



## AWS D1.5 Code Changes -2020 Edition

*NESMEA*

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*Presented by: Mr. Robert Horwhat - TRC*

## AWS D1.5 2020 Pending Changes – Introduction.

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### – INTRODUCTION

- The purpose of this slide presentation is to inform the attendees at this conference of the pending changes to the AASHTO/AWS D1.5 – 2020 Edition.
- The pending changes have been approved by the AWS D1 Main Committee, and AWS D1J Subcommittee on Bridge Welding.
- These changes are still pending approval by AASHTO, AWS Technical Activities Committee (TAC), and AWS Standards Council (SC).
- Additional changes may also occur at the AWS D1 Meeting schedule in October 2018.
- The current schedule for publication is the 2<sup>nd</sup> Quarter of 2020.

## AWS D1.5 2020 – Our AWS Team members

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- TRC has 3 members on the AWS D1 committees in various positions, :
  - Allen W. Sindel, AWS D1 Chairman and TAC Member.
  - James Merrill, AWS D1.8 Structural Welding Seismic and D1 Main Committee Member.
  - Mr. John Kinsey, Task Group Vice Chairman, Inspection.

## AWS D1.5 2020 Pending Changes – Disclaimer

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### DISCLAIMER

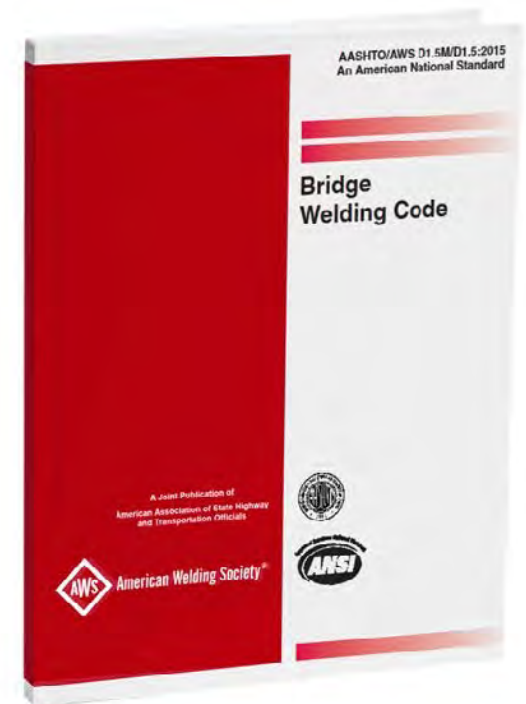
The information presented in this presentation represents the personal opinion of the author, Mr. Allen W. Sindel, and not that of the American Welding Society, American Welding Society Technical Activities Committee (TAC), or American Welding Society D1 Structural Welding Committees.

The pending AWS D1.5 for the 2020 edition that are contained in this presentation are subject to modifications or deletions due to the subsequent balloting process of AASHTO, AWS TAC, and AWS Subcommittees (SC).

Users of the information contained herein are reminded, these pending changes or any subsequent modifications will not be effective until after publication of this Code.

# AWS D1.5 2020 Pending Changes – Code Outline

- Table of Contents – Clauses
  - 1. General Provisions
  - 2. Design of Welded Connections
  - 3. Workmanship
  - 4. Technique
  - 5. Qualification
  - 6. Inspection
  - 7. Stud Welding
  - 8. Statically Loaded Structures
  - 9. Welded Steel Bridges
  - 10. Tubular Structures
  - 11. Strengthening and Repairing Existing Structures
  - 12. Fracture Control Plan for Nonredundant Members



## ...Getting into the details

- Over 120 revisions to over 50 pages of the code have been made.
- Only a portion of these are being presented here



# AWS D1.5 2020 Pending Changes – List

Note: **Red**-Deletions, **Blue**- Words Added (Other than Cause or Commentary Section and Titles, bold for emphasis only in this presentation – not part of the proposed code revision) , C-X.X.X- Commentary – **Highlighted – focus areas (RDH)**

## 2.1 Drawings (Design)

- C-2.1.2(2) The Engineer may consider whether minor weld discontinuities or base metal imperfections can be left unrepaired without jeopardizing the structural integrity, as gouging and repair welding will add additional cycles of weld shrinkage to the connection, and may result in the extension of existing **flaws discontinuities** or the generation of new **flaws discontinuities** by lamellar tearing.
- Rationale: **Flaws may be considered as rejectable where-as discontinuities must be evaluated to an acceptance criteria:.**
- C-2.1.6 2nd paragraph
  - In most cases, **E70 or E80** weld metal classified with minimum specified tensile strength of 70 or 80 ksi will be used for undermatching applications. 70-ksi weld metal E70 is generally preferable, but 80-ksi weld metal E80 is often ~~required~~ used for unpainted weathering applications. ~~because, when atmospheric corrosion resistance is required for weathering steels, the added alloys result in E80 strength class weld metal.~~
  - Rationale: Guidance for undermatch and overmatched weld metal based on strength versus the use of AWS filler metal classification (minimums but maybe more).

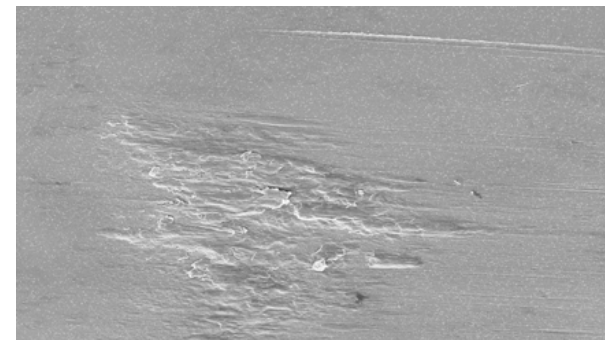
- EXXXX – H
- E= electrode



# AWS D1.5 2020 Pending Changes – List (Cont.)

## 3.2 Preparation of Base Metal (Workmanship)

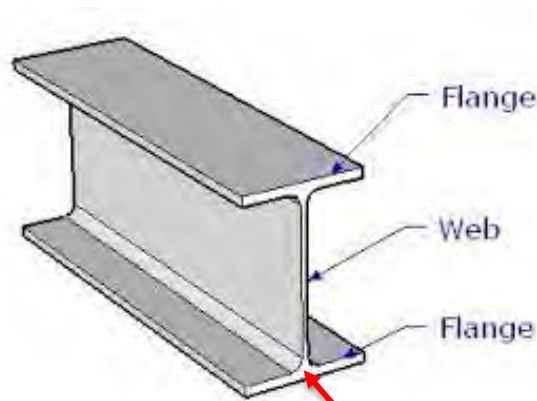
- **C-3.2.1 General.** For quality welds, base metal cleanliness is important. However, **it is neither required nor necessary for base metal to be perfectly clean before welds are made.** It is difficult both to establish quantifiable limits of cleanliness and to measure to those limits therefore, this provision uses the practical standard of the resultant weld quality. If the base metal is sufficiently clean so as to facilitate **a weld to be made that meets the requirements of this code,** it is clean enough. If the resultant welds do not meet the weld quality requirements of this code, cleaner base metal may be required.
- Rationale: Guidance on base metal cleanliness **when the resultant weld meets the quality requirements, then the base metal cleanliness is sufficient.**
- **3.2.2 Mill-Induced Surface Defects.** **Welds shall not be placed on surfaces that contain fins, tears, cracks, slag, or other base metal defects as defined in the base metal specifications.**
- Rationale: ASTM product specifications many times have acceptance limits for base metal defects. However, this provisions addresses welding over them.





# AWS D1.5 2020 Pending Changes – List (Cont.)

## 3.2 Preparation of Base Metal (Workmanship)



- **C-3.2.2 Mill-Induced Surface Defects.** The base metal to which welds are attached must be sufficiently sound so as to not affect the strength of the connection. Base metal defects may be repaired prior to the deposition of the prescribed weld. This subclause does not limit base metal repairs by welding.
- Rationale: Same reason as before but also address guidance for base metal repairs by welding.
- **3.2.3 Scale and Rust.** Loose scale, thick scale, and thick rust shall be removed from the surfaces to be welded and within 25 mm [1 in] of the weld. Welds may be made on surfaces that contain thin mill scale and rust if:
  - (1) the mill scale and rust can withstand vigorous hand wire brushing; and
  - (2) if the applicable weld quality requirements of this code can be met.

All mill scale shall be removed from the following:

- (1) web-to-flange connections
- (2) joint boundary of groove welds subject to calculated tensile stress

# AWS D1.5 2020 Pending Changes – List (Cont.)

## 3.2 Preparation of Base Metal (Workmanship)

•**C-3.2.3 Scale and Rust.** Excessive rust or scale can negatively affect weld quality. The code permits welding on surfaces that contain mill scale, providing both: a) the mill scale remains intact after wire brushing and b) the resultant weld quality is not adversely affected.

Web-to-flange welds are frequently minimum size fillet welds deposited at relatively high speeds; therefore these welds could exhibit piping porosity if welded over the heavy mill scale often found on thick flange plates. Therefore, web-to-flange welds in girders have the mandatory requirement to completely remove all mill scale. Similarly, welds subject to tensile stress at the weld root are more sensitive to internal discontinuities, so scale is also prohibited.

See C-3.2.1

Rationale: Clarify guidance on excessive rust or scale that could affect the quality of the weld; may be permitted with provisions of a) and b). However, must be removed as described in the second paragraph above.



# AWS D1.5 2020 Pending Changes – List (Cont.)

## 3.2 Preparation of Base Metal (Workmanship)

- **C-3.2.4 Foreign materials**. This subclause prohibits volumetric (three dimensional) quantities of contaminants from being left in place on the surface to be welded and adjacent areas. Surfaces contaminated by the materials listed in 3.2.4.1 must be cleaned, such as by wiping prior to welding. Special consideration should be given to the removal of surface contaminants containing hydrocarbons or condensed moisture, as the hydrogen released into the molten weld pool can cause serious weld imperfections, e.g., cracking. The cleaning operations, which may involve just wiping, need not remove all foreign contaminants nor do they require the use of solvents; welding through thin layers of remaining contaminants is acceptable, unless they degrade the weld quality requirements of this code resulting in unacceptable welds.
- **3.2.4.1 Surfaces to be welded, and surfaces adjacent to the weld, shall be cleaned to remove evident quantities of the following:**
  - Water
  - Oil
  - Grease
  - Other hydrocarbon based materialsWelding on surfaces containing residual amounts of foreign materials is permitted providing the weld quality requirements of this code can be met.

# AWS D1.5 2020 Pending Changes – List (Cont.)

## 3.2 Preparation of Base Metal (Workmanship)

- 3.2.4.2 Welds are permitted to be made on surfaces with anti- spatter compounds or protective coatings applied providing the weld quality requirements of this code can be met. Protective coatings are not permitted on web-to-flange connections or joints subject to calculated tensile stress.
- Rationale: To better clarify foreign materials, methods of cleaning when necessary, welding is permitted on surfaces with anti-spatter compounds provided the weld quality to the Code is maintain.
  - Note: Many of the clauses shown in this presentation and previous slides concerning cleanliness are being revised or clarified back to 2010 criteria. Maybe not exactly but close to be clearer and more specific.
- C-3.2.6 Changes are once again changing the word “indications” to “discontinuities”.
- Rationale: Indications is broad term which can mean any relevant or non relevant indication. Discontinuity generally means the indication is relevant and is evaluated with respect to Acceptable or Rejectable.
- 3.3.7.1 All tack welds shall be subject to the same quality requirements as the final welds, with the following exceptions: except as exempted in 3.3.7.3. Tack welding shall be performed in accordance with a WPS meeting the requirements of Clause 3 unless exempted by 3.3.7.3. Tack welds shall be cleaned and visually inspected before subsequent welding.

# AWS D1.5 2020 Pending Changes – List (Cont.)

## 3.3 Assembly (Workmanship)

- ~~(1) Preheat is not mandatory for single-pass tack welds that are remelted and incorporated into continuous SAW, ESW, or EGW welds.~~
- ~~(2) Discontinuities such as undercut, unfilled craters, and porosity need not be removed before the final SAW, ESW, or EGW that remelts the tack weld (see 3.3.8)~~
- **C-3.3.7.1** This subclause requires that tack welds meet the same requirements as final welds, with a few exceptions as listed in 3.3.7.3. The exceptions deal with tack welds that are remelted. Tack welds that are not consumed in a final weld and are left in the structure require remelted become part of the final weld and therefore normal quality practices such as the removal of visible slag and/or cracks to ensure that they are sound prior to subsequent weld passes.
  - Reason. Provides guidance and requirements for tack welds left in place with the intent the final weld will meet the requirements of the Code.
  - **C-3.3.7.2** Cascading the ends of multipass tack welds reduces the potential for incomplete fusion between the final weld and the ends of the tack welds. Incomplete fusion would create stress concentrations at the ends of the tack welds. Cascaded ends of multiple pass tack welds provide a smooth transition for the final welding.



## AWS D1.5 2020 Pending Changes – List (Cont.)

### 3.3 Assembly (Workmanship)

**3.3.7.3 Remelted Tack Welds.** Tack Welds made in accordance with 3.3.7.3(1) and 3.3.7.3(2) shall be considered fully remelted and incorporated into the final weld and shall be exempt from the following requirements:

- (a) Minimum preheat requirements shall not apply.
  - (b) WPSs for tack welding shall not require qualification testing in accordance with Clause 5.
- (1) **Exemption Requirements.** The following conditions shall be met for the exemptions of 3.3.7.3 to apply:
- (a) The tack welds shall be made in a single pass
  - (b) The filler metal for tack welding is listed in Table 4.1
  - (c) **No other welding process may be used to weld over a FCAW-S tack weld unless qualified** by 5.7.7.1.

# AWS D1.5 2020 Pending Changes – List (Cont.)

## 3.3 Assembly (Workmanship)

(2) Remelting Conditions. To ensure that tack welds are fully remelted the following shall apply:

(a) The remelting capability of the subsequent welding process and procedure is verified by macroetch in accordance with Clause 5.18.2 and 5.19.3.

(b) The maximum tack weld size used in production shall not exceed the tack weld size used in the qualification testing.

(c) The heat input of the pass used to remelt the tack in production shall not be less than that used in the qualification testing.



- C-3.3.7.3 Remelted tack welds are exempt from some code requirements because the remelting process eliminates the tack weld. The tack weld metal becomes part of the final weld metal. The code requirement to use Table 4.1 electrodes for tack welding is sufficient to ensure the quality of final welds that incorporate remelted tack welds.

Preheat is not required for remelted tack welds since the remelting process is expected to eliminate any potentially deleterious effects of welding on unpreheated steel, namely potentially hardened HAZs. However, even though preheat is not mandated for such tack welds, the tack welds must be crack-free in accordance with 3.3.7.5.

# AWS D1.5 2020 Pending Changes – List (Cont.)

## 3.3 Assembly (Workmanship)

Given the restraint that tack welds resist, when tack welds do crack, the cracking is typically readily apparent. Visible inspection is generally sufficient assurance that no cracked tack welds are present before final welding. Cracked tack welds should not be confused with broken tack welds (see 3.3.7.5).

High heat input processes such as SAW and ESW typically remelt small, single pass tack welds. Other welding processes and procedures can also remelt small tack welds. However, processes that utilize lower levels of heat input, including some SAW procedures, may not remelt tack welds. The code provides a qualification method to ensure that the final welding process and procedure being used will effectively remelt the tack weld.

### - 3.3.7.4 Unincorporated Tack Welds.

(1) Removal. Tack welds that are not incorporated into the final weld shall be removed in such a manner that the base metal is not damaged. Base metal damaged during tack weld removal may be repaired when approved by the Engineer. If the repair involves welding, it shall be done in conformance with 3.7.1.

(2) Cracked Base Metal. The removal of tack welds may expose cracked base metal. When cracked base metal is discovered after tack welds are removed, all other tack weld removal locations in the tension regions on the member shall be tested by MT to assure that no cracks are present. If the MT testing reveals cracks, hardness testing of the HAZ shall be required. Hardness values shall not exceed Rockwell C30 in the HAZ. These excessively hard HAZs shall be removed by shallow grinding.



# AWS D1.5 2020 Pending Changes – List (Cont.)

## 3.3 Assembly (Workmanship)

- C-3.3.7.4 Unincorporated tack welds are usually avoidable, but when they are necessary, they are removed after welding to avoid local stress risers and to reflect sound workmanship. They can simply be ground away.

Depending upon the constraint conditions and size of the components being tacked, it is possible for cracking to occur; when such cracking is observed, the code requires that additional testing be conducted. However, the MT testing and hardness testing prescribed by the code are only required when cracking is observed; these tests are not required for tack weld removal sites that reveal no cracks.

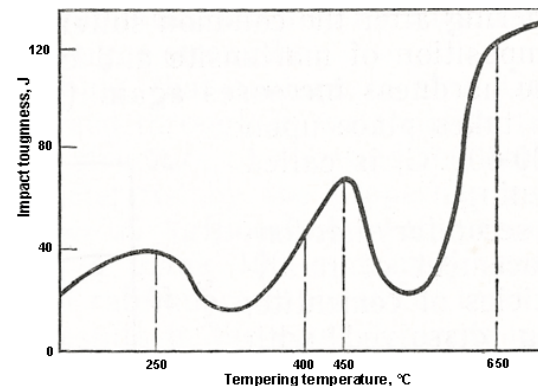
Rationale: The above clauses both Code and Commentary, provide guidance on Tack welds being remelted and unincorporated. Addition Code changes address Broken Tack Welds (which are not cracked welds) and Tack Welding to Backing. The main intent is to differentiate between tack welds that are left in place that could affect the quality of the final weld and tack welds that will be removed which should not affect the quality of the weld.



# AWS D1.5 2020 Pending Changes – List (Cont.)

## 3.4 Control of Distortion and Shrinkage

- 3.4.8 When straightening is necessary, members ~~Members~~ distorted by welding shall be straightened by mechanical means (with or without the application of heat) or by heat straightening (“heat shrink”) methods. If heat is applied, the minimum temperature during mechanical straightening or bending shall be 370° C [700° F]. ~~and/or by carefully supervised application of a limited amount of localized heat.~~ The maximum temperature of the heated areas as measured by approved methods shall not exceed 600° C [1100° F] for M 270M/M 270 (A709/A709M) Grades HPS 485W [HPS 70W] and HPS 690W [HPS 100W] steels or 650° C [1200° F] for other steels. ~~The part to be heated for straightening shall be substantially free of stress from external forces, except stresses resulting from the mechanical straightening methods used in conjunction with the application of the heat.~~
- Rationale: The Code is specifying the requirements for straightening and the associated Commentary is providing guidance concerning overheating, maximum temperature **near the transformation temperature**, and awareness when the material quenched and tempered.



# AWS D1.5 2020 Pending Changes – List (Cont.)

## 4. Technique (4.2 Electrodes and Fluxes for SAW)

### - 4.20 Condition of Flux



Flux shall conform to all of the following requirements:

- (1) Flux shall be **neutral fused** flux, ~~dry~~
- (2) ~~and~~ Flux shall be **dry and** free of contamination from dirt, grease, mill scale, or other foreign material.
- (3) Flux shall be **received in moisture-resistant packaging** that can be **stored under normal conditions** for at least six months without such storage **affecting its welding characteristics or weld properties.**
- (4) Flux shall be conditioned at 120° C [250° F] for at least two hours prior to welding, or as recommended by the manufacturer, and stored at the same temperature until dispensed for use.
- (5) **Flux that has been dispensed for use shall be discarded after 8 hours.**
- (6) Flux from packages damaged in transit or in handling shall be discarded.
- (7) **Wet** Flux that has been wet shall not be used.



- Rationale: The Code clarified “**Neutral**” flux, i.e. maybe **fused or bonded**, shall be dry, packaging and storage which will not affect the welding properties, when dispensed for after 8 hours be discarded, and **wet flux shall not be used.**

# AWS D1.5 2020 Pending Changes – List (Cont)

## 5. Qualification (Weld Procedure Qualifications)

### – 5.5.1 WPS Requirements for Consumables.

If the name of a manufacturer changes (e.g., merger or acquisition) or if the brand name or type of a consumable is revised without reformulation or other physical changes, such changes shall not constitute a change that requires WPS requalification. New WPSs may use the new identity based upon a PQR retaining the old information. Existing WPSs shall be revised to list the new identity while based upon a PQR retaining the old information. Documentation from the manufacturer explaining the change shall be filed with the PQR.

Rationale: This addresses the issue where by a merger or acquisition or brand name or type of consumable is revised but the formulation (generally chemistry or physical changes) has not changed, then a new WPS qualification is not required. Likewise, new WPS's and PQR can be revised to list the new identity but the old PQR must be retained; document the explanation of the change in the revised PQR.



- Table 5.6 PQR Essential Variables requiring WPS Requalification for ESW  
(11) A change in type of current (AC or DC) or polarity.

Rationale: Changes in type of current or polarity may affect the heat input.

# AWS D1.5 2020 Pending Changes – List (Cont.)



...into 6. Inspection

- 5.23.3 Tack Welder Qualification was revised.
- Rationale: Position was added and added if a welder is qualified by Options 1,2,3 in 5.23.1 or by the test in 5.23.1.1, the welder is also qualified to tack weld in the positions permitted by 5.22. As position is an essential variable and allows welders that were qualified by the other referenced paragraphs are equally qualified to tack weld.
- 6.7 Nondestructive Testing (NDT)  
The contractor shall perform NDT on welds to primary components of main members using the methods and frequencies required in Table 6.X. Subclauses 6.7.1 through 6.7.3 contain additional requirements. Where Table 6.X requires only partial testing, the inspector shall select the inspection locations, after welding is complete. The choice of the lot basis or per-joint basis of partial testing, where both options are given, shall be at the Contractor's option. (See Table 6.X next Page).

Rationale: To address when NDT is required, what types of joints, and to address in a New Table the NDT Methods and Frequency by the types of joints/Member Design Stress.

# AWS D1.5 2020 Pending Changes – List (Cont.)

D1.5M/D1.5:2015			PROPOSED REVISIONS			
<u>Table 6.X (new table)</u> <u>NDT Methods and Frequency</u>						
<u>Weld Type</u>	<u>Joint Type</u>	<u>Process</u>	<u>Member Design Stress Type</u>	<u>NDT Method</u>	<u>Frequency</u>	
<u>CJP groove welds</u>	<u>Butt joints other than in webs of flexural members</u>	<u>Other than ESW or EGW</u>	<u>Tension or reversal</u>	<u>RT</u>	<u>100% of each joint</u>	
			<u>Compression or shear</u>	<u>UT or RT</u>	<u>25% (See 6.7.3)</u>	
		<u>ESW or EGW</u>	<u>Tension or reversal</u>	<u>RT and UT</u>	<u>100% of each joint</u>	
			<u>Compression or shear</u>		<u>25% (See 6.7.3)</u>	
	<u>Butt joints in webs of flexural members, transverse to the direction of bending stress</u>	<u>Other than ESW or EGW</u>	<u>Tension</u>	<u>RT</u>	<u>1/6 of the web depth beginning at the tension flange or flanges for each joint</u>	
				<u>RT and UT</u>		
		<u>ESW or EGW</u>		<u>UT or RT</u>	<u>25% of the remainder of the web depth for each joint</u>	
				<u>RT and UT</u>		
	<u>Butt joints in webs of flexural members, parallel to the direction of bending stress</u>	<u>Other than ESW or EGW</u>	<u>Shear</u>	<u>UT or RT</u>	<u>25% (See 6.7.3)</u>	
				<u>RT and UT</u>		
	<u>T- or corner joints</u>	<u>Any</u>		<u>Tension or reversal</u>	<u>UT</u>	<u>100% of each joint</u>
				<u>Compression or shear (including web to either flange)</u>		<u>25% (See 6.7.3)</u>
<u>PJP groove welds and fillet welds, Grade HPS 620W [HPS 100W]</u>	<u>Any</u>	<u>Any</u>	<u>Any</u>	<u>MT</u>	<u>100% of each joint</u>	
<u>PJP groove welds and fillet welds, all other grades</u>					<u>10% (See 6.7.4)</u>	
			<p><u>C-Table 6.X The NDT acceptance criteria are workmanship standards and not based on fitness for purpose. The criteria reflect the level of workmanship that can be expected in a bridge shop.</u></p> <p><u>The AASHTO LRFD Bridge Design Specifications define main or primary members. Typical fillet or PJP groove welds that require testing are any welds to web or flange, and welds connecting</u></p>			

# AWS D1.5 2020 Pending Changes – List (Cont.)

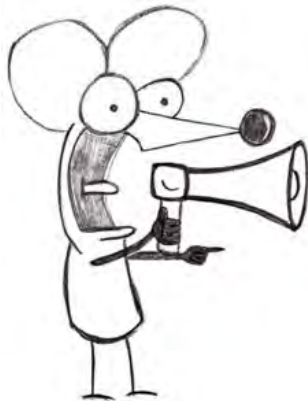
## 12. Fracture Control Plan for Non-Redundant Members

- **12.2.2 Fracture Critical Member (FCM).** The AASHTO LRFD Bridge Design Specifications define an FCM as a steel primary member or portion thereof subject to tension whose failure would probably cause a portion of or the entire bridge to collapse.
- Rationale: This Clause **was revised to reference AASHTO LRFD Bridge Design Specifications for the definition** and other clauses that follow in this section are already defined in this specification or in ASTM specifications, e.g. Fine Grain Practice, Specifying CVN testing which generally in the ASTM specification is a supplementary requirement S-X.
- 12.6.1.31 Electrode Optional Supplemental **Diffusible Hydrogen Moisture-Resistant** Designator Requirements for Welding. **Electrodes and electrode/flux** ~~SMAW-electrodes~~ used to weld base metal with a minimum specified yield strength of 345 MPa [50 ksi] or less shall conform to the diffusible hydrogen requirements of the AWS filler metal specifications optional supplemental designator H4, H8, or H16. All ~~SMAW~~ electrodes and **electrode/flux combinations** used to weld base metal with a minimum specified yield strength greater than 345 MPa [50 ksi] shall conform to the diffusible hydrogen requirements of the AWS filler metal specification optional supplemental designator H4 or H8. **This requirement does not apply to GMAW with solid electrodes** approved per 12.5.2 for use on FCMs.

# AWS D1.5 2020 Pending Changes – List (Cont.)

## 12. Fracture Control Plan for Non-Redundant Members

- C-12.6.31 Electrode Optional Supplemental **Diffusible Hydrogen Moisture-Resistant** Designator Requirements for Welding. The “H” designator indicates the maximum average diffusible hydrogen content in milliliters per 100 grams (mL/100 g) of deposited weld metal. H4 means a maximum of 4 mL/100 g and H16 means a level of 16 mL/100 g. Higher strength steels have a higher risk of hydrogen-induced cracking, therefore higher strength weld metal requires lower diffusible hydrogen levels for this Fracture Control Plan. **Solid electrodes for GMAW are typically not tested for diffusible hydrogen because the electrodes have no flux to absorb moisture. Solid GMAW electrodes are assumed to be capable of meeting the requirements for diffusible hydrogen designator H4.**
- Rationale: Filler metal classifications with “H” designators are to indicate the average diffusible hydrogen content in mL/100g. However, indicating filler metal is “Moisture Resistant” was probably not the actual intent. Likewise, solid wire electrodes do not have a coating (flux to absorb moisture) and therefore not tested for diffusible hydrogen.



Hey, There's no coating on GMAW wire



# AWS D1.5 2020 Pending Changes- Summary

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## – Overall Summary

- The changes listed in this presentation are to provide information on the more significant proposals to the AWS D1.5-2020 Code, but due to a limited time not all are included. Many changes not included probably have the same technical intent, but are either reworded for clarity or to prevent inconsistencies between AASHTO, AISC, ASTM, or other specifications/standards.
- As previously mentioned, these changes have been balloted through AWS Task Groups, Bridge Subcommittee, and the Main Committee. The remaining balloting process outstanding is AASHTO, AWS Technical Activities Committee, and AWS Standards Council. As such, through the remaining balloting process, the wording is subject to modifications in order to resolve either technical or editorial comments.
- With respect to the Tubular Section in the Bridge Code, the balloting process is ongoing at the time of this presentation. The AWS D1 Code meeting(s) will be in the middle of October 2018 and the work will continue. **If the resolution to comments can be addressed and finalized at these meetings then we are optimistic a Tubular Section should be in the AWS D1.5 – 2020 Code, publication scheduled for the 2<sup>nd</sup> Quarter 2020.** If not then the committee leadership will be exploring other mechanisms to issue the Tubular Section prior to 2025.

# AWS D1.5 – 2020 Pending Code Changes

## Questions?

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Thank you

Picture to the right Xisha Bridge  
From HighestBridges.com.  
Lianghezhen, Chongqing, China  
711 Feet High and 620 feet span  
Completed 2010.

[http://www.highestbridges.com/wiki/index.php?title=Xisha\\_Bridge](http://www.highestbridges.com/wiki/index.php?title=Xisha_Bridge)

