A Method of Predicting Rail Creeping and Track Buckling Using Wide-area 2-D FEM of Railway Tracks Based on GIS Data

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This study developed a horizontal two-dimensional static elasto-plastic FEM analysis program for rail track. The validity of the developed program was confirmed by comparing it with an existing one-dimensional analysis model. Additionally, it was found that the developed program was able to analyze the behavior prior to track buckling and the buckling temperature T_A with the same level of accuracy as the existing buckling analysis model. Furthermore, corner breakage in curves was a problem in the analysis using GIS line data of railway. Therefore, we proposed a smoothing method in which corner breakage was replaced with a circular arc of radius R and then moving average was performed, and confirmed its effectiveness.