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By editor

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Jawaharlal Nehru Port (JNP) is not only the busiest port in India, it is also the most susceptible to higher seismic hazard in Mumbai. The ground feature of the port has made it most vulnerable to an earthquake of even small magnitude. This has been revealed by research conducted by civil engineering experts from the Indian Institute of Technology, Bombay (IIT-B).

The man-made port is situated on soft soil which is most vulnerable to any seismic tremors. Moreover, the ground water level of the area is just below the surface of the port, which further increases the risk of adverse effects during any earthquake, said the research paper. "During any earthquake, the tremor starts from an epicentre which lies kilometres away from the surface.

And the waves created from it travel underneath the surface. But its characteristics get changed as it passes through layers of soil. The velocity of the waves depends on the nature of the soil that it passes through. In cases of rigid or hard soil, the impact of the waves lessens. However, it is just the opposite in soft soils," said Deepankar Choudhury, professor, department of civil engineering, IIT-B, who supervised the research. "In soft soil, even if the size of the tremor is small, it can get aggravated as the soil fails to restrain it.

So, if an earthquake of 4 magnitude hits the city, the port can get an impact of 6.5 magnitude," he said. Research investigated seismic ground effect at four sites including JNPT, Mumbai Port, Bhabha Atomic Research Centre (BARC) and Tarapur Atomic Power Station (TAPS). However, other than JNPT, all other centres were found safe as most of them are located on solid, hard soil, which would control the tremor. Research revealed that the JNPT site shows highly plastic and compressible soft marine clay up to a depth of 13 to 15 metres.

Additionally, ground water level is just below the surface which further increases risk factor due to "liquefaction". Professor Choudhury said, "Firstly, the soil of the area is soft and nearer to ground water. So, if a tremor hits it, unconsolidated soil loses its base and gets mixed with water due to the tremor. The soil starts acting like semi-liquid and the surface loses weight, leading to the collapse of the construction on it."

He highlighted the need to implement a region-specific study to survive during earthquakes and said "We can't follow generalised techniques as the soil in India is diversified. However, its implementation in India is still limited and that's why the mortality rate in India is higher."

When The Asian Age contacted Anil Diggikar, chairman of the port, he first agreed to speak over the phone; however, when asked if he was aware of the situation, he disconnected the call. Later, despite repeated attempts, he didn't reply to our calls or text messages.



[1]

A file photo of Jawaharlal Nehru Port

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