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## Indian Railways to Norway to learn tunneling technology

*Photo: Leif Johnny Olestad, visitnorway.com*

A group of 20 engineers and officers from Indian Railways recently visited NGI in Oslo for training in Norwegian Tunneling Technology.

Indian Railways is planning to expand its railway lines with 500 km each year over the next five years. Many of the new lines are in hilly and mountainous regions. An estimated 100 km of tunnels will be built each year.

At any time, Indian Railways has 20 – 25 lines under construction, including conversion of narrow gauge railways. In addition, a western and an eastern freight corridor are being designed. The number of employees is 1.4 million, making Indian Railways the world's second largest employer.

In the summer of 2014, another group of 20 engineers from India underwent a week's training in modern tunneling technology at NGI. The response was so positive that the Indian National Institute of Rock Mechanics, NIRM, decided to train more personnel in Norway, based on a commercial agreement between NGI and NIRM and an R&D memorandum of understanding between India and Norway.

India's longest railway tunnel is the new Pir Panjal Railway Tunnel, 11.2 km, in the Himalayan Jammu and Kashmir, while several longer tunnels are being engineered or under construction. Difficult, soft rocks present great challenges in several regions, and trials with tunnel boring machines proved unsuccessful. The Indian government plans to spend 500 billion US dollar on railway projects the next ten years.

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The Norwegian Geotechnical Institute (NGI) is a leading international centre for research and consulting within the geosciences. NGI develops optimum solutions for society, and offers expertise on the behaviour of soil, rock and snow and their interaction with the natural and built environment.

NGI works within the markets Offshore energy; Building, construction and transportation; Natural hazards, and Environmental Engineering.

NGI is a private foundation with office and laboratory in Oslo, branch office in Trondheim, and daughter companies in Houston, Texas, USA, and Perth, Western Australia. NGI was established in 1953.

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