

WELDABILITY OF ASTM A 1010

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**Iowa DOT A1010 Steel Workshop
Ames, Iowa
March 18, 2015**



Fairview Road Bridge





Waterville Bridge

A1010 vs. A 572 Grade 50, A 588 & HPS 70W

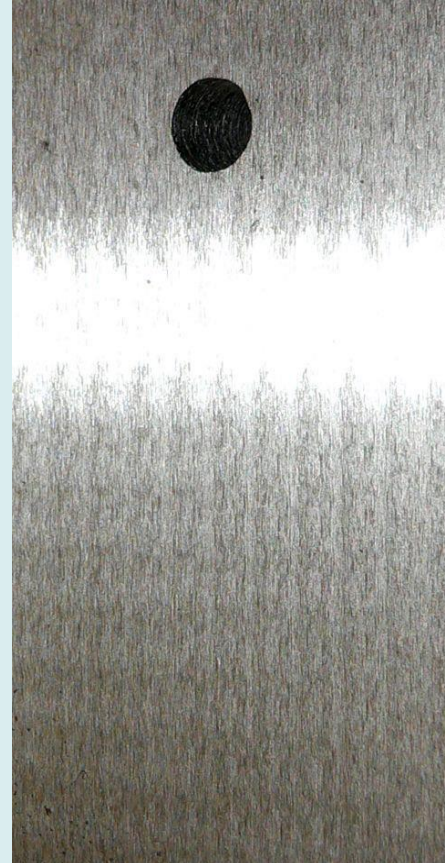
- (Machinability)
 - Drilling
 - Saw cut
 - Thermal Cut
- (Weld Feasibility)
 - Full penetration weld
 - Filet weld
 - » Single pass
 - » Double pass
- Accelerated Corrosion Test

CORROSION STUDY

Corrosion Test Setup



No environmental exposure



Corrosion Test Setup



Aggressive Corrosive Environment



16 Weeks Exposure

Water 4/days

Water 4/day
+Salt 2/week

Salt 2/week in
Closed Container

A 588



HPS 70W



A 1010



33 Weeks Exposure

Water 4/days

Water 4/day
+Salt 2/week

Salt 2/week in
Closed Container

A 588



HPS 70W



A 1010



1 Year Exposure.

A 588



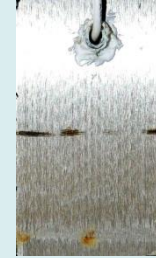
HPS 70W



A 1010



A 1010 Weld



Fresh water exposure 4/day.



Fresh water 4/day + salt water 2/week



Sealed container with water reservoir and salt spray 2/week.

2 Year Exposure.

A 588



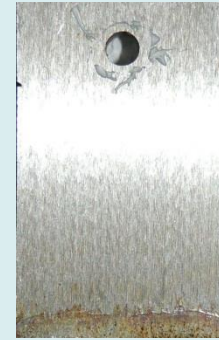
HPS 70W



A 1010



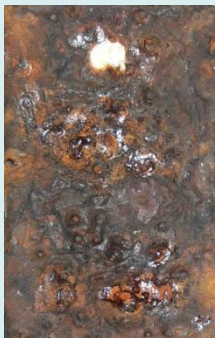
A 1010 Weld



Fresh water exposure 4/day



Fresh water exposure 4/day and salt spray 2/ week.



Sealed container with water reservoir and salt spray 2/week.

Crevice corrosion

Fresh water 4/day +
salt water 2/week



specimen, fresh water
4/day + salt water 2/week



Salt water 2/week
in sealed container

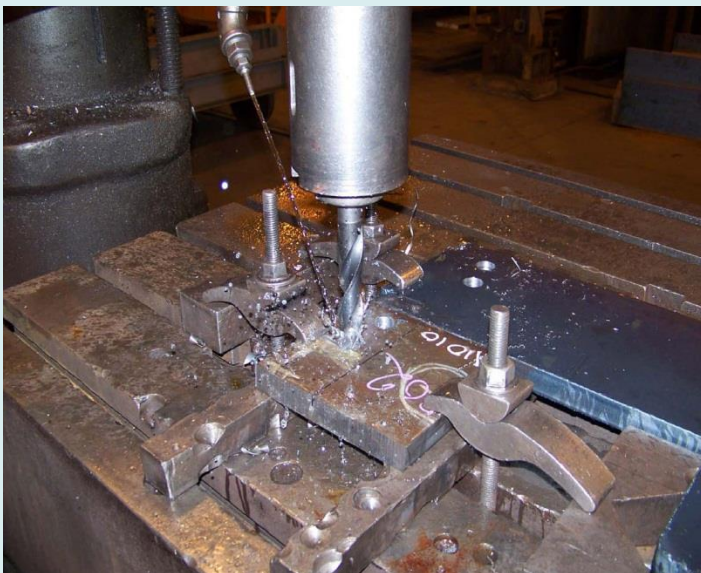


WELDABILITY STUDY

A572 Grade 50, **43 sec.** 6" cut vs. A1010, **49 sec.** 6" cut



Drilling 5/16" dia. twist drill.

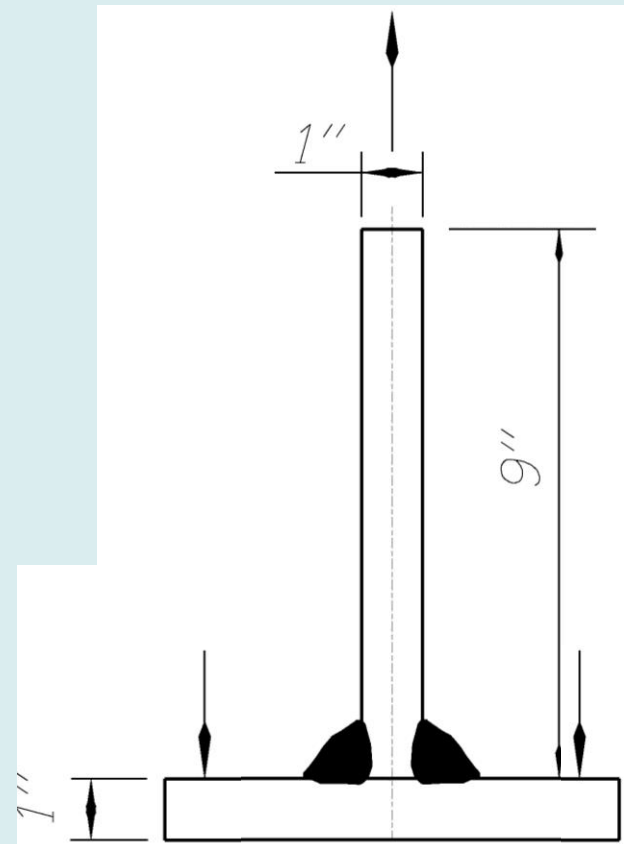


CHARACTERIZATION OF SUBMERGED ARC-WELDED 1-IN THICK DURACORR

- Heat inputs ranged from 25 kJ/in to 70 kJ/in with the latter an input commonly used for joining thicker plate.
- Thermal parameters
 - Flux baked at 400 °F, 8 hour minimum, unused flux recovered and rebaked for reuse.
 - Preheat temperature: Sufficient to remove surface moisture
 - Interpass temperature: 210-225 °F

Filet Weld

- FCAW single pass 5/16"
- SAW two pass weld 3/8"



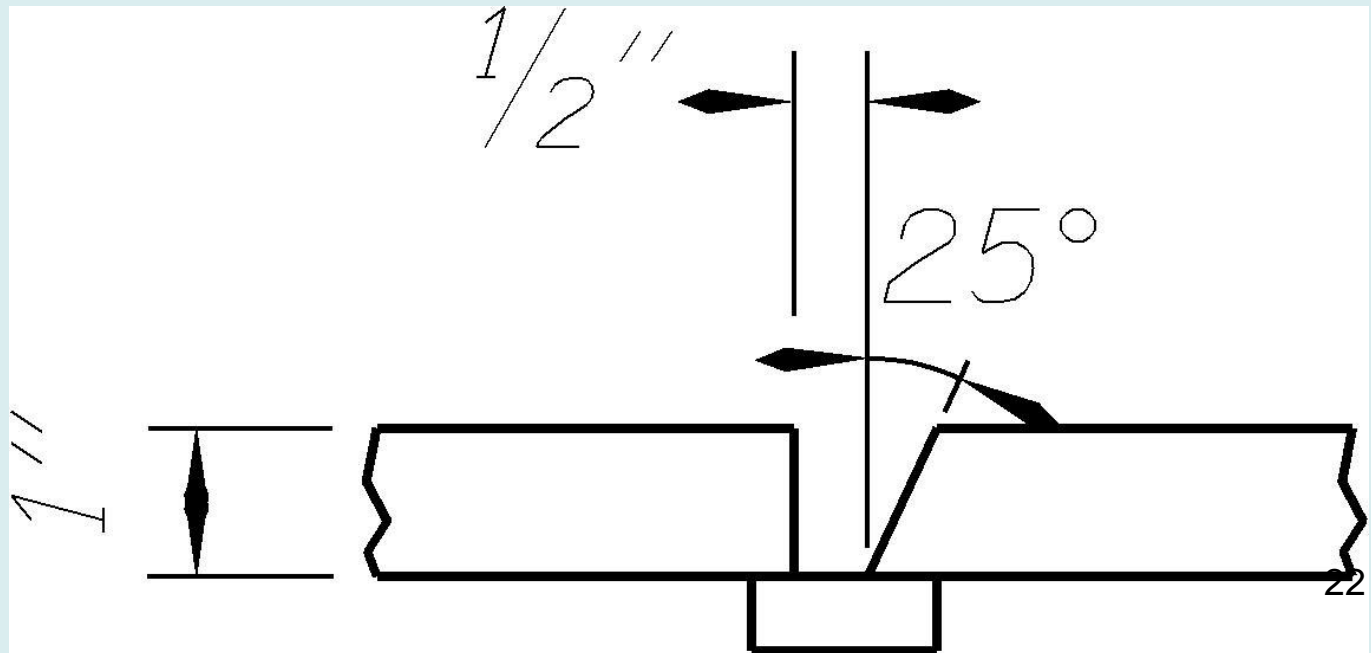
Filet Weld



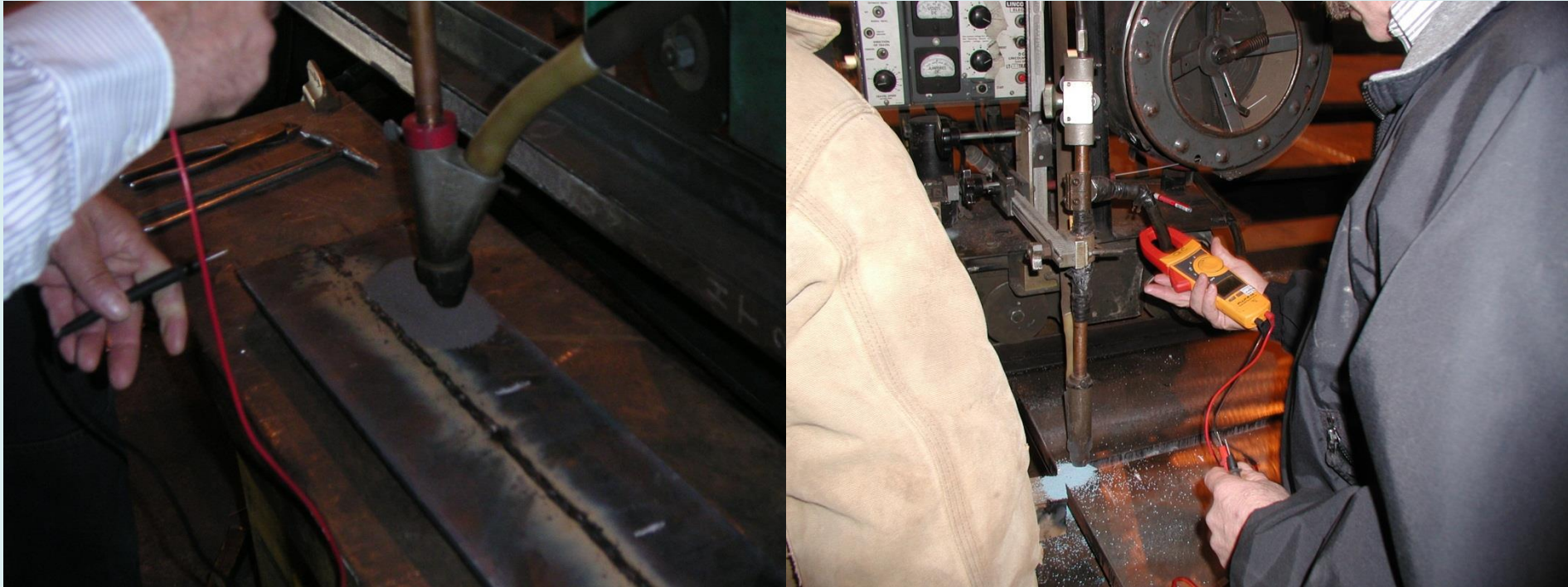
Photo 32
SAW Single Pass Fillet Fracture

Weld parameters

- Amps=450
- Volts=34
- Travel=17 IPM
- Heat Input=54 kJ/in
- Heat Input= $0.06 * V * I / T$
- Preheat=Ambient
- Lincoln Blue Max ER309L, 3/32" dia.
- Lincoln Blue Max 2000 Flux.



Heat input checked periodically





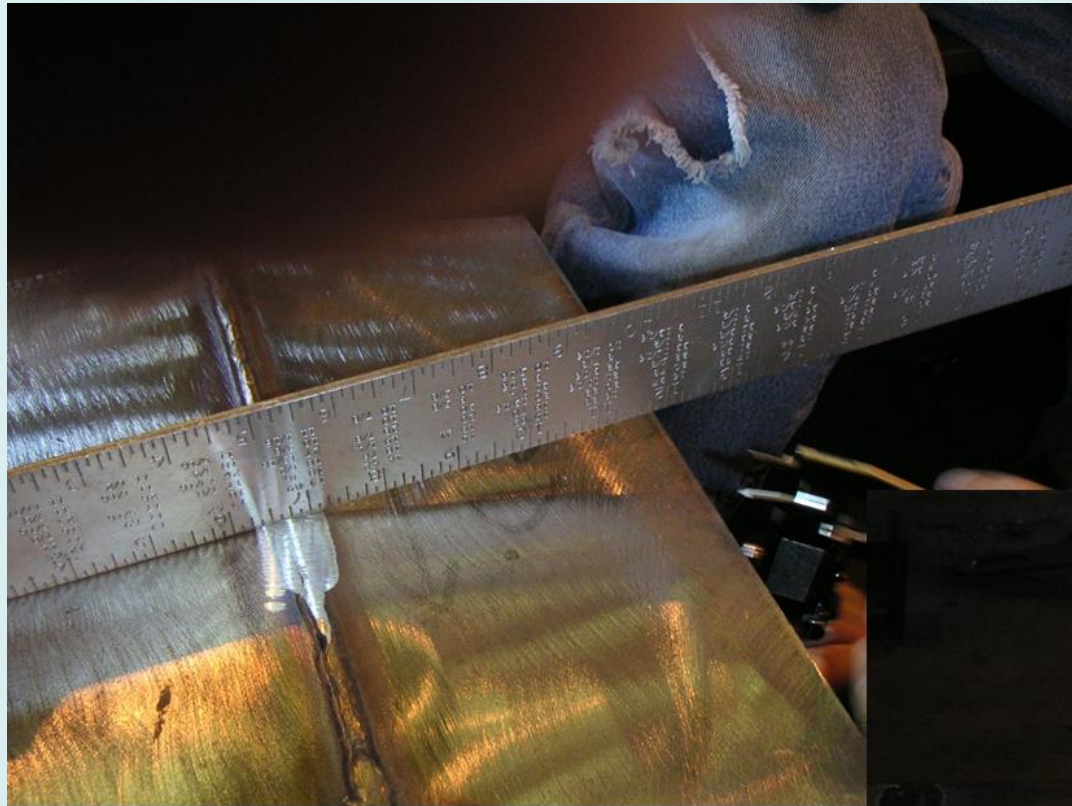


WASH YOUR HANDS
WEAR YOUR
HAND GLOVES

Distortion



Distortion



Distortion



Distortion





11/08/2011 12:46

TEST PLATE A1010-1

SIDE BENDS



TRANSVERSE
TENSILES



+40°F CHARPY TESTS



+40°F CHARPY TESTS



0°F CHARPY TESTS



0°F CHARPY TESTS



MACROETCH



MICROETCH

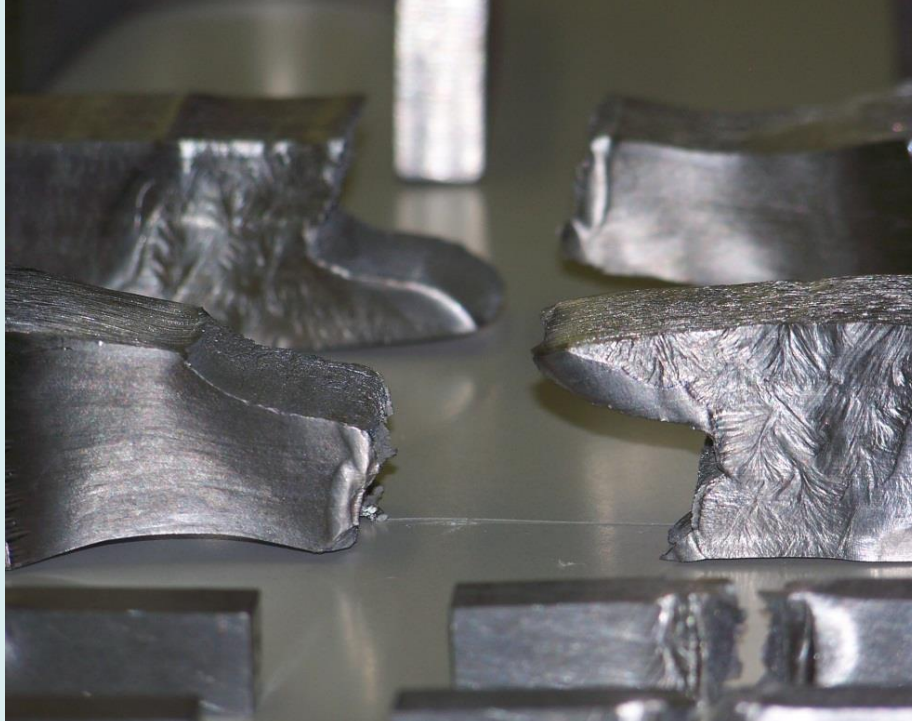




TRANSVERSE
TENSILES

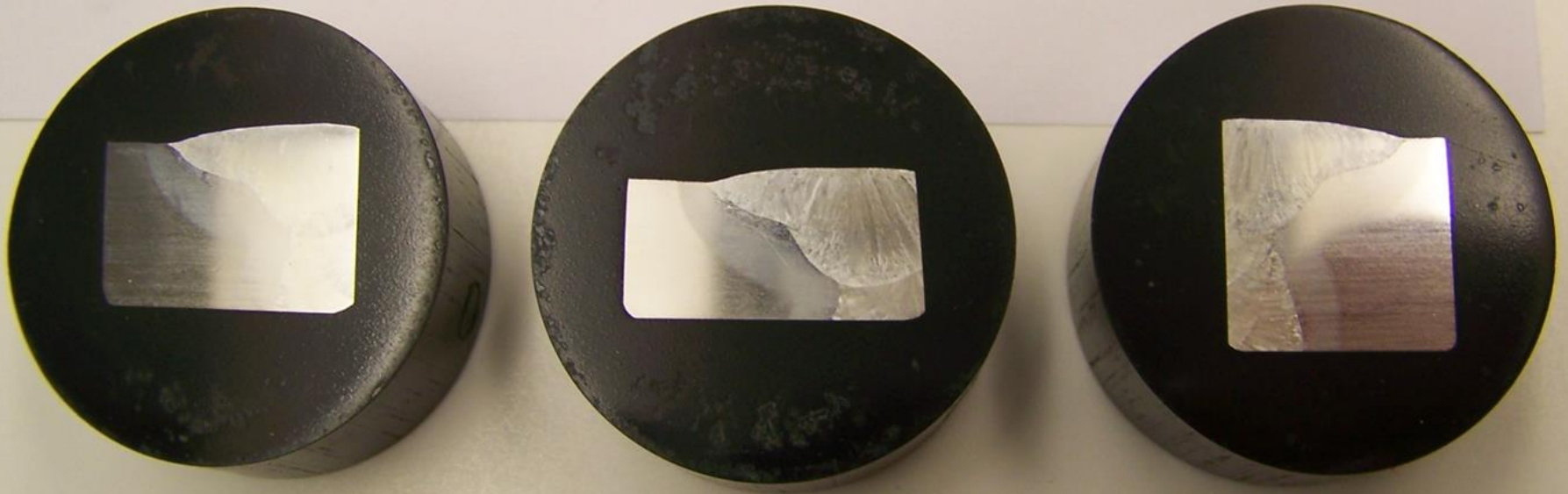


TRANSVERSE
TENSILES



TRANSVERSE
TENSILES

MICROETCH





MACROETCH



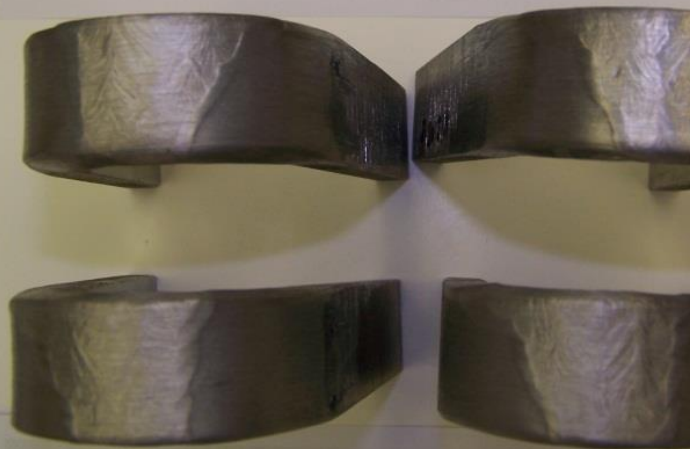
SIDE BENDS



SIDE BENDS



SIDE BENDS



SIDE BENDS

