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News & Views

Landslides in Assam, India: at least three fatalities

At least three people were killed in landslides in Dima Hasao district of Assam, an official bulletin said.

According to a bulletin issued by Assam State Disaster Management Authority (ASDMA) on Saturday night (7th May 2022), three persons, including a woman, lost their lives in Haflong revenue circle of Dima Hasao.

The hill district has been ravaged by flash floods and massive landslides at several places, snapping rail and road links from other parts of the state.

ASDMA reported that landslides have been reported from New Kunjung, Fiangpui, Moulhoi, Namzeurang, South Bagetar, Mahadev Tilla, Kalibari, North Bagetar, Zion and Lodi Pangmoul villages, where around 80 houses were severely affected.

"Railway line at Jatinga-Harangajao and Mahur-Phaiding was blocked due to landslides. Before reaching Maibang tunnel at Geremlambra village, road is likely to be blocked due to landslides," it added.

The ASDMA further reported that nearly 25,000 people are affected by floods across five districts in Assam.

The worst-hit is Cachar with over 21,000 people affected, followed by Karbi Anglong West with nearly 2,000 victims and Dhemaji with more than 600 persons hit by the deluge.

At least 227 people are taking shelter in 10 relief camps and distribution centres set up across two districts.

Nearly 2,200 people were rescued by the Army, paramilitary forces, Fire and Emergency Services, SDRF, civil administration and trained volunteers from Cachar and Hojai districts.

Incidents of massive waterlogging have been reported from various parts of Guwahati.

Source: Geoengineer.org, 12.5.2022

Dam project in China to be world's largest robotic 3D print

China is poised to build a hydropower dam in two years using artificial intelligence, construction robots, and zero human labour, the South China Morning Post first reported on Sunday, citing a paper published in April in the peer-reviewed Journal of Tsinghua University (Science and Technology).

The project, which is being carried out by the Science and Technology Department of Tsinghua University, is focusing on building the Yangqu Dam on the Tibetan Plateau layer by layer. After the

two-year construction period of the dam, it will then be used to supply the Yangqu Hydropower Plant, which will provide the Chinese province of Henan with about 5 billion kWh of electricity every year. In concrete terms, this means that a total of 100 million people will be able to benefit from the 3D-printed dam, as it will secure their electricity supply. The electricity will be transmitted through a high-voltage transmission line of about 4920ft, which has been built separately for the transmission of green energy aiming at sustainability. Liu Tianyue, one of the lead scientists of this project, comments that they want to "free people from heavy, repetitive and dangerous jobs" with this highly innovative project.

According to the Tsinghua University scientists, the Yangqu hydroelectric power plant is expected to reach a total size of ~520ft upon completion, which would make it the largest robotic 3D printing facility in the world, larger than the two-story office building in Dubai, the current world record holder.

At Yangqu, a central AI system will be used to oversee a massive, automated assembly line that starts with a fleet of unmanned trucks used to transport construction materials to parts of the worksite, per the scientists.

Once the materials arrive, unmanned bulldozers and pavers will turn them into a layer of the dam, and then rollers equipped with sensors will help to press each layer so that they become firm and durable, they said.

Per the paper, when a layer is complete, the robots will send information about the state of construction back to the AI system.
However, the mining of the construction material will still have to be done manually, the researchers noted.

The AI system and its army of robots will help eliminate human error, such as when roller operators don't keep to a straight line or when truck drivers deliver materials to the wrong spot, said lead author Liu Tianyun of Tsinghua University, according to SCMP.

The system will also allow on-site work to progress continuously without safety concerns for human workers, the researchers said, per the outlet.

According to the scientists, the completed Yangqu dam will provide 5 billion kilowatt-hours of power every year to China.

If successful, the building method could provide a blueprint for other construction projects, such as road construction, Liu's team said, as reported by SCMP.

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Source: Geoengineer.org, 20.5.2022

The Evolution of geotechnical information management: Why cloudb-based management is growing fast

All earth scientists know the geological time scale. From the Archean era of the Earth's formation billions of years ago, through the Paleozoic and Mesozoic eras of shifting land formations and bizarre primitive creatures, to the relatively recent Holocene epoch we live in now, the geological time scale helps to describe the timing and relationships between geological events throughout our planet's history.

A similar time scale can help us understand the rapid evolution of geotechnical information management (GIM). While studying the Earth and its geology has always generated large amounts of critical and interesting data, it was only in the past four decades that GIM was anything more than gathering piles of papers into filing cabinets and hoping nothing would become misplaced.

Since then, GIM has evolved rapidly, allowing geoscientists to do their jobs better and faster, as well as enabling them to find innovative new uses for the same data. Now more than ever, geotechnical work relies on advanced information management that allows data to be collected easily, analyzed quickly, and stored securely. What's more, it must be reliable and accessible to allow users to connect from anywhere (including directly in the field), streamline workflows, and ensure business continuity.

For these reasons, it's unsurprising that a shift to cloud-based GIM is in motion. But how much do you know about what GIM used to look like? Understanding the challenges throughout GIM's evolution makes it clear why cloud-based management is growing fast.

The pre-computer era

From the very beginning of geoscience through to the relatively ancient times of the early 1980s, geoscientists did not have easy access to computers. The few pieces of computing equipment available were the size of entire rooms, incredibly expensive, lacked reliable storage, and resided far from the field.

Salvatore Caronna, founder of gINT, said nearly every geotechnical activity had to be done manually. Effectively taking measurements sometimes required making personal sacrifices.

"Today, a lot of data reading is automated," he said. "Back then, the tests could last several days. I had to record at specific intervals the whole time. I had a cot at the site, I would wake up, I would take a reading, and I would go back to sleep."

In this era, everything was recorded by hand, such as borehole logs, lab testing, and section diagrams. Back at the office, a typist had to transcribe the information onto reports, which introduced errors. Caronna said field workers and typists had to continually proofread and revise – which sometimes meant having to retype the entire report. Additionally, typists had to carefully align the paper to type information into specific fields on forms, which was time-consuming and costly.

Information management barely existed in this era. For the most part, it was simply organizing overflowing folders in filing cabinets. Comparing data from previous projects or nearby sites meant diving into reams of paper. Making matters worse, these papers had a habit of multiplying, as the same information would have to be copied and recopied by different people anytime they needed a different type of report that displayed information in a different way. As a result, errors frequently cropped up during the copying process.

"QA and QC was a nightmare," Caronna said. "There wasn't a single source of truth. The same data was represented in different ways by different people."

The DOS and floppy disk era

In August 1981, the IBM Personal Computer was born. No longer did computers have to be the size of an elephant and cost more than a lavish sports car. Suddenly, computing became convenient, affordable, and readily available.

Many geotechnical departments quickly embraced the PC and took advantage of its ability to store up to 360 kilobytes of data on a 5.25-inch floppy disk. Entire groups of data and reports could be easily gathered into one place for easy access. Caronna said the floppy disk also made accessing older data much easier.

"When we started a new project, we had to write a proposal," he said. "We would grab as much data as we could from projects nearby. I spent many an hour going through paper reports to try to find information that was relevant to the proposal. With information on floppy disks, I could more easily pull data."

Though the technology was groundbreaking, change didn't happen overnight. Caronna said many organizations resisted PCs, as they believed condensing data into disks would make it easier to steal (realistically, large projects could require hundreds of disks – hardly easy to pocket).
And while PCs made data entry easier and improved collaboration, they didn't immediately solve the problem of having to manually input the same data into every form that used it. In some cases, convenient access to PCs made data entry errors worse.

"All of a sudden, executives, engineers, and management were typing their own stuff," he said. "And that lead to a lot of complaints."

Many geotechnical organizations tried to come up with in-house solutions for geotechnical information management, but most were quickly dropped. In their place arose numerous companies that specialized in geotechnical software. Caronna said he was inspired to transition from geotechnical work and form gINT by the desire to solve the tedium and inaccuracy of repeated data entry. By 1986, gINT eliminated the data entry issue by allowing data to be reused wherever it is needed.

"You could put one point in the database, and it's sent to log, graph, section, and exports," he said. "That replaced the work of five or six people."

The windows and network drive era

Through the 1980s and early 1990s, geotechnical software continued to advance. Data collection became automated and capable of recording data at faster intervals, eliminating the need for geoscientists to manually record data at the expense of sleep.

PCs advanced as well. Not only did floppy disks evolve into a 3.5-inch size with a capacity of 1.44 megabytes, but computers also started to store data locally on hard drives. Eventually, organizations gained the ability to store data on a centralized network of numerous connected PCs. These networks allowed data to be easily recorded and accessed by anyone without having to dig through a filing cabinet for the right folder or floppy disk.

"Having a network allowed you to take a single project and access it remotely at a decent speed," Caronna said. "You were able to share and collaborate among offices and personnel."

Network drives changed the way geoscientists worked. Previously, data had to be processed relatively close to project sites, and geoscientists were forced to move to where the projects were. But by accessing data remotely, increasing numbers of geoscientists could process data in the comfort of their home base. Clients could also access data in real time using the rapidly developing internet without getting their shoes dirty.

At the same time, Microsoft Windows made computers increasingly accessible. Windows NT and Windows 95 eventually eliminated the need for working within DOS entirely and enabled software to become more intuitive. The new interface helped GIM applications advance and extend their capabilities.

"The database in the DOS version of gINT could be extended, but it was crude and limited," Caronna said. "In the Windows version, everything could be customized yourself. Smart reports allowed you to write the rule to make the report be anything you want."
For example, if moisture content tests were not run on a borehole, a smart report could automatically suppress the column for moisture data and adjust the rest of the columns appropriately, eliminating the need to generate a new report. Geologists discovered numerous new ways to mine value out of data.

However, the divide between the site and the office remained. The rough, dirty conditions would overwhelm most electronics, and the early field devices were awkward to use, Caronna said. Despite the great leap in data management and analysis, field workers were still stuck with pen and paper.

The on-premises application server age

By the mid-1990s, many segments of geoscience developed the ability to share data among teams and clients across the world. But the process often wasn't easy at first. Roger Chandler, Co-Founder of Keynetix and Business Development Director at Bentley Systems, said his team had a particularly rough experience working onsite in the Philippines, supported by an engineering term in the United Kingdom, and providing materials to a client in the Netherlands. "Getting information off the vessel via satellite was a nightmare," he said.

Specialized yet primitive on-site devices evolved into ruggedized versions of the same devices found back in the office. Though some could run versions of the same applications as off-site researchers, many of them were still too bulky and unwieldy to bring into project areas, and they didn't easily connect with devices back at the office.

Worldwide data sharing via online servers improved as technology advanced, though more data to share meant more demand for that data. Contractors began requesting the raw data behind the charts and reports. As they received increasing amounts of data from different organizations, they wanted to come up with their own spreadsheet standards for everyone to fill in, rather than having to interpret different spreadsheet standards used by different teams. Data organization became standardized across geotechnical projects.

At first, online servers were just depositories of data – virtual filing cabinets. Even as applications began being hosted on drives to unify standards, users treated them as just another place to store information, Chandler said. Users could access a project if they wanted to, but at first there was no way to allow full collaboration on a project with the knowledge of how the data was entered or changed.

"Up through 2010, GIM was still thought of as an efficient way to create pieces of paper," Chandler said. "Paper sent through the email was thought of as efficient."

Gradually, geotechnical desktop solutions started to enable limited collaboration. For example, HoleBASE began to allow more than one person to work on a project in the same office. Soon, all project data could be stored, accessed, and changed in the same place and in the same way. The ability to do even more with the same data caused specialist data management roles to arise. Close to three decades after the PC became widely available, nearly everything outside of the project sites themselves became digitized.

"We were able to take things much further than paper," Chandler said.

The cloud era

Eventually, both data and digital processes moved online, forming what we know as the cloud. Geotechnical processes became digital from the start, transforming the way work was carried out. Storage cabinets finally vanished from offices. But that transformation wasn't painless, as version control was still an issue at first.

"Every week, clients would take information from the application and export it as the latest version of the data, then every company imported it," Chandler said. "This drove everyone nuts. No one knew what the latest info was, or what the differences between the data sets were."

Thankfully, applications evolved to eliminate these headaches, and cloud-based computing became the final piece of the digital transformation puzzle. Applications such as OpenGround were no longer bound to local computers and specific locations. Instead of having to retrieve data stored online for use within local applications, geoscientists could access data and carry out their work in the same online location, complete with version tracking that clearly showed which person changed what information. With no need to work on data offline, version control problems reduced significantly.

The process of transferring data also improved. Before applications migrated to the cloud, sharing data meant sharing files back and forth. Now, team members can find and access the data within each application without having to decipher code. "You've taken the data transfer and you've put it behind the scenes of the applications where it belongs. In the same way HTML makes your web browser work without having to email HTML files and import them to your browser," Chandler said.

The rise of smartphones and tablets provided the breakthrough on-site geoscientists were waiting for. Just add a ruggedized case, and they can bring convenient and familiar technology with them. Not only can they work with mobile versions of geotechnical applications used throughout the team, they can collaborate with far-flung team members via the cloud. The last vestiges of pen and paper use are starting to fade away. "These devices work in the rain, unlike pen and paper," Chandler said.

Making the move: Migration paths for desktop GIM users

While the benefits of cloud-based GIM (and the limitations of legacy software) are clear, planning the move from a trusted and time-tested desktop application can be daunting. "Most organizations are worried about the downtime and risk associated with a migration, making them hesitant to rock the boat," Chandler explained. "The irony is that, once the migration is complete, a cloud-based solution ultimately reduces downtime and risk."

As with any major technological shift, there eventually comes a time when legacy product can no longer keep up with the needs of its consumers, who are often left without a path forward. It was for

this reason that OpenGround was designed to provide a smooth migration plan for users of desktop GIM products. "Generally, migration from HoleBASE to OpenGround takes only a weekend," said Chandler.

Looking ahead to the future of GIM

Though the jump to the cloud was a huge evolutionary step, GIM continues (and will continue) to change and improve. For example, geotechnical companies are making great use of sensors and data collection devices, making it easier than ever to monitor sites and gather information in near real-time throughout the project. Digital twins can produce a detailed yet intuitive model of any project, improving both visibility and decision-making. And GIM will continue to evolve in new directions, some of which are in development and others we might not be able to imagine today. The new eras certain to emerge could make today's advancements look ancient.

Source: Geoengineer.org, 5.4.2022

India's longest highway road tunnel in Hyderabad

If things go as per plans, Hyderabad will have the country's longest Highway Road Tunnel, tentatively about 10 km from Jubilee Hills Road No. 45 Junction to Banjara Hills, Road No. 12 Junction. The proposed four-lane tunnel will wind its way via the KBR Park junction to NFCL Junction, Punjagutta and would be dug using a Tunnel Boring Machine.

With the State government assigning the task to Greater Hyderabad Municipal Corporation (GHMC), the civic body is going for a feasibility study and detailed project report by engaging technical consultants from the world over.

Currently, Syama Prasad Mookerjee Tunnel is the longest in India at 9.20 km and connects Kashmir to the rest of the country. A plan to dig a longer tunnel in Mumbai never saw the light of the day. The Telangana government has decided to explore the option of a tunnel road as it would help avoid cutting hundreds of trees in the KBR Park for the SRDP project. The government had earlier proposed six junctions around the KBR Park by constructing multi-level flyovers under the SRDP project, but this required cutting over 1,500 trees.

The consultancy selected should (i) prepare a DPR for construction of the tunnel along with approach roads; (ii) take into account lighting, ventilation, safety, operation and maintenance needs etc. and (iii) establish technical, economical, and financial viability of the project, taking into account tunnel alignment, approach roads design, earthquake protection measures, provision of service roads, intersections, rehabilitation and widening etc.

Tunnel may save hundreds of trees. A few years ago, while giving its nod to the proposal, the Union government said that the GHMC should not touch the trees inside the first boundary wall of the park that come under the ESZ. The trees outside the second boundary wall did not come under the ESZ.

Against this backdrop, Municipal Minister KT Rama Rao instructed officials to explore the possibility of an underground tunnel to avoid cutting of any tree.

GHMC officials told Express that SRDP was conceived with the objective of achieving signal-free intersections enabling faster movement between important destinations across the core city.

As part of SRDP, several grade separators have been constructed at various places like the flyover on Road No. 45, MindSpace Junction, Biodiversity Junction including the cable bridge at Durgam

Cheruvu. However, even the completion of the SRDP flyovers and the cable-stayed bridge has brought little respite from daily traffic congestion at several junctions on these road links from Punjagutta and Banjara Hills Road No. 12.

The consultant will need to understand (i) transport network to the approaches of KBR Park, (ii) various origin points for planning direct underground road connectivity to Road No 45 Junction, (iii) carry out necessary traffic analysis using CTS traffic demand model to identify best tunnel origin and destination points, (iv) prepare pre-feasibility study report to ensure minimal adverse impact on local population and road users, and (v) ensure minimal impact on the environment and minimal additional acquisition of land.

Source: Geoengineer.org, 20.3.2022

Seeds of 5K wild plant species are kept hidden in a South Korean mountain tunnel

Hidden in a South Korean mountain tunnel designed to withstand a nuclear blast, the seeds of nearly 5,000 wild plant species are stored for safekeeping against climate change, natural disaster and war.

Plant extinction is progressing at an alarming rate, researchers warn, driven by increasing human population, pollution and deforestation, even before many species are catalogued.

The Baekdudaegan National Arboretum Seed Vault Centre preserves nearly 100,000 seeds from 4,751 different wild plant species to ensure they are not lost to "apocalyptic events", says its head Lee Sang-yong.

It is one of only two such facilities in the world, he told AFP: unlike more commonplace seed banks, where samples are stored and regularly withdrawn for various purposes, deposits in seed vaults are meant to be permanent, with use intended only as a last resort to prevent extinction.

The vault is designated as a security installation by South Korea's National Intelligence Service, surrounded by wire fences and dozens of cameras, with restrictions on filming in place and police patrolling on a regular basis.

Inside, a lift leads about eight floors down to a cavernous concrete tunnel, where two heavy steel doors guard the storage room and its hand-cranked shelving racks, kept at -20°C to preserve the seeds and 40 percent humidity to keep them viable.

The vault's samples are largely of flora from the Korean peninsula, but with a capacity of two million seeds, the South makes its space available to other countries, with Kazakhstan and Tajikistan among those to have taken up the offer.

Depositors retain ownership of their samples and control over withdrawals.

But Lee pointed out: "The seed vault stores seeds to prevent their extinction, so the best scenario would be that the seeds never have to be taken out."

Despite its doomsday-defying role, it was built by a country that in 1950 was invaded by the neighbouring North, and Pyongyang has since developed a nuclear and missile arsenal.

The facility was built in the "safest spot" in South Korea, Lee said, designed to withstand a 6.9-magnitude earthquake and even an atomic strike.

"It's geographically very safe," Lee said. "And we paved a 46 metre-deep underground tunnel to ensure it's safe from war and nuclear threats."

Race against time

The world's biggest and best-known seed vault is buried deep inside a former coal mine on Svalbard, a remote Arctic Norwegian archipelago around 1,300 kilometres (about 800 miles) from the North Pole.

Dubbed the "Noah's Ark" of food crops, the Global Seed Vault focuses on agricultural and related plants, storing more than one million seed samples from nearly every country on the planet.

But researchers say preserving the seeds of wild plants - the original source of the crops we eat today - should not be overlooked.

Many crop relatives in the wild that could provide genetic diversity to help long-term food security "lack effective protection", according to a recent UN report.

It warned that farming was likely to be less resilient against climate change, pests and pathogens as a result, adding: "The biosphere, upon which humanity as a whole depends... is declining faster than at any time in human history."

Wild plants hold promise as future medicines, fuels and food, said the Royal Botanic Gardens Kew in a report last year, but around two-fifths of them are threatened with extinction, largely due to habitat destruction and climate change.

It was a "race against time" to identify them before they disappeared, it added.

Research on wild plant seeds is "lacking tremendously", said Na Chae-sun, a senior researcher at the Baekdudaegan National Arboretum.

She and her team collect samples and carry out a meticulous and extensive process including X-ray tests and trial plantations before seeds are catalogued and stored in the seed vault.

"One might ask why is that wild flower on the kerbside important?" she said.

"Our job is to identify these one by one and letting people know how important they are," she went on.

"The crops that we eat today may have come from that nameless flower on the kerbside."

Source: The Economic Times, 2.6.2021

Two more TBMs arrive from China; to be deployed for 9km twin tunnels

Two more tunnel boring machines that will be used to make twin tunnels in core city area have arrived in the city as CMRL is set to begin tunnelling in October.

With this, three boring machines are ready to be deployed for tunnelling. Officials said the two TBMs, which arrived from China, will be deployed for building 9km long twin tunnels between Venugopal Nagar near Madhavaram and Kellys in Purasaiwalkam. The 118km phase-2 has a 43km underground section with 48 stations. The phase is expected to be ready by 2025-26.

"Two tunnel boring machines have arrived at the Chennai Port. We are waiting for the customs clearance, which is likely to take two or three days. From the port, the machines will be shifted to Madhavaram," said L Girirajan, public relations officer, Chennai Metro Rail Limited (CMRL).

CMRL officials said the TBMs will be deployed by Tata Projects Ltd, which was awarded the contract to build the 9km twin tunnels from Venugopal Nagar to Kellys. On June 30, the first TBM for phase-2 to be deployed in the stretch arrived in the city and has been kept in Madhavaram. At present, construction of the elevated corridor, particularly corridor-4 from Porur to Poonamallee, is going on at a fast pace.

"The first TBM will start tunnelling between Madhavaram Milk Colony and Thapal Petti Station the next month and the second machine will be deployed for tunneling between Madhavaram High Road and Thapal Petti Station," the CMRL official said. Construction of peripheral walls, entry/exit points of the stations and tunnel boring machine launch and retrieval shafts are underway in four stations including Madhavaram Milk Colony, Madhavaram High Road, Aynavaram and Purasaiwalkam.

CMRL plans to deploy a total of 23 TBMs in various locations and they will be operated in tandem. This is to complete construction faster and also not let delay in one stretch affect the rest of the corridor. In all, 15 TBMs may be operated to build a 26.7km underground stretch with 30 stations on corridor-3 which extends from Madhavaram milk Colony to Siruseri Sipcot, four TBMs for a 10.1km stretch with 12 stations on corridor-4 from Lighthouse to Poonamallee and another four TBMs to build a 5.8km stretch with six stations in corridor-5 from Madhavaram Milk Colony to Sholinganallur.

Source: The Times of India, 6.9.2022

India plans own 'Channel' tunnel

Road and railway ministries, and the Border Road Organisation (BRO) have come on board for construction of the country's first underwater road-cum-rail tunnels across mighty Brahmaputra in Assam.

As per the plan, there will be three parallel tunnels – one for road, another for rail and the third one for emergency use. The tunnels will be of 9.8km each and this will be the first project where integrated tunnel construction will be undertaken. These tunnels will be inter-connected with cross passage for evacuation in case of any emergency.

The strategic multi-modal transportation system aims to integrate the rail and highway network through the Jamurihat-Silghat axis towards North Assam, Tawang and the rest of Arunachal Pradesh. This can be used for both civilian and strategic purposes.

According to the estimate, the government would spend around Rs 7,000 crore (1 crore = 10 million) for these tunnels. Earlier NHIDCL, a company under the road transport ministry, had proposed twin tunnels only for vehicles and had estimated an expenditure of Rs 12,800 crore.

Sources said the proposal prepared by the BRO and road ministry has helped reduce the likely investment even after adding one more tunnel.

The tunnel will take off from about 9 km upstream of the existing Kaliabomara (Tezpur) road bridge and it will connect Jakhlabandha railway station on the south bank and at Dhaliabil railway station on the north bank of Brahmaputra.

At a recent meeting chaired by the CEO and chairman of the Railway Board, the BRO submitted that these rail-cum-road tunnels are required from the strategic point of view. It also suggested that the project may be funded by the defence ministry.

"After discussion on the issue, it was decided that since rail-cum-road under water tunnel alignment is an essential requirement of the Ministry of Defence, the same may be considered further by the Northeast Frontier Railway subject to technical suitability. However, the cost estimate needs to be revisited by BRO and should be done carefully. The BRO/ MoRTH was also advised to confirm about funding of the project," the minutes of the meeting said.

Prime Minister Narendra Modi has asked the road and railway ministries to plan and work together for laying road and rail tunnels together to save cost.

The underwater tunnel project will also be an engineering marvel and will also benefit the country strategically by reducing travel time between Assam and Arunachal Pradesh.

The proposed tunnels will be constructed using tunnel boring machines and may take around two to two-and-a-half years to complete them after the work starts.

Currently, there are five bridges across the Brahmaputra.

Source: The Times of India, 17.5.2022

To be built at 23k cr, Uttarakhand to get India's longest railway tunnel

The railway ministry's ambitious 125km long Rishikesh-Karnaprayag broad gauge rail link project in Uttarakhand, the work on which is currently underway, will include a 14km long tunnel between Devprayag and Janasu (both in Pauri district), the longest in India. The project is expected to be completed by December 2024 and the track will start from Virbhadra, near Rishikesh, senior project manager of Rail Vikas Nigam Limited (RVNL), Om Prakash Malgudi told TOI on Monday. The project's initial cost was Rs. 16,216 crore, which became Rs. 23,000 crore after revision, he added. There will be 11 other stations between Virbhadra and Karnaprayag.

About 105km of the track will pass through tunnels and bridges.

Currently, the country's longest rail tunnel is the 11.2km long Pir Panjal railway tunnel in Jammu and Kashmir, constructed under the Udhampur-Srinagar-Baramulla rail link project. Malgudi added that a key Char Dham rail link project, connecting the Gangotri and Yamunotri shrines (dhams), is also in the offing.

Part of the Badrinath-Kedarnath railway line, it will have a 17km long tunnel and is likely to cost Rs. 30,000 crore. A detailed project report and the final location survey has been submitted to the ministry for the approval, he further said. The Badrinath-Kedarnath railway line starting from Doiwala (near Dehradun) will pass through 22 bridges and as many tunnels. It will include the 17km long tunnel between Jadal and Marod stations (in Tehri district) to reach Nandgaon Badkot, its final station. In between there will be seven more stations. For Gangotri and Yamunotri, the last stations will be Matali and Nandgaon Badkot respectively. These will be loop line stations to facilitate change of engine. Malgudi said that about 320 hectare land (101 of forest and 20 of revenue and 199 private) will be acquired.

For tunnels, New Austrian Tunnelling Method (NATM), also known as 'drill and blast technique', will be used. "Tunnel boring machines, costing Rs. 300 crore, may be used if geology is favourable,"

he added. The Rishikesh-Karnaprayag rail line project will run cross five districts of Uttarakhand - Dehradun, Tehri Garhwal, Pauri Garhwal, Rudraprayag and Chamoli.

Source: The Times of India, 28.8.2022

Supertech twin towers fall via 'controlled implosion' - how it happened

After much anticipation and a nine-year-long legal battle, the Supertech twin towers of Noida were reduced to rubble on Sunday (August 28). The towers, Ceyane (29 floors) and Apex (32 floors), that are part of the Emerald Court project of Supertech Ltd, were found to be in violation of multiple regulations regarding construction, and were therefore demolished.

The highest structure in India to be demolished, the towers, comprising about 850 flats and located in Sector 93A near the Noida-Greater Noida Expressway, have a height of almost 100 metres — taller than the Qutub Minar. Preparations, from charging the buildings to clearing the area, were in full swing earlier this week. The resident welfare association (RWA) had directed residents of nearby apartment complexes, ATS Greens Village and Emerald Court, to evacuate by Sunday morning. According to the police, Emerald Court has 15 towers and ATS village has around 25 towers and four villas.

The surrounding area of 500 metres radius is marked as an exclusion zone, where no human or animal was allowed except for the members of the team in charge of the demolition. Apart from this, the police, a team of the National Disaster Response Force, eight ambulances and four fire tenders will be deployed at the site.

Why were Noida's Supertech twin towers demolished?

Supertech was granted approval in 2005 by the New Okhla Industrial Development Authority (NOIDA) to build 14 towers with nine floors each, a shopping complex and a garden area. However, it revised its project in 2009 to include twin high-rise buildings — Apex and Ceyane. Even though the NOIDA authority approved the new plan, the Emerald Court Owners Residents Welfare Association (RWA) moved to the Allahabad High Court in 2012 alleging it was an illegal construction.

In 2014, the Allahabad High Court ruled that the towers were illegal and ordered demolition. The Noida Authority and Supertech approached the Supreme Court challenging this order. On August 31, 2021, the apex court upheld the ruling of the Allahabad High Court and ordered the demolition of the buildings.

The Supreme Court found the construction of the twin towers in violation of the minimum distance requirement.

It said the towers were built without complying with building regulations and fire safety norms.

It said the modification of the plan — removing the garden area to make way for the construction of Apex and Ceyane — was done without the consent of the flat owners, which violated the Uttar Pradesh Apartments Act, 2010.

The top court, in August 2021, while ordering demolition of the illegally constructed towers, said it was built through "acts of collusion between the officers of NOIDA and company", and sanctioned the prosecution of officials for violation of the Uttar Pradesh Industrial Area Development Act, 1976 and Uttar Pradesh Apartments Act, 2010.

Even though the Court ordered the demolition within three months, multiple delays resulted in setting the final date to August 28.

The demolition of Noida's Supertech twin towers

The Supertech towers will be demolished via a 'controlled implosion', which means it will collapse after explosives are strategically placed and detonated to ensure minimal damage to the surroundings. The process behind the implosion includes the gradual weakening of critical supports of the building, i.e., removing the structures that will help resist the gravitational force. This will be achieved by numerous explosives placed within the structure. Usually, the explosives on the lower floors of the structure initiate the controlled collapse of the building.

The technique was used for the first time in 1773 to raze the Holy Trinity Cathedral in Waterford, Ireland, with 68.04 kg of explosives. It was recently used in India in the 2020 demolition of four luxury waterfront apartments in front of Vembanad Lake in Kochi's Maradu for violating Coastal Regulation Zone regulations. The same technique can be used for the demolitions of bridges, smokestacks, towers, tunnels, and other structures, too.

Mumbai-based Edifice Engineering has partnered with South Africa's Jet, the same team behind the demolition of the Maradu buildings, to demolish the Supertech towers.

One of the most time taking processes in a controlled implosion is the preparation to place the chemicals. For this demolition, the preparation took nearly seven months, including one month of planning and six months of onsite preparations, said Utkarsh Mehta, CEO of Edifice Engineering.

Around 3,700 kg of explosives have been infused into the two towers. Apex has 11 primary blast floors, where all columns on the floor have explosives, and seven secondary floors, where 60 per cent of the columns will be blasted. Ceyane has 10 primary blast floors.

According to Mehta, the main component used for the explosion is the emulsion that has superior rock crushing quality, generally used underground for heavy blasts and mines. He said they have used a lesser quantity of it in Supertech since the structures don't require much. Apart from the emulsion, shock tubes that will direct blast waves and simulate actual explosions, and electric and non-electric detonators that will trigger the explosives, are also being used.

The event, which takes around 13 second, will leave behind approximately 80,000 tonne of construction and demolition waste, of which 50,000 to 55,000 tonne will be used for filling the site and the rest will be sent to a construction and demolition plant for processing.

Supertech twin towers demolition: Impact, concerns

There are several concerns regarding the demolition of Noida's Supertech twin towers. The first is the amount of dust the demolition will generate.

The second is the clearing of the debris, even though officials have said the rubble will be cleared within three months.

Third, experts have raised concerns over windblown dust generated in the blast, that can remain in the air for weeks and cause health issues to people in the area. The Noida Authority has said they will provide water tankers, mechanical sweeping machines, and sanitation staff to control the dust menace. Officials have also promised air quality monitoring.

Gaurav Saxena, a resident of the Emerald Court, is leaving Noida for Nainital on Saturday night with his 65-year-old mother as he is worried about the fine particles that may remain in the air. Saxena plans to return to his flat on Monday, but says he and his neighbours are hoping the plastic sheets put up to cover their windows and balconies will protect them. He also hopes rainfall will bring some relief.

Mehta, meanwhile, said, "We are expecting the dust to dissipate in 10 minutes. The moment it does, our team will inspect the site and check whether any explosives are remaining to explode. The settling of the dust is dependent on the wind direction and its strength."

The impact of dust on the already bad air quality of Noida can't be ruled out, said Delhi-based environmental activist and co-founder of New Delhi Nature Society, Verhaen Khanna. He said a more scientific method should be used to control the dust other than water spraying.

Another point of worry is the vibration and shockwaves that a demolition of this scale can induce. Mehta says multiple studies by the company predict a travel time of vibrations as 20-34 mm/s. But, on the ground, there will be much less impact, he claims, as the predictions are done without considering the design of the blast. "We call the design a waterfall implosion. The last point of the building hits the ground six to seven seconds after the first point. So, there is no sudden impact on the ground and the vibration will transfer gradually," he said.

Mehta said the company has assured nearby societies there will be no vibration that can damage any structures, but may cause cracks. He also said officials will monitor the vibrations during the process at various locations to assess the damage.

Residents will be permitted to return to their homes on Sunday (28th Aug 2022) evening, hours after the demolition.

Source: The Indian Express, 28.8.2022

In India's largest demolition till date, Supertech twin towers brought down within nine seconds in Noida

Apex and Ceyane, the two illegal towers built by Supertech in its Emerald Court compound in Noida's Sector 93A, were brought down at 2:30pm in a massive blast on 28th August 2022. The implosion was designed by explosive expert Joe Brinkmann.

The explosives were triggered over nine seconds and the twin towers fell within seconds. This was India's largest tower demolition till date.

Uttkarsh Mehta, partner at Edifice Engineering informed that the process of demolition was safe.

The Supreme Court had declared the twin towers illegal for violation of building laws and ordered them razed on August 31, 2021, and 10 years after the final revision of the layout plan by Noida Authority paved the way for their current shape.

The plums of dust permeated the neighbourhood after the spectacular demolition.

Realty firm Supertech on Sunday (28th Aug 2022) said the twin towers set to be demolished this afternoon were constructed as per the building pan approved by Noida development authorities and no deviations were made.

Two housing societies near the twin towers were completely evacuated before the demolition process. Many of the resident had moved out last (Saturday) evening itself, police said.

At least 40 stray dogs living in and around the Supertech twin towers were shifted temporarily to shelters run by NGOs ahead of the court-mandated implosion. An NGO had also requested authorities to conduct a dummy explosion or a false firing just before the twin towers are razed in order to save the birds in the area. Several NGOs, including House of Stray Animals, Friendicoes, Society for the Prevention of Cruelty to Animals (SPCA) and Happy Tails foundation have pitched in to accommodate the stray dogs temporarily.

Source: The Times of India, 28.8.2022