

“Concept of *Welding*”

The correct design of refractory could stay in place or fail depending on the weld integrity of the anchoring.

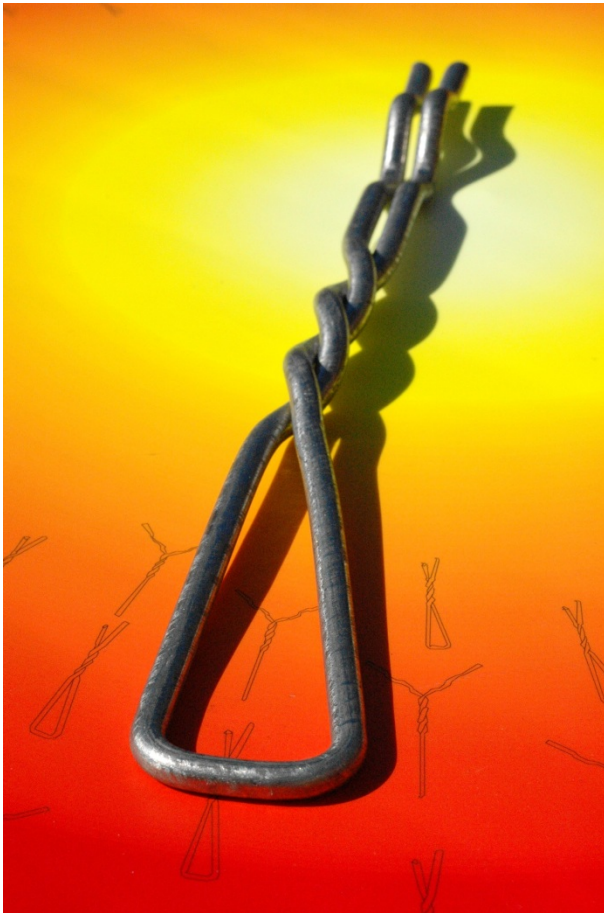
- by John R. Worner from Pressform Engineering Pty Ltd



“Example of *Refractory Anchors for Welding*”



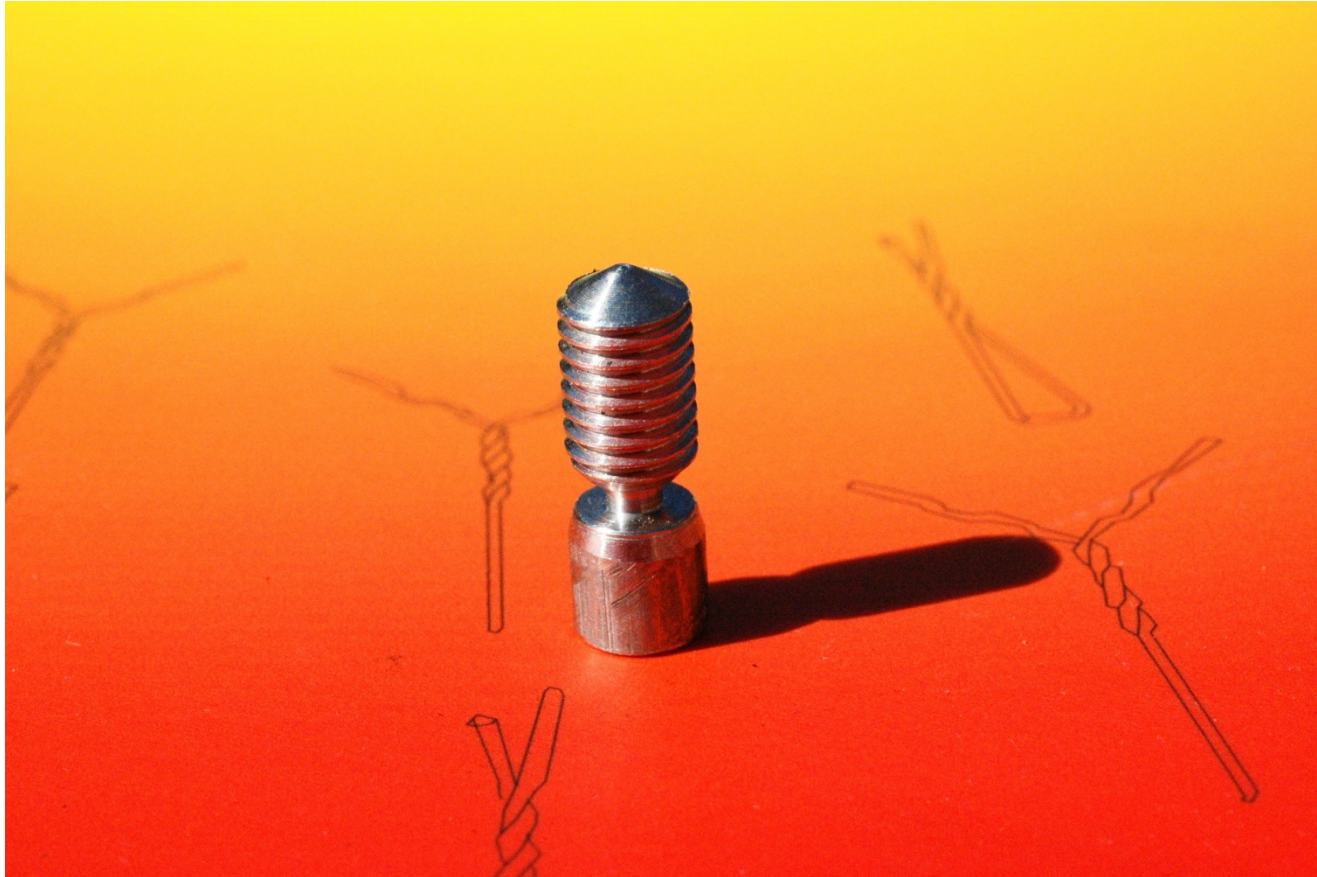
“Types for *Direct Welding*”



“Rod-Lok *Base Welding*”



“Stud Welding”



“Variable Stud / Base Designs”



“Welding *Process*”

MIG (*Metal Inert Gas Welding*)

TIG (*Tungsten Inert Gas Welding*)

STICK (*Flux Coated Wire Welding*)

STUD (*Welding*)



“MIG *Welding*”

Wire fed down the torch

Added to the weld pool and melted.

Shield by welding gas to control weld pool conditions.

“Example of *MIG* Welding”



“Example of *MIG Welding* (2)”



“Example of *MIG Welding* (3)”



“Example of *TIG Welding*”



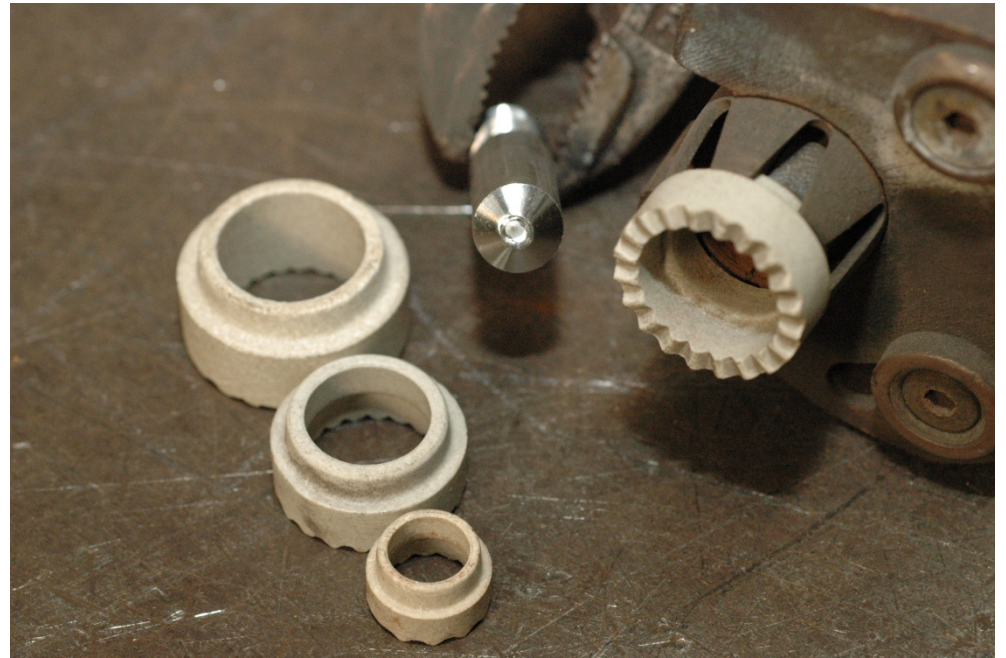
“Example of *Stick Welding*”



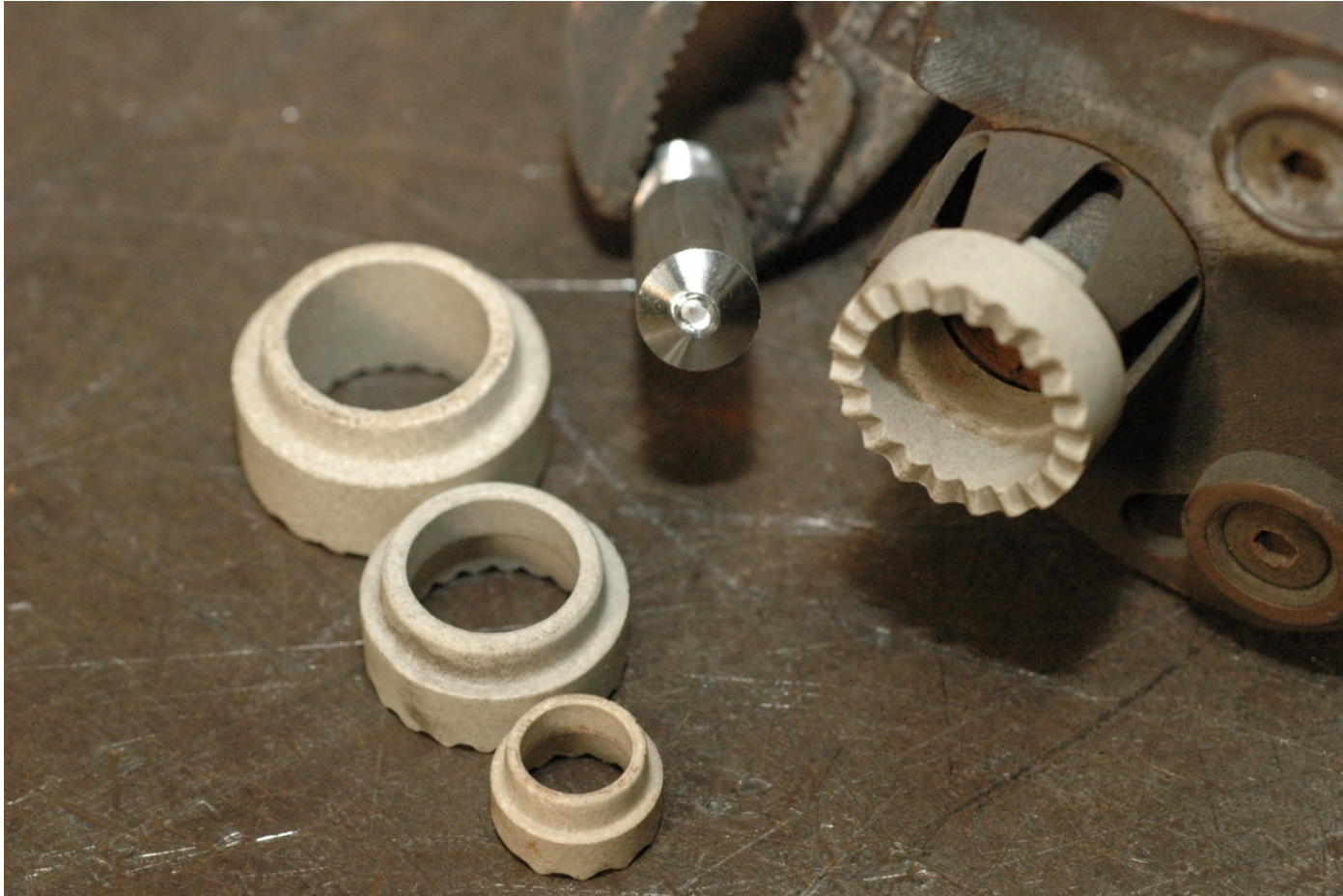
“Example of *Stick Welding* (2)”



“Example of *Stud Welding*”



“Example of *Stud Welding* (2)”



“Identification of *Metals*”

(Pressform Colour Codes)

METAL GRADE COLOUR CODES

Grade	Colour
304	Teal
321	Black
310	Red
316	Light Blue
904 L	Light Blue
253 MA	Yellow
INCONEL 601	Yellow
INCONEL 600	Black
INCOLOY 800 (DS)	Yellow
COPPER	Teal
BRASS	Teal
BRONZE	Teal
MONEL 400	Teal
ALUMINIUM	Grey
CARBON STEEL	White
BOILER PLATE	Red

- How do you ID your Anchors?
- Cut wire cannot be visually ID'd easily



“Storage of *Anchors*”



“Storage of Anchors (2)”



“Weld Preparation”



- Clean Anchor Base
- Clean Shell
- No Grinding particles, dust, grease paint...

“Dissimilar Metal *Welding*”





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“Dissimilar Metal *Welding* (2)”



“Welding *Equipment*”



“Stud Welding Machine”



Stud Welding Machine
WITH GUN AND
LEADS

“Personnel”



Correct
Welding
Helmet

Clothing

Protective
apron, gloves
and boots

Presentation

“Anything Wrong *Here!*”



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“Action Shot *Stud Welding*”



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“Good and Bad *Welds*”

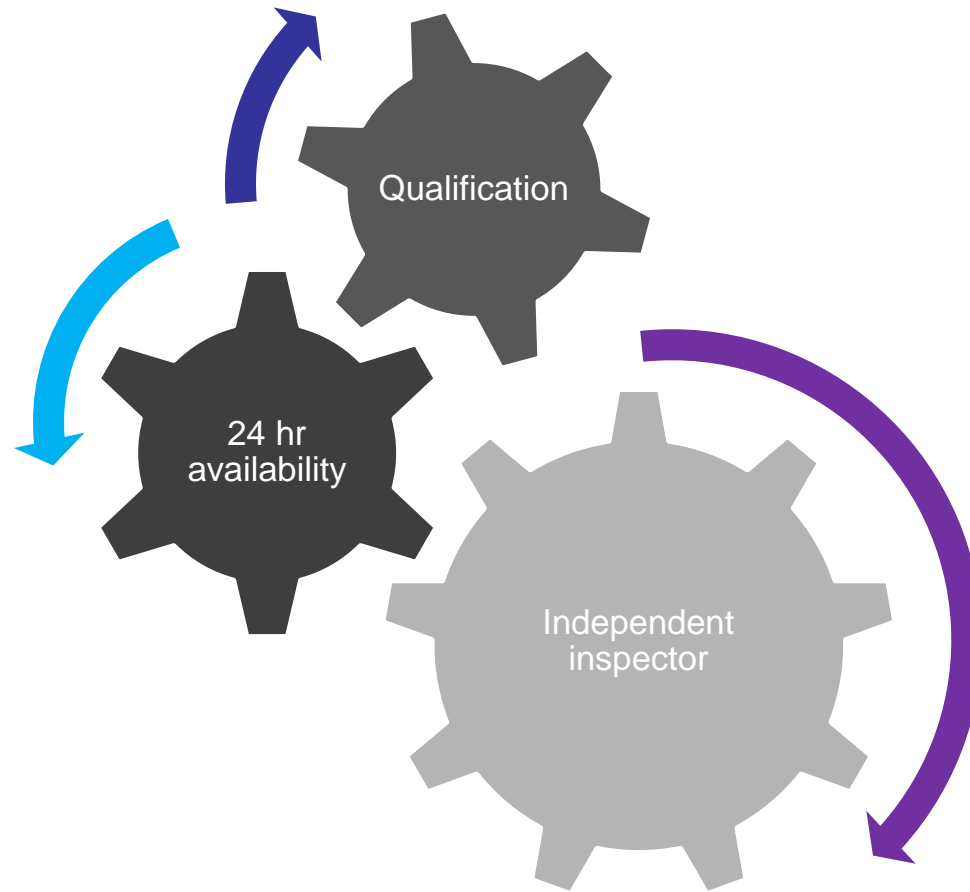




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“Inspection”



“Welding *Procedures*”

Design

Testing

Qualification

Equipment

Consumables

Environment – ambient temperature, humidity, dust etc.

Positional welding

Non-destructive testing – e.g. dye penetrant, magnetic particle, X-Ray



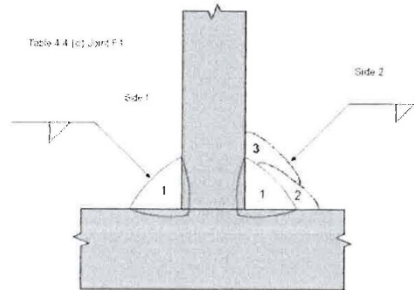
PRESSFORM ENGINEERING PTY LTD
 23 Jackson St.
 Bayswater

WELD PROCEDURE SPECIFICATION

WPS-PF039 Rev 0

CODE: AS/NZS1554 Part 6 1994 - Cat 1BIII

Supported by: WPQR-PF039 Rev 0



CLEANING: Wire Brush, Chip, Grind

BACKGOUGE: N/A

PREHEAT: Min Ambient 20 Deg C

Electrode/Wire	Gas	L/Min	Process	Classification	Materials Qualified
ER309LSi	Stainless	15 - 20	GMAW	AWS A5.9 ER309LSi	253 MA UNS S30815 AS1548-7-460R

WELDING DETAILS

Pass	Side	Electrode	Position	Size mm	Stick out	Amps	Volts	DC+ AC	Travel Speed	Interpass Deg C	Heat Input
1	1	ER309LSi	2F	0.9	8 - 12	180 - 220	26 - 30	DC+	266 - 358	-	0.8 - 1.5
Root	2	ER309LSi	2F	0.9	8 - 12	180 - 220	26 - 30	DC+	274 - 393	150 Max	0.7 - 1.4
Fillet/Cap	2	ER309LSi	2F	0.9	8 - 12	180 - 220	26 - 30	DC+	290 - 416	150 Max	0.6 - 1.4

SECTION 2.0

WELDING SUPERVISION DATA

THICKNESS TESTED: 4.5 - 9mm to 9 - 18mm

P.W.H.T.: N/A

JOINT TOLERANCES: ANGLE: N/A

GAP: 1.5mm Max

FACE: N/A

CONSUMABLE TREATMENT: Stored as per manufacturers recommendations

APPROVALS

PRESSFORM:	NAME:	DATE:
CLIENT:	NAME:	DATE:
THIRD PARTY: <i>D. Be...</i>	NAME: BEARHAM WELDING CONSULTANCY	DATE: 16-08-10



“Weld Testing”

PROVING PROCEDURE COMPLIANCE

HAMMER TESTING

TORQUE TENSION

TESTING TO AS/NZS

1554.2



“Storage and *Protection*”



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“Welding Consumables – *Condition*”



“Welding Consumables – Gas Selection”



“Safety Issues”

Working conditions

Environment

Fume extraction

Protective clothing

Flammable materials

Isolation from X-Rays





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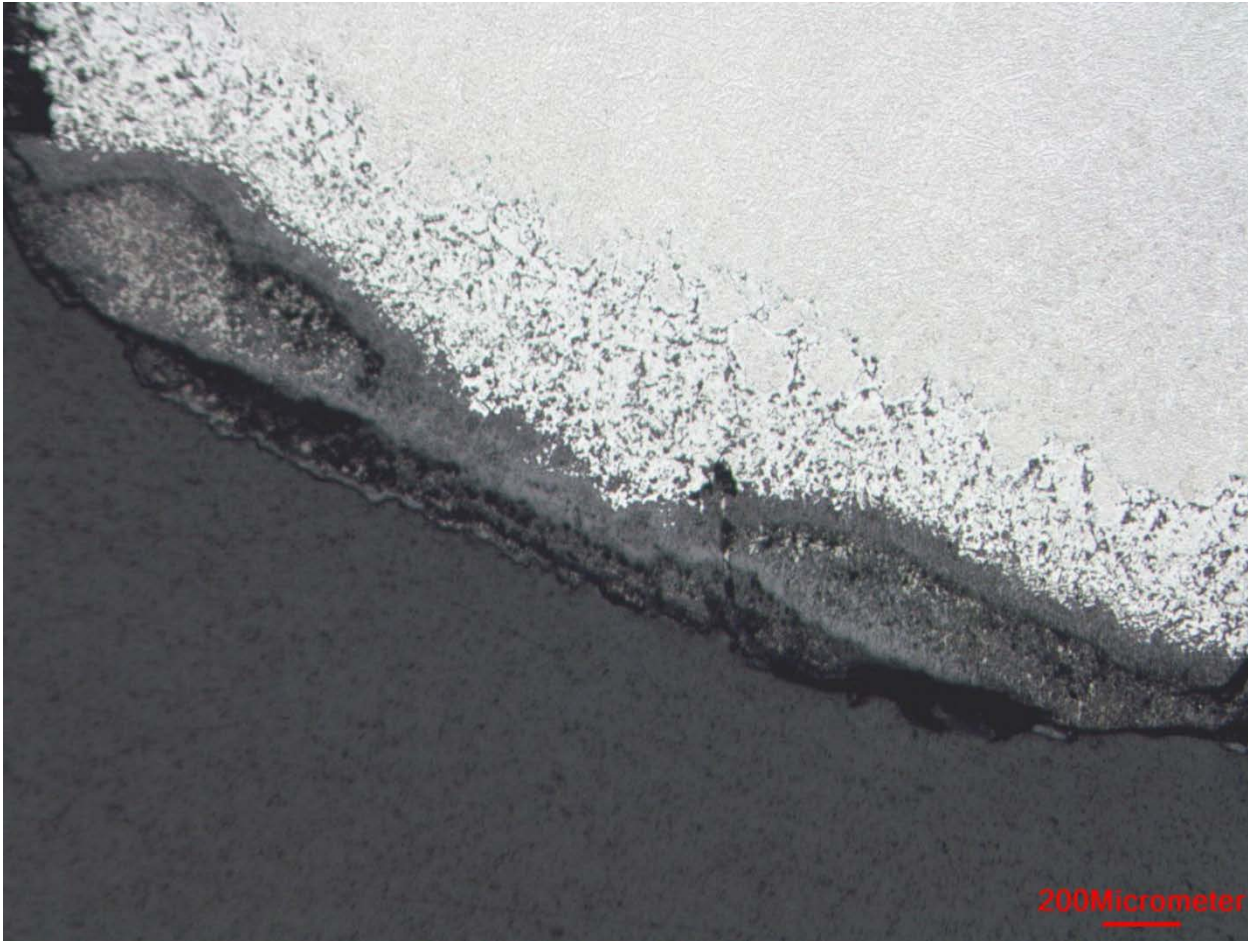


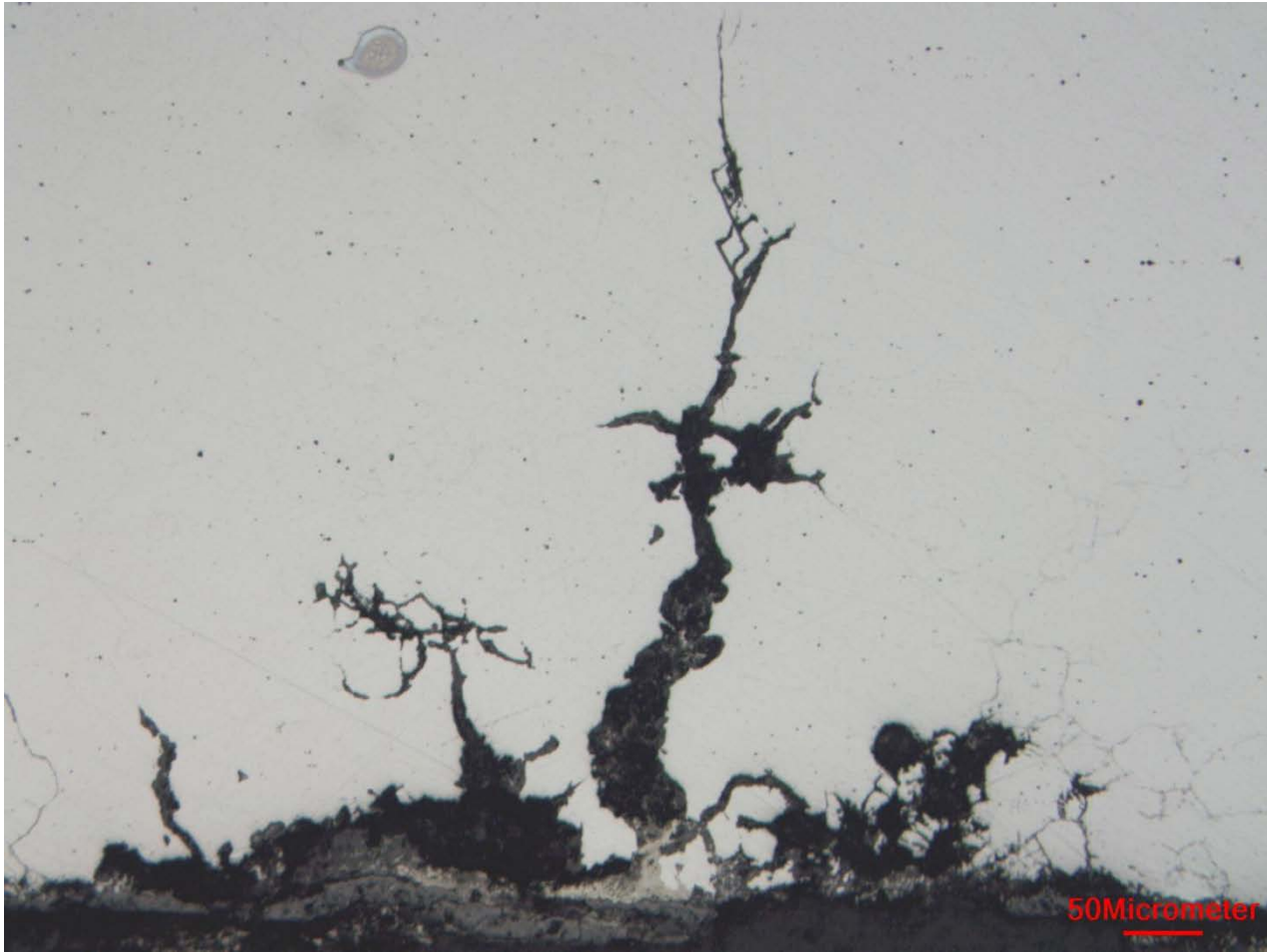


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“Conclusions”

Type of Anchor and Welding

Identification and Storage

Weld Preparation

Welding Dissimilar Metals – Special Care

Personnel and Equipment

Inspection and Procedures

Safety Issues

