Revision of Technical Standards for Bridges, Overpasses, and other Structures (Specifications for Roads and Bridges)

(Research period: FY 2013–2017)

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1. Background and purpose of revision

The Technical Standards for Bridges, Overpasses, and other Structures (Specifications for Roads and Bridges) are the standards used for the design of bridges on highways and national roads. It is also commonly used for other bridges on roads. It has been revised along with changes in technical knowledge and social situations. A major revision since its establishment was conducted recently, which was announced by the chief of the City Bureau and the chief of the Road Bureau on July 21, 2017.[1]

This revision included changes in the design methods to improve productivity and realize high-quality road bridges with longer service lives. The changes include the adoption of the partial factor design method that enables a more accurate evaluation of the performance of road bridges compared to the conventional design method while continuously using performance standards adopted in the revision of 2001.

2. Switch to partial factor design method

In the conventional design method, various types of safety measures have been secured using the combination of loads based on experience and one safety factor.

On the contrary, in this revision, the conventional safety factor is divided into five partial coefficients, which are then individually defined. Specific partial coefficients include the partial coefficient multiplied by the load depending on the scattering of the load and the difference in the frequency of the load combination, the partial coefficient that takes into account the scattering of material strengths and construction, the partial coefficient to take into account the precision of design formulas and the quality and quantity of fundamental data, the partial coefficient that takes into account the quality of the ground investigation and structural analysis, and the partial coefficient depending on the differences in the state of damage (figure 1).

The Bridge and Structures Division has been conducting research to shift to the partial factor design method that is now the international technical standard founded on the concept of reliable design. Many outcomes of these research studies, including coefficients to multiply to the loads, are being reflected in this revision.

The development of new technologies and the acceleration of their application are expected as a method to evaluate performance without relying on how materials are being combined, and the necessary quality and quantity of data for an evaluation become clearer than the conventional method in this revision. The use of such a design method also enables a rational performance evaluation of already constructed structures as well in the future.

3. Other revisions

The revision also increased regulations concerning durability and reevaluated earthquake resistant designs by reflecting the lessons learned from the damage sustained in the Kumamoto earthquake in 2016 to construct bridges that would be more resistant to damage and recover more quickly from damage.

The revision of the Specifications for Roads and Bridges is expected to accelerate the use of various structures and new materials. The new Specifications for Roads and Bridges are being applied to new designs after January 1, 2018.

☞For more detail

1) The revision of the Technical Standards for Bridges, Overpasses, and other Structures (Specifications for Roads and Bridges) on the website of the Road Bureau, Ministry of Land, Infrastructure, Transport and Tourism
http://www.mlit.go.jp/report/press/road01_hh_000862.html

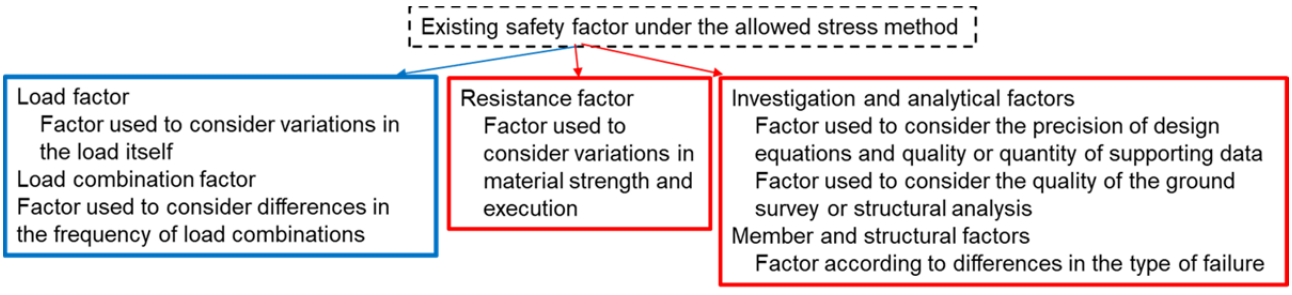

Figure 1. System of practical coefficients