KOBELCO WELDING TODAY

October 2005 Vol.8 (No.4)

Perpetual Innovation and Unrivaled Service: The KOBELCO Way

DC-spec High-Strength 2.25Cr-1Mo-V Filler Metals for Reactor Vessels:

CMA-106HD PF-500D / US-521HD

Kobe Steel has been supplying overseas markets with state-of-the-art filler metals for welding high-strength 2.25Cr-1Mo-V steel for reactor vessels since 1998. They are CMA-106HD for shielded metal arc welding and PF-500D/US-521HD for submerged arc welding with the direct current polarity. These brands have been earning a high reputation due to their consistent quality in chemical and mechanical properties, fulfilling the requirements specified by ASME Boiler and Pressure Vessel Code Sec. 8 Div. 1 Appendix 31 and Div. 2 Appendix 26. Recently, however, Kobe Steel has slightly modified the chemical composition of these filler metals in order to respond to more stringent customer requirements: Si+Mn: 1.10% max.; X-bar = (10P+5Sb+4Sn+As)/100: 12 ppm max.; J-factor = (Si+Mn)(P+Sn)×10^4 (%): 120 max. These stricter requirements are to minimize the temper embrittlement of the weld.

Figure 1 shows temper embrittlement test results of CMA-106HD and PF-500D/US-521HD weld metals, respectively. These test results display sufficient notch toughness in the as-PWHT condition and after Step-Cooling heat treatment, exhibiting very low susceptibility to temper embrittlement.

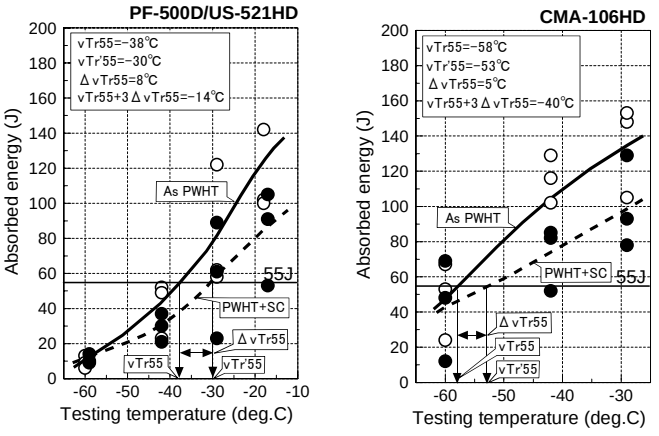


Figure 1: Charpy impact test results of weld metals after PWHT (705°C × 7h) and PWHT + Step Cooling

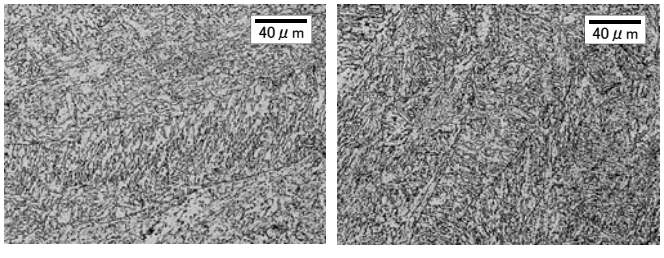
Table 1 shows the chemical and mechanical properties of CMA-106HD and PF-500D/US-521HD weld metals in comparison with the ASME Sec. 8 requirements.

Table 1: Typical chemical and mechanical properties of CMA-106HD and PF-500D/US-521HD weld metals

Properties	CMA-106HD	PF-500D/ US-521HD	ASME Sec.8
C (%)	0.09	0.10	0.05-0.15
Si	0.24	0.14	0.20-0.50
Mn	0.80	0.85	0.50-1.30
P	0.005	0.005	0.015 max.
S	0.003	0.003	0.015 max.
Cr	2.42	2.38	2.00-2.60
Mo	1.02	1.03	0.90-1.20
V	0.28	0.31	0.20-0.40
Nb	0.012	0.013	0.010-0.040
Sb	0.001	0.001	-
Sn	0.002	0.001	-
As	0.003	0.001	-
Si + Mn	1.04	0.99	
X-bar	67	6.0	-
J-factor	73	59	-
0.2% OS (MPa) (1)	533	518	415 min.
TS (MPa) (1)	648	634	585-760
El (%) (1)	24	25	18 min.
IV at –18°C (2)	Av.151	Av.125	Av. 54 min.

(1) PWHT: 705°C × 28h; (2) PWHT: 705°C × 7h

CMA-106HD and PF-500D/US-521HD weld metals possess fine bainitic microstructures as shown in Figure 2. This is the reason why the weld metals exhibit high tensile strength, adequate creep rupture strength, sufficient impact toughness, and low susceptibility to temper embrittlement.



CMA-106HD PF-500D/US-521HD

Figure 2: Fine bainitic microstructures of CMA-106HD and PF-500D/US-521HD weld metals after PWHT (705°C × 7h)

Essen Fair Encourages Welding Industries

It was very hot this summer in Japan. In these several years the climate in Japan has become very extreme. In the old days we sometimes had small thunder storms with minor showers in the summer season. But recently there have been much bigger thunder storms accompanied by heavy showers such as they often have in Thailand or Singapore. I guess the climate in Japan is gradually becoming tropical. Such extreme weather can also be seen in other places in the world. The USA has experienced some of the biggest hurricanes, and there have been big floods and earth quakes in several countries.... It seems to be impossible for humankind to stop global warming soon; however, we should make a concerted effort to improve the critical situation of the global environment.

The ESSEN WELDING FAIR was held on Sep. 12-17 in Essen, Germany, it is the biggest welding exhibition in the world and is held every four years. KOBELCO, as one of many worldwide exhibitors, displayed a lot of new welding products together with well known existing products, like DW-series stainless flux-core wires. During the Fair, we had a good chance to form closer relations with our customers and end users through talking and exchanging technical information about our welding consumables and their new projects. We are determined to make every effort to respond to customer desires and requirements for both business and technical matters through our international activities based on our business slogan of QTQ: Quality product, Technical service, and Quick delivery.

Masakazu Tojo
General Manager
International Operations Dept.
Welding Company
Kobe Steel, Ltd.

Booming Welding Businesses

How are you doing, dear readers of Kobelco Welding Today? Half a year has passed since I came to the International Operations Department. Immediately after taking up my present post, I visited all the overseas subsidiaries in order to better understand their activities. With different sorts of tasks they must carry out, they all are busy, and I could see that their businesses seemed to be expanding at either high or low rates.

As I was in charge of sales in Thailand from 1995 to 2000, visiting the ASEAN countries made me feel nostalgic about my old days. But I was surprised by the changes and rapid growth over the last five years. A big increase in the production of cars, motorcycles, and construction machinery by Japanese manufacturers there has brought about a remarkable increase of our sales of solid wires and an expansion of our production capacity. Having experienced the ASEAN economic crisis, I felt like I entered another world on hearing that more than 1.6 million cars are projected to be produced in Thailand in 2010.

I am well aware that the establishment of a stable supply system is a must for us manufacturers in order to respond to the global increase in demand, as well as maintenance of good quality. We have recently increased the production capacity of flux-cored wires and solid wires. Still, I am afraid that our deliveries may be inconveniencing some customers due to the simultaneous booming of the world and domestic economies. I apologize for this inconvenience and should like to ask for your generous understanding as we are trying to tackle the problem.

Toshiyuki Okuzumi
General Manager
International Operations Dept.
Welding Company
Kobe Steel, Ltd.

CONTENTS

WELDING OF CHEMICAL TANKERS

Part 2: Essential Factors in Welding Procedure Controls

The cargo tanks and piping systems of chemical tankers use special grades of austenitic and duplex stainless steel to resist their corrosive cargos. Such particular stainless steels require special consideration and handling to obtain successful welding results. Following Part 1, "How to Select Stainless Filler Metals," Part 2 of this two part series on welding chemical tankers discusses the essential factors in welding procedure controls.

Butt joint of solid stainless steels

Transverse bulkheads which section the entire cargo tank of a chemical tanker into segments (Figures 1 and 2) use solid austenitic stainless steel plates of types 316L, 316LN, and 317L.

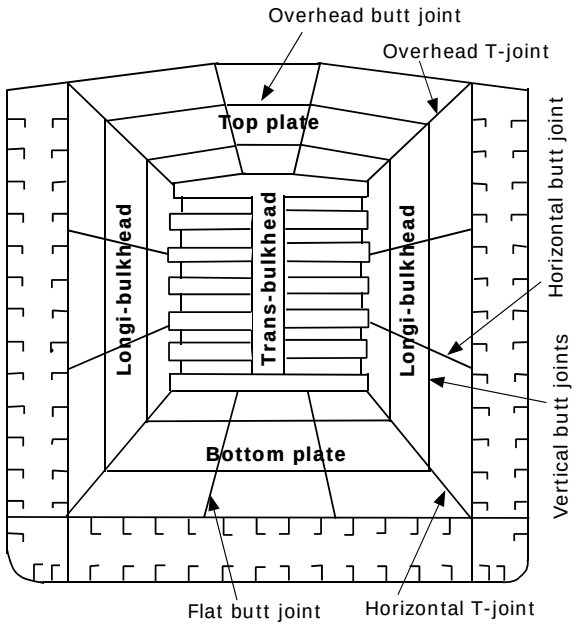


Figure 1: A perspective inside view of a chemical cargo tank with a transverse bulkhead at the innermost part of the figure

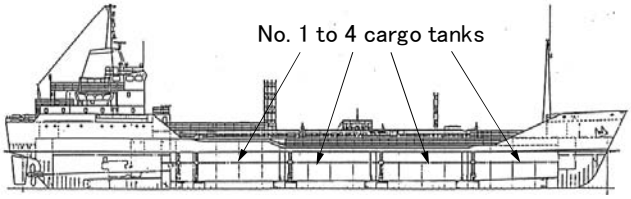


Figure 2: A chemical tanker's cargo tank sectioned by several transverse bulkheads

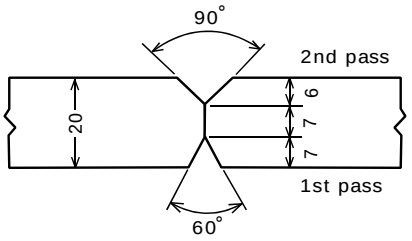
During assembly, plate-to-plate butt joints are welded in the flat position by submerged arc welding (SAW). In SAW, double-side single-pass welding without back gouging is often used for its higher efficiency. Double-side single-pass SAW, however, requires more control over welding parameters to prevent insufficient joint penetration and excessive melt-through as compared with the more common multiple-pass welding; therefore, the proper welding parameters should be determined through testing in advance. Where excessive melt-through is likely to occur due to excessive root opening, shielded metal arc welding (SMAW) should be used as a supplement before SAW. As to SAW flux, PFS-1M is more suitable for double-side single-pass welding because it can accommodate base metal dilution to a greater degree than PFS-1.

With 317L stainless steel that contains higher Mo, high heat input can cause embrittlement of the reheated part of the weld metal. To overcome this problem, the heat input and interpass temperature should be minimized. Table 1 shows the double-side single-pass SAW procedure, in which the final or second pass was welded while the backing or first pass was water-cooled to prevent reheat embrittlement of the backing pass weld metal.

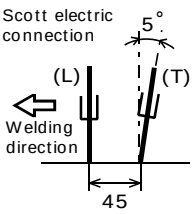
Table 1: Plate-to-plate butt joint of 317L stainless steel by SAW with PFS-1M/US-317L

Pass (1)	Wire	Welding conditions			Heat input (kJ/cm)
		Amperage (A)	Voltage (V)	Speed (cm/min)	
1st pass (Backing pass)	L (AC)	750	34	65	49.4
	T (AC)	700	40		
2nd pass (Final pass)	L (AC)	870	34	65	54.4
	T (AC)	700	42		

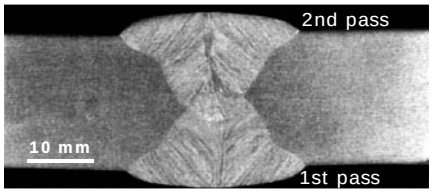
Groove preparation:



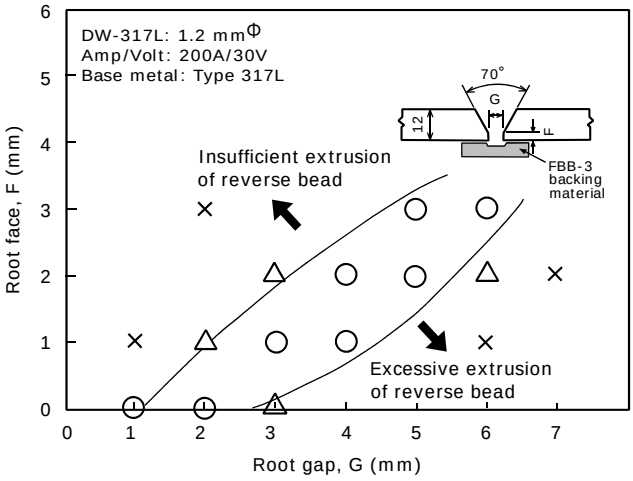
Wire arrangement:

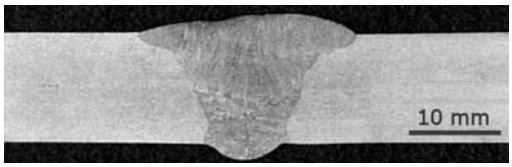


Macrostructure of weld cross section:

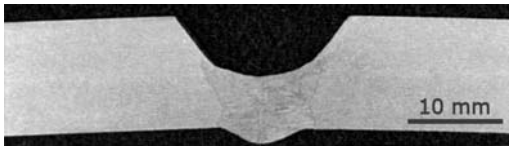


(1) The 1st or backing pass was water-cooled when the 2nd or final pass was welded to prevent reheat embrittlement of the 1st pass weld metal.





(b) Completed weld



(a) Appropriate root pass

Figure 3: The proper range of root gap and root face to obtain sound reverse bead appearance and macrostructure in one-side FCAW with DW-317L and FBB-3 backing material

An alternative welding process is flux cored arc welding (FCAW) for joining stainless steel plates, using flux cored wires. FCAW is more versatile than SAW because it allows all position welding and one-side welding using backing materials. Therefore, FCAW is used not only in plate-to-plate assembly but also in the block-to-block erection stage.

One-side FCAW is highly efficient but requires more control over welding variables to obtain consistent root pass welds, as compared with ordinary FCAW. As shown in Figure 3, besides controlling welding amperage, arc voltage, and welding speed, this process requires control over the root gap and root face size of the welding groove to provide sound root pass welds. A large root gap can cause excessive extrusion of the reverse side bead, which, if welding current is too high, is likely to contain hot cracks. By contrast, excessive root face causes insufficient extrusion of the reverse side weld bead, which, if welding current is too low, is apt to contain insufficient fusion and penetration.

Butt joint of stainless clad steels

Chemical tankers use stainless clad steels for their inner bottom plates, longitudinal bulkheads, and top plates of the cargo tanks (Figure 1). SMAW and FCAW are commonly used for joining these components because of superior performance in all position welding in the assembly and erection stages.

With either welding process, care must be taken not to fuse stainless steel clad when welding carbon steel base metals with carbon steel filler metals. If stainless steel clad is accidentally fused by carbon steel filler metal, the weld metal can contain considerable amounts of Cr and Ni, giving it a martensitic microstructure that may cause cracks in the weld metal. To avoid this trouble, carbon steel welding must be carried out while ensuring a certain clearance remains between the edge of the stainless steel clad and the toe of the carbon steel weld metal as shown in Figure 4.

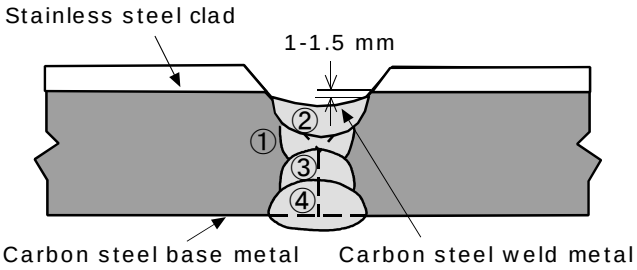
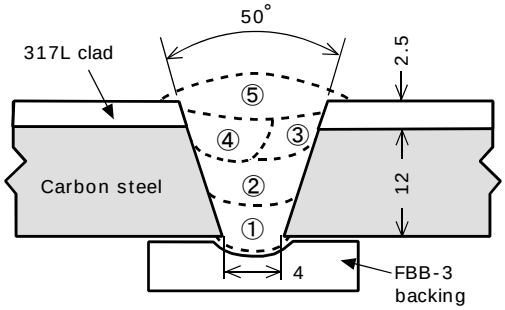


Figure 4: A clearance of 1-1.5 mm between stainless steel clad and carbon steel weld metal can prevent fusion between stainless steel and carbon steel weld metal.

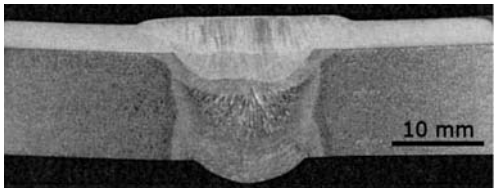
If the right amount of clearance is difficult to obtain as in the case of erection welding of cargo tank top plates (Figure 1), the carbon steel base metal can be welded with NC-39MoL (E309MoL-16) or DW-309MoLP (E309LMoT1-1/-4) in the flat position; the 317L stainless steel clad can then be welded with NC-317L (E317L-16) in the overhead position. In this way the problem of martensite formation and cracking can be eliminated.

Table 2: One-side FCAW of 317L stainless clad steel bottom plates with FBB-3 backing and DW flux-cored wires

Pass No.	Filler metal	Size (mm)	Welding position	Amp. (A)	Volt. (V)	Speed (cm/min)
1	DW-100	1.2Ø	Flat	200	24	15
2	DW-100	1.2Ø	Flat	280	30	25
3	DW-309MoL	1.2Ø	Flat	180	26	43
4	DW-309MoL	1.2Ø	Flat	180	26	30
5	DW-317L	1.2Ø	Flat	190	28	14



(a) Weld pass sequence

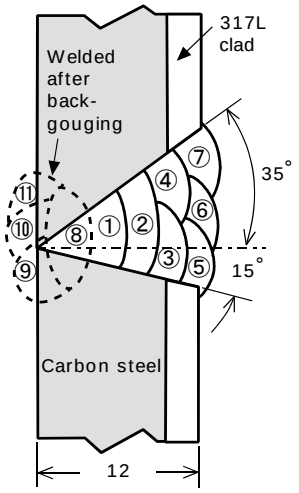


(b) Cross section macrostructure

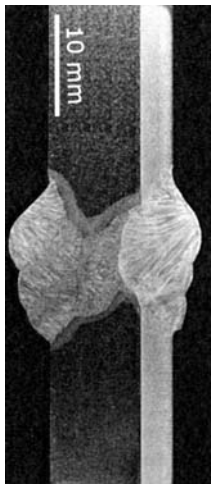
Butt joint welding of stainless clad steels is often conducted by FCAW in the flat and horizontal positions due to its higher welding efficiency. Table 2 shows how one-side FCAW can join bottom plates using FBB-3 backing. Table 3 shows how horizontal FCAW can be used for the longitudinal bulkhead in the horizontal position.

Table 3: The FCAW procedure for 317L stainless clad steel longitudinal bulkhead with DW flux-cored wires

Pass No.	Filler metal	Size (mm)	Welding position	Amp. (A)	Volt. (V)	Speed (cm/min)
1	DW-100	1.2Ø	Horizontal	180	24	36
2	DW-100	1.2Ø	Horizontal	280	30	54
3	DW-309MoL	1.2Ø	Horizontal	180	26	60
4	DW-309MoL	1.2Ø	Horizontal	180	26	50
5	DW-317L	1.2Ø	Horizontal	180	26	60
6	DW-317L	1.2Ø	Horizontal	180	26	50
7	DW-317L	1.2Ø	Horizontal	180	26	43
8	DW-100	1.2Ø	Horizontal	260	30	75
9	DW-100	1.2Ø	Horizontal	220	26	45
10	DW-100	1.2Ø	Horizontal	220	26	35
11	DW-100	1.2Ø	Horizontal	220	24	34



(a) Weld pass sequence



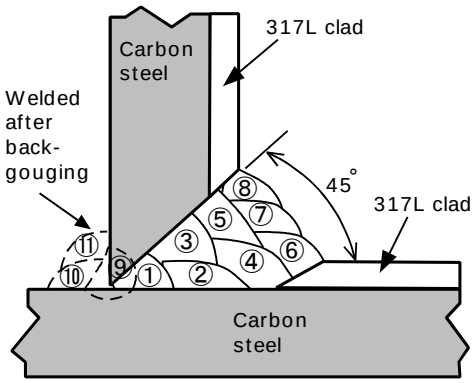
(b) Cross section macrostructure

T-joint of stainless clad steels

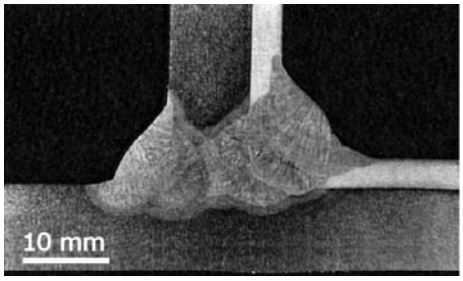
In a chemical tanker's cargo tank, T-joint butt welding is used mainly to joint the top plate or bottom plate and longitudinal bulkhead or transverse bulkhead, respectively as shown in Figure 1. A typical T-joint butt weld of the bottom plate and longitudinal bulkhead is shown in Table 4.

Table 4: The FCAW procedure for 317L stainless clad steel T-joints between the bottom plate and longitudinal bulkhead

Pass No.	Filler metal	Size (mm)	Welding position	Amp. (A)	Volt. (V)	Speed (cm/min)
1	DW-100	1.2Ø	Horizontal	230	26	36
2	DW-100	1.2Ø	Horizontal	280	30	60
3	DW-100	1.2Ø	Horizontal	280	30	65
4	DW-309MoL	1.2Ø	Horizontal	180	26	32
5	DW-309MoL	1.2Ø	Horizontal	180	26	35
6	DW-317L	1.2Ø	Horizontal	180	26	25
7	DW-317L	1.2Ø	Horizontal	180	26	45
8	DW-317L	1.2Ø	Horizontal	180	26	50
9	DW-100	1.2Ø	Horizontal	260	29	43
10	DW-100	1.2Ø	Horizontal	260	29	48
11	DW-100	1.2Ø	Horizontal	260	29	55



(a) Weld pass sequence



(b) Cross section macrostructure

Pipe welding in chemical tankers

The bridge and cargo tank of chemical tankers are equipped with the pumping and associated piping systems (Figure 5) to load and discharge cargos. Austenitic and duplex stainless steel pipelines for the piping system are mostly assembled at the factory and later erected on the ship. For fabricating pipelines, root pass welding by gas tungsten arc welding (GTAW) ensures the quality of girth weld joints.

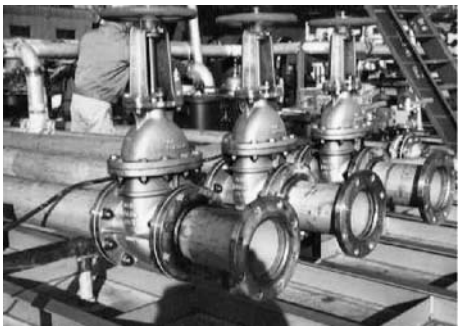
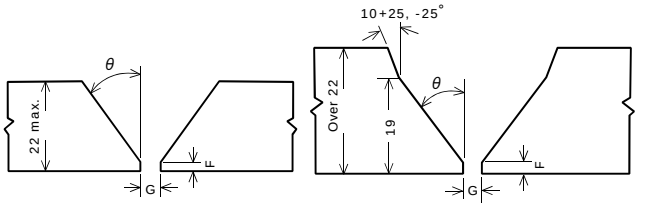


Figure 5: Stainless steel pipelines mounted on the deck of a chemical tanker

To ensure the quality of the root pass weld, groove preparation is essential. Table 5 shows the requirements of some standards and Kobe Steel's recommendation for groove configuration.

Table 5: Proper groove configuration of pipe joints (1)



	Bevel angle, θ (degree)	Root face, F (mm)	Root gap, G (mm)	Misalignment, max. (mm)
ANSI B31.3	37.5±2.5	1.6±0.8	-	-
ANSI B31.4	30+5, –0, 37.5±2.5	1.6±0.8	-	-
API 1104	-	-	-	1.59
Kobe Steel's recom.	35-40	0.4-2.0	2.5-3.2	0.8

(1) ANSI B31.3: Chemical plant and petroleum refinery piping
ANSI B31.4: Liquid petroleum transportation piping system
API 1104: Standards for welding pipelines and related facilities

In root pass welding of austenitic and duplex stainless steel pipes, back shielding is a must to prevent oxidation in the reverse side bead as long as solid filler rods are used. With flux-cored GTAW filler rods (e.g. TGX-316L), no back shielding is required because the slag generated during welding protects the surface of the reverse bead from the atmosphere. The filler passes are typically welded by GTAW, SMAW, and FCAW depending on the wall thickness and diameter of pipes.

Metallurgical considerations

Unlike fully austenitic stainless steel, the matching weld metal generally contains the proper amount of ferrite (approx. 3-10FN for 316L and 317L filler

metals) in the austenite matrix to resist hot crack and corrosion, and control the mechanical properties. The ferrite content of weld metal, however, can vary according to the base metal dilution ratio; the dilution ratio rises as welding current and speed increase as shown in Figure 6. With 1.2Ø flux-cored wire, welding currents should be 150-200A, and welding speeds should be 20-40 cm/min; with 1.6Ø, 200-250A, and 20-30 cm/min. In welding the buffer layer of stainless clad steel joints, current and speed are essential to control the ferrite content of austenitic stainless weld metal, thereby preventing hot cracking.

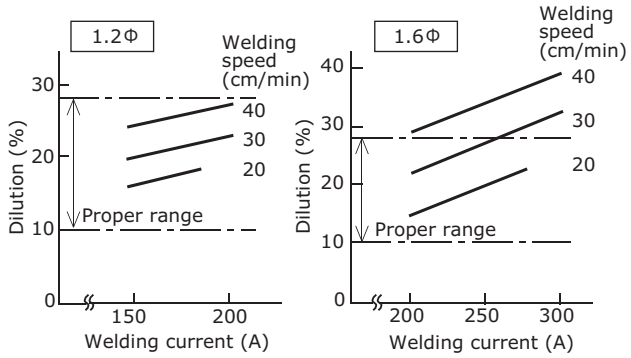


Figure 6: Dilution ratio as functions of welding current and speed in overlay welding with DW stainless flux-cored wire

As for duplex stainless steel welding, the weld metal is almost as susceptible to hot cracks as austenitic stainless weld metal; therefore, welding current and travel speed must be controlled to prevent hot cracks as shown in Figure 7.

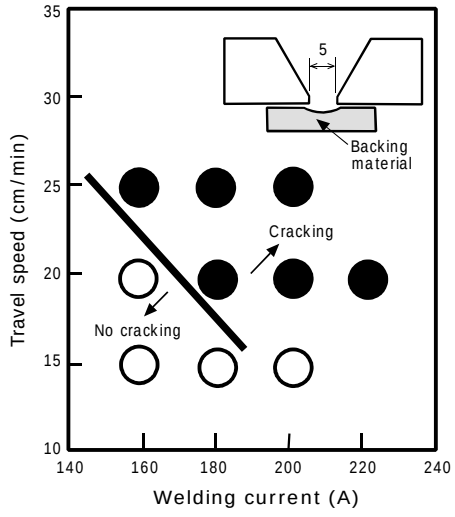


Figure 7: Hot crack susceptibility of DW-329AP root pass weld metal in one-side FCAW with FBB-3 backing

"Sensitization" is a serious problem encountered in welding austenitic stainless steel. It is accompanied by Cr carbide precipitation at the austenite grain boundaries of the base metal in the heat-affected zone when heated from 500-800°C. The carbide precipitation depletes corrosion-resistant, uncombined chromium at the vicinity of the grain boundaries. The low-chromium regions along the grain boundaries are thus more susceptible to corrosion. This phenomenon is called "sensitization," and thereby the weld becomes more sensitive to intergranular corrosion and stress corrosion cracking.

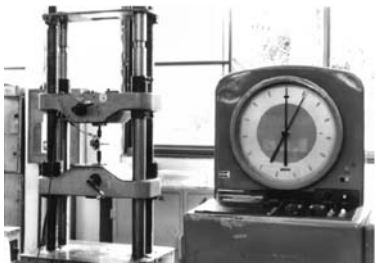
To minimize sensitization, the use of low carbon grades of stainless steel (e.g. 316L, 316LN, and 317L) is essential. In addition, heat input should be decreased to diminish the width of the heat-affected zone of the weld. Finally, interpass temperatures should be kept lower than 150°C to cool the weld faster during welding.

Tips for correct handling of stainless steels and filler metals

(1) SCRATCHES AND CONTAMINANTS (e.g. iron powder, spatter, and oil) can damage the passive coating on the surface of stainless steels, thereby causing rust and pitting. Several techniques are available to minimize these problems: (a) using scratch-free clamping jigs, (b) avoiding the use of magnet lifting devices, (c) putting wooden bars between stainless steel plates to prevent direct plate-to-plate touching, (d) preventing stainless clad surfaces from facing carbon steel base metal surfaces, (e) using stainless steel jigs for bending stainless steel plates, (f) protecting stainless steel surfaces by applying spatter removal agents and plywood sheets, and (g) distinguishing among slag hammers, wire brushes, and grinder stones used for stainless steels and carbon steels.

(2) MOISTURE CAN CAUSE pit and worm-tracking porosity in the weld metal. To avoid these problems, once a flux-cored wire or solid wire has been unpacked, the remaining spool of wire should be kept in a low humidity room, taking preventive measures against dew and dust. As for covered electrodes and SAW fluxes, the absorbed moisture can be removed by drying them in an electric oven according to specified temperature and soaking time.

Yield Point and 0.2% Offset Yield Strength



The tensile test can reveal several important engineering properties of materials. These properties are strength (yield point, yield strength, and tensile strength) and ductility (elongation and reduction in area). The strength and ductility of metals are generally obtained from a simple uniaxial tensile test in which a machined specimen is subjected to an increasing load. The stress (load divided by the original cross-sectional area, N/mm^2 or MPa) can be plotted against the strain (elongation divided by the original gage length, %) as shown in Figure 1.

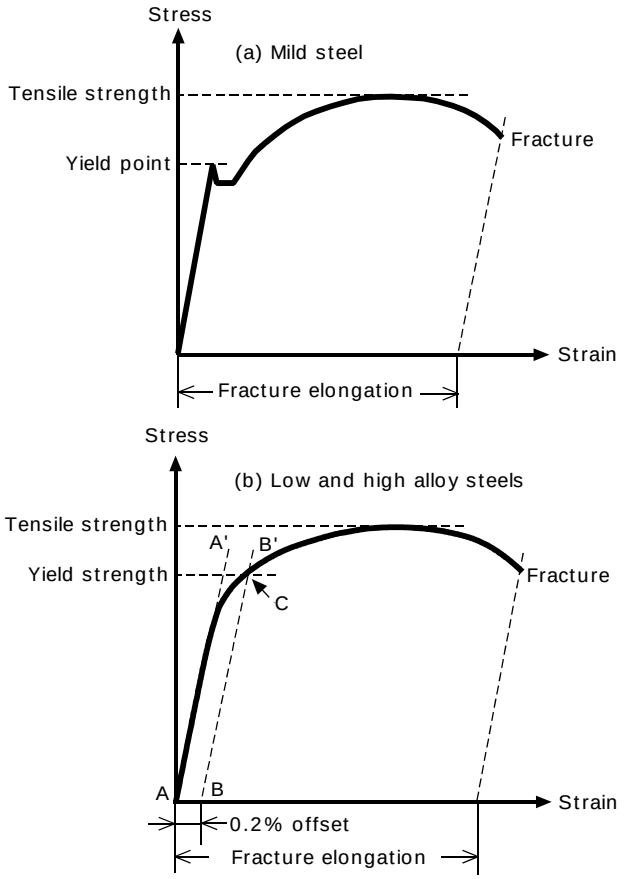


Figure 1: Stress-strain curves for mild steel and low and high alloy steel

The stress-strain curve can vary in configuration according to the properties of the metal tested and the testing temperature. The stress-strain curve of mild steel at room temperature, as in Figure 1(a), displays the point where plastic elongation occurs with no increase in load. This specific point is called the “yield point (or upper yield point).”

By contrast, the stress-strain curve of low alloy steel (e.g. high strength steel and heat-resistant steel) and high alloy steel (e.g. stainless steel) exhibits no such a specific yielding point but produces a smooth curve as shown in Figure 1(b). In this case, the stress required to produce an offset (plastic deformation) amount of 0.2 percent is generally used for the standard strength equivalent to the yield point, which is called “0.2% offset yield strength” or “0.2% proof stress.” Both yield point and 0.2% offset yield strength are often referred simply to as “yield strength” or “yield stress.”

In Figure 1(b) the straight solid portion (the straight modulus line) of Line A-A’ traces the specimen elongation over the original gage length with increasing stress. This linear proportionality between stress and strain represents Young’s modulus (modulus of elasticity) for the metal tested. If the load on this tension specimen is removed at any point along the straight modulus line, then the specimen length will return to its original dimension; thus absolute elasticity is demonstrated by the metal. Note Point B on the strain axis, and draw a line from there to Point B’ parallel to Line A-A’. The point C, where the 0.2% offset line (B-B’) intersects the stress-strain curve, is the 0.2% offset yield strength.

As for weld metal, the characteristic of yielding is similar to that of the steel materials mentioned above. That is, filler metals for mild steel (E6019 and E6013) display the yield point on the stress-strain curve of the weld metal, while filler metals for high strength, heat-resistant, and stainless steel exhibit no yield point on their stress-strain curves. Therefore, in the latter case, 0.2% offset yield strength is used as shown for individual brand data in Kobelco Welding Handbook.

In the design of steel buildings and bridges, yield strength is used for the standard strength to develop the allowable stress according to the specified safety factor. In the case of pressure vessels the allowable stress is developed based on yield strength as well as tensile strength according to the service conditions.

The Production Philosophy of KWE

R. Boumans
Production Manager
KWE

Producing stainless steel flux-cored wires since 1996, the Production Department of KOBELCO WELDING OF EUROPE (KWE) has developed into a steady workforce of 23 employees including the maintenance dept.

Because our customers insist on high quality, fast delivery, and flexibility, KWE is therefore implementing modern production techniques, such as self-controlling and self-steering production units. This approach asks for more responsibility and awareness from the workers but results in their having tighter relationship with their jobs.

However, for any chosen production system to succeed in ensuring growth, obviously the soil needs to be firm and of high quality. In reality this means that we first have to make sure that we have motivated workers who engage in good and fruitful communication and work in a positive atmosphere. Often this is underestimated by many companies, and as a result they have high effort and low results, since nobody enjoys or is aware of the importance of their jobs. In this part KWE made a lot of investment.

Finally, to let the process run successfully for the long term, KWE has set up a system of self-improvement. Themes are chosen to improve machinery, to continuously update operation manuals, or to implement automation where ever possible. We are also providing more frequent education to workers, and selecting more items for cost reduction.

Max. production; Max. Sales

Hiroyuki Kawasaki
Dpty General Manager
Business Dept.,
KWK

We, at KOBE WELDING OF KOREA (KWK), manufacture and sell mainly flux-cored wires for carbon steel. Our main customers are big shipbuilders in Korea, who are enjoying brisk business but their demand is well over KWK's production capacity of 1,200 tons per month, causing a continuing tight supply-demand situation. Though production plans are based on a projection of sales covering the months ahead and on firm communication between the sales and production sides, we suffer because the production schedule must often be changed to comply with customer's demand for immediate delivery upon receipt of an order.

To overcome this situation, we have proposed and implemented many improvements across the overall production system, including improving production speed, reducing the frequency of and time for production schedule changes, and enhancing the yield ratio, through integrating the sizes of hoops and semi-finished products. As a result, we are now capable of manufacturing 1,500 tons per month, fulfilling very active demand.

In addition to responding to quantitative demand, we are also trying to comply with qualitative requests from customers by expanding the range of technologically dominant products such as high-quality flux-cored wires for high-speed fillet welding and low-temperature steel. We will continue to strive to fulfill our customers' quality and delivery needs based on consistent quality while pursuing maximum production and sales.

Being Better!

Ang Sim Guan
Asst. Production Manager
KWS

As you may know, SINGAPORE is a multi-ethnic country, and KOBE WELDING SINGAPORE (KWS) has an identical constitution as its cornerstone. You can listen to English and Singlish, as the main languages along with Chinese, Hindi and Japanese in our factory but we all communicate well and have no problems working together.

This year, KWS' average production is 1,200 MT/month, which is double that of five years ago. Our production combines five brands in 18 sizes produced by only one production line. We have been working to improve the production quality in addition to making new investments in the production facility. Our everlasting challenge is employing KAIZEN (continual improvement) on the yield ratio of our products and on reducing excess production time on our single line that often suffers due to too many brands/sizes on our menu. Another factor that gets better performance out of the production line is routine maintenance, which must be the most important activity performed on the production facilities in our factory. These machines would not take a rest by their own will. If you did not take care of them, the result would be..., you know.

I am proud of KWS and my co-workers because we are a group that will never accept things as they are and keep trying to reach the next step.

Bright Future of KWT

Zhou Fang
Foreman
Manufacturing Section
Manufacturing Dept.
KWT

As sales are growing continuously, the Manufacturing Department is becoming busier and busier day by day at KOBE WELDING OF TANGSHAN (KWT). As production volume grows, we are faced with new tasks to tackle. How do we secure consistent quality of products while we increase production? How do we achieve cost reduction to survive in the very competitive market when prices of raw and auxiliary materials are getting higher? How do we respond to customers' demands swiftly? These are the main tasks that are imposed on us.

The staff and workers of the Manufacturing Department are as young as 22 years in age on average. The cooperation and efforts of these young people, guided by the General Manager and Section Manager of the Department, has lessened various and hitherto-frequent troubles and machine failures by leaps and bounds. This indicates, I am convinced, that the assistant manager, foreman and group leaders took pains to identify the cause of each problem, design countermeasures and train all the people concerned, which has led the workers to improve their skills and develop quality consciousness. We are continuing strenuous efforts, believing that a bright future is promised for KWT if we set our wisdom to work and challenge tasks confronting us.

Hello, from the production site!

Nopporn Katepan
QC Senior Manager
TKW/KMWT

In the wet season this year we have had little rain here in the Bangkok metropolitan region, and it is not so hot as usual. By contrast, in the northern province of Chiangmai, they had heavy rain causing big floods. As we have seen on TV news, foreign countries have also had extremely strong typhoons and hurricanes causing terrible floods. Such abnormal weather has made us become more aware of global environmental problems that can directly affect our daily life.

I joined THAI-KOBE WELDING (TKW) in 1992 right after graduation and started working for the Maintenance Section. After five years, in 1997, I was assigned to the Production Section to take up a new job of controlling the production of welding electrodes. Today, I have got a new mission for quality and technical control. I am doing my best to achieve consistent quality of our products and to improve it further to respond to the users' desire for better quality.

Our workers have been engaged in long term services, having sufficient skills for professional production activities. They also provide very good support to all the quality control activities including Quality Control Circle, Safety Practice, five Ss, and ISO 9001:2000 QMS. Now, we are under preparation for obtaining the certificate of ISO 14001:2004 EMS.

We are determined to provide quality products and services to satisfy our users. Please visit Thailand and our factory...we will welcome you.

KOBELCO WELDING TODAY
October 2005, Vol. 8 (No. 4)

Publisher:
International Operations Dept., Welding Company, Kobe Steel, Ltd.
Editor:
KOBELCO WELDING TODAY Editorial Staff
URL: http/www.kobelco.co.jp
E-mail: iod@melts.kobelco.co.jp