

---

ウォータールー大学（カナダ） 研修報告書  
狭開先ホットワイヤ・レーザ溶接法の全姿勢施工への適用

1

2024 7 24 8 28 ,

2

3

7 24  
7 25 ~8 26  
8 28

4

University of Waterloo

Prof.Adrian Gerlich

5

5.1

í μ ° á -

Fig.5.1

---

---

---

Fig.5.1 Illustration of Hot-wire laser welding method.

**5.2**

Table.5.2.1, Fig.5.2.1		SUS316L	
1.6mm	20mm	3°	3mm
Table.5.2.2	1.6 6.0mm	, 4	.
, 6, 5, 4kW	3	. Fig.5.2.3, Fig.5.2.4	,
			,

Table.5.2.2 Experiment conditions.

	1 pass	2 pass	3 pass	4 pass
Laser oscillator	LD			
Laser power, kW	6.0	5.0	4.0	
Spot shape, mm	1.6x6.0			
Defocus length, mm	0			
Laser irradiation angle, deg	10			
Welding speed, m/min	0.5			
Wire diameter, mm	1.6			
Wire speed, m/min	11			
Wire feed speed, m/min	3.3			
Wire feed speed, m/min	3.3			
Wire feed speed, m/min	2.7			
Wire current, A	131			
Wire current, A	129			
Wire current, A	129			
Wire current, A	115			
Convergence distance, mm	80			
Ar shielding gas, l/min	45			
Weaving function	Trapezoidal 2.3			
Weaving frequency, Hz	10			
Weaving voltage, V	1.5			

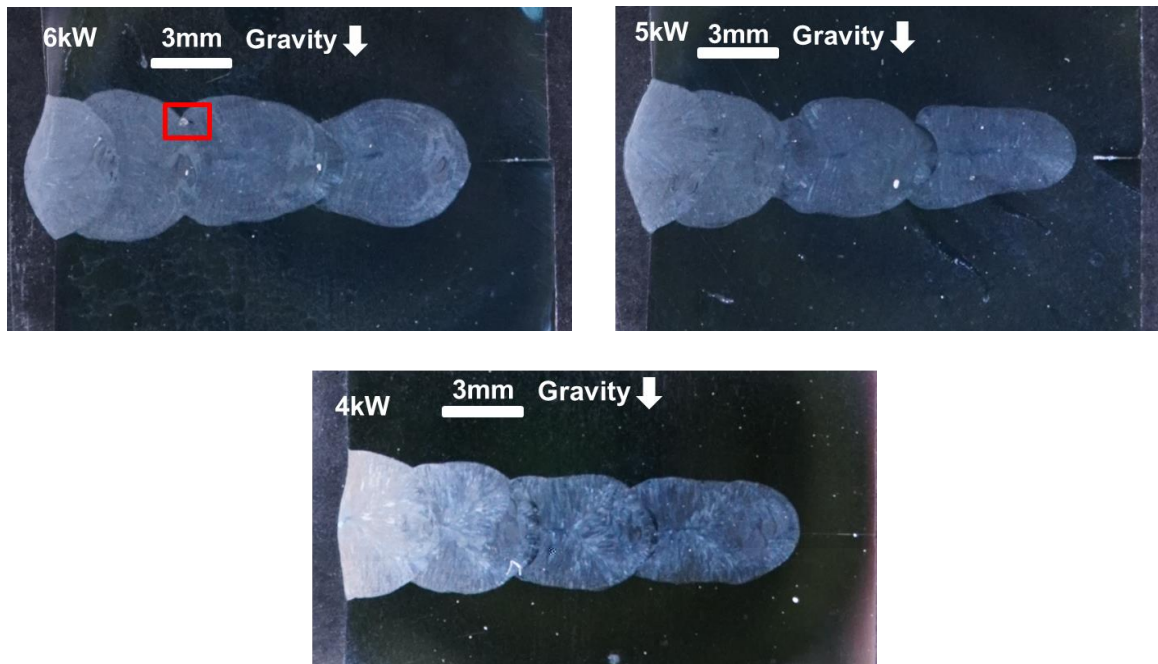


Fig.5.2.3 Cross section.

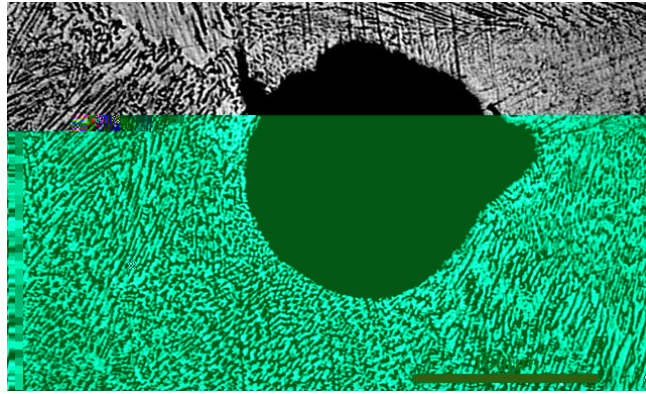


Fig.5.24 Observation by OM.

### 5.3

Fig.5.31

, 2 ,

Region1 Region3

4kW

Fig.5.3.2 Region1

6, 5kW

4kW

6, 5kW

Fig5.3.3. Region2

Region2

Region1

Region1

Fig5.3.4 Region3

Region3

6, 5kW

4kW

EBSD

DIC

EBSD

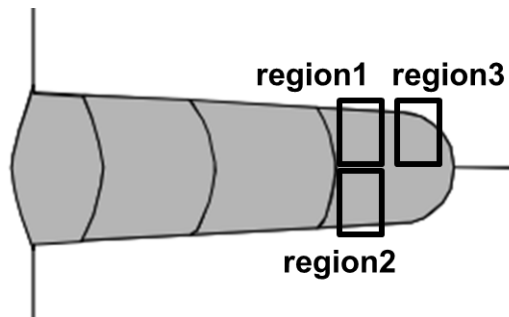
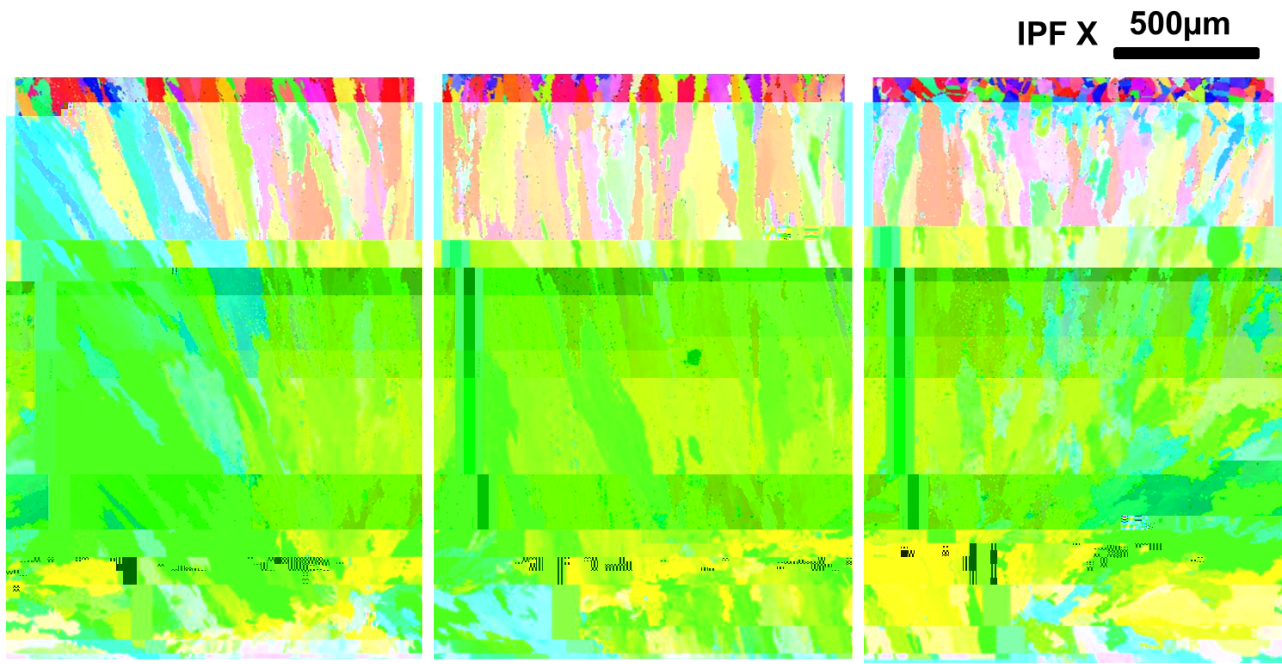


Fig.5.3.1 Illustration showing the analyzed area.

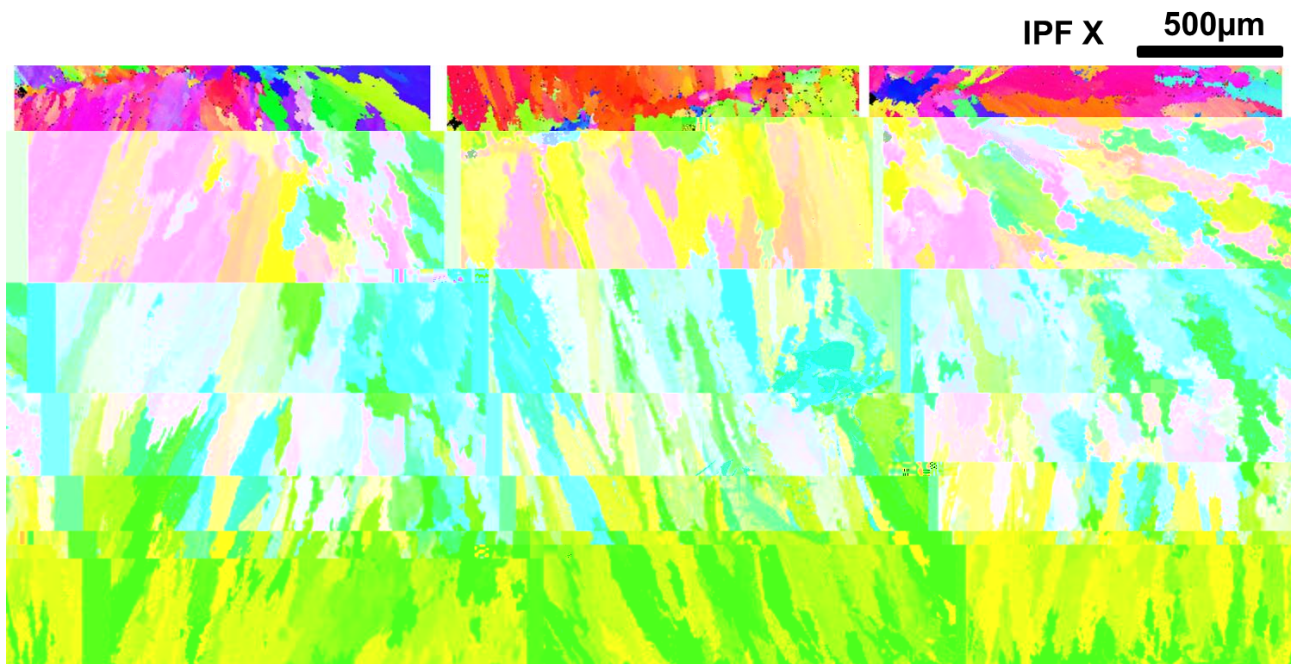


Laser power 6kW

Laser power 5kW

Laser power 4kW

Fig.5.3.2 Region1 of EBSD.



Laser power 6kW

Laser power 5kW

Laser power 4kW

Fig.5.3.3 Region2 of EBSD.

---

---

Fig.5.3.4 Region 3 of EBSD.

6

1

7

---

---