عنوان مقاله:

Effect of Rail Corrugation on the Amount of Train Induced Vibrations near a Historical Building

محل انتشار:

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خلاصه مقاله:

The evaluation and control of the trains induced vibrations needs even more attention in the case of undergroundtracks which passes near to monuments and historical sites. The rail corrugations which occur due to the wheels'impulse loads during the operation period of underground railway tracks, usually amplify the ground borne noise andvibration. In the current study, the mentioned phenomenon is simulated in Isfahan metro line 1 which includes twintunnels and passes nearby of ChaharBagh School monument. In this matter, a three dimensional vehicle track interactionsoftware (Adams/Rail) was used in conjunction with a geotechnical FEM software (Plaxis 2D). For this purpose,the vehicle-track interaction problem was solved considering rail corrugation in Adams/Rail part of MSC Adams®software and the amplified wheel load was imposed in a 2D plain strain model in Plaxis and consequently, the groundborne vibrations were extracted as vertical vibration velocity at a bench mark points (twin tunnel centerline and vicinityof Char-Bagh School) on the model surface. In this regard, sensitivity analyses were performed on train speedto show the corrugation effect on both increase in wheel dynamic impulse load and root mean square of vibrationvelocity at a bench mark points. The numerical results indicate that due to presence of rail surface corrugation, axleload increases with raise in train speed. In the worst case, when two trains run simultaneously with 90 Km/hr in twintunnels, the maximum induced vibration at bench mark points are about 79.53 and 75.82 dB respectively.

کلمات کلیدی:

Rail corrugation, train induced vibrations, Isfahan urban railway, historical monument