

## Cracks Effects on Tunnels Concrete Linings<sup>1</sup>

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### Abstract

Tunnels are usually considered as important and costly constructions and therefore it is very necessary to estimate their performance and analyze their structural behavior to maintain their safety in order to ensure their reliability and performance during their hypothetical life.

In this issue we reviewed the situation of Syrian railway tunnels on Aleppo – Lattakia axis from the field observations which show that these tunnel linings are cracked.

The numerical method, which is known as Distinct Element Method, was used in the analysis of cracked lining. This method performs modeling of discontinuous systems. We focused in this study on the concrete type through elasticity modulus and lining thickness. The result analysis shows that the effects of cracks modify the distribution of stresses and displacements in the lining. This modification is related to concrete elasticity modulus and mechanical crack characteristics.

**Keywords:** Tunnel, Lining, Lining Crack, Deterioration, Distinct Element Method, Modeling

<sup>1</sup> For the paper in Arabic see pages (233-263).

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