

AUSTRALIAN STAINLESS

SPECIALISING IN STAINLESS STEEL AND ITS APPLICATIONS

#36
WINTER
2006



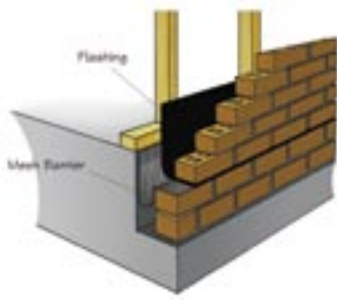
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ASSDA

BUILDING SUSTAINABLY WITH STAINLESS STEEL TERMIMESH



Residential developers are encouraging new homebuyers to adopt more environmentally friendly materials when building - a trend that is growing in strength throughout many Australian capital cities and regional towns.

The Old Broome Estate's Sustainable Home Award is offering \$20,000 cash as a first prize incentive to a homeowner/builder who can best meet the sustainable design guidelines.

One sustainable element specified in the guidelines included using a non-toxic white ant deterrent such as Termimesh, a stainless mesh barrier manufactured by ASSDA member, TMA Corporation (formerly Termimesh Australia).

Termites nest in the ground underneath homes and if left unchecked can make a meal of timber floorboards and supporting frames.

When a house has been identified as infested, immediate disruptive and expensive repairs, spraying and annual checks are required.

Termite damage is not commonly covered by normal household insurance, so land owners planning on building a new house should be proactive in specifying safe and effective termite protection.

The Termimesh System is produced from a proprietary, specialised grade of stainless steel that provides a highly effective and long life

protective barrier against termites without the spraying of chemicals.

Termimesh works just like an insect screen. The mesh barrier is expertly installed across concealed potential termite entry points during the early stages of construction.

Termimesh is included in the Australian Standard - Protection of Buildings from Subterranean Termites, and has been assessed through the CSIRO product appraisal system.

With the backing of a 10 year warranty, many leading home builders throughout Australia include the Termimesh System as their standard specification for termite control.

In addition, the Australian developed System has been exported overseas to South East Asia, Japan and the United States.

CONTACT:

- > Old Broome Estate - www.oldbroomeestate.com
- > TMA Corporation
(formerly Termimesh Australia Pty Ltd)
48 Century Road, Malaga WA 6090
Phone (08) 9249 3868 Fax (08) 9249 1021
www.termi-mesh.com

STAINLESS REBAR ENHANCES TECHNOLOGY PERFORMANCE



Stainless steel's non-magnetic properties were an important factor in the design, building and construction of the University of New South Wales' (UNSW) new Analytical Centre.

The facility has been designed to enhance the performance of high-tech analytical equipment such as the UNSW's nuclear magnetic resonance instruments (NMRs).

The centre is one of six components in the North Mall Development Zone (NMDZ) project, located within the Kensington Campus of the University of New South Wales (UNSW).

According to Mr Ed Smith of McLachlan Lister, the Project Directors of the NMDZ, building will accommodate both staff and equipment from the University's existing Electron Microscopy Unit (EMU), Nuclear Magnetic Resonance (NMR) and centre and eight other technical scientific instrument centres.

"The five NMRs within the Analytical Centre will emit very strong electromagnetic fields. A standard ferrous concrete reinforcement would adversely effect these fields and consequently the performance of these machines".

ASSDA member, Ancon Building Products supplied 150 tonnes of 304 and 316 grade



stainless steel ribbed reinforcement bar for the concrete slabs, beams, piles and columns.

Both 304 and 316 stainless steel are non-magnetic and strong enough to replace carbon steel reinforcement bar in the design.

Some stainless steel pile cages were passivated after welding. Ancon Building Products cut and bent all bars to schedule, longer bars were created using stainless mechanical couplers, which were custom fabricated.

CONTACT:

- > Ancon Building Products
114 Kurrajong Avenue, Mt Druitt NSW 2770
Phone (02) 9675 1000 Fax (02) 9675 3390
www.anconbp.com.au
- > Bovis Lend Lease - www.bovislendlease.com.au
- > McLachlan Lister - www.mclachlanlister.com
- > Taylor Thomson Witting - www.ttw.com.au

STAINLESS STEEL 'TRAVELLERS' MARK JOURNEY OF MIGRATION



Telling the tale of migration to Victoria is 'The Travellers', a series of giant stainless steel sculptures sliding quietly across the Sandridge Rail Bridge on Melbourne's Yarra River.

Unveiled just three days from the start of the Melbourne 2006 Commonwealth Games, the 10 sculptures are a tribute to multiculturalism.

Each of 'The Travellers' figures represents a period from our Indigenous and immigrant histories (as defined by historian Dr James Jupp) and were designed by Lebanese Artist, Nadim Karam of Atelier Hapsitus.

'Gayip - The Aboriginal Period', the first sculpture, is stationed permanently on the river bank to depict the Indigenous owners of the area who were here already.

Nine of the 10 sculptures cross the river three times a day on a fixed bogie system to represent stages of migration in Australia's history from the convict and gold rush periods through to European and refugee settlement.

More than 3.7 km of stainless steel (in 4455 pieces) was used to create the sculptures.

ASSDA member, Silverstone Engineering fabricated the majority of the 10 sculptures from grade 316 stainless steel supplied by ASSDA Major Sponsors, Sandvik Australia Pty Ltd, Atlas Specialty Metals and ASSDA Member, Midway Metals Pty Ltd.

The remaining stainless steel sculptures were fabricated by Danfab, JW Metal and Able Engineering.

Stainless steel rectangular hollow sections were used on the outer frames. The inner rails



were made of pipe and bar. Some of these rectangular hollow sections were inductarolled (rolled after heating by using an induction furnace) by Melbourne company, Inductabend, with a discoloured zone or heat band running around the material.

The sculptures required much tighter radii than had previously been delivered, and Inductabend's equipment was pushed to its limits when bending the steel sections.

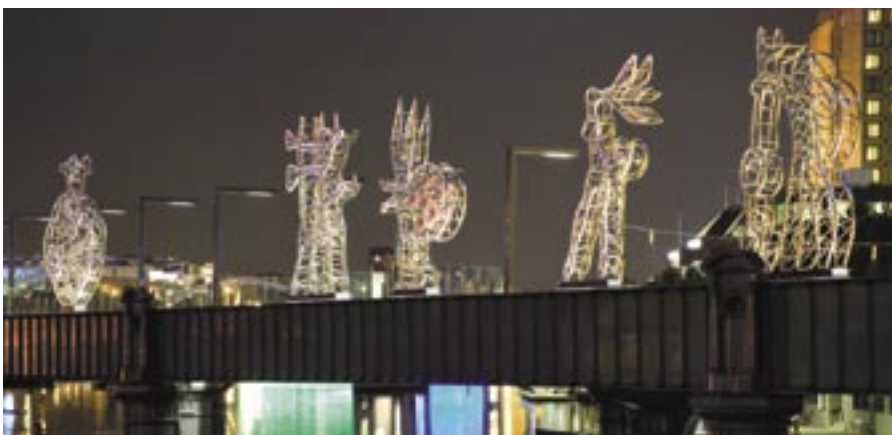
Following fabrication, the sculptures were then polished to 0.4 Ra, cleaned and then passivated to ensure high corrosion resistance.

Originally built in 1888 by David Munro, the Sandridge Bridge is considered one of the earliest examples of steel girder bridge construction in Australia.

The \$3 million 'Travellers' sculptures project was part of a \$18.5 million Sandridge Bridge Precinct development funded by the City of Melbourne and the State Government that includes a new pedestrian bridge, a plaza and a youth precinct on the north bank.

CONTACT:

- > Atelier Hapsitus - www.hapsitus.com
- > Atlas Specialty Metals
Lynch Road, Altona North Vic 3025
Phone (03) 9272 9999 Fax (03) 9272 9966
www.atlasmetals.com.au
- > Inductabend Pty Ltd - (03) 9315 1244
- > Midway Metals
33 Tatterson Road, Dandenong Vic 3175
Phone (03) 9791 5111 Fax (03) 9791 5333
www.midwaymetals.com.au
- > Sandvik Australia Pty Ltd
Cnr Fowler Road and South Gippsland Hwy
Dandenong Vic 3175
Phone (03) 9238 7200 Fax (03) 9238 7205
- > Silverstone Engineering
29-31 Horne Street, Hoppers Crossing Vic 3029
Phone (03) 9369 1830 Fax (03) 9369 1899
Email agjones@bigpond.com.au



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TECHNICAL ARTICLE:

No 4 - THE WORKHORSE FINISH



No 4 FINISH STAINLESS STEEL IS THE WORKHORSE OF THE LIGHT FABRICATION INDUSTRY. THE EASIEST OF THE FINISHES TO MAINTAIN, No 4 FINISH IS USED FOR WORK SURFACES, HANDRAILS AND WHERE APPEARANCE IS IMPORTANT.

A 'No 4' surface is produced by cutting the surface with abrasive belts to remove a very small amount of metal without affecting its thickness.

For architects and designers, No 4 finish gives low gloss and best apparent flatness of panels. For fabricators, the No 4 finish is directional, allowing easy matching of surfaces and refinishing of welds. For end users, the surface can be repaired to remove any service damage.

No 4 finish is duller than the other common finishes, 2B and BA and is generally used where lower reflectivity or gloss is required and where welds and other fabrication marks are to be refinished to match the original surface. This is not possible with 2B and difficult with BA.

Abrasive belts have very fine grains of refractory material such as silica, alumina and zirconia embedded in an adhesive layer on a flexible cloth or paper backing. The belts are wider than the stainless steel, which is usually worked on as coil, or sometimes in individual sheets. The steel is run slowly under rolls, on which the abrasive belts run.

The polishing machines at stainless steel mills lubricate the cutting action by flooding the strip with oil. This helps to keep it cool, and gives a finer, more uniform surface.

The variability of the process means not every No 4 finish looks the same, even from the same source. Different manufacturers use belts with different combinations of grit sizes, and the finish can vary through the life of a set of belts.

Where it is important that the appearance of material matches on a job, it should all be taken from the same pack of sheets, used sequentially and in the same orientation. A reasonable match in appearance can be achieved more readily with No 4 finish than with 2B or BA mill finishes.

STANDARDS

Until recently, standards defined No 4 finish in terms of the coarseness of the abrasives used to produce a general purpose finish widely used for restaurant equipment, kitchen equipment, shopfronts and food processing. New editions of the American and European standards define limits of surface roughness achieved.

Finishes produced by use of abrasives may be called ground or polished or abraded or linished. These words describe a process and do not specify the end result.

ASTM A480 defines No 4 finish simply as, "General purpose polished finish, one or both sides". It also states, "No. 4 - A linearly textured finish that may be produced by either mechanical polishing or rolling. Average surface roughness (Ra) may generally be up to 25 micro-inches (0.64 micrometres). A skilled operator can generally blend this finish."

The practice in Australia is only to use 'No 4' as a description of a polished finish and it is not a rolled finish. The European standard, EN10088-2, defines two finishes, '2J' and '2K'. There is no prescription of the appearance or roughness of the '2J' finish, but '2K' is defined as surface Ra below 0.5 micrometres. The notes state, "Additional specific requirements to a 'J'-type finish, to achieve adequate corrosion resistance for marine and external architectural applications."

The surface traces of Figures 1 and 2 show comparisons between typical No 4 and 2B finishes. Unlike a 2B finish which is generally rougher on thicker coil, the roughness of No 4 does not vary with the steel thickness.

While Ra can be specified to give better control of the corrosion properties of the surface, it correlates only moderately with appearance and is also difficult to measure reproducibly.

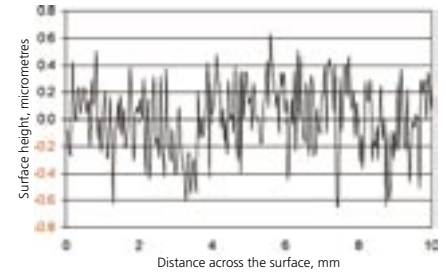


Figure 1: Surface trace of a typical No 4 finish (Ra = 0.41 micrometres)

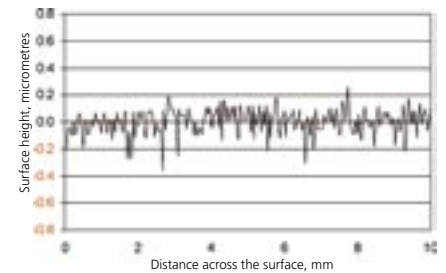


Figure 2: Surface trace of a typical 2B finish (Ra = 0.20 micrometres)

Gloss is the amount of light reflected whether specular (mirror like) or diffuse. It is moderately correlated with appearance and with surface roughness, but can also have problems when used for specification.

Neither Ra nor gloss are suitable for specification for critical jobs in architecture. Two finishes with the same Ra can look substantially different, as can finishes with the same gloss level.

For critical jobs appearance is best specified using reference samples viewed under agreed conditions. These should be large enough that they can be viewed from a variety of angles and distances - appearance can vary with viewing angle.





CORROSION RESISTANCE

The corrosion resistance of a No 4 finish is usually lower than that of a mill finish (BA or 2B) on the same grade.

The surface scratches or grooves produced by abrasion expose sulphide inclusions, which are always present in all steels, and can act as a catalyst for corrosion.

The passive surface layer is more likely to be disrupted somewhere on the vastly increased surface area with all its sharp peaks and deep valleys. It is difficult to keep the surface clean when there are intersecting valleys, torn metal flaps or peaks that have been folded over.

Corrosion resistance may be reduced depending on the stainless steel grade used. By using grade 316 with a No 4 finish in aggressive environments, the corrosion resistance is negated and may be less than on 304 with a 2B or BA finish.

Figure 3 shows the results of electrochemical tests for corrosion of a polished surface. Corrosion resistance of a smooth surface can be better than the corrosion resistance of an abraded surface of a more highly alloyed grade.

The orientation of the No 4 finish is also important. When the lines on the surface are vertical, drainage is easier and corrosion resistance is better than when the lines are horizontal.

The reduced corrosion resistance of the No 4 finish is not likely to be of concern in mild applications such as food preparation and display. However, in more aggressive conditions such as marine and industrial atmospheres

it is important to be aware of the reduced corrosion resistance of No 4 finish and to take steps to improve the resistance.

Corrosion resistance of No 4 finish can be improved by pickling the surface in a mixture of hydrofluoric and nitric acids, or passivating in a nitric acid solution.

The passivation treatment dissolves the sulphide inclusions in the surface, but doesn't change the appearance of the surface. The pickling treatment is more aggressive and removes both the sulphide inclusions and some of the rougher parts of the surface, dulling the appearance.

Unfortunately it is almost impossible to achieve a uniform finish, and it is rarely practical to pickle for better corrosion resistance. Passivation is often used. ASTM A967 "Chemical Passivation Treatments for Stainless Steel Parts" specifies a number of treatments with various acid strengths, temperature and contact time.

Electropolishing the surface can also improve the corrosion resistance and brighten the surface. The peaks on the surface are smoothed, reducing the Ra value and increasing the reflectivity or gloss. The sulphide inclusions may also be removed or reduced.

PROTECTION OF THE SURFACE

No 4 finish is usually supplied with a protective plastic film of white polyethylene, which often has printed lines on the plastic in the same direction as the No 4 polish.

It is best to keep the film on the surface of the steel during fabrication, to prevent handling and transport damage. The film has limited

resistance to sunlight, and should not be left on the steel in the sun for more than a week or two – an hour or two if the film isn't black underneath. The film may bake onto the surface and either become brittle or tear into strips on removal, or leave the glue on the steel surface.

Glue on the steel will trap dirt, and may cause rapid surface discolouration or tea staining. If it is suspected there is residual glue on the steel, swab the surface with a solvent such as Methyl ethyl ketone (or MEK - a solvent) available from panel beaters suppliers. You may need to test other solvents, depending on how the glue has polymerised.

The water break test tells you the surface is clean – clean water dries as a film, doesn't stand in bubbles on the surface. A final wipe with a glass or window cleaner will ensure a streak free finish.

CLEANING

No 4 finish can usually be kept clean by wiping down with a damp soft clean cloth. For grease, moisten the soft cloth with ammonia solution, or with one of the household liquid grease removers. Very hot water is also quite effective.

Wiping should always be in the direction of the polishing lines. Some No 4 finishes can pull threads and fluff from the cloth which are very hard to get off the steel.

Abrasive cleaners and materials such as Scotchbrite™ should never be used as these will change the appearance of the surface. If you want to change it, try an inconspicuous area, then treat the whole surface – but it's difficult to get it uniform.

There are also white powder stainless steel cleaners (Clark and Esteele), made of sulphamic acid, which can be wiped over the surface on a damp rag to brighten it – test an inconspicuous area first. Fingerprints can be made less obvious by applying a light oil to the surface. There are many proprietary products available, usually labelled 'stainless steel cleaner'. Choose an oily one, although it will tend to trap dust.

This ASSDA technical article was written by Dr Alex Gouch, Development and Technical Manager of Austral Wright Metals.

ASSDA acknowledges the assistance and contribution of Mr Peter Moore, Technical Services Manager of Atlas Specialty Metals and Dr Graham Sussex, ASSDA Technical Specialist in the production of this article.

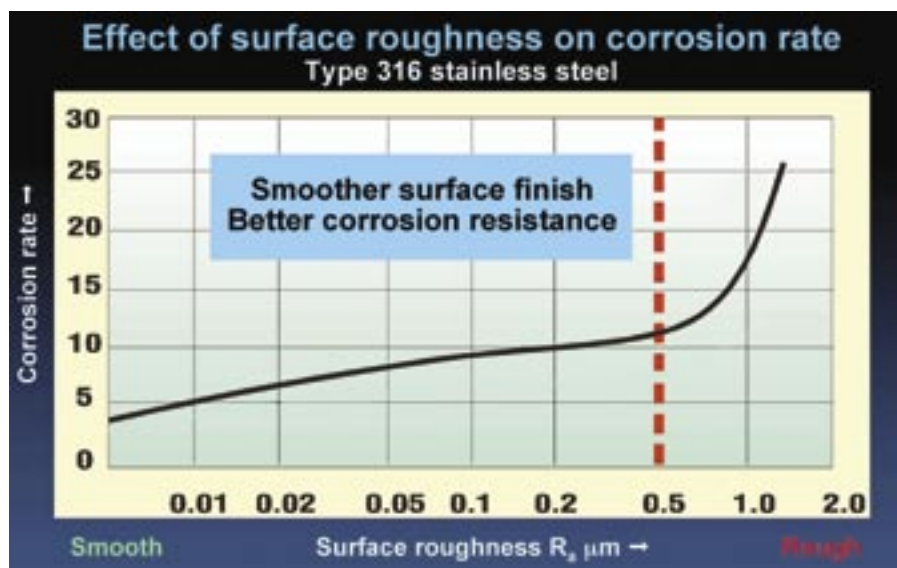


Figure 3: The acceleration of the corrosion of the surface at Ra above 0.5 micrometres is apparent.

REMEMBERING A LOVED ONE — FOREVER SHINING IN STAINLESS



When a loved one passes, you want to remember your special person's life with a suitable monument that reflects your love. After losing a loved one, two men came up with a shining memorial of stainless steel that would help make the memory of a loved one shine forever.

With no prior experience or previous interest in cemetery and crematorium industry, mechanical engineers Allan Burman and Albert Boer started a business to manufacture and supply modern stainless steel memorials.

Allan's daughter, Nicole, was a vibrant, energetic, artistic, high achieving, talented young woman.

Unfortunately, Nicole was diagnosed with a serious brain tumour in her fifth year of medical studies. She was so determined to become a doctor that she successfully completed her medical degree after brain surgery.

Many other people in similar circumstances would have given up. Nicole successfully

completed her internship while battling with a life threatening disease, but passed away during her specialist training and studies.

After Nicole's death they visited her grave which was surrounded by a sea of conventional colourless black, white and grey monuments. Even though many of these stone monuments were well presented they were not Nicole's style.

During this time they met other people who had lost a loved one and, like them, were dissatisfied with the memorials currently available.

They realized that there was a need and desire on the part of loved ones for a beautiful, long lasting, stylish alternative from those traditionally available. They believed that there must be a better way for people to remember their loved ones.

In joint discussions with their wives, Susie and Judy, they drew upon their engineering knowledge and expertise

and brainstormed various possible ideas, concepts and compatible materials to produce what they believed to be low maintenance memorials that were modern, structurally sound, durable and colourful.

Allan and Albert initially designed a prototype of a full size stainless steel monument complete with patented applied laser cut inscription and motif backed by glass to produce vibrant colour.



In the case of reburial, the cemetery staff can remove the whole monument from the grave in order to prevent any damage to the monument during the digging process.

This monument was featured on the New Inventors program on ABC Television.

Since that time, much research and development has taken place and their range of products has expanded considerably to include monuments, headstones, plaques, urns and personalized memorabilia.

The mission of Forever Shining is to produce beautiful, durable and long lasting memorials that the family and friends of the departed desire. These memorials are designed to preserve the memories of their loved ones for as long as possible for their families and future generations.

Forever Shining have incorporated proven new and old materials including stainless steel, granite, crystal and glass into modern styles and designs to give a new look which meet the expectations and needs of a changing society.

The company has developed an interactive website - www.forevershining.com.au - where potential customers can design their own memorial online.

CONTACT:

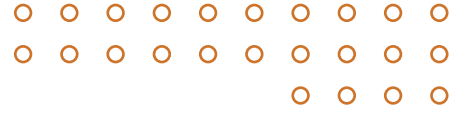
- > Forever Shining - Phone 1300 851 181
www.forevershining.com.au
- > Stirlings Australia
Cnr Baile Road and Modal Crescent
Canning Vale WA 6155
Phone (08) 9366 6700 Fax (08) 9366 6710
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MANUFACTURING MALT WITH STAINLESS STEEL



Australians really enjoy a good beer - at home barbeques, parties, music concerts, sporting events - in fact, everywhere!

World beer consumption is increasing by more than two per cent a year, a trend that is set to continue. There is an important relationship with beer consumption and demand for its main and critical ingredient - malt.

Malting is the partial germination and kilning of a grain, usually barley. Malt gives varying colour, flavour and body to beer depending on the style of malt being used.

Australia is a key player in the world market representing about 32 per cent of world trade in malting barley and 12% of the world malt trade.

Joe White Maltings, an ABB Grain Ltd company, is Australia's largest malt producer with eight malting plants Australia-wide with a capacity to produce 500,000 tonnes annually.

An expansion at the company's Perth plant in May 2006 saw production capacity more than double from 90,000 tonnes to 200,000 tonnes.

As the largest malting facility in the southern hemisphere, the Perth plant features stainless steel vessels throughout with cylindrical-conical steep vessels, circular germination vessels, a separate circular kiln, full automation and in-place cleaning.

ASSDA member, Stirlings Australia sourced more than 155 tonnes of grade 304 stainless steel with 2B finish from ASSDA Major Sponsor, Outokumpu Stainless for the expansion. Stirlings Australia also used its hi-definition plasma cutting service for processing



of material ranging from 2mm to 20mm thick sheets by 1200,1500 and 2000mm wide plates.

The Perth-based global metals distributor also supplied more than \$150,000 worth of stainless steel to Built Environs subcontractors for the fabrication of the project.

Press Construction Services were supplied with various grade 304 stainless steel pipe, plate, angle and flats including processing of all plate material for the fabrication of six steep vessels.

ASSDA member, Austline Fabrication of the Foodline Group of Companies was supplied various grade 304 stainless steel sheet, plate and angle for the fabrication of fan ducts and kiln hoods.

From this expansion, Joe White Maltings are able to meet increased demand from producers of most Australian beers and for the major brewers throughout Asia.

CONTACT:

- > Austline Fabrications Pty Ltd
181 Welshpool Road, Welshpool WA 6106
Phone (08) 9451 7300 Fax (08) 9451 7311
www.tfggroup.com.au
- > Built Environs - www.builtenvirons.com.au
- > Joe White Maltings Pty Ltd
www.joewhitemaltings.com.au
- > Outokumpu Stainless
134-136 Fitzgerald Road, North Laverton Vic 3026
Phone (03) 9369 3344 Fax (03) 9360 9355
www.outokumpu.com
- > Press Construction Group Pty Ltd
www.presscg.com.au
- > Stirlings Australia
Cnr Baile Road and Modal Crescent
Canning Vale WA 6155
Phone (08) 9366 6700 Fax (08) 9366 6710
www.stirlingsaustralia.com.au



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TRAINING YOUR STAINLESS STEEL SPECIALISTS WITH ASSDA



Transforming apprentices into stainless steel specialists can be a challenging but rewarding experience for employers seeking to improve quality, retain staff and increase profitability.

Underpinning theory and practical training in stainless steel represents only a small part of TAFE fabrication education in Australia. Understanding of standard industry terms such as pickling and passivation, crevice corrosion and knowledge of all the stainless steel grades by students even after completion is minimal.

In response to this problem, ASSDA developed the Stainless Steel Specialist Course, a 16 module training course that provides the industry with the underpinning knowledge required to meet the quality demands of architects, asset owners and end users.

Since the course was released in April 1999, it has provided more than 1000 Australian students with specialist knowledge of stainless steel, its properties, performance and uses.

In 2006, ASSDA upgraded the specialist course into an interactive e-learning flash presentation with images, animations and video for faster, more rewarding training for fabricators, sales representatives, estimators and engineers - anyone working with stainless steel.

ATLAS SPECIALTY METALS

ASSDA Major Sponsor, Atlas Specialty Metals recently enrolled more than 70 students in the new e-learning course. Mr Tony Hodges, an internal salesperson for the Melbourne branch, became the first stainless steel specialist to complete the new intermediate course.

However, two rapidly expanding Queensland ASSDA Accredited Fabricators are using the Stainless Steel Specialist Course in different ways to ensure their staff are trained and retained as quality stainless steel specialists.

BRIDGEMAN STAINLESS SOLUTIONS

Mr Len Webb, Managing Director of Bridgeman Stainless Solutions uses the course as an incentive to encourage employees to advance their knowledge of stainless steel and as a 'shortlist' for promoting motivated staff.

As a growing company, Bridgeman Stainless Solutions faces worsening skills shortages in an increasingly competitive labour market.

Mr Webb said that "the next person that walks up to me and says I want more money or I will go and work for Billy down the road, I needed a strategy enabling me to offer more money to these employees, while retaining committed employees."

The company offered to enrol current employees in the Intermediate Course and several took up this opportunity. Those who completed and passed the course are recognised for their efforts in the form of a bonus.

So far four of the seven tradesmen have now completed and passed the course, and as such have improved their overall knowledge of stainless steel and increased their understanding of the requirements for welding and fabrication. In turn they have all received their bonuses in recognition of their participation.

"Recognising these tradesmen were interested in doing the Specialist Course allowed me to develop a stronger more committed workforce

and to give them the chance to move forward with the company. We will continue to support our tradesmen in further learning at every opportunity," Mr Webb said.

ROCKPRESS (ROCKLEA PRESSED METAL)

Mr Dave Osborne, General Manager of Rockpress (Rocklea Pressed Metal) is impressed by the effect the increase in knowledge has had on the workshop floor.

At Rockpress, the course is compulsory for the majority of employees from second year apprentices to estimators and managers.

In 2005, Mr Osborne enrolled 22 employees in the Full Certificate course. Two employees have already passed the course and nine people currently qualify for an Intermediate Certificate.

"Customers always put a great demand on you and it is changing everyday and we have to compete globally like everyone else does.

"This course gives them the underpinning theory on what makes stainless steel, what it is, what to watch for when they weld it, what to look for when fabricating with stainless steel."

Many of the staff study the modules at the same time, resulting in many discussions about course topics at lunchtime. Improved knowledge of the various grades of stainless steel and correct welding practices has also meant that staff now understand enough to ask questions and can individually identify where potential failures can be prevented.

CONTACT:

- > Atlas Specialty Metals
Lynch Road, Altona North Vic 3025
Phone (03) 9272 9999 Fax (03) 9272 9966
www.atlasmetals.com.au
- > Bridgeman Stainless Solutions
Unit 1, 12 Combarton Street, Brendale Q 4500
Phone (07) 3205 9466 Fax (07) 3205 9477
- > Rockpress (Rocklea Pressed Metal)
29 Colebard Street East, Acacia Ridge Q 4110
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CONTACT — Max Russell, email max_r@assda.asn.au

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Enquiries for further information on any material presented in this publication should be directed to:

Australian Stainless Steel Development Association
Level 15, 215 Adelaide Street
Brisbane Queensland 4000 Australia
Phone: 07 3220 0722
Fax: 07 3220 0733
Email: assda@assda.asn.au

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