

2-29

Task Force Certificate

- (i) Lay out of the Land-be followed as far as possible.
- (ii) Heavy cutting/filling be avoided-as far as possible. The technology of cut and fill method is to be adopted. Steep hill slopes also to be avoided.
- (iii) Unstable/slide-prone areas to be avoided. For identifying such areas the advice of Geotechnical engineers and geologists to be taken during the survey for alignment.
- (iv) Comparison of various possible alignments with reference to erosion potential be made and the alignment involving minimum erosion risks be preferred.
- A part from the stage of planning the road alignment, effective steps are also required to be taken by ground engineer during the process of road construction for minimized ecological disturbance to the hill roads Broadly the measures to be taken have been identified as :-
- (ii) Cut and fill method to be adopted while excavating for road formation and heavy earth cutting is to be avoided Box cutting is to be avoided to the extent possible.
- (ii) (ii) Blasting by explosives is to be restricted to the minimum. Lay out of holes to be drilled for blasting is to be planned keeping in view the line of least resistance and the existence of joints Controlled blasting should be repeated using low charge and care be taken to avoid activating slide zones or widening fissures and cracks in rock. Use of delay detonators in large scale blasting work is to be made for anaoline dispersion of chock waves, so that minimum disturbance is caused to the rock stratum as a result of the blasting process.
- (iv) (iii) All cut slopes, unusable hill side and slide prone erosion prone areas are to be provided with suitable correction measures by using one or the other of the techniques developed by CRRI. Several techniques have been sponsored by CRRI. like simple vegetative turning, bitumen much treatment and slide treatment by jute netting coir netting of these simple vegetative turning seems to be the most appropriate preventive measure in many situations. This should be established in the denuded slopes immediately after the excavation is made
- (v) Adequate drainage measures and protective structures like intercepting catch water drains, longitudinal drains/culvers, breast walls, retaining and the walls are provided for purposes of establishing the slips Growth vegetative cover is stimulated in the disturbed hill slopes above the road level by planting suitable fast growing shrubs and plants. In certain selected unstable areas terraced afforestation has also been plasticized as a stabilizing measure with good results.
- (vi) Over the past few years the roads wing of the Ministry of Shipping and transport has issued instruction laying down broad guidelines and check list of the preparation of road construction projects which provide an inbuilt mechanism of tacking land slides/erosion control for the guidance and follow up action by engineers of state 'PWD' Border Roads Organization and other engaged in construction of hill roads these should be observed.

प्रमाणित किया जाता है कि योजना आयोग द्वारा गठित टास्क फोर्स की उपरोक्त संस्तुतियाँ याचक विभाग को मान्य हैं।

सहायक अभियन्ता,
प्रान्तीय खण्ड, लोक निर्माण विभाग,
रानीखेत

अधिशमरी अभियन्ता,
प्रान्तीय खण्ड, लोक निर्माण विभाग,
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2.29

**GUIDLINE FOR ROAD CONSTRUCTION IN HILL AS CONTRALIRED IN THE PORT OF
TASK FORCE OF THE PLANNING COMMISSION FOR STUDY OF ECO-DEVELOPMENT IN
THE HIMALAYEN REGION**

Name of the project :- For Construction of Deghat-Nagchulakhal motor road to Chanterkhadi- Kaliyaligurd Motor Road in Distt-Almora. (2.500 Km.) , 1.485 Hect.

The Guidelines for selection of alignment are :-

1. "Lay of the land" be followed as far as possible.
2. Heavy cutting/filling be avoided. As far as possible the technology of "cut and fill" method is to be adopted. Steep hill, slope to be also avoided.
3. Unstable/slide prone areas to be avoided. For identifying such area the advice of geotechnical engineers and geologists to be taken during the survey for relocation of alignment.
4. A comparison of various possible alignments with reference to erosion potential be made and the alignment involving minimum erosion risks be preferred.

A part from the stage of planning the road alignment, effective step are also required to be taken by ground engineers during the process of road construction for minimising ecological disturbance to the hill roads. Broadly the measures to be taken have been identified as :

- I. (Cut & fill) method to be adopted while excavating for road formation and heavy earth cutting is to be avoided. Box cutting is to be avoided to the extent possible.
- II. Blasting by explosive is to be restricted to the minimum, layout of holes to be drilled for blasting is to be planned. Keeping in view the line of least resistance and the existence of joints, controlled blasting should be restored to by using low charge and care be taken to avoid activating slide zones or widening fissures and cracks in rock. Use of delay detonators in large scale ballasting work each to be made for enabling dispersion of shock waves, so that minimum disturbance is caused to the rock strata as a result of the blasting process.
- III. All cuts slopes, unstable hill slopes and slide prone/erosion prone areas are to be provided with suitable correction measures by using one or the other of the techniques developed by CBRI. Several techniques have been sponsored by CBRI like simple vegetative surfing, bitumen mulch treatment and slope treatment by jute matting /coir matting of these simple vegetative surfing seems to be the most appropriate preventive measures in many situations this should be established on the denuded slopes immediately after the excavation.
- IV. Adequate drainage measures and protective structure like intercepting catch water drains, longitudinal drains, cross drains, culverts, breast walls, retaining walls are toe walls are provided for purpose of stabilizing the slopes. Growth of vegetative cover is stimulated in the disturbed hill slopes above the road level by planting suitable fast growing shrubs and plants. In certain selected unstable areas, terraced afforestation has also been practiced as a stabilizing measure with good results.
- V. Over the past few year the roads wings of the Ministry of shipping and transport has issued instruction, laying down broad guidelines and check list of the preparation of road construction project, which provide an inbuilt mechanism for tackling land slides/erosion control for the guidance and follow up action by an engineer of state P.W.D., Border Roads Organization and others engaged on construction of hill roads. These should be observed.

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