Oregon Department of Transportation

Bridge Design Manual Format Guide

April 30, 2023

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1 Structure of the BDM

This chapter will describe the basic arrangement of the BDM. Including what types of information belong in each section, how each section is laid-out, and how local agency requirements are clarified. Additionally, the location of figures and graphics within the document will be discussed.

1.1 BDM Sections

Except for the "Introduction", each BDM section has:

- Main body of text
- Appendix

Section 1 makes up the bulk of the document and includes design standards and detailing practices along with guidance on bridge design principles, including general information for the selection of bridge type, layout, appearance and constructability their use. It is intended to be used along with AASHTO LRFD and, as a result, reflects the structure of that document. There are many bridge design subjects which LRFD does not address also included in this section.

In Section 2 of the BDM, the procedures and processes for bridge design at ODOT are described. This includes information on the standard Design-Bid-Build project life-cycle, quality requirements, and expected coordination with other disciplines on a project team. The section does not address non-standard project delivery methods, the special requirements of specific regions, nor is it intended to capture processes that are already described in other Statewide Project Delivery documents.

1.2 Section 1 Layout

Due to the size of Section 1, the migration to this format will take place over a number of years. Parts that have not been updated will retain the existing formatting and layout. As subsections are updated, they will be migrated to the format and layout described here.

Some subsections of section 1 of the BDM will utilize a two-column layout. The reasons for this are: to visually separate standards from guidance; to coincide with LRFD; and to more directly tie commentary to the relevant standards. Other sections that are primarily made up of standards will utilize a single-column format, with commentary located below. This avoids large blocks of blank space.

This is an example of what the two-column format looks like.

Writing in this format relies on the use of column and continuous section breaks.

A template for writing in this style is available.

This enables the resulting columns to be accessible for many users.

The single column format is done using Normal text, and can use this file as a template. Commentary should use the Commentary Heading styles and be located immediately after the subsection on which it is commenting. Continuous section breaks should be used between all Heading denoted subsections to maintain columns. Sections should be separated by next page section breaks to simplify formatting in the future.

1.3 Section 2 Layout

Sections 2 utilizes the single-column format. It is not expected that commentary will be required for this section.

1.4 Local Agency Requirements

When a subsection applies to local agency bridges, or has elements that apply, make this clear in the text by specifically mentioning requirements for local agency project category. Unless specified, designers should assume the BDM requirements do not apply. Reference relevant sections of the Local Agency Guidelines, as needed, to allow designers to find them quickly.

2 Style of the BDM

This section will reference the various ODOT Style Guides for Branding and for Writing Style. It will add clarification for the use of fonts and formatting specific to the BDM, including how to indicate references/links.

2.1 Fonts and Formatting

Comply with the required elements and styles from the ODOT Brand & Publication Guidelines supplement *Applying Accessibility and Branding to Technical Manuals and Guides* except as modified below.

The page numbers of the Section's text are prefixed with the Section number. Thus, for Section 2, the page numbers are 2-1, 2-2, etc.

2.1.1 Headings

Use the predefined headings included in this document. Headings 1 through 4 include section numbering in the AASHTO LRFD Style. These were modified from the standard to increase the size differential and limit the number of heading levels used. Heading 5 is for titles within a subsection.

These headings look like this:

Example of Heading 1

Example of Heading 2

Example of Heading 3

Example of Heading 4

EXAMPLE OF HEADING 5

2.1.2 Text

Use Normal style text for most of the document.

Do not use italics for emphasis. Instead use the **Strong** style.

References to other publications should use the *Reference* style. This includes references to other locations within the BDM or AASHTO LRFD, which should use the form *BDM 1.23.1*.

Bulleted lists should use the List Paragraph style.

- Example.
- List.

2.1.3 Links

Links should use the Hyperlink style.

2.1.4 Commentary

The commentary sections should also use Normal text for the body, but should use the Commentary Heading styles. These are identical to the Heading styles, but do not include automatic numbering. The section title for commentary sections should be written as C1.X.X.

2.1.5 Tables

Tables should use the Table Header and Table Text styles. Include a caption for each table, placing it above, rather than below, the table. Anchor captions at the left, rather than centered. Create tables in Word or Microstation.

Accessibility requirements:

- Designate a header row. This is different from applying the header style.
- Add alternative text for each table.
- Avoid merged or split cells.
- Do not add blank rows or columns. If additional space is needed, adjust the line spacing for the rows using the spacing toolset found in the layout tab.

2.1.5-1 Example Table

Example	**Table Heading**
Example	Table Text

2.1.6 Figures

In both format options, figures, which includes graphics, tables and graphs, should appear in single-column width. Locate figures as close to the textual reference as possible. Include a caption for each figure, placing it above, rather than below, the image. Anchor captions at the left, rather than centered.

2.1.6-1 Example Figure Caption

Formatting requirements:

- Use Microstation to draft figures.
- Scale figure text so all text is equivalent to 11 font size. Note the scale in the Microstation drawings.
- Do not include the figure title in the drafted figure.
- Set the print box as full page width when drafting.

Accessibility requirements:

- Provide alternative text for each figure.
- Place images in line with your text. If you must "float" an image, be sure it is anchored to related text and includes an adequate description.
- Limit the use of color. When using color, ensure adequate contrast with the background. Ensure that information conveyed by color differences is also available in text. Use colors identified in ODOT's Brand & Publication Guidelines, and limit colors to the 3 primary palette colors when possible.

2.2 Writing Style

In general, write the standards within Section 1 of the BDM using the five C's from the ODOT Specifications Manual: clear, concise, correct, complete, and consistent.

2.2.1 Roles

When referring to people within the text of the manual, follow these guidelines:

- Use titles per the Bridge Organization Chart.
- Refer to a specific position, not an individual by name or a general section.
- Refer to BDM section owners as BDM Technical Resource, and provide a hyperlink.
- Refer to Bridge specialists as Technical Specialists, and provide a hyperlink to the ODOT Bridge Section Specialist List. If the relevant role is not included on the list, request the addition from the Bridge Standards and Program Manager
- Refer to Standard Drawing and Detail owners as Technical Owners, and provide a hyperlink to the Technical Owners List.
- Do not precede titles with ODOT.
- Use Bridge Designer or Engineer, not Structural Engineer, when referring to designers within Bridge Section.

2.2.2 Modifications from Writing Style Guide

Use the ODOT Style Situations and Exceptions rules modified as follows:

- Bulleted Lists – For text-based bulleted line items, end the line with a period. When an equation is presented in list format, a period is not required.
- Numerals – This standard does not apply to equations; it is only for numerals referenced in text format. Always use figures in equations, rather than spelling out the numerals. Use a decimal values for amounts less than one.
- Large Numbers – For large numbers, use the equation builder to add the value in text using scientific notation. Example: Avogadro's number (6.022×10^{23}) is one mole.

2.2.3 Equations

All equations, whether in text or inset, must use the equation editor within Microsoft Word. The equation editor uses a different font than the normal style; this is an approved exception. You do not need to change the font to match the normal text. Symbols used outside of equations should also use this tool, unless the required symbol is not available. Add symbols used in more than one subsection to the BDM Symbology.

3 Update Process for the BDM

This section will detail the processes and rough schedule involved in updating the BDM.

3.1 Spring Update (Standard Process)

The standard process for updating the BDM involves five main phases:

- Update Requests.
- Internal Review.
- External Review.
- Management Approval.
- Publishing.

All phases of the update will primarily utilize ProjectWise, when possible. Not all external reviewers have access to ProjectWise, so an internet option will continue to be provided.

The spring update is the primary means of modifying the BDM. Bridge Section management must approve all technical changes prior to publication.

3.1.1 Schedule

The intention is to publish the spring update at the end of April each year. To facilitate formatting and publishing, all technical article updates must be finalized by the end of March. Prior to that phase, all articles must go through both internal and external reviews, with time for responses. As such, the list of requests must be finalized by the middle of January each year.

Table 3.1.1-1 Approximate Schedule for Spring BDM Update

Phase	Start Date	Duration
Request for Updates	Mid-December	5 Weeks
Internal Review	End of January	2 Weeks
Response	Early February	2 Weeks
External Review	End of February	3 Weeks
Response	Mid-March	2 Weeks
Management and Communications Review	End of March	4 Weeks
Publishing	End of April (4/30)	-

3.1.3 Request for Updates

A request for recommended BDM updates will be sent out via email in the middle of December to all members of the Oregon bridge community. All requests should be submitted using the form on the Bridge website. They should be submitted to the Bridge Design Manual Standards Engineer, who will add them to the tracker and post them as MS Word files to the 0_Review folder in the Bridge Discipline ProjectWise location within five working days.

As soon as requests are posted to ProjectWise, they will be assigned to a member of the Bridge Standards staff as the revision owner for processing. In many cases, the revision owner may also be the individual submitting the request. The processing step involves making a recommendation for moving the article forward in the process and may involve rewriting, reformatting or adding research support. Just prior to the Internal Review phase, the Bridge Standards Unit will hold a meeting to finalize the list of updates moving forward in that update and to assign reviewers.

3.1.4 Change Format

When completing the change request form, the text for the modified section should be copied from the MS Word version of the BDM, available in the 2_Standards folder in ProjectWise. If ProjectWise access is not available, contact the Bridge Design Manual Standards Engineer for the pertinent sections. All new text should be highlighted and removed text should be formatted using strikethrough. New or updated figures should be given a yellow border. If not using PW, send updated figures to Bridge CAD Standards Specialist for review and storage in PW. This allows the proposed changes to be distinguished from comments made using track changes during the review process. Commentary and references can be added or linked to the form.

3.1.5 Internal Review

The Internal Review phase of the BDM update occurs in February of each year. In this phase the assigned reviewer has two weeks to provide comments using track changes within the file in ProjectWise. If any major concerns or flaws are noted, or the change is considered controversial, the reviewer should arrange a meeting with the revision owner, the requestor, and any other relevant staff. Other staff may include experienced designers, members of the Construction Section, or management.

Once the reviewer is done, the revision owner has until the end of February to respond to the comments and produce a clean version of the request form. The versioning tool within ProjectWise is used to store the previous comments while maintaining a clean copy for the next phase. Additional meetings between the owner and the reviewer may be required to resolve comments.

Any controversial topics remaining should be elevated to the Standards Manager or State Bridge Engineer for approval before the next phase.

3.1.6 External Review

At the beginning of March, an email will be sent to the Oregon bridge community opening the articles up for comment. Also include the Senior Program Engineer – Project Delivery QA/QC in this distribution. The preferred method for this review is to provide comments directly on the file in ProjectWise. If that is not possible, the full set of articles will be posted on the ODOT Bridge Section website and comments can be sent in via email.

The external comment window is open for three weeks, leaving a further two weeks to incorporate those changes into the final change. The final changes will then be versioned once again to form the final draft.

3.1.7 Management Approval

At the end of March, any articles reformatted per the guidelines in chapters 1 and 2 of this document will be sent to the Communications Section for review. That review will be check for compliance with ODOT's accessibility and branding standards. During that time, the full set of articles will also be submitted to the Standards Manager and State Bridge Engineer for final review. The revision owner and reviewer will jointly address any remaining changes. If these changes are significant it may be necessary to resend it to Communications, potentially causing a delay. That is why it is important to involve management on any potentially significant changes.

Document changes in BDM 2.5 in the Bridge QC Revision History and Approval form located on PW. Send to the State Bridge Design Engineer for review and signature. Complete the Quality Standard of Practice Update form to document the required annual quality standards of practice review.

Once any last updates are made, the Standards Manager provides email concurrence to the State Bridge Engineer. The State Bridge Engineer then signs a letter approving the changes and summarizing them for the bridge community.

3.1.8 Publishing

Following the Communications review, the publishing process will involve replacing the updated articles with the revised copies. Any previously marked changes will also be cleared from the BDM so that the new changes are clearly visible. At this same time, the now final articles will be printed to pdf, signed, and compiled into a portfolio within the 2_Standards folder. In addition, the word files and the full pdf will be posted within the 2_Standards folder. Insert the signed Bridge QC Revision History and Approval form into the final pdf version of the BDM.

The final pdf version of the *BDM* will be posted to the ODOT Bridge Engineering website along with the approval letter from the State Bridge Engineer. Include bookmarks in the final pdf version. Post any other documents that changed as a result of the BDM update (e.g. General

Notes, Standard Details/Drawings, Technical Resource List, etc.). Send website posting request to DelivOpsWeb@odot.oregon.gov with documents titled in the following naming convention:

- Full Manual: *BDM-YYYY-MM*
- Sections: *BDM-YYYY-MM-Section#*
- Additional files: *BDM-YYYY-MM-Title*

3.2 Interim Updates

Interim updates can be issued at any time with the approval of the State Bridge Engineer. These are issued as Draft BDM Change Requests along with a letter of approval which will be emailed to the community and posted on the website. The active manual is not updated in this process. This process is intended for non-urgent updates that are helpful to the community.

3.3 Urgent Updates

Urgent updates should be rare. These may be used if there is a significant risk from not making the change immediately. In order to do this, the update must be approved by the state bridge engineer, and must also go through the full review process of a standard update. Once approved, the active manual will be updated and reissued.

3.4 General Requirements

3.4.1 Oregon Bridge Community

The Oregon bridge community is made up of all engineers whose work is potentially impacted by BDM or Standards changes. The list includes ODOT bridge section, known bridge engineering consultants, local agency engineers, and federal partner agencies (FHWA, WFL, USFS). Each consulting firm has one identified contact to reduce the difficulty of tracking personnel over time. The identified contact is expected to forward the email to all interested parties at their firm. ACEC Oregon (American Council of Engineering Companies) is also included on the distribution list, in case of any unnoticed changes to a consultant contact.

3.4.2 Use of ProjectWise

The following section applies only to the use of the Bridge Discipline folder within the PW_ODOT_PROD database. The Bridge Discipline folder is used to store and share files related to bridge standards and 3D models of bridges that do not belong within the project structure. All other use of ProjectWise should follow the ODOT ProjectWise standards.

3.4.2.1 Naming Conventions

Label files within Projectwise using the Document Naming Tool according to the file BR_Misc_01 – Bridge Miscellaneous Document – Naming Convention.

BDM Change Requests will be named using "<Sheet-No> - Bridge Miscellaneous", which generates a file name BR_Misc_##. The <Sheet-No> should be replaced with the BDM section number. Set files will be created to keep track of which files belong to which update cycle.

The final BDM will be named using "Bridge Report", with the update date added.

The compiled signed changes will be named as "Bridge QC" files.

3.4.2.2 Versioning

Use the versioning tool within ProjectWise between each of the review steps. This tool is available by right clicking on the file and hovering over New and selecting Version from the menu. In the window that appears, the initial files ("Document") should be identified as the "Initial Draft" through the end of the Internal Review phase. Multiple initial drafts may be required and should be numbered. When the articles are ready for external review the "New Version" should be named as "Review Copy". The version for management review will be identified as "Final Draft" by the BDM Standard Engineer.

For more information on the use of ProjectWise by Bridge Standards, please contact the Bridge Design Manual Standards Engineer or Bridge CAD Standards Specialist.