Evaluating remaining lifespan for maintenance of existing steel infrastructures

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Actual damage on steel structures, alongside output damage modes of steel girder ends from the model developed by Sasaki and his team at Tokyo Tech.

The maintenance of existing steel infrastructures such as bridges is vitally important to ensure the safety of our society. Ongoing monitoring, inspection, and evaluation are key processes in these maintenance programs. However, it is difficult to evaluate the actual remaining capacity and lifespan of infrastructures from current

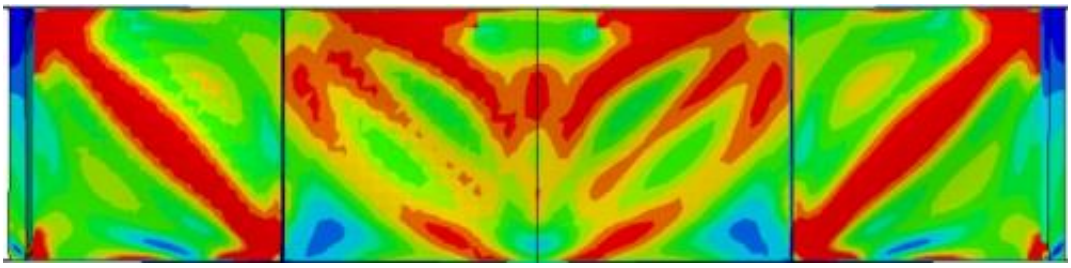
inspection methods.

Now, Eiichi Sasaki and his colleagues are aiming to develop efficient maintenance systems especially for steel structures. In the development of such a system, the quantitative evaluation of the remaining capacity of structures is one of the most important variables to ascertain.

The team investigated the effects of various types of damage on steel bridges and developed an evaluation method for efficient maintenance systems. They conducted real-scale experiments and detailed numerical modeling to uncover the variety of damage patterns in actual structures.

The investigations by Sasaki's team revealed that in both shear, and shear-bending, cases, the ratio of width-thickness ratios between damaged and un-damaged regions is the governing parameter to determine the remaining capacity.

Their final evaluation method proposes using this new governing parameter as a useful method of interpreting results from the inspection of steel bridges.



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More information: "Experimental and numerical evaluation of bearing capacity of steel plate girder affected by end panel corrosion." International Journal of Steel Structures 14, 659-676 (2014). DOI: 1007/s13296-014-3023-8

"Analytical demonstrations to assess residual bearing capacities of steel plate girder ends with stiffeners damaged by corrosion." Structure and Infrastructure Engineering 10, 69-79 (2014). DOI: 10.1080/15732479.2012.697904

"Finite element investigation of shear capacity of locally corroded end panel of steel plate girder." International Journal of Steel Structures 13, 623-633 (2013). DOI: 10.1007/s13296-013-4004-z

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