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# COLLISION DAMAGE AND INFLUENCE ON MECHANICAL PERFORMANCE ON STEEL BRIDGE GIRDER

A truck running on a highway collides with the main girder of a bridge over the highway occasionally. The influence of the damage due to the collision on the mechanical behavior of the bridge must be evaluated for the safety of traffic on the bridge immediately. Yet it is not an easy task, since the mechanical behavior of a deformed girder has not been studied much. One of the authors has been involved in the safety evaluation of a steel girder bridge damaged by collision. The bridge consisted of two steel main-girders, one of which was badly damaged: the web was deformed transversely; some transverse stiffeners were buckled; some other stiffeners were separated from the welds on the web; and some bolted connections between lateral struts and the web were broken. Based on the information on the actual damage of this bridge, the collision load was estimated by the 3-D finite element analysis and the deformation of the main girder was reproduced. The load-carrying capacities of the main girder without damage, the main girder damaged by collision, the main girder with larger damage were then studied numerically. The results indicate that the damage influences the load-carrying capacity, but the influence is limited even though the deformation is much larger than the fabrication error allowed in the bridge design codes.

### Biography

Eiki Yamaguchi has completed his PhD from Purdue University, USA. He is currently the Professor at Department of Civil Engineering, Kyushu Institute of Technology, Japan. He has published more than 100 papers and serves as Editorial Board Members of *Journal of Constructional Steel Research* and *International Journal of Advanced Steel Construction* as well as International Advisory Committee Members of several international conferences. His expertise includes applied/structural mechanics, steel structures and bridges.