OHIO DEPARTMENT OF TRANSPORTATION

CENTRAL OFFICE, 1980 W. BROAD ST., COLUMBUS, OHIO 43216-0899

January 17, 2020

To: Users of the Bridge Design Manual

From: Tim Keller, Administrator, Office of Structural Engineering

By: Sean Meddles, Assistant Administrator, Office of Structural Engineering

Re: January 2020 Edition of the ODOT Bridge Design Manual

The January 2020 Edition of the ODOT Bridge Design Manual is now available. This edition shall be implemented on all Department projects that begin Stage 1 plan development date after January 17, 2020. Implementation for projects further along the development process should be considered on a project-by-project basis.

The January 2020 edition of the Bridge Design Manual may be downloaded at no cost using the following link:

http://www.dot.state.oh.us/Divisions/Engineering/Structures/Pages/default.aspx

Attached is a brief description of revisions in the new edition.

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BDM Section 200 in the 2020 Edition of the Bridge Design Manual has been converted from Preliminary Design content to information included in Structural Submissions for the ODOT Staged Review Process. Much of the technical information in the previous editions of BDM Section 200 have been moved to new locations. The "Roadmap" below provides a guide for where information from the 2019 Edition now resides in the 2020 Edition.

2019 Edition SECTION 200 – PRELIMINARY DESIGN	→	**2020 Edition SECTION 200 STRUCTURE SUBMISSIONS**
201 STRUCTURE TYPE STUDY	→	201 STRUCTURE TYPE STUDY
201.1 GENERAL	→	201.1 GENERAL
201.2 STRUCTURE TYPE STUDY SUBMISSION REQUIREMENTS	→	201.2 STRUCTURE TYPE STUDY SUBMISSION REQUIREMENTS
201.3 UTILITIES	→	310.4 UTILITIES
202 BRIDGE PRELIMINARY DESIGN REPORT	→	202 BRIDGE PRELIMINARY DESIGN REPORT – STAGE 1
202.1 GENERAL	→	REMOVED
202.2 BRIDGE PRELIMINARY DESIGN REPORT SUBMISSION REQUIREMENTS	→	202.1 BRIDGE PRELIMINARY DESIGN REPORT SUBMISSION REQUIREMENTS
203 BRIDGE WATERWAY	→	203 WATERWAY PERMIT DETERMINATION
203.1 HYDROLOGY	→	REMOVED
203.2 HYDRAULIC ANALYSIS	→	REMOVED
203.3 SCOUR	→	REMOVED
203.4 BRIDGE AND WATERWAY PERMITS	→	203.1 BRIDGE AND WATERWAY PERMITS
203.5 TEMPORARY ACCESS FILLS	→	203.2 TEMPORARY ACCESS FILLS
204 SUBSTRUCTURE INFORMATION	→	306 SUBSTRUCTURE
204.1 FOOTING ELEVATIONS	→	306.1.1 FOOTING ELEVATIONS
204.2 EARTH BENCHES AND SLOPES	→	306.2.1.4 EARTH BENCHES AND SLOPES
204.3 ABUTMENT TYPES	→	306.2.2 TYPE OF ABUTMENTS
204.4 ABUTMENTS SUPPORTED ON MSE WALLS	→	306.2.2.2 ABUTMENTS SUPPORTED ON MSE WALLS
204.5 PIER TYPES	→	306.3.3 TYPES OF PIERS
204.6 RETAINING WALLS	→	307 RETAINING WALLS
205 SUPERSTRUCTURE INFORMATION	→	308 SUPERSTRUCTURE
205.1 TYPE OF STRUCTURES	→	308.2 SUPERSTRUCTURE TYPES
205.2 SPAN ARRANGEMENTS	→	308.1 SPAN ARRANGEMENTS
205.3 CONCRETE SLABS	→	308.2.1 CONCRETE SLAB BRIDGES
205.4 PRESTRESSED CONCRETE BOX BEAMS	→	308.2.3.3 BOX BEAMS
205.5 PRESTRESSED CONCRETE I-BEAMS	→	308.2.3.4 I-BEAMS
205.6 STEEL BEAMS AND GIRDERS	→	308.2.2 STRUCTURAL STEEL
205.7 COMPOSITE DESIGN	→	REMOVED
205.8 INTEGRAL DESIGN	→	306.2.2.5 INTEGRAL ABUTMENTS

2019 Edition SECTION 200 – PRELIMINARY DESIGN	→	2020 Edition SECTION 200 STRUCTURE SUBMISSIONS
205.9 SEMI-INTEGRAL DESIGN	→	306.2.2.6 SEMI-INTEGRAL DESIGN
206 MINIMAL BRIDGE PROJECTS	→	REMOVED
207 BRIDGE GEOMETRICS	→	302 BRIDGE GEOMETRICS
207.1 VERTICAL CLEARANCE	→	302.1 VERTICAL CLEARANCE
207.2 BRIDGE SUPERSTRUCTURE	→	REMOVED
207.3 LATERAL CLEARANCE	→	302.3 LATERAL CLEARANCE
207.4 INTERFERENCE DUE TO EXISTING SUBSTRUCTURE	→	302.4 INTERFERENCE DUE TO EXISTING SUBSTRUCTURE
207.5 BRIDGE STRUCTURE, SKEW, CURVATURE AND SUPERELEVATION	→	302.5 BRIDGE STRUCTURE, SKEW, CURVATURE AND SUPERELEVATION
208 TEMPORARY SHORING	→	310.1 TEMPORARY SHORING
208.1 SUPPORT OF EXCAVATIONS	→	310.1.1 SUPPORT OF EXCAVATIONS
209 MISCELLANEOUS	→	310 MISCELLANEOUS
209.1 TRANSVERSE DECK SECTION WITH SUPERELEVATION	→	309.3.6.1 SUPERELEVATION
209.2 BRIDGE RAILINGS	→	309.4 RAILING
209.3 BRIDGE DECK DRAINAGE	→	309.7 BRIDGE DECK DRAINAGE
209.4 SLOPE PROTECTION	→	306.5 SLOPE PROTECTION
209.5 APPROACH SLABS	→	310.2 APPROACH SLABS
209.6 PRESSURE RELIEF JOINTS	→	310.3 PRESSURE RELIEF JOINTS
209.7 AESTHETICS	→	310.5 AESTHETICS
209.8 RAILWAY BRIDGES	→	310.6 RAILWAY BRIDGES
209.9 BICYCLE BRIDGES	→	310.7 BICYCLE BRIDGES
209.10 PEDESTRIAN BRIDGES	→	310.8 PEDESTRIAN BRIDGES
209.11 SIDEWALKS ON BRIDGES	→	309.8 SIDEWALKS & SHARED USE FACILITY
209.12 MAINTENANCE AND INSPECTION ACCESS	→	310.9 MAINTENANCE AND INSPECTION ACCESS
209.13 SIGN SUPPORTS	→	310.10 SIGN SUPPORTS

2019 Edition SECTION 300 – DETAIL DESIGN		→	2020 Edition SECTION 300 – BRIDGE DESIGN	
301	GENERAL	→		REMOVED
301.1	DESIGN PHILOSOPHY	→		REMOVED
301.2	DETAIL DESIGN REVIEW SUBMISSIONS	→	204 205	DETAIL DESIGN – STAGE 2 DETAIL DESIGN – STAGE 3
301.3	DESIGN METHODS	→		REMOVED
301.4	LOADING REQUIREMENTS	→	303	LOADING REQUIREMENTS
301.5	REINFORCING STEEL	→	304.4	REINFORCING STEEL
301.6	REFERENCE LINE	→	301	DESIGN SPECIFICATIONS
301.7	UTILITIES	→	310.4	UTILITIES
301.8	CONSTRUCTION JOINTS, NEW CONSTRUCTION	→	304.2.3	CONSTRUCTION JOINTS
302	SUPERSTRUCTURE	→	308	SUPERSTRUCTURE
302.1	GENERAL CONCRETE REQUIREMENTS	→	304.2	CONCRETE, CAST-IN-PLACE
302.2	REINFORCED CONCRETE DECK ON LONGITUDINAL MEMBERS	→	309.3	REINFORCED CONCRETE DECK ON LONGITUDINAL MEMBERS
302.3	CONTINUOUS OR SINGLE SPAN CONCRETE SLAB BRIDGES	→	308.2.1	CONCRETE SLAB BRIDGES
302.4	STRUCTURAL STEEL	→	308.2.2	STRUCTURAL STEEL
302.5	PRESTRESSED CONCRETE BEAMS	→	308.2.3	PRESTRESSED CONCRETE BEAMS
303	SUBSTRUCTURE	→	306	SUBSTRUCTURE
303.1	SEALING OF CONCRETE SURFACES, SUBSTRUCTURE	→	306.1.2	SEALING OF CONCRETE SURFACES, SUBSTRUCTURE
303.2	ABUTMENTS	→	306.2	ABUTMENTS
303.3	PIERS	→	306.3	PIERS
303.4	FOUNDATIONS	→	305	FOUNDATIONS
303.5	DETAIL DESIGN REQUIREMENTS FOR PROPRIETARY RETAINING WALLS	→	204.1	PROPRIETARY RETAINING WALLS
304	RAILING	→	309.4	RAILING
305	FENCING	→	309.5	FENCING
306	EXPANSION DEVICES	→	309.6	EXPANSION DEVICES
307	BEARINGS	→	306.4	BEARINGS

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Summary of Revisions to the January 2020 ODOT BDM

BDM Section	Affected Pages	Revision Description
200		This new section of the BDM provides information for the following structural submittals: A. Structure Type Study B. Stage 1 C. Waterway Permit Determination D. Stage 2 E. Stage 3 F. Final Tracings All technical information from previous editions of BDM Section 200 have been moved to appropriate locations in BDM Section 300
201.2.1.E	2-2	Hydraulic information related to bridges over waterbodies with controlled outlets or spillways has been provided.
201.2.2.E	2-3	Hydraulic information related to bridges over waterbodies with controlled outlets or spillways has been provided.
201.2.2.G	2-4	Future wearing surface is included in the Design Loading information.
202.1.3	2-10 Through 2-12	Provided more information to be included in the Structure Foundation Exploration Report regarding micropiles and continuous flight auger piles.
204	2-16 Through 2-17	Clarified that Stage 2 plan information includes Estimated Quantity items to be listed (without final quantity values) and all details shall be dimensioned with bar sizes, shapes and spacings properly shown. Bar dimensions, quantities and weights are not required.
303.1.4.2.b	3-6	ODOT has revised the ductility requirements for spirals and ties in concrete columns.
304.5.1	3-19	Removed the standard 0.5-in diameter strand (A_s = 0.153-in^2).
305	3-20 Through 3-66	Entire re-write of the Foundation Design section of the BDM

BDM Section	Affected Pages	Revision Description
305.1.3	3-21 Through 3-22	Vertical and Horizontal Movement criteria has been provided
305.1.6	3-25	Clarified that Rock Channel Protection shall be ignored when predicting scour depth and noted that foundation design check for global stability need not consider scour.
305.2.1.2	3-26 Through 3-31	New requirements for spread footing foundation depths.
Figure 305-3	3-28	Included a new figure for determining frost depth.
305.3.2	3-35 Through 3-41	Procedures for determining load effects for piling are introduced including new considerations for pile setup and downdrag.
305.3.5.3	3-46 Through 3-47	Corrosion potential for piling is introduced.
305.3.5.6	3-47 Through 3-48	New considerations for pile points.
305.3.5.7	3-48	New considerations for pile penetration depths.
305.3.6	3-50 Through 3-51	New considerations for vibration monitoring during pile driving.
305.4.1	3-52 Through 3-56	Procedures for determining load effects for drilled shafts are introduced.
305.4.4.2	3-58	New drilled shaft concrete cover requirements based on shaft diameter.
305.4.4.3	3-58 Through 3-61	New ductility requirements for spirals and ties in drilled shafts.
Figure 305-4	3-60	Provided a better figure illustrating the reinforcement detailing between columns and drilled shafts.
305.4.4.6	3-61 Through 3-62	New demonstration drilled shaft requirements.
305.4.5	3-62	New drilled shaft integrity testing requirements.

BDM Section	Affected Pages	Revision Description
305.5	3-63 Through 3-64	New micropiles requirements.
305.6	3-64 Through 3-65	New continuous flight auger piles requirements.
306.2.1.2	3-72 Through 3-73	Provided requirements for supplemental reinforcement in bearing seats when cover above steel exceeds 4-in due to transverse cross-slope.
Figure 306-4	3-73	New figure for supplemental reinforcement in bearing seats when cover above steel exceeds 4-in due to transverse cross-slope.
Figure 306-6	3-78	Provided new design chart for integral concrete beam types.
Figure 306-7	3-79	Provided a detail for integral composite box beams.
Figure 306-8	3-81	Provided a detail for semi-integral composite box beams.
306.2.3.1.b	3-85	Provided information for using Prefabricated Geocomposite Drainage (PGD) systems and Porous Backfill.
Figure 306-10	3-86	Cross-section through abutment showing PGD system.
Figure 306-11	3-87	Cross-section through wingwall showing PGD system.
306.3.3.1	3-89 Through 3-90	Revised the ductility requirements for spirals and ties in concrete columns.
306.4.2	3-94 Through 3-96	Reduced the permissible bearing types for new structures down to elastomeric and HLMR.

BDM Section	Affected Pages	Revision Description
307	3-97 Through 3-123	Entire re-write of the Retaining Walls design section of the BDM that includes the following types: A. Rigid Gravity and Semigravity i. Rigid Gravity Walls ii. Cantilever Walls iii. Counterfort Walls iv. Precast Gravity and Semigravity Walls B. Prefabricated Modular i. Modular Block Walls ii. Bin Walls iii. Crib Walls iv. Gabion Walls C. MSE Walls i. Precast Concrete Panel Walls ii. GRS-IBS Abutments D. Reinforced Soil Slopes E. Drilled Shaft Walls i. Tangent Walls ii. Secant Walls iii. Soldier Pile Walls F. Steel Sheet Pile Walls i. Cantilever Sheet Pile Walls ii. Cellular Sheet Pile Walls G. Anchored Walls H. Soil Nail Walls I. Temporary Walls i. Wire Faced MSE Walls ii. Fabric Wrapped Walls
308.2.2.1.d.1	3-127 Through 3-130	Revised the applications of un-coated weathering steel.

BDM Section	Affected Pages	Revision Description
Figure 308-1	3-130	New figure showing coating application for fascia beam/girder on un-coated weathering steel superstructure.
308.2.2.1.j	3-133 Through 3-134	Revised the contact surface requirements for un-painted weathering steel and metallized surfaces to Class B.
308.2.2.2.b	3-136 Through 3-138	Provided some new guidelines that apply for steel framing layouts utilizing LRFD C6.7.4.2 and NSBA G13.1 guidance.
308.2.3.3	3-145 Through 3-146	Revised truck traffic requirement for considering box beam superstructures and restricted the use of 36-in and 48-in box beams in the same span with some commentary on the purpose of this restriction.
308.2.3.3.a	3-146 Through 3-147	Revised the requirements for specifying debonded strands in compliance with approved changed coming to LRFD.
308.2.3.4.a.2	3-154 Through 3-155	Revised the requirements for specifying debonded strands in compliance with approved changed coming to LRFD.
Figure 309-7	3-174	Clarified the haunch dimensional requirements for steel beam/girders.
Figure 309-8	3-174	Clarified the haunch dimensional requirements for I-beams.
309.4	3-192 Through 3-199	Revised the entire Railing section for compliance with MASH on the NHS.
309.4.3.6	3-197 Through 3-198	Provided the requirements for specifying PCB-91 and RM-4.2.
Table 309-4	3-210	Provided a combined table for expansion joint uses.
310.6	3-220	Provided link to the Ohio Rail Development Commission website to access CSX and Norfolk Southern public project manuals.
310.11	3-222	Provided information for structural grounding and underpass lighting.
C401.4.B_3	4-3	The load comparison should be between proposed and original loadings.
403.5.1	4-21	Provided a clarification for bridge width when considering eliminating a longitudinal joint.

BDM Section	Affected Pages	Revision Description
403.5.2	4-21	Fixed a discrepancy with Figure 403-1.
602.3	6-3 Through 6-4	Specify the maximum aggregate size for the drilled shaft concrete.
605.1	6-7 Through 6-9	Revised Pile Driving Constraints note to include a specified waiting period to minimize downdrag.
605.2	6-9 Through 6-10	Revised Construction Constraints note for spread footings to include a specified waiting period to minimize settlement.
605.5	6-11	New note for bearing resistance for MSE wall abutments.
605.6	6-11 Through 6-12	New notes for Shaft Drilling constraints to minimize downdrag.
606.2	6-14 Through 6-15	Revised note for friction piles with scour allowance. Eliminated note for friction piles with downdrag. Revised Static Load Test note.
606.3	6-15 Through 6-16	New section for steel pile points or shoes.
606.5	6-17	Removed galvanizing option from pile encasement to be consistent with CPP-1-08.
606.6	6-17 Through 6-20	Provided a spread footing settlement monument note for retaining walls.
606.7	6-20 Through 6-25	Provided vibration monitoring note and preconstruction survey note. Provided notes for utilizing soil setup.
606.8	6-25 Through 6-27	Provided notes for friction, laterally loaded, uplift drilled shafts. Also included notes for demonstration drilled shafts, thermal integrity testing, crosshole sonic logging and high-strain dynamic testing.