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WELDING ENGINEER FORUM

SUMMER 2021

July 13th, 2021



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AGENDA



- ¾ Procedures Review Process and some recent statistics
- ¾ CSA W59 clause 3.2 – Unlisted base metal
- ¾ Complete Joint Preparation PQR to Support the Acceptance of Partial Joint Preparation and Fillet Weld
- ¾ Procedure Qualification Test – Limitations on Welding Parameters
- ¾ CWB Database of Previous Accumulated Test – Search and Acceptance Criteria
- ¾ Procedure Qualification Test Reports from Other Organization
- ¾ Sharing of Accepted Welding Procedures Between Fabricators
- ¾ Q & A
- ¾ Next Forum

Procedures and Electrodes Department

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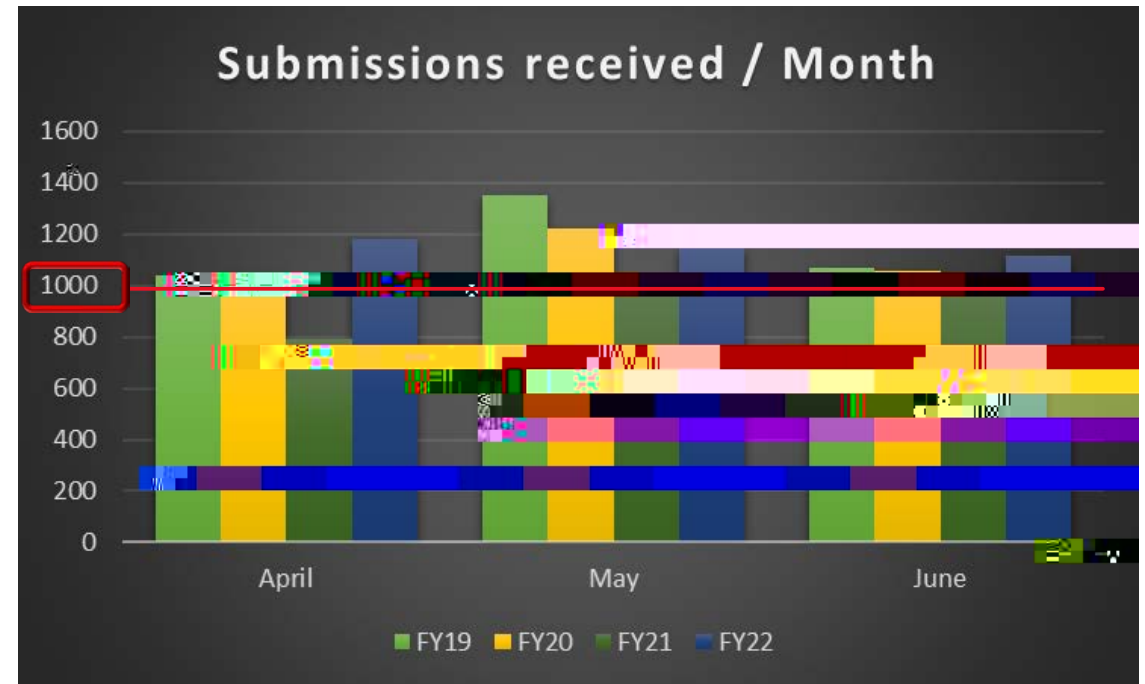
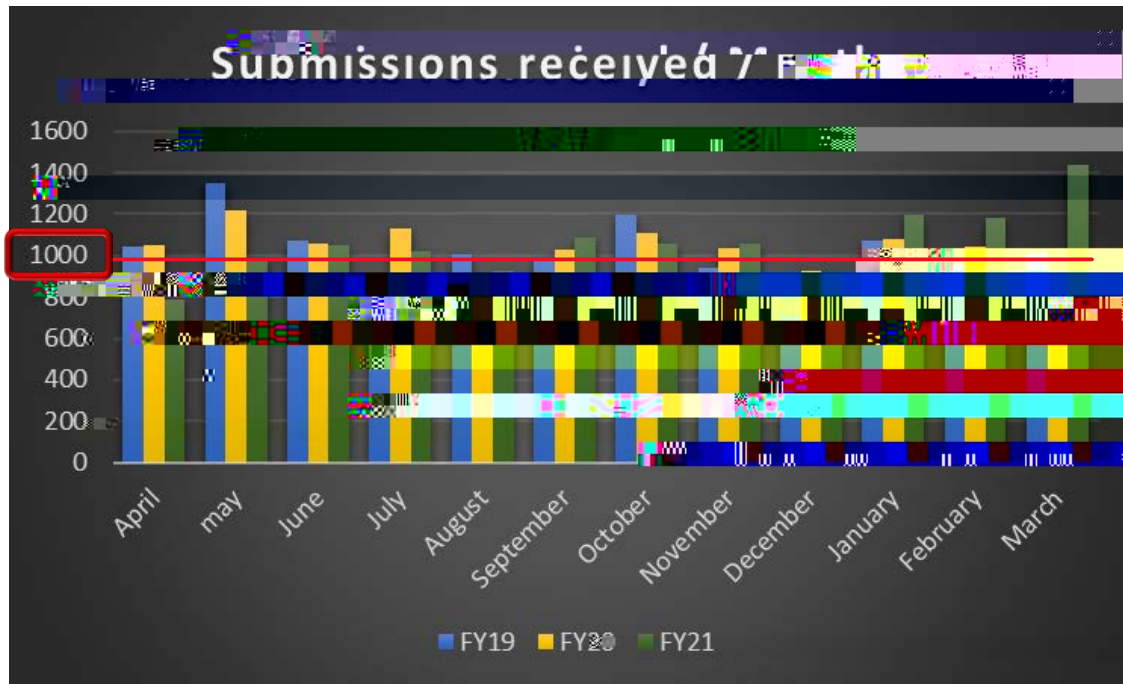


WHAT WE DO:

- We review & accept



Procedures and Electrodes Department (cont.)



Procedures Review Process



Procedures Review Process



A. Submission of welding procedures to CWB

All welding procedures are sent at procedures@cwbgroup.org

- a. You will get a reply confirming the reception of your email by CWB
- b. All welding procedures should be submitted in PDF and not secured

B. Response from CWB

A review letter will be sent when the review will be completed

a. There are three possible outcomes:

i. : H O G L Q J S U R F H G X U H V K D Y H E H H Q D F F H S W H G §

i. As prequalified

ii. Based on PQT

iii. Based on previous test accumulated by the CWB

ii. : H O G L Q J S U R F H G X U H V U H T X L U H V T X D O L I L F D W L R Q §

iii. : H O G L Q J S U R F H G X U H V U H T X L U H V U H Y L V L R Q §

Unlisted base metal

CSA W59 clause 3.2 – Unlisted base metal



3.2 Base metal

3.2.1 General

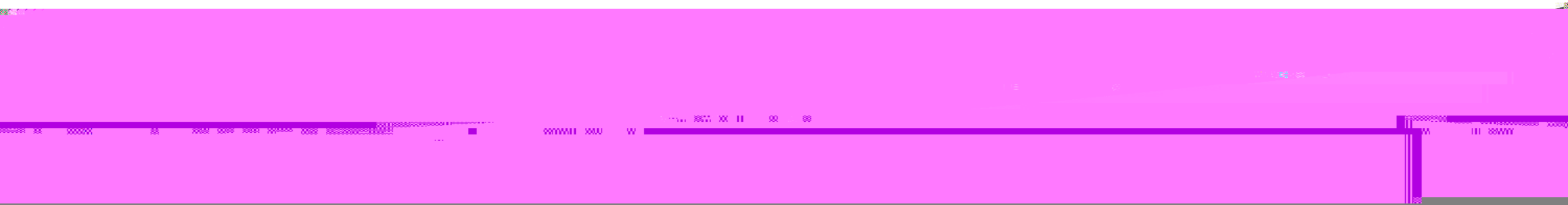
Steel base metal to be welded under this Standard shall conform to the requirements of the CSA or ASTM Standards listed in Clauses 3.2.2 and 3.2.3 or other recognized specifications of equivalent welding quality as determined by the contractor's engineer and approved by the engineer. Equivalent welding quality shall be established on the basis of composition and carbon equivalent. Carbon equivalent shall be determined in accordance with the International Institute of Welding formula:

$$CE_{IIW} = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15$$

In addition to the chemical composition, the non-listed steel shall have:

- ¾ Similar mechanical properties
- ¾ Max Sulfur & Phosphorus content
- ¾ Same delivery condition (Q&T, TMCP, ...)
- ¾ Preheat to be specified on the WPDS (as the non-listed steel will not be included in table 5.3 of CSA W59)

CJP PQR to Support the Acceptance 5inØ05



CJP PQR to Support the Acceptance of PJP and Fillet



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- x A CJP PQR will qualify PJP and fillet weld within the range of essentials variables, if the joint configuration of the PJP and fillet weld size concur with associated clauses of CSA W59

Examples :

f A CJP PQR will not qualify an 8mm single pass fillet weld using 0.9mm GMAW electrode

10.5.3.1

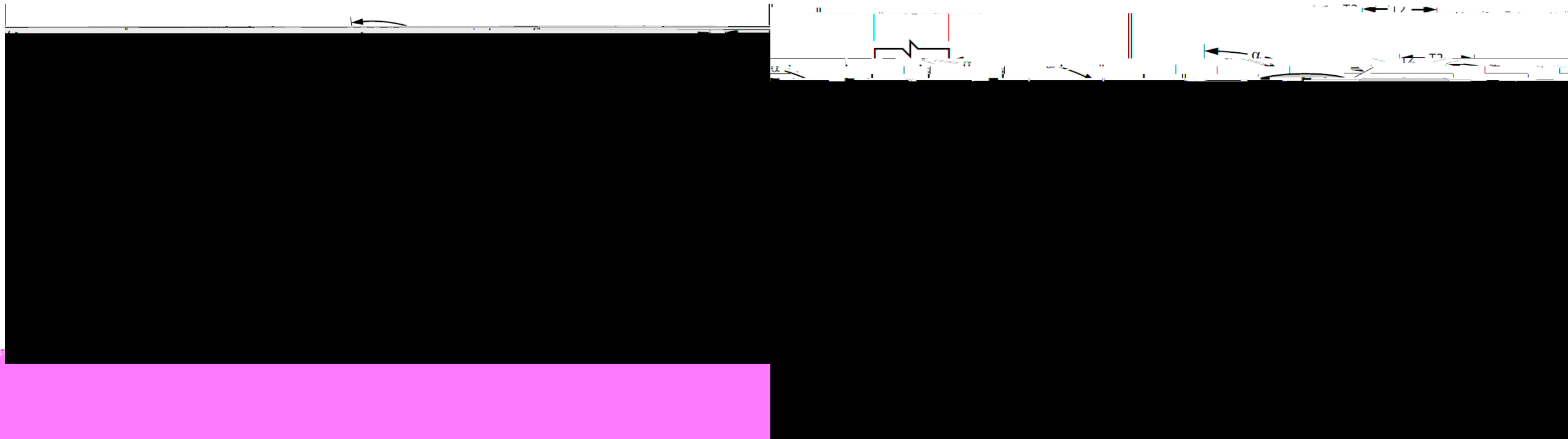
The maximum size of a fillet weld made in one pass in either the flat or the horizontal position, shall be

- a) 6 mm (1/4 in) for 0.9 mm (0.035 in) electrode wire diameter;

CJP PQR to Support the Acceptance of PJP and Fillet (cont.)



- x For aluminum, as per clause 10.6.1.3 of CSA W47.2 a CJP will qualify a PJP within the range of essentials variables. Please be aware that a change in specified joint geometry is an essential variable as per CSA W47.2 table 3



CJP PQR to Support the Acceptance of PJP and Fillet (cont.)



- x For aluminum, CJP will not qualify a fillet weld
- x For stainless steel, as per note 2) of table K.5 of CSA W47.1 and clause 6.7.1 of AWS D1.6, a CJP PQR will qualify PJP, plug/slot weld and fillet weld within the range of essentials variables
 - x Same logic as CSA W47.1 will be followed, the corresponding PJP and fillet weld size should be as per the prequalification limitations

process (SMAW)

Welding Position	Welding Process	Welding Position	Welding Process	Welding Position	Welding Process
Horizontal	SMAW	Horizontal	SMAW	Horizontal	SMAW
Overhead	SMAW	Overhead	SMAW	Overhead	SMAW
Vertical	SMAW	Vertical	SMAW	Vertical	SMAW
Flattened	SMAW	Flattened	SMAW	Flattened	SMAW

Procedure Qualification Test - Limitations on Welding Parameters

Procedure Qualification Test - Limitations on Welding Parameters

- CSA W47.2 has qualification range specified for welding parameters in Table 3 (Essential variables for GMAW, GTAW, and PAW).
 - f* Welding current : $\pm 15\%$
 - f* Arc voltage: $\pm 10\%$
 - f* Arc travel speed: $\pm 25\%$
- CSA W47.1 does not specify any such range, but it should be coherent and not too far from the welding parameters used during PQT; we recommend the following :
 - f* Welding Current and Wire Feed Speed: $\pm 10\%$
 - f* Arc Voltage: \pm

Previous Accumulated Test Search and Acceptance Criteria

CWB Database of Previous Accumulated Test – Search and Acceptance Criteria

As allowed by clause 11.2.2 of CSA W47.1, non -prequalified WPDS can be accepted based on previous tests accumulated by the CWB (WeldEye)

Limitations :

1. Database in WeldEye has not been updated lately
2. Two similar PQR required (Reliability Concerns / Human Error)
3. Similar Welding Parameters as those on the WPDS are required to support the acceptance
4. Searching can be subjective between CWB engineers

WeldEye search ... example for an FCAW stainless steel fillet weld between SS and CS

$\frac{3}{4}$ E309LT1-1 / 1.2mm wire diameter

$\frac{3}{4}$ 100%CO₂

$\frac{3}{4}$ In horizontal

CWB Database of Previous Accumulated Test –



Procedures

Search

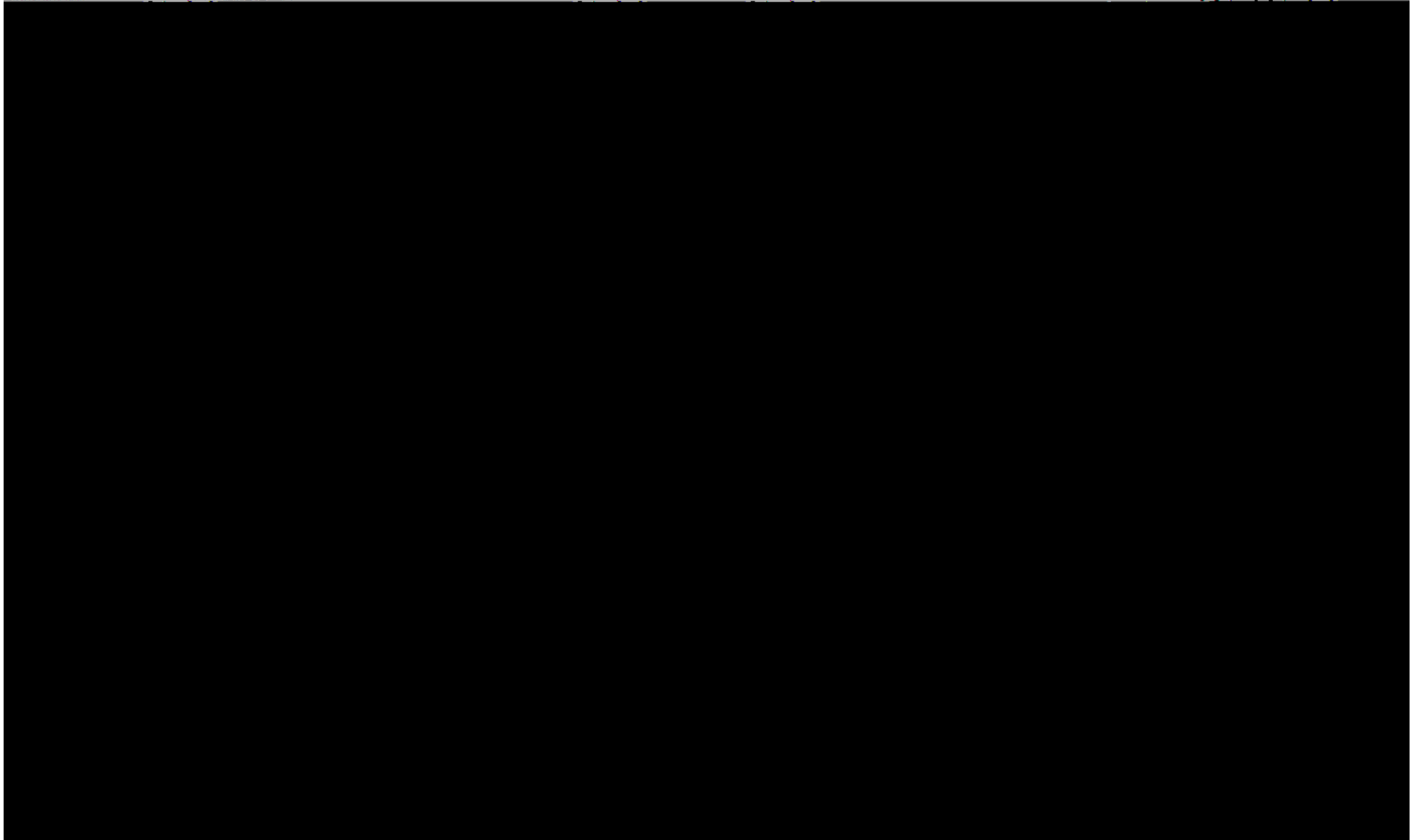
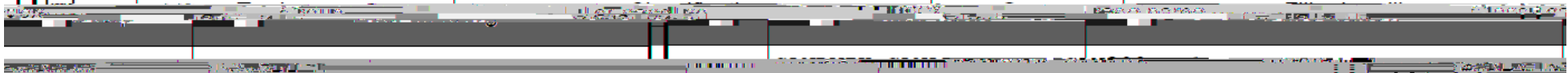
Logout
Help

Tools
Administration

0.00 -	-	2F	ONE 8.00 -	TEE FILLET	<input type="checkbox"/> P 001168	0	FILLET	FCAW	A240 TYPE 316L A36	38	50
0.00 -	-	2F	ONE 6.00	TEE FILLET	<input type="checkbox"/> P 002188	0	FILLET	FCAW	A240 TYPE 304L A36	10	10
0.00 -	TEE				<input type="checkbox"/> P 002188	0	FILLET	FCAW	A240 TYPE 304L	2F	ONE 15.00 -
0.00 -	ONE	LAP	6.00 -	FILLET	<input type="checkbox"/> P 004175	0	FILLET	FCAW	A240 TYPE 304L A36	6.00 -	A36



Identification of filler metal...



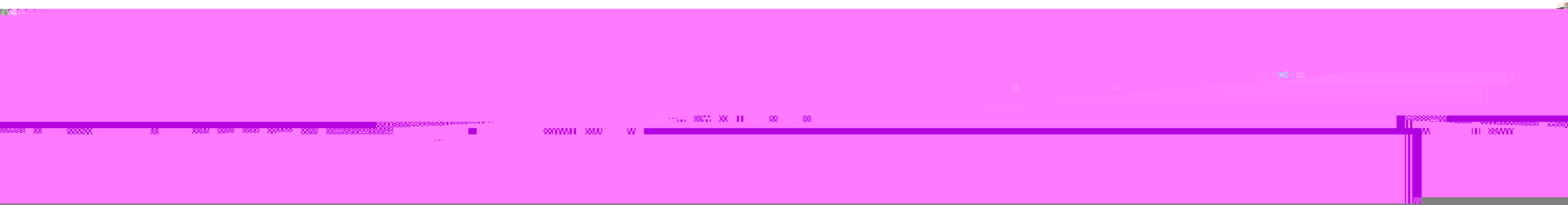
CWB Database of Previous Accumulated Test – Search and Acceptance Criteria (cont.)

Going forward:

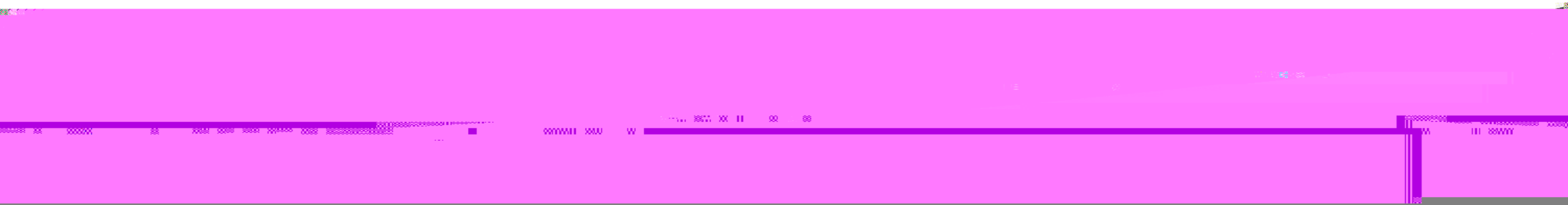
1. New PQR to be uploaded in database
2. Search criteria are under review
3. Improvement of the search guideline for CWB engineers

PQR from Other Organization

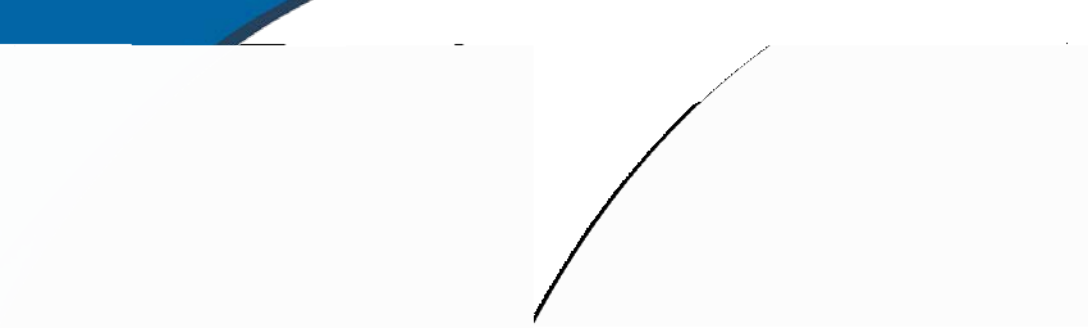




Sharing Welding Procedures Between Fabricators



Questions & Answers:



Closing Words & Next Forum

