AUSTRALIAN WELDING INSTITUTE

WELDED

TRANSMIG 175i
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VRD
Voltage Reduction Device

3 IN 1
MIG • Stick • TIG
Multi Process Inverter

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Cover Page

In August 2010 Thermadyne released the Transmig 175i Multi-Process Inverter that is capable of performing GMAW/FCAW (MIG), MMAW (Stick) and GTAW (Lift TIG) welding processes.
The 175i is packed full of functional and safety features suitable for the serious tradesperson who is looking for the total welding package and value for money.

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THERMADYNE
A Global Cutting & Welding Market Leader

CIGWELD Pty Ltd
A.B.N 56 007 226 815
A Division of Thermadyne Industries, Inc.
71 Gower Street, Preston
Victoria, Australia 3072

CIGWELD Transmig 175i.

In August 2010 Thermadyne released the Transmig 175i Multi-Process Inverter that is capable of performing GMAW/FCAW (MIG), MMAW (Stick) and GTAW (Lift TIG) welding processes.
The 175i is packed full of functional and safety features suitable for the serious tradesperson who is looking for the total welding package and value for money.

CIGWELD new multi-process Transmig 175i.

Thermadyne, a leading global welding manufacturer, are proud to announce the addition of a multi process welding inverter to their premium Cigweld Professional line.

The Cigweld Transmig 175i is a self contained single phase multi process inverter that is capable of performing GMAW/FCAW (MIG), MMAW (Stick) and GTAW (Lift TIG) welding processes.

This impressive unit boasts a range of features sure to satisfy the broad operating needs of the modern welding professional. Equipped with an integrated wire feed unit, Voltage Reduction Device (VRD) when in STICK mode, and digital voltage and amperage meters, the 175i provides excellent welding performance across a broad range of applications.

Even light gauge aluminium jobs are made easy with the 175i as the ergonomic, well-balanced design of the TWECO MIG gun ensures smooth feedability. Or plug in your TIG torch for superb performance for your stainless or mild steel applications.

The 175i also comes as a kit that packs the inverter into an easy to carry bag with a range of accessories. These include a COMET Argon regulator, feed rolls, contact tips a TWECO MIG welding gun and Arc welding lead sets, making this an ideal investment for the serious tradesperson wanting value for money.

Transmig 175i Features:

• Full multi process capabilities: GMAW/FCAW (MIG), MMAW (STICK), GTAW (TIG)

• Integrated wire feed unit

• Standards Compliant Voltage Reduction Device (VRD)

• Fully compliant to AS 60974.1

• Light weight (14.6kg) and compact power source (410mmH x 210mmW x 450mmD)

• Digital voltage and amperage meters

• Enclosure rated to IP23S

• 3 Year Limited Warranty*

**Outlined in the 175i operating manual*

CIGWELD Tweco THERMAL DYNAMICS STOODY Arcair

CIGWELD vacuum packaging for arc welding electrodes.

In today's workplace where time and cost efficiency are critical, it is a common complaint that the pre-conditioning process required for re-baking electrodes can be both time consuming and costly. As a manufacturer of electrodes since the 1940's, CIGWELD have committed to continual product innovations and upgrades to suit the demands of the market. As a result Thermadyne released the CIGWELD Professional Ultra-Seal Vacuum Packs.

CIGWELD vacuum packaging for arc welding electrodes.

Ultra-Seal electrodes remain in perfect 'factory fresh' and 'moisture-free' condition for an indefinite period provided the vacuum seal remains intact and undamaged. The electrodes are hermetically packaged and sealed which ensures they can be used in critical welding applications without the need for pre-conditioning. This is an enormous benefit to the end-user in terms of savings in both handling and reconditioning costs.

CIGWELD's Professional Ferrocraft and Alloycraft low hydrogen electrodes, and Satincrome and Weldall stainless steel welding electrodes are now available in the Ultra Seal Vacuum packaging.

New and improved packaging from Thermadyne-CIGWELD:

2.5kg aluminised foil vacuum packs with new Ultra-Seal branding

Direct replacement for 3kg steel cans with no change to flux formulations. Moisture-free, with indefinite shelf life while vacuum seal remains intact and undamaged.

Due to hermetic packaging directly after baking, the end user does not need to precondition electrodes, provided vacuum pack is intact

Due to hermetic packaging directly after baking, the end user does not need to precondition electrodes, provided vacuum pack is intact

Substantial savings in handling/baking costs and time. Ultra-seal packs have far better transportability compared to steel cans

Company History:

J.B Arnold commenced operations in Australia in 1922 as manufacturers of gas welding equipment, before establishing CIG (Commonwealth Industrial Gases) in 1935. CIGWELD branched off as CIG's equipment division in 1985 with a focus on welding and gas equipment, before separating completely in 1989. Comweld Group Pty Ltd (trading as CIGWELD) was acquired by Thermadyne in 1996 and since then has expanded its product portfolio to include other prominent global welding and cutting brands such as Tweco, Thermal Dynamics, Arcair and Stoody.

For additional information, please contact:
Laura Carrazza
Marketing Communications Manager – Asia Pacific CIGWELD Thermadyne
T: 03 9474 7329
M: 0435 968 356
laura_carrazza@thermadyne.com.au
www.thermadyne.com.au

CIGWELD Tweco THERMAL DYNAMICS STOODY Arcair

Local Content Maximisation Proposals

There is some very deep concern in WA regarding the number of build contracts and the sheer volume of work going to overseas companies. Lead by the Australian Steel Institute (ASI) and supported by the AWI™ the recent rally attracted, a 5000+ crowd to listen to various speakers talking about 'local content' for fabrications. The rally achieved several outcomes. The rally further solidified the attention of State Government and gave some political impetus, which should open some doors to allow negotiations with all parties.

The rally also raised public awareness and gave the resources companies a 'heads-up' on the feelings of the states fabricators and involved stakeholders. The AWI™ supports these initiatives.

James England of the ASI has identified some key areas which need discussion with state authorities and the resource companies. The key areas for local content maximisation are:

- Project approval process should include a rigorous local content review and refer to local content policy as part of that process. The policy should be reviewed to more closely resemble the Hebron Benefits Agreement because the agreement removes ambiguity on what benefits are being sought, it provides measurable hurdles for nominated local content, it provides a mechanism for review and compliance to the nominated hurdle quantities by agreement.
- The State Agreement Acts should refer to the building local content policy when a project is undertaken. The State Agreements should be amended to include key recommendation number two if the Auditor General's 2004 review which was: "the Department should adopt a structured approach to evaluating Agreement performance, including how companies discharge their obligations to maximise the use of local content." The recommendation is the result of key finding "The Department has not methodically monitored how well companies discharge Agreement obligations to maximise the use of local labour, services and materials.
- The ICN and ASI should take up the role of local content administrators. In doing the work the following key activities would come into play;
  - Bringing project proponents and Australian suppliers together to match capacity, competency and capability with specific project demands.
  - Analysing major project scopes of work prior to the project execution and identifying quantifiable portions of work the will be assigned to local industry.
  - Auditing major project procurement activities for compliance to measurable local content levels.
  - Reviewing and approving major project proponent industry participation plans in order to ensure they are developed to maximise local content to the fullest extent under the relevant regulatory framework.
  - Ensuring local content measure maximise local content that is not inherently local by its nature (for example civil work of construction at site will deliver local by its very nature and should be reported separately)
  - Conducting post-project reviews in order to quantify whole of project costs for non-local content with a view to advising local industry on how to successfully capture this work in future projects.
  - A skills or competency development audit to ensure skills are not only retained but developed on a project by project basis.

Welding Case Study:

Hamilton Engineering (HEC) specialises in providing end-to-end engineering solutions for resources, and other industries in WA. From the initial design to the fabrication, welding and machining, HEC is a one-stop-shop for their client's engineering requirements.

HEC's team of highly skilled and professional workforce use the latest in welding innovation, design and technology at their purpose-built workshop, which is capable of engineering various metal components to the most exacting standards. With extensive experience, over 40 years of serving the resource and other industries, Hamilton are experts in the production of durable and reliable parts suitable for use in extremely demanding conditions.

Case Study: Mearsk Ngujima-Yin FPSO

Background

HEC was approached by Lloyds Register to solve the issue of hydrants being fitted upside down and on a vertical line from the ring main. As a result of hydrants being fitted upside down, rust and sediment accumulated in the piston; seizing/sticking the piston, which caused the hydrant discharge pressure to be restricted or at worst fail. The constant problems with these hydrants were also flagged as a serious issue at safety meetings and exercise debriefs.

Project

HEC needed to come up with an innovative and suitable solution therefore proposed to fabricate and install a 'U' bend to enable the valve to be fitted in its correct orientation. The bend would be fitted with a nipple and drain valve to enable accumulated rubbish or sediment to be drained off.

In addition, it was proposed each bend be provided with a ball valve to enable the hydrant to be isolated for maintenance without isolated large sections of the ring main; 27 assemblies were required.

Issues

It was evident to HEC that the welding on 80NB Sch 80 pipe using standard Tig/Stick method was time consuming and inefficient, so they came up with a much more efficient and innovative method to improve the efficiency of the butt welds in carbon steel piping.

Solution

The solution came by developing a Weld Specification to ASME IV & AS 3992 using GMAW/FCAW on the smaller diameter pipe. The qualifying weld was carried out on 80NB x 7.6mm wall in a 6G position. This had restrictions on other pipe work welding so they qualified another WPS for unlimited diameters up to 22mm wall at the same time.

Outcome

In developing the WPS it reduced the overall welding time by 50%, which virtually eliminated the use of other WPS's due to their high efficiency.

Future

HEC plans to develop a WPS to cater for their 316 and duplex stainless steel pipe procedures in order to provide efficient services to their existing and future clients, decreasing their downtime and increasing their bottom line.

Being in the manufacturing industry, HEC recognise it is extremely important to continuously provide improvements in project deliverables, including the supplying of quality engineering products and workmanship at competitive prices, so their clients make a profit.

HEC are ISO 9001 accredited so they consistently deliver high standards of quality throughout their comprehensive scope of engineering services, including:

- General Engineering
- Fabrication Welding
- CNC Machining
- Winches
- Pipe Fabrication
- Installation, Repair and Servicing

Engineering and technology is constantly evolving to meet the requirements of today's industries. HEC understands the demands of industry and offers a wide range of general engineering machining and fabrication to suit all client requirements.

www.hamiltonengineering.com.au

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WEAR PROTECTION PRODUCTS AND SERVICES

A leading German company providing products and services for wear protection is currently seeking a distribution partner in Australia. Their product spectrum ranges from **deposition welding materials** through **prefabricated composite wear plates** to **wear-resistant cast products**.
The group of companies operates in over 50 countries worldwide both with own companies as well as distributors and is now wishing to expand in the Australian market.

Some of the benefits of the industrial wear plates are that they are highly wear-resistant, give extended service life, have hard-surface layer to suit the application and are easily installed using simple fastening. One of the widest application fields of their products are machines and plants for the concrete industry. Furthermore the products are used in metallurgical, cement, recycling, glass and asphalting industry as well as coal-fired power stations and mining industry.

The German company is seeking a **capable distribution partner** who ideally has a **well established client base, owns a workshop** (or has access through a sub-supplier) **for wear-plate constructions** and is **willing to actively market the products**.

Some of the target industries are: **mining, coal-fired power station**, cement industry, iron and steel fabrication and waste management plants.

Please contact Hana Mujadzic at the

German –Australian Chamber of Industry and Commerce for further information

Tel.: 02 – 8296 0433,

Email: Hana.Mujadzic@germany.org.au

High(er) Strength Steels In Structures – Engineering and Welding Considerations

'Higher' strength structural steels are becoming more highly utilised in structural steel construction, where 'Grade 350' type steels are often used due to the advantages of:

a) additional strength for the same steel weight;

b) less weight for a reduced transport cost, which is important for overseas fabrication.

c) the ever increasing availability (in various standard designations).

The days of 'Grade 250 mild steel' are most likely numbered. Of course there are many high strength steel options for both structural and other applications.

This article is generally reviewing the relatively common 'higher' strength structural steel around the yield strength of 350MPa, and addresses a number of issues surrounding the use of these steels, particularly when being sourced from overseas steel mills.

In combination with these gains in material strength, additional consideration must be given to issues such as material substitution, weldability and long term structural maintenance issues.

Material used for design versus the procured fabrication material – The consideration of the likely materials of construction is required as early as possible in a project.

Alignment of the original design requirements and design intentions with the fabrication practices,

including the materials of construction, is of vital importance both technically and economically.

This is most aptly described in the following phrase from the foreword of ISO 2394 *General principles on reliability for structures*:

"**It is important to recognize that structural reliability is an overall concept comprising models for describing actions, design rules, reliability elements, structural response and resistance, workmanship, quality control**

procedures and national requirements, all of which are mutually dependent.

The modification of one factor in isolation could therefore disturb the balance of reliability inherent in the overall concept".

Many Design Engineers are not aware of the 'common' worldwide steel standards. Australian standard materials may not be used for a particular design, even if it is being fabricated in Australia! These could include Euronorm Standards such as EN10025 and EN10210, or Chinese Standards such as GB/T 1591, GB 700 and GB/T 8162, or American Standards ASTM A 36 or A 572, not to mention BS, JIS or DIN standards as well.

A key difference between most other international standards and the structural steel Australian Standards AS3678, AS3679 and AS1163 is that the international standards yield strengths are generally lower for the nominal and industry common, but poorly termed, 'Grade 350' type steel. The grade designation of steels (i.e. Grade 350, S355, Q345 etc) is generally defined as the yield strength for up to 16mm thickness. As thickness increases, yield strength generally decreases for the same grade.

Take the following examples of 20mm and 50mm plate for the relevant Australian Standards and for two overseas standards.

Yield Strength (MPa)

Standard and Grade	20mm	50mm
AS3678 Grade 350	350	340
EN10025 Grade S355	345	335
GB/T 1591 Grade Q345	325	295

The above table shows up to 45 MPa, or 13% difference between standards for the same plate thickness. Another comparison is that for the 50mm plate, Grade '350' has become Grade '295' with use of an overseas standard material.

So what should be done at the design stage?

Where possible, the Design Engineer should obtain guidance from the Owner or Contractor on where the fabrication is likely to be carried out, and what materials are likely to be used.

Once the likely materials of construction are known, undertake the design to the relevant mechanical properties of the materials.

Some may challenge this approach by stating that specifying materials to Australian Standards is all their design responsibility requires. They are potentially justified in this approach as the Designer, however, once the technical queries start rolling in on material substitutions, design costs can escalate rapidly, and delay projects.

A subsequent consequence of using substitute overseas standards materials is that the original design thickness (to an Australian Standard) often requires substitution with a thicker plate, resulting in a weight changes, drawn details no longer being accurate and potential cost penalties with these issues.

There are large savings to be made by use of selected overseas material standards for use, at the design stage. If Australian Standard steels are then selected for fabrication, the substitution process is simple, as mechanical properties will likely exceed the design requirements.

The Design Engineer may specify further testing requirements for the use of overseas standard materials.

Whatever the materials used in design, it is imperative to state in the steelwork specifications, on drawings and in drawing notes the Standard and the Grade of steel specified, plus include a note that material substitution is permissible only with the approval of the Design Engineer.

As evident from above, be cautious with the frequently abused term 'Grade 350 steel', including when purchasing steel from Australian steel merchants.

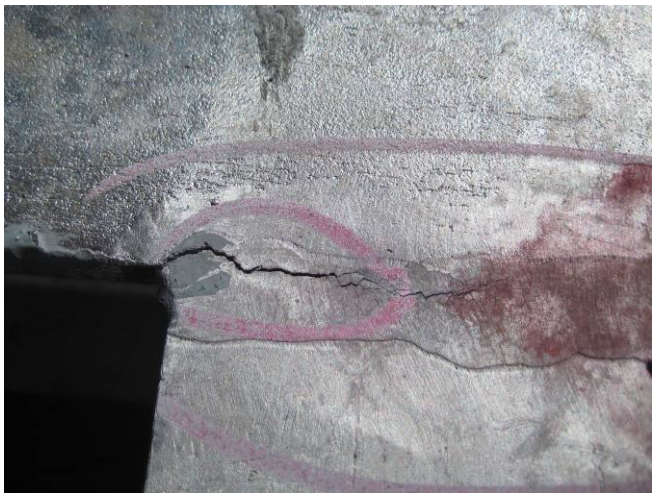
Welding and weldability – Welding procedure qualifications can become an issue with materials (and materials substitution) manufactured to overseas standards.

At the design level, the design standards AS4100 and AS3990 only cover Australian Standard materials.

At the welding level, AS1554 also only covers Australian Standard materials.

Being structures, it is expected that welding will be specified to be category 'SP' in accordance with AS/NZS 1554.1.

So how is a welding procedure qualified in this situation – the same way one would be done in accordance with AS1554 (and most other international welding standards) – qualification by testing, on the materials of construction.



Weldability of the materials of construction should also be addressed.

A specific example of material substitution encountered in recent times has the following characteristics:

Design material: AS3678 Grade 350, material thickness 10mm, which requires a minimum yield of 360MPa.

Fabrication material: GB/T 1591 Grade Q345C, material thickness 10mm, which requires a minimum yield of 345MPa.

To account for the difference in specified yield strength for the design and the material intended to be used, the Contractor proposed a material testing regime. The yield strength determined by mechanical tests provided a result on 465MPa.

Now the initial perception is that the material easily accommodates the design, which it does on one criterion.

However, what other issues does this 'excessive over-strength' produce:

a) Were the testing techniques and sampling levels satisfactory?

b) The steel is now outside the parameters of steels covered by AS4100 or AS3990, which limits design to materials with a yield strength of 450MPa or less.

c) How are welding procedure qualifications affected – with a yield of 465MPa, AS1554.1 is now no longer applicable (limit to 450MPa). Qualified WPS to the Q345 material technically allows welding of materials up to 50MPa greater, but this particular piece of steel is greater by 120MPa.

d) What quality control processes does the steel manufacturer have in place (i.e. why sell a steel with 120MPa greater strength than required).

e) What other tests are needed to assess toughness and ductility of the steel (and now the welds to this steel!).

The above issues could have been easily resolved at the design stage, by using the material of construction in the design calculations. Sample steel testing should then also look at rejecting excessive strength materials due to the above issues, including possibly finding another steel mill for supply!

A key principal here is that the fabricator should already have materials testing and qualified welding procedures in place, for the materials most likely to be able to be procured in their region. If this is not the case, fabricator competency must be questioned.

Also, materials should be procured that will satisfy the design requirements.

Maintenance issues – Very little thought is currently being given to structural maintenance requirements on steel fabricated with materials to an overseas standard.

How is structural maintenance to be carried out on materials manufactured to an overseas standard material? Do welding procedures performed to Australian Standard materials remain qualified? What is the material being welded? Were WPS's retained from fabrication such that they can be used for future maintenance?

In the future, the failure to understand the above issues may result in 'repairs' being detrimental to structural integrity. Today's gains in economy may be transferring engineering to a later date?

All the above principles apply to local fabrication as well, which may use materials manufactured to an overseas standard.

Lastly, Lead Engineers in design offices need to educate and direct younger engineers to know more about steel than the AS4100 reference to steel standards.

Doug Hawkes is a Director of Structural Integrity Engineering Pty Ltd, a Company specialising in the provision of structural engineering services to the mining and heavy industries. Whilst this article describes techniques to manage overseas materials and fabrication, the author is an advocate for more local steelwork fabrication.

Author:
Doug Hawkes
Principal Structural Engineer,
Structural Integrity Engineering Pty Ltd
Brisbane: Mobile 0417 716 390
Perth: Mobile 0407 242 707
Email: dhawkes@sie.au.com
Web: www.sie.au.com

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We have just launched our new website and online shop, with special discounts of up to 40% off our regular price. Send an email to sales@paintpens.com.au when you place an order online stating you saw our article in WELDed and we'll send you a free sample of a marker of your choice.

AWI leads the way

The AWI methodology of delivering - AS/NZS ISO 3834 Quality Requirements for Fusion Welding appears to be the preferred model in industry!

So what is the model?

There would appear to be a lot of hype and mystery out there in 'fabrication-land' about AS/NZS ISO 3834 Quality Requirements for Fusion Welding, so to put these in readily understandable terms we offer the following as an example:

Let us assume; the company you own or work within; wants an ISO 9001 quality system. A simple breakdown of the steps would be:

- You would choose a suitable and reputable company to assess your quality needs
- You work with this company to put the ISO 9001 quality system into place and once this is up and running;
- You complete a periodic review of your quality system, which is completed by a 3rd party accredited organisation.

So, in terms of AS/NZS ISO 3834 model that AWI™ has developed, it is essentially the same:

- You choose the AWI™ as a reputable organisation to assess your welding quality needs
- We work with you to gain access to the technical expertise to assist integrate AS/NZS ISO 3834 into your company in a practicable, cost effective way
- AWI™ has a joint venture agreement with a JASANZ accredited auditing company TQCSI Pty Ltd to complete the periodic audit of your newly installed the AS/NZS ISO 3834 system with suitably qualified auditors.

There is no 'smoke and mirrors', you don't need anything more than to follow the requirements of AS/NZS ISO 3834, and AWI™ was the first in the country to work with an existing JASANZ accredited auditing company!

With our ability to minimise certification costs for its members and with its first successful joint venture completed in Nov 2010, there are a number of national companies showing great interest in this model from AWI™. We are also working towards involving other, well known auditing bodies to further minimise costs to our members.

To endorse this model, recent communication from other Australian welding industry bodies, others appear to want to follow the AWI™ methodology of integrating Australian Welding and Quality Management Systems.

Embracing the future

The directors of AWI™ have recognised for some while now that the Australian welding and fabrication industry cannot be insulated from technological advances in society.

When you look around, there's the internet, Facebook, Twitter a whole heap of social sites, forums and places to gather information, generate responses to a problem etc.

Whilst we don't profess to be as tech-savvy as the current generation, we identify that there is an ever increasing place for this form of communication. To this end AWI™ have set a strategy in place to ensure we make the most of the available technology to engage our members.

The AWI™ has setup a social media Facebook and Twitter presence. They can be accessed via:

www.facebook.com/austwelding

www.twitter.com/austwelding

In addition to these two arenas; there is a forum setup

www.weldingflash.com.au/forum.

The forum has proven to be a great tool for people in the industry looking for an outlet to exchange thoughts and seek assistance on technical issues.

The beauty of this particular forum is that it becomes a permanent record of technical exchanges for later reference. Log on and find out for yourself!

The AWI™ is keen to ensure we maintain the best possible presence for our members so we are currently upgrading our website which will be launched in the near future.

The Australian Welding Institute Members draw resulted in two winners, Mr. Gary Downs of Western Construction Company in Kwinana WA and Mr. Stephen Course of Mectest Laboratories in Spotswood VIC. Both winners have been presented with their prizes.

Mr. Gary Downs, on the left, received his prize of a Cigweld WeldSkill 130 Inverter from Mr. Darren Molloy, the state manager for Thermadyne - Cigweld WA. The presentation was made at Mr. Down's workplace at Kwinana.

Mr. Stephen Course, on the left, received his prize of a Sperian Optrel Satellite welding helmet from Mr. Stephen Walsh of the Australian Welding Institute. The helmet was provided by Sperian Protection. The presentation was made at Mr. Course's workplace at Spotswood in Melbourne.

Fishing

A game warden noticed how a particular fellow named Sam consistently caught more fish than anyone else, whereas the other guys would only catch three or four a day. Sam would come in off the lake with a boat full. Stringer after stringer was always packed with freshly caught trout. The warden, curious, asked Sam his secret. The successful fisherman invited the game warden to accompany him and observe.

So the next morning the two met at the dock and took off in Sam's boat. When they got to the middle of the lake, Sam stopped the boat, and the warden sat back to see how it was done.

Sam's approach was simple. He took out a stick of dynamite, lit it, and threw it in the air.

The explosion rocked the lake with such a force that dead fish immediately began to surface. Sam took out a net and started scooping them up.

Well, you can imagine the reaction of the game warden. When he recovered from the shock of it all, he began yelling at Sam. "You can't do this! I'll put you in jail, buddy! You will be paying every fine there is in the book!"

Sam, meanwhile, set his net down and took out another stick of dynamite. He lit it and tossed it in the lap of the game warden with these words, "Are you going to sit there all day complaining, or are you going to fish?"

Talking Dog

A guy sees a sign in front of a house: "Talking Dog for Sale." He rings the bell and the owner tells him the dog is in the backyard. The guy goes into the backyard and sees a black mutt just sitting there.

"You talk?" he asks. "Yep," the mutt replies.

"So, what's your story?" The mutt looks up and says,

"Well, I discovered this gift pretty young and I wanted to help the government, so I told the CIA about my gift, and in no time they had me jetting from country to country, sitting in rooms with spies and world leaders, because no one figured a dog would be eavesdropping. I was one of their most valuable spies eight years running."

"The jetting around really tired me out, and I knew I wasn't getting any younger and I wanted to settle down."

"So I signed up for a job at the airport to do some undercover security work, mostly wandering near suspicious characters and listening in."

"I uncovered some incredible dealings there and was awarded a batch of medals. Had a wife, a mess of puppies, and now I'm just retired."

The guy is amazed. He goes back in and asks the owner what he wants for the dog. The owner says, "Ten dollars." The guy says, "This dog is amazing. Why on earth are you selling him so cheap?"

The owner replies, "He's such a liar. He didn't do any of that stuff."

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Trading as
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47 Dowd Street
Welshpool,
Western Australia 6106

P: +61 8 9258 5113
F: +61 8 9258 4963
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admin@technoweld.com.au
www.technoweld.com.au
+61 409 698 968

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Paul HOSKING
Technical Work Co-ordinator

Asset Integrity and Reliability
Services Pty Ltd
35-37 Stirling Street
Thebarton, South Australia, 5031
Australia

Phone: +61 (0) 8 8416 5337
Fax: +61 (0) 8 8416 2760
Mobile: +61 (0) 410 221 484
paul.hosking@au.bureauveritas.com
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Ron Hocking

18b Gumbowie Avenue,
Edwardstown. S.A. 5039
Email: rhocking@scis.com.au
Shop Online at www.scis.com.au

Mobile: **0429 401 991**
Warehouse: (08) 8277 6288
Fax: (08) 8277 6244
Freecall: **1800 645 587**

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3834 WELD MANAGEMENT PTY LTD
ACN 137 556 962

Phil Richardson

Address: PO Box 116 Greenwood WA 6924
Email: weldtraining@iinet.net.au
Mobile: 0433 174 575

AUSTRALIAN WELDING INSTITUTE

WWW.AUSTWELDING.COM.AU

QLD, NSW, VIC & TAS
ALEC 0408 420 150
SHAMUS 0413 640 526

WA
PHIL 0433 174 575

SA & NT
GRAHAM 0409 698 968

ADMIN@AUSTWELDING.COM.AU