steel CONSTRUCTION

Volume 36 No. 4 2012

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International conference on structures for mining and related materials handling

SMH 2012

INTERNATIONAL CONFERENCE ON STRUCTURES FOR MINING AND RELATED MATERIALS HANDLING

OFFICIAL JOURNAL OF THE SOUTHERN AFRICAN INSTITUTE OF STEEL CONSTRUCTION

SOUTHERN AFRICAN INSTITUTE OF STEEL CONSTRUCTION

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EDITOR'S NOTE

Before I want to say anything further I just want to apologise to Terry Smith of the Hot Dip Galvanizing Association of SA and Shaun Dixon of Arup about getting it wrong the second time around. Yep, page 43 of Steel Construction no. 3 was supposed to be the correction of the corrosion specification of Moyo on the Pier on page 26 of Steel Construction no 1. I managed to repeat part of the original error again. So rather than trying to explain it for the third time, Terry will write an article on the whole subject soon.

I had the privilege of being part of the judging team that went to inspect the flue gas ducting and steel platforms of the two chimneys at the Medupi Power Station. I was in awe of the massive activity happening on a very flat piece of South Africa. We were of the few non-project team members that got to go up 213 metres in the air in a lift that still had an elevator operator (instead of pressing the button saying 213 metres you tell him where you want to go). The sight from the top was difficult to put into perspective. The other structures, massive in their own right, looked small and insignificant.

Mining and industrial projects are often frowned upon in terms of their heavy carbon footprint and the stuff they release into the air and water. But should we stop building these projects all together or try to do it as responsibly as possible?

The Medupi project is just one of some interesting industrial projects covered in this issue and each of them shows that reducing environmental impact formed a major part of their planning. All of them are Steel Awards entries so one of these might just be a winner...

Our mining and industrial feature includes all the information you need to book for SMMH 2012 the Conference on Structures for Mining and related Materials Handling (15 - 18 October 2012). So go book your seat if you want to hear the mining *"boffins' speak!

**South African slang for an expert.*

steel CONSTRUCTION

Volume 36 No. 4 2012

Contents

The Steel Construction journal supports the freedom of media and speech implicitly enshrined in our Constitution (Article 16).

OFFICIAL JOURNAL OF THE SOUTHERN AFRICAN INSTITUTE OF STEEL CONSTRUCTION

Front Cover: Bateman's Hope Bay Project

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SAISC COMMENT

By Dr Hennie de Clercq,
Executive Director, SAISC

The most important good news was that she felt confident that the government would expedite its capital expenditure programme, especially through Eskom, Transnet and SANRAL. On the other hand, we should expect ongoing uncertainty and volatility with respect to such key things as the exchange rate of the rand and the economic growth rate.

DARK CLOUDS AND SILVER LININGS

On 1 June I had the pleasure of being part of a building industry group invited by the Reserve Bank to bring them up to speed with what is happening in this industry. This was the whole purpose of the meeting – to inform the Bank – but I found it fascinating that the members of the group of visitors latched onto this opportunity to give the Governor and her senior officials a whole earful of the problems besetting the industry, not in the mode of "here's what's happening in our world; hope it helps you to formulate your policies" but rather "these are our problems; can you help us with them?"

The Reserve Bank keeps itself busy with such issues as the exchange rate of the rand, the inflation rate, interest rates and the availability of money and we all know that. Nevertheless, some of us clearly came with the expectation that the Governor could help us, and actually asked her for help with the litany of problems facing the building industry. The list of problems include the general lack of capacity at local authority level, one of the results of which is that it is often very difficult to get permission to build, the fact that developments are held back because of a shortage of services, especially electricity, a general lack of forward planning, the lack of enthusiasm among banks for lending money to fund projects, the fact that authorities on all levels are very slow to pay consultants or contractors, and several other issues, each of which can be further elaborated. From the Institute's side we expressed concerns about whether the government will actually spend the much-vaunted funds on capital expenditure, and the fact that the private sector does not seem to have enough confidence to embark on capital projects.

The list of problems was in itself quite disheartening; there are surely many things to fix about the government of this country. But I found the fact that we were just too eager to pour our hearts out to the first person in authority who would listen to us (with 'us' including the Master Builders and the associations representing the architects, civil engineers, consulting engineers, quantity surveyors, black professionals, and two black contractors associations) disquieting. This confirmed what some of the delegates said: there is a disparity between the private sector and government; there is also a lot of distrust. The fact that many managers in the local authorities and departments like Public Works have no technical background adds to this distrust and lack of understanding. This means that the available high level skills, including that of black people, are generally not employed towards addressing the country's issues.

It was clear that none of what we said was really news to Gill Marcus – she knows about it all, but she wanted to hear it directly from us. She said the Reserve Bank was not the medium for addressing the problems, but she did have some good news. The most important good news was that she felt confident that the government would expedite its capital expenditure programme, especially through Eskom, Transnet and SANRAL. On the other hand, we should expect ongoing uncertainty and volatility with respect to such key things as the exchange rate of the rand and the economic growth rate.

The problem is basically that we are part of a world economy that is in a very difficult state. The Governor said: "The situation in Europe may take a generation to be resolved". That's serious. When countries land themselves in a situation where there is no expectation of things improving any time soon the people start getting restless and politicians start thinking about drastic measures to get something new to strive for. Then things can go properly off the rails. Much as we have been programmed by decades of peace to think otherwise, the world may well become a really dangerous place.

Once we start looking at what's happening in other countries, a new perspective on our own situation starts emerging. We are certainly in a better situation than many, and there are great opportunities to do exciting things, in the country and on the sub-continent. But to realise these opportunities we need leadership; leadership of a quality that no country can expect every time they need it, and certainly not leadership that's in evidence when we look around us.

There is every reason to believe that the future will be interesting; there's less reason to think that it will be marked by unadulterated peace and prosperity.

INTERNATIONAL CONFERENCE

Structures for mining and related materials handling

15 - 18 October 2012
Vanderbijlpark, South Africa

Overview

Programme

Exhibition and sponsorship opportunities

SMMH 2012 sponsors

www.smmh2012.co.za

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SOUTHERN AFRICAN INSTITUTE OF STEEL CONSTRUCTION

Dr Geoff Krige, convener of SMMH 2012.

STRUCTURES FOR MINING AND RELATED MATERIALS HANDLING CONFERENCE 2012

SOUTH AFRICA AFFIRMS LEADERSHIP IN MINING STRUCTURE CONSTRUCTION

Such is the extent of our global leadership in mining construction that the set of SABS standards for the design of mining related structures, which were developed under the auspices of the SAISC, are generally recognised as the leading standards in the world.

The interest in SMMH 2012 from mining people worldwide, affirms both South Africa's leadership in this field and the success of the last SMMH conference, which was held in this country at the end of 2009.

"Almost from the moment the last conference ended we received requests to stage another one and the wide interest in SMMH 2012 has vindicated our decision to do that," says Dr Hennie de Clercq, SAISC executive director.

It is appropriate that the second conference also takes place in South Africa given this country's leadership role in this particular industry. Such is the extent of our global leadership in this field, the set of SABS standards for the design of mining related structures, which were developed under the auspices of the SAISC, are generally recognised as the leading standards in the world. In addition, South African companies have developed procedures for maintenance management that have also assumed a position of global leadership.

In the establishment of a mine it is necessary to build a great variety of structures: underground, to store and handle ore; the guides in the mine shaft; the headgears; the conveyors that transport people and equipment up and down the shaft; the plant above ground for conveying and storing the ore and then processing it into a more refined product and then further transportation and storage - conveyors, silos etc., as well as ore terminals.

Mine structures are often subject to unusual and severe loading and high levels of corrosion and, because of excessive vibration, metal fatigue is a real challenge. These structures also tend to suffer abuse at the hands of miners more intent on getting the job done than on preserving them. Safety is also a major concern for mines and with the danger of collapse and serious injury or loss of life safe structures are obviously a high-priority issue.

It is clear that mining related structures need to be planned, designed, built and maintained, and, as a result of the many challenges in the mining environment, designs tend to be quite complex. A number of engineers worldwide have specialised in this discipline, developing it into a fine art and the main aim of the SMMH conference is to give the global industry the opportunity to learn from these experts.

Dr de Clercq says he is delighted that among the speakers there are experts from Canada, North America, Australasia, Europe and South America. "The intention is that this conference will in future be held in various other countries with strong mining industries," he says.

SMMH 2012 will be convened by Dr Geoff Krige, who convened the first conference to much acclaim.

Dr Krige is one of the leading experts in this field in the world and the SAISC is delighted that he has once again accepted the job of convenor. He is uniquely positioned to shape this conference and maximise its benefits for all stakeholders.

Dr Krige will coordinate the full day Workshop on Design Standards on Monday, 15 October 2012. The focus will be on SANS 10208 (the South African Standard), but relevant sections from other international design standards will be incorporated.

A new addition to the conference programme is a one-day workshop focusing on maintenance of these structures. The best procedures for inspecting such structures will also be covered in this course.

On the last day of the conference delegates could also participate in site visits to relevant structures in the area with full technical guidance, where possible by the design engineer involved with the project.

An exhibition by suppliers relevant to this industry will run throughout the conference.

The conference will have ample networking opportunities during lunch and tea breaks. There will also be an opening cocktail function on the evening of 15 October 2012, prior to the first day of the conference as well as a conference dinner on 16 October 2012 preceded by a sundowner cruise on the Vaal River.

So far delegate demand has been high and people should register as soon as possible. 'Early-bird' registration rates have been extended to 15 August 2012.

SMMH 2012 will run from 15-18 October 2012 at the Riverside Lifestyle Resort on the banks of the Vaal River, Vanderbijlpark, approximately 50km from Johannesburg and centrally located to major mining activity in South Africa.

Dr Hennie de Clercq, Executive Director, SAISC.

Sponsors for SMMH 2012 include CadexSA, Vital Engineering and StruMIS. Visit the website for information on excellent sponsorship and exhibition opportunities that are still available.

For further information visit www.smmh2012.co.za or contact the SAISC: +27 (0)11 726 6111, marle@saisc.co.za

INTERNATIONAL CONFERENCE

Structures for mining and related materials handling

15 - 18 October 2012 Vanderbijlpark, South Africa

Provisional programme

15 OCTOBER 2012
WORKSHOP ON INTERNATIONAL DESIGN STANDARDS FOR MINING STRUCTURES, INCLUDING ALL FOUR PARTS OF SANS 10208

Part 1: Headgear structures
SANS 10208-1:2005 (SABS 0208-1)
Part 2: Sinking stages
SANS 10208-2:2007 (SABS 0208-2)
Part 3: Conveyances
SANS 10208-3:2001 (SABS 0208-3)
Part 4: Shaft system structures
SANS 10208-4:2001 (SABS 0208-4)

Workshop coordinator: ***Dr Geoff Krige, Chairman of the South African Standard Committee.***

16 OCTOBER 2012
DAY 1 – PRESENTATION OF PEER REVIEWED PAPERS

Key note address: To be advised

THEME 1: MATERIALS FOR STRUCTURES

Case study – Hot dip galvanized steel on deep level *RE Wilmot, Hot Dip Galvanizers Association SA;* **Welding Fabrication: opportunities and pitfalls** *T Paterson, Aluminium Federation of SA;* **Steel shaft guide products** *AM Smith, D Hill and M Stockwell, Tata Steel Europe*

THEME 2: LIFE CYCLE OF STRUCTURES

Assessing hazards associated with deterioration of mine shaft structures *G Krige, Walker Ahier Holtzhausen (SA);* **Structural assessment of CIP tanks** *M Khan, TWP Projects (SA);* **Aspects to consider when using an engineering design company to conduct third party inspections of mining structures** *P Louw, TWP Projects (SA)*

THEME 3: HEAVY EQUIPMENT

Validation of the finite element model of ring motors for grinding mills *P Petereit and K Tischler, Siemens Germany;* **Machine start-up regime – effect on resonance** *N Elvin and A Elvin, University of Witwatersrand (SA);* **The use of castellated sections in structures subjected to semi-dynamic loads** *R Szejwallo, ThyssenKrupp (SA)*

THEME 4: PROJECT MANAGEMENT

South Deep vent shaft headgear and shaft *P Collins, Gold Fields (SA);* **Failures due to inadequately managed change** *G Krige, Walker Ahier Holtzhausen (SA);* **Simplifying the project complexity: Going further than eating the elephant in pieces** *V Anyosa, EPCM Experts SAC Peru*

SMSMH 2012

17 OCTOBER 2012
DAY 2 – PRESENTATION OF PEER REVIEWED PAPERS

THEME 5: SHAFTS

Capturing mine shaft condition and scheduling maintenance electronically *A Veldtman, Prodispace and G Krige, Walker Ahier Holtzhausen (SA);* **Design of tall steel A-frame structures for mine hoisting** *B Mashford, Consulting Canada;* **Spillage handling infrastructure for the mid-shaft loading station at Konkola No 4 shaft** *A Bannerman and Z Pulic, TWP Projects (SA);* **Evaluation of shaft infrastructure to meet production upgrade** *I van der Wat and M Khan, TWP Projects (SA)*

THEME 6: DESIGN

Case study: Design of a light weight steel screen support structure (screening unit) *M Mmusi, TWP Projects (SA);* **Connection design for industrial structures – problems and solutions** *Bo Dowswell, SDS Resources (USA);* **Experimental investigation and modeling of non-uniform stresses in steel silos** *P Trinchero, Macsteel (SA)*

THEME 7: VIBRATION

Comparison of predicted dynamic response results to measured values for a screening plant *M Kahn and M Essack, TWP Projects (SA);* **Minimising vibration by structural dynamic modification after structural monitoring** *K Li and A Elvin, University of Witwatersrand (SA);* **Human structure interaction: Can minor movement resonate a structure?** *N Elvin and A Elvin, University of Witwatersrand (SA);* **Technogrids in mining related structures** *Fritz van Eeden, Horne Group (SA)*

PANEL DISCUSSION

18 OCTOBER 2012
COURSE OR VISITS

COURSE ON THE MAINTENANCE OF MINING STRUCTURES

Aimed at all persons tasked with the management and hands-on maintenance of these structures and focusing efficient inspection of such structures.

OR

SITE VISITS WITH FULL TECHNICAL GUIDANCE TO RELEVANT STRUCTURES IN THE AREA

SOCIAL EVENTS:

Monday, 15 October 2012
Opening cocktails in the exhibition area

Tuesday, 16 October 2012
Conference dinner preceded by an optional sundowner cruise on the Vaal River.

SOUTHERN AFRICAN INSTITUTE OF STEEL CONSTRUCTION

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Excellent opportunities to confirm your presence in an industry focused on Structures for Mining and Related Materials Handling

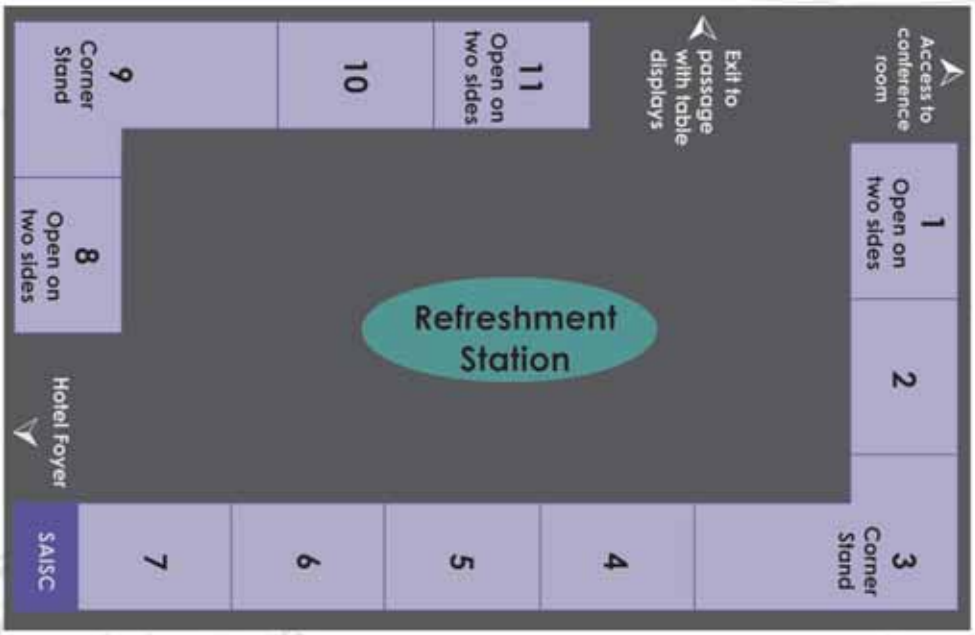
— Platinum sponsorship —

— Design standards workshop —
— Opening cocktails —
— Folders —
— Conference dinner —
— Conference bags —
— Proceedings —
— Book an insert in all the delegate bags —

Contact Marlé Lötter on 011 726 6111 or marle@saisc.co.za

Exhibit at SMMH 2012

— Corner stands: R20 000 excl VAT —
— Shell stands (3m wide x 2m deep) R14 000 excl VAT —
— Table displays R8500 excl VAT —



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Cadex SA supplies and fully supports Tekla Structures the leading 3D modeling tool for structures. The innovative tools are used by individuals and teams to improve profitability, quality and performance and to reduce risk on their projects.

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Cadex SA, Tekla's regional reseller, brings more than 60 years of experience in the Southern African steel construction industry to their clients.

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StruM.I.S: SMMH2012 LUNCH SPONSOR

StruM.I.S is an all encompassing steel fabrication management information system that harnesses the information flow and work processes through the steelwork contract between departments, suppliers and clients; from estimate tendering, through procurement and production into construction.

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INDUSTRY NEWS IN BRIEF

AVENG GRINAKER-LTA AND OTHER INDUSTRY PRACTITIONERS JOIN FORCES TO FOSTER A SAFE WORKING ENVIRONMENT

Steel Awards 2012 Main Sponsor

BuildSafe South Africa, a home grown safety initiative founded by Aveng Grinaker-LTA, Fluor, Sasol Technology, Murray & Roberts and Foster Wheeler is making progress in its bid to improve safety in the construction industry through collaboration. The initiative, launched on the 19th January 2012, has increased its signatory member companies to 33 whilst individuals registered with the website have risen to well over 500.

Speaking about the progress that has been made in entrenching a culture of safety, inaugural Chairman Grahame McCaig said: "The response so far has been phenomenal and the diversity of our membership, which is representative of the industry as a whole, is most encouraging. Companies and individuals alike are beginning to recognise that sharing information, aimed at improving safety on construction projects, is a social responsibility that should be embraced. Registering with the BuildSafe website is free and provides access to an invaluable HSE information portal."

Through its website *www.buildsafe.co.za* the organisation provides a broad spectrum of material to both its members, who are predominantly industry managers and HSE professionals as well as general visitors to increase health, safety and welfare (HS&W) awareness and to promote incident and injury-free workplaces. BuildSafe has a simple mechanism – members submit HS&W information which, after checking to ensure technical compliance and alignment to industry best practice, is then uploaded to the BuildSafe website for general use, but also shared with those registered with the website through e-mail and social media channels. The benefit of registering with the website is regular access to safety information that can be used to highlight and prevent incidents from occurring. It also provides useful information for continuous learning and for the development of material for toolbox talks, awareness lectures and on-site training.

McCaig concludes that safety is not only ethically "the right thing to do" business-wise it is "the smart thing to do". There is no competitive advantage to be gained through safety – we must work together to raise the benchmark and ensure a safer, more productive work place. Safety is an investment – the returns will be delivered through improved bottom line performance."

The new windmill's tail, proudly displaying the name of Stewarts and Lloyds.

STEWARTS & LLOYDS DOES ITS BIT FOR THE COMMUNITY

Steel Awards 2012 Light Steel Frame Award Sponsor

Residents around the Golden Harvest City Park in Johannesburg, would have been well aware of the very old and dilapidated windmill, running with the wind for the past seven decades or so.

One of these residents is Gerard Byrne. Mr. Byrne thought it wise to study the windmill from up close and contact the original company responsible for erecting the windmill. He noticed the Stewarts & Lloyds name on the tail and decided to contact one of the branches to see if the company can assist in renovating the windmill that was now an eyesore and a possible danger to visitors of the park.

Stephen Hadley, shareholder of the Booysen branch thought this was a great idea and got the ball rolling.

Now, courtesy of Stewarts & Lloyds, the park boasts a new, shiny windmill. This windmill will be running with the wind for hopefully another seven decades!

Johannesburg City Parks caught it on film - go to *http://youtube/eSodiV0g898.*

LANDMARK RETAIL CONTRACT FOR COSIRA IN CAMEROON A PRECURSOR OF THINGS TO COME

Steel Awards 2012 Partner Sponsor

In a first for the company, the Cosira Group has supplied fabricated steel to Zillion Air who is acting on behalf of Camo Trading that is building a new shopping complex in Cameroon. This landmark contract award is in line with Cosira's strategic plans to expand its pan-African footprint.

John da Silva, Chief Executive Officer for the Cosira Group, explains that the contract award was based on capabilities and quality which entailed the manufacturing and delivery of 140 tons of steel columns and trusses to Camo Trading in Cameroon.

The contract, which was awarded in September 2011, was extremely fast tracked, with a required delivery period of only eight weeks. "Fortunately, we have gained extensive experience on similar projects for a wide and diverse portfolio of our other clients and this, combined with our pool of highly skilled engineers and artisans, allowed us to tackle the project with confidence," says Da Silva.

The Cosira Group sub-contracted a portion of the work to B&T Steel (also a Steel Awards Partner Sponsor) and delivered all the specified steel items to site on time and in budget. "We were responsible for transporting the completed sections to Cameroon. By instituting best practice in our quality and customer service, we were able to carefully plan each element of our project scope and timeously provide the client with the requisite elements," says Da Silva.

John da Silva, Chief Executive Officer for the Cosira Group.

In addition to the time requirements, the client also specified that items be packed into the transportation containers in a specific order. "This then allowed Camo Trading's offloading crew to remove items in the order required by the assembly team on the project. The feedback we have received from the client with regard to the quality of our work, our attitude towards the project requirements and our service levels, has been very good."

KALTENBACH'S HIGH QUALITY UP-CUT SAWS ENSURE INTEGRITY OF PIPE OR TUBE

SAISC company member

The quality of the cut is critical to the integrity of a pipe or tube. To find a saw that not only guarantees these high quality levels, but also increases productivity, is a challenge for companies involved in manufacturing or engineering.

CALENDAR OF EVENTS

VISITING ENGINEER: STRUCTURAL-FIRE ENGINEERING
Mike Engelhardt
Johannesburg – 2 August 2012
Cape Town – 8 August 2012

ISF: AFRICA-AUSTRALIA PROCUREMENT WORKSHOPS
6 – 8 August 2012
Gauteng
Contact Neels van Niekerk at neels@isf.co.za

COURSE: SEISMIC DESIGN FOR THE SOUTH AFRICAN ENGINEER
Cape Town – 13 August 2012
Durban – 15 August 2012
Johannesburg – 17 August 2012

SASFA EXHIBITION AT INTERBUILD AFRICA 2012
15 – 18 August
NASREC
Contact us for free access passes: john.barnard@saol.com/ marle@saisc.co.za

STEEL AWARDS 2012
6 September 2012
Gauteng – Emperors Palace
KZN – Durban Botanic Gardens
Cape – Kirstenbosch Botanical Gardens

SHORT COURSE: DESIGN OF HEAVY INDUSTRIAL BUILDINGS
18 & 19 September
National Museum of Military History, Saxonwold, Johannesburg

SMMH 2012 – STRUCTURES FOR MINING AND RELATED MATERIALS HANDLING INTERNATIONAL CONFERENCE
15 -18 October 2012
Vanderbijlpark

SAISC AGM
15 November 2012

STEELFUTURE CONFERENCE 2013
5 & 6 March 2013
Sandton

FOR MORE INFORMATION ON EVENTS VISIT OUR WEBSITE – www.saisc.co.za

INDUSTRY NEWS

"The use of up-cut saws in the tube industry has become very popular due to the versatility of these machines. Not only can you cut angles, but the total number of pipes that one can cut at the same time in the same cutting jig, has made them popular," says First Cut Director, Steve Van Wyk.

First Cut, one of Southern Africa's leading distributors of international capital equipment, received a request from one of their clients for a saw that addresses cutting quality challenges. This request was addressed by First Cut with machines from one of their global suppliers, Kaltenbach. "A substantial investment in research and development has allowed Kaltenbach to ascertain specific market needs, then engineer and manufacture machines that exceed expectations," says Van Wyk.

Kaltenbach has developed a wide range of up-cut circular saws for various applications, with varying diameter requirements. The KKS 400/450 E offers an economical solution for single cuts and small batches. Extremely robust and user-friendly, the KKS 400/450 E is the perfect general-purpose mitre saw for all industries.

Van Wyk points out that the Kaltenbach's range of up-cut saws is designed for speed and ease of use. "The diameter of the pipes obviously plays a major role, but it is possible to perform a number of concurrent cuts in one cycle of a cutting machine. Clients need a saw that is not restricted to one operation only when cutting multi-bend pipes. In addition, one should take cognisance of the cost of consumables and weigh up the benefits that a standard circular saw can provide."

"It is in a company's best interests to invest in a machine that does not restrict the cutting possibilities for future projects. Often companies make

Kaltenbach KKS 450 E.

a purchasing decision based on current projects, but it makes financial sense to anticipate and plan for possible upcoming projects where an up-cut saw would derive the most benefits for the company," Van Wyk concludes.

AZA2012 BIENNIAL FESTIVAL

The South African Institute of Architects (SAIA) in partnership with the Cape Town Institute for Architecture and Architecture ZA.NOW is proud to announce the AZA2012 Biennial Festival, which will take place at the Cape Town City Hall from Thursday 13 until Sunday 16 September.

This follows on the first and hugely successful AZA2010 Biennial Festival, which was held in September 2010 in Newtown Johannesburg.

The Architecture ZA 2010 was Africa's first and largest premier urban culture festival as it brought together leading-edge thinkers and multi-disciplinary practitioners in the built environment from around the globe.

Six international speakers from around the globe will participate in this year's event and they include: David Adjaye (UK), Atelier Bow-Wow (Tokyo), Tatiana Bilbao (Mexico), Teddy Cruz (US), Rahul Mehrotra (India) and Kibwe Tavares (UK).

Local speakers include: Ora Joubert, Andrew Makin and Thorsten Deckler amongst others.

More information and the festival programme can be found *http://www.architectureza.org/aza2012.*

House in an orchard by Rahul Mehrotra, guest speaker at the Architecture ZA 2012 Biennial Festival.

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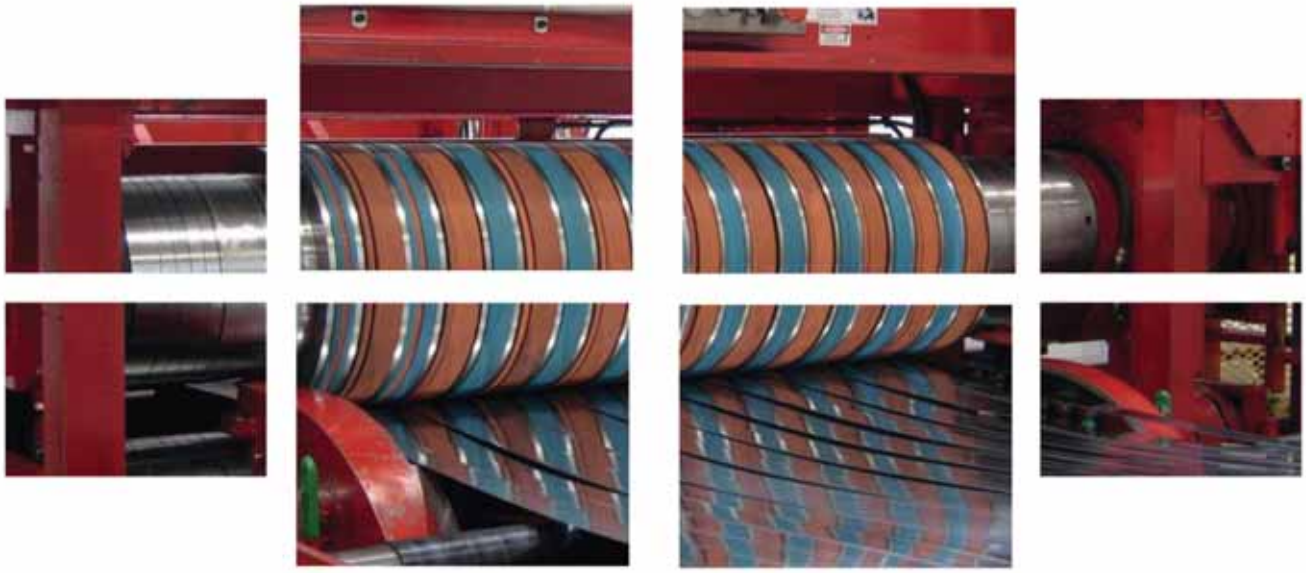

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THE STRATEGY OF THE SAISC

By Dr Hennie de Clercq,
Executive Director, SAISC

It was rather pleasing that the feedback from members as to their view of the Institute was generally very favourable. It is downright flattering to hear managing directors of companies say that they regard an association like ours as being of real, day-to-day importance to their business. It is also somewhat daunting: we cannot disappoint our constituency.

Steel framed multi-storey building.

Towards the end of January 2012 the members of the Board of the SAISC, together with a few selected people who were considered to be potential valuable contributors, met for two days to hammer out a new strategy for the Institute.

Before the workshop the facilitator, Mr Louis Heyl, did a survey among members to assess what they thought of the Institute and what their key issues were. It was rather pleasing that the feedback from members as to their view of the Institute was generally very favourable. It is downright flattering to hear managing directors of companies say that they regard an association like ours as being of real, day-to-day importance to their business. It is also somewhat daunting: we cannot disappoint our constituency.

It was quite interesting to note that the five issues of most concern to the members were, in order: the high price of steel, threats of Chinese imports, the limited market growth potential, our lack of penetration in Africa, and the poor quality work done by many companies in the industry. As to what the Institute does well, the members thought we were good at engineering advice and knowledge, education and training, and the development of the light steel frame building industry. We got reasonable scores for influencing the business environment, interaction with government, market development, and export promotion.

For an industry, or a company, to grow and prosper three things need to be in place:

- There must be a market for the products of the industry.
- The companies in the industry must have a sufficient level of excellence, in terms of price, quality and level of service.
- The business, legal, regulatory and governmental environment in which the industry operates must be conducive to the success of the industry.

We added a fourth requirement: for the success of the steel construction industry in South Africa the Institute needs to perform a useful role and for that it needs to be adequately equipped.

Out of all these considerations grew the business plan, of which we will discuss the key elements.

MARKET DEVELOPMENT

The Board saw three avenues for developing the market for the industry's products.

Promoting the use of steel in multi-storey buildings. The term 'multi-storey' should not be equated with 'high rise'; it refers only to buildings with more than one storey. The vast majority of office and other buildings in South Africa, as in the rest of the world, are not taller than about five storeys, and it is at these buildings that the Institute will be targeting its promotional efforts. They include office buildings, parking garages, hospitals, etc. Residential buildings are generally not attractive for hot rolled steel

A new application of LSFB: Exterior facades of office buildings and shopping malls.

structures; they fall within the scope of what can be done with light steel framing. Our work since the strategy workshop has shown that steel structures can indeed be economical for many types of multi-storey buildings, and that there is substantial scope for innovation. This is an exciting project.

Promoting exports to the rest of Africa. The Institute's whole export promotion effort is channelled through the International Steel Fabricators (ISF). Exports must constitute a growing proportion of the output of our steel construction industry and this is fully realised by the leadership of ISF, which is currently going through its own process of reassessing its approach and strategy, especially with respect to Africa, which has traditionally been a logical destination for our steelwork.

Promoting light steel frame building. With respect to light steel frame building the Institute's vehicle is the South African Light Steel Frame Building Association (SASFA). This sub-association can claim (subject to the danger of being proved wrong) to have played a bigger role in establishing a new industry than any association anywhere else. Faster progress in the housing and steel truss market has only been prevented by the slowdown in the building industry. The next targets are the exterior walls of multi-storey buildings, shopping centres, industrial buildings, etc, and multi-storey residential buildings, including hotels (i.e. buildings with reasonably closely-spaced permanent walls).

INDUSTRY EXCELLENCE

Four programmes were identified to encourage ongoing industry improvement over a wide range.

Instituting a certification scheme. The scheme will enable steelwork contractors to be certified as being able to handle specific types of work, based on their capabilities, capacities, quality systems and (probably) financial strength. Similar schemes in advanced countries have been to the benefit of fabricators and clients alike, and have had the effect of improving the overall productivity and profitability of companies.

Doing high level benchmarking. The concern is that, while our companies are often successful in exports and must thus be reasonably competitive, we don't see ourselves as a low cost steel fabrication country. There is a need to establish what the factors are that increase our costs, relative to those of companies in other countries in similar situations. What is the relative cost of labour, steel, consumables, electricity, transport, etc? The complexity of such a project should not be underestimated, but it can be a launching pad for targeted efforts to make the industry more competitive.

Education and training. For all of its existence the Institute has been involved in many ways in education and training, and this emphasis must be continued. The remit of the SAISC is to cater for the skills needs that are specific to steel construction of all people in the broader industry above the level of artisan. This includes supervisors, estimators, all the various types of managers in the steel construction industry, draughtsmen, designers, architects, merchants and others. The existing programmes must continue. The plan is to integrate the existing SAISC draughting school fully with the Institute under one roof, and to set up an 'Academy of Steel Construction' to handle the whole educational programme.

CREATING A CONDUCIVE ENVIRONMENT

The environment in which the industry operates is largely determined by government and the industry's clients. Other environmental factors, such as the existence and health of supporting industries and skills and the general quality of education in the country, are either not problematic or outside the scope of what the Institute sees as things that it can do anything about. Thus the work in this field reduces to only one programme.

There is a need to do high level benchmarking in the industry.

Lobbying. The overarching objective of the Institute's lobbying programme at this stage can be expressed in one phrase: ensuring that structural steelwork is fabricated in South Africa, rather than imported. This requires a programme of continuously interacting with government and other decision makers, the collection and interpretation of data, and on occasion some spy work. The programme has till now arguably meant more to SAISC members in money terms than any other one of the Institute.

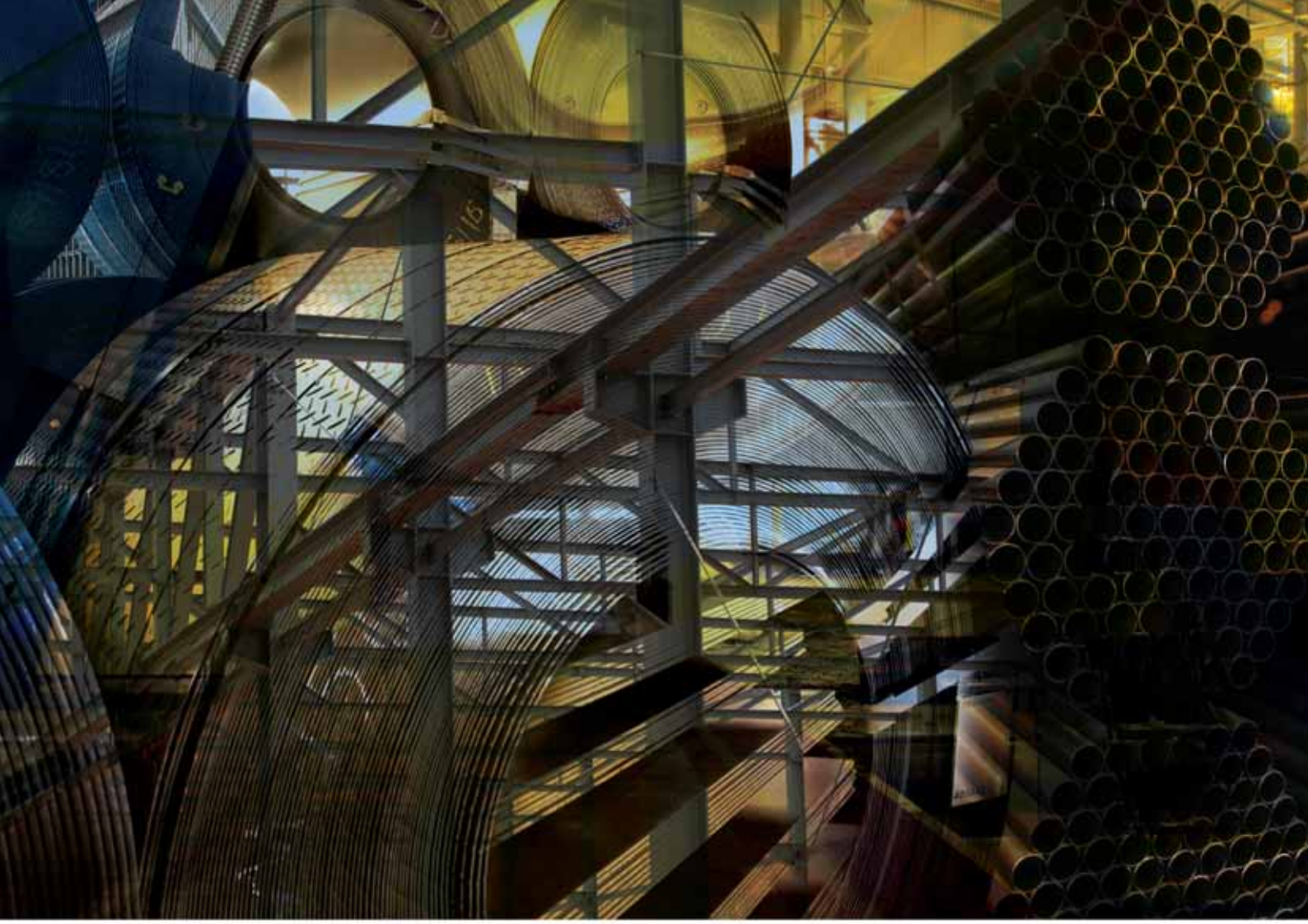
CAPACITY OF THE INSTITUTE

An organisation like the Institute consists basically of a group of people dedicating their skills and enthusiasm to the furtherance of an ideal. Thus, the better the human resources the better the chances of achieving the objectives. And all of this needs adequate funding. The current situation then requires two programmes under this heading.

Finding sufficient funding to enable the execution of all programmes. The Institute generates more than 50% of its funds through its own activities – publications, courses and events, advertising, etc. Part of the income comes by way of membership fees, and the remainder is contributed by the mills. But the programmes listed above require considerably more funds than we have spent till now, especially to enable the appointment of additional staff, and new and increased sources of funding are being sought.

Succession planning. The success the Institute has enjoyed during recent years can largely be attributed to the quality of its staff. The problem, however, is that the professional members of the staff are ageing and will soon have to be replaced (fortunately, nobody seems to want to retire before the end of 2015). A strategy has been devised to ensure that the present staff will be replaced by capable people when they retire.

The leadership of the Institute believes that implementation of the new strategy and the business plan based on it will achieve the results we have in mind; we are certainly committed to making it work. It should be apparent, however, that among all the programmes there is one that has precedence over the others: finding additional funding. Only once we have the money to recruit additional staff can we think of tackling additional programmes. We hope that our efforts in this regard will soon bear fruit.



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SASFA TRAINING COURSES FOR DESIGNERS, JUNE 2012

By John Barnard, SASFA director

The second course, Design of midrise buildings – taking light steel framing to a new level (in South Africa), was presented by Don Allen, a professional structural engineer from the USA, who has been involved in many of the light steel framing building codes there.

As part of its education programme, SASFA recently arranged the presentation of two one-day courses aimed mainly at designers. The courses were presented in Johannesburg, Durban and Cape Town from 28 May to 5 June 2012.

The first course, Code Course SANS 517:2011, was intended to assist designers, contractors and material suppliers to gain in-depth knowledge of the LSF building code. Three specialists presented the course namely Annemarie Sassenberg (AMS Consulting Engineers), Barend Oosthuizen (By Design) and John Barnard (SASFA). The course provided an introduction to LSFB and the South African industry, and covered all aspects of SANS 517, i.e.

- terminology and materials used,
- structural design considerations for roofs, walls and floors.
- general requirements (acoustics, thermal insulation and fire rating) and deemed to satisfy solutions of the major components of LSF residential buildings,
- installation of services and
- the design of foundations.

The second course, Design of midrise buildings – taking light steel framing to a new level (in South Africa), was presented by Don Allen, a professional structural engineer from the USA, who has been involved in many of the light steel framing building codes there.

Don gave a background to the organisation of the LSF industry in America, and discussed the various framing specific codes in use in North America, referring to similarities with the new South African code, SANS 10162:2 Design of cold-formed steel, which was adopted from the Australian code.

He covered the general provisions for midrise light steel frame construction, and illustrated the principles by using a number of actually built case studies. This included curtain wall examples, hollow core floor structures, timber and steel shear walls, gypsum concrete flooring as well as concrete cast floors using deep decking profiles. The presentations certainly made the local industry aware of the growth potential still available for LSF in Southern Africa.

Both the courses were accredited by SAIA and SAICE for purposes of CPD credits.

Don Allen discussing design of midrise LSF buildings.

Anna-Marie Sassenberg co-presented the SABS 517 code course.

Attendees rated both courses highly on rating questionnaires handed out during the course. Special sponsorships for aspects of the courses were received from Lafarge Gypsum, Eticon Construction and Marshall Hinds Pty Ltd.

SASFA's six-day training courses for building contractors will be presented in Durban from 23 to 28 July, and Cape Town from 22 to 27 October 2012, provided there is sufficient demand for the courses. SASFA is also planning to present its half-day course for building inspectors at various venues towards the end of the year.

SASFA will also exhibit at Interbuild Africa 2012 from 15 to 18 August at Nasrec. SASFA has been actively marketing the concept of light steel frame building at numerous exhibitions since its inception in 2006. Apart from the Interbuild Africa Exhibition, also attended in 2008, other exhibitions include the Green Buildings Exhibition in 2011 and several events arranged by the Master Builders Association and the SA Housing Foundation. Interbuild Africa 2012 aims to incorporate all aspects of interior and exterior building design and products across residential, commercial and industrial developments in addition to a wide spectrum of the hardware and allied products industries.

Contact info@sasfa.co.za or Pamella at 011 726 6111 for additional information.

XANADU'S HIGH PROFILE RESIDENCE – SUCCESS FOR LIGHT STEEL FRAME BUILDING

The architect is confident that LSFB has an excellent future in the high-end property market. "There are several advantages from an architect's point of view. Cost is reduced, speed of construction increased, insulation qualities and energy efficiencies incomparable and, importantly, the end product looks exactly like the CAD drawings – perfect corners, straight walls and excellent finishes all round."

Since its inception, the ongoing message from SASFA has been that the light steel frame (LSF) construction method is suitable for all types of building, from residential to commercial and office buildings. The latest upmarket residence in the Xanadu Eco Park overlooking the Hartebeespoort Dam in the North West Province is a stunning vindication of this claim.

The advantages of LSF building (LSFB) in terms of time of construction, energy efficiency and logistics, all resulting in bottom line savings, are sufficiently significant to make the method appropriate for residential developments from 'affordable' on to the most upmarket structures. Any impression that LSF building is for temporary or lower cost developments only, is being demolished by the rapidly growing number of high-end, aesthetic structures where LSFB is being utilised.

The house at Xanadu, designed by AIF Design Architects, is a first-rate example. This is a magnificent home and its complex design and aesthetic outcome were, by and large, made possible by light steel framing.

The overall sustainability of the building method is perfectly in tandem with the Xanadu environmental philosophy where, in their own words, '...each phase of the development is sensitive to the preservation of the area's precious wetland ecosystem.' Energy and general environmental matters are deemed to be of paramount importance.

AIF's Cobus du Plessis confirmed this, saying that not only did they want an appropriate aesthetic for the location but that the ongoing energy consumption of the house was a major priority.

"To this end we chose light steel framing for the construction above the surface bed and took it one step further by introducing a 100mm air gap in-between the outer and inner layer steel frames. This not only gave us the advantage of the air barrier, but also gave us the aesthetic advantage of 350mm thick walls," says Cobus. It also made installation of services easy namely plumbing, electrical and the central vacuuming system.

The main challenges were the cost of construction and the long construction period, and in both cases light steel framing proved to be the best option as there were significant savings on the construction time and costs.

The house is built on the highest site in Xanadu Eco Park, offering a wonderful view over Hartebeespoort Dam and surrounds.

The Xanadu house consists of three levels – the lower level for basement and services, which required excavation into the mountain, and the two upper living areas.

The architect is confident that LSFB has an excellent future in the high-end property market. "There are several advantages from an architect's point of view. Cost is reduced, speed of construction increased, insulation qualities and energy efficiencies incomparable and, importantly, the end product looks exactly like the CAD drawings – perfect corners, straight walls and excellent finishes all round."

The Xanadu house consists of three levels – the lower level for basement and services, which required excavation into the mountain, and the two upper living areas. The design's main objective was to capitalise on the spectacular view over the dam. Fortunately, the client understood the architect's vision in turning the house 'up-side down' from the conventional way, so the house was designed with the dining-room, kitchen and entertainment room on the second floor, leaving the bedrooms downstairs.

Lightweight steel represents 85% of the structure of the house and all of it – roof trusses and the wall and floor panels - were manufactured at the Innosteel (Pty) Ltd's factory in Honeydew and transported to site. Innosteel MD and founder Len Lategan was very upbeat about the outcome of the Xanadu project. "The thick-wall design makes it very special and with the double-glazing gives it the best possible insulation. I would hazard to say that this is one of the best insulated houses ever built in South Africa."

LSFB is significantly more energy efficient than more traditional masonry construction methods – both with regard to the 'embodied energy' of the

Stages of the Xanadu project: clad external walls on the left, frames only on the right.

materials and components, as well as 'operational energy' of the building over its design life. A recent research project carried out by the CSIR indicated that a LSF building will require about half the energy needed to heat and cool a masonry residential building to comfortable internal temperatures. If necessary, heating of the Xanadu house in winter will be supplied by under-floor heating from circulated hot water.

According to Len, there is a lot of scope for development by the component suppliers, to capitalise on the narrow tolerances offered by LSFB. For example, doors should be delivered to site fully fitted in frames – installing doors in their frames should be a simple 'clip in' procedure. While there are certain suppliers that make this possible, availability and distribution are limited at this stage.

SASFA is positive that as the market increasingly realises that LSFB can be used for a range of different applications with its considerable benefits of the building method, both practical and financial, perceptions about traditional building methods being the only viable alternatives for residential and commercial buildings are definitely being challenged.

Andries Bezuidenhout, executive director of the Xanadu residential project, has an emotional stake in the development as his grandfather, the legendary Bezuidenhout of Bez Valley in Johannesburg, purchased Xanadu farm way back in 1942.

"For me the development of Xanadu Eco Park goes beyond just the continuation of our family legacy, I am passionate about creating a lifestyle where people and nature can co-exist in perfect harmony," he says.

project team

Owner/Developer:

Mr Hein Enslin

Architect:

AIF Design Architects

Structural engineer:

C-Plan Structural Engineers

Contractor:

IKN Construction

LSFB contractor:

Innosteel (Pty) Ltd

Double layer of steel frames used for external walls. It provided space for installation of services, such as the central vacuuming system.

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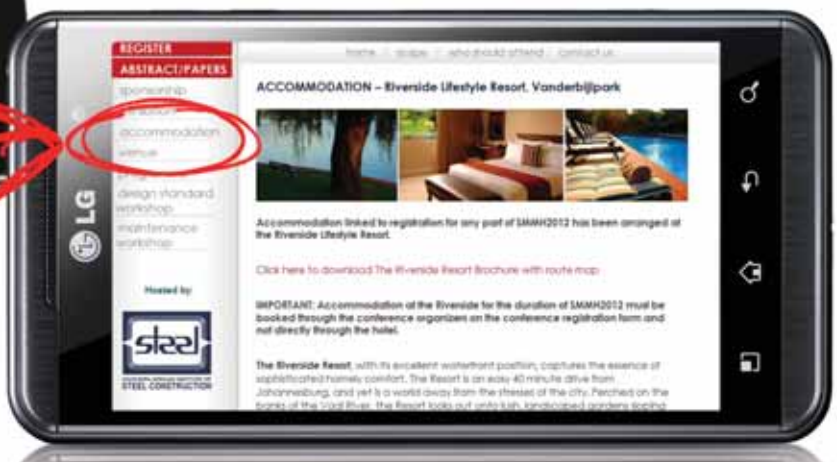

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5 DECK SHAFT SINKING STAGE

This shaft sinking stage was commissioned by Afplats for their Leeuwkop shaft and is a temporary steel structure that is used as a working platform by the shaft development teams. It is lowered down into the shaft as it gets deeper and facilitates the equipping of a new shaft.

It is a cylindrical structure, 9.5m in diameter and 20m tall, weighing in excess of 85 tons. It comprises of 5 levels (decks) connected to each other by a series of cat ladders. The stage will provide working areas, services and kibble access during the sinking of the shaft and will be discarded once the shaft has reached its terminal depth.

The stage was fabricated in such a way that each of the 5 decks could be pre-assembled to enable a modular method of erection and to ensure that all assembly issues were addressed prior to site erection.

Problems with availability of steel at the time of fabrication due to the ArcelorMittal SA Newcastle plant disruption proved to be one of the most serious threats to the success of this project. The fabricator was forced to source material from four provinces in order to complete the project.

Parts were delivered from Carletonville to site in a semi-knocked-down state to speed up the erection process and all deliveries were carefully sequenced to ensure optimal efficiency on site. The entire structure was assembled in 21 days over the 2011 Christmas period.

Special care needed to be taken at all times to ensure the stability of the structure taking into account the relatively slender diameter and significant height. The stage is designed to be suspended from the sheaves on deck 2 and not to support its own weight in standing.

Assembly was completed using a 30ton and a 140ton mobile crane. After assembly was completed, the stage was lifted and lowered into the shaft using a 720ton mobile crane.

The timeline was very demanding since the stage fell on the critical path for the mine's development programme. The erection of the permanent condition headgear could not commence until the stage had been successfully installed.

project team

Developer/Owner:
Afplats

Structural Engineer:
Afplats (in-house)

Main Contractor:
Steel Services

Steelwork Contractor:
Steel Services

HOPE BAY PROJECT

As a mining project Hope Bay did not have a happy ending. The entire mining project was scrapped, after the modular steelwork was completed and ready to be shipped out to Canada. Most of the steel will return to scrap and although this is a huge financial loss for the client, it is not so for the environment as steel will just come back as steel and not add to another landfill. However, we decided that it is still a highly innovative achievement and a great story (well, the beginning) for modular mining construction.

The Hope Bay project was awarded to Bateman as the design and supply of a gold processing plant, from primary crushing to final gold recovery. The site of the mine was on the Arctic tundra and the temperature is often below -50°C in winter.

The cost of maintaining a workforce on site is prohibitive, and a task on this site will take fifteen times longer than it would under conventional conditions. Reducing site based work thus became a driver for the execution plan.

The strategy was to design the plant as a number of individual modules, that could be shipped as complete, operational and pre-commissioned units that would require only final interconnecting piping once on site.

The nature of mining projects renders steel irreplaceable as a material of construction. On this project for example, because of deadlines, (missing the boat took on a whole new meaning), certain work was started earlier than it should have been, resulting in a fair amount of rework. This was a considered risk, but only possible with steel as the material of choice

Because of the tight schedule, the steelwork contractor sub-contracted to other fabrication yards in the dock area, all of which were usually employed in the shipbuilding industry. The quality of welding on the project was outstanding. Corrosion protection was taken equally seriously. A shot blasting and painting facility was established on site and all steelwork was primed within a short period of shot blasting. The resultant quality of workmanship can only be described as exceptional. The term 'Rolls Royce Plant' has been used by a number of visitors to the fabrication yard.

project team

Developer/Owner:

Newmont Mining Co, Denver USA

Structural Engineer:

Tenova Bateman

Project Manager:

Bateman Modular Division

Main Contractor:

Bateman Modular Division

Steelwork Contractors:

Metso ND Engineering (Pty) Ltd, Shipbuilders Durban (Pty) Ltd, Channel Construction

Detailers/Detailing Company:

G&C Projects (Pty) Ltd/ Strydom Cad Services

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STEEL FLUE CANS FABRICATION, MEDUPI POWER STATION

project team

Developer/Owner:
Eskom Holdings Ltd

Structural Engineer:
Karrena - Germany

Project Manager:
MM&G Mining and
Engineering Services (Pty) Ltd

Main Contractor:
Karrena – Concor Joint Venture

Steelwork Contractor:
DSE Fabrication

Steelwork Sub-Contractor:
MM&G Mining and
Engineering Services (Pty) Ltd

Detailers/Detailing Company:
PCP Drafting cc

The project entailed the supply and fabrication of flue gas ducting for two 220m high chimneys, each containing three flues. Medupi will be the first power station in South Africa to use 9 metre diameter flue duct cans.

Manufacturing of the steel flue shells at Medupi Power Station was done under shop conditions by DSE, a division of Aveng Grinaker-LTA's Mechanical and Electrical business unit and MM&G who was their sub-contractor responsible for the on-site manufacturing and assembling.

The manufacturing was done on site in a custom build workshop – especially designed to meet the required production targets. Each flue consists of 22 flue sub-cans with a 90° bend which is called a 'lobster bend'. The top three cans of each flue are manufactured from stainless steel (316L) because of its corrosion resistance properties as these cans will be exposed to acid corrosion. To lessen the impact on the environment a specially tiled sulphur dioxide emission removal system and carbon capture linings were part of the components of the chimney.

The rest of the cans are made from 3m high, 8mm thick mild steel (S355JR) plate sections. Three of the steel plates are welded together to form a 3m high, 9m diameter pipe section. Three of these sections are then welded together with channel stiffeners and flanges at either end to form a 9m high flanged section which is transported to the chimneys, lifted into position inside the windshield and bolted together. A perfect fit-up between the can flanges making up the flue gas ducts was required. For this purpose MM&G developed a unique design methodology for the drilling of the 192 holes for each flue can's 192 bolts. The total weight of all the units was approximately 2 400 tons, where the structural steel components accounted for 2 070 tons

During manufacturing and transporting, 'spiders' (temporary structural steelwork supports) were used inside the flues to ensure that the shape is maintained up to delivery to the chimneys. These were then removed prior to final bolting and lifting.

The timely construction and handover of the flue duct cans for both chimneys are evidence that these steelwork contractors can compete with the best.

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– Jeff Nicolajsen (Owner) Sperling Industries Ltd.

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CHIMNEY PLATFORMS FOR MEDUPI POWER STATION

project team

Developer/Owner:
Eskom Holdings Ltd

Structural Engineer:
Beroa Deutschland GmbH

Quantity Surveyor:
Eskom/PB Power

Project Manager:
Eskom/PB Power

Main Contractor:
Karrena Concor Joint Venture

Steelwork Contractors:
Aveng Grinaker-LTA:
DSE-Manufacturing, Robor Galvanisers, Bulldog Projects

As described in the previous article, the three flues of each chimney at the Medupi Power Station extend all the way up the chimney (213m) and protrude 7m above the top of the concrete.

These flues are supported by steel platforms at five levels – 55m, 90m, 150m, 180m and the main support girders at 205m level. The platforms were manufactured and assembled by the steelwork contractor in their facility and transported to site.

As the 205m level girders support most of the load from the flues, they had to be the largest and weighed approximately 13 tons each. These fish belly girders, 17m long x 3m deep at centre with 50mm thick flanges and 20mm thick webs could not be hot dip galvanized as with all the other girders, due to their size.

Thermal zinc metal spraying was identified as the best alternative, since the zinc applied during the zinc metal spraying has the same chemical composition when used in the hot dip galvanizing process.

Once received on site, the platforms were assembled on the floor slab inside the chimneys and connected to the heavy lifting system. The lifting system comprised off 32mm diameter Dywidag bars connected to six 100ton hydraulic jacks. Each platform was lifted ±8 - 10m into the chimney, to allow the next platform assembly to be executed underneath.

The platforms were then connected to each other by the Dywidag bars and the same process was repeated until all five platforms were connected to each other. Then they were jacked to their final positions and lowered onto concrete corbels which were slid with the concrete windshield. The total weight of these suspended platforms is 227 tons (per chimney).

Lowering these platforms onto the corbels required great precision and skill as underneath each platform there were six main bearer-beams suspended in the air, which needed to be rigged from the main platform onto the concrete corbels. Once these were positioned, the main platform was lowered to slot into the key-ways provided in the bearer beams to create a stable and sturdy platform.

This type of lifting operation in chimney construction is a first in South Africa and greatly assisted the contractor to achieve certain milestone dates on the tight schedule.

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MVOTI RIVER PIPE BRIDGE CROSSING

The Mvoti River crossing is a key component of the Umgeni Water North Coast Bulk Water Conveyance system that ensures security of potable water supply to the north coast area of KwaZulu-Natal. This project comprises a 280m long 800mm nominal diameter steel pipe supported by a 220m long steel lattice type bridge. The abandoned concrete abutments and unreinforced concrete central pier of a decommissioned road bridge were extended and utilised as the new bridge supports. A maintenance walkway along the bridge and allowance for the installation of a second 800mm diameter pipeline at a later stage, form part of the project.

Steel was the best solution for the long spans and no additional supports were required. The two arched, tubular trapezoidal girders (79.4m each) were fabricated from tubular steel for its aesthetics, speed of construction and ease of maintenance, as well as the high strength to weight ratio, which provided a cost-effective solution.

Using the existing (abandoned) concrete supports and fabricating the steelwork off-site and then lifting it into place reduced the impact on the natural environment of the Mvoti River.

The existing unreinforced structure that was constructed in 1921 could not sustain the tension forces imposed on the central pier. This was overcome by an elaborate system of dowelling, and also limiting the tension forces applied to the central pier during erection and in the long term.

Both main spans were fully pre-assembled, surveyed and welded in the contractor's workshop to ensure fitment on site. The girders were then dismantled in 20m segments, shot-blasted and painted. The contractor transported the girder segments to site in eight abnormal loads, the longest of which was 24 metres.

The truss segments were spliced together on the flood plain and erected in two lifts per span into their final position. The two bridge sections were then bolted together in situ and connections at the central pier were site-welded onto the cast-in plates.

Unusually high spring rains proved to be a challenge. Flooding of the river bed occurred and engineered platforms had to be constructed to enable the 200ton mobile crane to lift the bridge segments.

project team

Developer/Owner:
Umgeni Water

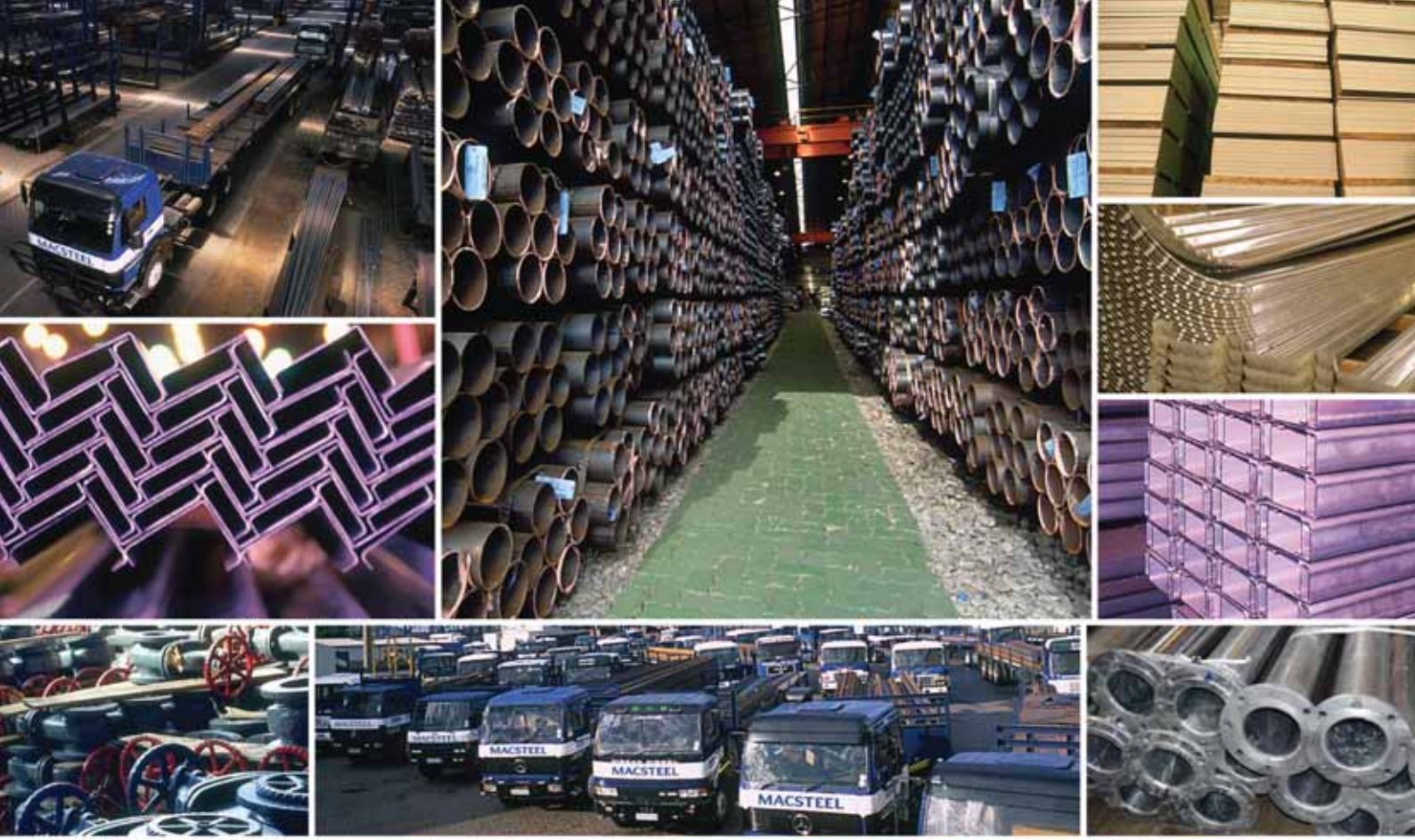
Structural Engineer:
BKS

Project Manager:
Bosch Stemele (Pty) Ltd

Main Contractor:
Icon Construction

Steelwork Contractor:
Impact Engineering

Detailers/Detailing Company:
Impact Engineering



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SASOL'S WAX EXPANSION PROJECT

The Cosira Group, one of the largest structural steel fabricators and erectors in Southern Africa was awarded a prestigious contract for work on Sasol's Wax Expansion Project in Sasolburg in February 2011 through global engineering, design and construction group Foster Wheeler.

The global petrochemicals group is a leading producer of synthetic and petroleum-derived waxes. The project was prompted by high demand from the sector's customer base and will be implemented by Sasol in phases, in line with the projected growth in key markets for hard wax. The plant is expected to double the production of hard wax, as well as significantly increase the medium wax and liquid paraffin production.

The contractor's scope for the project entails the supply of approximately 1 700 tons of Grade 350 WA structural steel and floor grating and includes the shop detailing, manufacturing and fabrication of the structural steel at the company's Vulcania facility. The painting of the fabricated steel was done by sub-contractors, and then transported to site for erection. The steel structures are used to house the mechanical components of the wax plant, including, piping and reactors.

The site of the project, the former Sasol 1 coal gasification plant, presented a number of challenges to Cosira. Sasol 1 is a fully operational, highly complex site and the space allocated to the expansion project is extremely limited.

It is almost a pre-requisite that the project's various stakeholders and sub-contractors, including the civil engineers, structural engineers, mechanical and piping engineers, work together in synergy. The level of cooperation, timing and communication had to be very high in order to achieve the successful completion of the project.

Leveraging its extensive experience and capabilities, the contractor was able to meet the challenges of this phase of the project. Cosira's capacity and ability to undertake superior turnkey solutions, site construction and project management will enable it to deliver the completed project timeously to Sasol.

project team

Developer/Owner:
Sasol Chemical Industries Ltd

Structural Engineer:
Foster Wheeler South Africa (Pty) Ltd

Quantity Surveyor:
PCC

Project Manager:
Foster Wheeler South Africa (Pty) Ltd

Main Contractor:
Foster Wheeler South Africa (Pty) Ltd

Steelwork Contractors:
Cosira South Africa (Pty) Ltd, Imbabala Logistics Management (Pty) Ltd

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TWISTDRAAI COLLIERY - THUBELISHA SHAFT: DIESEL WORKSHOP

project team

Developer/Owner:
Sasol Mining (Pty) Ltd

Architect:
Venter Architects

Structural Engineer:
RSV Enco / Goba JV

Quantity Surveyor:
Meyburgh & Associates cc

Project Manager:
RSV Enco / Goba JV

Main Contractor:
Group Five Housing

Steelwork Contractor:
Group Five Housing

Detailers/Detailing Company:
Group Five Housing

The new Thubelisha and Impumelelo coal mines will supply Sasol's coal-to-liquids (CTL) operations in Secunda. Thubelisha is expected to produce about 10.6 million tons of coal per year.

The project, at a cost of R3.36 billion, includes the development of service, ventilation and decline shafts, as well as materials handling systems and all mine infra-structure needed to support operations. The placing of shaft infrastructure was done carefully to avoid negative environmental impact on the few drainage line wetlands in the area.

The diesel workshop is one of the largest surface infrastructure buildings on the site. The workshop measures 132m long x 19m wide and incorporates two suspended slab mezzanine office areas, as well as two external cantilever canopies on the south side of the building.

To allow for thermal expansion, the roof structure is split in the middle with two braced bays on either end. Most of the workshop is constructed from hot-dip galvanized (due to Secunda's corrosive environment), hot rolled I-beam sections which are well suited for their use in crane supporting structures.

The building is designed for a 20ton crane (double girder box type, with a span of 18.15m) to travel along the length of its 120m long runway. To allow for access to service the crane and its running parts, a crane platform with access ladder is positioned on the north side of the building. Straddling the crane runway path are access walkways or surge girders (for lateral crane rail forces) made up of Vastrap plating and channels on one side of the main crane gantries.

Eighteen roller-shutter door bays on the north side and four on the south side of the building allow for access by heavy duty mining vehicles to the workshop. To drain away wash-down effluent from the vehicles inside the workshop, drainage channels are cast into either side of the concrete floor.

Translucent sheeting is installed, running down the length of the roof to allow for natural lighting during the day while ridge ventilators keep the inside temperature of the workshop within comfortable limits.

The push into the Sub-Saharan region by many South African, and foreign steel fabricators continues unabated with many focusing on the continuing opportunities in Mozambique.

Recently the ISF participated in the third Mozambique Mining & Energy Conference and Exhibition (MMEC) in Maputo and the interest from many leading South African companies was significant.

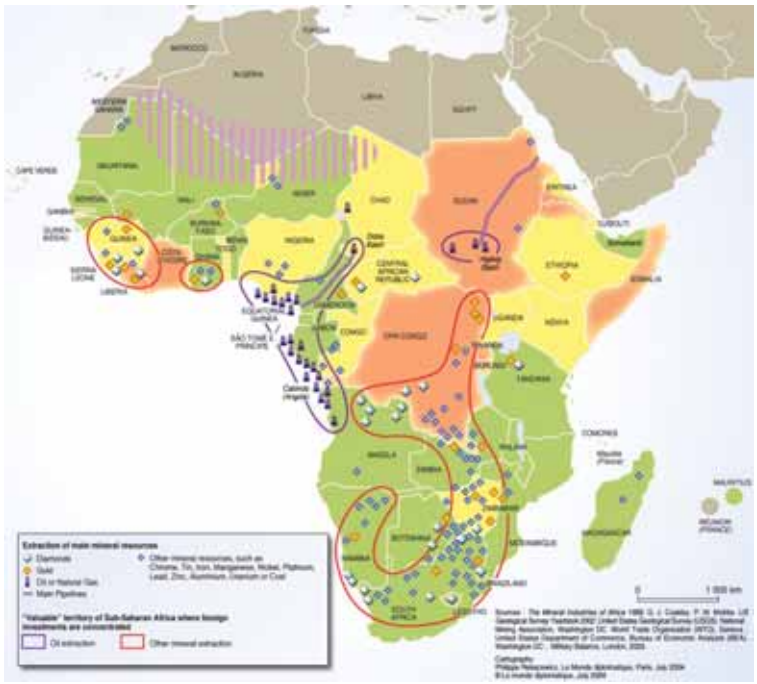
The MMEC is the premier event focusing on the Mozambique mining, energy and oil and gas sectors and their sustainable development. This year it attracted a large group of international investors, mining experts, and, of course steel fabricators, including many South African companies whose proven expertise in these areas is sought after.

One of these companies was the Cosira Group, which is upbeat about the opportunities in Mozambique. According to Francis Braz, MD Cosira Mozambique, the company is actively engaged in talks with clients involved in mining, energy and ports infrastructure as well as engineering project houses.

"Although Mozambique's traditional partners have been China (whose trade with Mozambique increased by 800% in the last decade), Europe, Brazil and India, we are making excellent headway," says Braz. "For example last year (2011) Cosira delivered more than 10 000 tons of steel to the Moatize coal projects alone and we should see this easily surpassed this year."

Braz paid tribute to the ISF for helping to set up opportunities for his and other South African companies both in Mozambique and throughout the world. "The ISF does relentless networking and the success of many South African steel fabricators in being able to compete with the giants like China, Europe, India and Brazil is in no small measure due to their efforts," he says.

Tass Engineering MD, Tim Tasioulas, agrees saying that the ISF's contribution has been significant. "Networking has been the key to their success with South



Neels van Niekerk, ISF Director.

COMPANIES FOCUS ON MOZAMBIQUE AS SUB-SAHARAN DRIVE CONTINUES

The African situation is enticing for South African exporters. New coal mining in neighbouring countries like Mozambique is booming and the discovery and capacity confirmation of new offshore gas fields around all the other Southern African countries signal the start of a great new Southern African industry.

Francis Braz, MD Cosira Mozambique

Tim Tasioulas, MD Tass Engineering.

African fabricators and for us this has been most helpful in Mozambique where we benefited from being introduced to the MMEC by the ISF and meeting a host of potential clients. We are currently following up on some interesting leads and we're impressed by potential in that country," Tasioulas says.

Mozambique's economy continues to perform well growing by estimated 7.5% in 2011 and mega-coal projects in Tete province adding substantially to exports in 2012. Mining investor analysts and banks estimate that the total value of mining projects in 2011 across seven commodities in Mozambique was US$11.6 billion of which the coal sector accounted for US$7.1 billion. Mozambique remains a preferred and secure destination for investment.

In terms of the ISF, there has been a significant increase in companies applying for membership of the ISF the past year because of four main reasons:

1. A number of fabricators have recently made major investments to increase capacity in order to be able to take part in the Medupi and Kusile power station projects. They are now becoming concerned as to what will replace this additional created capacity, once the fabrication for the power stations is completed.
2. Over at least the past decade, the South African mining industry dwindled in attractiveness to global investors. Today South Africa ranks 54th out of 93 on the Fraser Institute Mining Survey in attractiveness as a mining destination and new mining projects have become scarce. Fabricators are concerned that once all the fabrication for the new coal mines that will service the new power stations is completed, there will be no new, substantial mining projects taking its place.
3. The global meltdown has also had its effect on South Africa. The low number of local industrial and commercial projects requiring structural steelwork in the coming year is of growing concern.
4. In contrast to our local scene, there are daily reports of increased activity in the mining as well as the petroleum and gas industries worldwide including in Africa.

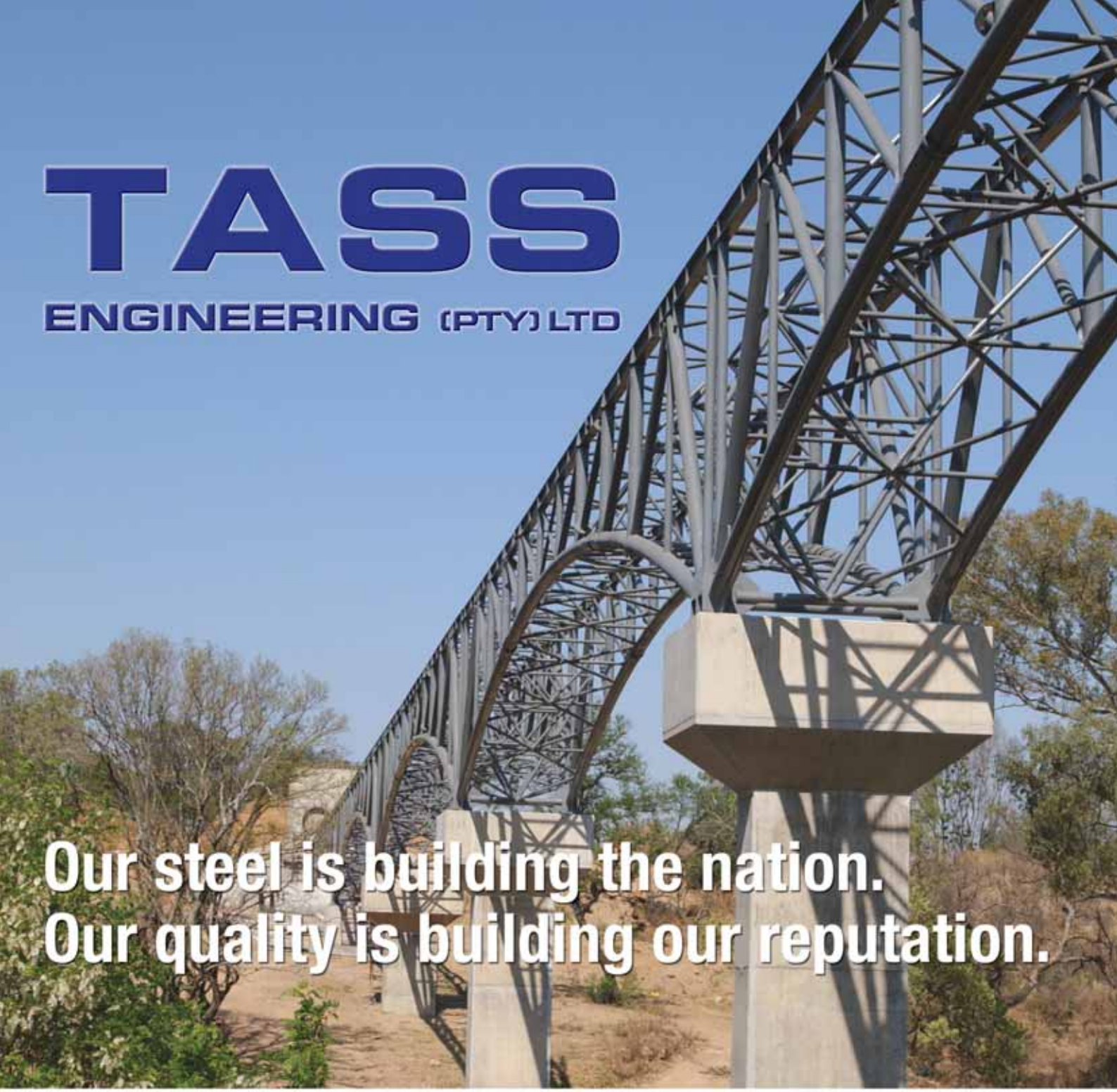
The African situation is enticing for South African exporters. New coal mining in neighbouring countries like Mozambique is booming and the discovery and capacity confirmation of new offshore gas fields around all the other Southern African countries signal the start of a great new Southern African industry.

The mining of precious and base metals in most of the Southern African countries is moving into a boom phase and the interest in the Uranium deposits of Southern Africa has never been higher. This positive outlook is the same for the countries of Central and West Africa, which are, in addition, also benefitting from a large number of iron ore mining projects.

About forty countries in Africa have a higher estimated growth rate than South Africa and there is a direct relation between the steel consumption and the growth rate of countries.

While the burgeoning growth in other markets entices our exporters, the current weakening rand is a long-awaited and welcome contributor to the prospects of even further increases in structural steel exports. Export of fabricated structural steel (HS-code 37.08) dropped from a peak in 2008 of well over 200 000 tons p.a. and settled at an average of 150 000 tons p.a. for the following years. The ISF is confident that structural steel exports will reach the 200 000 tons p.a. mark again within the next 18 to 24 months as competitive and entrepreneurial companies position themselves to dedicate a substantial proportion of their fabrication capacity to exports accompanied by focused and aggressive marketing campaigns. These companies will undoubtedly survive the next decade, while the future of the others who are not that proactive, is more uncertain according to the ISF.

ISF group events and missions this year have included, apart from Mozambique, countries such as Botswana, Turkey, Tunisia, Canada (oil sands), Canada (mining), Tunisia (African Development Bank) and Chile as well as our own iconic Mining Indaba in Cape Town in February 2012. Later this year, the ISF will lead the annual pilgrimage to the Africa Down Under mining event in Perth and also take part in Minexpo (USA), Midest (France) and Wapic (Nigeria) as well as visiting Senegal. Visits to Uganda, Rwanda, Burundi and South Sudan are in the planning stages.



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- Cradlestone Mall - Sasol Pension Fund
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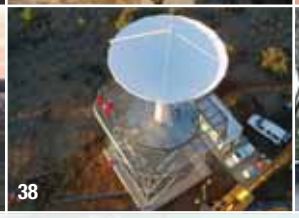

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14 Stellar Wholesale City
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A SUMMARY OF THE WELDING WORKSHOP PRESENTED BY BOB SHAW

By Spencer Erling,
Education Director, SAISC

I am sure that every person who attended the Bob Shaw workshops, irrespective of their interest in welding, i.e. designer, fabricator, inspector, end user came away having learnt a tremendous amount. Speaking for myself, it was a pleasure to listen to Bob's easy style of delivery and learn so much at the same time.

What a month May was for visiting American experts to visit South Africa to share their knowledge with us. Firstly there was Don Allen who came to talk about multistory light steel framed construction (see article on page 18) and then we were lucky enough to have Robert (Bob) Shaw, an expert on the AWS welding specifications and bolting issues, who did a number of one day workshops in Cape Town, Durban and Johannesburg on the welding issues and one talk in Johannesburg on the bolting issues. The seminars were hosted by the Southern African Institute of Welding (SAIW).

This article is a summary of the welding workshop. Bob emphasised the differences between the ASME (American Society of Mechanical Engineers) boiler pressure vessels and piping standards and the AWS structural standards. This article concentrates on structural issues.

TOPIC 1: STANDARDS AND ACHIEVING THE RIGHT QUALITY

To start with Bob tied together AWS, SANS10162 design code (which is identical to the Canadian CSA16), SANS2001 CS1 construction requirements and then went straight to the quality requirements confirming that the (structural steel) contractor is required to do all inspection requirements of the above documents and the engineers specifications including (but not limited to):

1. **Inspection prior to welding**

a) Welder qualifications

b) Welding equipment

c) Consumables
   i) Welding rods and their storage
   ii) Gasses

d) Suitable weld procedure specifications (WPS) for the proposed joints

e) WPS settings for the machines (current, voltage, wire feed speed, gas flow etc)

A homemade welding machine - not great equipment!

f) Surface condition of steel to be welded
   i) Free of discontinuities
   ii) Unwanted dirt i.e. rust, grease, oil, paint etc, thermal cut edges cleaned
   iii) Condition of tacks, removed where specified

g) Fit-up of joints, root openings, weld access holes, condition of backing strips. Details of allowable inaccuracies of joint alignment were covered later in Bob's talk. The main ones are:
   i) Up to 2mm gaps in fillet welds (without increase in weld size) up to 5mm by increasing the weld size by the size of the gap. From 5mm to 8mm it is required that a backing strip be used.
   ii) For groove welds, root openings can be ±2mm out of tolerance, the angler of the groove -5° to +10°.

iii) Wind velocity, ambient temperature, minimum and maximum preheating requirements

2. Inspection during welding

a) WPS setting in production

b) AC/ DC positive

c) Travel direction for vertical up

d) Interpass temperatures

e) Changes in ambient conditions (wind, rain etc)

f) Welding techniques (electrode angles, stringer beards, sequence etc)

g) Interpass cleaning, inspection of profiles, NDT if required

3. Inspection after welding

a) Fabricated member tolerances (web/ flange distortion etc)

b) Delay before welding can be inspected (cooled properly to ambient temperature)

The requirements for visual inspection in AWS

Table 6.1 of AWS describes the requirements fully for visual and dimensional inspection. Bob discussed these in detail under Topic 9. Other than to generically describe them below, no details will be covered in this article. Table 6.1 is (like the rest of AWS D1.1) very clear in what the visual inspection requirements are and is covered in the Red Book with some detail.

a) Weld free of cracks

b) Weld size length and location

c) Weld profile

d) Weld appearance (appears to be fused where visible, overlap), weld craters, undercut, and porosity

e) Shape of beam notches (copes) - radius corners with no nicks in web

f) No unspecified welds, arc strikes, tack welds or construction aids (all ground smooth and repaired after removal)

g) Re-entrant corners

h) NDT if called up

i) Repairs, where required, to repair procedures

j) Welders ID/ weld map

k) All documentation in the data file, release notes

Quality plan (quality assurance system in American terms)

Quality plans have been covered in detail before in Steel Construction (copies can be obtained from spencer@saisc.co.za) so will not be repeated in this article.

Nevertheless, please "responsible engineer", be reminded that at the end of your project, in terms of the National Building Regulations you will be required to sign off the project as having been built to your design. I do not know of any method, other than a good quality plan (that is signed off as each activity has been properly completed), by which an engineer can possibly ensure that every detail as required in the design, the drawings, the engineers specifications, national codes and specifications and NDT testing are attended to correctly. It is at your risk to run any engineering without quality plans!

Bob spent some time on the document AISC360 which is their specification for structural steel buildings. Table N5.4-1 covers the inspection of welding (most of which is summarised above).

He then proceeded to explain that if your company is doing all the steps requiring inspection as described above properly, then the step to getting accreditation to ISO3834 quality requirements for fusion welding of metallic materials (welding process quality management) is not a big one.

I am sure that most of our bigger fabricators are aware that, in order to do work for Sasol, ArcelorMittal and Eskom (amongst others) in the future, you will be required to be ISO 3834 accredited (by the South African Institute of Welding - contact Sean Blake sblake@saiw.co.za). Consulting engineers in South Africa should also start specifying requirement for this accreditation to be sure that the welding is done properly on their contracts.

There are AWS specifications that set standards to cover the requirements for welding inspector qualifications. The Canadian welding bureau also

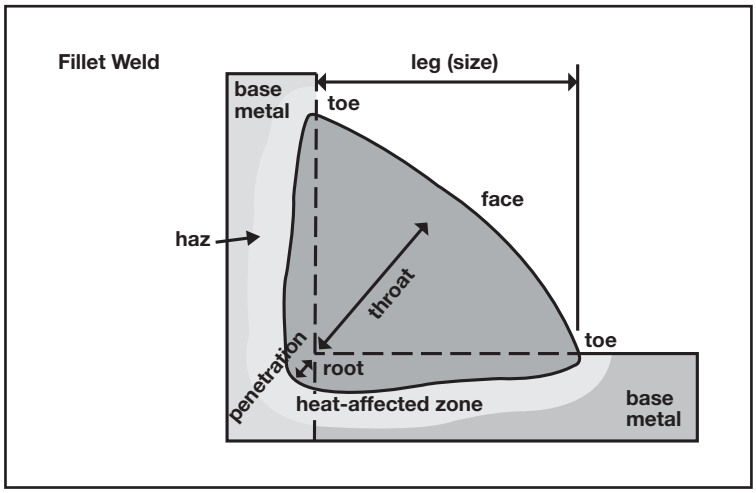

Figure 1: Fillet weld.

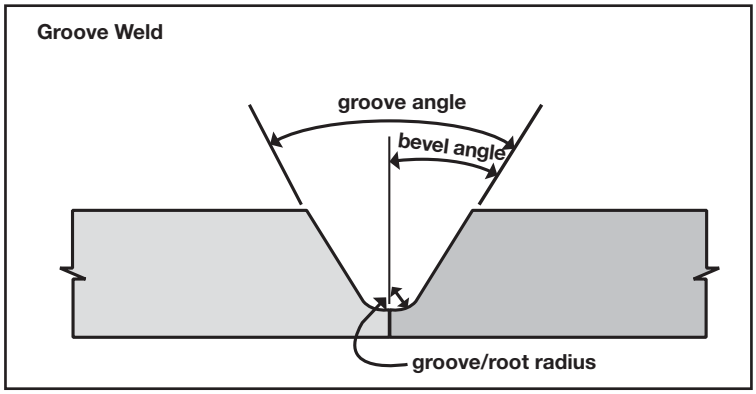

Figure 2: Groove weld.

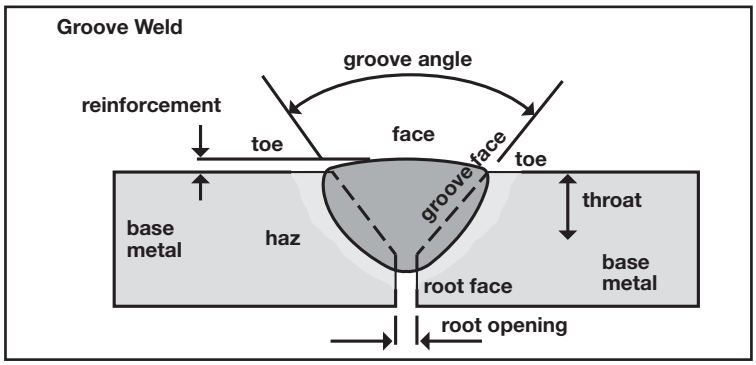

Figure 3: Groove weld.

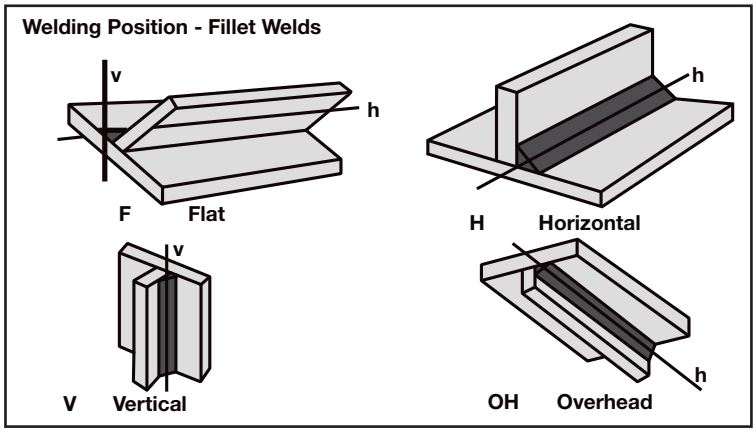

Figure 4: Welding position - fillet welds.

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has specifications for certification of welding inspectors. Once again the SAIW runs courses for such inspectors and keeps a register of such qualified persons.

TOPIC 2: 'WELDING NOMENCLATURE'

All the details will not be repeated in this article but a few are worth noting

1. **CJP groove welds**

a) 'Complete joint penetration' is the AWS term for what is loosely called a 'complete penetration butt weld' in South Africa.

2. **Fillet weld terms, groove weld terms and welding positions**

Whilst these were discussed in detail, *figures 1 - 4 (page 44)* say it all...

3. **Bob described the specification EN1011-2:1998**

a) Avoidance of hydrogen cracking was explained using *figure 5* and clauses used to calculate pre-heat temperatures, units of cracking susceptibility (UCS) and how to use the UCS results i.e.

b) UCS >30 low resistance to cracking; UCS <10 high resistance to cracking

c) Risks of cracking

TOPIC 3: MATERIAL STANDARDS (very briefly)

1) The welding process were described (not repeated here)

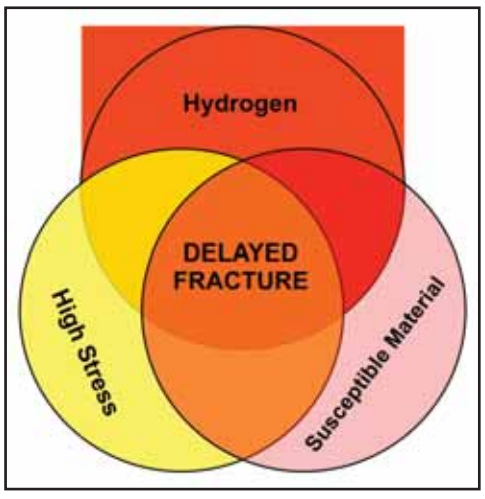

Figure 5.

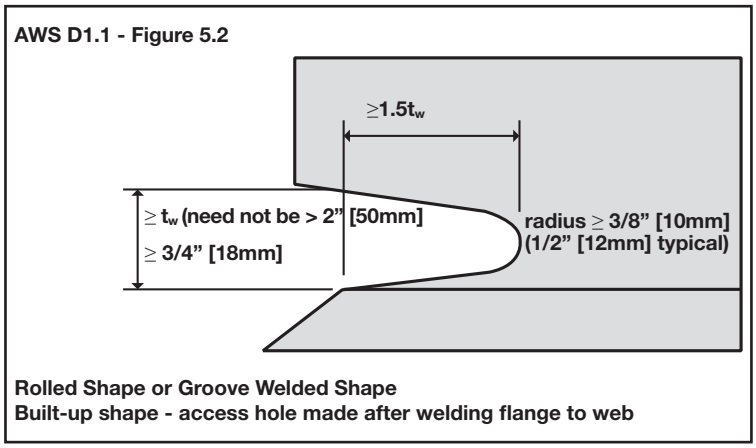

Figure 6.

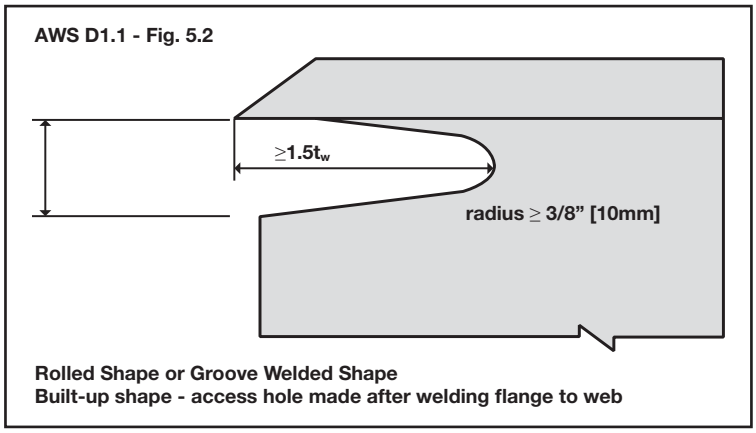

Figure 7.

2) Welding consumables (not repeated here, but adequately covered in the Red Book for non-alloy materials) and their care

3) Welding gasses

TOPIC 4: WELD PROCEDURE SPECIFICATIONS; TOPIC 5: WELD PROCEDURE QUALIFICATION AND TOPIC 6: WELDER QUALIFICATION

As the SAISC recommends that weld procedure specifications should be drawn up by specialists (welding engineers in particular) the details will not be covered in this article. The same specialist should assist in the qualification of the procedure and the welders. For typical workshop welding requirements a '3G' qualification is very suitable for welders since the test which is done in a vertical up direction, covers the welder for fillet and groove welds in plates up to 20mm thick in the flat, horizontal and vertical up welds. This qualification lasts indefinitely unless the welder has not done the procedure for more than six months or if there is some reason to question the welder's ability.

TOPIC 7: WELDED JOINT DETAILS

AWS has a multitude of so-called prequalified joints within the text that can be used for weld procedure specifications without further testing for a whole range of American steel grades. There is a simplified table of some of these details in the Red Book. Pedantic inspectors call for procedure re-qualification on the basis that South African steel grades are not covered by AWS. Future South African

construction specifications (SANS2001 CS1) will have a clause that allows pre-qualified AWS weld details to be used with South African grades of steel.

TOPIC 8: FABRICATION DETAILS AND QUALITY

Weld access holes were discussed as per *figures 6 and 7 (page 46)*.

The use of backing strips for welding CJP groove welds from one side was discussed. AWS details show how steel backing strips can be used and removed if required. AWS prequalified welds do not apply to copper and ceramic backing strips and procedures need to be re-qualified.

Extension pieces (run-on and run-off plates [*figures 8 and 9*] in SA welding tabs in the US) are recommended for continuous fillet welds to eliminate craters at the start and end of important welds. The requirements for removal methods (i.e. grinding and not breaking them off) were also described.

Tack welds play an important role in steel fabrication. Boilermakers should be qualified to do tack welds. If the tack weld is to be incorporated in the finish weld, then it must be done to the same procedure as the finish weld, failing which it should be removed before welding.

It is also pre-scribed that no welding be done at temperatures below -20°C (not an issue in South Africa), nor on wet or ice covered surfaces, nor in high wind conditions.

TOPIC 9: VISUAL WELD ACCEPTANCE CRITERIA

As mentioned above Table 6.1 of AWS, describes AWS requirements fully and accurately and are not repeated in this article.

What is of interest to note is that the EPRI (Electric Power Research Institute) has published a document called "Visual Weld Acceptance Criteria" which is available as a free download at hhtp://my.epri.co,/portal/server.pt?Abstractid=NP-5380-V1-V3(SET). The requirements are less onerous than AWS and has gained acceptance in the USA.

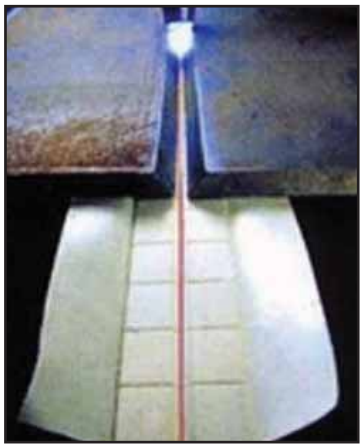

Figure 8: Ceramic liner and run off plates.

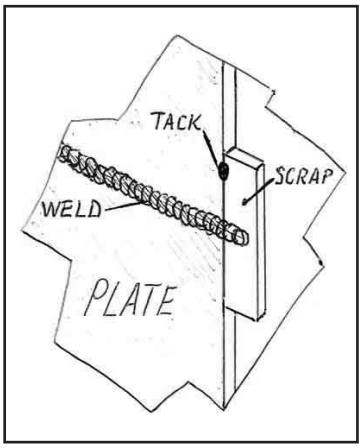

Figure 9: Run-off plate.

Workshop welding inspectors should be properly trained in the requirements of Table 6.1. Design or the responsible engineers need to understand this document as well.

TOPIC 10: NON DESTRUCTIVE TESTING REQUIREMENTS AND CRITERIA

Some information is covered in the Red Book. Details will not be covered here. Once again, consult an expert if exceptional quality of welding is required for advice on what testing methods apply and their relevant acceptance criteria.

The AISC N5 document mentioned above categorises buildings by risk associated. They are described by risk category from IV (essential buildings or high risk associated with collapse) down to risk category I (low risk to human lives). The document then advises on NDT by category.

TOPIC 11: SUITABLE INTERVALS FOR WELDING INSPECTION TASKS

The most important item covered in this section was a pie chart summary of case studies of weld inspection and testing which highlights the following major contributing factors to failure in quality of welds:

1) 18% Poor or incorrect fit up
2) 16% welding conditions (position accessibility)
3) 27% welders' skills

This summary is a simple guide where to spend your time checking.

IN CONCLUSION

I am sure that every person who attended the Bob Shaw workshops, irrespective of their interest in welding, i.e. designer, fabricator, inspector, end user came away having learnt a tremendous amount. Speaking for myself, it was a pleasure to listen to Bob's easy style of delivery and learn so much at the same time.

As South Africans we are truly grateful that Robert Shaw came to South Africa and shared with us his extensive knowledge of welding.

SOCIAL SNIPPETS

By Marlé Lötter,

DTI tour: Kusile/Genrec, 20 March 2012

IABSE Day 2012: 14, 16 and 18 May 2012

Neil Penson Breakfast: 10 July 2012

Hennie de Clercq explains some steel detailing complexities to Thandi Phele, Chief Director for Metals, and other delegates of the DTI in the steel yard at Kusile.

Two of the international presenters in the IABSE DAY 2012 series: From left: Naeem Hussain (Arup Hong Kong) with his wife Moira, Spencer Erling (SAISC) and Prof Yozo Fujino (University of Tokyo).

Serious guests considering serious content of labour related issues at the SAISC Breakfast Talk.

DTI SITE TOUR TO KUSILE AND GENREC, 20 March 2012

SAISC Industry Development Executive, Kobus de Beer, invited a delegation of the Department of Trade and Industry on a short tour to the construction site of the Eskom power station at Kusile near Bronkhorstspruit and subsequently to the workshop of Genrec in Wadeville. The aim of this visit was to provide more direct insight into our industry that would hopefully also play a role in decision making and regulations concerning imports. The SAISC thanks Genrec for the time and effort of their staff and access to their premises. Special thanks to Laurence Savage for a very concise overview presentation, Carlos Galego for accompanying the group and Monya de Kock for arranging catering and other logistics for the visit to Genrec.

IABSE DAY SOUTH AFRICA 2012 – JOHANNESBURG, DURBAN AND CAPE TOWN, May 2012

As in 2010 the SAISC assisted in hosting IABSE Day 2012 in collaboration with the Joint Structural Division.

The International Association for Bridge and Structural Engineering (IABSE) is a scientific and technical association founded in 1929. Its mission is to promote the exchange of knowledge and to advance the practice of structural engineering worldwide in service of the profession and society, taking into consideration technical, economic, environmental, aesthetic and social aspects.

The event was hosted in three cities: on 24 May at the Country Club Johannesburg, 16 May at the Bluewaters Hotel Durban and 18 May at the Protea Vineyards Estate Cape Town. The aim was to increase awareness of IABSE and also to expose South African engineers, contractors and architects to international structural engineering projects of interest through presentations by international and local speakers. The IABSE Day South Africa 2012 series was convened by Professor Jan Wium of the Department of Civil Engineering, University of Stellenbosch, and also the representative for IABSE in South Africa.

In conclusion of the programme delegates had excellent networking opportunities over cocktails and snacks – thank you BKS, cocktail sponsor for all three venues! We also acknowledge the support of FormScaff for providing all delegates with conference folders.

SAISC BREAKFAST TALK WITH NEIL PENSON, 10 July 2012

Industry participation in current labour issues is always a contentious topic. For that exact reason the SAISC hosted a breakfast talk with Neil Penson, chairman of the Constructional Engineering Association and also company secretary of the Babcock International Group. The presentation covered recent developments in the metals and engineering industry in respect of labour legislation, disputes between employer groups, the industry policy forum, training and the next round of wage negotiations. If you would like a copy of the presentation please contact Pamella Mnyanda at pamella@saisc.co.za .

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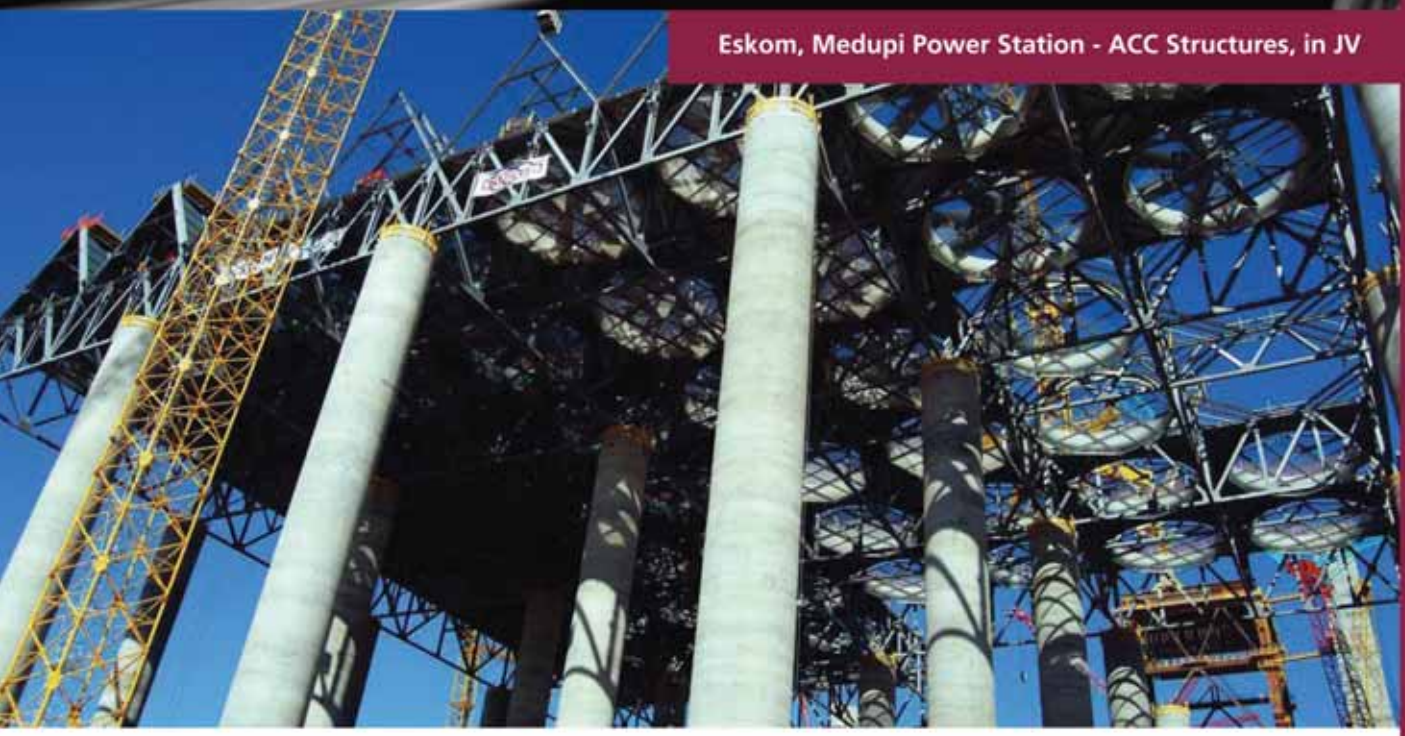

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