Fusion

Newsletter of the Southern African Institute of Welding

May 2014

SAIW
Southern African Institute of Welding

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Ignore EN 15085 at your peril… … in this once-in-a-lifetime opportunity

With Alstom, China South Rail (CSR) Zhuzhou and China North Rail (CNR) - all of which having been awarded the lion's share of the massive R100 billion upgrade programmes of Transnet and the Passenger Rail Agency of South Africa (PRASA) - stipulating that South African fabricators must comply with EN 15085 in order to sub-contract to them, local companies ignore EN 15085 certification at their peril. This is the view of the SAIW's Sean Blake.

"The problem is that many fabricators feel that because they are ISO 3834 certified and that there are many similarities between it and EN 15085, there is no need for specific EN 15085 certification. This is not the case and our fabricators, if they want to make the most out of this once-in-a-lifetime opportunity, must not make this mistake," he says.

While it is true that EN 15085 is closely aligned to ISO 3834, which defines comprehensive quality requirements for fusion welding of metallic materials both in workshops and in the field, it must be understood that EN 15085 is a product-specific standard for the construction, manufacturing and testing of welded rail vehicles and their components and Alstom's, CSR's and CNR's requirement is that South African companies, which will work as its sub-contractors must be certified accordingly.

Alstom will supply PRASA 600 3 600 coaches.

CSR will supply 359 electric locomotives and CNR 232 diesel locomotives to Transnet, giving them a collective 56% of a tender for the manufacture of 1,064 locomotives. They are earmarked for Transnet's general freight business, the most important area of its strategy to shift freight from road to rail. Transnet aims to increase general freight volumes to 170-million tons from 82.6 million tons by 2019.

Alstom will supply PRASA 600 passenger trains (3 600 coaches) between 2015 and 2025. The contract includes the construction of a local manufacturing facility. The project, part of PRASA's quest to revitalise the rail industry, create jobs and provide efficient, reliable and safe public transport, is one of the biggest in rail transport worldwide and is the largest contract ever signed in Alstom's history.

The total value of both contracts is approximately R100 billion.

Both the Transnet and PRASA contracts have a stringent local manufacture stipulation (60%-70% for the passenger coaches; 55% for the diesel locomotives and 60% for the electric locomotives) affording local fabricators one of the biggest opportunities in South African industrial history.

But Blake reiterates that all parties will insist that local fabricators are EN 15085 certified. "For the Chinese this has a special significance as Transnet initially came under fire for ignoring rumours of dubious quality with respect to the Chinese tender winners who will go to great lengths to ensure that their quality is nothing short of world class," Blake says.

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Message from SAIW Executive Director

There are certain opportunities that literally come once in a lifetime. And, for the local welding and related industries, the R100 billion railway contracts that Transnet and the Passenger Rail Agency of South Africa (PRASA) have awarded for the manufacture of new locomotives and coaches is certainly one of these. There will be plenty of work for many years for local fabricators when these projects get underway, but I don't think that this work will just fall into your laps – specifically you will need EN 15085 certification in order to make sure you get your fair share of these giant projects. I urge you all to read the front page article of this Fusion and to take the necessary steps required in this process.

Also in this issue we talk about an important step for the NDT industry in Africa - the formalisation of the hitherto informal African Federation of Non Destructive Testing (AFNDT). This will enable the body to better fulfil its goals and objectives which include promoting collaboration amongst African countries in matters of common interest in NDT. It's always a very positive step when we succeed with initiatives that enhance cooperation in the welding and related industries between African countries. This makes each participating country more powerful and makes Africa's "welding brand" more inviting. This in turn helps to bring more welding work to the continent creating an upward and positive cycle. I wish the AFNDT all the best for the future.

On the question of upward cycles it is important to note South Africa currently has a host of large-scale welding projects on the go including the new power stations, the railway renewal programme and others, with many more to come. We need to use these opportunities to employ as many South Africans as possible. For this to happen, especially in our skill-based industry, welding training and education of the highest level is an absolute priority and the Institute remains committed to continue providing the best possible standards of welding training and education to the broad spectrum of industry in Southern Africa.

Jim Guild

Ignore EN 15085 at your peril…

Continued from page 1

One of the main quality control measures will be EN 15085, which is an important standard in both Europe and China with a total of 931 manufacturers having been certified in Germany and 360 in China. "These are indeed significant numbers in this limited fabrication sector and South African fabricators should take heed of them," says Blake.

SAIW executive director, Jim Guild, concurs that any fabricator serious about being part of these initiatives will have to be EN 15085 certified and that the Institute is doing what it can to facilitate local certification. "We have been talking to EN 15085 experts worldwide in our pursuit of making the process as easy as possible for local fabricators and we are establishing a cooperative relationship with DVS in Germany which will ensure manufacturers have access to both preparatory advice and EN certification. I urge all those interested to watch the SAIW press and website over the next few months for details," he concluded.

The table below represents a comparison of the requirements of ISO 3834 and those of EN 15085.

Requirement	ISO 3834	EN 15085
Technical Review	Required	Required
Sub-contracting	Permitted	Permitted but welding to be contracted to an appropriately certified company according to EN 15085
Welding Personnel	*Welders:* to be qualified appropriately to a manufacturing code (i.e. ASME IX, AWS D1.1, ISO 9606, etc.)	*Welders:* only qualified to ISO 9606
	Coordination Team: education levels are not specified, competence is required	*Coordination Team:* to be qualified as IWE, IWT or IWS depending on certification level or as defined by EN 15085
Inspection & Test Personnel	*Welding Inspection:* specific qualifications are not required, competence is required	*Welding Inspection:* minimum qualification is IWIP/EWI Level 1
	NDT: to be qualified appropriately to an appropriate standard (e.g. ASNT - TC-1A, ISO 9712, etc.)	NDT: to be qualified to EN 473 / ISO 9712
Technical Requirements	To have appropriate equipment	Stipulates additional equipment on top of the bare essentials of ISO 3834
Welding Procedure Qualifications	To be qualified appropriately to a relevant code (i.e. ASME IX, AWS D1.1, ISO 15607)	To be qualified according to ISO 15607
Production Planning	Required	Required
Welding Consumables	Required	Required
Inspection & Testing	Required	Required
Non-conformance & Corrective Actions	Required	Required
Quality Records	Required	Required

**The above information is a brief overview of the similarities between the two standards but is not all-encompassing of all of the standards and requirements*

ISO 3834 - an industry fundamental

According to Sean Blake, SAIW GM operations, the continued growth in the number of companies applying for and succeeding in getting ISO 3834 certification is a very encouraging phenomenon in the Southern African welding Industry.

"ISO 3834 is the fundamental benchmark for quality in our industry and it is very pleasing that so many fabricators continue to see the light in this regard," Blake says. He adds that there is no doubt that the 'push-pull' effect is still powerful in the South African welder fabrication market. "Life is made so much easier for the larger end users when they see that a potential supplier is certified. They can be immediately confident that the quality of the product supplied will be of the highest standard. Significant end users are, in the main, working only with ISO 3834-certified companies and this, in turn, continues to push fabricators to get certified," he says.

"ISO 3834 IS THE FUNDAMENTAL BENCHMARK FOR QUALITY IN OUR INDUSTRY AND IT IS VERY PLEASING THAT SO MANY FABRICATORS CONTINUE TO SEE THE LIGHT IN THIS REGARD" – SEAN BLAKE

One of the most recent companies to get ISO 3834 certification is the Boiler and Environmental division of John Thompson, the Power division of electro-mechanical giant ACTOM, the largest manufacturer, solution provider, repairer and distributor of electro-mechanical equipment in Africa, employing about 7 500 people. A BEE company, ACTOM's annual order intake is in excess of R7.5-billion and it has 43 operating units, 44 production, service and repair facilities, and 41 distribution outlets throughout Southern Africa.

Kempton Park-based John Thompson, South Africa's largest manufacturer of industrial and utility boilers, says its principle aim is to be the best boiler and environmental solutions company serving the power generation and industrial markets, both locally and internationally.

Arnold Webb, Regional Engineering Manager of the Boiler & Environmental division, says that to achieve this aim, ISO 3834 certification was essential. "It is the single most important endorsement for the welding quality of any South African fabricator and we are proud to have achieved certification from the SAIW," he says.

He adds that John Thompson workshops – with more than 30 utility boilers in Eskom and municipalities throughout the country –manufacture a wide range of utility boiler components such as super-heater elements, finned economisers, tube-panels, burner tube-nests, various headers and tube-shields. "In addition to boiler envelope and boiler external piping maintenance services we also maintain coal milling plant, pulverised fuel systems and course and fine ash plants for the utility industry," he says.

Sean Blake (third from left) with the John Thompson team (l-r) Arnold Webb, Zain Hoosen, Andy Abbey, Divisional - CEO of the Power division, Fernando Machado, Celio Graca, Promise Chandigere, Tobie Jansen, and Deon Geldenhuys

Melissa van Dyk, QMS representative, receiving certificate from Sean Blake on behalf of Loyiso Industrial Solutions

Another company to be recently ISO 3834 certified is general steel fabricator Loyiso Industrial Solutions and GM Cobus Coetzee says that while the initial motivation for getting certification was to be able to become an ArcelorMittal vendor, he knows that it will be good for his business all round. "It will open doors for us," he says. "It is really like being a member of an elite club of fabricators in South Africa and will act as an automatic reference for our company," Coetzee says. "More and more of our customers want to see that we are adhering to the highest quality standards and ISO 3834 reflects that we are up there with the best."

Blake congratulated both companies for the quality of their welding processes and thanked them for the professional manner in which they approached the audit process.

FOR MORE INFORMATION ON ISO 3834 CERTIFICATION PLEASE CONTACT SHELTON ZICHAWO ON 011 298 2100 OR GO TO www.saiw.co.za

COURSE NEWS

In each Fusion we look in detail at one or more courses offered by the SAIW. This month SAIW Operations GM, Sean Blake, tells us why the Heat Treatment Practitioner Course is so important.

When welding parent materials with high alloy contents, the microstructure formed following welding is not suitable and the material will display poor mechanical properties with brittle, glass-like properties. Metallurgists have devised methodologies to change these poor properties to the desired properties by undertaking heat treatment processes.

Sometimes multiple post-weld heat treatments with complicated processes need to be done in order to obtain the desired properties. All heat treatment processes are time and temperature dependant, making control of these parameters critical in order to obtain the required results. Too high a temperature and / or too much time will generally produce softer material with poor mechanical properties. Too low a temperature and/or too little time will not adequately transform the microstructure, which will then retain the brittle glass-like properties. A deviation of only a few minutes in the soaking time or a deviation of a few degrees in the soaking temperature may mean that the desired properties are not achieved, sometimes with catastrophic consequences!

THE SAIW HEAT TREATMENT PRACTITIONER COURSE FOCUSES ON TEACHING THE FUNDAMENTALS OF HEAT TREATMENT

Heating and cooling must also be done within defined parameters in order to ensure the desired properties are attained. There are a number of different methods of heating and cooling using different types of equipment. Items for heat treatment can be heated in a furnace with either direct or indirect heating. The source of the energy could be electrical energy, combusted gas, or induction heating, which is a versatile method of heating. This process uses eddy currents generated by high frequency electrical current passed through a coil which creates a magnetic field and heat is generated by magnetic hysteresis, which heats the surface of the material. Localized heating and the rate of heating are all important parameters that need to be understood and controlled for all these different methods of heating.

Also, understanding how the item is going to be cooled is just as important as the heating of the item and a thorough understanding of the equipment used is also vital in order to successfully conduct heat treatment.

The SAIW Heat Treatment Practitioner course focuses on teaching the fundamentals of heat treatment associated with welding such that the student has a thorough understanding of the heat treatment process and the important parameters that need to be controlled in the process.

On completion of the course, successful students will: understand the necessity to perform pre- and post-weld heat treatments correctly; be able to determine heat treatment cycles in accordance with various codes; will be able to set up and operate heat treatment equipment; produce reports on the heat treatment that has been specified in compliance with the specified requirements.

Sean Blake SAIW Operations GM

The course includes a theoretical element which covers:

- Basic metallurgy
- Heat treatment definitions
- Welding processes
- Welding effects on materials – why is heat treatment necessary?
- Heat treatment cycles, heating and cooling rates, soaking temperatures, soaking times
- Code and material specification requirements for welding pre-heat, post-weld heat treatment, normalising, annealing, hydrogen removal
- Methods of heat treatment
- Equipment - machines, heaters, recorders, cables, thermocouples, thermocouple welders, insulation materials
- Thermocouple locations
- Code requirements for heating band width and insulation band width

The practical element of the course covers the following:

- Determining pre- and post-weld heat treatment requirements to codes and standards
- Determining heating and insulation band widths
- Determining heating configurations on nozzles
- Setting up equipment for weld heat treatments - thermocouples, heaters, insulation
- Operating heat treatment equipment

Heat treatment requirements of the following codes are included in this course: PD 5500, BS 2633, EN 13445, EN 13480, ASME VIII

COURSE NEWS *continued*

Inaugural Safety Course a success

A new five-day Safety Course was launched by SAIW at the end of 2013 with the first course successfully held from 24th-28th February 2014.

SAIW GM operations, Sean Blake, says that fabrication environments are inherently dangerous sites with many hazards. "Heavy equipment being moved around, hot items from heat treatment or welding, electrical cables and fumes from the welding process are just a few of the hazards that could be encountered," he says.

Blake adds that the new safety course identifies the hazards in the work place and provides information on how they can be managed to prevent accidents. Aspects such as Personal Protective Equipment, Ventilation, Fire Prevention and Protection, Confined Spaces, Oxyfuel Gas Welding and Cutting Safety are all covered in detail in the course. The Safety Course is aimed at any personnel involved in a fabrication environment from production management to the welding operators and the safety officers. The course is also ideally suited for safety representatives who will get detailed information on managing the risks in a fabrication environment.

In addition to the theoretical training offered on the course, a practical element is included. One of the five days of the course is spent in a welding workshop getting to grips with the practical issues in welding with hands-on sessions being conducted.

The next course will be held in the first week of September 2014. SAIW is planning to run the course twice a year depending on demand.

First SAIW Foundation Student on Board

Lebogang Thabang Thwala (Lebo) is the newly-formed SAIW Foundation's first bursary student for welding training at the SAIW. The SAIW Foundation was created to provide bursaries to needy students for welding, Non Destructive Testing and other related technology courses. "This obviously includes SAIW certification programmes, but is not limited to them," says SAIW executive director, Jim Guild. "We wanted the SAIW Foundation to promote careers in the welding and related industries in the broadest possible context," he says.

Lebo, 24, who earlier this year achieved an average score of 85% in his final year of his Mechanical Engineering Diploma from the Tshwane South College FET, says that he is over the moon with this opportunity. "I realised that welding is the foundation of all fabrication and to be able to get this opportunity to learn such an important skill is life-changing," he says.

Lebo has started with a short practical welding course, will move on to Welding Inspector training and then on to higher things. "There's no reason why Lebo shouldn't go on to achieve International Welding Technologist level. He is a bright and enthusiastic learner and has the potential for great things," says Guild.

He adds that encouraging young people to make careers in the welding industry is one of the main goals of the SAIW Foundation, which will be actively seeking deserving students like Lebo so that they too can benefit from the bursary programme.

"In order to ensure that we get the best possible candidates – and a lot of them – we plan to make presentations to schools and colleges to show the benefits of a career in welding. This is in addition to organising promotional events – like the Young Welder of the Year competition, which the SAIW runs every second year – which are specifically aimed at recruiting young people to make careers out of welding," concludes Guild.

The role of Quality System Certification in manufacturing in accordance with the PER and SANS 347 - for local manufacturers

The link between the PER and SANS 347

The Occupational Health and Safety Act includes the Pressure Equipment Regulations (PER) which came into effect on 1 October 2009 replacing the Vessels Under Pressure Regulations. Regulation 4(1) of the PER requires manufacturers to ensure that all equipment designed and manufactured for use in South Africa is conformity assessed and subjected to the requirements set out in the standard SANS 347 'Categorization and conformity assessment criteria for all pressure equipment'.

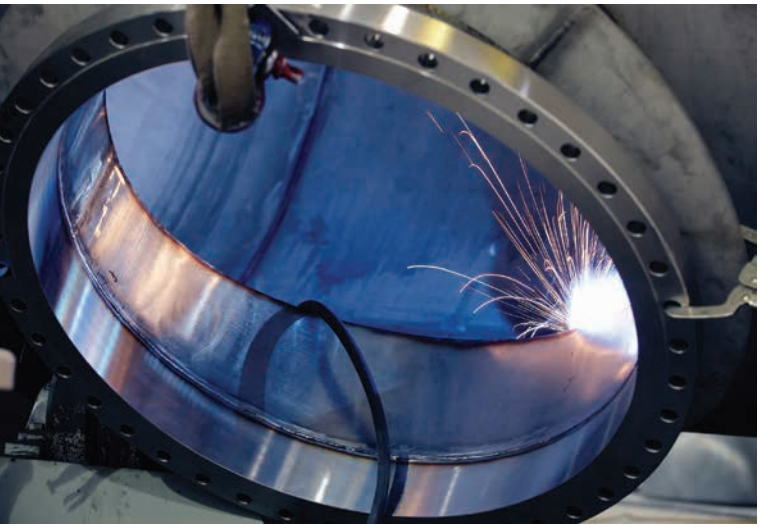
What is the purpose of SANS 347?

SANS 347 guides all parties (including manufacturers, users, certification bodies and approved inspection authorities) in the categorization of pressure equipment in terms of hazard. There are five hazard categories, namely, Sound Engineering Practice (SEP) and categories I, II, III and IV. SEP is the lowest level of risk and category IV the highest level. In general, the lower the design pressure and volume, the lower the hazard category of the equipment.

Having identified the hazard category, SANS 347 then goes on to identify the minimum levels of conformity assessment criteria that need to be applied during manufacture including new construction, repair and modification. Keep in mind that older equipment built under the VUP or earlier regulations can be repaired or modified in accordance with the VUP and need not be categorised - but the full involvement of an AIA is required.

The conformity procedures are incorporated in SANS 347 as modules (identified as A to H1). The modules for equipment assessed as categories II, III, and IV require the involvement of an independent body which may be an Approved Certification Body (CB), an Approved Inspection Authority (AIA) or a Third-Party Organisation (TPO) either in the approval and monitoring of the manufacturer's quality system or in direct product inspection.

Note: 1) SEP equipment is not subjected to conformity assessment and 2) Category I equipment is subjected to conformity assessment but the involvement of an independent body is not required i.e. manufacturers are entitled to apply the internal production control conformity assessment module (Module A).



TPOs, when approved by the regulatory authority may also carry out the approval of welding procedures and personnel, including non-destructive testing personnel required for pressure equipment classified as category II, III and IV. For direct product inspection the involvement of an AIA is mandatory for categories II, III and IV.

The conformity assessment modules applied to categories I to IV differ according to the type of assessment and the organisation performing the assessment (i.e. manufacturer and AIA or a CB).

Does a manufacturer need a quality system and what are the benefits of having it certified?

SANS 347 requires all manufacturers involved in new manufacture, repair, modification and installation of pressure equipment to operate a quality system to ensure compliance with the relevant health and safety standard. For certain conformity assessment modules the manufacturer's quality system has to be approved by a CB.

Acceptable quality systems are systems based on SANS 3834 and ASME VIII Div 1 Appendix 10, or a version of SANS 9001 adapted to meet all the requirements of the applicable health and safety standard.

SANS 347 USES THE HAZARD CATEGORY AND STATUS OF THE MANUFACTURER'S QUALITY SYSTEM TO PRESCRIBE THE APPROPRIATE CONFORMITY ASSESSMENT MODULES WHICH ARE APPLICABLE TO PRESSURE EQUIPMENT.

SANS 347 uses the hazard category and status of the manufacturer's quality system to prescribe the appropriate conformity assessment modules which are applicable to pressure equipment. Different requirements are specified for manufacturers with a certified quality system and those manufacturers who do not have a certified system. There is a further sub-division of applicable modules depending on whether single product or batch production is considered.

It has to be borne in mind that the requirements of the applicable health and safety standard have to be taken into account but in general, manufacturers operating a certified quality system are able to apply conformity assessment modules which have less AIA interventions than manufacturers with a quality system which is not certified.

A further consideration to be taken into account is the section in SANS 347 which deals with 'Essential requirements for construction'. This section of the standard incorporates certain requirements which in some cases are over and above the requirements of the conformity assessment modules. The requirements for AIA or TPO involvement in approval of welding procedures, welders and NDT personnel have been the subject of much upset with manufacturers, especially those with certified quality systems. This upset has largely been caused by of a lack of consistency in the manner in which AIAs have gone about the

approvals. SANS 347 is currently being revised and should relieve the current level of upset and provide clarification.

Surveillance of a manufacturer's certified quality system is addressed in section 7 of SANS 347. A CB has to carry out periodic audits to ensure that the manufacturer maintains and applies the quality system. The frequency of the periodic audits has to be such that a full re-assessment is carried out every three years. In addition the certification body may pay unexpected visits to the manufacturer. As might be expected the manufacturer is obliged to provide access to allow the CB to perform its work.

A certified system is compulsory for certain equipment

Annex C of SANS 347 addresses requirements for ASME stamped equipment and RSA/CI/OHSA stamped equipment (our local version of ASME and commonly used). It includes all stationary equipment in hazard categories I through IV and stipulates that modules G and H shall be applied. This means that a manufacturer is required to have a certified quality system (module H) and to ensure extensive involvement of an AIA in the manufacture (module G). In effect module G is the full involvement of an AIA as was applied under the VUP. So, for ASME and RSA/CI/OHSA equipment it is mandatory for a manufacturer to have a certified quality system and there is no dispensation for reduced involvement of an AIA, making the requirements for our commonly used RSA/CI/OHSA more stringent than when building using other codes, EN for example. This apparent anomaly is being considered in the revision of the standard but there is no certainty it will change.

As already mentioned RSA/CI/OHSA stamping is our local version of ASME where equipment is built in accordance with the ASME Code except for marking and certification requirements with an AIA taking the role of the ASME authorised inspector. For manufacturers to build and stamp equipment RSA/CI/OHSA they are required to meet one of two options. These are:

a) Be an ASME stamp holder and use an AIA to take the role of an authorised inspector in inspecting, verifying and certifying the equipment
b) Have a quality system which is certified as in line with ASME VIII Div 1 Appendix 10 and SANS 3834 Part 2. (The requirements for a quality system derived from each of these documents are very similar so it is not difficult to comply with both. Note also that an adapted version of ISO 9001 system is not suitable for this purpose.)

Requirements applicable to Certification Bodies and status of the SAIW/IIW Certification System

The information above gives an understanding of the role of quality system certification in manufacturing in accordance with the PER and SANS 347 but until recently there has been a complication because of the requirements applicable to the CB. SANS 347 requires that a CB is approved by the regulatory authority - in this case the Department of Labour (DoL) - and accredited by the government-endorsed accreditation body - in this case SANAS. Accreditation by SANAS is a pre-requisite for an application to DoL.

SAIW is accredited as an Authorised National Body for Company Certification (ANBCC) by the International Institute of Welding (IIW) to operate its Manufacturing Certification System (MCS) which is an ISO/SANS 3834-based system and SAIW has been certifying manufacturers since 2008. The system was introduced to give our local manufacturers international recognition for their competence in producing welded fabrications but it was also apparent that it would have a place

Jim Guild, Executive Director SAIW

in assisting manufacturers to comply with the changing pressure equipment regulations.

Bodies certifying quality management systems are required to comply with the ISO 17021 standard and the IIW rules for accrediting SAIW and other ANBCCs are based on this standard. An application for accreditation of the SAIW system was made to SANAS in 2010. Although SANAS is well versed in ISO/SANS 17021 accreditations it has not had access to expertise with the SANS 3834 standard so it has been unable to conduct the accreditation assessment. This may not change for some time since the demand for this category of accreditation is likely to be very low. This has meant that in some circumstances manufacturers could be deemed as not complying with the SANS 347 standard and the PER. It has also meant that some AIAs have not allowed manufacturers to apply certain conformity assessment modules and have insisted on full AIA involvement.

THE REQUIREMENTS FOR AIA OR TPO INVOLVEMENT IN APPROVAL OF WELDING PROCEDURES, WELDERS AND NDT PERSONNEL HAVE BEEN THE SUBJECT OF MUCH UPSET WITH MANUFACTURERS, ESPECIALLY THOSE WITH CERTIFIED QUALITY SYSTEMS.

Fortunately, some progress has been achieved in the last few weeks and the DoL has now confirmed that it accepts the IIW accreditation of SAIW for certifying quality systems in the context of the PER and the associated SANS 347 standard. DoL has granted SAIW interim approval in terms of regulation 4 to certify manufacturers for SANS 3834 and ASME Section VIII Div. 1 Appendix 10. SAIW is, of course, obliged by DoL to maintain its IIW accreditation. This information is being communicated to all SAIW certified companies and to the Association of Inspection Authorities for dissemination to AIAs.

Other Information for manufacturers

It is mentioned that in addition to being a Certification Body SAIW is also a TPO so can assist manufacturers with approval of welding procedures and welding and NDT personnel.

This article was prepared by Jim Guild (above) Executive Director of SAIW and is the first in a series of articles related to pressure equipment.

JOB KNOWLEDGE

Copper-nickel alloys

Copper and nickel are completely soluble in each other, giving rise to a range of alloys that includes both copper-nickel (Cu-Ni) and nickel-copper alloys, the latter alloys having been covered in the Job Knowledge articles numbers 107 and 108.

Although there is a wide range of alloys, only two are commercially significant. These are the 90/10 and 70/30 grades and the Table shows typical compositions and mechanical properties. Both grades have excellent corrosion resistance, particularly in sea water applications, and are used extensively in marine and offshore applications. The 70Cu/30Ni alloy is the stronger of the two with a yield strength in the annealed condition of ~150MPa compared with 120MPa of the lower nickel alloy. The 90Cu/10Ni grade however is probably the most used grade as it is less expensive than the higher nickel alloy.

The alloys are single phase and cannot be hardened by heat treatment. The only method of increasing tensile strength is by cold working which, when the metal is in the fully hard condition, can match that of good quality carbon steel. Work hardening, however, has implications with respect to welding in that there will be some strength loss in the HAZs. Fortunately this region is relatively narrow due to the low coefficient of thermal conductivity; approximately the same as steel. This narrow, low strength region can cause problems during welding procedure qualification testing of transverse bend coupons, most of the deformation being concentrated in the narrow area of strength loss. Bend testing is therefore generally carried out using a longitudinal bend specimen.

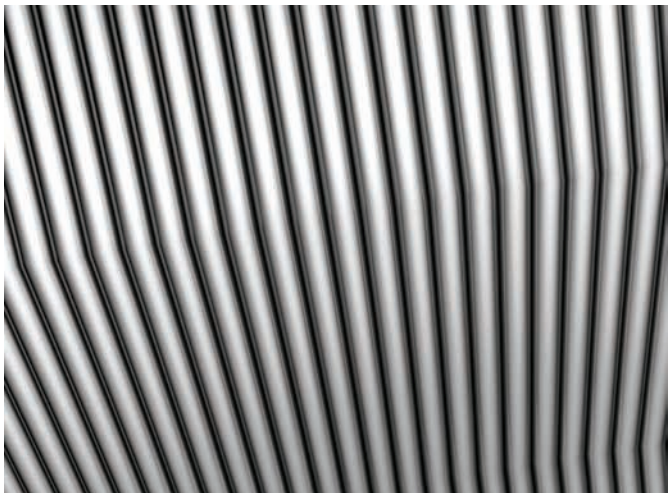
THE FILLER WIRE IS RELATIVELY SOFT AND LOW FRICTION LINERS ARE ESSENTIAL. INTERMEDIATE WIRE FEEDERS MAY BE REQUIRED IF THE WELDING IS TAKING PLACE SOME DISTANCE FROM THE WIRE DRIVE UNIT.

The other main alloying elements are manganese, around 1%, that is used as a deoxidant and desulphuriser, and up to 2% iron which is added to improve erosion resistance. Some of this iron, perhaps 1% or more, may be replaced with chromium to increase the strength. Niobium may also be added to castings to increase the strength and at the same time improve weldability.

Due to a deficiency in deoxidants in the alloys, porosity is a problem and they cannot be welded autogenously. A highly deoxidised filler metal needs to be used although there is an exception to this rule; thin sheet containing substantial amounts of titanium. A very strong deoxidant, is now available and this is capable of being welded autogenously by TIG, plasma-TIG and the power beam processes without significant porosity problems

There are filler metals available that match both grades but it is generally 70Cu/30Ni filler that is used; AWS

A 5.6 ECuNi MMA electrodes and AWS A5.7 ERCuNi for TIG and MIG wires. The weld metal from these filler metals overmatches the strength of both grades in the annealed condition. Having a 0.2% proof of some 270MPa it has better handling characteristics than the 90Cu/10Ni filler



and is noble with respect to the 90Cu/10Ni parent metal. The 90Cu/10Ni filler metals have a lower 0.2% proof of around 200MPa and should be used for welding 90Cu/10Ni alloys only.
The weld metal from both grades of filler metal is more sluggish than, say, carbon steel. Weld preparations therefore need to be more open to enable the welder to control and manipulate the weld pool. An included angle of 70 to 800 is recommended. Root face dimensions would typically be 0-1.5mm root face with a zero-1.5mm root gap.

As mentioned above, porosity when welding either grade can be a problem and to reduce the risk the filler metals contain substantial amounts (around 0.5%) titanium. Cleanliness of weld preparations and filler wires is also important, as is the use of high purity shielding gas. Weld preparations may need to have the tenacious oxide films removed by belt or disc sanding and should be thoroughly degreased with commercially available solvents. Stainless steel wire brushes and stainless steel wire wool are also useful.

This cleaning equipment must not be used on any other metals otherwise cross contamination will occur. Ideally the Cu/Ni fabrication area should also be physically separated from other fabrication areas to prevent dust from activities such as grinding settling on the cleaned weld preparations. One point worth noting is, if air powered tools are used for wire brushing or sanding, these may leave a film of moisture and/or oil on the surface (compressed air is seldom completely free of contaminants) and this may result in porosity and or cracking.

Depositing a pore-free root pass can be particularly difficult. Insufficient filler metal coupled with a large amount of dilution from the parent metal may result in unacceptable porosity. Copious amounts of filler metal and a larger than normal root gap (~2-3mm) will reduce porosity to acceptable levels.

Other causes of porosity may be associated with inadequate gas shielding. When TIG welding, use as large a diameter ceramic as possible, together with a gas lens. Arcs should be kept short; too long an arc length may permit atmospheric contamination.

Both the alloys are sensitive to hot cracking. As with the other nickel alloys the main culprit is sulphur but lead, phosphorus and carbon will also have and adverse effect. Cleanliness, as discussed above, is therefore crucial and all grease, oil, marker crayon, paint etc must be removed from the weld preparation and the adjacent areas before welding. To reduce further the risk of hot fissuring the interpass temperature should be limited to 150°C.

The alloys have high coefficients of thermal expansion and more extensive tack welding than would be required for a carbon steel is necessary to prevent excessive distortion and root gaps closing up during welding. Tacks should be wire brushed or ground to bright metal if they are to be incorporated in the completed weld.

TIG (GTAW) welding will give the best quality weld metal and a well shaped root bead. DC-ve current should be used. Pulsed current will give good control and a neat appearance when welding positionally.

As mentioned above, a large a ceramic shroud equipped with a gas lens is recommended to give the most effective gas shield and the arc length should be kept short; 3.5-4.5mm. Argon or argon with small amounts of hydrogen, (1- 5%) are the appropriate shield gases with the Ar/H mixtures providing higher heat input. Above about 6mm thickness, TIG welding is generally replaced by the higher deposition rate MIG process, although mechanised/automated systems such as orbital TIG are very cost effective. A root purge of argon is recommended when welding a TIG root run and the next couple of fill passes.

MIG (GMAW) welding is carried out using either pure argon or argon-helium mixtures; particularly useful on thicker sections. As with TIG, pulsed current will give better weld quality and appearance than dip transfer when welding out of the flat position. The filler wire is relatively soft and low friction liners are essential. Intermediate wire feeders may be required if the welding is taking place some distance from the wire drive unit. The filler wire pack should be opened at the last moment and should be adequately protected from contamination when installed in the wire feeder.

MMA (SMAW) welding electrodes are available, generally with a basic flux coating and designed to operate on DC+ve. Whilst these electrodes do not require baking before use, they may be dried at around 250°C if they have absorbed any moisture. Damp electrodes will result in weld metal porosity, as will a long arc. Weaving should be restricted to 3-4 times the electrode diameter.

Submerged arc welding (SAW) becomes cost effective over a thickness of about 12.5mm if the component can be manipulated to enable welding to take place in the flat position. Weld preparation would be similar to that used for MIG welding. MIG wires of up to 2.4mm in diameter may be used so welding currents need to be correspondingly low, 300-350amps. The choice of welding flux should be discussed with the consumable supplier as an incorrect choice can result in slag detachability problems.

Post weld heat treatment is not necessary but if dimensional stability is important the component may be stress relieved at 350-450°C.

Alloy type	Chemical composition % typical						Typical Mechanical Properties MPa Annealed condition			
	bal	Ni	Fe	Mn	S	P	0.2% proof	UTS	EL%	Hardness HV
90 Cu/10Ni	bal	9-11	1.5	0.75	0.01	0.015	120	310	32	95
70 Cu/30Ni	bal	29-33	0.75	1.25	0.01	0.015	150	150	35	105

Empowerment Power…Level 4 for SAIW

The SAIW has attained a Level 4 Broad-Based Black Economic Empowerment (B-BBEE) with a rating of 65,05% giving the company a 100% B-BBEE procurement recognition level.

This was independently verified by BEESHOP, a B-BBEE verification agency in terms of codes of good practice and the construction sector code.

SAIW finance and administration manager Michelle Warmback, who managed the verification process on behalf of the Institute, says she is delighted with this achievement and that the SAIW's efforts in this sphere are paying dividends. "It is especially pleasing because, as a not-for-profit organisation, there is no ownership contribution to our score in the assessment process," she says.

"Empowerment remains a critical process in any company in South Africa and we are no different. It has been most pleasing how the entire organisation has got behind the process and especially my immediate team who have all gone the extra mile," says Warmback. "It's not just about a certificate. More importantly, it is about the development of an organisation that is more conscious of working together towards a goal of productivity and harmony in a truly South African environment.

Warmback says she is particularly pleased with the scores achieved in the categories of socio-economic development (100%), skills development (85%) and enterprise development (100%). "Above all the SAIW is about the training and development of people within and outside the organisation and our exceptional scoring in these areas reflects the essence of our success," Warmback says.

(l-r) Fiona Weimers, Rebecca Motloung, Nazreen Mohamed, Lilian Pin, Laetitia Dormehl, Jean Scholtz, Michelle Warmback and Elizabeth Shole

A Night

2 of the 3 graduates – IIW International Welding Specialist

Godfrey Nhlapo

Mohlakola Tshabalala

2 of the 8 graduates – International Welding Technologist

Anna Kgabi

Simangele Msomi

Awarding people for excellence and achievement so that they may do the best that they can in their chosen careers is the raison d'etre of the SAIW…and this year was no exception - the exceptionally high standard achieved by so many people was just reward for the huge effort made by all.

Special congratulations to SASOL's Daniel Livingstone who

8 of the 13 graduates – Inspector Level 2 with IIW (S) Diploma

Donovan Coleman

Gavin Leaveil Henry

Juan van Niekerk & partner

Kriveshin Dinesh Chhana

to Remember

received only the third Inspection Technology diploma in SAIW's history. In addition a total of eight International Welding Technologist diplomas were awarded along with three International Welding Specialist diplomas.

And, to boot, a good night was had by all with the speeches, food and drink meeting high standards too!

George Andries Nel & partner

Jayanth Kissoon

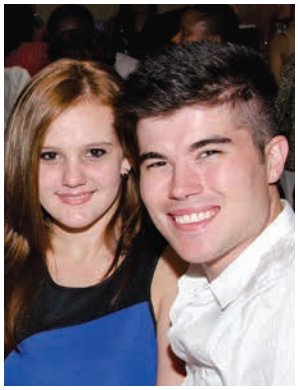
Pierre Steenberg

Travis Anthony Sheasby

2 of the 3 graduates – Inspector Level 1 with distinction

Elvis Makoge Eseh

Mmabatho Maebela



Qualification and Certification

CONGRATULATIONS TO THE PEOPLE BELOW WHO RECENTLY ACHIEVED QUALIFICATION AND CERTIFICATION.

SAIW
Southern African Institute of Welding

SAQCC-NDT CERTIFICATES

Liquid Penetrant Testing Level One
Manyane MF
Mashego M
Nzimande TL
Tyhalithi L
Zwane LN

Liquid Penetrant Testing Level Two
Mabusela RJ
Madhlophe WD

Liquid Penetrant Testing Level Three
Newman SCV

Magnetic Particle Testing Level One
Manyane MF
Mashego M
Monthoni RV
Tyhalithi L

Magnetic Particle Testing Level Two
Dlamini SZ
Dyantyi A
Harris A
Holein CA
le Grange AM
Mabusela RJ
Madhlophe WD

Magnetic Particle Testing Level Three
Newman SCV
Osman KEMAH

Ultrasonic Testing Level One
du Raan A
King R
Perumal K
Rosenberg KD
Scherman CJ

Ultrasonic Testing Level Two
JJ Minnaar

Ultrasonic Testing Level Three
None

Ultrasonic Testing Wall Thickness
Appelgryn BJ
Bruwer R
Cooper CC
de Kock R
Dlodlo TP
Gololo ME
Kgole TJ
Khanyi STP
Luvhenga RS
Mabe A
Mabuza JB
Mahlare MKM
Makhado D
Makola RM
Malaza BNL
Mantsoe KP
Mashamba PC
Mbele NI
Mnguni KG
Moekoena NA
Mokuwe PI
Moloi KE
Msimango MM
Mulibana S
Muthivi RE
Ngobeni MC
Nkutha MV
Nxumalo TB
Radebe SPH
Salae ME
Smith CJ
Stevenson LG
Strydom H
Tjale PKM
Tsanwani TT
van Zyl G
Weerepas IA

Radiographic Testing Level One
None

Radiographic Testing Level Two
None

Radiographic Testing Level Three
None

Radiographic Interpreters
Makhubela T
Mashiyane NF
Ogle CD
Roberts DK
Skosana P

STUDENTS THAT PASSED THE WELDING INSPECTORS LEVEL ONE & TWO

Inspectors Level One
Baderoon MS
Bezuidenhout JJ
Bothma DJ
Breet GJD
Buys D
Chetty DOB
Daya A
de Jager GAW
Denya T
Dorasamy D
Duma SZ
Dunn MT
Eseh EM
Fiquerdo AD
Fouche HJ
Gradidge KE
Hadebe TN
Hadebe Z
Hamman R
Harding BW
Jadwat I
Joubert QF
Keller WJ
Khuzwayo JB
King KF
Klaas KK
Kutama NM
Kutu LS
Letsoalo L
Lloyd YST
Lloyd SL
Lukhele X
Mabuza SS
Mahlangu SL
Majeke LP
Masuku S
Mbhele PP
Mbobo PB
Mlangeni N
Mmachacha NB
Moopanar R
Motloung M
Murugen D
Mvula J
Mzinyane FS
Ndhlovu N
Nel PJ
Nemshungwa WA
Ngomane A
Ngomane BS
Ohlsson DW
Oosthuizen M
Padayachee M
Parker ABC
Paton C
PeattieJW
Pestana DR
Posthumus DM
Pretoriaus RD
Robbertze C
Serabane MJ
Shabangu ZT
Sheikh MS
Strachan JJ
Swanepoel DJ
Tarin DN
Thabede MC
Tolmay PJ
Tshithukhe V
van Coller J
van der Merwe NT
van Niekerk RJ
Venter W
Viljoen J
Viljoen WA
Whitlock R
Winton LG
Wolfaard CC
Wynne LC
Xaba K

Inspectors Level Two
Anderson J
Arjunan B
Botha JA
Captain-Hastibeer CH
Chabane H
Eksteen KR
Geyser C
Govender K
Govender V
Groenewald BL
Haricharan P
Issel D
Jacobs S
Jordaan W
Ker CG
Koekemoer H
Lawson RS
Makhurupetji PL
Malope TC
Maneckchund V
Masilela SH
Matsapola ML
Mbatha KKM
Mdletshe SC
Michael MP
Mnguni NS
Morrow W
Motheo SM
Ngubane A
Ogle DC
Prinsloo GA
Pugin JD
Ramrattan RA
Ratter JN
Reynolds D
Rooskrantz B
Roth D
Selling DC
Stainbank G
Strauss GJ
van der Merwe A
van Wyk R
Williams DD

ASME CODES OF MANUFACTURE

Govender V
Mahamba MJ
Makoge DA
Radebe RM
Strydom JJ
Strydom MP
Stuart WS
Thompson LW
Tsolo PP
Van Wyk M
Very MCJ
Viviers A

Painting Inspectors
Bosch JH
Dlamini SL
Koekemoer CJ
Lehoko IB
Naidoo D
Ndobela RM
Selling N
Swarts PJ
Todd M
Tsolo PP
van Wyk AS

CERTIFIED STUDENTS

Boilers
T Matsebe

Pressure Vessels
Msomi L
Ngwenya JXD

IPE
Brits D
Lloyd M
Sukhram A

In the SPOTLIGHT

J H Pieterse

IN OUR SERIES OF PROFILES ON PEOPLE WHO ARE MAKING A DIFFERENCE TO THEIR COMPANIES AND TO THE WELDING INDUSTRY GENERALLY, WE TALK TO JOHAN PIETERSE A SOUTH AFRICAN WELDING STALWART WHO HAS BEEN WITH AFROX FOR MORE THAN 25 YEARS AND IS CURRENTLY A MEMBER OF THE SAIW COUNCIL.

Fusion: How long have you been with Afrox and what do you do in the company?

JP: I have been with Afrox for the past 25 years and currently hold the position of Business Manager, Manufacturing Industries. Our division offers specific welding, cutting and heating application solutions to all the sub-sectors of the manufacturing industries, and our team is responsible for developing unique solutions for complex customer problems and supporting the implementation of these solutions.

Fusion: How did your career begin?

JP: I started my career at South African Airways as an apprentice Aircraft Instruments Technician and qualified in 1986. The pace at SAA was a little slow and I decided to join Afrox in 1989 where I qualified as an Electronics Technician with a National Diploma in Electronics. Soon after joining Afrox, I recognised my passion for the industry and the marketing and sales environment, and went on to obtain a B Com Honours degree in marketing from the University of Johannesburg.

Fusion: What are your personal and business goals?

JP: My main personal as well as business goal is to ensure that whatever I do has a positive impact on the sub-Saharan African economic growth. I firmly believe that if we focus on continuously improving our productivity and skills in Africa, we can achieve the competitiveness required to compete in the global economy. To this end, I view our relationship with the SAIW as very important and collaborate with the Institute at many levels to ensure that we work towards a common goal in the South African welding industry, which is a significant part of our business.

Fusion: Is there anything you'd like to see changed in the industry?

JP: I think that the industry in general is in excellent shape in South Africa, but If there was one thing I could change, or influence, in the industry it would be to ensure that all industry players work towards a common goal of economic growth and prosperity in our region. This would mean adopting and developing new technology and processes that would improve quality and productivity thus increasing our competitiveness. This process would also require a concerted effort from everyone to improve our skills levels. It is never too late to start!

Fusion: What advice would you give to a young person considering welding as a career?

JP: My advice to the youth currently weighing up career options is that they should seriously consider a technical career, specifically welding. Welding is the backbone of any economy playing a critical role in developing a country's infrastructure. Within the welding world there is a host of career options including welding, boiler making, inspection, supervision, sales, welding engineering and various managerial opportunities. It is also worth noting that during the past six years we have witnessed a substantial amount of new and exciting infrastructural development projects in South Africa, such as Medupi and Kusile, and we can look forward to more growth in the industry, making welding a very lucrative career option for the future.

Fusion: What do you do outside of work?

JP: I enjoy cycling and relaxing with a good book. I also enjoy travelling and have been fortunate enough to visit many countries on our beautiful continent and in other parts of the world, and plan to see much more going forward.

I am married to Anita and we have 5 children; Renier, Michelle, Nakita, Chantelle and Bianca. We are also fortunate to have a grandson, Franques, and enjoy spending time with him and the children.

African Oxygen Limited (Afrox) is a leading gases and welding products manufacturer and supplier to the sub-Saharan African markets, and is a member of the global Linde Group. Afrox was established in 1927 and listed on the JSE in 1963. The company is also represented in 17 sub-Saharan African countries. We offer a wide range of application solutions to a broad spectrum of industry sectors including manufacturing, mining, metals and food & beverage, amongst others.

AFRICA NEWS

African NDT Federation formalised

First formulated in 2002, the African Federation of Non Destructive Testing (AFNDT), an informal, voluntary association representing countries involved in AFRA/IAEA group NDT projects was formalised by organisations from eight countries at a meeting held in Johannesburg in early April 2014. The eight countries forming the AFNDT signed a constitution document which will be used to develop the organisation into an effective regional body.

The main objectives of AFNDT include promoting collaboration amongst African countries in matters of common interest in NDT, holding regional conferences on the technology and application of NDT methods, acting as the regional representative for Africa in the leading international body, ICNDT and encouraging the formation of NDT societies in countries where these do not exist.

The eight founding organisations of AFNDT are:

Coalend-CSC	Algeria
CTN	Angola
Hydrac	Cameroon
GAEC	Ghana
KEBS	Kenya
SAIW	South Africa
SAEC	Sudan
Cetime	Tunisia

Two new categories of membership have been introduced, namely “associate member” and “liaison member”. This will allow countries to have more than just a single member organisation and encourage wider participation.

The members of AFNDT constitute the General Council, which is the policy and decision making body of the association. Mourad Zergoug from the Centre for Scientific and Technical Research on Welding and Control has been appointed as the President of AFNDT and will lead the organisation through to its next regional conference which will be held in Algiers in April/May 2015.

A new position of Executive Secretary has been created and Harold Jansen of SAIW has been appointed to the post. He will be responsible for managing the day-to-day affairs of AFNDT including arranging meetings and promotional and information communications.
For more information please contact Harold at jansenh@saiw.co.za.

Mourad Zergoug

SAIW/KEBS strengthen ties

Samuel Njoroge and Frans Vorster

While the Kenyan Bureau of Standards (KEBS) and the SAIW have worked together in NDT training for several years, they are now considering a wider relationship and possible joint venture.

In this context Samuel Njoroge, KEBS Head of Engineering Workshops, came in May 2014 to the SAIW for an orientation visit. Samuel spent time with the SAIW team learning about training in both welding and NDT.

Kenya is expected to get a significant boost from industrial development over the next decade with significant construction projects and the availability of suitably trained, qualified and certified personnel will be essential for maximum localisation of the workforce.

Training and certification of welders and NDT personnel is one of the areas of special interest for Samuel and his time spent with Harold Jansen and Frans Vorster will help him gain a thorough understanding of the resources and expertise needed for these activities.

HR NEWS

New Appointment

Renier Mostert

Renier Mostert was recently appointed as senior welding consultant at the SAIW. His responsibilities include consulting on welding procedure qualifications, welder qualifications, welder skills evaluation, welding documentation audits, presenting 'off-site', tailor-made, theoretical and practical welder training and assistance with solving and/or preventing welding-related problems.

A welder by trade, Renier has worked in the welding industry for 21 years. His qualifications include Welding Inspector Level 2, International Welding Inspector (Standard) and International Welding Specialist. Renier says that attaining qualification as an International Welding Technologist and as an Inspector of Pressurised Equipment is an important personal goal.

Farewell

Professor Madeleine du Toit

The SAIW and the South African welding industry bids farewell to SAIW President, Prof Madeleine du Toit. Her achievements are legendary in our industry. She did brilliant work at UP and as our President. We wish her all the best in her move to Wollongong University, Australia and thank her for the four years of support and leadership that she gave the SAIW and the Southern African welding industry generally.

Confidence Lekoane becomes a mom

SAIW congratulates Confidence Lekoane on the birth of her first child, Thoriso Didintle Lekoane. Thoriso is a Valentine's baby, having been born on the 14th of February 2014. Confidence works in the technical services department of SAIW. She is responsible for the management of the metallurgical testing laboratory opened by SAIW in June 2013.

NDT stalwart bats for SAIW

In its quest for heightened compliance with new and revised quality standards, SAIW secured the services of John Thompson, an internationally renowned quality and Non Destructive Testing (NDT) expert, to, inter alia, help review the SAIW quality system.

SAIW executive director Jim Guild explains that for some areas of the SAIW activities, independent body accreditation is an essential 'licence to operate'. "This is especially so in the areas of the personnel and company certification systems where SAIW has to meet the requirements of international standards and is assessed by both the national accreditation body, SANAS and international bodies such as IIW, ICNDT and IAEA.

"Although the SAIW quality system, which is used to manage certification activities, has been through many successful audits it is, on occasion, very helpful to have it reviewed and measured by an independent expert in the field. With new editions of the ISO 17024 standard, dealing with the requirements for bodies certifying personnel, and the ISO 9712 standard, dealing with training, qualification and certification of NDT personnel, having been issued recently the SAIW management team felt the timing was opportune to involve international expertise and John Thompson, who was involved in the development of both the new standards, was the ideal person to advise SAIW when he visited the Institute in March 2014,"says Guild.

Thompson, who is no stranger to South Africa having regularly worked here over the past 15 years, worked for the British Institute of NDT for 25 years in various posts including head of Certification and International Affairs and, latterly, as director.

During his visit Thompson worked closely with Herman Potgieter and Harold Jansen from the Institute's management team. He also met with Ben Beetge, Chairman of the SAQCC NDT committee.

According to Thompson, South Africa's compliance is on par with the rest of the industrialised world and "it is therefore a pleasure to be working with SAIW".

"We are privileged to be working with John," says Jim Guild, executive director of SAIW. "He is a highly sought after consultant, as his 32 scheduled global audits over the next year show. His assessment has been thorough and comprehensive so he has left us with quite a bit of work to do but we are confident in the process and the advice we are receiving."

John Thompson

Branch NEWS

Cape Town

The big news for Cape Town is the upcoming opening in mid-May of our first ever branch office & training facility. Work is currently underway with the refurbishment of a property in the centrally-located Milpark Centre, Milnerton, which will provide classroom facilities for all theory-based SAIW training courses, as well as a much-needed venue for evening meetings, presentations & exam re-writes. It will also provide a welcoming environment for students & members. See next Fusion for more news on the official opening.

The many public holidays in April & the beginning of May have posed some difficulties regarding the organization of our regular evening meetings, but we look forward to an exciting second quarter – watch this space!

FORTHCOMING TRAINING COURSES:

RT Interpreters
12th – 23rd May

Senior Inspector (Level 2) – 5 wks
2nd – 13th June
14th – 25th July &
18th – 22nd August

Welding Inspector (Level 1) – 5 wks
23rd June – 11th July &
4th – 15th August

Appreciation of Welding for Engineers
9th – 13th June

For further information on forthcoming events, any suggestions regarding topics for evening meetings, or to be added to the Cape Town SAIW mailing list, please contact Liz Berry on berryl@saiw.co.za.

Durban

The Durban branch of SAIW has shown considerable growth over the last quarter. Our database has grown from around 150 interested parties to 419 in the past few months and attendance of our monthly meetings is increasing steadily. All of the courses running in Durban are fully booked at present and bookings have already begun for the Welding Inspector courses starting at the end of September. We are running a Pressure Vessels workshop in May, which is also fully booked.

As a result of the increased demand for training and services in Durban, we are currently looking for premises to house the Durban branch. Some facilities have been identified thus far and we will hopefully finalise the site of our new home soon. This is an exciting development and will relieve a lot of the pressure that is currently on the head office in Johannesburg. Watch this space!

The January 2014 meeting was well attended and featured Nico Fourie lecturing on "Weld Distortions". Tafadzwa Mushove's address to the attendees of the March 2014 meeting, was based on the requirements of Paint Inspection.

Re-writes are currently being done in Durban. The first round was held in March and proved to be very successful. The second round of re-writes was held at the end of April.

The Durban Certification Dinner was held on the 20th of May at Westville Country Club. Pictures to follow in the next issue of Fusion.

Johannesburg

Evening Meetings

At the February 2014 meeting, SAIW's NDT manager, Harold Jansen, discussed "The role of a NDT Level 3 in the South African industry". The focus was on what can be reasonably expected from a Level 3 qualification and the role it plays in the South African industry.

At the March meeting Prince Dlamini, metallurgical engineer at Eskom, presented "Dealing with materials and welding quality on Eskom's new build plants", focusing on the role of welding in Eskom's capital expansion program, including the two new power plants currently under construction. He emphasised that the importance of quality control during manufacturing cannot be overstated; it is critical to assure long-term integrity and reliability of all Eskom plants.

Both meetings were well attended.

The May meeting, "Safety testing and calibration / validation testing of welding equipment", will be reported on in the next Fusion.

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