides were found to be debris slides and slumps caused mainly due to tampering of the natural slope for making road. Geologically the area comprises of weathered granite, granite and gneisses. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 30° . The slopes are thickly vegetated. The overburden thickness is less than 5 m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m. The vertical cut slopes for making road have increased the instability of the hill slopes. The loose and non-cohesive material formed due to prolonged weathering failed due to increase in pore water pressure during heavy rain in monsoon experienced in the Ghat section.

E) Landslides recorded between Bhagamandala to Talcavery road section: 6 landslides are recorded along 8 km stretch of this ghat section. The majority of slides were found to be debris slides and slumps caused mainly due to tampering of the natural slope for making road. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 30°. The slopes are moderately vegetated. The overburden thickness is less than 5 m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m. The cut slopes have failed due to heavy rain in the Ghat section during monsoon. Geologically the area comprises of weathered granite and gneisses.

F) Landslides along SH-27 Aldur-Balehonnur road section: 5 landslides are recorded along 35 km stretch of this ghat section. The majority of slides were found to be debris slides and slumps caused mainly due to tampering of the natural slope for making road. one rock slide was also found. Geologically the area comprises of weathered granite. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 30°. The slopes are thickly vegetated mainly tea and coffee plantations. The overburden thickness is less than 5 m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m. The vertical cut slopes for making road have increased the instability of the hill slopes. The loose and non-cohesive material formed due to prolonged weathering failed due to increase in pore water pressure during heavy rain in monsoon experienced in the Ghat section.

G) Landslides along SH-27 Balehonnur-Koppa road section: 8 landslides are recorded along 30 km stretch of this ghat section. The majority of slides were found to be debris slides and slumps caused mainly due to tampering of the natural slope for making road. Two composite slides were also found. Geologically the area comprises of weathered granite. The slides are shallow with less than 2m depth. The general slope angle varies from 25° to 30°. The slopes are thickly vegetated mainly tea and coffee plantations. The overburden thickness is less than 5 m and consists of soil and weathered rock. The cut slope angle is 70° to 80° with height varying from 2-15m. The vertical cut slopes for making road have increased the instability of the hill slopes. The loose and non-cohesive material formed due to prolonged weathering failed due to increase in pore water pressure during heavy rain in monsoon experienced in the Ghat section.

CONCLUSIONS

1. All slides studied were caused due to the human interference with the natural slopes. The main causes of landslides in Western Ghat are toe cutting of hill slopes for the construction of road, modification for human settlement, highly weathered rock mass and frequent rain.
2. All slides are triggered by heavy rainfall mainly in rainy seasons extending for 4 months from May to August. The ubiquitous presence of water is favorable for intense weathering of rocks causing appreciable drop in their shearing resistance. The heavy rainfall during monsoon is the major trigger for all the slides.

3. Majority of the slides observed in 2009-10 are debris slides (60 landslides or 54.55% of the total) followed by slumps, including both debris slump and earth slumps (42 landslides or 38.18% of the total). Debris slides were mainly noticed in and around Madikeri town wherein for human settlement construction purpose huge cutting of slopes were made in an unscientific way. Debris slides were also noticed in higher number in Charmudi ghat road section and Madikeri-Karikeri road section where cut slope height is relatively higher than rest of the sections we can see the dominance of debris slides. Similarly small cut slope height and almost vertical to sub vertical slope angle may be attributed for occurrence of debris slump and earth slumps.
4. Majority of the slides are small in dimension viz., 94.55%, 85.45% of the slides observed were having less than 30 m in length, width respectively. Interesting to notice that almost all slides are shallow depth with less than 2m. The width of the slides vary between a long ranges because of the fact that multiple source, lateral grading of slides and slides are juxtaposed and difficult to delimit.
5. Majority of the landslides have occurred where bed rock is weathered granite or granite (59 slides or 53.64 % of the total). This is followed by weathered gneiss (50 slides or 45.45%) and a rock slide was noticed on basic dyke.
6. Majority of the slides have cut slope heights ranging between $>5\text{m}$ to $\leq 15\text{ m}$ (87 slides, 79.1% of total slides) with nearly vertical slope angle.
7. Majority of the slides falls in new slide category (76 slides or 69.09% of the total) followed by old slides (30 slides or 27.27% of the total) and reactivated slides (4 slides or 3.64% of the total).
8. The depth to length ratio (D/L) for all the slides show that most of the slides fall in between 0.03 to 0.15 indicating shallow depth of the landslides. One slide in Charmudi ghat is a quite deep landslide with D/L ratio going beyond 0.2.
9. The convex slopes were found to be more prone /susceptible to sliding than the concave and irregular slopes. Therefore cut slopes should be made as a plane or with a little concavity with the top edge a plane at an angle less than the over angle of concavity.
10. Cut slope angle and height plays a major role in landsliding. Prograding of the slide is more towards both the flanks rather than towards back of the crown.
11. Overburden thickness is around 4-5m consisting of mostly soil and weathered rocks.

VI. RECCOMENDATIONS

- 1 Management of drainages is not properly carried out in the study area. Blockage of drainage is observed in 60% of the slided area. Water from up hill slope may be diverted in the following ways in order to minimize sliding.
 - i. Provision of contour drainage above the crown of landslides,
 - ii. Catch water drains in the sections,
 - iii. Insertion of horizontal perforated pipes into the slopes which will act as weep holes in the vertical slopes, thus reducing the pore pressure by draining out the excess water. This has to be given at suitable interval as per the site condition.

2. Vertical cut slopes should be avoided in future as it does not give stability in such terrain.
3. Retaining structures like retaining wall, stone pitching and gabions are recommended as per the site condition.
4. Efforts should be made to make it mandatory for the district authorities to provide each and every landslide details to GSI in the provided format.
5. The date of occurrence of slide and rainfall data to be provided by the dist. authority.

Sd/- (K.V.MARUTHI) Senior Geologist	Sd/- (A.K.MISHRA) Senior Geologist
SCRUTINIZED BY Sd/- (Dr. S.S.NAYAK) Director	

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SYNOPSIS OF WORK DONE

1.	Title of the report	A REPORT ON LANDSLIDE INVENTORY ALONG NH & SH OF GHAT ROADS IN CHIKMAGLUR, COORG, DAKSHINA KANNADA, UDUPI AND SHIMOGA DISTRICTS KARNATAKA		
2.	Item No.	EG/SR/KG/2009/043		
3	Field Season	2009-10		
4	Date of commencement	October 2009		
5	Date of completion	September 2010		
6	Officers Associated with investigation and No. of days spent in the field	K.V.MARUTHI, SENIOR GEOLOGIST A.K.MISHRA, SENIOR GEOLOGIST		
7	Quantum of work done			
	Nature of Work	Total work envisaged	Work proposed for FS: 2008-09	Work completed
	Aerial photo/ High resolution image interpretation and checking of incidences given by state governments and other incidences enroute.	200 L km	200 L km	204 L km (110 incidences)
8	Expenditure (1) POL (2) Wages (3) Misc.	Rs.13,925=00 Rs. 3633=92 Rs. 5910=00		
9	Other information if any	----		

Sd/- (K.V.MARUTHI) Senior Geologist	Sd/- (A.K.MISHRA) Senior Geologist
Sd/- (Dr. S.S.NAYAK) Director	

Slide No	Slide No	Location	Toposheet no	Latitude			Longitude			ELEVATION (M)	Taluk	District	State	Landmarks	Date of occurrence	Time of occurrence	Dimension of slide			Base length (Toe length)
				degree	Min	Sec	Deg	Min	Sec								Length (in m)	Width (in m)	Depth(in m)	

GEOLOGICAL SURVEY OF INDIA

Type of slide	History	Overburden		Material involved	Depth of weathering	Volume of material(cu m)
		Type	depth			

GEOLOGICAL SURVEY OF INDIA

whether road	Structures	Run out	Up to	Casualties	Rainfall	Type of	Local geology	Regional	Structure				Cutslope	Type of failure	Slope morphometry				Repose angle
cutting	affected	Distance(m)	Location			Bedrock		geology	Joint orientation	spacing	opening	filling	height	surface	Slope pre failure	Slope post failure	Slide Direction	General slope gradient	

GEOLOGICAL SURVEY OF INDIA

Failure angle	horizontal extent	vertical interval

GEOLOGICAL SURVEY OF INDIA

LOCATION MAP OF KARNATAKA STATE IN INDIA



III. 6. Landslides along SH-27 Aldur-Balehonnur road section

SLIDE NO: KA-376

LOCATION: The slide is located at latitude 13° 16' 13.7" N and longitude 75° 37' 26.3" E in Survey of India toposheet No 48 O/11 along SH-27 between Aldur-Balehonnur road section, Mudigere Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >6.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 3.0 m and vertical interval of 8.0 m (Photo 112).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 8.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 10.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 20.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 10.0m/ SH-27 |
| i. Cut slope Height | : | 7.0 m |
| j. Direction of slide | : | N25°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Old slide almost stabilised.

SLIDE NO: KA-377

LOCATION: The slide is located at latitude 13° 16' 15.5" N and longitude 75° 37' 21.5" E in Survey of India toposheet No 48 O/11 along SH-27 between Aldur-Balehonnur road section (200 m from slide no KA-376 towards Balehonnur), Mudigere Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >6.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 113).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 8.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 24.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 48.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 10.0m/ SH-27 |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N25°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Old slide almost stabilised. Slide on the bend of the road, removal of debris with slope easening is recommended to arrest reactivation.

SLIDE NO: KA-378

LOCATION: The slide is located at latitude 13° 16' 18.9" N and longitude 75° 37' 25.9" E in Survey of India toposheet No 48 O/11 along SH-27 between Aldur-Balehonnur road section (300 m from slide no KA-377 towards Balehonnur), Mudigere Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is >8.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 14.0 m (Photo 114).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 13.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 22.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 143.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 15.0m/ SH-27 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N35°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECOMMENDATION: Removal of debris material, proper drainage and slope grading/slope easening are recommended.

SLIDE NO: KA-379

LOCATION: The slide is located at latitude 13° 16' 20.1" N and longitude 75° 37' 24.8" E in Survey of India toposheet No 48 O/11 along SH-27 between Aldur-Balehonnur road section (50 m from slide no KA-378 towards Balehonnur), Mudigere Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new rock slide. The debris consists of rock fragments mainly weathered granitic material. Two sets of joints are noticed J1- EW/46°NE with 10-15 cm spacing and is tight and J2- N55°W/vertical with 10-50 cm spacing and is tight. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown part of the slide is stable and head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 8.0 m (Photo 115).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 19.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 47.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 12.0m/ SH-27 |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Removal of debris material, proper drainage and slope grading/slope easening are recommended.

SLIDE NO: KA-380

LOCATION: The slide is located at latitude 13° 16' 10.2" N and longitude 75° 36' 59.7" E in Survey of India toposheet No 48 O/11 along SH-27 between Aldur-Balehonnur road section (1 km from slide no KA-379 towards Balehonnur), Mudigere Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. Three slides adjacent to each other taken as one slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 25.0 m (Photo 116 and 117).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 23.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 58.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 667.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 26.0m/ SH-27 |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N40°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Removal of debris material, proper drainage and slope grading/slope easening are recommended.

III.2. Landslides recorded in and around Madikeri town along different SH and district roads

SLIDE NO: KA-308

LOCATION: The slide is located at latitude 12° 24' 43.3" N and longitude 75° 44' 51.5" E in Survey of India toposheet No 48 P/11 in Mangaladevi nagar, Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during June-2007. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. Construction of houses/settlements is the main land use. Circular crown cracks are noticed which are 5-10 cm in length, 10-20 cm opening and having radial pattern. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 35).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 40.0 m ³ |
| e. Slope angle post failure | : | 45° |
| f. Slope angle pre failure | : | 70° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | S50°E |

CAUSES: Human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main cause for the slide.

NATURE OF DAMAGE: Settlements in Mangaladevi nagar affected.

RECCOMENDATION: The debris should be removed from the slided zone. Retaining wall should be provided as no space is available between the slope and the houses (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-309

LOCATION: The slide is located at latitude 12° 24' 43.7" N and longitude 75° 44' 49.6" E in Survey of India toposheet No 48 P/11 in Mangaladevi nagar, Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during July-2007. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. Construction of houses/settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 36).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 30.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 2.0 m |
| d. Volume of failed mass above the failure surface | : | 240.0 m ³ |
| e. Slope angle post failure | : | 45° |
| f. Slope angle pre failure | : | 70° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 6.0 m |
| j. Direction of slide | : | N55°W |

CAUSES: Effect of human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main causes for the slide.

NATURE OF DAMAGE: This slide occurred in the northern end of the spur trending N55°E-S55°W in the left bank slope without causing any damage to structure.

RECCOMENDATION: The debris should be removed from the slided zone (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-310

LOCATION: The slide is located at latitude 12° 24' 43.5" N and longitude 75° 44' 50.7" E in Survey of India toposheet No 48 P/11 in Mangaladevi nagar, Madikeri town, Madikeri Taluk, Coorg district (The slide occurred in the left side slope of the valley in the N55°E trending hillock. The slided debris consisting of earlier dumped material in the slope slid along the narrow gap between the two houses in the valley floor.)

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during June-2007. The slided debris consisting of earlier dumped material in the slope. The slided area has an overburden thickness of nearly 2.0 m. Construction of houses/settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 37).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 40.0 m ³ |
| e. Slope angle post failure | : | 45° |
| f. Slope angle pre failure | : | 70° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | S50°E |

CAUSES: Human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main causes for the slide.

NATURE OF DAMAGE: No major structures affected.

RECCOMENDATION: The debris should be removed from the slided zone (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-311

LOCATION: The slide is located at latitude 12° 24' 44.5" N and longitude 75° 44' 54.0" E in Survey of India toposheet No 48 P/11 in Mangaladevi nagar, Madikeri town, Madikeri Taluk, Coorg district . The slide is located in the left bank slope of the valley of the spur trending N85E.

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during July-2007. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. Construction of houses/settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The boundary wall and pavement of the house constructed in the hill top located at the edge of the slope facing the valley slid down slope. The 15 cm vertical displacement of the crack in the intact boundary wall indicates that the slope to be still unstable and further movement is expected (Photo 38).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|------------------------|
| a. Length of failed mass from crown to foot | : 30.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 2.0 m |
| d. Volume of failed mass above the failure surface | : 240.0 m ³ |
| e. Slope angle post failure | : 45° |
| f. Slope angle pre failure | : 70° |
| g. General slope gradient | : 30° |
| h. Run out distance / up to | : -/- |
| i. Cut slope Height | : 5.0 m |
| j. Direction of slide | : N55°W |

CAUSES: Human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main cause for the slide.

NATURE OF DAMAGE: Boundary wall and pavement of the house constructed in the hill top located at the edge of the slope are damaged.

RECCOMENDATION: The debris should be removed from the slided zone with proper drainage (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-312

LOCATION: The slide is located at latitude 12° 24' 44.5" N and longitude 75° 44' 54.0" E in Survey of India toposheet No 48 P/11 in Mangaladevi nagar, Madikeri town, Madikeri Taluk, Coorg district . The slide is located nearly 100 m west of slide no KA-311 in the same area. The debris material from below the foundation of the house in the top of the hillock slid down slope damaging one house in flow path.

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during July-2007. The debris consists of rock fragments, clay and weathered granitic material. The crown cracks with >5 cm opening are observed on the ground indicating persisting instability .The slid area has an overburden thickness of nearly 1.0 m. The depth of weathering is 5.0 m. Construction of houses/settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 39).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|------------------------|
| a. Length of failed mass from crown to foot | : 32.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 9.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 2.0 m |
| d. Volume of failed mass above the failure surface | : 288.0 m ³ |
| e. Slope angle post failure | : 45° |
| f. Slope angle pre failure | : 70° |
| g. General slope gradient | : 30° |
| h. Run out distance / up to | : -/- |
| i. Cut slope Height | : 5.0 m |
| j. Direction of slide | : N45°W |

CAUSES: Human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Settlements in Mangaladevi nagar affected.

RECCOMENDATION: Both the houses have to be vacated. The dumped material in the slopes should be removed as the lower contours have many houses (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-313

LOCATION: The slide is located at latitude 12° 24' 44.5" N and longitude 75° 44' 54.0" E in Survey of India toposheet No 48 P/11 in Mangaladevi nagar, Madikeri town, Madikeri Taluk, Coorg district . The slide occurred in the right bank slope of the valley of the spur trending N85°E.

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during July-2007. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is 5.0 m. Construction of houses/settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 40).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 30.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 9.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 2.0 m |
| d. Volume of failed mass above the failure surface | : | 270.0 m ³ |
| e. Slope angle post failure | : | 45° |
| f. Slope angle pre failure | : | 70° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | N52°E |

CAUSES: Human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main cause for the slide.

NATURE OF DAMAGE: No damage to structures caused by the slide.

RECCOMENDATION: Removal of slided material and provision of proper drainage are recommended (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-314

LOCATION: The slide is located at latitude 12° 25' 10.7" N and longitude 75° 43' 41.5" E in Survey of India toposheet No 48 P/11 in Jyothinagar (sloping depression nala section at Jyothinagar), Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during July-2007. The debris consists of rock fragments, clay and weathered granitic material. The slided debris moved nearly 30 m down the slope without damaging two houses near the left bank of the nala no other structure is seen in the slide zone. This slide is vulnerable for further prograding as huge crack has developed with 30-50 cm horizontal a 30cm-1m vertical displacement. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of houses/settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 41).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|-----------------------|
| a. Length of failed mass from crown to foot | : 12.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 2.0 m |
| d. Volume of failed mass above the failure surface | : 96.0 m ³ |
| e. Slope angle post failure | : 60° |
| f. Slope angle pre failure | : 80° |
| g. General slope gradient | : 20° |
| h. Run out distance / up to | : -/- |
| i. Cut slope Height | : 5.0 m |
| j. Direction of slide | : N52°E |

CAUSES: Human interference by cutting of the slope for construction of houses and bad maintenance of drainage coupled with high rainfall are the main cause for the slide.

NATURE OF DAMAGE: No damage to structures caused by the slide.

RECCOMENDATION: Removal of slided material and proper drainage are recommended and the slope should be left as it is and in future no construction should be allowed (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-315

LOCATION: The slide is located at latitude 12° 25' 42.3" N and longitude 75° 42' 56.2" E in Survey of India toposheet No 48 P/11 in Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of local road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 42).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 8.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 16.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 64.0 m ³ |
| e. Slope angle post failure | : | 60° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N49°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local road is affected.

RECCOMENDATION: Removal of debris and slope easening are recommended.

SLIDE NO: KA-316

LOCATION: The slide is located at latitude 12° 25' 35.2" N and longitude 75° 43' 8.0" E in Survey of India toposheet No 48 P/11 in Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.5 m. The depth of weathering is >10.0 m. Construction of local road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 43).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 7.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 28.0 m ³ |
| e. Slope angle post failure | : | 65° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 7.0m/local road |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N20°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local road is affected.

RECOMMENDATION: Removal of debris and slope easening are recommended.

SLIDE NO: KA-317

LOCATION: The slide is located at latitude 12° 25' 31.7" N and longitude 75° 43' 17.6" E in Survey of India toposheet No 48 P/11 in Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of local road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 44).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 7.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 10.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 35.0 m ³ |
| e. Slope angle post failure | : | 60° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 7.0m/local road |
| i. Cut slope Height | : | 6.0 m |
| j. Direction of slide | : | N16°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local road is affected.

RECCOMENDATION: Removal of debris and slope easening are recommended.

SLIDE NO: KA-318

LOCATION: The slide is located at latitude 12° 25' 0.4" N and longitude 75° 43' 51.5" E in Survey of India toposheet No 48 P/11 in Indiranagar Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. The Construction settlements is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 45).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--------------------|
| a. | Length of failed mass from crown to foot | : | 6.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 6.4 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 9.6 m ³ |
| e. | Slope angle post failure | : | 85° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 80° |
| h. | Run out distance / up to | : | 10.0m/local house |
| i. | Cut slope Height | : | 8.0 m |
| j. | Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of settlements and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local house is affected.

RECCOMENDATION: Proper drainage and slope easening are recommended. Removal of polythene sheet spread over the slide material is suggested as it may reactivate the slide as there is no proper drainage.

SLIDE NO: KA-319

LOCATION: The slide is located at latitude 12° 25' 0.7" N and longitude 75° 43' 57.7" E in Survey of India toposheet No 48 P/11 in Indiranagar Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. Three sets of Joints are noticed J1- N30°W/16°NE with 5-6 cm spacing and is tight, J2- N50°W/76°NE with 30 cm spacing and is tight(day lighted plane) and J3- N18°E/81°W with 1 m spacing and is tight. The depth of weathering is >10.0 m. Construction settlements and local road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 46).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 20.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 60° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 13.0 m |
| j. Direction of slide | : | S25°W |

CAUSES: Human interference by cutting of the slope for construction of settlements/road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local house/road was affected.

RECCOMENDATION: Old slump almost stabilised.

SLIDE NO: KA-320

LOCATION: The slide is located at latitude 12° 24' 55.6" N and longitude 75° 44' 3.7" E in Survey of India toposheet No 48 P/11 in Indiranagar Madikeri town, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. One set of joints is noticed N10°E/66°E with 3 cm spacing and is tight. The depth of weathering is >10.0 m. Construction settlements and local road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 47).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 5.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 9.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 11.3 m ³ |
| e. Slope angle post failure | : | 60° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 50° |
| h. Run out distance / up to | : | -/- |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | S55°W |

CAUSES: Human interference by cutting of the slope for construction of settlements/road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local house/road was affected.

RECCOMENDATION: Slope easening is recommended.

SLIDE NO: KA-321

LOCATION: The slide is located at latitude 12° 24' 51.4" N and longitude 75° 44' 0.9" E in Survey of India toposheet No 48 P/11 in Indiranagar Madikeri town, Madikeri Taluk, Coorg district

SLIDE DESCRIPTION: The slide is classified as an old debris slide which has occurred during June-2007. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is > 10.0 m. Construction settlement is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 48).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|------------------------|
| a. Length of failed mass from crown to foot | : 20.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 18.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 2.0 m |
| d. Volume of failed mass above the failure surface | : 360.0 m ³ |
| e. Slope angle post failure | : 65° |
| f. Slope angle pre failure | : 90° |
| g. General slope gradient | : 30° |
| h. Run out distance / up to | : -/- |
| i. Cut slope Height | : 5.0 m |
| j. Direction of slide | : N85°W |

CAUSES: Human interference by cutting of the slope for construction of settlements/road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Local houses/road was affected.

RECCOMENDATION: The ground fissures are to be covered with polythene to avoid the percolation of surface water and the debris has to be removed from the slope and the slope to be graded or terraced. Long term preventive measures include construction of retaining structures at the base of the vertical cuts and providing proper drainage system in the area to divert the surface water (Slide description, morphological parameters and recommendation data taken from "A Geotechnical note on Landslides of June 2007 Coorg district Karnataka" by A.K.Mishra).

SLIDE NO: KA-322

LOCATION: The slide is located at latitude 12° 25' 7.7" N and longitude 75° 42' 59.6" E in Survey of India toposheet No 48 P/11 , 500 mts from Madikeri town on Madikeri-Kushalnagar SH-88 road, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is >10.0 m. The Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable (Photo 49).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 11.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 27.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 11.0m/SH-88 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | Towards N |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: SH-88 road was affected.

RECCOMENDATION: Slope easening is recommended.

SLIDE NO: KA-323

LOCATION: The slide is located at latitude 12° 25' 50.2" N and longitude 75° 45' 26.6" E in Survey of India toposheet No 48 P/15 on Madikeri-Kushalnagar SH-88 road, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 12.0 m (Photo 50).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 15.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 52.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 12.0m/SH-88 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N12°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: SH-88 road was affected.

RECCOMENDATION: Slope easening is recommended.

SLIDE NO: KA-324

LOCATION: The slide is located at latitude 12° 25' 45.4" N and longitude 75° 46' 45.2" E in Survey of India toposheet No 48 P/15 on Madikeri-Kushalnagar SH-88 road, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is >10.0 m. The Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 8.0 m (Photo 51).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 12.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 30.0 m ³ |
| e. Slope angle post failure | : | 65° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 14.0m/SH-88 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N50°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: SH-88 road was affected.

RECCOMENDATION: Slope easening is recommended.

SLIDE NO: KA-325

LOCATION: The slide is located at latitude 12° 26' 11.3" N and longitude 75° 46' 45.2" E in Survey of India toposheet No 48 P/11 on Madikeri-Abbefalls road, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slump. Multiple slide may prograded laterally. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 10.0 m (Photo 52).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------------------------|
| a. Length of failed mass from crown to foot | : | 12.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 25.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 75.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 12.0m/
Madikeri-
Abbefalls road |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Madikeri-Abbefalls road affected.

RECCOMENDATION: Slope easening is recommended.

SLIDE NO: KA-326

LOCATION: The slide is located at latitude 12° 26' 12.4" N and longitude 75° 44' 2.0" E in Survey of India toposheet No 48 P/11 on Madikeri-Abbefalls road, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as an old and reactivated debris slump. Multiple slide may prograded laterally. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 12.0 m (Photo 53).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---------------------------------------|
| a. | Length of failed mass from crown to foot | : | 15.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 105.0 m ³ |
| e. | Slope angle post failure | : | 70° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 12.0m/
Madikeri-
Abbefalls road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Madikeri-Abbefalls road affected.

RECCOMENDATION: Grading of slope/slope easening is recommended as slide is old one which is reactivated and may prograde laterally. Proper drainage is also to be provided.

SLIDE NO: KA-327

LOCATION: The slide is located at latitude 12° 26' 49.2" N and longitude 75° 42' 51.4" E in Survey of India toposheet No 48 P/11 on Madikeri-Galibeedu road, Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 10.0 m (Photo 54).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---------------------------------------|
| a. | Length of failed mass from crown to foot | : | 18.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 15.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 135.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 20° |
| h. | Run out distance / up to | : | 20.0m/
Madikeri-
Galibeedu road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N62°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Madikeri- Galibeedu road affected.

RECCOMENDATION: Grading of slope/slope easening, plantation on the slope and proper drainage are recommended.

SLIDE NO: KA-328

LOCATION: The slide is located at latitude 12° 26' 42.2" N and longitude 75° 44' 7.4" E in Survey of India toposheet No 48 P/11 on Madikeri-Galibeedu road(50m before Abbefalls cross road), Madikeri Taluk, Coorg district .

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 8.0 m (Photo 55).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 20.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 11.0m/
Madikeri-
Abbefalls road |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N10°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Madikeri- Abbefalls road affected.

RECCOMENDATION: Grading of slope/slope easening, plantation on the slope and proper drainage are recommended.

SLIDE NO: KA-329

LOCATION: The slide is located at latitude 12° 26' 42.7" N and longitude 75° 44' 13.0" E in Survey of India toposheet No 48 P/11 on Madikeri-Galibeedu road (200m from slide no KA-328), Madikeri Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The slide scarp is 3 m in height and is vertical. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 7.0 m and vertical interval of 10.0 m (Photo 56).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------------------------|
| a. Length of failed mass from crown to foot | : | 25.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 3.0 m |
| d. Volume of failed mass above the failure surface | : | 525.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 50.0m/
Madikeri-
Abbefalls road |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | N20°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Madikeri- Abbefalls road affected.

RECCOMENDATION: Grading of slope/slope easening, removal of debris material and proper drainage are recommended.

SLIDE NO: KA-330

LOCATION: The slide is located at latitude 12° 26' 43.6" N and longitude 75° 44' 15.4" E in Survey of India toposheet No 48 P/11 on minor road near Madikeri-Abbefalls road (500m from slide no KA-329), Madikeri Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay. The slided area has an overburden thickness of nearly 4.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 5.0 m (Photo 57).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 10.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 25.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 62.5 m ³ |
| e. | Slope angle post failure | : | 45° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 30° |
| h. | Run out distance / up to | : | 12.0m/ minor road near Madikeri-Abbefalls road |
| i. | Cut slope Height | : | 5.0 m |
| j. | Direction of slide | : | N10°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Minor road near Madikeri-Abbefalls road affected.

RECCOMENDATION: Grading of slope/slope easening, removal of debris material and proper drainage are recommended.

SLIDE NO: KA-331

LOCATION: The slide is located at latitude 12° 26' 43.6" N and longitude 75° 44' 15.4" E in Survey of India toposheet No 48 P/11 on minor road near Madikeri-Abbefalls road (Near slide no KA-330), Madikeri Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay. The slided area has an overburden thickness of nearly 0.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 8.0 m (Photo 58).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 8.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 11.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 22.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 30° |
| h. | Run out distance / up to | : | 10.0m/ minor road near Madikeri-Abbefalls road |
| i. | Cut slope Height | : | 4.0 m |
| j. | Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide and saturation of strata.

NATURE OF DAMAGE: Minor road near Madikeri-Abbefalls road affected.

RECCOMENDATION: Grading of slope/slope easening, removal of debris material and proper drainage are recommended.

SLIDE NO: KA-332

LOCATION: The slide is located at latitude 12° 27' 45.6" N and longitude 75° 45' 47.7" E in Survey of India toposheet No 48 P/15 on local road near Makundur west of Madikeri town, Madikeri Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay. The slided area has an overburden thickness of nearly 0.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 10.0 m (Photo 59).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---------------------------------|
| a. | Length of failed mass from crown to foot | : | 15.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 25.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 187.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 20° |
| h. | Run out distance / up to | : | 15.0m/ local road near Makundur |
| i. | Cut slope Height | : | 4.0 m |
| j. | Direction of slide | : | N75°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide and saturation of strata.

NATURE OF DAMAGE: local road near Makundur affected.

RECCOMENDATION: Grading of slope/slope easening, removal of debris material and proper drainage are recommended.

SLIDE NO: KA-333

LOCATION: The slide is located at latitude 12° 28' 50.3" N and longitude 75° 45' 31.9" E in Survey of India toposheet No 48 P/15 on local road near Makundur west of Madikeri town, Madikeri Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay. The slided area has an overburden thickness of nearly 0.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 60).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---------------------------------|
| a. | Length of failed mass from crown to foot | : | 15.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 17.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 127.5 m ³ |
| e. | Slope angle post failure | : | 65° |
| f. | Slope angle pre failure | : | 70° |
| g. | General slope gradient | : | 30° |
| h. | Run out distance / up to | : | 12.0m/ local road near Makundur |
| i. | Cut slope Height | : | 11.0 m |
| j. | Direction of slide | : | N70°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide and saturation of strata.

NATURE OF DAMAGE: local road near Makundur affected.

RECCOMENDATION: Grading of slope/slope easening, removal of debris material and proper drainage are recommended.

III. 7. Landslides along SH-27 Balehonnur-Koppa road section

SLIDE NO: KA-381

LOCATION: The slide is located at latitude 13° 22' 41.2" N and longitude 75° 23' 37.5" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section, Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 2.0 m and vertical interval of 11.0 m (Photo 118).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 9.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 20.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 45.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 10.0m/ SH-27 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N45°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Old slide almost stabilised. Removal of fallen debris to arrest any reactivation.

SLIDE NO: KA-382

LOCATION: The slide is located at latitude 13° 22' 45.2" N and longitude 75° 23' 35.4" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (50 m from slide no KA-381 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new composite slide (half debris half rock, left side debris right side rock). The debris consists of rock fragments, clay and weathered granitic material. Three sets of joints are noticed J1- N30°E/85°NE with 2-30 cm spacing and is tight, J2- N45°W/78°NE with 30 cm spacing and is tight and J3- N20°E/Horizontal which is foliation plane also. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown part of the slide is stable where as head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 12.0 m (Photo 119).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 32.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 80.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 12.0m/ SH-27 |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | N55°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Nala is flowing right in the middle of the slide. Proper drainage and slope modification/ slope easening are recommended.

SLIDE NO: KA-383

LOCATION: The slide is located at latitude 13° 22' 55.4" N and longitude 75° 23' 7.1" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (1 km from slide no KA-382 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 3.0 m and vertical interval of 21.0 m (Photo 120).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 19.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 34.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 323.0 m ³ |
| e. Slope angle post failure | : | 65° |
| f. Slope angle pre failure | : | 70° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 22.0m/ SH-27 |
| i. Cut slope Height | : | 14.0 m |
| j. Direction of slide | : | N10°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Old slide almost stabilised. Tea plantations are seen on debris. Proper drainage and slope modification/ slope easening are recommended for arresting reactivation.

SLIDE NO: KA-384

LOCATION: The slide is located at latitude 13° 23' 27.4" N and longitude 75° 22' 47.9" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (2 km from slide no KA-383 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 4.0 m and vertical interval of 34.0 m (Photo 121).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|------------------------|
| a. Length of failed mass from crown to foot | : 18.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 32.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 1.0 m |
| d. Volume of failed mass above the failure surface | : 288.0 m ³ |
| e. Slope angle post failure | : 75° |
| f. Slope angle pre failure | : 80° |
| g. General slope gradient | : 25° |
| h. Run out distance / up to | : 20.0m/ SH-27 |
| i. Cut slope Height | : 15.0 m |
| j. Direction of slide | : Towards W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Old slide stabilised. Plants growth seen on debris.

SLIDE NO: KA-385

LOCATION: The slide is located at latitude 13° 23' 56.7" N and longitude 75° 22' 24.2" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (2 km from slide no KA-384 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as an old composite slide (half debris half rock slide, left side debris right side rock). The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 2.0 m and vertical interval of 19.0 m (Photo 122).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 18.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 17.5 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 157.5 m ³ |
| e. Slope angle post failure | : | 75° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 20.0m/ SH-27 |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N85°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Proper drainage and slope modification/ slope easening are recommended.

SLIDE NO: KA-386

LOCATION: The slide is located at latitude 13° 23' 51.1" N and longitude 75° 22' 23.2" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (50m from slide no KA-385 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >12.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 30.0 m (Photo 123 and 124).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 28.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 196.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 35.0m/ SH-27(debris fallen on road has been removed) |
| i. Cut slope Height | : | 16.0 m |
| j. Direction of slide | : | N35°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Debris flown up to road. Removal of debris, slope grading/ slope easening, proper drainage are recommended. Slide may prograde laterally.

SLIDE NO: KA-387

LOCATION: The slide is located at latitude 13° 27' 37.0" N and longitude 75° 20' 32.7" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (2 km from slide no KA-386 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown part of the slide is stable where as head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 20.0 m (Photo 125).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 18.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 24.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 108.0 m ³ |
| e. Slope angle post failure | : | 75° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 20.0m/ SH-27 |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N75°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Slope modification/ slope easening with proper drainage and removal of debris are recommended.

SLIDE NO: KA-388

LOCATION: The slide is located at latitude 13° 27' 35.2" N and longitude 75° 20' 32.3" E in Survey of India toposheet No 48 O/7 along SH-27 between Balehonnur-Koppa road section (50 m from slide no KA-387 towards Koppa), Koppa Taluk, Chikmagalur district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown part of the slide is stable where as head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 20.0 m (Photo 126).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 19.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 142.5 m ³ |
| e. Slope angle post failure | : | 75° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 20.0m/ SH-27 |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall together with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: SH-27 road affected.

RECCOMENDATION: Slope modification/ slope easening with proper drainage and removal of debris are recommended.

III. 5. Landslides recorded between Bhagamandala to Talcauvery road section

SLIDE NO: KA-370

LOCATION: The slide is located at latitude 12° 22' 42.6" N and longitude 75° 30' 57.4" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Talcauvery road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 10.0 m (Photo 105).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 12.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 18.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 54.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 13.0m/
Bhagamandala-
Talcauvery road |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | Towards E |

CAUSES: Human interference by cutting of the slope for construction of road and ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: Madikere-Bhagamandala road affected.

RECCOMENDATION: Removal of debris material, proper drainage and slope modification with plantation on slope are recommended.

SLIDE NO: KA-371

LOCATION: The slide is located at latitude 12° 23' 10.8" N and longitude 75° 29' 35.0" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Talcauvery road(near Talcauvery gate), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 28.0 m (Photo106 and 107).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 30.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 42.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. | Volume of failed mass above the failure surface | : | 945.0 m ³ |
| e. | Slope angle post failure | : | 70° |
| f. | Slope angle pre failure | : | 80° |
| g. | General slope gradient | : | 20° |
| h. | Run out distance / up to | : | 35.0m/
Bhagamandala-
Talcauvery road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N20°E |

CAUSES: Human interference by cutting of the slope for construction of road high rainfall coupled with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: Madikere-Bhagamandala road affected.

RECCOMENDATION: Large slide. Temporary structure on the toe part of the slide should be removed, slope grading/ slope easening with proper drainage are recommended.

SLIDE NO: KA-372

LOCATION: The slide is located at latitude 12° 23' 3.2" N and longitude 75° 30' 4.9" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Talcauvery road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 1.5 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 7.0 m (Photo 108).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 9.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 26.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 58.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 10.0m/
Bhagamandala-
Talcauvery road |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N40°W
(Variable as on
a road bend) |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: Madikere-Bhagamandala road affected.

RECCOMENDATION: Slide caused due to road widening. Removal of debris and proper drainage with slope modification are recommended.

SLIDE NO: KA-373

LOCATION: The slide is located at latitude 12° 23' 7.3" N and longitude 75° 30' 4.4" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Talcauvery road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. Old slide on the left is laterally spreading on right side due to construction of road. The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 1.5 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 5.0 m (Photo 109).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 7.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 20.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 35.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 10.0m/
Bhagamandala-
Talcauvery road |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall are the main causes for the slide.

NATURE OF DAMAGE: Madikere-Bhagamandala road affected.

RECCOMENDATION: Proper slope grading/slope easening with good drainage is recommended.

SLIDE NO: KA-374

LOCATION: The slide is located at latitude 12° 22' 52.6" N and longitude 75° 30' 43.4" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Talcauvery road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 35.0 m (Photo 110).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 38.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 2.0 m |
| d. | Volume of failed mass above the failure surface | : | 532.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 40.0m/
Bhagamandala-
Talcauvery road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N55°W |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: Madikere-Bhagamandala road affected.

RECCOMENDATION: Slide is located right on a nala. It is laterally prograding at crown/head portion. The road on crown part is in grave danger. Back filling/stone pitching and proper drainage with plantation on slope are recommended.

SLIDE NO: KA-375

LOCATION: The slide is located at latitude 12° 22' 51.8" N and longitude 75° 30' 48.0" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Talcuvery road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 68.0 m (Photo 111).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---|
| a. | Length of failed mass from crown to foot | : | 70.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 26.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 2.0 m |
| d. | Volume of failed mass above the failure surface | : | 1820.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 78.0m/
Bhagamandala-
Talcuvery road |
| i. | Cut slope Height | : | 20.0 m |
| j. | Direction of slide | : | N25°E |

CAUSES: Human interference by cutting of the slope for construction of road and high rainfall with ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: Madikere-Bhagamandala road affected.

RECCOMENDATION: Huge slide. Remedial measures are being taken up (Work on remedial measures like stone pitching and construction of cladding wall is in progress).

III. DESCRIPTION OF INDIVIDUAL SLIDE

III.1. Landslides recorded along SH-64 between Chikmagalur-Dakshina Kannada district boundary- Beltangady road section

SLIDE NO: KA-279

LOCATION: The slide is located at latitude 13° 04' 39.9" N and longitude 75° 28' 21.3" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (10 m from Chikmagalur-Dakshina Kannada Dist boundary towards Beltangady) .

SLIDE DESCRIPTION: The slide is classified as an old and reactivated debris slide. The debris consists of mostly clay minerals and highly weathered rock particles. The slid area has an overburden thickness of nearly 4.0 m. The depth of weathering is > 10 m. Scarp height is 1.0 m with a width of 5.0 m and Scarp angle is vertical. The slope forming material is weak and loose. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The head part, toe and crown parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 15.0 m (Photo 1).

MORPHOLOGICAL PARAMETER OF SLIDE:

a. Length of failed mass from crown to foot	:	20.0 m
b. Maximum width of failed mass from the left flank to the right flank boundary	:	50.0 m
c. Maximum depth of the failed mass from the surface of the slide to the failure surface	:	1.0 m
d. Volume of failed mass above the failure surface	:	500.0 m ³
e. Slope angle post failure	:	80°
f. Slope angle pre failure	:	90°
g. General slope gradient	:	30°
h. Run out distance / up to	:	25.0 m/SH-64
i. Cut slope Height	:	15.0 m
j. Direction of slide	:	S45°E

CAUSES: The cutting of the slope for construction of road has increased the gradient. The pore pressure development during monsoon triggered this slide as the slope forming debris material was highly saturated with rain water.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Old slide reactivated. Easening of slope is recommended.

SLIDE NO: KA-280

LOCATION: The slide is located at latitude 13° 04' 34.3" N and longitude 75° 28' 17.3" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (100 m from slide no KA-279 towards Beltangady) .

SLIDE DESCRIPTION: The slide is classified as an old and reactivated debris slide. The debris consists of mostly clay minerals and highly weathered rock particles. The slid area has an overburden thickness of nearly 1.0 m. The depth of weathering is > 10 m. Scarp height is 1.0 m with a width of 5.0 m and scarp angle is vertical. The slope forming material was weak and loose. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The head part and toe parts are unstable where as crown part of the slide is stable. The slide has a horizontal extent of 3.0 m and vertical interval of 8.0 m (Photo 2).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 70.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 350.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 25.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S20°E |

CAUSES: The cutting of the slope for construction of road has increased the gradient. The pore pressure development during monsoon triggered this slide as the slope forming debris material was highly saturated with rain water.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Old slide reactivated. Easening of slope/ Grading or benching is recommended.

SLIDE NO: KA-281

LOCATION: The slide is located at latitude 13° 04' 33.5" N and longitude 75° 28' 13.4" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near 10th hair pin curve towards Beltangady) .

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of mostly clay minerals and highly weathered rock particles. The slided area has an overburden thickness of nearly 3.0 m. The depth of weathering is 7.0 m. The slope forming material was weak and loose. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The head part and toe parts are unstable where as crown part of the slide is stable. The slide has a horizontal extent of 2.0 m and vertical interval of 9.0 m (Photo 3).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 9.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 12.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 54.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 10° |
| h. Run out distance / up to | : | 9.0 m/SH-64 |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | S20°E |

CAUSES: The cutting of the slope for construction of road has increased the gradient. The pore pressure development during monsoon triggered this slide as the slope forming debris material was highly saturated with rain water.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and easening of slope/ grading or benching is recommended.

SLIDE NO: KA-282

LOCATION: The slide is located at latitude 13° 04' 33.5" N and longitude 75° 28' 17.3" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near 9th hair pin curve towards Beltangady) .

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 10.0 m. Scarp height is 2.0 m with a width of 6.0 m and scarp angle is 32°. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. Remedial measures in the form of cladding wall have been provided at the toe portion. The head part and crown parts are unstable where as toe part of the slide is stable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 4).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 13.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 292.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 85° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 15.0 m/SH-64 |
| i. Cut slope Height | : | 14.0 m |
| j. Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This slope modification coupled with high rain fall has triggered the slide. The remedial measures provided in the form of cladding wall has stabilised only the toe part.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Cladding wall should be extended to head and crown parts also.

SLIDE NO: KA-283

LOCATION: The slide is located at latitude 13° 04' 32.6" N and longitude 75° 28' 11.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near 100 km stone-13 km to Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 10.0 m. Scarp height is 1.0 m with a width of 5.0 m and scarp angle is 90°. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown part is stable where as toe and head parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 10.0 m (Photo 5).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 9.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 23.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 103.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 10.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S40°W |

CAUSES: The debris slide is caused due to slope cutting during construction of the road.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Debris slide at the curve of the road, care should be taken to arrest any progradation. Removal of debris and grading of slope in the form of benching is recommended.

SLIDE NO: KA-284

LOCATION: The slide is located at latitude 13° 04' 41.7" N and longitude 75° 28' 1.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-283 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is 10.0 m. Scarp height is 1.0 m with a width of 5.0 m and scarp angle is 90°. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown and head parts of the slide are stable where as toe part of the slide is unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 8.0 m (Photo 6).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 12.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 48.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 12.0 m/SH-64 |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | S63°W |

CAUSES: The debris slide is caused due to slope cutting during construction of the road.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and grading of slope in the form of benching is recommended.

SLIDE NO: KA-285

LOCATION: The slide is located at latitude 13° 04' 42.8" N and longitude 75° 28' 0.4" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-284 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as an old debris slide (plantation growth seen on slide). The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 9.0 m. Scarp height is 1.0 m with a width of 5.0 m and scarp angle is 90°. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 4.0 m and vertical interval of 22.0 m (Photo 7).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 20.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 10.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 100.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 30° |
| h. Run out distance / up to | : | 22.0 m/SH-64 |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | S46°W |

CAUSES: The debris slide was caused due to slope cutting during construction of the road.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Old slide almost stabilised.

SLIDE NO: KA-286

LOCATION: The slide is located at latitude 13° 04' 44.8" N and longitude 75° 27' 58.5" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-285 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered granitic material. The slide is translational one with two stages of sliding is seen. The slided area has an overburden thickness of nearly 3.0 m. Scarp height is 1.0 m with a width of 5.0 m and scarp angle is 90°. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 3.0 m and vertical interval of 12.0 m (Photo 8 and 9).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|------------------------|
| a. Length of failed mass from crown to foot | : 14.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 20.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 1.0 m |
| d. Volume of failed mass above the failure surface | : 140.0 m ³ |
| e. Slope angle post failure | : 80° |
| f. Slope angle pre failure | : 90° |
| g. General slope gradient | : 25° |
| h. Run out distance / up to | : 16.0 m/SH-64 |
| i. Cut slope Height | : 12.0 m |
| j. Direction of slide | : S55°W |

CAUSES: The debris slide is caused due to slope cutting during construction of the road.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Old slide almost stabilised.

SLIDE NO: KA-287

LOCATION: The slide is located at latitude 13° 04' 46.1" N and longitude 75° 27' 56.5" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-286 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as an old debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 3.0 m. Scarp height is 1.0 m with a width of 5.0 m and scarp angle is 90°. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 4.0 m and vertical interval of 15.0 m (Photo 10 and 11).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 16.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 22.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 160.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 18.0 m/SH-64 |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | S10°W |

CAUSES: The debris slide is caused due to slope cutting during construction of the road.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Old slide caused due to cutting of spur almost stabilised.

SLIDE NO: KA-288

LOCATION: The slide is located at latitude 13° 04' 47.5" N and longitude 75° 27' 55.1" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-287 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide (three slides side by side one big debris slide and two small slumps, data of big slide is taken). The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 12.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 18.0 m (Photo 12 and 13).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 20.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 26.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 260.0 m ³ |
| e. Slope angle post failure | : | 85° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 22.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S25°W |

CAUSES: The debris slide was caused due to slope cutting during construction of the road.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and easening of slope/ grading or benching is recommended.

SLIDE NO: KA-289

LOCATION: The slide is located at latitude 13° 04' 47.1" N and longitude 75° 27' 53.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150-200 m from slide no KA-288 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide. Translational slide, two slides I) long debris slide ii) slump; slump occurred first. The slided material has gone below SH_64 to valley side. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 4.0 m. The depth of weathering is 12.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 8.0 m and vertical interval of 60.0 m (Photo 14).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 60.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 10.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 3.0 m |
| d. Volume of failed mass above the failure surface | : | 900.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 60.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S45°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This slope modification coupled with high rain fall has triggered the slide. First the slump has occurred which prograded in to big debris slide. Slide has occurred along a nala course.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and easening of slope/ grading or benching is recommended. Proper drainage should be maintained as nala is flowing on the debris.

SLIDE NO: KA-290

LOCATION: The slide is located at latitude 13° 04' 46.2" N and longitude 75° 27' 52.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (25 m from slide no KA-289 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide which is translational in nature. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 12.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 12.0 m and vertical interval of 20.0 m (Photo 15 and 16).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|------------------------|
| a. Length of failed mass from crown to foot | : 25.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 16.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 3.0 m |
| d. Volume of failed mass above the failure surface | : 600.0 m ³ |
| e. Slope angle post failure | : 60° |
| f. Slope angle pre failure | : 90° |
| g. General slope gradient | : 25° |
| h. Run out distance / up to | : 28.0 m/SH-64 |
| i. Cut slope Height | : 12.0 m |
| j. Direction of slide | : S45°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This slope modification coupled with high rain fall has triggered the slide. The slide is translational in nature.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and construction of retaining wall for 18.0 m length and 3.5 m height with back filling is recommended.

SLIDE NO: KA-291

LOCATION: The slide is located at latitude 13° 04' 44.8" N and longitude 75° 27' 50.5" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (100 m from slide no KA-290 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 3.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 9.0 m and vertical interval of 14.0 m (Photo 17).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 12.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 28.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 3.0 m |
| d. Volume of failed mass above the failure surface | : | 504.0 m ³ |
| e. Slope angle post failure | : | 75° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 14.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S15°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This slope modification coupled with high rain fall has triggered the slide. Intense water action has caused high degree of weathering resulting in formation of clay patches as seen in the debris. This has resulted in drop in the shearing resistance of the material.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and soil nailing with proper drainage facilities is recommended.

SLIDE NO: KA-292

LOCATION: The slide is located at latitude 13° 04' 40.6" N and longitude 75° 27' 43.0" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (250 m from slide no KA-291 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 10.0 m (Photo 18).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 12.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 80.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 480.0 m ³ |
| e. Slope angle post failure | : | 75° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 14.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S20°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This slope modification coupled with high rain fall has triggered the slide. Intense water action has caused high degree of weathering resulting in formation of clay patches as seen in the debris. This has resulted in drop in the shearing resistance of the material.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Slide is widening sideways, slope grading/ slope easening and removal of debris is recommended.

SLIDE NO: KA-293

LOCATION: The slide is located at latitude 13° 04' 35.4" N and longitude 75° 27' 27.0" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near 102 km stone- Charmudi 8 km towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 3.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 20.0 m (Photo 19).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 22.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 12.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 198.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 14.0 m/SH-64 |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This slope modification coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening is recommended. Trees which are precariously hanging should be removed.

SLIDE NO: KA-294

LOCATION: The slide is located at latitude 13° 04' 32.5" N and longitude 75° 27' 24.6" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (100 m from slide no KA-293 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new earth slump. The debris consists of clay and highly weathered material. The slid area has an overburden thickness of nearly 1.0 m. The depth of weathering is 8.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 9.0 m and vertical interval of 14.0 m (Photo 20).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 8.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 20.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 10.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | Towards W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening with proper drainage facilities is recommended.

SLIDE NO: KA-295

LOCATION: The slide is located at latitude 13° 04' 29.8" N and longitude 75° 27' 27.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (100 m from slide no KA-294 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new earth slump. The debris consists of clay and highly weathered material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 8.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 8.0 m (Photo 21).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 8.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 10.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 40.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 7.0 m/SH-64 |
| i. Cut slope Height | : | 5.0 m |
| j. Direction of slide | : | S30°E |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening with proper drainage facilities is recommended. Trees precariously hanging should be removed.

SLIDE NO: KA-296

LOCATION: The slide is located at latitude 13° 04' 31.4" N and longitude 75° 27' 31.4" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near 8th hair pin curve, 150 m from slide no KA-295 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 12.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 12.0 m (Photo 22 and 23).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 13.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 22.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 214.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 15.0 m/SH-64 |
| i. Cut slope Height | : | 7.0 m |
| j. Direction of slide | : | S19°E |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening with proper drainage facilities is recommended.

SLIDE NO: KA-297

LOCATION: The slide is located at latitude 13° 04' 29.1" N and longitude 75° 27' 23.7" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (200 m from slide no KA-296 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slump(part of the slide is earth slum also, basic gabbro body has weathered in to soil) . The debris consists of clay and highly weathered rock material. The slided area has an overburden thickness of nearly 3.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is basic weathered gabbro. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 24).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 8.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 10.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 20.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 10.0 m/SH-64 |
| i. Cut slope Height | : | 7.0 m |
| j. Direction of slide | : | S46°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening is recommended.

SLIDE NO: KA-298

LOCATION: The slide is located at latitude 13° 04' 35.1" N and longitude 75° 27' 20.3" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (300 m from 8th hair pin curve, 400 m from slide no KA-297 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new Rock slide. One set of joint is noticed which is parallel to foliation plane in gneiss trending N74°W/49°NE with 2-10 cm spacing and is tight. Composite failure both planar and wedge failure are noticed. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 14.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 20.0 m (Photo 25).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 18.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 26.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 351.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 20.0 m/SH-64 |
| i. Cut slope Height | : | 14.0 m |
| j. Direction of slide | : | N65° W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of rock debris and slope easening with proper drainage.

SLIDE NO: KA-299

LOCATION: The slide is located at latitude 13° 04' 34.1" N and longitude 75° 27' 19.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (20 m from slide no KA-298 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new Rock slide. Composite failure both planar and wedge failure are noticed. The slid area has an overburden thickness of nearly 3.0 m. The depth of weathering is 14.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 20.0 m (Photo 26).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 18.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 189.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 20.0 m/SH-64 |
| i. Cut slope Height | : | 14.0 m |
| j. Direction of slide | : | N20° W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of rock debris and slope easening with proper drainage

SLIDE NO: KA-300

LOCATION: The slide is located at latitude 13° 04' 10.2" N and longitude 75° 26' 35.6" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Between 108 & 107 km stone towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as an old Rock slide which is stabilised. One set of joint is noticed which is parallel to foliation plane in granite trending N49°E/41°NW. Planar failure is noticed. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 20.0 m (Photo 27).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 9.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 20.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 90.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 12.0 m/SH-64 |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N57°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening is recommended. As nala is flowing on the left flank proper drainage is also to be provided to arrest any reactivation.

SLIDE NO: KA-301

LOCATION: The slide is located at latitude 13° 04' 29.0" N and longitude 75° 26' 57.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-300 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new earth slump. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 8.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 8.0 m and vertical interval of 13.0 m (Photo 28).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 21.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 15.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 236.3 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 8.0 m/SH-64 |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N25°E |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening is recommended.

SLIDE NO: KA-302

LOCATION: The slide is located at latitude 13° 04' 33.3" N and longitude 75° 27' 2.5" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (200 m from slide no KA-301 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide which is almost stabilised. (debris slump prograded in to debris slide). The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 5.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 13.0 m (Photo 29).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------|
| a. Length of failed mass from crown to foot | : | 15.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 14.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 105.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 17.0 m/SH-64 |
| i. Cut slope Height | : | 9.0 m |
| j. Direction of slide | : | Towards N |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris and slope easening is recommended.

SLIDE NO: KA-303

LOCATION: The slide is located at latitude 13° 04' 33.2" N and longitude 75° 27' 8.6" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (500-600 m from slide no KA-302 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 4.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 30).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 75.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 12.0 m/SH-64 |
| i. Cut slope Height | : | 6.0 m |
| j. Direction of slide | : | N25°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Slope easening with proper drainage is recommended.

SLIDE NO: KA-304

LOCATION: The slide is located at latitude 13° 04' 34.7" N and longitude 75° 27' 11.1" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (300 m from slide no KA-303 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new Earth slump. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 6.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown and head parts of the slide are stable and toe part of the slide is unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 31).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 22.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 55.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 12.0 m/SH-64 |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N53°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Slope easening with proper drainage is recommended.

SLIDE NO: KA-305

LOCATION: The slide is located at latitude 13° 04' 33.6" N and longitude 75° 27' 19.0" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (150 m from slide no KA-304 towards Kotigehara).

SLIDE DESCRIPTION: The slide is classified as a new Debris slide which is translational in nature. The debris consists of rock fragments, clay and weathered gneissic material. One set of joint is noticed trending N81°E/49°NW with 2-5 cm spacing and tight in nature. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is 12.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 12.0 m (Photo 32).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---------------------|
| a. Length of failed mass from crown to foot | : | 14.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 13.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 91.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 16.0 m/SH-64 |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | S80°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris, soil nailing with 1m concrete apron or shotcreting with proper drainage is recommended.

SLIDE NO: KA-306

LOCATION: The slide is located at latitude 13° 04' 42.9" N and longitude 75° 27' 22.0" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near 8th hair pin curve)

SLIDE DESCRIPTION: The slide is classified as a new Earth slump. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is 12.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown and head parts of the slide are stable and toe part of the slide is unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 12.0 m (Photo 33).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|-----------------------|
| a. Length of failed mass from crown to foot | : 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 20.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 0.5 m |
| d. Volume of failed mass above the failure surface | : 50.0 m ³ |
| e. Slope angle post failure | : 70° |
| f. Slope angle pre failure | : 80° |
| g. General slope gradient | : 20° |
| h. Run out distance / up to | : 12.0 m/SH-64 |
| i. Cut slope Height | : 7.0 m |
| j. Direction of slide | : S54°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Removal of debris, slope easening with proper drainage is recommended.

SLIDE NO: KA-307

LOCATION: The slide is located at latitude 13° 04' 30.6" N and longitude 75° 27' 22.8" E in Survey of India toposheet No 48 O / 8 along SH-64 between Kotigehara-Charmudi road section, Beltangady Taluk, Dakshina Kannada district (Near slide no KA-306)

SLIDE DESCRIPTION: The slide is classified as a old Earth slump which is almost stabilised. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is 10.0 m. Construction of the State Highway is the only land use on this moderately to thickly vegetated slope. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 4.0 m and vertical interval of 12.0 m (Photo 34).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | |
|--|------------------------|
| a. Length of failed mass from crown to foot | : 13.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : 18.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : 1.0 m |
| d. Volume of failed mass above the failure surface | : 117.0 m ³ |
| e. Slope angle post failure | : 80° |
| f. Slope angle pre failure | : 90° |
| g. General slope gradient | : 25° |
| h. Run out distance / up to | : 15.0 m/SH-64 |
| i. Cut slope Height | : 7.0 m |
| j. Direction of slide | : N75°W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: SH-64 road was affected.

RECCOMENDATION: Old slide almost stabilised.

III. 3. Landslides recorded between Madikeri-Bhagamandala road section

SLIDE NO: KA-334

LOCATION: The slide is located at latitude 12° 21' 19.7" N and longitude 75° 38' 53.3" E in Survey of India toposheet No 48 P/11 on Madikeri-Bhagamandala road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slided area has an overburden thickness of nearly 3.0 m. The depth of weathering is >10.0 m. Two sets of joints noticed J1- NS/vertical with 30 cm spacing and is tight and J2- N65°E/78°NW with 20 cm spacing and is tight. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 16.0 m (Photo 61 and 62).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---|
| a. | Length of failed mass from crown to foot | : | 22.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 15.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 165.0 m ³ |
| e. | Slope angle post failure | : | 65° |
| f. | Slope angle pre failure | : | 70° |
| g. | General slope gradient | : | 30° |
| h. | Run out distance / up to | : | 24.0m/
Madikeri-
Bhagamandala
road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N30°E |

CAUSES: Human interference by cutting of the slope for construction of road and ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: Madikeri-Bhagamandala road affected.

RECCOMENDATION: Grading of slope/slope easening, proper drainage are recommended.

SLIDE NO: KA-335

LOCATION: The slide is located at latitude 12° 21' 25.8" N and longitude 75° 38' 40.8" E in Survey of India toposheet No 48 P/11 on Madikeri-Bhagamandala road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old and reactivated debris slide. The debris consists of rock fragments, clay and weathered granitic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.0 m and vertical interval of 5.0 m (Photo 63).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|----------------------------------|
| a. Length of failed mass from crown to foot | : | 8.5 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 31.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 65.9 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 35° |
| h. Run out distance / up to | : | 9.0m/ Madikeri-Bhagamandala road |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | N38°E |

CAUSES: Human interference by cutting of the slope for construction of road and ineffective drainage are the main causes for the slide.

NATURE OF DAMAGE: Madikeri-Bhagamandala road affected.

RECCOMENDATION: Grading of slope/slope easening and proper drainage are recommended.

III. 4. Landslides recorded between Bhagamandala–Karike road section

SLIDE NO: KA-336

LOCATION: The slide is located at latitude 12° 28' 50.3" N and longitude 75° 45' 31.9" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Karika road, 2km from Bhagamandala towards Karika, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide which is almost stabilised. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 4.0 m and vertical interval of 9.0 m (Photo 64).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 11.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 18.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 49.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 13.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 12.0 m |
| j. Direction of slide | : | N60°E |

CAUSES: Human interference by cutting of the slope for construction of road.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised as observed from the growth of plantation seen on debris material. Slope easening and proper drainage are recommended to arrest any reactivation in future.

SLIDE NO: KA-337

LOCATION: The slide is located at latitude 12° 24' 20.8" N and longitude 75° 31' 4.7" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Karika road (500 m from slide no KA-336 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide which is almost stabilised. The debris consists of clay and highly weathered rock material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 10.0 m (Photo 65).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 14.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 22.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 77.0 m ³ |
| e. | Slope angle post failure | : | 75° |
| f. | Slope angle pre failure | : | 85° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 16.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 12.0 m |
| j. | Direction of slide | : | N80°E |

CAUSES: Human interference by cutting of the slope for construction of road.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised as observed growth of plantation seen on debris material. Slope easening and proper drainage are recommended to arrest any reactivation in future.

SLIDE NO: KA-338

LOCATION: The slide is located at latitude 12° 24' 22.3" N and longitude 75° 30' 59.8" E in Survey of India toposheet No 48 P/11 on Bhagamandala-Karika road (500 m from slide no KA-337 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 10.0 m and vertical interval of 22.0 m (Photo 66).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 26.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 390.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 30.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | Towards W |

CAUSES: Human interference by cutting of the slope for construction of road is the main cause for the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: New slide and one more slide is developing on left flank may reactivate. Removal of debris, slope modification and proper drainage are recommended.

SLIDE NO: KA-339

LOCATION: The slide is located at latitude 12° 24' 23.4" N and longitude 75° 30' 59.8" E in Survey of India toposheet No 48 P/11 On Bhagamandala-Kariker road (50 m from slide no KA-338 towards Kariker) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slump which is almost stabilised. The debris consists of rock fragments and clay. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 10.0 m (Photo 67).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---|
| a. | Length of failed mass from crown to foot | : | 12.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 17.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 51.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 14.0m/
Bhagamandala-
Kariker road |
| i. | Cut slope Height | : | 12.0 m |
| j. | Direction of slide | : | N65°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and poor drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Kariker road was affected.

RECOMMENDATION: Old slide almost stabilised, slope grading/ slope easening is recommended to arrest any reactivation.

SLIDE NO: KA-340

LOCATION: The slide is located at latitude 12° 24' 31.5" N and longitude 75° 30' 36.7" E in Survey of India toposheet No 48 P/11 On Bhagamandala-Karika road(500 m from slide no KA-339 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide which is almost stabilised. The debris consists of rock fragments and clay. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 5.0 m and vertical interval of 8.0 m (Photo 68 and 69).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 11.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 82.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 13.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N44°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and poor drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised. Plants are grown on debris material hence no remedial measures suggested.

SLIDE NO: KA-341

LOCATION: The slide is located at latitude 12° 24' 37.5" N and longitude 75° 30' 10.3" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. Two slides are taken as one slid (old slide on right flank). Limonitic clay patches seen on debris. The debris consists of clay, rock fragments and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 9.0 m (Photo70 and 71).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 11.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 34.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 93.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 85° |
| g. General slope gradient | : | 20° |
| h. Run out distance / up to | : | 12.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N10°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and poor drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Fallen trees on debris should be removed. Proper drainage and slope grading/ slope easening are recommended.

SLIDE NO: KA-342

LOCATION: The slide is located at latitude 12° 24' 37.4" N and longitude 75° 30' 7.6" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new earth slump. Limonitic clay patches seen on debris. The debris consists of clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 8.0 m (Photo 72).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 10.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 15.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 75.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 85° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 14.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N50°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Slide perpendicular to road. Removal of the trees fallen on debris material, slope grading/slope easening and proper drainage are recommended.

SLIDE NO: KA-343

LOCATION: The slide is located at latitude 12° 24' 31.9" N and longitude 75° 30' 1.3" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slump which is almost stabilised. Limonitic clay patches seen on debris. Two adjoining slides are considered as one slide. The debris consists of clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 3.0 m and vertical interval of 8.0 m (Photo 73).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 10.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 28.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 70.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 12.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 10.0 m |
| j. Direction of slide | : | N24°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised.

SLIDE NO: KA-344

LOCATION: The slide is located at latitude 12° 24' 44.4" N and longitude 75° 29' 59.0" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old and reactivated earth slump. The debris consists of clay and weathered granitic material. The slid area has an overburden thickness of nearly 1.5 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 8.0 m (Photo 74).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 11.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 13.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 71.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 12.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris, tree trunks fallen on debris material, and slope easening are recommended.

SLIDE NO: KA-345

LOCATION: The slide is located at latitude 12° 25' 0.4" N and longitude 75° 29' 55.4" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new earth slump. The debris consists of clay and weathered granitic material. The slid area has an overburden thickness of nearly 1.5 m. The depth of weathering is 2.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 11.0 m (Photo 75).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 13.5 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 12.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 40.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 15.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 12.0 m |
| j. | Direction of slide | : | N10°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Slope easening, removal of boulders from the crown, proper drainage and plantation on the slope are recommended.

SLIDE NO: KA-346

LOCATION: The slide is located at latitude 12° 25' 0.2" N and longitude 75° 29' 50.8" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new earth slump. The debris consists of clay and weathered gneissic material. The slid area has an overburden thickness of nearly 1.0 m. The depth of weathering is 5.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 7.0 m (Photo 76).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 9.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 13.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 29.3 m ³ |
| e. | Slope angle post failure | : | 75° |
| f. | Slope angle pre failure | : | 80° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 10.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Proper drainage and slope grading/ slope easening are recommended.

SLIDE NO: KA-347

LOCATION: The slide is located at latitude 12° 25' 7.9" N and longitude 75° 29' 33.4" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new earth slump. The debris consists of clay and weathered gneissic material. The slid area has an overburden thickness of nearly 1.0 m. The depth of weathering is 5.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 77 and 78).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 12.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 180.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 14.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 12.0 m |
| j. | Direction of slide | : | N50°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Slope modification/ slope easening, removal of debris, tree trunks fallen on debris and proper drainage are recommended.

SLIDE NO: KA-348

LOCATION: The slide is located at latitude 12° 25' 9.1" N and longitude 75° 29' 30.4" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. Two slides side by side taken as one slide. The debris consists of clay, rock particles and weathered gneissic material. The slid area has an overburden thickness of nearly 1.0 m. The depth of weathering is 5.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 7.0 m (Photo 79).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---------------------------------------|
| a. | Length of failed mass from crown to foot | : | 8.5 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 15.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 31.9 m ³ |
| e. | Slope angle post failure | : | 70° |
| f. | Slope angle pre failure | : | 80° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 9.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 9.0 m |
| j. | Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Slope modification/ slope easening, removal of fallen debris, tree trunks fallen on debris and proper drainage are recommended.

SLIDE NO: KA-349

LOCATION: The slide is located at latitude 12° 25' 10.6" N and longitude 75° 29' 27.6" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(800 m from slide no KA-348 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. Three adjacent slides taken as one slide. The debris consists of rock fragments, clay and weathered gneissic material. The slide scarp has width of 10 m with 3 m height and is vertical. The slid area has an overburden thickness of nearly 1.5 m. The depth of weathering is 6.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 13.0 m (Photo 80 and 81).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|---|
| a. Length of failed mass from crown to foot | : | 15.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 75.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 562.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 18.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N60°E(variable
as slide is on
road bend) |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Slope modification/ slope easening, removal of debris and proper drainage are recommended.

SLIDE NO: KA-350

LOCATION: The slide is located at latitude 12° 25' 11.9" N and longitude 75° 29' 22.6" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(500 m from slide no KA-349 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. Three adjacent slides taken as one slide. The debris consists of rock fragments, clay and weathered gneissic material. The slide scarp has width of 12 m with 5 m height and is vertical. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 12.0 m (Photo 82 and 83).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 15.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 225.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 17.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N22°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Slope modification/ slope easening, removal of debris and proper drainage are recommended.

SLIDE NO: KA-351

LOCATION: The slide is located at latitude 12° 25' 13.0" N and longitude 75° 29' 21.2" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(20 m from slide no KA-350 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new earth slump. Two adjacent slides taken as one slide. The debris consists of rock fragments, clay material. The slide scarp has width of 8.0 m with 2.0m height and is vertical. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 6.0 m (Photo 84).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 8.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 13.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. Volume of failed mass above the failure surface | : | 26.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 10.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 8.0 m |
| j. Direction of slide | : | N45°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Slope modification, removal of debris and proper drainage are recommended. (Very close to slide no KA-350 so both the slides maybe given remedies in one go)

SLIDE NO: KA-352

LOCATION: The slide is located at latitude 12° 25' 15.6" N and longitude 75° 29' 18.5" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(500 m from slide no KA-351 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old earth slump. The debris consists of rock fragments, clay material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 2.0 m and vertical interval of 6.0 m (Photo 85).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 9.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 18.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 40.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 85° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 11.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N35°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Old slide almost stabilised as plant growth seen on the debris material.

SLIDE NO: KA-353

LOCATION: The slide is located at latitude 12° 25' 61.3" N and longitude 75° 29' 17.8" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(20 m from slide no KA-352 towards Karika) Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown and head parts of the slide are stable and toe part of the slide is unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 6.0 m (Photo 86).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 9.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 19.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 42.8 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 85° |
| g. | General slope gradient | : | 20° |
| h. | Run out distance / up to | : | 12.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N55°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Slide may reactivate. Removal of debris and proper drainage are recommended.

SLIDE NO: KA-354

LOCATION: The slide is located at latitude 12° 25' 38.9" N and longitude 75° 29' 7.7" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 2.0 m and vertical interval of 33.0 m (Photo 87).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 35.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 12.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. | Volume of failed mass above the failure surface | : | 315.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 30° |
| h. | Run out distance / up to | : | 38.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 40.0 m |
| j. | Direction of slide | : | N40°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised may reactivate with rain in monsoon. Proper drainage with slope easening is recommended.

SLIDE NO: KA-355

LOCATION: The slide is located at latitude 12° 25' 30.9" N and longitude 75° 29' 7.2" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road, Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new Composite slide left side earth/debris slide right side rock fall. The debris consists of rock fragments, clay and weathered granitic material. Two sets of joints are noticed J1-N30°W/70°NE with 20cm-150 cm spacing and is tight, J2- N10°E/78°NW with 100 cm spacing and is tight. Limonitic clay patches seen on debris. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered granite. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 1.5 m and vertical interval of 5.0 m (Photo 88).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 7.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 12.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 42.0 m ³ |
| e. | Slope angle post failure | : | 70° |
| f. | Slope angle pre failure | : | 80° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 10.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | Towards W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: One huge tree precariously hanging on the crown part should be removed otherwise the tree will fall and Road may be blocked. Easening of slope, removal of boulders and debris and proper drainage are recommended.

SLIDE NO: KA-356

LOCATION: The slide is located at latitude 12° 25' 33.1" N and longitude 75° 29' 6.0" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(100 m from slide no KA-355 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown and head and parts of the slide are unstable and toe part is stable. The slide has a horizontal extent of 4.0 m and vertical interval of 12.0 m (Photo 89).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 14.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 22.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 154.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 17.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N34°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old slide almost stabilised. Proper drainage, slope grading and removal of debris may prevent reactivation.

SLIDE NO: KA-357

LOCATION: The slide is located at latitude 12° 25' 34.1" N and longitude 75° 29' 0.2" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(Near 10 KM stone towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as an old debris slump. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 1.5 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are stable. The slide has a horizontal extent of 3.0 m and vertical interval of 10.0 m (Photo 90).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 12.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 21.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 126.0 m ³ |
| e. | Slope angle post failure | : | 60° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 20° |
| h. | Run out distance / up to | : | 14.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | N35°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Old debris slump almost stabilised.

SLIDE NO: KA-358

LOCATION: The slide is located at latitude 12° 25' 39.2" N and longitude 75° 28' 55.9" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(600 m from slide no KA-357 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 9.0 m (Photo 91).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 12.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 18.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 0.5 m |
| d. | Volume of failed mass above the failure surface | : | 54.0 m ³ |
| e. | Slope angle post failure | : | 75° |
| f. | Slope angle pre failure | : | 80° |
| g. | General slope gradient | : | 20° |
| h. | Run out distance / up to | : | 14.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 10.0 m |
| j. | Direction of slide | : | Towards N |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris material, proper drainage and slope grading/slope easening are recommended.

SLIDE NO: KA-359

LOCATION: The slide is located at latitude 12° 25' 38.6" N and longitude 75° 28' 56.9" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(30 m from slide no KA-358 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 28.0 m (Photo 92 and 93).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 30.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 15.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 225.0 m ³ |
| e. Slope angle post failure | : | 85° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 35.0m/ Bhagamandala-Karika road (debris fallen on road has been removed) |
| i. Cut slope Height | : | 20.0 m |
| j. Direction of slide | : | N15°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Removal of debris material, proper drainage and slope modification are recommended.

SLIDE NO: KA-360

LOCATION: The slide is located at latitude 12° 25' 47.2" N and longitude 75° 28' 55.5" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(30 m from slide no KA-359 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >7.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 19.0 m (Photo 94).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 22.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 24.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 264.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 25.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris material, providing proper drainage and slope modification are recommended.

SLIDE NO: KA-361

LOCATION: The slide is located at latitude 12° 25' 49.8" N and longitude 75° 28' 52.8" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(500 m from slide no KA-360 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 10.0 m (Photo 95).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 12.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 17.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 102.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 15.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N25°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Nala is flowing on the slide material, providing proper drainage and debris removal are recommended.

SLIDE NO: KA-362

LOCATION: The slide is located at latitude 12° 25' 49.3" N and longitude 75° 28' 52.1" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(Near 11 KM stone towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 20.0 m (Photo 96).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 22.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 31.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. Volume of failed mass above the failure surface | : | 511.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 26.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 20.0 m |
| j. Direction of slide | : | N20°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris material, providing proper drainage and slope modification with plantation on debris are recommended.

SLIDE NO: KA-363

LOCATION: The slide is located at latitude 12° 25' 49.1" N and longitude 75° 28' 50.9" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(50 m from slide no KA-362 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 2.0 m and vertical interval of 10.0 m (Photo 97).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 13.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 18.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 17.0 m ³ |
| e. Slope angle post failure | : | 70° |
| f. Slope angle pre failure | : | 80° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 15.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 15.0 m |
| j. Direction of slide | : | N40°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris material, providing proper drainage and slope modification are recommended.

SLIDE NO: KA-364

LOCATION: The slide is located at latitude 12° 25' 51.4" N and longitude 75° 28' 49.5" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(20 m from slide no KA-363 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 5.0 m and vertical interval of 42.0 m (Photo 98).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 45.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 30.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.5 m |
| d. | Volume of failed mass above the failure surface | : | 1012.5 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 48.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 1532.0 m |
| j. | Direction of slide | : | Towards W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris material, proper drainage and slope modification are recommended. (Over a stretch of 200 m four slides are recorded all slides may be treated simultaneously)

SLIDE NO: KA-365

LOCATION: The slide is located at latitude 12° 25' 50.9" N and longitude 75° 28' 46.6" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(250 m from slide no KA-364 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slump. The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 17.0 m (Photo 99 and 100).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|---|
| a. | Length of failed mass from crown to foot | : | 19.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 32.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 304.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 25.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N10°E(variable
as slide is on
road bend) |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Highly weathered material (gneiss) on debris should be removed; proper drainage and slope modification are recommended.

SLIDE NO: KA-366

LOCATION: The slide is located at latitude 12° 25' 56.7" N and longitude 75° 28' 34.6" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(800 m from slide no KA-365 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. Gullies formed on debris material due to water action and limonitic clay seen on debris. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 26.0 m (Photo 101).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 29.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 35.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 507.5 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 35.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 25.0 m |
| j. Direction of slide | : | N35°E |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Debris removal, proper drainage, plantations on slopes, slope grading/ slope easening are recommended.

SLIDE NO: KA-367

LOCATION: The slide is located at latitude 12° 26' 5.1" N and longitude 75° 28' 21.0" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(1 km from slide no KA-366 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new composite slide (left flank rock slide right flank debris slide). The debris consists of rock fragments, clay and weathered gneissic material. The slid area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 4.0 m and vertical interval of 25.0 m (Photo 102).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 28.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 32.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 448.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 35.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 20.0 m |
| j. | Direction of slide | : | Towards S |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Removal of debris material, proper drainage and slope modification with plantation on slope are recommended.

SLIDE NO: KA-368

LOCATION: The slide is located at latitude 12° 26' 11.3" N and longitude 75° 27' 52.3" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(2 km from slide no KA-367 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 3.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 14.0 m (Photo 103).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | | |
|----|---|---|--|
| a. | Length of failed mass from crown to foot | : | 16.0 m |
| b. | Maximum width of failed mass from the left flank to the right flank boundary | : | 40.0 m |
| c. | Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. | Volume of failed mass above the failure surface | : | 320.0 m ³ |
| e. | Slope angle post failure | : | 80° |
| f. | Slope angle pre failure | : | 90° |
| g. | General slope gradient | : | 25° |
| h. | Run out distance / up to | : | 20.0m/
Bhagamandala-
Karika road |
| i. | Cut slope Height | : | 15.0 m |
| j. | Direction of slide | : | N35°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECOMMENDATION: Slide is spreading laterally. Proper drainage, removal of trees from the crown part and slope grading/ slope easening are recommended.

SLIDE NO: KA-369

LOCATION: The slide is located at latitude 12° 26' 9.9" N and longitude 75° 27' 45.8" E in Survey of India toposheet No 48 P/7 On Bhagamandala-Karika road(800 m from slide no KA-368 towards Karika), Bhagamandala Taluk, Coorg district.

SLIDE DESCRIPTION: The slide is classified as a new debris slide. The debris consists of rock fragments, clay and weathered gneissic material. The slided area has an overburden thickness of nearly 2.0 m. The depth of weathering is >10.0 m. Construction of road is the main land use. The geology of the studied area is weathered gneiss. The crown, head and toe parts of the slide are unstable. The slide has a horizontal extent of 3.0 m and vertical interval of 28.0 m (Photo 104).

MORPHOLOGICAL PARAMETER OF SLIDE:

- | | | |
|--|---|--|
| a. Length of failed mass from crown to foot | : | 30.0 m |
| b. Maximum width of failed mass from the left flank to the right flank boundary | : | 29.0 m |
| c. Maximum depth of the failed mass from the surface of the slide to the failure surface | : | 1.0 m |
| d. Volume of failed mass above the failure surface | : | 435.0 m ³ |
| e. Slope angle post failure | : | 80° |
| f. Slope angle pre failure | : | 90° |
| g. General slope gradient | : | 25° |
| h. Run out distance / up to | : | 32.0m/
Bhagamandala-
Karika road |
| i. Cut slope Height | : | 25.0 m |
| j. Direction of slide | : | N30°W |

CAUSES: Human interference by cutting of the slope for construction of road has increased the gradient. This modification of slope coupled with high rain fall and ineffective drainage has triggered the slide.

NATURE OF DAMAGE: Bhagamandala-Karika road was affected.

RECCOMENDATION: Removal of debris material, proper drainage and slope modification with plantation on slope are recommended.