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# アルバータ大学（カナダ） 研修報告書

## 高能率ホットワイヤ GMA 溶接技術の開発

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### 1. はじめに

2015 8 1 8 27

### 2. 共同研究課題の決定

GMA

### 3. 共同研究スケジュール

### 4. 共同研究派遣先の概要

: University of Alberta

: Patricio F Mendez

### 5. 共同研究内容

#### 5. 1 背景・目的

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## 5. 2 供試材料

A36, ER 70S-6 ( 1.2mm)  
 Table 5.2 . 25( ) 155( ) 155( )mm ,  
 . Fig. 5.2 .

Table 5.2. Chemical compositions of base metal and filler wire.

Material	Chemical composition, wt%												
	C	Si	Mn	P	S	Al	Cu	Ni	Nb	Ti	Cr	Mo	
A36	0.25	0.4	0.8~1.2	0.03	0.03	-	0.2	NO data					
ER 70S-6	0.07~0.15	0.07~0.15	0.8~1.15	0.03	1.40~1.85	0.025	0.035	-	0.5	3			



Fig. 5.2 Test specimen.

## 5. 3 実験方法

Table 5.3.1, Table 5.3.2 Fig. 5.3  
 400A, 0.4m/min, Hot-wire feeding speed 0 0.254m/min  
 30 ,  
 80%Ar+20%CO<sub>2</sub> , 18.8L/min .

Table 5.3.1 Welding conditions

		Welding speed, m/min		0.4	
400	30	400	30	400	30
16	10	16	10	16	10
50	100	50	100	50	100
0.27	2.54	0.27	2.54	0.27	2.54
30		30		30	
0		0		0	
100		100		100	

Shield gas: 80% Ar + 20% CO<sub>2</sub> / 18.8 L/min

Welding process: MAG

Hot Wire

Arc current, A

Arc voltage, V

Wire feeding speed, m/min

Extension length, mm

Wire current, A

Wire feeding speed, m/min

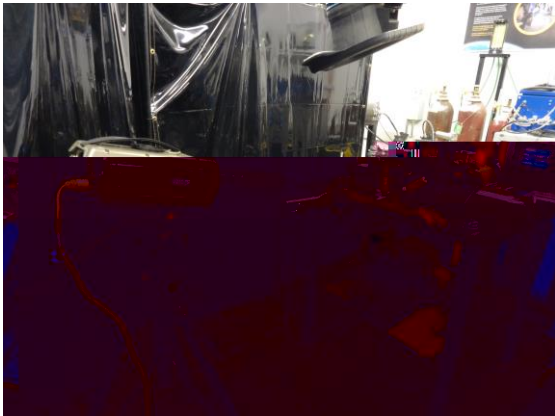
Wire feeding angle, degree

Wire feeding position, mm

Duty, %

Table 5.3.2 Recording condition

Recording condition	
Sample Rate, pps	5000
Exposure Time, $\mu$ s	80
EDR, $\mu$ s	40



(b) Phantom v210



(c) LCX LIBURDI



(d) Miller Pipe Pro 450

Fig. 5.3 Appearance of equipment

## 5. 4 実験結果及び考察

Fig. 5.4.1

1.27m/min , 2.54m/min

Fig5.4.2

1.27m/min , 2.54m/min

31.9mm<sup>2</sup>, 1.27m/min

32.3mm<sup>2</sup>, 2.54m/min 32.5 mm<sup>2</sup> , HAZ

1.24, 1.44mm, 1.27m/min 0.86,

1.26 mm, 2.54m/min 0.97, 1.21 mm

, HAZ

, HAZ

Appearance of welding bead		10mm
No using Hotwire		
Using Hotwire	1.27m/min	
	2.54m/min	

Fig 5.4.1. Appearance of welding bead

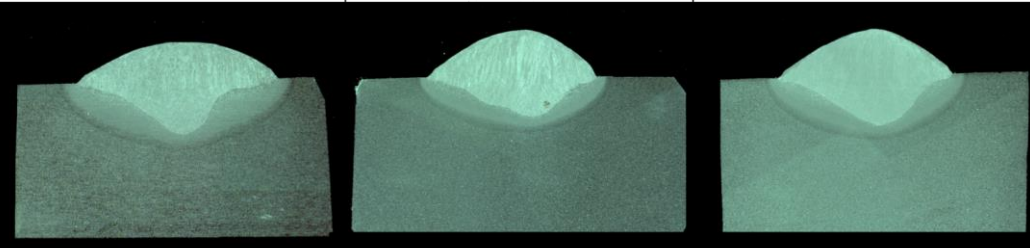
Only MAG		MAG + Hotwire				10mm
Hot wire feeding speed						
No using hotwire		1.27m/min		2.54m/min		
						
Area of reinforcement (mm <sup>2</sup> )						
43.8		44.7		46.3		
HAZ width, mm						
1.24	1.44	0.86	1.26	0.97	1.21	

Fig 5.4.2. Cross section

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## 6. まとめ

## 7. 謝辞

Patricio F. Mendez

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