Washington State Department of Transportation
Bridge and Structures Office

DESIGN MEMORANDUM

TO: All Design Staff
FROM: Bijan Khaleghi
DATE: September 14, 2012
SUBJECT: Disk Bearings

The purpose of this memorandum is to clarify the rotational requirements for design of high-load multi-rotational (HLMR) bearings. This memorandum supersedes WSDOT Bridge Design Manual Section 9.2.3 B.

Both service and strength limit state rotations are used in the design of HLMR bearings. These rotations must be shown on the plans to allow the manufacturer to properly design and detail a bearing.

The service limit state rotation shown on the plans shall include an allowance for uncertainties of +/-0.005 radians.

For disc bearings, the strength limit state rotation shown on the plans shall include an allowance of +/-0.005 radians for uncertainties. For other HLMR bearings, such as spherical, pot, and pin bearings, the strength limit state rotation shall include an allowance of +/-0.005 radians for fabrication and installation tolerances and an additional allowance of +/-0.005 radians for uncertainties, in accordance with the AASHTO LRFD Bridge Design Specifications.

Background:

Failure of deformable elements such as polyether urethane discs and PTFE sliding surfaces generally result from gradual deterioration under many cycles of load rather than sudden failure under a single high load application. Therefore, these deformable elements are designed for service level loads and rotations.

The maximum strength limit state rotation is used in the design of HLMR bearings to assure that potential hard contact (metal-to-metal or metal-to-concrete) is prevented under the full range of expected loading.

The allowance applied to the service limit state rotation is consistent with that used for design of steel reinforced elastomeric bearings.

If you have any questions regarding these issues, please contact Ralph Dornsife at 360-705-7199 (DornsiR@wsdot.wa.gov).

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