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Influence of collision damage on load-carrying capacity of steel girder

It happens sometimes that a truck running on a highway collides with the main girder of a bridge over the highway. The influence of the damage due to collision on the mechanical behavior of the bridge has to be evaluated for the safety of traffic on the bridge. Yet it is not always an easy task, since the mechanical capacity 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 and one of them looked badly damaged: the web was deformed outwardly; some transverse stiffeners were buckled; some other stiffeners were separated from the web; and bolted connections between some lateral struts and the web were broken. Making use of the information on the actual damage, the collision load is estimated by the finite element analysis and the deformation of the main girder is reproduced. The load-carrying capacities of the main girder without damage, the main girder damaged by collision, the main girder with larger damage are 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 earned his PhD at Purdue University, USA. He is currently the Vice President and Professor at Department of Civil Engineering, Kyushu Institute of Technology, Japan. He has published more than 100 papers and serves as Editorial Board Member of *Journal of Constructional Steel Research* and *International Journal of Advanced Steel Construction* as well as international advisory committee member of several international conferences.

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