



IMPORTANCE OF ROADSIDE VEGETATION

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ABSTRACT

Roads are the integral part of transportation system. It plays a significant role in achieving national development and with the help of road side vegetation and by selecting right species of plant at right area we can reduce the maintenance needs and cost of road, provides safety for vehicles, improves the overall driving experience of roads, reduce soil erosion.

Enhance the drainage aspect of roads as vegetation increase the water infiltration capacity of soil, improves the shear strength of embankments by controlling the moisture content and increase the life of shoulder. Beside all these factors vegetation also cover the environmental aspect such as control noise pollution, air pollution and maintains the ecological balance and aesthetic view.

1. INTRODUCTION

As with growing time government of every country wants the best & economic technique should be adopted in each part of the country &

an attempt is made by the engineers to find the alternatives of each technique. The Roadside vegetation or bio engineering is a technique through which the life of road can be increased by controlling the moisture content of soil, by improving shear strength of soil, by improving infiltration capacity of soil & by controlling soil erosion. Through this technique we can also reduce the cost of construction, maintenance cost of roads.

The road side vegetation technique or bio engineering technique requires assessment of existing road condition determination of type of roadside environment desired according to increased public demand and customer expectations. There are various factors on which vegetation techniques depend:

Soil conditions; Traffic Composition;
Location of road; Topography; Adjacent
Land Use; The Priority of Road; Aesthetic
appearance

It is a rapidly growing field subject to innovations & changing design specifications. Due to increased environmental awareness this technique is beneficial than traditional approaches.

2. BENEFITS OF VEGETATION

2.1 ECONOMIC ASPECTS

- Improved Road side conditions enhance the visitor visit.
- Reduce cost of construction activities due to less requirement of improved technology.
- Also improves life of pavement. (This technique can be used in soil stabilization situations)
- It also reduces maintenance cost and needs.
- It improves water infiltration capacity of soil & reduces run off.
- The roots, stems & associated woods that we obtained from cutting are used to build the structures.
- Traditional method of controlling stream flow & wave induced erosion on embankment have relied on structural practice like retaining wall & sheet piles which are expensive, ineffective whereas Bio engineering technique as one of best economic alternative approach.

2.2 ENVIRONMENTAL ASPECTS

- It improves air quality by absorbing carbon monoxide, and carbon dioxide.
- It also stabilizes the ground surface to prevent soil erosion as with time the strength of root system increases which increase the

soil stability and the soil is less prone to soil erosion.

- Provides habitats for wildlife.
- Control weeds on roadside conditions.
- Increased biodiversity (variation of species)

2.3 SAFETY ASPECTS

- Vegetation proves an effective tool for slope protection in road projects.
- It minimizes effect of rain, snow and ice formation.
- It also minimizes hazardous conditions for maintenance staff.
- It reduces the slippery on the roads and provides safety for vehicles.

3. BENEFITS OF VEGETATION ON EMBANKMENTS

In Embankment design slope stability is the major consideration or element on which design of embankments depends and there is complex relationship between vegetation and slope stability. Vegetation enhance slope stability in following ways:-

By Removing water from soil

- (i) Due to shading of trees, the soil becomes dry which increases the infiltration capacity of the soil and allows deep penetration of the rain water.
- (ii) Due to capillary action of plants the r is drawn up from the roots or soil to the leaves which is then removed through process of transpiration it also by controlling moisture content of soil.

Mechanical Reinforcement

- i. Roots increase the shear strength of the soil by binding the particles along the potential failure plane.
- ii. Due to root elongation across slip plane there is development of root tensile force which is transferred to soil.

4. EFFECT OF VEGETATION ON SHOULDER

A shoulder is a portion of roadway that is continuous with the travelled way and is provided for lateral support of base and surface course. Due to lack of funds most common types of shoulder prevail in India are earthen shoulders that are compacted in different layers. Due to earthen shoulders maintenance requirement is an essential component and vegetation plays a vital role in maintaining shoulders during rainy season as it prevent the rain cuts, reduce slipperiness of the shoulder. Improves the water Infiltration capacity of the shoulder and also avoid soil erosion during rainy season by firmly binding the soil particles. Vegetation is also the one of way of keeping the earthen shoulder in proper shape of profile. With the help of vegetation dust nuisance is also minimized and load carrying capacity of shoulder is also increased.

5. IMPORTANCE OF VEGETATION ON HILL ROADS

As hill ranges are very young due to which a minor disturbances can cause slips, subsidence and Land-slides. Landslides are basic problem on all hill roads. There are many factors which contribute the land slide whereas deforestation, grazing of animals is also a major contributing

factor. As trees or vegetation on roadside not only increase shear strength along the failure plane but also improves the load carrying capacity of soil along the failure plane, provides lateral support by preventing soil erosion. As a preventive measure to avoid landslides afforestation & fencing should be done so that grazing of animals should be stopped.

6. AESTHETIC ASPECT OF VEGETATION

- Roadside vegetation protects from unsightly views such as slums, Junk Yards, Storage depots etc.
- Trees provide shade, colour if they are of flowering variety and also yields fruits.

7. ENVIRONMENTAL ASPECT OF VEGETATION

Noise Pollution: Noise is an unwanted sound on the road & it is mainly caused by breaks, horn, and engine of vehicles. So for highway engineering it is also a better opportunity to control noise pollution by just planting the trees and shrubs on the roadside.

Air Pollution: As lot of poisonous fumes and smell are caused by the engines of vehicles which are hazardous to environment and driver. All types of pollutant like lead particles, oxides of nitrogen, Carbon monoxide, Oxides of nitrogen can be easily controlled by the roadside vegetation.

8. LIMITATIONS OF VEGETATION

- Vegetation doesn't stabilize instable slopes as due to higher planting difficulties and a

higher erosion hazard produce by greater runoff velocity.

- Improper drainage and poor consolidation of roads are less stabilized by vegetation.
- The availability of easily adapted plants may be limited.
- Labour needs are intensive & skilled experience labour may not be available. So pre-requisite training is required.
- The planting season of plant or vegetation may be limited.
- If trees are planted at top of slope extra 10% factor of safety should be required as tree of 30-50m height generally applies loading of 150km/m².

9. SPECIES SELECTION

It should be beneficial to select native species instead of non-native species as these can easily compete with the prevailing climatic conditions and one should try to select those species of vegetation that can roughly match with the environmental conditions of road and special attention should be given in following cases:-

- Select those species with that are comfortable with soil movement at project sites.
- The deep and widespread root system should be adopted where deep earth movements are there. E.g.: Popular, Eucalypts Acacia.
- Special attention should be given in shady regions as most of plants material will grow poorly and their life is also short.

10. CONCLUSION

Although roadside vegetation has certain limitations like limited plantation season of trees

but keeping in view all the above benefits of roadside vegetation, considering its economic, environmental, safety aspect etc. ; it should be given due importance.

Since, roadside vegetation has varied benefits on hilly roads, embankments, to improve soil strength, improving infiltration capacity of soil, reduction in soil erosion. So considering the benefits of roadside vegetation, this paper has been attempted to promote roadside vegetation as an important aspect in Highway Engineering.

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