**ELASTO-PLASTIC IMPACT RESPONSE ANALYSIS OF CUSHION RUBBER SET RC BEAMS**

TOMOKI KAWARAI[1], MASATO KOMURO[1], NORIMITSU KISHI[1], YASUYOSHI NAGAI[1]
[1] Muroran Institute of Technology

When reinforced concrete (RC) beams were subjected to static loads, flexural cracks develop from the lower fiber and the beams reach the ultimate state in flexural failure mode. However, when the beams were directly impacted due to drop weight, the response characteristics of the beams were different from that under the static loading. Namely, the flexural cracks occur from not only the lower fiber but also the upper fiber of the concrete cover, the diagonal cracks occur near the loading area accompanying with the flexural ones, and the beams reached the ultimate state with flexural-shear failure mode. Recently, cushion rubber was installed in the girder ends of the bridges to mitigate the impact force erected due to the girder colliding with the abutment at earthquake shaking. Even though the intensity of the impact force can be effectively reduced by setting the rubber, the dynamic response characteristics of the rubber set structures may not clearly be understood. From this point of view, In this paper, to investigate dynamic response characteristics of the rubber set RC beams, drop-weight impact loading tests and 3D elasto-plastic impact response analysis of the RC beams with/without cushion rubber were conducted. In these results, the intensity of the impact force, the midspan displacement, and the strain distribution on the bottom surface of the beams were measured and crack patterns after loading were also inspected. Dynamic response of the RC beams can be appropriately evaluated by applying the proposed model. By conducting the analysis, The absorbing effects of the rubber to the dynamic response of the beams were discussed comparing with the results without the cushion rubber.