



News & Views

Two Uttarakhand districts and four in Kerala among top 10 landslide risk districts in the country, ISRO study

Rudraprayag and Tehri Garwhal districts of Uttarakhand have the highest landslide density in the country, a satellite-based study of the 147 most vulnerable districts by the National Remote Sensing Centre (NRSC) has found, reiterating that the western Himalayan region is most vulnerable to landslides.

“Rudraprayag district in Uttarakhand state, which has highest landslide density in India, is also having highest exposure to total population, working population, literacy and no. of houses (to landslides),” the study based on ISRO satellite maps said.

Among the 10 most landslide prone districts, four are in flood prone areas of Kerala, two in Jammu and Kashmir and two in Sikkim. In fact, after the Himalayas, the Western Ghats, which has seen large-scale development in the past few years, has high landslide density.

For the first time, NRSC scientists did risk assessment on the basis of 80,933 landslides recorded between 1988 and 2022 in 147 districts in 17 states and two union territories to build a Landslide Atlas of India.

The risk analysis was based on human and livestock population density, which indicates the impact these landslides have on people, and shows the most landslide vulnerable spots in the country. The atlas used satellite data of ISRO to map all seasonal and event-based landslides like the Kedarnath disaster in 2013 and landslides triggered due to Sikkim earthquake in 2011.

The landslide risk has intensified over the years due to environmental degradation and extreme weather events such as high intensity rainfall, which have increased due to climate change, the scientists said.

“In recent years, we have seen unplanned development in the hills of Himalaya and in Western Ghats, with scant regard for environment and forests. The impact of it, coupled with extreme rainfall, is visible through the rising number of major landslides and land subsidence incidents being reported from Joshimath to Doda to Darjeeling,” said Ravi Chopra, former head of the Supreme Court appointed panel on Char Dham highway project in Uttarakhand.

The new study recorded 80,933 landslide hot spots between 2000 and 2022, with the maximum of 12,385 in Mizoram, followed by 11,219 in Uttarakhand, 7,280 in Jammu and Kashmir and 1,561 in Himachal Pradesh. Among the southern states, the greatest number of landslide hot spots have been recorded in Kerala (6,039).

Using satellite data, the National Remote Sensing Authority had also recorded total landslides in states between 2010 and 2022, with Uttarakhand recording the maximum landslides in this period. Within the state, Rudraprayag and Tehri districts recorded the highest number of landslides, the study said.

The Dehradun-based Wadia Institute of Himalayan Geology has prepared a spatial distribution of landslide susceptible zones of Uttarakhand Himalayas, according to which 51% of the state is located in high and very high landslide susceptible zones, 22–23% in the moderate and 26–27% in the low and very low landslide susceptible zones.

Eight other districts among the top 10 worst affected districts were Thrissur in Kerala, Rajouri in Jammu & Kashmir, Palakkad in Kerala, Poonch in Jammu and Kashmir, Malappuram in Kerala, south and eastern districts of Sikkim and Kozhikode in Kerala. As many as 64 districts of the northeast figured in the list of 147 districts.

The study said a major part of the Himalayan region is susceptible to landslides. It is the high population density, major pilgrimage routes and tourism spots that have worsened the impact of disasters in Jammu and Kashmir, Himachal Pradesh and Uttarakhand. Uttarakhand alone reported over 7,750 extreme rainfall events and cloud bursts since 2015.

India is the third most landslide prone countries in the world, where every year the loss of lives per 100 sq km due to landslides is more than one, the study said. The other countries are Colombia, Tajikistan and Nepal.

In the west coasts of North and South America, Central America, Alpine regions of Italy, France, Switzerland and Austria in Europe, Himalayan regions of India, Nepal in Asia and parts Central Asia, the effects of landslides are more pronounced, mainly due to the spurred developmental activities to meet the growing demands of people, the report said.

Approximately 0.42 million sq km, or 12.6% of India's land area, excluding snow covered area, is prone to landslide hazard, according to the study. Of this, out 0.18 million sq km falls in North East Himalaya, including Darjeeling and Sikkim Himalaya; 0.14 million sq km in North West Himalaya (Uttarakhand, Himachal Pradesh and Jammu & Kashmir); 0.09 million sqkm in Western Ghats and Konkan hills (Tamil Nadu, Kerala, Karnataka, Goa and Maharashtra) and 0.01 million sqkm in Eastern Ghats of Aruku area in Andhra Pradesh.

“In India, landslides mostly occur in the monsoon season. Himalayas and Western Ghats are highly susceptible to mass movements due to hilly topography and heavy rainfall,” the study said.

In India, such disasters mostly occur in the monsoon season, due to heavy rainfall that causes sliding of the slopes that could have been impacted due to use of heavy machinery in developmental projects. However, the NRSC said in the future it would be able to map the slow-moving mountain slopes, which has higher risk of landslides.

Source: Excerpts from www.hindustantimes.com, 5.3.2023

Why the Zojila tunnel promises to revolutionise connectivity to Ladakh

Union Road Transport and Highways Minister Nitin Gadkari on Monday (April 10) inspected the under-construction Zojila tunnel, which will establish all-weather connectivity between the Union Territories of Ladakh and Jammu and Kashmir.

Gadkari visited the project site along with J&K Lieutenant Governor Manoj Sinha and members of the Parliamentary Consultative Committee on Road Transport and Highways.

As part of an ongoing project to improve connectivity in the region, 19 tunnels are being constructed at a cost of Rs 25,000 crore. As of now, 38 per cent of the work on the Zojila tunnel, said to be India's longest, has been completed.

What is the Zojila tunnel?

The Zojila tunnel will be India's longest road tunnel, and is expected to be Asia's longest bi-directional tunnel, boasting a length of 14.15 km.

A connecting tunnel from Z-Morh on NH1 to the Zojila tunnel will be built in the Zojila Ghats between Sonmarg and Kargil. This involves the development and expansion of the 18.475km highway between Z-Morh to Zojila. A 3km stretch will be expanded; the rest will be newly developed. The highway will have two twin-tube tunnels, five bridges, and two snow galleries.

The work on the entire 33km span is spread between two union territories – Jammu and Kashmir; and Ladakh.

Why is the tunnel needed?

Currently, the commute between Srinagar and Leh, the largest city in Ladakh, takes over 10 hours on a good day and passes through extremely inhospitable terrain. The Zojila Pass is a high mountain pass through which one has to travel in order to make the journey.

During harsh winters, this route is closed due to fears of avalanches, landslides and slippery roads, with areas beyond the pass cut off from the rest of the country for at least five months. With the Zojila pass shut, air connectivity is the only option, and airfares can skyrocket to over Rs 40,000 during peak winter months (For context, this much money can fetch a flight ticket between Delhi and London).

The upcoming Zojila tunnel will provide perennial connectivity between Ladakh and the rest of the country. This will not just benefit civilians living and employed in the region, but also the military, by expediting movement of troops and supplies in this vitally important strategic region.

How much commute time will the tunnel save?

Apart from providing perennial connectivity, the tunnel also promises to cut travel time between Kashmir and Ladakh. The distance from Baltal to Minamarg, currently 40 km, will come down to 13 km with travel time expected to be cut by an hour and a half.

The journey is also expected to be less strenuous. Given Zojila's inhospitable terrain, many fatal accidents are reported on the route each year. Once the tunnel project is completed, chances of accidents will significantly come down.

The project is expected to lead to the integrated development of both Union Territories. Speaking to reporters during his visit on Monday, Gadkari said, "From a strategic point of view, this is important. This area will be developed so people do not have to migrate. This is going to increase employment potential in this region as well."

What is the cost of the project?

The tunnel is being built at a cost of more than Rs 4,600 crore. It is expected to be completed by December 2023.

Source: The Indian Express, e-paper, 13.4.2023

Delhi-Meerut RRTS achieves major milestone with first tunnel breakthrough

The Regional Rapid Transit System (RRTS) project connecting Delhi with Meerut in Uttar Pradesh is progressing rapidly, with officials anticipating the opening of the priority section in just a few months. The National Capital Regional Transport Corporation (NCRTC) recently announced that the first tunnel breakthrough for the RRTS line in Delhi has been achieved, marking a significant milestone in the project's construction.

First Tunnel Breakthrough Achieved

The breakthrough was made at Khichripur in east Delhi using the tunnel boring machine (TBM) Sudarshan 4.1, and is seen as a crucial step in the Delhi section of the rapid rail project. The tunnel is the longest in the city made by any boring machine, measuring three kilometres in length and with a diameter of 6.5 meters.

RRTS Project in Phases

The RRTS project will be implemented in phases, with three priority corridors connecting Delhi-Ghaziabad-Meerut, Delhi-Panipat, and Delhi-Gurugram-Shahjahanpur-Neemrana-Behror-Alwar. The 17km long first priority section of the 82.15 RRTS corridor between Sahibabad and Duhai is expected to start commercial operations soon, with trial runs and final inspections currently underway on this Ghaziabad stretch. This section includes five stations: Sahibabad, Ghaziabad, Guldhar, Duhai, and Duhai Depot.

Speed and Efficiency

Once complete, the RRTS corridor will be the fastest Metro service in the country and is expected to cut down the travel time between Delhi and Meerut to around 55 minutes. The tunnels are designed to facilitate a maximum speed of 180km per hour, and the NCRTC plans to commission the entire Delhi-Ghaziabad-Meerut corridor for public use by 2025.

Future Plans

After the opening of the first-phase section, the corridor will be extended from Duhai to Meerut South Station in the second phase, and then expanded within Delhi in the third stage. In the final stage, the corridor will be extended further into and through Meerut.

Overall, the progress on the Delhi-Meerut RRTS project is promising and the breakthrough of the first tunnel marks a significant achievement in its construction. With the implementation of this rapid rail project, travel between Delhi and Meerut will become more efficient and faster than ever before.

TLDR

The construction of the Delhi-Meerut Regional Rapid Transit System (RRTS) is making significant progress, with the first tunnel breakthrough recently achieved in east Delhi. The breakthrough was made using the tunnel boring machine Sudarshan 4.1 and is a crucial step in the construction of the rapid rail project. The 17km long first priority section between Sahibabad and Duhai is expected to start commercial operations soon, with the entire Delhi-Ghaziabad-Meerut corridor expected to be commissioned for public use by 2025.

Source: www.timesproperty.com, 11.4.2023

Delhi Metro Phase IV: 2.2km tunnel ready, 18 underground stations planned

The Delhi Metro Rail Corporation (DMRC) is making significant progress on Phase-IV of the metro network. This phase comprises a total of 65 km, of which 28 km will be underground. The DMRC has already constructed a 2.2 km tunnel between Krishna Park Extension and Keshavpur on the Janakpuri West-RK Ashram Marg corridor, while work is ongoing on the 1.27 km tunnel between Chhatarpur and Kishangarh stations on the Aerocity-Tughlakabad corridor. In the coming months, tunneling will commence on several other stretches. The underground stations are being constructed using the traditional 'cut and cover' technology, but special Tunnel Boring Machines (TBMs) are being employed for the tunnels.

Due to the routes' passage through heavily populated areas, the DMRC faces a substantial hurdle in completing the 18 stations it plans to construct on the underground portion of Phase-IV. Throughout the underground work, the structures above the work zones will be continuously observed. A total of 19 km of the line's total length will be buried along the Aerocity-Tughlakabad corridor, while 9 km will be subterranean along the Janakpuri West-RK Ashram Marg sector. By the end of 2025, the DMRC hopes to have finished the full Phase-IV project.

DMRC officials have stated that tunneling work will commence soon on several stretches, including Sangam Vihar-Anandamayi on the Aerocity-Tughlakabad corridor, and Derawal Nagar-Pul Bangash and Nabi Karib-Pul Bangash on the Janakpuri West-RK Ashram Marg corridor. The tunneling work will be monitored, and the buildings above the tunnels will be regularly checked. The use of TBMs is revolutionizing tunneling work worldwide, according to a DMRC official, as they do not affect surrounding buildings or other structures on the ground while making the tunnels.

TBMs are incredibly useful in underground tunneling work in congested urban areas, and the DMRC has been using them since Phase-I of the project. During Phase-III, when the 50 km underground section was constructed, approximately 30 TBMs were employed in Delhi. The Janakpuri West-RK Ashram corridor (Magenta Line) will have 22 stations, 11 of which will be underground. The Tughlakabad-Delhi Aerocity (Silver Line) will have 15 stations, seven of which will be underground. Finally, the Majlis Park-Maujpur (Pink Line) will have eight stations.

Source: www.dnaindia.com, 13.4.23

GCRE backs innovative hyperTunnel underpass project

A project to build an underpass, trialling advanced technology from underground construction innovators, hyperTunnel, has been awarded funding from the Global Centre of Rail Excellence (GCRE) in Wales.

The £25,000 grant will be used to carry out a feasibility study into building an underpass at GCRE using hyperTunnel's approach which is 10 times faster and up to 50% more economical than current cut-and-cover construction techniques. The project aims to provide an economically viable alternative to hazardous level crossings, to improve safety, increase rail capacity and avoid inconvenience to road users.

Currently under construction in South Wales, GCRE is Europe's first, purpose-built rail innovation facility. It aims to undertake world-class research, testing and certification of innovative new rail technologies, acting as an incubator for pioneering projects. The hyperTunnel scheme was selected as one of 24 stand-out railway innovations in the first phase of a two-phase competition. If successful in Phase 1, the project may progress to a second funding round where 12 schemes will be demonstrated on GCRE's Dulais Valley site in 2024.

Using AI, digital surveying and swarm robotics to 3D print a structure in the ground before any excavation takes place, hyperTunnel's unique low-disruption approach uses 50% less electrical energy, has a lower carbon footprint and generates far less waste than traditional underground-building methods. It is also much safer and involves far less operational and financial risk. It has already proven successful in a large-scale trial in controlled conditions. Phase 2 of the project would enable it to be tested on a real site in the form of a 10m long pedestrian-sized tunnel built under GCRE's test track, with the railway remaining open throughout.

"The digital revolution using AI, machine learning and robotics has advanced other industries, but in underground construction, techniques haven't changed," said hyperTunnel co-founder Steve Jordan. "Building underground must become quicker and more affordable and sustainable. We believe our methodology presents a genuine technological breakthrough to solve the urgent need for underpasses. We're very excited at the prospect of testing it in real-world conditions at GCRE. It's a fantastic opportunity to get feedback for the further advancement of our technologies."

By Danny Longhorn

Source: <https://news.railbusinessdaily.com>, 13.4.23

Japan commits Rs. 7084 cr funding for three projects in India

The government of Japan has committed Rs 7,084 crore to India for three infrastructure projects, including Patna metro rail.

These include Patna metro rail project (around Rs 5,509 crore), a project for forest and biodiversity conservation for climate change response in West Bengal (approx. Rs 520 crore) and Rajasthan Water Sector Livelihood Improvement Project (RWSLIP) (about Rs 1,055 crore).

The Patna metro rail project is constructing the new Metro Corridor-I and II. The lowering work of the first-ever tunnel boring machine (TBM) segment for Corridor-II (Patna Junction-Patliputra Bus Terminal) has been started for the laying of an underground network. The estimated time to complete the underground tunnel is 30 months.

Source: www.projectstoday.com, 29.3.2023

Poem on Geology

When asked ChatGPT to write a poem on Geology, it wrote this... and it's amazing...

Beneath the Earth's crust lies a world unseen,
A realm of rocks, minerals, and things
between,
The study of which is called geology,
A science that unlocks Earth's history.

From mountains high to valleys low,
Geology tells the story of how they grow,
Of shifting plates and volcanic fire,
Of ancient oceans and creatures that retire.

Rocks and stones, they speak volumes,
Of time and pressure, their tales consume,

From sedimentary to igneous,
Each layer tells a story, quite curious.

Geology teaches us about the land,
How it was formed, how it will stand,
A glimpse into the world that we tread,
A view of the past, and what lies ahead.

So let us delve into the depths below,
Where geology's secrets continue to glow,
And uncover the stories that lie within,
For geology is where our Earth's journey
begins...

Source: Chat GPT, April 2023