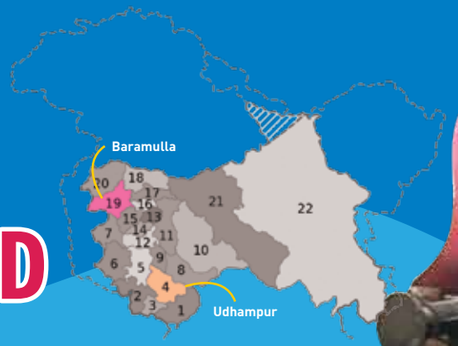
AN ONGOING LIVE PROJECT

WOMAN BEHIND A MISSION



Once completed, the **Chenab Bridge** would be the world's **highest railway bridge,** a title currently held by the Biepanjiang Bridge in China.

DID YOU KNOW?

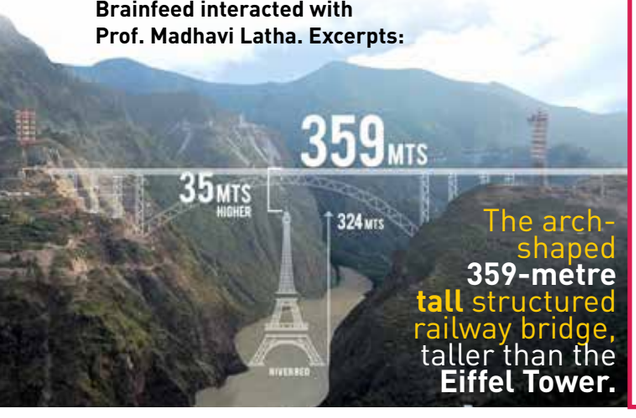
The steel arch portion of the Chenab Bridge is **465 m long,** making it the **largest single span railway arch bridge in the world.**

India is ready to set up world records one after the other whether it is space projects or railway projects.

An estimated cost of ₹1,110 crores, the project involves constructing a number of tunnels and bridges.

In early August 2004, the Indian Railways embarked on one of its ambitious projects: the construction of **a new railway line from the town of Udhampur to Baramulla district in Jammu.** The arch-shaped 359-metre tall structured railway bridge, taller than the Eiffel Tower, is being built across the Chenab river and is slated to be ready by 2019. With an estimated cost of ₹1,110 crores, the project involves constructing a number of tunnels and bridges. The mammoth structure will be made with the help of over 24,000 tonnes of steel that is blast-proof and can resist extremely low temperatures and high wind speeds. Experts from various fields in India and abroad are involved in this project. **Prof. Madhavi Latha,** Professor at the Department of Civil Engineering and working in the field of Earthquake Geotechnical Engineering at IISc, Bengaluru, has spent the last decade working on this project as a geotechnical consultant.

Brainfeed interacted with Prof. Madhavi Latha. Excerpts:



The arch-shaped **359-metre tall** structured railway bridge, taller than the **Eiffel Tower.**

How did you get involved with the Chenab Bridge's construction work?

I am one of the few experts on rock engineering problems available in India. Hence the construction company AFCONS, who is executing the project, has contacted me.

What is your role in this project?

My role is to assess the stability of slopes under various critical conditions of earthquakes and design rock anchor systems to make the slopes resistant to earthquake forces.

What kind of challenges are you facing during the construction of the bridge?

The challenges are many. They include unforeseen weaker zones within the rock slopes supporting the bridge, huge variation in properties of rocks below foundations because of their large dimensions, open cavities that appear as surprises within the rocks, which make the stabilisation of rocks very difficult. Erection of arch elements is a big challenge because of the height of the arch as there is no ground support for the erection. For erecting the arch, the world's largest cable crane is commissioned at the site.

What is rock mechanics? In what way is its study helping you in the construction of the Chenab Bridge?

Rock is a naturally occurring material. Rocks can be of different varieties, having different strength properties. Rock mechanics is the study of rocks, their types, understanding the properties of rocks and designing structures on rock. In nature, no rock is found without joints or faults since the formation of rocks is closely related to the tectonic activities of earth plates. For constructions on rock, studying the type of rock and the joints and faults occurring at the site is very important. Since the Chenab Bridge is a very tall structure being supported on two rock slopes, stability of these slopes is very important. Knowledge of rock mechanics helps in understanding the stability aspects of the bridge and in providing solutions for improving the stability of the rock slopes.

Tell us something about your research on soil and ground reinforcement.

My interest in soil mechanics developed during my days of B.Tech at JNTU College of Engineering, Kakinada. This led me to choose geotechnical engineering as a specialisation for my M.Tech at NIT Warangal. Ground improvement has been my favourite subject since it is an extremely innovative area with no boundaries. Through the knowledge of this subject, one can do wonders in civil engineering constructions. The Palm Island in Dubai constructed in sea, support provided to leaning tower of Pisa to stop it from leaning more and construction of big underground metros below existing cities without the ground caving in, are all examples of ground improvement and reinforcement techniques. My research on ground reinforcement started at IIT Madras, where I have developed innovative techniques to reinforce the soft grounds using polymers, to facilitate the constructions over soft soils, which otherwise fail. I continued research in this direction to extend my studies at IISc Bangalore. Some of my studies in this area include earthquake hazard mitigation using polymers and use of waste materials like used rubber tires for building sustainable roads.

Your future plans.

I want to do research on topics that could provide cheaper solutions for infrastructural needs of the country. I would love to get involved in the country's dream of bullet trains. In a country that is spreading over regions with diverse soil properties and difficult terrains, preparing the ground for high speed trains is a real challenge and I would like to work on quicker and sustainable solutions for this problem.