



(RESEARCH ARTICLE)



## Study on topographic features of land-sliding zone of Jammu –Kashmir National highway 44 (Nh-44) & finding some solutions to stop the threat of land-sliding

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### Abstract

National highway 44 is the longest highway of our country connecting Kashmir to Kanyakumari. This highway is part of NORTH-SOUTH & EAST-WEST CORRIDOR. The designing of this highway is quite satisfactory in every aspect. From Kanyakumari to Jammu this highway is quite safe and does not fall in prey of any Danger like land slidding. However the link of NH-44 from Jammu to Kashmir faces main natural dangers like land sliding. On this link there are the various dangerous spots of land sliding that makes this beautiful Highway dangerous for travel. Roads are known as the golden coins of economy of any nation and its responsibility of every individual related to this field to find some solutions for such kind of dangerous problems .BY studying the topography of the Land sliding zone we has come up with some solutions that can erase the threat of land sliding over this beautiful highway. The solution will not only enhance the stability of this highway but will also prevent lives of thousands of people that every year falls in the prey of land sliding. Almost every year thousands of people travelling from Jammu to Kashmir or vice versa on this beautiful highway falls in the prey of death because of dangerous land sliding. The solution we have come up with if implemented on this will boost our economy as well, as every day cores of rupees are being spent on the maintenance of this link of NH-44.

**Keywords:** NH-44; Jammu Kashmir; Tunnels; Land sliding; Erosion; Economy; Solutions

### 1. Introduction

National highway 44 is the longest highway of our country. Its length is 4112 km. It passes through the Union Territory of Jammu & Kashmir, States of Punjab, Haryana, Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Maharashtra, Telangana, Andhra Pradesh, Karnataka, and Tamil Nadu. In Jammu & Kashmir this highway covers about 304 km of distance. Kashmir is the starting mark of this highway and Kanyakumari marks the end of NH-44 route. The speed limit of cars for NH-44 is 100 KMPH and for Expressways it is 12KMPH. The limit for two wheelers for both expressways & highways is 80KMPH. The NH-44 is maintained by NHAI and NHDP. Both National highways Authority of India and National Highway Development Projects maintain this beautiful Highway. This Highway is safe for travel in all the states passing through except for UT Jammu & Kashmir. The entrance of this highway in Jammu & Kashmir state in plain terrain, however when it reaches at the middle of journey, it passes through the mountainous terrain. This highway When enters in the mountainous terrain of J&k is subjected to land sliding because of which the entire beauty of this safest highway is discarded. Evert year during the Rainy season's and winter this highway gets closed for large number of days. Cores of rupees are being spent for maintenance of this link of NH-44 by creating Tunnels and Retaining walls, but when we see off the results, the results are not satisfactory. Under the influence of land sliding, every retaining wall structure fails off there as the extent of land sliding is more. By creating Tunnel structure, the soil structures again loss their thixotropy, which in turn leads to more soil erosion. In one part of this highway the construction of Tunnels is feasible and has greatly reduced the travel time between Jammu or Srinagar or vice versa , but in another part the construction of tunnels is facing problems because of the topography of the region. Also construction of tunnels in the

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region is associated with the destruction of the natural features like mountains, tress. The mountains, tress is cutted down which intern leads to soil erosion and creating the danger of land sliding. We need to find some solid methods to prevent the influence of land sllding without destroying the natural features like mountains. There can be various measures that can prevent the extent of land sliding.



**Figure 1** NH-44 SECTION AT Delhi Jammu LINK



**Figure 2** NH-44 PASSING THOUGH NH-7 CHANDIGARH



**Figure 3** NH-44 at panipat section



**Figure 4** NH-44 at Samba section (jammu



**Figure 5** NH-44 at Kashmir section



**Figure 6** NH-44 at Jammu section ( Nagrota)

## 2. Methodology



**Figure 7** Map of jammu and kashmir

The Jammu Srinagar national highway is the northern most segment of NH-44. It runs from Srinagar in the Kashmir valley southward to the city of Jammu. The highway starts from Lal Chowk Srinagar and passes through Pulwama district, Anantnag District, Kulgam District, Ramban District, Udhampur District and ends in Jammu city. The highway lies in the Kashmir valley for first 70 km up to Qazigund in plain terrain and then passes through a series of Mountains up to Udamphur. The road stretch that passes through the mountainous terrain is subjected to land sliding and because of which the highway gets closed for many days in excessive and least count of rainfall. On some part of this highway various tunnels have also been constructed like CHENANI-NASHRI TUNNEL. This tunnel starts in Chennai and ends in Nashri in Ramban district. It's the India's longest road tunnel with length of 9.2 km and country's first tunnel with fully integrated tunnel control system. This tunnel has reduced the travel time by 30km and this tunnel bypasses snowfall

and avalanche prone areas in winter like patnitop, kud and batote that obstructs NH44 every winter and causes long queues of vehicles for many days.

Banihal – Qazigund Road tunnel is the another important tunnel that starts from Qazigund and ends in Banihal. Its approx length is 8km and has reduced the distance of 16 km between Jammu to Srinagar and vice versa.

Currently the zone of land sliding on this highway that has created havoc in the entire country is the zone that lies between Ramban to Banihal.

The route map Features of Jammu Srinagar NH 44 is as:

- JAMMU – Nagrota- Udhampur – RAMBAN-BANIHAL –QAZIGUND- KULGAM – ANANTNAG- SRINAGAR
- The road stretch between Jammu to Nagrota is excellent in plain terrain subjected to no land sliding
- The Road stretch between Nagrota to Udhampur lies also in plain Terrain subjected to no land sliding
- The Road stretch between Udaipur to Ramban consists of Tunnels making it safe for use.
- The stretch between Ramban to Banihal is land sliding zone, Most dangerous zone
- The Road stretch between Banihal to Qazigund consists of a tunnel structure
- THE road stretch between Qazigund to Srinagar is a newly constructed expressway.

## 2.1. Area of study

The Area of study is the land sliding zone that starts from Ramban and ends in Banihal. The main spots of land sliding that came to known us by means of topographic survey and practical survey were as:

- CHANDERKOOT
- RAMPARI
- PANTHAL
- RAMSOO

These four zones lie in the road stretch of Ramban –banihal link and are the most dangerous spots of land sliding that came to known to us.



**Figure 8** Land sliding zone of NH-44 by GIS



**Figure 9** Aerial view of land sliding zone



**Figure 10** Places with most land sliding

## 2.2. Solution

The extent of land sliding can be stopped by various engineering practices. The various practices that should be adopted as per of study areas.

- HYDROSEEDING: Application of seeds with machines on the mountains slopes to help grow grass and plants .it holds the top soil and avoids erosion of soil that intern stops the extent of Landsliding in the Area. It's a conductive for steep slopes and landslide areas.
- Using GEOSYNTHETICS or Geotextiles to reinforce the soil of this mountainous terrain Area's, holds the soil and can reduce the extent of land sliding.
- Use of geogrids, geonets, geomebranes, geocells on slopes. These materials are used to reinforce soils. The retaining walls constructed should be reinforced with geogrids.
- Concrete clotting should be done on slopes. Concrete cloth is an innovative material composed of a flexible aluminate cement powder impregnated fabric that raidly hardens upon hydration to form a thin, durable, waterproof concrete layer. The concrete carpeting should be done on sides of the national highway 44 for stabilization of the slope
- Asphalt mulch treatment should be done on the mountainous soil of the land sliding zone of NH44. this treatment involves a laying a layer of Asphalt mulch over the mountainous terrain , that will act as a surface sealing and will prevent the entry of rain water into the soil, thereby can stop the extent of land sliding
- Jute Netting and wire netting should be done across the sections.
- Small check dams needs to be constructed in this zone to hold the water.
- Proper drainage system needs to be designed across the mountainous terrain of this Area so that the rain water will not infiltrate into the soil.

- Sheet pile Reinforcement should be done for slope stability.

There is a need of modification of slope geometry and internal slope reinforcement.

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### 3. Conclusion

Land sliding of National Highway 44 at Jammu Kashmir section is an matter of concern for every individual related to the field of civil engineering, and it's duty of every single individual to find some solutions that can come up to solve the problem. We as an Civil Engineering Scholars has found that there are various ways through which the extent of land sliding can be stopped at some extent. The solution Cannot only stop the extent of land sliding but can also prove economical in every single aspect.

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### Compliance with ethical standards

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The author's declares that there is no conflict of interest regarding the main research, authorship and publication of this paper.

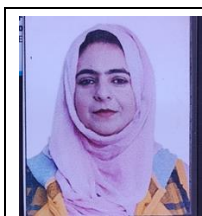
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