REVISIONS TO THE SCDOT SEISMIC DESIGN SPECIFICATIONS FOR HIGHWAY BRIDGES
April 2020

The revisions included herein shall apply to the SCDOT Seismic Design Specification for Highway Bridges and Bridge Design Memorandum DM0115.

Table 3.4 of the SDS is revised as follows:

Note 3 is revised to "Include Bent Caps, Footings and their foundation elements, and Oversized Shafts"

SDS 5.1.8 Load Combinations second paragraph is revised as follows:

50% of Live load without impact shall be included in the load combination. The Live load shall be distributed evenly along the bridge center line to analyze the seismic response of foundation.

SDS 5.2.5 is added as follows:

5.2.5 Accounting for Structure Resonances:

The Structure Engineer of Record shall consider potential resonances of the bridges due to coincidences of the structure fundamental period, the soil column period and the earthquake period according to LRFD Seismic Analysis and Design of Transportation Geotechnical Features and Structural Foundations, FHWA-NHI-11-032, GEC No.3. Acceptable solutions to address large displacement demand due to resonances include changing structural configuration to avoid resonant responses and/or designing and detailing bridge structure elements to sustain the high demand

SDS 5.6.2 Backwall/Wingwall Modeling is revised as follows:

Backwall and wingwall stiffness shall be modeled to account for the mobilized passive resistance due to soil-structure interaction per the GDM.

SDS 8.4 Ductile Member Design Requirements For SDC B, C and D is revised as follows:

"The provisions of this section are applicable only to bridges designated SDC B to SDC D with the exception of the minimum detailing requirements for SDC A bridges as shown in Figures 8.2 , 8.3 and 8.4"

SDS 8.4.11 revised as follows:

"The spacing of transverse reinforcement detailed outside of a column or non-oversized drilled shaft plastic hinge region shall not be more than twice that placed in the plastic hinge region"

SDS 8.4.12 last sentence revised as follows:

"The maximum spacing for transverse reinforcement outside the plastic hinge region for columns and non-oversized drilled shafts shall not exceed 12 inches"

SDS 8.4.14 first sentence revised as follows:

"The volumetric ratio of lateral confinement in an oversized drilled shaft shall be 50% of the confinement at the base of the column provided that the shaft is designed for a loading case with the expected nominal flexural capacity equal to 1.25 times the moment demand generated by the overstrength moment of column acting at the base of the column."

The following sentence is added to the beginning of SDS 8.6:

"Seismic Shear capacity shall be based on the nominal material strengths, not the expected material strengths"

SDS 8.6 is revised as follows:

Line 7 and 8, delete "or 8.6.2"

SDS 8.6 is revised as follows:

Line 10, replace "8.6.3" with "8.6.2"

SDS 8.6.1 is revised as follows:

Delete Equation (8-12b). Delete definition for A_{sp}; add "ρ_s Volumetric ratio of transverse reinforcement (Eq. 6-44)"; the definition of μ_d is revised to "Maximum local displacement demand ductility of member, as defined by Equation (7-2)"

SDS 8.7.2 is revised as follows:

Replace "f'_c" with "f'_{ce}" in Equations 8-23 and 8-24. Revise definition under Equation 8-23 and 8-24 to define "f'_{ce}" as "Expected maximum concrete compressive strength (ksi)"

SDS 8.7.3 is revised as follows:

"When the principal tension stress is less than the limit established by Equation (8-25), a minimum amount of joint shear reinforcement in the form of column hoops as determined by Equation (8-26) shall be detailed, otherwise the provisions of Sections 8.7.5 through 8.7.7 shall apply."

SDS 8.7.7 is revised as follows:

Definition of "l_{ac}" is changed to: "Provided anchorage length for longitudinal column reinforcement (in)"

BRIDGE DESIGN MEMORANDUM – DM0115 is revised herein:

Page 3, the first sentence of 7.1.3 Local Member Ductility Capacity is revised as follows:

Local member ductility is different from global ductility. The global ductility capacity is calculated by the global displacements, which include the foundation displacements, while the local ductility capacity of a member is defined using Equations 7-3a or 7-3b with the idealized local displacements. The local displacement ductility capacity shall be calculated for an equivalent member that approximates an idealized fixed base cantilever element or an equivalent member idealized as two cantilevered segments that approximate a fix head condition as defined in Figure 6.3 to 6.6

Page 3, Notes after Equation (7-3b) and "Where" on page 3 are replaced with the following:

μ_c is the local member ductility capacity, see Figure 6.3 & 6.5.

μ_{c1} is the local member ductility capacity of first cantilever segment, see Figure 6.4 & 6.6

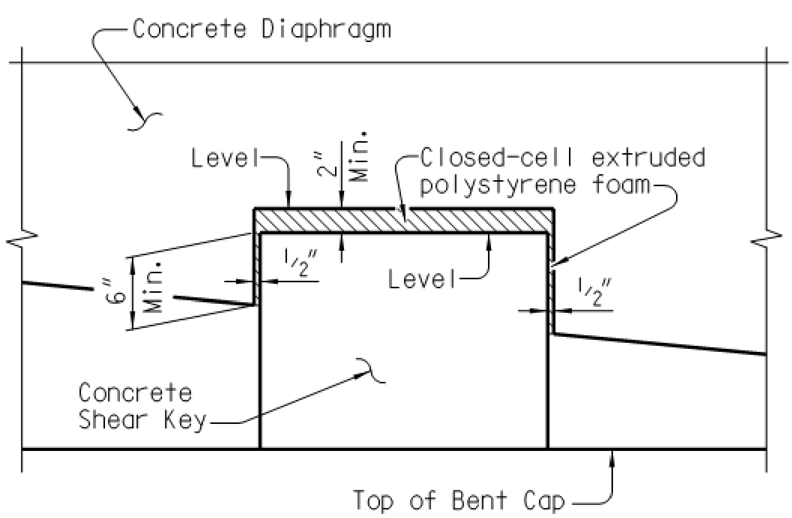
μ_{c2} is the local member ductility capacity of second cantilever segment, see Figure 6.4 & 6.6

Page 4, the first sentence is replaced with: "Δ_c, Δ_{c1}, Δ_{c2} , Δ_y, Δ_{y1}, Δ_{y2} are the idealized local member displacements calculated by equations given in Section 6.5.2 or equivalent equations disregarding the displacement of foundations"

Page 8, 9.2.2 Concrete Superstructure Shear Key Design:

First paragraph is replaced with: "Shear keys shall be provided at bents with expansion joints, except as noted for SDC A bridges."

Design shear keys that comply with the following detail:



SHEAR KEY DETAIL

Page 8, 9.2.3 Steel Superstructure Shear Key Design:

First paragraph is replaced with "Shear keys shall be provided at bents with expansion joints, except as noted for SDC A bridges."