



Case Study

0.5" steel (EH36) Butt Welding with S-MIG

Comparison with GMAW conventional welding

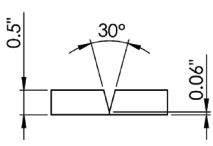
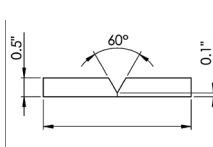
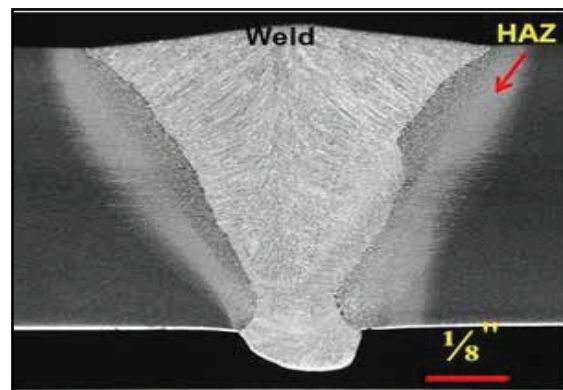
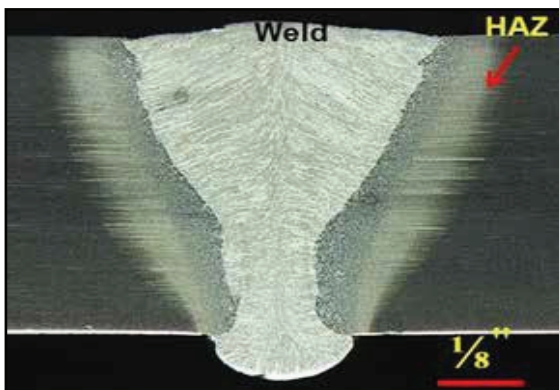
Weld ID#	Plate Angle/ .00 Inch Root Opening	Weld Passes	Plasma Arc Parameters			GMAW Parameters					
			Current Amps	Volts	Heat Input KJ/inch	Wire Dia (inch)	Wire Feed Rate Inch/min	Travel Speed in/min	Volts	Current Amps	Heat Input KJ/inch
LIN153 Plasma GMAW		1	140	23	11	0.0625	270	17.0	28	427	42
LIN158 GMAW -Two Passes		1	-	-	-	0.0625	230	16	26.5	365	36
		2	-	-	-		250	13	28.5	395	52

Table 1- Welding results comparison

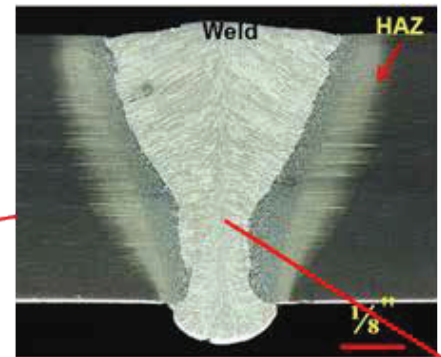
Macrostructural Appearance - Plasma/GMAW and GMAW



Welding Effects on the Heat Affected Zone

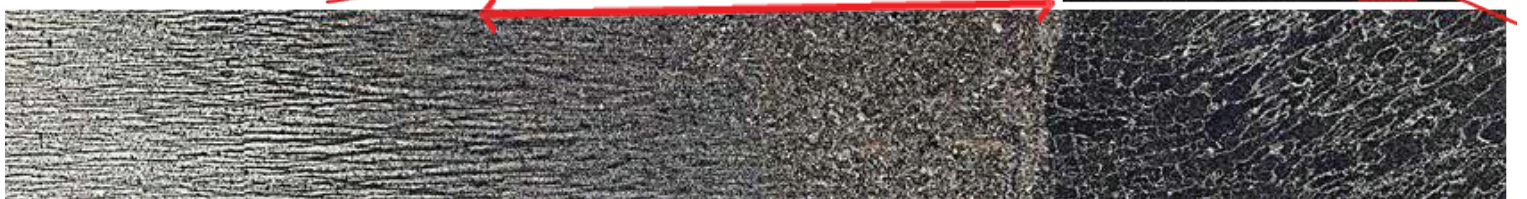
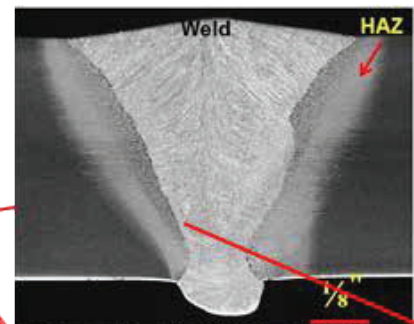
Hybrid Weld LIN153

- » The HAZ microstructure was very gradual from coarse at the weld side to very fine towards the base plate
- » Remaining rolling direction bands still visible in the HAZ
- » No defects such as porosity or discontinuities were observed



GMAW Only-Weld LIN1158

- » The HAZ microstructure is finer and slightly shorter than that of the hybrid weldment
- » The weld did not show the appearance of defects such as porosity or discontinuities





Tensile Properties

Weld ID #	0.2% Yield Strength, ksi	Ultimate Tensile Strength, ksi	Elongation %	RA %
Hybrid Plasma/GMAW LIN153 30° Angle, 1 Weld Pass	54.2 ± 0.7	81.5 ± 0.2	22.6 ± 0.15	68.3 ± 2.6
GMAW Only LIN158 60° Angle, 2 weld Passes	56.9 ± 0.1	81.5 ± 0.14	22.5 ± 1.2	66.2 ± 1.3
AWS ER70S-6 As-welded AWS Specification	58.0 min.	70.0 min	22 min.	
EH-36 Steel Plate (MIL-S-22698C)	51.0 min	71.0 min	22 min.	

Table 2 – tensile properties summary

Conclusions:

Hybrid Plasma and GMAW welding of 0.5" thick EH36 plate offers the advantage of producing superior welds; lower preparation angle, one pass weld (double throughput) with tensile strengths compared to conventional GMAW processes.

One pass, lower angle, superior results

Smart Welding Solutions

Smart Welding Solutions

0.5" steel (EH36) Butt Welding with S-MIG



Global Headquarters:
Kibutz Eyal, Israel 4584000
Tel.: +972-54-2228423
E-Mail: didi@weldobot.com
www.weldobot.com



ver 1.6.0