

3-D Tsunami inundation simulation in Shimanokoshi for the 2011 off the Pacific coast of Tohoku earthquake

*Seiji Tsuno¹, Ken Watanabe¹, Yuko Sato¹, Kaoru Kawaji², Mariko Korenaga²

1. Railway Technical Research Institute, 2. ITOCHU Techno-Solutions Corporation

In Shimanokoshi, Shimohei-gun, Iwate Prefecture, railway structures were severely damaged during a Tsunami of the 2011 off the Pacific coast of Tohoku earthquake. In this report, therefore, to evaluate a Tsunami wave-field in and around the Shimanokoshi station which were extremely damaged by the Tsunami and to evaluate the Tsunami force acting a railway structure, we performed the 3-D Tsunami inundation simulation for the Shimanokoshi station.

As for Tsunami simulation, we performed the 2-D Tsunami simulation by a grid size of 15m in the area to the coast and we performed the 3-D Tsunami inundation simulation by a grid size of 5m in the inland, using the fault model of the 2011 off the Pacific coast of Tohoku earthquake proposed by Cabinet Office, Government of Japan. As for the results of the 2-D Tsunami simulation, the Tsunami height of 20m in the vicinity of Shimanokoshi were estimated in this simulation. The height was the same as the Tsunami height observed in the vicinity of Shimanokoshi during the 2011 off the Pacific coast of Tohoku earthquake. As for the results for the 3-D Tsunami inundation simulation, a railway structure of Shimanokoshi station whose length reaches to about 200m were affected by the Tsunami inundation for about 10 minutes; however, the railway structure were acted by the Tsunami force for about 2 minutes from the input of the Tsunami inundation. The distribution of the Tsunami force were locally varied along the railway structure and therefore, we performed the 3-D Tsunami inundation simulation by a grid size of 1m for the area of 250m x 100m including the Shimanokoshi station. Moreover, we performed the frame analysis for the railway structure of the Shimanokoshi station, using the distribution of the Tsunami force estimated by this 3-D Tsunami inundation simulation.

Keywords: 3-D Tsunami inundation simulation, 2011 off the Pacific coast of Tohoku earthquake, Shimanokoshi