

Changes to Bridge Design & Drafting Manual 2004

1. The system of measurement was converted from the International System of Units (SI) to English Units. Section 1.5.5 Metric Conversion was maintained in the Manual as a reference to provide a guide to the conversions and practices used during the Metric era.
2. **Section 1: Office Organization and Personnel Policies** was eliminated because decentralization of the design function requires each design group to develop their own internal procedures.
3. **Section 2: Design Phases and Responsibilities** were mostly eliminated because decentralization requires each design group to develop their own internal procedures. Design considerations still pertinent were included in Section 1 of the new manual.
4. **Section 3: Construction and Maintenance** was eliminated because decentralization of the design function requires each design group to develop their own internal practices and procedures.
5. **Section 4: Drafting Practices** became **Section 2: Drafting Practices** in the new manual. Significant changes include:
 - 2.1.1 ODOT works from a server based system.
 - 2.1.2 CAD Files, Drawings Start to Finish
 - 2.1.2.1 Using Models within Microstation
 - 2.1.4 Using ODOT Plans menu for English files.
 - 2.3.1 Drawing Identification Tag
 - 2.4 No Bridge Engineers Stamp on plans.
 - 2.7.4 Foundation Data sheets are once again included in the set of Bridge contract plans. (Note: Structures that fall under National Bridge Inventory type structures will use "D" size drawings. "D" size Foundation sheet borders will come from Bridge Section. "B" size Foundation sheet borders will come from Geo/Hydro Section.
 - 2.8.2 Plotypus Plotting
 - A2.1.3 Cell Library pictures
 - A2.2.2 Level Naming conventions
6. **Section 5: Design and Detailing Practices** became **Section 1: Design and Detailing Practices** in the new manual. Numerous minor changes and updates were made to the manual and sections pertinent to a specific design should be reviewed thoroughly. Significant changes include:
 - Imperative Mood - Changed language to imperative mood at numerous locations. Not all needed changes were captured in this update.
 - Removal of archaic references - References to structures or units that have been disbanded or modified due to ODOT restructure have been changed. Not all needed changes were captured in this update.

- Change to LRFD Specifications - References to Standard Specifications for Highway Bridges have been updated to the equivalent reference in the LRFD Bridge Design Specifications. Most, but not all, needed changes have been captured.
- Introduction, Procedure for Office Practice Changes - State Bridge Engineer to approve changes rather than PAS Team. Design Standards and Practice Engineers to recommend approval or rejection.
- 1.1.1 Standard Specifications and Standard Drawing Manuals - section was updated and moved from the old Section 2.
- 1.1.1 Bridge Foundation Design - Added sentence stating Bridge Foundation Design is conducted using AASHTO Standard Specifications for Highway Bridges.
- 1.1.2 Fundamental Decisions for Bridge Designs – sections were copied from the old Section 2 and updated.
 - a) 1.1.2.2(3) End Fill Slopes – 2:1 end slopes recommended, but steeper slopes may be allowed if recommended in the Foundation Report. Although this a change in policy, the existing 2:1 max. end slope policy was not consistently enforced.
 - b) 1.1.2.3 Earth mounds for column protection - Roadway no longer allows use of earth mounds. This change puts Bridge policy in line with Roadway policy.
 - c) 1.1.2.11 Type Size and Location Design – section was updated and biological assessment considerations added.
 - d) 1.1.2.11(3) Added two items; Drilled Shafts and Liquefaction Potential under the Foundations Heading.
 - e) 1.1.2.12 List of Final Design Deliverables - Added "construction assistance cost estimate" to list.
- 1.1.5 Foundation Design - foundation design and process guidelines were added. Guidelines were added for spread footings, pile footings and drilled shafts.
- 1.1.7 Loads and Distribution – guidelines added.
 - a) 1.1.7.2 Live Loads – new live load criteria that includes ODOT permit loads was added. Permit loads were re-named per ODOT Tier-2 Load Rating designations.
- 1.1.10 Seismic Design
 - a) 1.1.10.1 Seismic Design, General - seismic design guidelines and seismic maps were added. Changed seismic design criteria from 500-year "no collapse" to 1000-year "no collapse" plus 500-year remain "serviceable". Replaced Geomatrix maps with new USGS maps. Added 1000-year and 2500-year return period maps in addition to the 500-year map. Require use of new maps instead of AASHTO LRFD maps. Note: the 2500-year maps are not yet available, and will be added later.

- b) 1.1.10.6 Liquefaction Mitigation Procedures – flowchart and guidelines were added.
- 1.1.14 Precast Prestressed Concrete Elements
 - a) 1.1.14.2 Use of alternate precast shapes - Clarified that ODOT shapes must be used on original design plans for traditional design-bid-build contracts. Alternate shapes are permissible as a contract change order.
- 1.1.20 Deck Design and Detailing
 - a) 1.1.20.1 Deck Design and Detailing – an LRFD Concrete Deck Reinforcement chart was added. Moved deck design & corrosion protection to "Deck" section. Modified and clarified corrosion protection requirements and category definitions. Note that empirical design methods for determining deck reinforcement are not acceptable.
- 1.1.21 Bridge Rail
 - a) 1.1.21.2 Rail Retrofit Guidelines – FHWA requirements added for NHS rail retrofits.
- 1.1.25 Corrosion Protection – definitions and practices updated in first three sections.
- 1.2.1 Steel Girders – detailing and design guidelines were added, sub-sections (1) through (6).
 - a) 1.2.1.1 Materials and Identification – weathering steel guidelines were added, and plate thickness.
 - b) 1.2.1.2 Shop Lengths of Welded Girders, field splice location.
 - b) 1.2.1.3 Intermediate Cross Frames – details modified to reduce bolted connections, show more economical welded connections.
 - c) 1.2.1.5 Bearing Stiffeners - revised.
 - d) 1.2.1.7 Composite Action and Flange Shear connectors, changed minimum spacing.
 - e) Beam Camber Figures 1.2.1.8F and 1.2.1.8G - Added steel beam camber and superimposed beam camber.
 - f) 1.2.1.9 Deck Pour Sequences - Delay time between concrete pours and check negative moment areas for deck pour sequences.
- 1.2.2 Welding
 - a) 1.2.2.2 Use of fillet welds – revised.
 - b) 1.2.2.3 Flange welds - All Flanges will be considered tension members for butt splice details.
- 1.4.1 Retaining Structures - note added referring retaining structure design to the Geo-Environmental Section.