عنوان مقاله:

A Numerical Investigation of Segmental Lining Joints Interactions in Tunnels-Qomrud Water Conveyance Tunnel

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خلاصه مقاله:

A comprehensive analysis of segmental lining joints can assist to guarantee a safe construction during tunnelling and serviceably stages. This paper has thoroughly investigated the interaction mechanism of precast concrete lining joints in tunnels. The Universal Distinct Element Code (UDEC), a two-dimensional numerical program based on the distinct element method (DEM) for discontinuum modelling, was implemented to simulated a typical segmental lining model consisting of six segment rings. In the analyses, the typical segmental lining design parameters of Qomrud water conveyance tunnel, aimed to transfer 100 million cu. m. water from the origins of Dez River to central Iranian desert, were employed to fulfil the purpose of the research. In the conducted analyses, the worst-case scenario of the loading faced during the boring of Qomrud tunnel was considered. This was highly associated with the existence of the crushed zone dipping at 75 degree at the location of the key segment. The worst scenario based on the condition that concerns the crushed zone intersect segmental lining at the location of key segment has been taken into consideration. In this study, the load acting on the joints of the segments includes the gravity load from the tunnel overburden and the crushed zone stratum force that intersects tunnel with 75 slopes at the location of the key segment, the gravity force of the segments and the earth pressure. The numerical investigation has been used for the different coefficients of stress concentration of 0.5, 1, 1.5, 2 and also different geological conditions of the saturated crushed zone under critical scenario.

کلمات کلیدی:

The Universal Distinct Element Code (UDEC); DEM Method; Contact Problem; Longtidunal Joint; Interface; Key Segment