Effect of Underground Beam on Seismic Response of Railway Rigid Frame Viaduct in 2016 Kumamoto Earthquake

Meguru ONODERA　　Kazunori WADA
Atsushi HINO　　Yoshitaka MURONO

In the 2016 Kumamoto Earthquake, a case was confirmed where the degree of damage to a railway rigid frame viaduct was different from to an adjacent one. In one viaduct there was no damage, but in the other viaduct, cracks of piers occurred. There is structural difference in the presence or absence of underground beams between both structures. This difference seems to be a factor that caused a difference in damage degree. The seismic response of structures in the 2016 Kumamoto earthquake was investigated by numerical analysis in this study. As a result, it was shown that natural period of a structure without underground beams was closer to the predominant period of the ground motion than that of the other structure with underground beams. The seismic response of a structure without underground beams increased due to this. Furthermore, it was shown that the effect of the ground displacement on the structure without underground beams was larger than that on the other one.