

## DUCTILE CAST IRON DECK FOR BRIDGE

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**D**uctile cast iron is applied to a bridge deck. Since the fabrication of a cast iron product is based on casting, no welding is needed. The possibility of fatigue crack occurrence is therefore very little while fatigue crack is a serious problem in the orthotropic bridge deck made of steel. The cast iron deck would be light, about a half of the reinforced concrete (RC) deck slab, so that it could enhance the seismic resistance of a bridge as well. This is an important feature for a bridge in the seismic zone such as Japan. In the present study, the design analysis was done by FEM to take stress concentration into account and the maximum stress was made smaller than the allowable value. The deck has longitudinal and lateral stiffeners. All the connections such as those between the stiffeners and those between the deck plate and the stiffeners were rounded to reduce the stress concentration. That is an easy task for cast iron products. On the other hand, it was not so easy to produce a ductile cast iron deck with uniform material property, since the bridge deck is large and the width-to-thickness ratio of the deck is much larger than that of an existing cast iron product. Various computational simulations and casting processes were tried out before the deck panel with uniform material property was produced successfully. Then static test and fatigue test were conducted, which concluded that the ductile cast iron deck satisfies the requirements imposed by the Japanese design specifications for highway bridges.



### Biography

Eiki Yamaguchi has received his PhD from Purdue University, USA. Currently, he is serving as a Professor at Department of Civil Engineering, Kyushu Institute of Technology, Japan. He has published more than 100 papers and serves as an Editorial Board Member 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.

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