



Celebrating a fusion of seven decades



Southern African Institute of Welding
Celebrating a fusion of seven decades

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FOREWORD

Looking back and thinking about our organisation, I was struck by the fact that, amongst all the things that happened in the year 1948, it was the year that the SAIW was founded and the year the Nationalist Apartheid government came to power.

SAIW 70 Years on

A word from the President, Morris Maroga

What a momentous year 1948 was in the history of our country! South Africans were led down a path of hatred and divisiveness by a government that was to become reviled the world over. Its policy of discrimination and deprivation caused untold harm, which will take generations to fully recover from.

Yet, even from those dark times, organisations arose that became key to the empowerment of millions of South Africans – regardless of race, colour or creed – through education and skills training. One such organisation was the SAIW, which has become the leading welding training company in Africa, having over the years trained thousands of people from all over the continent, with most having been able to get a job either in their home country or abroad. This is a magnificent achievement of which I am extremely proud.

It is obviously true that, like all South African educational – and other – institutions, the SAIW needed to become a relevant post-apartheid organisation

through the requisite transformation. In this regard, while I acknowledge there is still work to be done, I am pleased to be able to report that our management, teaching staff and students today represent the full gamut of South African society. The SAIW is committed to making a difference in South Africa by providing both our youth, and the more experienced personnel in our industry, an opportunity to get ahead in life.

In the more than 70 years of its existence, the SAIW has become an organisation which is known globally for its quality. Wherever one goes in the world the SAIW is known by those in the welding and related industries. Locally we are a real hedge against unemployment for those who successfully complete our programmes. This is indeed a feather in our cap!

I want to thank all those who have contributed in some way to the success of this great institution of learning – and to everyone who offered up their time, expertise and input in the creation of this commemorative book.

Fusion is a familiar term within the welding industry.

It denotes the intended result of every weld – where two or more distinct pieces of metal are joined to form one solid entity. Substantially different from soldering, for example, which relies on a third material to act as the “glue” between separate pieces, fusion requires the complete coalescence or blending of materials – the atoms of each metal literally bond. The original pieces are now intrinsically altered and the result is something entirely new, something solid and strong. A single entity greater than the sum of its parts. It’s no surprise then that achieving fusion is an intensive process. Characterised by extreme heat of materials fused together to form a new metal, the highly-specialised welding procedures are mastered through unwavering concentration, foresight, persistence and experience.

The product is then subjected to rigorous testing – from the surface appearance through to the quality of the molecular bonding, to determine that fusion is total and complete. And for very good reason: It is critical to the soundness and integrity of a structure; essential for bearing human innovations higher, deeper and faster – and bearing human lives, safely.

- - -

Fusion is also the story of how the SAIW was forged – and continues to be forged – from its varied origins, additions and influences into a greater whole. South Africa’s history and political climate; SAIW’s staff, students and members;

the board of directors, the leaders present and past, the funders, the industry partners and government institutions; even the physical building and its inner-city location; all represent diverse backgrounds and objectives, incorporated within the Institute for the common good, fused together, as it were, in a rich history. And, like a sound weld, strong and effective, SAIW has endured. It's a story that begins in 1948, when South African politicians strategised a future of segregation and systematic oppression, and this non-profit institute envisioned quite another future. Working, as leaders often do, in the background and after hours, the SAIW founders set out to build and serve. They built from the ground up, with a focus on quality and training that would help grow the nation's economy and expertise – developing infrastructure, creating jobs and growing leaders; regardless of race, culture or creed.

- - -

Fusion is also the ongoing story of our multicultural nation. Fusion is the opposite of separation – and the once-powerful deception that segregation is best and that the “other” is bad. Fusion is the enlightened notion of ubuntu – the beneficial connectedness that exists between all people.

As such, fusion offers a concept – with SAIW its material proof – of what can be achieved through joint efforts and perseverance. Not simply in the welding industry, but in the country as a whole. And not just in South Africa, but across the continent.



**This book is a celebration of the
Institute's 70 years.**

This book is a celebration of the Institute's more than 70 years of contribution to South Africa's industry and society. It is by no means exhaustive or even strictly chronological. Rather, it portrays some of the human stories behind the formalities of timelines and annual reports, to offer a composite portrait of the SAIW – a combination of remarkable people and remarkable moments.

Money makes the
world go round,
but welding keeps
it together.

- Morris Maroga

CHAPTER 01

1948



1959



Milestones



March 1948

Inception

“The South African Institution of Welding be and is hereby formed.”

A small group of businessmen and academics meet in the landmark Eskom House that once stood in Johannesburg’s historical mining district. Committed to the advancement of welding technology in the country, the group forms a non-profit, voluntary industry association – of 30 founder members.



1948-1950

Harvey Shacklock serves as SAIW’s first president.



May 1948

The International Institute of Welding (IIW) is formed in Brussels, with SAIW a founder member. The membership fee is £20.

Later that same month:

The nationalist Apartheid government comes to power.





**What does it take to survive
70 years of change and
challenges?**

I think it's leadership.

**Not of self-service, but
rather the kind of leadership
determined to grow the
Institute beyond the state in
which they found it.**

- Morris Maroga



SAIW PRESIDENT:
2014-2018

CORPORATE SPECIALIST:
MATERIALS AND WELDING AND NDT, ESKOM

Meet the president Morris Maroga

Ironically, Morris Maroga's introduction to the SAIW in the early 2000s was not voluntary. In fact, the engineering graduate strongly resisted his manager's insistence that he enrol for the Institute's Welding Inspection course – so much so that said manager eventually wrote it into his employment contract. That persistent boss, Maroga reflects, opened up an entire world for him.

Maroga discovered a discipline so intriguing, that he pursued the subject further – in the form of a master's degree and seats on industry councils. This unexpected career path rewarded him with a prominent position at Eskom, as well as numerous awards including the esteemed Harvey Shacklock Gold Medal in 2010 and the Eskom Chairman's Award for Excellence in 2011, in recognition of his contribution of exceptional value to Eskom. And in 2014 he was appointed president of SAIW – news he relayed to his former manager with great amusement.

This anecdote illustrates the misconceptions that cloud the welding field and hinder people from taking up the ample, diverse and fulfilling careers the sector offers – a problem that Maroga is now passionate about solving.

“People have this one-dimensional perception of welding – like I did – that it's just a dirty career. Young people want to be lawyers and doctors. But when I speak at schools and explain my job and the broadness of the sector, I can see the perceptions of both the learners and the educators changing.”

“If you pursue a career in welding,” Maroga adds, “you are more likely to get a job than in most other industries.” This is due to the country's massive skills shortage, a dilemma evidenced by the field's imported skilled-labour statistic which sometimes exceeds 70%. Maroga hopes to alleviate this two-sided problem of skills shortage and unemployment by the active endorsement of welding careers; in partnership with government, industry and the relevant educational institutions and international bodies.

The Eskom Welding School, which he established with SAIW, exemplifies this vision. Opened in 2011, it offers internationally accredited training to disadvantaged applicants, with its success having attracted the attention, as well as the funding, of government.

Dispelling industry myths



For the layman, welding may evoke misconceptions of low-skilled, manual work – of a small, one-man business manufacturing burglar bars and garden gates. The reality of the industry, however, could not be more different.

Fact: It is an industry of diverse and sophisticated career opportunities.

The industry, which comprises welding and its allied technologies, offers a diverse range of career opportunities suited to all levels of education – from grade 10 to PhD level, and every level between these two extremes.

“In the three broad categories of Welding Technology, Non-Destructive Testing, and Practical Welding there are a host of different complex, high-end specialities to choose from, enabling young people to find a career in something that suits their individual interest and temperament ... and make a good living!”

- Jim Guild | Caretaker Executive Director, SAIW

Fact: It is an industry of great prospects and meaningful employment.

Professionals in this sector are able to secure employment more easily than in other industries, because they hold scarce skills that are in high demand in South Africa and abroad. All levels of qualified practitioners can earn decent – even lucrative – salaries. And additionally, SAIW's internationally accredited qualifications mean that the welding professional is presented with literally a world of career opportunities.

“For young locals, achieving certification in a welding discipline guarantees a job in the industry in this country – even at low levels of economic activity, as the need for skills is massive and ubiquitous.”

- Morris Maroga

“Welding skills secure employment with excellent financial prospects.”

- Etienne Nell | Business Development Manager, SAIW

“It's no wonder many regard it as the ‘miracle’ career.”

- Anne Meyer | KZN Representative, SAIW

Fact: The industry is critical to a country's economy and infrastructure

Joining, of which welding is one method, is a major production process in just about every type of manufacturing industry. And it literally undergirds the infrastructure – transport, buildings, pipelines – used by ordinary people, every day.

“While most commonly used for metals, plastics are also welded. Its applications can be seen in almost all facets of life, from toys to the micro welding required in medical instruments and electronic applications; from motorcars, trucks, trains and ships to infrastructure such as electricity transmission, bridges, buildings and process plants. In simple terms, welding is all around us.”

- Prof. Tony Paterson | Professor of Welding and Welded Fabrication, Wits University

Fact: The industry offers equally attractive opportunities to both women and men

The industry – from practical welding to welding engineering – abounds with remarkable women defying the male stereotype traditionally associated with such a sector. In particular, recent years have seen a marked change in gender representation:

2006: Roelien Vorster becomes the first woman to receive the Harvey Shacklock Gold Medal.

2008: Nonhlanhla Zulu becomes the first woman to win a major prize in practical welding.

2010: Prof. Madeleine du Toit becomes the SAIW's first female president.

Choosing welding as a career was probably one of the best choices I have made. Welding has taught me a lot of patience. I found that welding wasn't just a skill; it is what I would call art. ...Every single day, you are tested on different types of welding that require different methods and different skills. That is why I love welding – for it is a new challenge every day.

- Haley Naldrett discovered her love for welding after being sent on a basic welding course. To continue in her career, she joined John Thompson, trained at SAIW and qualified as a welder and later as a welding inspector.

At first it was a challenging career choice, especially in such a male dominated industry. I had to work twice as hard to prove to everyone that this is where I belong, but due to my hard work and determination, I got the recognition that I deserved.

- Ntomboxolo Zono was the first black woman to qualify as an artisan at John Thompson. She started as an apprentice, became a qualified welder and then trained as a welding inspector at SAIW.



PROFILE

“Welding is a major contributor to Afrox’s success and remains so.”

- Johann Pieterse | Business Manager, Afrox

Harvey Shacklock and Afrox

Harvey Shacklock was a man of firsts, twice a pioneer in the SAIW story. His appointment as the first president of the SAIW in 1948 was a fitting one, built on 21 prosperous years heading up Afrox as its founder and first CEO. His vision would initiate the decades-long success of both SAIW and Afrox, as well as their enduring 70-year relationship.

Afrox was formed in 1927 through a significant merger, a result of Shacklock’s foresight that consolidation of the changing industrial gases market would ensure its survival. Over the years, the company’s range of products and services expanded to cover sectors as diverse as manufacturing, medicine, food and beverage, and welding, which became a core focus. Shacklock identified the need for an institution for advancing welding technology, and called that first historic meeting in 1948, which was to give birth to the SAIW. In honour of the man, the SAIW created the Harvey Shacklock Gold Medal Award in 1949, a prestigious accolade still sponsored by Afrox, that is given to the author of the best technical paper presented at an Institute or IIW event.

Today, Afrox is South Africa’s largest supplier of welding gases and products. Their 1948 commitment to technical advancement brought success, not just in traditional terms, but also helped establish a prevailing corporate culture of skills development and partnership, which has proved so essential. Over the years, Afrox has collaborated with the SAIW and the Department of Education on a number of vital industry endeavours: sponsoring bursaries, establishing training centres, upgrading technical schools and training educators.



This is to certify that

Nonhlanhla Angel Mathebula


is the

Aluminium Category

in the

**SAIW YOUTH WELDING CHALLENGE
2016**

signed on the 29th of November 2016


Executive Director
S. Shale


Competition Manager
E. Nell

SAIW WELDING CHALLENGE
ALUMINIUM
YOUTH CATEGORY WINNER

The SAIW Foundation: A solid start for Nonhlanhla Angel Mathebula

Nonhlanhla Angel Mathebula was one of four students in the inaugural group sponsored by the SAIW Foundation. All four successfully completed the International Welder course in 2015, and Mathebula's performance propelled her along a series of consecutive successes.

First, a Johannesburg-based manufacturer, In2Structures, donated funds to extend her training in specialist techniques, in exchange for her serving her internship with the company. She then went on to achieve at the 2017 WorldSkills SA Competition, demonstrating her winning welding skills in the aluminium category and finishing second overall. Today, she is employed as a welder and supervisor with Afrox, one of the industry's leading companies.

"Angel Mathebula, as well as being the star performer in the aluminium category at WorldSkills SA, has been employed by an SAIW member and placed on a fast-track career development programme."

-Etienne Nell

These achievements unfolded in just three years, a remarkable career kickstart for a deserving young talent, whose only handicap was financial. While Mathebula has demonstrated commendable ability, she is not an exception to the norm. There are masses of promising young South Africans with little to no access to career opportunities; their restriction simply – and unjustly – is monetary.

With this in mind, the SAIW Foundation was established to provide training to disadvantaged individuals, across the broad spectrum of welding specialisations and allied technologies. While conceived and seed funded by the SAIW, the Foundation is intended to function as a joint effort between the Institute and industry, as explained by Morris Maroga:

"We want the SAIW Foundation to become a conduit for the welding industry's charitable efforts so that, through economies of scale, we can give as many youngsters as possible a chance in life, while at the same time doing as much as we can to alleviate the skills shortage in our industry."

What is a 6G Certification?

Tube and pipe welders are expert practitioners. They are at the top of their game, well paid and in demand the world over – wherever power stations, oil rigs, pipelines, and refineries are built. But they also have to master the most difficult welding position, the 6G.

6G is one of many welding combinations, where the number refers to the position of the weld, and the letter refers to one of two types of joints – “G” signifying a groove weld.

Four primary positions are numbered from 1 for “flat” (the easiest) to 4 for “overhead” (the most difficult). Pipe welding incorporates two additional positions – 5G and 6G, with 6G denoting an immovable pipe at a 45-degree angle, a position which may require both right and left-handed welding.





unedited previews



It is remarkable that SAIW has not only survived for 70 years, but that it has grown out of humble beginnings to become the major player in Africa.

- Robin Williamson | SAIW Board Member

CHAPTER 02

1960



1969



Milestones



1961

SAIW establishes the Founding, Welding, Production Engineering Journal (FWP Journal)
– a joint endeavour with the South African Institute of Foundrymen and the South African Institute for Production Engineering.



1963

School of Welding Technology is launched
– a forerunner of the Institute's training activities.



And in South African history

1960 marks a turning point in the country's history. On the 21st March, police open fire on a crowd protesting the hated pass laws, leaving 69 people dead. The Sharpeville massacre attracts international condemnation of Apartheid, and strengthens the resolve for an armed resistance by the ANC and PAC.

The 1960s also sees significant infrastructural development. Pipelines are built, a national power network established and Pelindaba, South Africa's nuclear research centre, is inaugurated.







SAIW STALWART, LECTURER & TRAINING MANAGER
1985-2015

HONORARY LIFE MEMBER

Lessons from Ted Barwise

Ted Barwise began his career as an apprentice welder in Liverpool, at one of the world's largest shipyards, Camell Laird. He had little idea that the next few decades would take him overseas and across job roles – to become immersed in the world of education and training as one of SAIW's most beloved and longest-serving employees.

Barwise was hired as a lecturer by Chris Smallbone in the 1980s and during the course of 30 years he was promoted to training manager, witnessed changes and challenges, and proved indispensable to the Institute's survival and success. He taught his first class in a cold and leaky contractor hut in the car park, because the premises was essentially a building site. He drew up the procedures for the Practical Welding school, where they still reside today. Under the tenure of Jim Guild (who considered him an invaluable stalwart), he was instrumental in getting the Institute accredited as an IIW ATB (Authorised Training Body) and helped re-establish the Young Welder of the Year competition. He put in numerous extra hours, undertook varied roles and tasks, and simply did what needed to be done for the SAIW to become what it is today.

Barwise also brought that intangible but critical aptitude to the SAIW – a passion for people and learning. He retired – for the third time – in 2015, but his office visits are still met with genuine affection. “Uncle Ted” (as he's known in the finance department) imparts some memorable lessons below.

ON THE BONDS THAT DEVELOP WHILE WORKING:

“What happens when you've been here for as long as I have, you meet people and build great friendships. That's the thing, I have a good rapport with people, with the staff, and with the students as well.”

ON LEARNING:

“Chris said to me on a Friday, ‘Ted, you're going to take a class on radiography on Monday,’ and I said, ‘You must be joking – I've never done radiography in my life!’ To which he replied, ‘Well you've got the weekend to learn.’”

ON TEACHING:

“I'm not saying I'm the best lecturer but I was pretty good at it. It's a sort of charisma that you have when you go into class. If you haven't got that enthusiasm, forget it.”

ON A JOB WORTH DOING:

“I've really enjoyed my employment here – it's the best job I've ever had and I think I made a contribution. It's as simple as that.”

Scoring the SAIW

A 2018 survey was conducted of current students, recent graduates and alumni, with favourable findings:



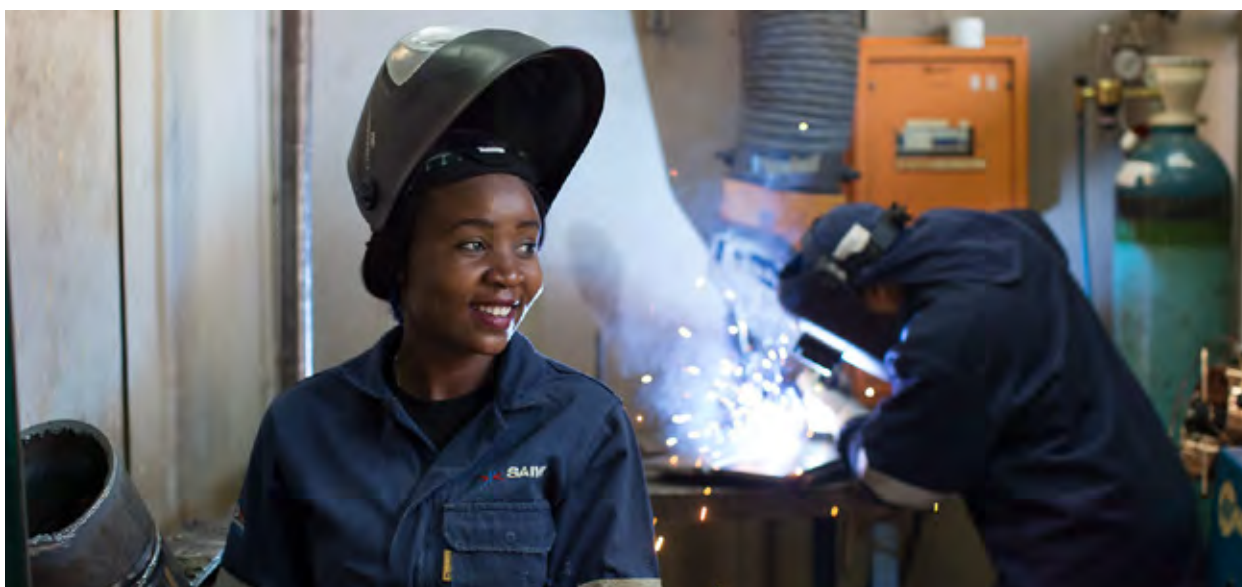
8/10

BOTH LECTURERS AND
COURSES RECEIVED AN
EXCELLENT OVERALL RATING



COURSES' TOP ADVANTAGE:

career focused and
internationally recognised



76%

GRADUATES FINDING
EMPLOYMENT AFTER
GRADUATION

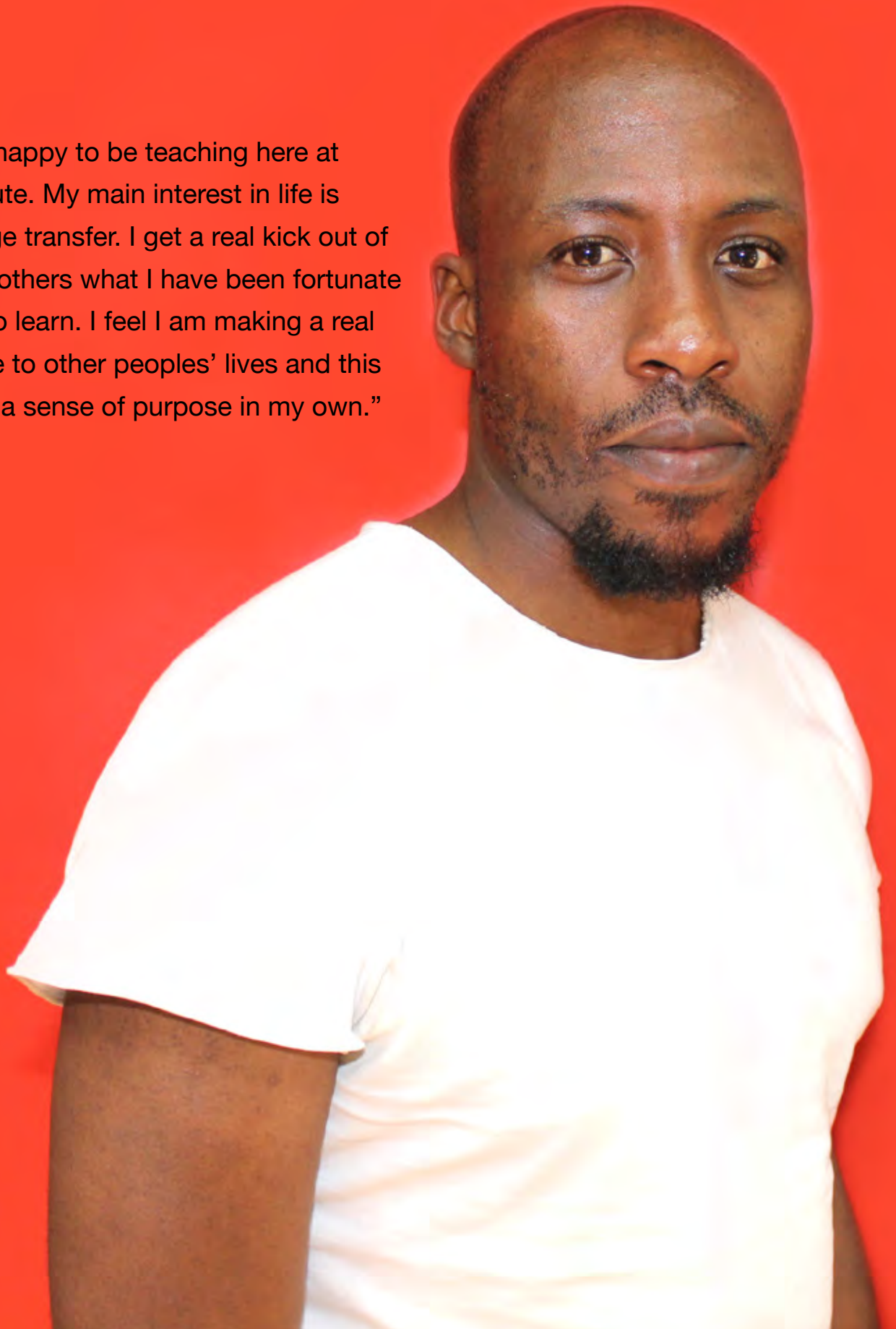
OVER

60%

GRADUATES
RECOMMENDING THE SAIW
TO FRIENDS AND FAMILY

* INDEPENDENTLY CONDUCTED BY MERAKI RESEARCH

“I am so happy to be teaching here at the Institute. My main interest in life is knowledge transfer. I get a real kick out of teaching others what I have been fortunate enough to learn. I feel I am making a real difference to other peoples’ lives and this gives me a sense of purpose in my own.”



SAIW WELDING TECHNOLOGIST LECTURER

Ndwakhulu King Mufamadi: Actions speak louder

“Discipline, dedication and determination – those are my three Ds.”

This is how SAIW Lecturer Ndwakhulu King Mufamadi succinctly describes his approach to life and to his career. But this is no empty platitude preached at the students in his class; it's a motto exemplified by his remarkable journey thus far, lived out in his daily routine.

Just a couple of years ago, Mufamadi was working for free at Metal Protection Engineering (MPE). A graduate in metallurgical engineering, he was eager to specialise in welding, but unable to pay the university fees required. He chose instead to volunteer at MPE in order to gain experience in the field, embracing it as a valuable opportunity, and even taking on supervisory responsibilities over the course of the year.

In 2016, this exceptional commitment was rewarded with an IWT (International Welding Technologist) bursary through the SAIW Foundation, and his dedication further proven by the many distinctions and first-time full pass he achieved during his studies. The year finished with a paid job offer at MPE as a welding supervisor and coordinator.

But his story doesn't end there. In late 2017 a lecturing and consulting job opened up at SAIW, and Mufamadi, ever intent on growing and learning, decided to apply. While he was uncertain whether he had the right credentials for the job, his informal experience again revealed something exceptional – a passion for learning and teaching others: While at MPE, he had offered to train other student volunteers wanting experience. When he left the company, some of the volunteers were hired – an achievement he names as one of his happiest.

And now as a lecturer at SAIW, his joint interests in welding and learning find form. Mufamadi loves to master new subjects through in-depth study, exchanging insights with colleagues and sitting in on their classes to understand the varied approaches to a topic. After hours, on his local tennis court, his classes continue. A fitness fanatic, he welcomed nearby resident students to join him in his physical training two years ago. Today, he trains a group of up to 50.

STORY

“The stories are numerous of those who have done well in the competition going on to stellar careers in welding and it is important that the SAIW, the competition sponsors and the general welding industry continue to support this initiative for the sake of the development of our youth.”

- Morris Moroga

Reigniting the SAIW Welding Challenge

One of the many Institute-shaping initiatives that took place at the start of the millennium was the establishment of the SAIW Welding Challenge. Welding and technical skills competitions had been instigated during the 80s under Chris Smallbone’s direction, but fell away for a time until 2005. It was then that Ted Barwise was called back from retirement to reinstate the tradition (then known as the Young Welder of the Year competition).

The competition is, however, much more than mere tradition. The biennial challenge plays a vital part of a larger strategy to promote welding as a career to South African youth, shining a spotlight on the sophistication and complexity of the skill, and also on the country’s up-and-coming talent, whose achievements attract the attention of industry.

The inaugural 2005 challenge was won by Thembinkosi Matyeka – an achievement that heralded a series of successes, with a knock-on effect beyond his own career. The award took him to the WorldSkills Competition in Helsinki that same year, and was followed by successive industry positions in technical sales, as department head at the West Coast TVET College, and in 2012 as an application specialist at Afrox, where he is still employed.

This knock-on effect impacted another young apprentice in 2010 – when Houston Isaacs won a bursary to that same West Coast TVET College and began training under Matyeka. With the support of his mentor, Isaacs entered the Welding Challenge that year and achieved second place. His talent attracted the attention of Afrox, who employed him as an intern, and during the following eight years, Isaacs racked up a number of accolades: He qualified as an International Welding Specialist at just 20 years old, won all categories at the SAIW Welding Challenge in 2013, represented South Africa that same year at the WorldSkills Competition in Germany, and again in 2017 at the Arc Cup in China. Today he holds the same position as his former trainer – application specialist at Afrox.



“The future was uncertain until the SAIW put me on the welding map.”

- Houston Isaacs | Application Specialist, Afrox



Welding Inspection

Welding Inspection is the Institute's flagship training programme – with the suite of courses training about 1000 students each year, and accounting for roughly two thirds of the total qualifications issued since 2010. It was the first programme offered by the SAIW, launched in 1980 and aligned with courses that had been recently established in the USA and UK. This enabled the Institute's programme to be as good as, if not better than, its overseas counterparts. It was later also affiliated with the SAQCC (IPE) (South African Qualification and Certification Committee for Inspectors of Pressurised Equipment) scheme, a system pioneered and co-launched by the Institute in 1990. As Chris Smallbone, executive director at that time, recounts:

“These were fantastic milestones – not just for welding, but for the country.”

The inspection courses have since evolved – obtaining international accreditation with the IIW in 2010 – but remain one of the SAIW's most significant achievements and catalysts of success. The training equips the graduate to conduct inspections, identify welding defects and their causes, and validate welder qualification tests. It provides a sound platform for a number of promising career paths. The original SAIW Level 1 and 2 courses have been integrated with the IIW IWIP (International Welding Inspector Personnel) scheme, meaning students qualify with a diploma for both the national and international programmes. A third qualification (the IWIP Comprehensive) is available to students pursuing careers at a specialist level or in inspection management. The result is a best-practice, homegrown system with internationally relevant qualifications that are sought after across the globe.

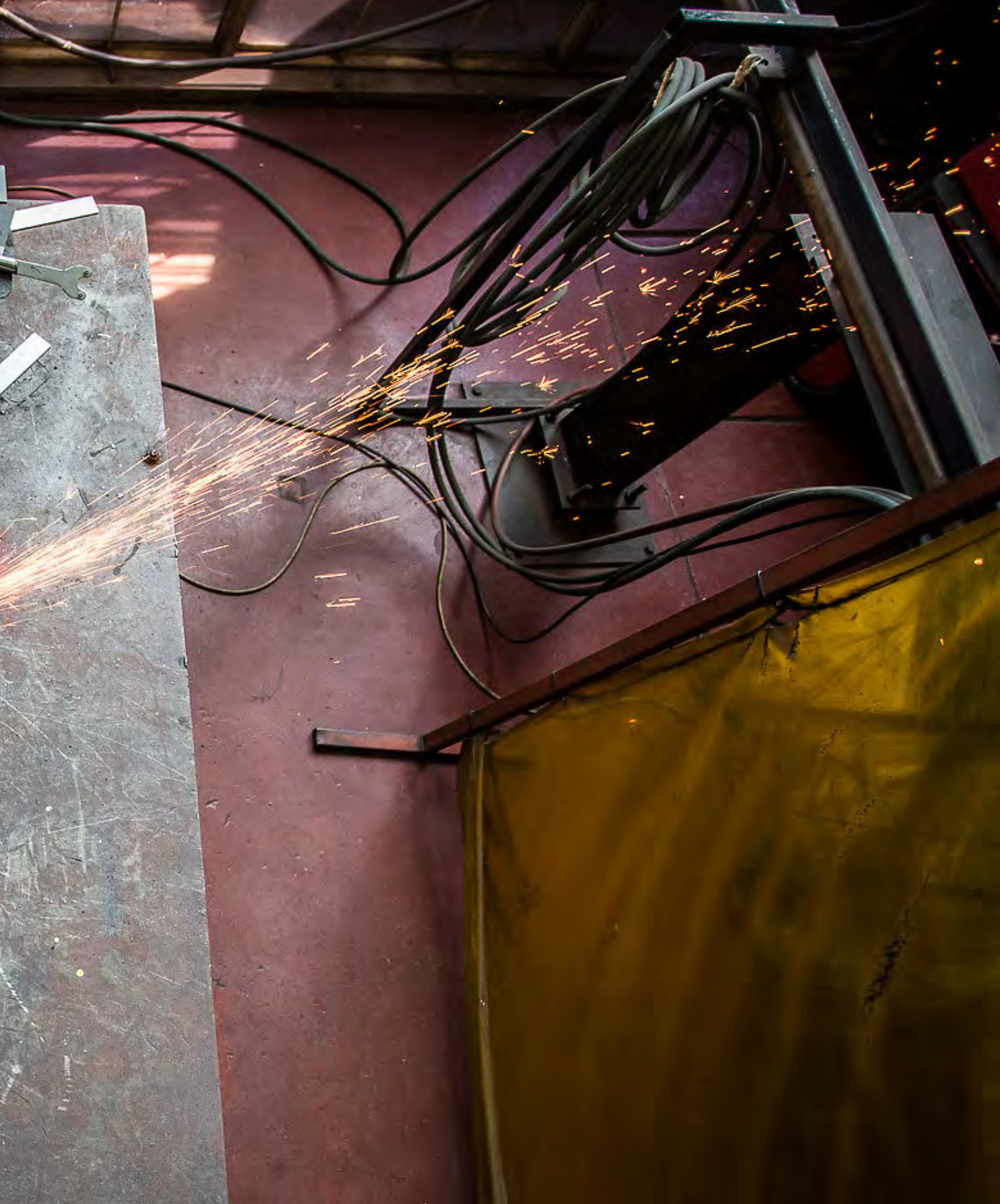
“The success of this programme is testament to the strategy of analysing the needs of the industry and basing the contents on those needs.”

– Herman Potgieter | CEO, SAIW Certification





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PROFILE

“The primary steel producers gained much from the SAIW over the years – through their constant supply of well-trained artisans and quality control... SAISI is proud to have played a role in the long-term development of SAIW, a welding institute of international standard.”

- Charles Dednam | Acting Secretary General, SAISI

South African Iron and Steel Institute

As the representative body of the steel industry, the South African Iron and Steel Institute (SAISI) naturally plays a significant part within the welding sector – and is consequently a strong ally of the SAIW. The association began in 1985, when SAISI was still known as the Rolled Steel Producers' Co-ordinating Council, and donated steel for the construction of the SAIW head office in City West, Johannesburg. Just a few years later, in 1989, SAISI's support became financial. In these first years, the sponsorship was substantial, and allowed the Institute time to develop and introduce many of its courses and qualification and certification systems which are now accepted and widely used by South Africa's metal working and associated industries. Additionally, SAISI representatives – including the long-serving, recently retired Johann Nel – freely contributed their business advice and industry experience to SAIW by participating in its council and committees.

Since that first association, the SAIW has become increasingly self-sufficient in terms of funding, but the relationship continues. SAISI's financial sponsorship and ad hoc steel donations to the Practical Welding school now make up a relatively small proportion of the total SAIW income. They are, however, crucial in enabling certain Institute initiatives, such as the undergraduate and postgraduate welding programmes at our partner universities, and the Young Welder of the Year competition. In return, the SAIW contributes to the development of the downstream steel market by facilitating the use of steel fabrications, by improving the quality and reliability of these fabrications and by offering technical support to welded steel users.

“Between 2006 and 2008, when South Africa built infrastructure such as the soccer stadiums, Gautrain, power stations and upgraded roads, steel demand increased substantially, together with the country's requirement for well-trained welders to put all the structures together. SAIW attended not only to the increased demand for welders but also to the need to ensure good quality during the manufacturing processes, through certifying quality systems used by welding fabricators. Furthermore, SAIW ensured that fabricator credibility remained intact for local projects managed by international designers and EPCM houses – all to the benefit of South Africa, but also to the local primary steel producers.”

- Charles Dednam



unedited previews



Whether a high-pressure gas pipeline extending thousands of miles across Australia or a pipe supplying water to a village in Africa, welding technology makes a huge positive impact on the global quality of life. Its value to a nation's economy is both significant and critical...

- Chris Smallbone | SAIW Executive Director 1979-1994

CHAPTER 03

1970



1979





Milestones



1974 - 5

SAIW supports the Technikon Witwatersrand's establishment of **South Africa's first ever specialist courses in welding technology.**



1977

Phil Santilhano is appointed as the Institute's first technical director, hired to expand the scope of the Schools of Welding Technology, consultancy and in-house training.



1978

Chris Smallbone is appointed as Institute's youngest ever president, and in **1979 as its first executive director,** launching the SAIW's 12-year strategic plan



And in South African history

The 1970s sees a continuation of infrastructural development. Pipelines are built, uranium enrichment is piloted, and Eskom is required to double its generating capacity in response to a rapidly increasing demand for electricity.

1973: Eskom achieves a national grid.

1976: Construction begins on Eskom Koeberg, the first and only nuclear power station in Africa.

That same year, the government initiates a nuclear weapons programme, and also attracts international condemnation for a monumental event: The anti-Apartheid Soweto Uprising leaves hundreds dead, many of them schoolchildren. The tragedy strengthens the resolve of the liberation movement.



“Smallbone epitomised the difference between leadership and management – vision.”

- David Barnett, *Linking people, joining nations: The impact of the International Institute of Welding (IIW) since 1990*



SAIW PRESIDENT (1978-1979), EXECUTIVE DIRECTOR (1979-1994) & HONORARY LIFE MEMBER
IIW PRESIDENT (2005-2008) & IIW BOARD DIRECTOR (2014-2017)

The irrepressible Chris Smallbone

Even though he officially left the Institute more than 20 years ago, Chris Smallbone enjoys something of a legendary status at the SAIW, his name popping up repeatedly in conversations and documents. Such is the impact of a man credited by many as responsible for building up the SAIW in just over a decade, laying rock-solid foundations for future successes.

Smallbone arrived in South Africa in 1974 to take up a lecturing position at the Wits Technikon, tasked with establishing the brand-new Welding Technology programmes. He also joined the SAIW council that year, and within five years became the Institute's first executive director, via a position as its youngest ever president. Under his leadership, the SAIW grew from a team of three to a full-time staff of 49, from a small office in Braamfontein to a 3500 m² purpose-built headquarters.

Astonishingly, this massive growth spurt occurred during a period of political turmoil and severe economic recession. Smallbone describes how he went around “begging” from companies, securing donations and discounts in whatever form they were offered – money, materials, equipment and even second-hand office furniture. Ever pragmatic, hands-on and persuasive, he visited seven European countries in 10 days on one such fundraising mission, returning with R200k towards training disadvantaged South Africans, in his quest for non-racial programmes.

It is unsurprising, then, that Smallbone went on to serve as President of the International Institute of Welding (IIW), accumulating a combined total of 84 years in senior IIW positions along the way. His additional achievements are literally too many to mention, but can be summed up – rather overwhelmingly – as follows: Industry accolades from six different nations and the IIW, including the eminent Walter Edström Medal; the establishment of two awards in his honour; the delivery of more than 35 keynote addresses and 55 papers at international conferences in over 20 countries; and the development of two successful national welding institutes as Executive Director (South Africa and Australia).

Smallbone is now “retired”, but what this really means is that he spends four days a week on voluntary work, two of which are devoted to IIW activities and centred on the vision to improve global quality of life through the welding industry. This, he believes, simply requires “enthusiasm, persistence and cooperation”, citing another captain of industry to expand his point:

“You can do anything if you have ENTHUSIASM. Enthusiasm is the yeast that makes your hopes rise to the stars. Enthusiasm is the sparkle in your eyes, the swing in your gait, the grip of your hand, the irresistible surge of will and energy to execute your ideas. Enthusiasts are fighters. They have fortitude. They have staying qualities. Enthusiasm is at the bottom of all progress. With it there is accomplishment. Without it there are only alibis.”

- Henry Ford | Founder of Ford Motor Company



SAIW DURBAN BRANCH MANAGER

“I remember clearly the day Etienne [the then Training Manager] came to the welding school to offer me a career-changing challenge. I’m not sorry I accepted the challenge.”

George Walker

Taking up the challenge

George Walker began his career in 1978 as a semi-skilled welder, serving his apprenticeship working on Sasol 2 – the world’s largest single-site petrochemical complex at the time. This experience put him in very good stead for his trade test, which he finished in an exceptionally short time.

Over the next few decades Walker continued to accumulate valuable experience, working on Koeberg, Sasol 3 and a number of other notable plant construction projects. He arrived at the SAIW in 2006 with an impressive proficiency in welding, boilermaking and pipefitting, ready to share his knowledge as an instructor in the welding school. In this role, he continued to grow his expertise by enrolling in welding inspection courses. His enthusiasm and aptitude were noticed, and after just one year he was offered what he calls a “career-changing challenge” – a lecturing position.

Change his career, it certainly did. In 2008 Walker was sent to Nigeria to train 15 instructors at the newly formed Nigerian Institute of Welding (NIW), as part of the successful Train the Trainer initiative established between the SAIW and the NIW. 2016 saw his greatest achievement yet – promotion to Branch Manager at the new Durban premises, where he has since been responsible for overseeing the venture and also for the majority of lectures.

The Durban branch has flourished under his guidance, and Walker is intent on serving the local industry which he believes is poised for a boom. He remains passionate about training and skills development – the kind of training that imparts not just know-how, but that all-important ability to take ownership and initiative:

“We need skilled workers who are efficient and who can stand on their own two feet. We need people who are more proactive and less dependent on their superiors. Unless more of our workers are upskilled to the point where they can operate independently and effectively, we are fighting a losing battle.”



STORY

“When it comes to research and longer-term development activities, it is better to seek strong partnerships with the universities.”

- Jim Guild

Joining forces with universities

High-level welding technologists and engineers fulfil a crucial role in a country's infrastructure and development, but are in very short supply. In order to promote the field to engineering and engineering science students, the SAIW partners with two of South Africa's top universities – the University of the Witwatersrand (Wits) and the University of Pretoria.

There has long been a natural exchange between the academic world and the SAIW, with university representatives serving on the SAIW council. Shared interests became formalised during the 1990s, when an EWF (European Welding Federation) aligned course commenced at Wits. From the late 90s onwards, this programme was taken over and championed by Professor Andy Koursaris – who would prove a key player in aligning the courses to IIW standards, and would later also serve as president of the SAIW from 2006-2010.

The University of Pretoria had similar beginnings, with the Welding Science and Engineering Department headed up by field expert Professor Madeleine du Toit, who in turn took over as SAIW president from 2010-2014. Professor Pieter Pistorius has since taken over as leader of the university department, and the welding training and research function remains vibrant.

The SAIW's involvement constitutes the sponsorship of a professorial chair and research and development programmes at each university, and the regular audits of each institution to maintain accreditation as IIW Approved Training Bodies. To date, the universities have issued in excess of 200 IWE (International Welding Engineer) and IWT (International Welding Technologist) qualifications.

“The image and perception of the welding sector needs to change from a man on the street carrying a simple welding kit to a discipline involving skilled and accomplished professionals. It needs to be communicated that there is a master's degree in welding, that welding is part of material sciences and that welding incorporates mathematics, sciences and politics.”

- Prof. Loyiso Nongxa | Former Vice-Chancellor and Principal, Wits University

Welding is far more complicated than it seems. The key is the impact of failure. Many applications, the stub axle of a motor car taken as an example, have serious implications should the welding fail.

- Professor Tony Paterson first started working with the SAIW in 1985 while the Executive Director of the Aluminium Federation of South Africa. At that stage, the aluminium industry was a major SAIW supporter, and he worked with the Institute on the development of welding guidelines specifically suited to aluminium. From the mid 1990s, he joined the lecturers assigned to Wits University's first welding engineering courses. He is a current member of the SAIW Board and serves as the Professor of Welding and Welded Fabrication at the university. He received the SAIW Gold Medal in 2009.

The SAIW plays a critical role, as it provides not only training to welders, inspectors, and postgraduates (through Wits and the University of Pretoria) but also the accompanying international accreditation through the IIW. This ensures internationally accepted standards which are available throughout the local industry. Our link with the SAIW enables students to do applied research on industrially relevant projects.

- Prof. Lesley Chown teaches Metallurgical Welding Engineering at Wits University.

STORY

“Welding is a critical enabling technology for the securing of electricity supply for South Africa.”

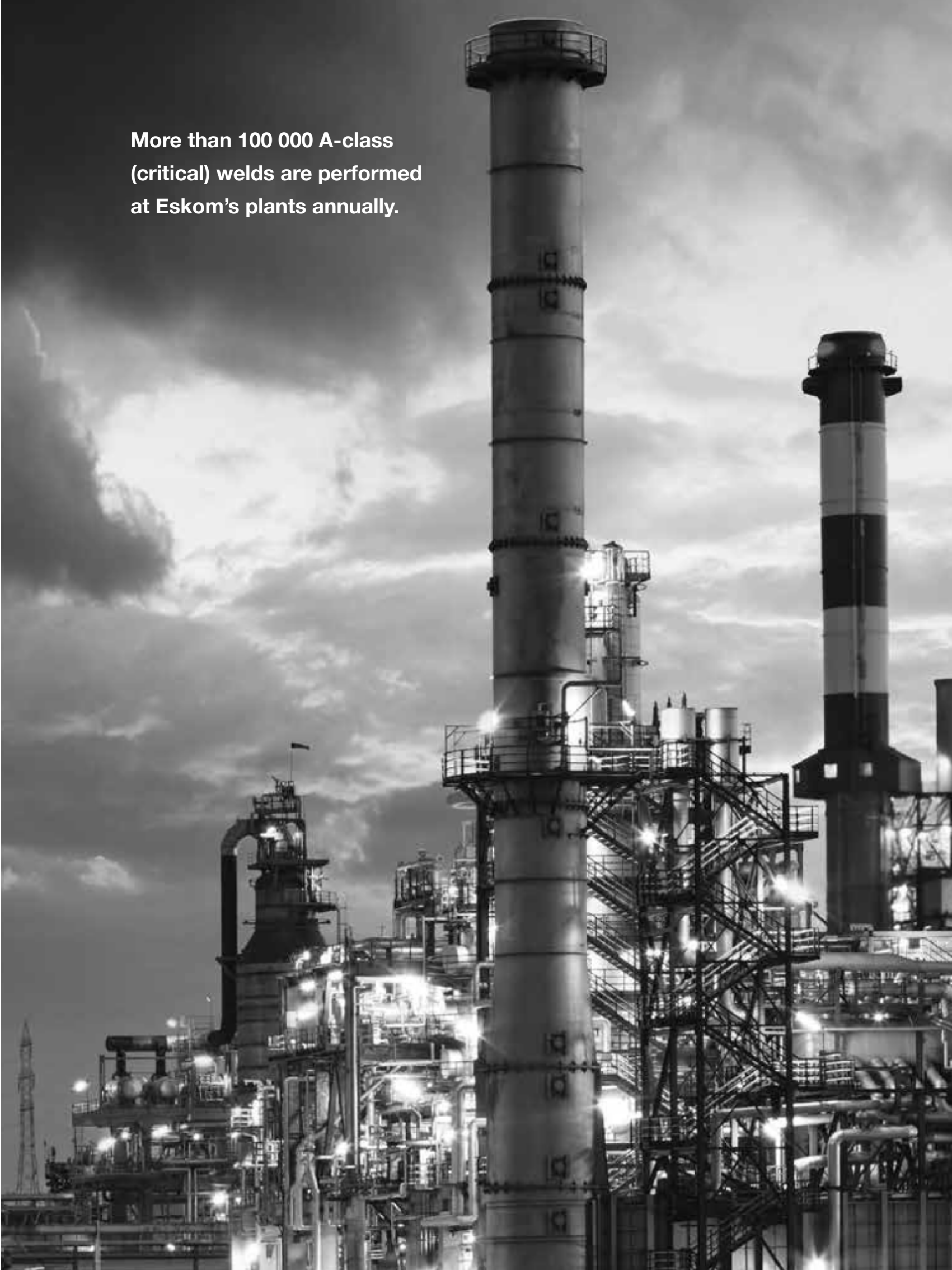
- Morris Maroga

Eskom and its Welding School of Excellence

The power generation industry is vitally dependent on the whole gamut of welding specialisations – from engineers and pipe welders to co-ordinators and inspectors, all are necessary in the construction of power plants and generators and in the continual maintenance, upgrading and inspection activities required to ensure safety and meet the ever-increasing demand for electricity.

Established in 1923 as the Electricity Supply Commission, Eskom has spanned nine decades of enormous change – politically, economically and technologically. Among the challenges the utility faces today is the country’s shortage of highly-skilled welders and subsequent dependence on imported skills. In response, Eskom founded the Welding School of Excellence in 2011 – part of the company’s larger strategy to improve welding productivity and expertise, while also addressing unemployment. Based in Midrand, the programme enjoys close partnership with the SAIW, with the Institute having accredited the school to IIW requirements to meet international quality standards. Over the next seven years, the programme trained more than 200 welders.

**More than 100 000 A-class
(critical) welds are performed
at Eskom's plants annually.**





The difference between a qualification and certification

QUALIFICATION

A qualification does not expire. It is awarded upon satisfactory completion of an exam (following a training programme), whereby a candidate demonstrates the knowledge and skills to perform specific tasks.

CERTIFICATION

Certification has an expiry date. It is issued upon the successful fulfilment of specific requirements – sometimes including a demonstration test – and requires renewal by the certification body at regular intervals.

A skills revolution
is needed on the
African continent.

- Prof. Andy Koursaris | SAIW President 2006-2010

CHAPTER 04

1980



1989



Milestones



1980s

The 1980s sees a massive growth spurt for the SAIW.

Despite the economic downturn, income exceeds expenditure and staff numbers and office space multiply exponentially. This is largely due to the increased training, qualification and certification activities launched in response to industry's needs, as well as technology transfer schemes; with funding secured from a number of businesses and governments. Over 6000 South Africans are trained during this growth period.

1980-81

SAIW acquires an NDT training centre, welcoming its first NDT students in 1981.

1983-84

The Institute helps found the SAQCC (NDT) (South African Qualification and Certification Committee for NDT) to certify NDT technicians to national and international standards, and acts as its management and national examination centre.

1985-86

The SAIW moves to its **new, purpose-built premises** in City West, Johannesburg.

1988

Membership reaches 1000 (including 135 corporates) and this helps SAIW assets break the R5million mark.

1989

Funds established by prominent industry players contribute towards a range of SAIW training and technology transfer activities, including the training of over 500 NDT, welding and inspection personnel, significantly upgrading competency levels within South Africa.

1989

The SAIW establishes technology centres in welding and NDT, providing technology transfer services and staffed by eight full time consultants.



And in South African history

The 1980s is a time of turbulence and turnaround. A combination of mounting sanctions, divestment and pressure, resulting from the formation of the UDF and the escalation in the ANC's armed struggle, leads to the infamous "Rubicon" speech, causing global lenders to cut off new loans. The country defaults on its foreign debt, a state of emergency is declared, and by the end of the decade, the Apartheid system starts to unravel. Petrochemical plant construction develops in parallel.

1980-1981: Sasol 2 (the world's largest, single-site petrochemical complex at the time) and Sasol 3 are completed.

1987: The GTL (gas-to-liquids) project in Mossel Bay (Mossgas) – South Africa's first oil production platform and the world's first large-scale GTL project – is initiated.

1989: FW de Klerk becomes president and begins the work of ending Apartheid. Public facilities are desegregated and many ANC activists are freed.



SAIW PRESIDENT 1986-1990

FEATURE

“My extremes of duty stretched from the sublime to the ridiculous, from rubbing shoulders with cabinet ministers and captains of industry to turning up in a dog cart dressed as Father Christmas for the SAIW children’s Christmas party.”

Mike Holland, industry pioneer

Mike Holland was the first SAIW president to serve a consecutive term of four years – the result of a constitutional amendment due to that dramatic growth spurt of the 1980s. He explains:

“The board decided that a longer term would be beneficial in providing stability and continuity at a time when the Institute was expanding rapidly.”

Fortunately, Holland was no stranger to change and growth. He was Sasol’s Sasolburg Manager of Metallurgical & Inspection Services during the early 80s – a period of extreme flux and expansion due to the new, state-of-the-art plants under construction, Sasol 2 and 3 at Secunda. These new developments had a profound impact on Sasolburg operations, with Holland “losing” around 75% of his best inspectors to Secunda’s urgent resource needs.

Holland then set about developing South Africa’s first nationally recognised certification scheme for welding and fabrication inspectors, together with his colleagues at Sasol 2 and 3 and in collaboration with the SAIW. The scheme was based on Sasol’s unprecedented requirements and was adopted by all three plants.

“I find it extremely gratifying that nearly 40 years later Sasol is still heavily involved with the now greatly expanded range of SAIW inspector-related courses.”

Holland’s office as SAIW President continued along a trajectory of singular developments – among these the new SAIW headquarters, the 40th anniversary celebrations attended by government ministers and industry VIPs, and a monumental win for the Institute in the official adoption of SAQCC qualifications by Mossgas, South Africa’s major GTL (gas-to-liquids) project. During this time, Holland was also involved with the design phase of Mossgas, and in 1990 he joined the refinery as Manager of Metallurgical & Inspection Services.

By this time well acquainted with innovation, Holland successfully introduced a new, efficient inspection method called RBI (Risk Based Inspection) to both Mossgas operations and the South African government, where it remains entrenched in statutory legislation to this day. His paper on the method ultimately won him SAIW’s prestigious Harvey Shacklock Gold Medal in 1997.

STORY

Built during the 1980s to accommodate the SAIW's major growth spurt, the impressive HQ in City West also serves as a monument to the ingenuity, drive and can-do attitude that governed the Institute – its very architecture testifying to this spirit.

A new HQ of combined objectives

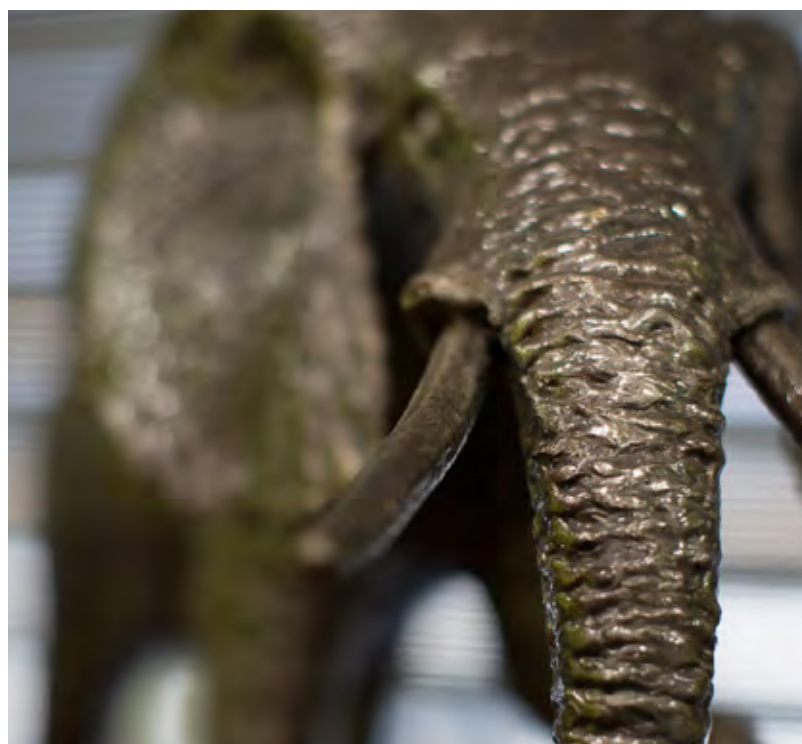
The challenge from the start was money: The SAIW was thriving despite the severe recession, but it had no endless supply of funds for a project of this scale. Executive Director Chris Smallbone developed a multifaceted solution, and set about securing funding from businesses and overseas governments, negotiating a loan from local government and acquiring donations of construction materials.

ISCOR, Hulett Aluminium and Middelberg Steel & Alloys were just a few corporations in the long list of donors that provided structural steel, aluminium and stainless steel for the modern, metallic style of architecture – and even for interior furnishings. This design met a combination of objectives quite poetically, as Smallbone explains:

“It was about keeping our donors happy by using their materials, getting our materials free or as cheap as possible, and showcasing the welding industry.”

Phase 1 opened in 1985 and a small contingent of staff members moved in. Classes were held in two small, cold contractors' huts in the carpark – lecturers simply doing what needed to be done until construction was completed. The official 1986 opening was attended by local and international dignitaries – a grand affair which contrasted with another amusing case of interior furnishings: With no money to spare, Smallbone persuaded corporate members to donate their old, second-hand furniture to the Institute, thus fitting the otherwise classy spaces with desks that were missing both drawers and legs – that only came a little later.

In more recent years the landmark headquarters expanded even further – with additions of a multipurpose auditorium and a state-of-the-art material testing laboratory.



Industry profile: Sasol

Sasol was established in 1950 as the South African Coal, Oil and Gas Corporation, and swiftly began pioneering the commercial application of petrochemical technology. It first produced oil from coal at its pilot plant, Sasolburg, in 1955.

The urgency to expand operations increased over the following decades due to the country's low oil reserves and the embargoes it faced from the international market. Thus began the construction of Sasol 2 and 3, announced in the late 70s – ambitious projects of gargantuan proportions. Sasol 2 would be the world's largest, single-site petrochemical complex and was forecasted to produce ten times as much as Sasolburg.

The plants required not just a hefty budget, but an unprecedented number of highly skilled personnel to undertake the fabrication and inspection activities. The transfer of the majority of Sasolburg's workforce to Sasol 2 and 3 was not enough to fill the skills gap, so this was followed by an alternative route – the company applied for government permission to train black and coloured technicians. Permission was granted, and training began in earnest, with 250 people at a time undergoing rigorous instruction as artisan welders. John Collings, author of a 2002 history of Sasol, estimates that this programme, which continued into the 1980s, produced around 30 000 artisans.



Collings concludes:

“As it turned out, the depletion of Sasolburg’s ranks proved painful, while trampling on the country’s job-reservation laws was an unqualified success.”

In parallel, Sasol worked closely with the SAIW to develop a national certification scheme for welding and fabrication inspectors – another national first ultimately adopted by all three Sasol plants. The Institute also provided training for the first two groups of welding inspectors at the new plants. These ambitious ideas helped forge a long-lasting partnership, as Mike Holland explains:

“The huge expansion of personnel required to operate all three plants impacted on the Inspection Departments, in a way that gradually cemented a very close association between Sasol and the SAIW, which still holds to this day.”

Today, the corporation has increased its reach even further: It boasts 31 270 employees in 32 countries, sells more than 7 million tons of chemical products annually, and – still based in South Africa – it is one of the country’s largest corporate taxpayers.



“What does it take to survive for 70 years? One needs to be relevant in the industry – working alongside the welding industry is key for survival. Adoption of the certificates and qualifications by different corporate environments is key for those who achieved their certificates through the SAIW. And this is the case because the material courses that are developed and presented at SAIW are some of the best in the world.”

- Joseph Zinyana is an SAIW Board member and CEO of New Age Engineering Solutions – a black-owned South African enterprise making its mark in an industry of predominantly internationally-owned businesses.

“Empowerment remains a critical process in any company in South Africa and we are no different. ...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.”

- SAIW Finance and Administration Manager Michelle Warmback is in charge of obtaining B-BBEE certification for the Institute. The SAIW is a Level 4 Broad-Based Black Economic Empowerment organisation, with scores of 100% in both socio-economic development and enterprise development.



SAIW PRESIDENT: 2006-2010

**SAIW PROFESSOR & HEAD OF DEPARTMENT:
WELDING ENGINEERING, WITS UNIVERSITY (1996-2010)**

PROFILE

“When Prof. Andy Koursaris took over the Wits welding programme, he both introduced the IIW syllabus and brokered support from SAIW – without which, the programme may well have failed.”

- Prof. Tony Paterson

Prof. Andy Koursaris on progress

Originating from Cyprus, Professor Andy Koursaris came to South Africa in the 1970s to pursue postgraduate studies in metallurgy at Wits University. After completing his PhD in 1981, he stayed on to lecture and remained with the university until his retirement in 2010.

These 30-odd years incorporated many other roles and activities apart from lecturing, driven by his passion for progress within the country and continent, ignited by a love of learning and teaching. He served as president of the South African Institute of Foundrymen; headed up the newly established, first-of-its-kind Wits/SAIW welding engineering programme, during which time he oversaw its IIW accreditation; published over 100 papers; and served on a number of SAIW committees and councils before becoming the Institute’s president in 2006. During his tenure he was involved with momentous SAIW milestones, such as its 60th anniversary celebrations and its expansion into the rest of Africa via the Train the Trainer initiative – a partnership with the Nigerian Institute of Welding whose success, he states, “has shown us what can be achieved when we work together.”

On retirement, Koursaris was awarded the SAIW Gold Medal in recognition of his work in training welding engineers, and his contribution to the development of the Institute. But he was not quite finished. In 2013, he delivered the Jaeger presentation at the IIW Regional Congress – a lecture award that demonstrated his industry prestige as well as his vision of the progressive African economy.

This vision, he still believes, will only be realised through cooperation and broad, inclusive development – a notion he expands with these words:

“In an economy, you can’t have pockets of excellence. That’s what happened during the Apartheid system – there were pockets of excellence, but these were surrounded by a desert. And it doesn’t work like that. An economy has to move as a unified front – where you develop on all fronts, in all spaces, in all disciplines and move together. That’s the way for a country to make progress.”

What does an IIW welding engineer do?

A welding engineer is chiefly responsible for any welding activity in the fabrication industry, and is also involved with research and development of new technologies to optimise welding processes, and the design of structures according to requirements and specifications. It is a critical role that requires a practical understanding of welding and a grounding in sound scientific and engineering knowledge acquired at university level.

The problem is that practical and theoretical training in welding is not incorporated in our undergraduate curricula, leaving the already tiny pool of engineers in the field ill-equipped for optimum job performance.

In response, the SAIW started partnering with universities in the 1990s to train candidates to the required level, with the courses aligned to IIW standards at the turn of the millennium. Both Wits University and the University of Pretoria offer the IWE (International Welding Engineer) course as a postgraduate degree, and promote the discipline to promising undergraduates. To date, 119 IWE diplomas have been issued.



You've got to be able to evolve with the times and you can't continue doing things the way they've always been done.

You have to constantly look out for new developments in the field and ensure you have the capability of training and qualifying people in techniques that perhaps weren't available five years ago.

- Willie Rankin

CHAPTER 05

1990



1999



Milestones



1990s

The 90s signal transition:

a state by its very nature unstable – but also pregnant with possibility. Against a backdrop of radical political shifts, the SAIW too experiences both the hope and turmoil inevitable with any major regime change. Political tensions and fears mount; and sanctions are lifted. Security fences are erected; and national borders are opened.

1990

The SAIW establishes the SAQCC(IPE) (the South African Qualification and Certification Committee for Inspectors of Pressurised Equipment) with the support of industry.

1992

Sasol Limited sponsors SAIW's Chair of Welding Engineering,
for the training of welding engineers and technologists.

1993

SA Skills Foundation takes the first non-racial SA team to the International Skills Olympics.

1994

The IAEA (International Atomic Energy Agency) starts funding a pan-African NDT training, qualification and certification programme, conducted at the SAIW.

1995

The SAIW's minor name change from "South" to "Southern" is indicative of growing partnerships with sub-Saharan countries.

1997

South Africa's first MSc Welding Engineering programme is established by Wits University, SAIW and Cranfield University (UK), and aligned with European accreditation.



The background image shows a stark, institutional interior, likely a prison cell. In the foreground, a long, light blue table is paired with several black chairs. To the left, there is a large, dark metal workbench with a perforated top. The walls are a plain, light-colored material, and the ceiling has fluorescent lighting. In the background, a barred window or door is visible.

And in South African history

1990: Nelson Mandela is released from prison.

1991: South Africa becomes the only state in the world to voluntarily dismantle its nuclear weapons, which it had developed itself in earlier decades.

1994: Apartheid is fully repealed. South Africa holds its first democratic election and Nelson Mandela is elected president.

“Willie was instrumental in setting the SAIW on the path to excellence. He steered the organisation in the direction of sound business practices – and we have now become financially self-sustaining – and he supported Jim Guild throughout the transformation of SAIW into the highly respected, IIW-accredited and internationally recognised body it is today.”

- Robin Williamson



SAIW PRESIDENT 1998 - 2002

HONORARY LIFE MEMBER

Willie Rankin: Thriving through change and turbulence

Willie Rankin had an unusual start to his successful career. It began in a bar in Scotland, where he (a former law student) served drinks to regulars from an NDT company. At the time, he didn't even know what NDT stood for, but a manager offered him a job as the company's site clerk, fortuitously introducing him to an entirely new world.

Over a number of years Rankin obtained various NDT certifications and moved up the ranks to become a supervisor. With the promotion came another "new world" – a contract in South Africa in 1978 – to work on the Sasol 2 construction. The move became permanent during the 80s, and the decade proved pivotal for both Rankin and the industry: He was appointed director of his company at the time when the South African NDT qualification was undergoing significant change and upgrading – and the new qualification would become mandatory for personnel working on the industry-defining Moss gas project.

As head of a large NDT company, this revamp made Rankin's involvement imperative – and marked his introduction to the SAIW, as the Institute was a founder member of the new qualification scheme, SAQCC (NDT) (South African Qualification and Certification Committee for NDT):

"I came into SAIW through SAQCC NDT – which was a committee set up on its own to handle the new qualification system – and eventually I became chairman of that committee and then it moved on from there."

He continued as chairman and member of various committees and councils and in 1998 was persuaded to serve as president of the Institute, unaware of the turbulence that awaited him. A number of factors had colluded to leave the SAIW financially unstable, a situation which demanded many extra hours from Rankin in an effort to turn things around. Fortunately halfway through his office, his efforts were joined by those of Jim Guild, appointed as Executive Director at just the right time.

"The Institute went through a tough time, and no-one really knew what was going to happen. We were very fortunate that Jim Guild stepped into the breach – he really pulled the Institute together."

Together, they led the SAIW out of danger and into the promising new millennium, laying foundations that would bring about many notable achievements – as well as financial security – within just a few years. Rankin's exceptional leadership under these difficult challenges was rewarded with the SAIW Gold Medal in 2017.





Training the trainer, building a continent

Spanning 11 years and roughly 5 000 km, the relationship between the welding institutes of South Africa and Nigeria has grown from strength to strength.

The partnership began in 2007 when the SAIW assisted the Nigerian Institute of Welding (NIW) in getting its welding courses up and running; providing mentorship and training to instructors, and assisting with the process of becoming an IIW Authorised National Body, which would enable the NIW to certify the full range of IIW qualifications.

The NIW has since thrived, under the direction of its dynamic president, Solomon Edibiri. In just the first five years, they produced over 500 IIW qualified welding professionals. They also established the West African Welding Federation and helped institute the Welding Society of Ghana. And perhaps most importantly, they have helped change the African landscape from one that is conflict-ridden, exploited and disordered, towards the vision of what the resource-rich continent should be: a cohesive industrial hub with indigenous expertise, producing its own exportable innovation.

This spirit of change is exemplified by the partnership's first initiative, Train the Trainer, whereby the SAIW's best instructors were sent to Nigeria to provide intensive, months-long training to a group in the Niger Delta region, an area known for its rich oil reserves – and its violent conflict. The group was trained to become IIW-accredited welding trainers, who would in turn equip many former militias with an in-demand skill. This would help them transition to civilian life, while growing the local industry in a knock-on effect of knowledge transfer. Edibiri's describes the vision:

“This cycle would eventually help to overcome the massive shortage of skilled welders in Nigeria, West Africa and Africa as a whole.”

The success of the NIW-SAIW partnership recently instigated a new venture in the form of The Welding Federation of Africa (TWFA), which intends to replicate this collaborative approach across the continent; disseminating and sharing knowledge, equipping organisations to adhere to global codes and IIW systems – ultimately achieving harmonisation of certification and industry standards, building local capacity and deterring capital flight. It is a venture vitally dependent on co-operation, as espoused by both institutes:

“We have to unify it for it to work. I must say, however, that this does not apply to welding alone; it affects all facets of engineering activities on the continent...”

- Solomon Edibiri | President, Nigerian Institute of Welding

“It makes sense for African countries to be working together. We understand the difficulties that industries and institutes face to establish credible qualification and certification programmes in the welding field. The NIW and SAIW cooperation project is a model that we can use to enhance African capabilities in welding and related technologies much more widely.”

- Jim Guild

STORY

“Highly skilled personnel are at the heart of a successful manufacturing industry.”

- Shelton Zichawo | Training Services Manager, SAIW

DHET Centres of Specialisation: Bridging the skills gap with strong partnerships

Welding is a scarce skill, which leaves South Africa very dependent on imported welders. According to SAIW Business Development Manager Etienne Nell, this problem is compounded by the fact that the welders we do have are usually not properly qualified and certified, and don't meet the required skill level needed by industry.

In a move to solve this problem, the Department of Higher Education and Training (DHET) recently revamped its technical training strategy, with a focus on 13 priority trades, of which welding is one. The approach is structured within the Centres of Specialisation project, an initiative designed to boost capacity of TVET (Technical and Vocational Education and Training) colleges to partner with industry in delivering suitably skilled graduates.

In 2016 the SAIW was awarded the tender to assist the DHET with the project's welding programme, and as “Quality Custodian”, the Institute is responsible for implementing the new and vastly improved National Artisan Welder curriculum in TVET colleges. The IIW-accredited qualification is a product of the recently established QCTO (Quality Council for Trades and Occupations) and is based on a high quality, dual apprenticeship system that combines training with real-life work experience at a fabrication workshop. Essentially, the qualification was devised to serve the needs of the industry.

Etienne Nell was appointed the industry's Occupational Team Convener for the process, and states:

“This new system will certainly make a palpable difference to the quality of graduates and of the welding industry as a whole.”

Tellingly, he has confidence not only in the system, but also in the revitalised DHET:

“The revamped DHET has been most effective in ensuring that the nature of training in this country emphasises quality and not quantity, and in pushing the SETAs [Sector Education and Training Authorities] and industry at large to do their best to ensure that skills training – a national priority – is of the highest quality.”



Explaining ultrasonic testing

In simple terms, NDT (non-destructive testing) refers to the testing of materials and welds to ascertain measurements, quality or deficiencies; while leaving the materials intact and functional.

One of the eight core methods in which the SAIW offers training, is ultrasonic testing. Similar to the way in which many bat species “see” by sending out high-frequency sound-waves to echo off objects, this NDT method sends ultrasonic (beyond human hearing range) pulses through a material, with any flaws “bouncing” back the pulses as echoes. An electronic image is then generated on a monitor – much like a medical ultrasound reveals foetal imagery – to establish accurate measurements as to the location of the flaw.

The method requires intensive training, and the SAIW offers three progressive levels of proficiency as well as advanced specialisations such as phased array testing.

NDT through the decades

NDT is a critical aspect of the welding industry – and thus an equally important activity of the Institute, developed since the 1980s:

1981: SAIW acquires and launches an NDT training centre, signalling a significant growth phase which continues in expansion in 1982.

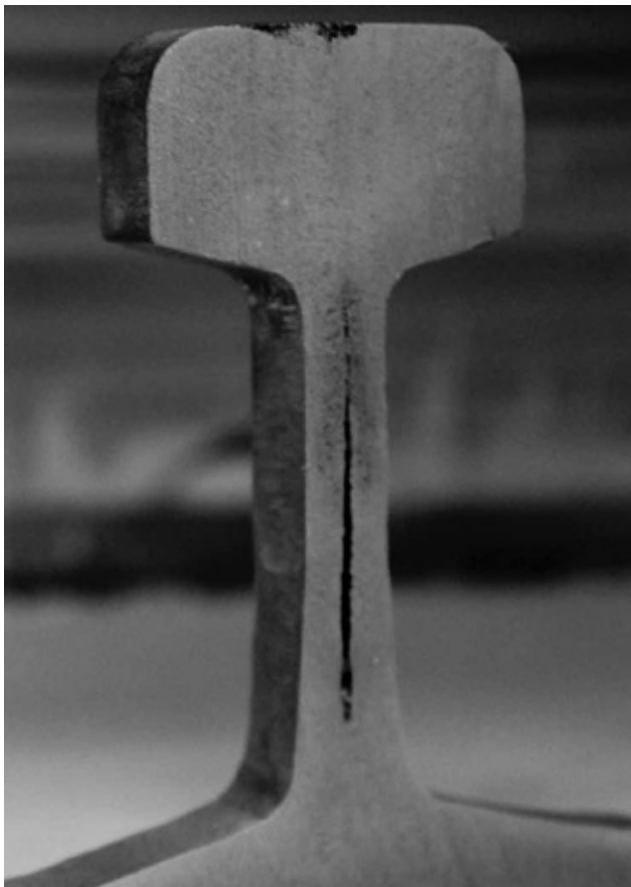
1983-84: During the next couple of years the Institute helps found the South African Qualification and Certification Committee for NDT to certify NDT technicians to national and international standards, and becomes its management and national examination centre.

1994: A decade later, the SAIW becomes a key figure in the expansion of NDT capability across the continent, with the support of the IAEA’s (International Atomic Energy Agency) – a partnership that continues today.

2001: SAIW is officially appointed as the IAEA’s anglophone training centre for NDT in Africa.

2006: The Institute facilitates the establishment of the African Federation for Non-destructive Testing (AFNDT).

2012: SAIW starts to offer training in advanced NDT techniques such as phased array ultrasonic testing, eddy current testing and time of flight diffraction.



“NDT is an integral part of this institute’s responsibility and we are significantly upgrading our capabilities in this important discipline.”

- Jim Guild

“From the outset, I found the SAIW management of NDT aspects (e.g. training, certification and research) to be on a par with that of the UK. My apprehension, therefore, was ill founded, and during the 20 years (or so) of collaboration I have found the SAIW to be an informed and reliable partner in all regards.”

- Graham Wilson trained, qualified and honed his expertise in NDT in the UK, then moved to South Africa in 1995 to accept a job offer with Eskom. Initially apprehensive about his transition to South African industry standards, his concerns were immediately allayed as he began his 24-year-long relationship with the Institute – in his various roles as student, exam moderator and research collaborator.

“I like how fair the Institute is when it comes to exams or tests. They make sure you are prepared, giving you one-on-one help during lectures and encouraging you to stop a lecturer when you do not understand something.”

- Learn Mogane was an unemployed mechanical engineering graduate who was sponsored by Arup to study NDT at SAIW in 2016. When he first started, he had never even heard of NDT before, but he went on to earn distinctions in a number of subjects – graduating as the top NDT student in 2017 and receiving the prestigious Presidents’ Award, a moment he describes as “a great feeling and one of the best nights of my life”.

Welding is ubiquitous. It is involved in up to 98% of manufacturing processes and it offers opportunities for people who may have a Grade 10 education to people who hold a PhD.

- Jim Guild

CHAPTER 06

2000

|

2009



Milestones

The new millennium ushers in a prosperous period for the SAIW – a major turnaround from the difficult few years preceding it. The Institute increases in strength, stability, international relevance and pan-African reach. The financial situation improves dramatically, despite the 2008 global economic crisis.

Among the many notable accomplishments of this time is the emergence of highly skilled women in the industry. Roelien Vorster becomes the first woman to receive the Harvey Shacklock Gold Medal, Nonhlanhla Zulu becomes the first woman to win a major prize in practical welding, and there is also a general increase in female graduates in the Welding Inspector course.

2001

SAIW is appointed the Regional Designated Centre (RDC) of AFRA (African Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology), acting as its anglophone centre for NDT in Africa.

2003

SAIW becomes an Authorised National Body (ANB) of the International Institute of Welding (IIW) – able to offer all IIW training courses, conduct examinations, issue diplomas and approve training bodies.

2005

The Young Welder of the Year competition is re-established.
SAIW Certification is established to administer examinations and certification programmes.

2006

SAIW hosts its first IIW Regional Congress, attended by speakers and experts from all over the world. The Institute facilitates the establishment of the **African Federation for Non-destructive Testing (AFNDT)**.

2007

A partnership is established with the NIW (Nigerian Institute of Welding).

2008

SAIW is accredited by the IIW as an Authorised National Body for Company Certification (ANBCC) – the first outside Europe – enabling it to certify fabricators to the ISO 3834 standard.



And in South African history

Unfortunately, the country does not experience a similar process of stabilisation. The global economic recession of 2008, xenophobic violence and political upheaval mark the decade as a difficult one.



SAIW EXECUTIVE DIRECTOR (2000-2015)
& CARETAKER EXECUTIVE DIRECTOR (TO END OF 2019)
IIW CHAIRMAN OF THE INTERNATIONAL AUTHORISATION BOARD: 2014-2017

HONORARY LIFE MEMBER

“His is one of the most deserved Gold Medals in the Institute’s history – as this highly successful organisation owes its current status and achievements almost entirely to his inimitable, charismatic and professional management.”

- Willie Rankin

The understated, overdelivering Jim Guild

Former colleagues and industry partners hold Jim Guild in very high regard, ranking him alongside Chris Smallbone as an Institute-shaping leader. Whereas Guild tends to shrug off these compliments, preferring the belief that the turnaround experienced during his tenure was due to simple principles of good governance and the co-operation of many. He states:

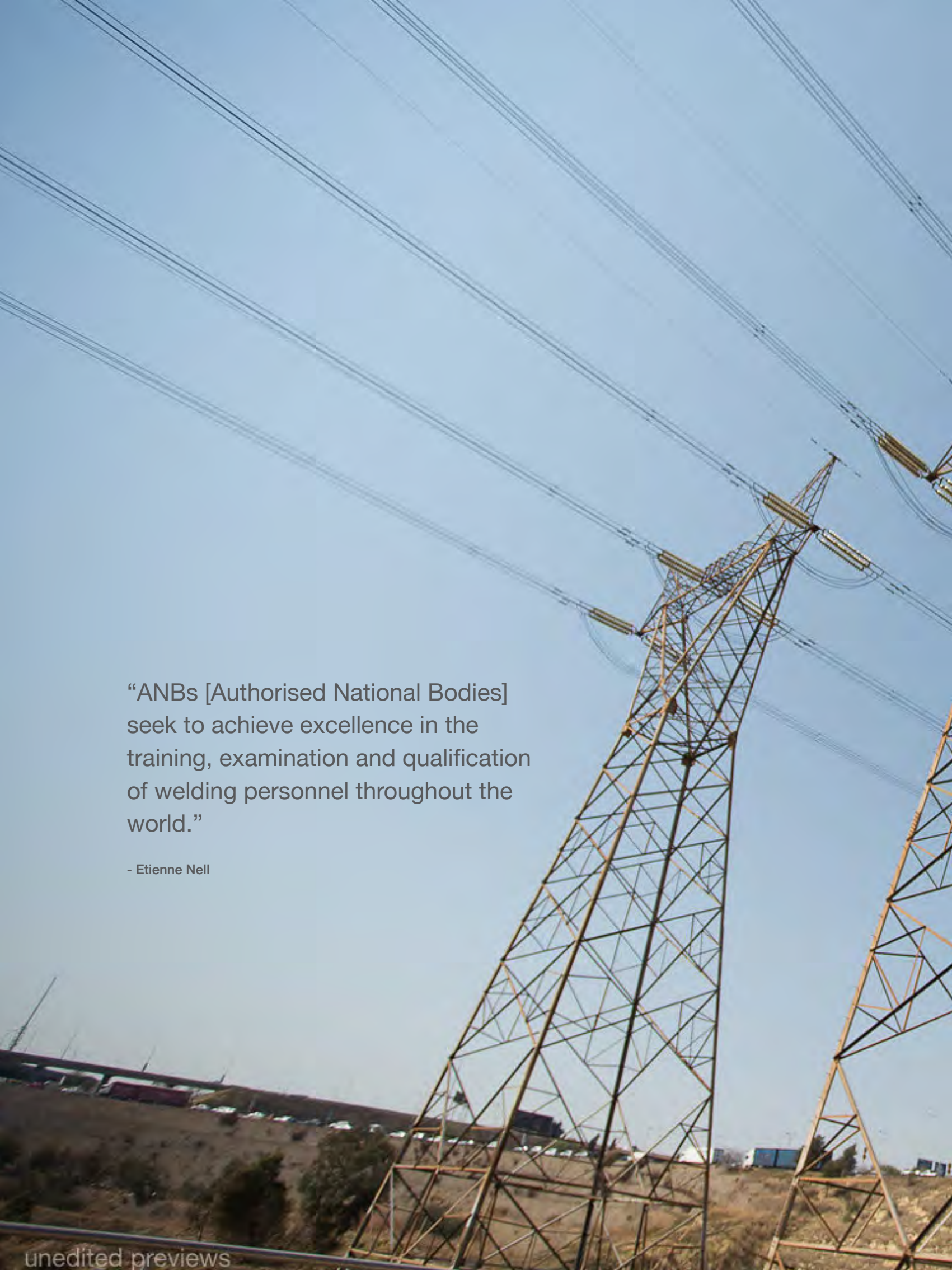
“I put our successes down to exceptional teamwork. From the beginning of my tenure the old stalwarts, like Ted Barwise, for example, rallied around me to help get things going the way we wanted. Their input was absolutely invaluable. Since then each and every person at the Institute has played his and her part to ensure that we met our goals and achieved what we did.”

Whatever the difference in opinion, the facts are overwhelming: The SAIW underwent significant transformation while Guild was at the helm – from a troubled organisation during the latter years to a financially self-sufficient, internationally accredited, continent-leading institute. He got to work immediately, prioritising accreditation with the IIW as an ANB (Authorised Nominated Body) and also joining the IAB (International Authorisation Board) in his personal capacity, later becoming Chairman.

A long list of additional achievements crowded the 15 years of his tenure, but interestingly, the one he deems most important cannot be reduced to an official milestone or accolade. It is that of transformation within SAIW demographics:

“The teaching staff is as diverse as the student population in terms of race and gender – probably even more diverse.”

According to Guild, this occurred without an overly prescriptive employment practice or any concerted effort on his part. Ever unassuming, he asserts that it was an organic process, the result of simply making available opportunities for career progression. Indeed, it was Guild who in 2007 offered a lecturing position to George Walker, a welding instructor in the workshop. And today, Walker heads up SAIW’s Durban branch.



“ANBs [Authorised National Bodies] seek to achieve excellence in the training, examination and qualification of welding personnel throughout the world.”

- Etienne Nell



SAIW Certification: Upholding standards

SAIW Certification was established in 2005 to uphold industry standards through the administration of exams and internationally recognised certification programmes. In line with international best practice and IIW stipulations, it operates separately from the Institute and is governed by an independent board of directors.

- As an IIW Authorised National Body (taking over the SAIW accreditation achieved in 2002), it is licensed to offer all IIW training courses, conduct examinations, issue diplomas and approve training bodies.
- As an IIW Authorised National Body for Company Certification (accredited in 2008 as the first outside Europe), it is licensed to certify fabricators to the ISO 3834 standard (which dictates the quality requirements for welding).
- SAIW is also accredited by SANAS (South Africa's member of the International Accreditation Forum) to the ISO 17024 standard (to administer a number of inspection personnel certification programmes specific to South African regulations) and to the ISO 17021 standard (to administer company certification).



Lessons from Willie Williams

Willie Williams is yet another industry veteran that the SAIW is fortunate to have on board. He began his trade as a young apprentice – attracted to the prestige and elite expertise of the older pipe welders in his circle. Over the years he passed the relevant trade tests and certifications to join the select few who attain that level of pipe welder. And he is, according to his colleagues, one of the best in the country. Through a chance encounter at the Institute in 2002 – he'd been looking into acquiring more skills – he was offered a role as a welding instructor. So began his SAIW career.

Training proved a natural fit for Williams, who had always enjoyed the hands-on and mentoring aspects of his previous supervisory roles, his vast workshop experience making him well aware of the world of difference between book learning and practical, real-life application. He has guided many students of all ages through the various complex processes and positions of welding, encouraging the necessary commitment and tenacity required to excel in the field. He has also trained other instructors, and spent six months in Nigeria in 2010 in this vital, foundational role, upskilling locals as part of the pioneering Train the Trainer partnership between the SAIW and the NIW (Nigerian Institute of Welding). His service there was commended by Jim Guild: *"...much of the credit must go to Willie Williams who created an environment conducive to disciplined and fruitful learning."*

Today, Williams heads up the Practical Welding School, and his expertise is sought by students, instructors and technical departments alike. Below, he shares some of his industry insights:

ON TEACHING YOUNG PEOPLE:

"Welding is not an easy trade, that's why it's so scarce. And you just feel frustrated until you start mastering it. The minute you master it, you enjoy it. And that's what I say to the youngsters."

ON TEACHING OLDER PEOPLE:

"They've been doing something a certain way for 40 years – and you need to convince them it's wrong....A college can't teach you everything about how to teach people, you need to have something in you – a way of dealing with people."

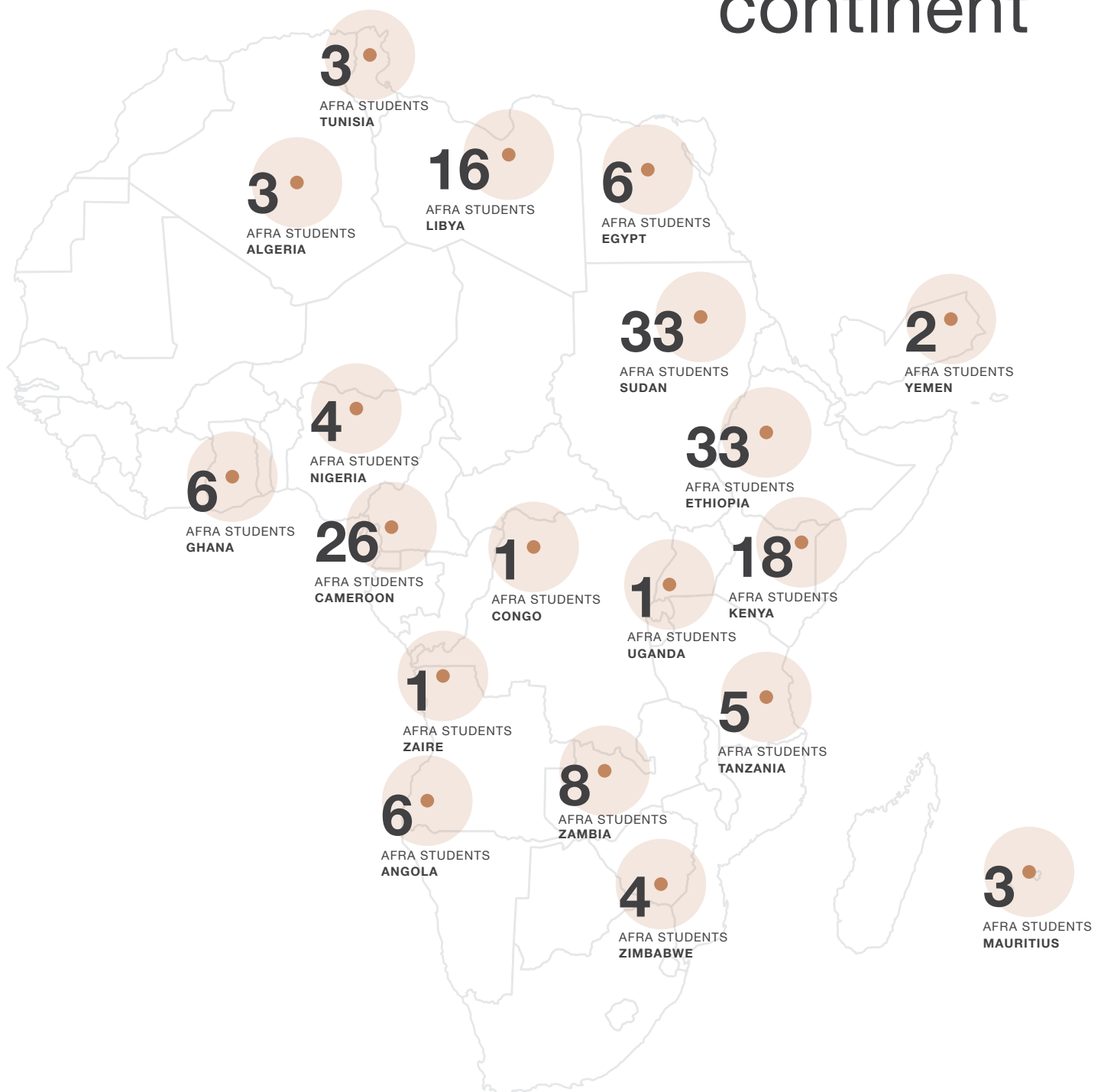
ON MASTERING COMPLEX SKILLS:

"Welding is a very difficult skill that you can compare with any professional sport. So if you can do it well, it gives you a sort of prestige. You've got to be proud of it – it's not something that just any person can achieve."

ON LIFELONG LEARNING:

"I still enjoy what I'm doing. And when I joined SAIW it was a plus for me because I saw that I could share and gain more knowledge..."

AFRA: Expanding NDT co-operation across the continent



*Number of AFRA students since 2000

The AFRA project is expansive in scope and ambition, as suggested by its lengthy descriptor. The acronym stands for the African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology. Essentially, it's an intergovernmental agreement between African member states of the IAEA (International Atomic Energy Agency), whereby nuclear science is harnessed for the socioeconomic development of the continent. The initiative launched in 1990 and is funded by the IAEA to cover a range of activities centred on the peaceful application of nuclear technology. It functions via collaboration and shared needs and resources, with the development of NDT (non-destructive testing) one of its core focuses.

As Jim Guild explains in his 2008 presentation at the World Conference on non-destructive testing:

“One of the most important conditions of successful industrial development is the proper practice of non-destructive testing (NDT). ...The impact of the IAEA/AFRA projects in member states is significant.

This is where the SAIW comes in. After nurturing partnerships with the IAEA from the early 90s, and establishing NDT training and certification facilities a decade earlier, the Institute was appointed as Regional Designated Centre for the IAEA in 2001, the anglophone training centre for NDT personnel from other African member states. Besides training, the SAIW hosts scientific workshops and undertakes expert missions to other countries to help establish their own NDT capability for training and technology.

To ensure ongoing compliance to international standards, the SAIW is regularly audited by international experts from the IAEA, one of whom had this to say:

“SAIW has a key role to play in furthering NDT capability in Africa, through the training, qualification and certification of NDT personnel and the accreditation of NDT training undertaken in countries that cannot support their own authorised national training bodies.”

- Shabbeer Khodabux | IAEA Assessor

This co-operative, regional approach has been hugely successful. Besides training around 500 IAEA fellowship students and hosting 19 scientific workshops, it has also birthed another continental collaboration – the African Federation for Non-Destructive Testing (AFNDT), of which SAIW's Harold Jansen is Executive Secretary.

What is ISO 3834?

The International Organisation for Standardisation, offers the following explanation of its system of standards:

“International Standards make things work. They give world-class specifications for products, services and systems, to ensure quality, safety and efficiency. They are instrumental in facilitating international trade.”

ISO 3834 is one of the more than 21 000 standards that ISO has published. It dictates the quality system for fusion welding of metallic materials and is thus a critical certification for fabrication companies. The standard affirms a company as thoroughly professional, through independent verification, acting as an official “stamp of quality”.

SAIW Certification introduced the standard to South African industry when it became an ANBCC (Authorised National Body for Company Certification) in 2008, and to date it has certified over 160 welding companies against ISO 3834. The standard is so important that two SAIW awards have been established in its recognition.

“It’s the basic stamp of quality in the welding fabrication business and it is a considerable boost to one’s business potential.”

– Herman Potgieter



INTERNATIONAL INSTITUTE OF WELDING



Having satisfied the requirements of the IIW
Manufacturer Certification Scheme according to
ISO 3834

Company: **SAIW Fabrication**
The Unit: Fabrication Workshop
Located in: 52 Western Boulevard, Johannesburg
is certified in accordance with



SANS ISO 3834 Part 2

For the product(s): Pressure Vessels, Structural Steel, and Piping Systems

with the scope of work stated in the attached Schedule

Certificate number and revision status: ZA-999 - Rev. 0

First issue date: 2016/01/01

Current issue date: 2016/01/01

Date of expiry: 2018/12/31

ANSCC Governing Board Representative

Scheme Manager

SAIW Certification South Africa



This Certificate is subject to the rules established by IIW
for the certification of Companies



I think it's important for women to consider careers in welding and engineering, because we don't have enough engineers and we don't have enough highly skilled personnel in welding.

- Prof. Madeleine du Toit | SAIW President 2010-2014

CHAPTER 07

2010

|

2018



And in South African history

2010: The nation celebrates with the hosting of the FIFA World Cup.

2012: Police open fire on workers at a platinum mine in Marikana – the most lethal use of force by South African security forces against civilians since 1976.

2015: Eskom begins load shedding in an attempt to conserve power.

2018: Jacob Zuma submits to pressure from the ANC and resigns from the presidency. Veteran trade unionist and businessman Cyril Ramaphosa succeeds him, his appointment generally regarded as positive.



Milestones

The Institute experiences tangible growth in this latter decade – with numerous additions and extensions expanding and enhancing SAIW's facilities and services. At the Joburg premises, the interior is refurbished, a multi-purpose auditorium and metallurgical test laboratory are added, and a separate and dedicated facility established for SAIW Certification. The SAIW also expands nationally, with a fully-fledged training centre opening in Durban, and NDT training facilities acquired by the Cape Town office.

2010

SAIW elects its first female President, Prof. Madeleine du Toit.

2012

SAIW partners with the University of Pretoria
to launch the Centre for Welding Engineering.

2014

The SAIW Foundation is established
as an industry vehicle for social upliftment and development.

2016

SAIW wins the tender for the Department of Higher Education's
Centres of Specialisation project – to implement the QCTO National Artisan Welder curriculum in TVET colleges.

2016

The Material Testing Laboratory receives its ISO 17025 accreditation,
enabling it to offer a complete service for the verification of welding consumables.

2018

SAIW obtains QCTO
(Quality Council for Trades and Occupations) **accreditation**

2018

The institute partners with the Nigerian Institute of Welding to **launch**
The Welding Federation of Africa (TWFA).





SAIW PRESIDENT: 2010 - 2014
PRETORIA: 1997 - 2014

**PROFESSOR & HEAD OF DEPARTMENT: MATERIALS SCIENCE AND
METALLURGICAL ENGINEERING, UNIVERSITY OF PRETORIA: 1997 - 2014**

First Lady: Prof. Madeleine du Toit

“I think now there are more and more female engineers in industry, it’s becoming a more acceptable career option for girls.”

The curriculum vitae and reputation of Professor Madeleine du Toit put to rest any lingering fallacies that women are not suited to the engineering and welding sectors. Her career has been nothing short of illustrious.

Professor Du Toit became the SAIW’s first female president in 2010, an appointment that followed years of distinguished service in industry and academia. With no less than four degrees in metallurgical and welding engineering – including two master’s degrees cum laude and a PhD – she headed up the University of Pretoria’s Materials Science and Metallurgical Engineering department for a total of 17 years.

Fortunately for the Institute and industry, Du Toit’s interests have never been purely academic. On the contrary, she always maintained strong links with industry; serving as Chairman of SAIW Certification from 2005 - 2014, chairing two IIW (International Institute of Welding) bodies and in 2012, while serving as SAIW President, helping launch the Centre for Welding Engineering at the University of Pretoria – a university-SAIW partnership geared at addressing industry’s shortage of welding engineers.

Her hard work and expertise have been recognised with numerous industry awards, including the IIW Jaeger Lecture Award in 2006 and the SAIW Harvey Shacklock Gold Medal in 2008. To top it all, she attracts enormous admiration from colleagues and peers, with former Executive Director Jim Guild describing her as an “outstanding professional person who is also charming and approachable” and former IIW President Dr Baldev Raj honouring her as “a beautiful person with a beautiful mind”.

Now heading up Wollongong University’s Materials Engineering programme, it is pleasing to note that she still cites her office as SAIW President as one of her greatest accomplishments:

“My proudest achievements? I think firstly, it would be being elected as president of the SAIW... that was a great opportunity to interact with industry and with welding people, and to give a bit of direction to welding in South Africa.”



SAIWV



Skills development: It takes a village

In 2018, 21-year-old Princess Mpembe was part of the medal-winning South African team that made history at the Arc Cup in China. This was the first time that SAIW's team had comprised mostly women – three out of the total five. Even more remarkably, the three South African women represented almost half the total number of female competitors across the entire competition. Mpembe describes her experience:

“The Arc Cup competition was very eye-opening ... I was also highly motivated and inspired to work hard as a female welder, because most people believe the field is mainly for men.”

Just two years earlier, Mpembe had been living in a rural township of Gauteng, with no knowledge of welding. And she didn't possess the funds to educate herself on such a subject. How then, did this history get made? Yet again, it was the result of collaborative group effort to maximise opportunity.

INDUSTRY: ARCELORMITTAL SCIENCE CENTRES

TRAINING: SAIW FOUNDATION

GOVERNMENT: MERSETA

OPPORTUNITY: THE ARC CUP

ArcelorMittal Science Centres

“These [Science Centres] comprise ArcelorMittal South Africa’s flagship corporate social investment project – a perfect example of a public private partnership that is addressing both a national development challenge and a serious and urgent business need.”

- Pieter Venter | Technology Manager, ArcelorMittal

The ArcelorMittal Science Centres are the products of a non-profit partnership between ArcelorMittal South Africa (AMSA) and the Department of Education, born of a mission to champion the study of science and ultimately alleviate the skills shortage in the engineering fields. The learning facilities are based in the predominantly rural communities surrounding AMSA operations, in order to serve the learners, out-of-school youth and teachers in these under-resourced areas. Science, mathematics and technology are promoted as the exciting and inventive subjects that they should be, with knowledge and skills transferred by practical, fun and interactive means in hi-tech but relaxed environments.

A schools programme focused on Grade 10 to 12 helps learners improve their performance in mathematics and science during these three crucial years of schooling; with interactive, curriculum-based lessons; free transport from school to the centre; and guidance on bursaries and training and employment opportunities. The first ArcelorMittal Science Centre launched in 2006 in Sebokeng, Gauteng. This centre currently provides learner support to an astounding 43 schools and roughly 1600 pupils per year.

SAIW Foundation

While the SAIW Foundation was conceived and seed funded by the SAIW, it was always intended to function as a joint effort between the Institute and industry, thus maximising the Foundation’s impact through economies of scale.

ArcelorMittal South Africa (AMSA) donates steel to the SAIW and has enjoyed a relationship with the Institute for years. A partnership with the newly established Foundation seemed like the logical next step in pursuit of their shared vision, so they identified six Grade 12 learners who demonstrated potential and eagerness to learn, even though they knew nothing about welding at the time. The candidates were selected for training as IIW International Welders through the SAIW Foundation, with AMSA to provide funding, material for training and experiential training. This inaugural group began in 2017 and included three women – Zelda Khumalo, Rose Mfabane and Princess Mpembe. They would go on to excel, as Willie Williams explains:

“The six ... completed the International Welder Programme in record time and all passed with flying colours. This is one of the most successful groups to graduate from the SAIW.”

merSETA

In addition to the Department of Education's involvement with the Science Centres, the government plays a role in skills development in the form of SETAs. 21 SETAs (Sector Education and Training Authorities) were established at the turn of the millennium to facilitate sectoral training; by collecting levies and paying grants to companies (like ArcelorMittal), accrediting and monitoring training providers (like SAIW) and identifying scarce skills.

MerSETA (Manufacturing, Engineering and Related Services SETA) accredited the SAIW as a training provider in 2002 and the relationship has continued ever since. The partnership has engendered training projects for industry and TVET colleges and MerSETA has played a key role within the Institute's skills development competitions. They sponsor the South African participants in the international welding world's two most prestigious competitions: WorldSkills and the Arc Cup. But their assistance is more than monetary, as Arc Cup team leader Etienne Nell explains:

“The South African welding community owes a huge debt of gratitude to the MerSeta, not only for their financial assistance, but also for their encouragement and enthusiasm.”

The Arc Cup

Hosted by China, the Arc Cup was originally devised as the country's national welding competition during which the Chinese WorldSkills participants would be selected.

It was opened up to international participants in 2012, and the South African student contingent has impressed at the competition ever since. Jaco van Deventer placed second in 2016, Osbourne Samukelo Mbambani took first prize in 2017 and 2018 saw South Africa's first majority-female team - of which Princess Mpembe was a part - win a bronze medal. SAIW's Etienne Nell, who is also an Arc Cup judge and committee member, describes this impact:

“This shook up the competition organisers in terms of recognising the power of women in the welding industry with the result that a dedicated Arc Cup for women is on the agenda for all future competitions.”

“I will always have a passion for welding and the training and knowledge I got from SAIW. I can start to build a career which my family and I can hopefully be proud of some day. It is thanks to my husband, who helped me discover my love of welding, and to SAIW for all my qualifications, that I am where I am today.”

- Welding Inspector Chanae Marais enjoyed welding ever since her husband taught her CO₂ welding in 2011. She had dreams of working as a boilermaker like him, so completed the necessary course and secured her first real welding job. Her supervisor thought she'd make a good welding inspector and encouraged her to enrol for the course at SAIW. She started Level 1 in 2015 and Level 2 in 2018, a major undertaking as she had a full-time job AND a new-born baby – her third son. She found it very difficult, but passed – receiving the highest mark in the class, just 2% shy of a distinction! But, as she says, the best was yet to come. A few months later she was awarded the Phil Santilhano Award, bestowed on the best Welding Supervision and Inspection student, an achievement she describes as the biggest of her career.

“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.”

- Lebogang Thabang Thwala was the SAIW Foundation's first bursary student, and completed the practical welding course.

What do different machines test?



THE 450 J CHARPY IMPACT MACHINE:
Impact Strength



THE SPECTROMETER:
Chemical Composition



THE XRF ANALYSER:
Material And Chemical Composition



SANS/MTS CRITERION MACHINE: STRENGTH
(Bend And Tensile Testing) Of Welded Joints



EMCOTEST DURASCAN 70 VICKERS-UNIT MACHINE:
Hardness



THE MICROHARDNESS TESTER:
Hardness



THE HYDROGEN ANALYSER:
Diffusible Hydrogen In Weld Metal



THE NIKON MA-200 OPTICAL MICROSCOPE:
Surface Structure

What happens in the Material Testing Lab?

In 2013, the SAIW opened its newly-built, world class metallurgical testing laboratory at its Johannesburg headquarters. The R12-million facility was kitted out with state-of-the-art equipment to conduct in-house mechanical and non-destructive testing and evaluation of welds and consumables – sent in from the welding school, other training providers or industry.

It now forms a valuable component of the Institute's consultancy services, as Riaan Loots, SAIW Technical Services Manager, explains:

“... the Lab increasingly supports the consulting services offered by the SAIW, which include failure analysis, welding related research and development, welding consumable evaluation, weld procedure qualification, welder qualification, post weld heat treatment and positive material identification.”

The laboratory is ISO 17025 accredited, which confirms its technical competency and accuracy as a testing and calibration lab.

“Never let age or gender define your capabilities.”

- Confidence Lekoane, Welding Consultant

The woman manning the lab: **Confidence Lekoane, Welding Consultant**

HIGHEST QUALIFICATION:

B-Tech Metallurgy, IIW International Welder, NDT Technologist: Penetrant Testing, Magnetic Particle Testing, Radiographic Testing.

JOINED SAIW:

In 2012 as Materials Laboratory Technician for the newly launched material testing laboratory. Promoted to Welding Consultant in 2017.

PROUDEST ACHIEVEMENT:

Part of the team that achieved the crucial ISO 17025 accreditation for the lab.

“A lot of women have to prove that they are capable before they are given the credit – a common question I get asked is, ‘What welding qualifications do you have?’”



KG LETLOLE, MATERIALS LABORATORY TECHNICIAN, NICOLINE KGOEDI, ASSISTANT LABORATORY TECHNICIAN,
CONFIDENCE LEKOANE, WELDING CONSULTANT,

Kegomoditswe (KG) Letlole, Materials Laboratory Technician

HIGHEST QUALIFICATION:

B-Tech Metallurgy, NDT Technologist: Penetrant Testing, Magnetic Particle Testing, Radiographic Testing (all Level 1).

INTRODUCED TO SAIW:

When her former company sent her there on a training course. Realising the Institute could offer both experience and education in something she loved, she applied for the role of Materials Laboratory Technician and started the job in 2017.

PROUDEST ACHIEVEMENT:

Keen to “dig deep” and understand the whys, Letlole decided to study metallurgy, and “fell in love with welding”. Coming from a poor background, she names studying and passing – more than once – as her proudest achievements, and she is now able to help feed and house her family. Letlole also received one of the five best marks (94%) in 2018.

“At some workplaces there are men who don’t want to take instructions from a ‘young girl’ – when you’re trying to apply your knowledge and improve what they’re doing. I think we’re lucky here, we don’t have that kind of thing.”

Nicoline Kgoedi, Assistant Laboratory Technician

HIGHEST QUALIFICATION:

B-Tech Metallurgy, NDT Technologist: Penetrant Testing, Magnetic Particle Testing, Radiographic Testing (all Level 1).

INTRODUCED TO SAIW:

In 2015 - 2016 when she completed her practical training as part of her physical metallurgy diploma. She was permanently employed as a laboratory technician in 2018.

PROUDEST ACHIEVEMENT:

Successfully balancing work and studies when pursuing her B-Tech in metallurgy.

“Women are not afraid of challenges ... Being a laboratory technician comes with a big responsibility. However, it’s a flexible career that offers several courses for advancement.”



NICOLINE KGOEDI, ASSISTANT LABORATORY TECHNICIAN
KG LETLOLE, MATERIALS LABORATORY TECHNICIAN



... welding can be a
core part of addressing
transformation issues,
fortifying our manufacturing
base and delivering a better
life for all.

- Dimitra Kreouzi | Human Resources, SAIW



“We will need to be more outward looking and embrace change in the next few years. This is not always easy in a mature, well established organisation, but it’s been a fact of life at SAIW for very many years. New goals have to be set and the management team has to strive for continuous improvement in all areas.”

– Jim Guild

Future-fitting the SAIW for the next 70 years

Business agility is the ability to adapt – in simple terms, it’s the ability to switch hats at the drop of one. This skill is one of two organisational characteristics named repeatedly by Institute stakeholders as the reason for SAIW’s longevity and success. The other vital attribute is that of industry relevance. Relevance translates to serving the sector by responding to the challenges they face, offering training that aligns with the latest innovations in the industry, and equipping graduates accordingly, ensuring that qualifications and certifications offered are of exceptional quality and aligned with international standards.

“What made SAIW a success was our industry involvement – our contact with industry. If we’re not providing programmes the industry needs, then we will become obsolete.”

- Dawie Olivier | SAIW Board Member

In keeping with these central aims – agility and relevance – the immediate goals on the Institute’s agenda include:

- Expanding further into Africa through increased collaboration and knowledge dissemination, as envisioned by the newly launched Welding Federation of Africa (TWFA) partnership.
- Developing the Future Welder Training Centre, which focuses on advanced technologies such as robotic welding (as used in the automotive and other industries) and virtual reality (simulated) welder training.
- Promoting advanced NDT techniques, such as ToFD (Time of Flight Diffraction), phased array, digital radiography and eddy current testing, which offer major improvements to traditional techniques in terms of speed, scope, risk and accuracy.

“ToFD, phased array, digital radiography and other advanced NDT techniques are highly effective, but not necessarily easy to interpret or evaluate. Training is therefore absolutely critical for their successful growth and implementation in general industry.”

- Harold Jansen | Systems & Quality Manager, SAIW

- Expanding SAIW’s technology transfer activities to ensure modern technology is accessible to South African businesses and small medium enterprises.
- Alleviating the chronic skills shortage through intensive promotion of welding and related technologies as preferred options for a rewarding career.
- Playing a leading role in international bodies to keep abreast of technology developments.
- Being an important member of TEAM SOUTH AFRICA and disseminating the capabilities and capacities of local industry throughout the continent and beyond.

BEYOND BORDERS, BEYOND WELDING

“Welding contributes positively to all human endeavours and the quality of life of all nations.”

- International Institute of Welding

There's a common conviction held among those associated with the Institute: Welding matters. To expand: The industry improves quality of life on a micro level – providing well paid, in-demand employment across a range of skill levels and career paths, in a country where unemployment is rife. But it also improves lives on a macro level, beyond those directly involved, because it is essential to other industries and decent standards of living. Welding has been described as the critical “backbone” of industry, infrastructure and economy, an “enabling technology” that can build “whole nations”.

This conviction reflects a grand vision – inevitably global in nature. It's unsurprising, then, that international engagement is at the heart of the SAIW: It is a founding member of the International Institute of Welding (also established in 1948), and has prioritised relationships across the continent and the world. Additionally, SAIW representatives have served in a host of senior positions within the IIW; organising conferences, aligning with IIW standards and consolidating efforts for the greater good.

The partnerships are mutually beneficial – the SAIW is no second-rate organisation playing catch-up at the bottom of the African continent. In fact, its remarkable leadership and innovation over the years have made substantial impact internationally. Examples include: furthering NDT capability throughout the continent under the AFRA project, co-founding the Welding Federation of Africa and the African Federation for Non-Destructive Testing (AFNDT), and joining the Arc Cup committee in China. There's also the SAIW's Welding Inspector course – a training programme pioneered during the 80s, with a rigorous syllabus of such high quality that it was readily adopted by South African industry and seamlessly dovetailed into the IIW programmes in the early 2000s.

Lastly, there's the Institute in its entirety, a model of what can be achieved from the ground up. It's a great example for countries developing their own, self-sufficient welding and NDT capabilities. And SAIW has proved itself a willing partner in assisting other organisations and countries to do just that – by sharing knowledge and know-how.

“The SAIW is an excellent model both for welding and NDT which could be replicated in many developing countries.”

- Dawie Olivier



The SAIW Board of Directors

There's one last profile in the SAIW story that needs recognition. It's a body that has been around since the earliest days, steering the Institute with wisdom, keeping it afloat during tough times – for no reward other than seeing the SAIW effective, improved and strengthened.

It's the Board of Directors (once known as the SAIW Council) – a dynamic team of industry experts who have volunteered their time and knowledge after hours and behind the scenes. Of course, the board has represented many, many individuals over the years; each making a valuable contribution during their term, then handing over the mantle of service to new elected members equally committed to the SAIW vision.

The historic list of members is too long to include here, though their efforts are gratefully acknowledged – and evidenced by the remarkable organisation that the SAIW has become.

BOARD OF DIRECTORS 2019

Elected members

Morris Maroga, Eskom
Dawie Olivier, Olivier Survey Group
Ben Beetge, Lemo NDT
Robin Williamson, Consultant
Johan Pieterse, Afrox
Gert Joubert, SAISI Representative
Joseph Zinyana, New Age Welding Solutions

Nominated Members

Paolo Trinchero, SAISC
John Tarboton, SASSDA
Louis Breckenridge, CEA
Tony Paterson, WITS University
Tom Rice



SAIW

Southern African Institute of Welding



“...at 79 years old, I am so grateful to still be associated with SAIW, which has been an important part of my life for over 30 years.”

- Robin Williamson knew he would become a mechanical engineer at the age of 10 or 11 – around about the time that the Institute was formed. He joined the SAIW Board in the 1980s and has been involved ever since, serving on various committees and as president from 1994 to 1998. He names the Gold Medal Award in 2014 as one of his greatest achievements.

“Welding makes up over 30% of the labour cost on steel fabricated structures... I can’t think of anything made today where welding of some sort is not involved.”

- SAIW Board member Louis Breckenridge is currently Director of the Constructional Engineering Association of South Africa. He worked at Girder Naco for almost 50 years, building some of the country’s most iconic structures, with some of the most sophisticated welding requirements – including the stadiums at Mahikeng and Mabopane, and the booms for container cranes at the Durban container terminal.

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Interviewees:

Morris Maroga	Prof. Andy Koursaris	Willie Williams
Ted Barwise	Joseph Zinyana	Princess Mpembe
Johann Pieterse	Mike Holland	Dawie Olivier
Nndwakhulu King Mufamadi	Willie Rankin	Charles Dednam
Jim Guild	Robin Williamson	Chanae Marais
Sean Blake	Louis Breckenridge	Confidence Lekoane
Chris Smallbone	Etienne Nell	Kegomoditswe (KG) Letlole
George Walker	Graham Wilson	Nicoline Kgoedi
Prof. Tony Paterson	Learn Mogane	Dr Cécile Mayer

All SAIW staff and associates, notably:

Alan Browde
Dimitra Kreouzi
Harold Jansen

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