

# RESOURCE NOTES

NO. 41

DATE 08/17/00

## *Design and Construction Specifications for Bridges*

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### **Background**

Bureau of Land Management Manual Section 9112, Bridges and Major Culverts, provides the responsibilities, policies, and procedures for the planning, design, construction, and maintenance of bridges and major culverts. The objective of this manual section is to provide safe bridges and major culverts under a uniform system of design, construction, and maintenance management. The manual requires that bridges and major culverts be designed in accordance with the latest edition of the "Standard Specifications for Highway Bridges", published by the American Association of State Highway and Transportation Officials (AASHTO). Additionally, the manual requires the use of Federal Highway Administration's (FHWA) "Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects for preparing construction or maintenance specifications for bridges and major culverts.

### **Discussion**

AASHTO's Subcommittee on Bridges and Structures meets

annually to revise and update the standard design specifications. Constant research and development in structures of all types of construction materials necessitate the continual improvement of the design specifications. During the 1999 Annual Meeting, a new bridge design specification, which will replace the Standard Specifications for Highway Bridges, was officially adopted as the basic specification. This new specification is AASHTO LRFD Bridge Design Specifications, which has been under development for 10 years under the National Cooperative Highway Research Program (NCHRP Project 12-33). The design provisions of the new specification employ the load and resistance factor design (LRFD) methodology and are intended for the design, evaluation, and rehabilitation of highway bridges.

Load and resistance factor design philosophy considers the variability in the properties of structural elements. This is similar to the philosophy of load factor design (LFD) which reflects the variable predictability of certain load types, such as vehicular loads and wind forces, through adjustments to the design factors. LRFD methods will result in improved bridge designs and more accurate analysis methods. This will lead to bridges exhibiting superior serviceability, enhanced long-term maintainability, and more uniform levels of safety.

As the implementation and use of the new LRFD design specification proceed, the old design specification will be gradually phased out. AASHTO's current Standard Specifications for Highway Bridges, Sixteenth Edition, 1996 which allows the use of either Working Stress Design or Load Factor Design methods, will not be maintained after 1999. Any errors discovered in the specification will be corrected, but additional study or new research to enhance the specification will not be undertaken.

Specifications used for construction of roads and bridges are printed in FHWA's Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects. The current edition is FP-96 which was issued in 1996. The International System of Units (SI) is used in this publication as required by Public Law 100-418 (1988 Omnibus Trade and Competitiveness Act) and Executive Order 12770 (Metric Usage in Federal Government Programs). The preceding edition, FP-92, was issued in 1992 and used Customary U.S. (English) Units of measurement with metric equivalents in parentheses. Presently, metric designs by various state departments of transportation are declining because of the reluctance of industry to make changes and the enactment of laws in some states prohibiting metric designs. Only about 50



percent of the states are currently designing roads and bridges in metric units. Consequently, FHWA plans to issue a revised edition of its Standard Specifications in 2003. This edition will be printed in two volumes, one volume in the International System of Units and one volume in U.S. Units.

### Conclusion

With the adoption of AASHTO's LRFD Bridge Design Specifications as the new design criteria, eventually all new bridges will be designed in accordance with the load and resistant factor methodology. However, as the implementation of the new specification proceeds, the

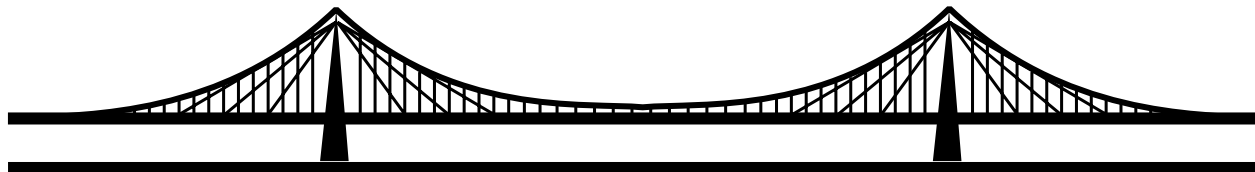
Sixteenth Edition of the Standard Specifications for Highway Bridges will remain a viable standard to use for design until it ultimately becomes obsolete.

FHWA's Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-96, is the preferred edition for use in the construction of roads and bridges until the revised edition is issued in 2003. However, when FP-96 is used, either design drawings should bear soft metric equivalents unless metric units are used exclusively or supplemental specifications should be written to convert the metric units within FP-96 into U.S. Units.

The use of the older edition, FP-92, although acceptable, is discouraged. FP-96 has corrected some deficiencies in the older specification, and copies of FP-92 are out of print and unavailable for purchase.

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