CONSTRUCTION MEMORANDUM
12-08

July 9, 2012

TO: District Deputy Commissioners
    District Construction Directors
    District Testing Engineers
    District Area Engineers
    District LPA Coordinators
    Field Engineers
    Technical Services Directors
    Project Engineers/Supervisors
    Office of Materials Management

FROM: Mark A. Miller, Director
      Division of Construction Management

SUBJECT: Welder Certifications

It has become apparent that there is considerable confusion regarding the certifications or qualifications required for those persons performing field welding. Standard Specification 711.32 requires that welders, welder operators, and tack welders (hereinafter referred to as welders) are qualified in accordance with the AWS D1.5 Bridge Welding Code. These qualification tests are intended to document the ability of a welder to make sound welds by following a weld procedure specification provided by the contractor. Welder qualification tests are only intended to measure the skills that are necessary to produce weld soundness. The AWS D1.5 also provides recommendations regarding the period of effectiveness that the welder’s qualification should be considered valid. AWS D1.5 states that so long as the welders engage in the given process of welding for which the welder has qualified at least once every six months, the welder’s qualification remains in effect indefinitely. The Department does not share this line of reasoning and instead requires that the date provided on the welder’s certification or qualification test record be current to within the past 5 years. If the date on the certification or qualification test record is more than 5 years old, the Department requires the welder to be re-qualified or re-certified in accordance with the AWS D1.5.

In order to determine if the welder is certified or qualified to perform the required welding on a contract, the following steps should be performed.

1. The PE/S should determine the type of welding that will be performed (fillet welding, groove welding, or both). Some welders are only certified for fillet welding. Certified groove welders
can perform both fillet welding and groove welding. The welds a welder is certified to perform will be determined by the letter following the welding position number. (F = fillet, G = groove)

2. Welding is done in one of four different positions. The PE/S should review the plans to determine in what position the weld will be performed. Fillet welds or groove welds can be made in each of these positions. For plates, position describes the orientation of the axis of the weld. For pipes, position describes the orientation of the axis of the pipe. The position affects the flow of molten filler metal into the joint and the difficulty of making a successful weld. Figure 1 (attached) shows the various positions used in plate and pipe welding. The positions are listed below.

- **1F or 1G (Flat) position** – For plates, the plates and the axis of the weld joining the plates being welded are both horizontal. For pipes, the axis of the pipe is horizontal and the pipe can be turned or rolled while welding.

- **2F or 2G (Horizontal) position** – For plates, the plate that is being welded is vertical and the weld is horizontal. For pipes, the axis of the pipe is vertical, but the resulting weld is horizontal. **The welds for pipe pile and H-pile splicing are most commonly performed in this position.**

- **3F or 3G (Vertical) position** – For plates, both plates being welded are vertical and the weld is uphill vertical (start at the bottom and continue up). There is no 3G position for pipes.

- **4F or 4G (Overhead) position** – For plates, both plates being welded are horizontal and above the welding equipment. There is no 4G position for pipes.

- **5G position** – For pipes only, both pipes are horizontal. The pipe cannot be turned or rolled while welding.

- **6G position** – For pipes only, both pipes are on an inclined axis (45°±5°) and the pipes cannot be turned or rolled.

The certifications or qualifications are for each position number and those positions below (for example, an individual certified in position number 2 is certified for both positions 2 and 1; an individual certified for position number 4 is certified for positions 4, 3, 2, and 1.)

3. The next step is to check the **welder’s qualifications** and that they are valid. There are many different kinds.

a. The most widely accepted is the AWS certification. An AWS-certified welder will have an AWS certification wallet card. You can verify an AWS certification online at [http://www.aws.org/wa/certification/index.html](http://www.aws.org/wa/certification/index.html) by entering the welder’s AWS number (i.e. 1010002W–see Figure 2). The AWS website will indicate if the welder is still certified and for what positions. The AWS website also had a list of the abbreviations that appear on the AWS Certified Welder cards. Welders who have an AWS certification are generally employed at fabrication facilities where it is easier for them to document their work experience to AWS and thus maintain their certification.
b. The PE/S may receive a union wallet card that lists they are a certified welder. These should have a date listed.

All certified welders meeting 3a or 3b must document their performance by submitting a form to AWS at least once every six months. This must be done every six month period. If any of the information provided to you is older than six months, then the welder has not kept current on their certification and according to AWS certified welder program they are no longer certified.

If a welder does not have an AWS card, there are other means a welder can prove that they are qualified to perform the work.

c. The PE/S may receive a Welder, Welding Operator, or Tack Welder Qualification Test Record (see Figures 3 and 4), hereinafter referred to as a qualification test record. This may or may not be on the AWS form that is contained in the AWS D1.5 Bridge Welding Code. (It is not required to be on the AWS form.) The qualification test record will have the positions listed as 1F, 2F, 3F, 4F or 1G, 2G, 3G, 4G, 5G, or 6G. The PE/S will need to check that the inspector who signed the certification is a CWI (certified welding inspector) approved by AWS which can be also verified online at http://www.aws.org/wa/certification/index.html. At a minimum, the qualification test record has a CWI stamp certifying the qualification test record. Often the CWI stamp is accompanied by a signature.

d. The PE/S may also receive a Certified Weld Instructor Certification (see Figures 5 and 6). If so, it can be reviewed using the same guidelines as for a qualification test record (given above).

The qualifications described in 3c or 3d are obtained by the welder performing a welding procedure specification (WPS) and having the test specimen pass various tests. The certification date on the Welder, Welding Operator, or Tack Welder Qualification Test Record or Certified Weld Instructor Certification (see 3c or 3d) must be within the past five years otherwise the individual needs to be re-tested.

The following five sample AWS Certified Welder card and welding certifications are attached to this memo.

- Certified Welder Card shown in Figure 2: Per the information on the back of the individual’s card, this individual can weld in all positions, fillet and groove, because the position is listed as 6G. From checking the AWS website, it shows that the individual’s certification expired April 27, 2012. Therefore this individual is not qualified to weld on your contract.

- Welding certification shown in Figure 3: This individual can weld in positions 1 (flat) and 2 (horizontal). Since the position number is followed by the letter “F”, this individual can only weld fillets-no groove welding can be performed. This certification was performed 9/19/11 and thus should be considered current because September 19, 2011 is within the past five years.

- Welding certification shown in Figure 4: This individual can weld both fillet and groove welds in positions 1 (flat), 2 (horizontal), and 3 (vertical) since the position number is followed by the letter “G”. This certification was performed 7/30/10 and thus should be considered current because July 30, 2010 is within the past five years.
➢ Welding certification shown in Figure 5: This individual can weld both fillet and groove welds but only in position 1 (flat). Therefore, no welding on piles that have already been driven. This certification was performed on 3/30/09 and thus should be considered current because March 30, 2009 is within the past five years.

➢ Welding certification shown in Figure 6: This individual can weld in positions 1 thru 4 and can weld both fillet and groove welds. This certification was performed on 1/19/12 and should be considered current because January 19, 2012 is within the past five years.

Please consult the Division of Construction Management field engineer assigned to your district for any assistance with this item.

MAM/GGP/jr

All names, identification numbers, and other information contained on Figures 2, 3, 4, 5, and 6 with the exception of the American Welding Society are purely fictitious. Any resemblance to real persons, living or dead, or companies in or out of existence, is purely coincidental. The documents represented in these figures are for illustrative purposes only and intended to educate field personnel and are in no way an attempt to copy a legitimate document.
## Welding Positions

### FILLET WELDS

<table>
<thead>
<tr>
<th>Position</th>
<th>Illustration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1F</td>
<td><img src="image1" alt="Image" /></td>
<td>Axis of Weld Horizontal</td>
</tr>
<tr>
<td>2F</td>
<td><img src="image2" alt="Image" /></td>
<td>Axis of Weld Horizontal</td>
</tr>
<tr>
<td>3F</td>
<td><img src="image3" alt="Image" /></td>
<td>Axis of Weld Vertical</td>
</tr>
<tr>
<td>4F</td>
<td><img src="image4" alt="Image" /></td>
<td>Axis of Weld Horizontal</td>
</tr>
</tbody>
</table>

### GROOVE WELDS

<table>
<thead>
<tr>
<th>Position</th>
<th>Illustration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1G</td>
<td><img src="image5" alt="Image" /></td>
<td>Plates Horizontal</td>
</tr>
<tr>
<td>2G</td>
<td><img src="image6" alt="Image" /></td>
<td>Plates Vertical</td>
</tr>
<tr>
<td>3G</td>
<td><img src="image7" alt="Image" /></td>
<td>Plates Vertical</td>
</tr>
<tr>
<td>4G</td>
<td><img src="image8" alt="Image" /></td>
<td>Plates Horizontal</td>
</tr>
<tr>
<td>5G</td>
<td><img src="image9" alt="Image" /></td>
<td>Pipe Shall Not Be Turned or Rolled While Welding, Axis of Pipe Vertical</td>
</tr>
<tr>
<td>6G</td>
<td><img src="image10" alt="Image" /></td>
<td>Inclined Axis with Pipe Stationary</td>
</tr>
</tbody>
</table>

**Figure 1**
Certified Welder (CW) Quickcheck

Free Online CW Verification Service
Please enter a CW number below. This number can be found on a wallet card produced by the welder. The search will return the certification number, a name, and an expiration date for that individual.

Enter Certification number: 1010002W
Go

Note: AWS strongly suggests that the welder’s identity be verified with a government-issued photo identification card, such as a driver’s license.

Certification was found

Cert #: 1010002W
Name: Andre Milhaus

<table>
<thead>
<tr>
<th>Test Date</th>
<th>Sup</th>
<th>Code</th>
<th>Process</th>
<th>Gas</th>
<th>Metal</th>
<th>Base Metal</th>
<th>Position</th>
<th>Thickness</th>
<th>Expires</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010/03/23</td>
<td>G</td>
<td>D1.5</td>
<td>SMAW</td>
<td>N/A</td>
<td>E7018</td>
<td>A36</td>
<td>6G</td>
<td>U</td>
<td>2012-04-27</td>
</tr>
</tbody>
</table>

How to interpret the CW number:

- The first four digits of the CW number are the year and month of original certification. For example, 9603xxxW means that the Welder was certified in March of 1996.
- The next three digits of the number are unique and the last letter of the CW number indicates that the certification is for a welder.

Guide to interpreting abbreviations on AWS Certified Welder cards

CAUTION: AWS QC7-93: AWS Standard for Certification AWS Certified Welders, section 10.1 and 10.2 states:

10.1 Cards.
AWS will issue a certification card to those qualified under this program.

10.2 Card Care.
Welders certified under this program shall maintain the card in good condition. The cards are the property of the AMERICAN WELDING SOCIETY and shall be returned on demand. If the card becomes illegible, a new one must be requested. The welder shall, as soon as possible after it is discovered, report lost or stolen cards to the Q&C Department. Evidence of tampering with the card shall require return of the card to the Q&C Department for investigation. An investigation by the Q&C Committee may result in dismissal of the charges, suspension, revocation of certification, or renewal qualification, depending upon circumstances. The Committee will provide an explanation for its actions.

Information from AWS Verification on-line
Figure 2
WELDER AND WELDING OPERATOR QUALIFICATION RECORD

Welder or welding operator's name: Max Power
Identification no.: H8026

Welding process: SMAW Manual X Semiautomatic Mechanized

Position: 1F or 2F
(Flat, horizontal, overhead or vertical—if vertical, state whether upward or downward)

In conformance with WPS no.: SMAW-2-1-W

Material specification: ASTM A709 Grade 50, 50W, 50W to 70W undermatch

Thickness range this qualifies: 1/4” or greater for Fillet Welds

FILLER METAL

Specification no.: AWS A5.5
Classification: E8018-C1-H4R

Describe filler metal (if not covered by AWS specification)

Is backing used? No

Filler metal diameter and trade name: 5/32” Excalibur 8019-C1 MR

Flux for SAW or gas for GMA W or FCAW-G

VISUAL INSPECTION (6.26.1)

Appearance: Satisfactory
Undercut: None
Pitting porosity: None

Guided Bend Test Results

<table>
<thead>
<tr>
<th>Type</th>
<th>Result</th>
<th>Type</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Test conducted by: John A. Doe
per: NA
Laboratory test no.: NA
Test date: NA

Filler Test Results

Appearance: Acceptable
Fracture test root penetration: Acceptable
(Fracture test root penetration: Acceptable)
Macroetch: Acceptable
Test conducted by: John A. Doe
per: NA
Laboratory test no.: H8043 job no 2112
Test date: September 19, 2011

RADIOGRAPHIC TEST RESULTS

<table>
<thead>
<tr>
<th>Film Identification</th>
<th>Results</th>
<th>Remarks</th>
<th>Film Identification</th>
<th>Results</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Test witnessed by: John A. Doe
per: NA
Test no.: NA

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in conformance with the requirements of AASHTO/AWS D1.5M/D1.5, (2010) Bridge Welding Code.

Jane P. Doe
Manufacturer or Contractor: Blacksheep
Authorized By: John A. Doe
Date: September 19, 2011

Form N-5—Welder and Welding Operator Qualification Record

Figure 3
WELDER QUALIFICATION TEST RECORD AWS D1.5

Welder's Name: Jane P. Doe  BAC WO# 12S23569
Welder's Driver's License # or ID # & State of issue: 9876-543-2101  State
Welding Process: Shielded Metal Arc Welding (SMAW)
Manual: XX  Semi-automatic:  Machine:
Position: Vertical Up (3G)
In accordance with procedure or specification no.: AWS D1.5
Material Specification/Thickness: ASTM A-36 / 1"
Thickness Range this qualifies: 1/8” to UNLIMITED for Groove and Fillet Welds

FILLER METAL

Specification No. AWS 5.1  Classification E7018
F-No. 4  Is backing strip used? Yes

VISUAL INSPECTION

Acceptable: (YES or NO) Yes
Appearance: Satisfactory  Undercut: None  Piping Porosity: None

GUIDED BEND TEST RESULTS

Type: 3G side  Result: Satisfactory  Type: 3G side  Result: Satisfactory

Testing Witnessed and Conducted by: BAC Corporation

John R. Doe, II
John R. Doe, II – Certified Welding Inspector  Date: 7/30/10

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of AWS D1.5:2010 Bridge Welding Code Section 5 part C.

Manufacturer or Contractor: Jones Construction, Inc.

Authorized by: Fred Thompson  Date: 8/1/10

Figure 4
Welding Operator's Name: Max Power

<table>
<thead>
<tr>
<th>Date</th>
<th>3-30-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID Number</td>
<td>U-1234-5678</td>
</tr>
<tr>
<td>Process</td>
<td>SMAW</td>
</tr>
<tr>
<td>Position</td>
<td>1G</td>
</tr>
<tr>
<td>Material</td>
<td>A36</td>
</tr>
<tr>
<td>Procedure No.</td>
<td>B-U2a</td>
</tr>
<tr>
<td>Dia. &amp; Wall thickness (if pipe) otherwise joint thickness:</td>
<td>0.375 in. Grooved Plate</td>
</tr>
<tr>
<td>Is backing strip used?</td>
<td>Yes</td>
</tr>
<tr>
<td>Filler Metal:</td>
<td>1/8 - 7018</td>
</tr>
<tr>
<td>Maximum Thickness Qualification:</td>
<td>Maximum Thickness Qualification: 0.750 in. Position = 1G; Unlimited Fillet 1F</td>
</tr>
</tbody>
</table>

**Visual Inspection (AWS D1.5, 5.27)**

- **Appearance:** Good
- **Excessive Reinforcement:** None
- **Undercut:** None
- **Lack of Fusion:** None
- **Porosity:** None

**Penetrant Test Results (AWS D1.5, 5.27)**

- **Face:** Conforms
- **Root:** Conforms
- **Side:** Not Applicable

I, the undersigned, certify that the results of this record are correct and that the welds were prepared in accordance with the requirements of the AWS D1.5 Bridge Welding Code.

Signed [Signature]

AWS Certification No. – 98765432
Certification Expiration Date – 11/01/2014

For verification of any American Welding Society (AWS) certified instructor, you may call 1-800-443-9353 and enter the AWS Certification Number listed above.

Figure 5
Jane S. Doe  
AWS QC1 Certified Welding Inspector  
1987 Smith Blvd  -- Sydney, AA 10010  (800) 555-1212

Welding Operator's Name:  Paco Gonzales

Date:  1/19/12  ID Number: 9876-5432

Process:  SMAW  Position:  4G

Material:  A 36  Procedure No.:  B-U2a

Dia. & Wall thickness (if pipe) otherwise joint thickness:  0.375 in. Grooved Plate

Is backing strip used?  Yes  Filler Metal:  1/8 in. 7018

Maximum Thickness Qualification:  0.750 in.-Flat, Overhead Groove, Unlimited

Visual Inspection (AWS D1.5, 5.27)

Appearance:  Good  Excessive Reinforcement:  None

Undercut:  None  Lack of Fusion:  None

Porosity:  None

Bend Test Results (AWS D1.5, 5.27)

Face:  Conforms  Root:  Conforms

Side:  N/A

I, the undersigned, certify that the results of this record are correct and that the welds were prepared in accordance with the requirements of the AWS D1.5 Bridge Welding Code.

Signed  Jane S. Doe  Date  1/19/12

AWS Certification No. – 01234567  Certification Expiration Date – 9/01/2012

For verification of any American Welding Society (AWS) certified instructor, you may call 1-800-443-9353 and enter the AWS Certification Number listed above.

Figure 6