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Structural health monitoring of underground facilities – Technological issues and challenges

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Abstract

Driven by the scarcity of land, many urban planners are seriously considering underground space to meet residential, commercial, transportation, industrial and municipal needs of their cities. Besides saving land resources, the benefits offered by underground structures include safety against earthquakes and hurricanes, and freedom from urban noise. However, owing to their unique design and construction, they call for rigorous structural health monitoring (SHM) programmes during construction and operation, especially when important structures are located nearby on the ground surface. Their continuous monitoring can serve to mitigate potential hazards, ensure better performance and facilitate in-depth understanding of the overall structural behaviour. This paper addresses major technological issues and challenges associated with structural monitoring of underground structures. A detailed review of the available sensor technologies and methods for comprehensive monitoring is presented, with

special emphasis on conditions encountered underground. Practical benefits arising out of such monitoring are also highlighted, with the help of several real-life case studies involving underground structures.



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Keywords

Structural health monitoring; Underground; Damage; Sensors; Strain

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