



Recent advances on the behaviour of tunnels under seismic loading

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15.06.2021

Abstract

In this presentation we will discuss some of the latest developments on the behaviour of tunnels under seismic loading. In particular we will be focussing on Sprayed Concrete Lining (SCL) tunnels (or NATM). The presentation will include results from field measurements in two tunnels in Santiago de Chile carried out within an international research project, shaking table tests and numerical modelling. After these new insights we will conclude the presentation with a research area outlook and other unanswered questions with significant implications in practise for design and tunnel operation.

Recent papers in the topic by the Presenter

- Antoniou, M., Nikitas, N., Anastasopoulos, I., and Fuentes, R. (2020). "Scaling laws for shaking table testing of reinforced concrete tunnels accounting for post-cracking lining response." *Tunnelling and Underground Space Technology*, 101, 103353.
- Kampas, G., Knappett, J. A., Brown, M. J., Anastasopoulos, I., Nikitas, N., and Fuentes, R. (2019). "The effect of tunnel lining modelling approaches on the seismic response of sprayed concrete tunnels in coarse-grained soils." *Soil Dynamics and Earthquake Engineering*, 117, 122–137.
- Kampas, G., Knappett, J. A., Brown, M. J., Anastasopoulos, I., Nikitas, N., and Fuentes, R. (2020). "Implications of volume loss on the seismic response of tunnels in coarse-grained soils." *Tunnelling and Underground Space Technology*, 95.
- de Silva, F., Fabozzi, S., Nikitas, N., Bilotta, E., and Fuentes, R. (2020). "Seismic vulnerability of circular tunnels in sand." *Géotechnique*, 1–15.
- Tsinidis, G., de Silva, F., Anastasopoulos, I., Bilotta, E., Bobet, A., Hashash, Y. M. A. Y. M. A., He, C., Kampas, G., Knappett, J., Madabhushi, G., Viggiani, G., Fuentes, R., Nikitas, N., Pitilakis, K., Silvestri, F., Viggiani, G., and Fuentes, R. (2020). "Seismic behaviour of tunnels: From experiments to analysis." *Tunnelling and Underground Space Technology*, 99, 103334.