

عنوان مقاله:

Effect of Constructing Canal in Embankments on Sand Flow through Railway Tracks in Desert Regions

محل انتشار:

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خلاصه مقاله:

Entry of sand dunes into the railway tracks can result in sand deposition on tracks, railway obstruction, derailment, damage to track flexibility, and impairment of electrical signs and rail fleet. The approach of the present study is to keep the route open for sand pass. Therefore, it is aimed to investigate the strategies and solutions for reducing sand aggregation on railway tracks (including construction of sand passage canals through embankments and modification of the geometric form of the track sleeper humps) and to present an optimal design for the created canals in order to provide easy movement of the sands. The fluid analyses were performed in the relevant software (via numerical modeling) based on the maximum sand passage through canals, minimum subsidence of sand at entries, and minimum deposition of sand on slabs. In this regard, using the fluid mechanics principles (aerodynamics), the design requirements and limitations were taken into account; then, various distances of the canals from railway surface as well as various geometric forms of the hump, which had appropriate aerodynamic behaviors, were designed and simulated using Rhino software. Diameter of the canal was equal to 1.5 m and located at various distances (0-2 m) from the embankment surface. The designs were simulated in Fluent software. Results of the analyses on the canals indicated that the M4-P2 canal design (2m distance from the embankment and a hump with conic circular form and height of 20 cm (M-C20) was the optimal one. Besides, it was shown that the circular-form cross-sections would remove the sands much faster than other studied forms.

کلمات کلیدی:

Slab track, sand dunes, sand-absorbing region, sand flow simulation, embankment

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