Joining Spans with the New *Bridge Welding Code*

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Crack open the 8th edition of the American Welding Society's (AWS's) D1.5, *Bridge Welding Code,* and you'll find the names of the individuals who worked to publish this new edition on schedule in 2020. These volunteers conscientiously carved changes into shape — addressing ballot comments, questions, and negatives from five AWS and American Association of State Highway Transportation Officials (AASHTO) committees — assisted by dedicated AWS staff.

Running the ballot gauntlet may sound excessive, but the process serves our community well. These diligent steps ensure that scores of professionals from various spheres of the bridge welding world review the provisions and contribute their perspectives. Comments come from academia, owners, designers, fabricators, inspectors, erectors, and material and equipment suppliers.

Sixty-two ballots and thousands of comments later, highlights include the following:

Organization. The "References" and "Terms and Definitions" clauses are pulled forward and are now Clauses 2 and 3. These moves improve the consistency of D1.5 with other AWS Standards. As a result, all clauses beyond Clause 1 have new numbers in 2020.

Less "unless approved by the engineer" language. This phrase is peppered through the code to remind engineers they have flexibility regarding what they accept under the code. However, this phrase is redundant with Clause 1.1.2, which already makes this clear. Such adaptability is needed to address the great variety of unusual situations that occur in bridges and to facilitate innovation. Given the explicit license granted by 1.1.2, the "unless approved by the engineer" phrase is not needed elsewhere.

Approved materials. Previously, D1.5 was approved for materials in specification ASTM A709 (AASHTO M270). However, this is not suitable because changes to A709 (M270) out pace changes to D1.5. Instead, the 2020 edition calls out specific grades as approved (see Clause 1.2.2).

Finishing. D1.5 has often used process-oriented terms for finishing, but the process doesn't matter provided the desired condition is achieved. For example, "mill-to-bear" conditions don't necessarily need to be milled. Hence, many (but not all) instances of "grind" and "mill" are changed to "finish" in 2020.

Base metal preparation for welding. Changes improve the consistency of D1.5 with other D1 Standards and reduce ambiguities, particularly regarding mill scale and rust. The code is no longer silent about welding over coatings; except for on tension joints and girder web-to-flange joints, this practice is now allowed, provided the fabricator demonstrates that such welding does not compromise weld quality.

Tack weld remelting and broken tack welds. The code has always allowed tack welds to be made without preheat if the tack welds are fully remelted by final welding. The 8th edition now has a required means of demonstrating this remelt. Also, language was added to clarify tacks that break in advance of welding do not necessarily have to be fixed, thus allowing welding to progress and avoiding unnecessary starts and stops.

"Flaw" is out. By definition, flaws are discontinuities that are undesirable but not necessarily rejectable. D1.5 is concerned with discontinuities that are either acceptable or not (i.e., defects). The term "flaw" is subjective; just how undesirable are the discontinuities called "flaws?" To avoid this subjectivity, the term "flaw" is now avoided.

Magnetic particle inspection (MT) lots for short welds. The new code allows a "lot basis" alternative for MT of welds under 1-ft long, whereby assembled components can be grouped, and then only one-in-ten members need be tested. For example, if a bridge has 40 main-member cross frames, the fabricator now has the option to only MT four entire cross frames.

Digital radiographic testing (RT). In perhaps the most momentous change to the code, digital imaging is now explicitly allowed for RT in D1.5. This brings the code up with actual practice; fabricators have been using digital RT for many years, for many bridge owners. Both computed and digital radiography are addressed.

Personnel qualifications for phased array ultrasonic testing (PAUT). The new code expands technician qualification requirements for PAUT, increasing the hands-on hours requirement from 80 to 320 h, adding a written test, and adding a second practical exam.

The desire for excellence in bridge welding drives change. Be excited for the future and be confident that the code stewards are diligently updating the next edition as new technology hits the shop floor and welding practices evolve.

Use the new code — available for purchase at *pubs.aws.org* — to ensure your bridge work is state of the art. But don't get complacent: Another edition will be here before you know it. See you again in 2025. WJ