steel CONSTRUCTION

Volume 38 No. 2 2014

IN THIS ISSUE:

Refurbish with Steel

SOUTHERN AFRICAN INSTITUTE OF STEEL CONSTRUCTION

OFFICIAL JOURNAL OF THE SOUTHERN AFRICAN INSTITUTE OF STEEL CONSTRUCTION

Total process optimization

Bob (35) knows the most efficient way to design, detail, and fabricate a steel structure. His company uses Tekla to automate fabrication and project management through interfacing with MIS systems and CNC machinery. What's more important, sharing the Tekla model allows the project team members to stay in the building information loop real-time.

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EDITOR'S NOTE

I want to talk about the 'word' that we hardly ever mention in the magazine, but it is an editor's most dreaded word *(maybe some editors love it – maybe it is just me)*. Deadline. My sister has a coffee mug with the witticism "deadlines amuse me" on it. I thought about getting one too, but no, deadlines don't amuse me, they keep me on my toes. Few things would ever get done if it weren't for deadlines. Think of a construction project. Imagine a client saying:"Take as long as you want – there is no rush." They would still be building the Empire State Building...

So, one thing this issue of Steel Construction didn't do was make its deadline. I rarely share personal stories here, but the reason is personal. Despite all the contingency planning for the editor's absence due to maternity leave, Baby Max didn't fit into the schedule quite as planned. Any mother would have scoffed at my plans anyway. Apologies to our readers and advertisers, but we hope it was worth the wait.

Another looming *(but exciting for me)* deadline is the last day for submissions for Steel Awards 2014. We know it has been another tough year for the construction industry, but so far we have been surprised by the number of quality projects that came out of so-called tough years. So send us your projects no matter if it is just a small 'refurb' job. See page 43 for details.

In 2013 we received a wide variety of refurbishment and extension projects. In this issue we feature two of those projects that didn't quite win awards, but still have some interesting aspects and aesthetically pleasing features.

Also read the article on the SAISC Connections eToolkit (page 36) if you are an engineer responsible for connection design or better still call Amanuel at the Institute's office and take the eToolkit for a test drive.

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Join us on and YouTube

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Tyger Valley Centre refurbishment

Photographer: Chris Frylinck
(Runner-up Steel Awards 2013 Photo Competition)

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SAISC COMMENT

By Paolo Trinchero,
Chief Executive Officer, SAISC

One of the problems of being constantly bombarded by information and review is that our planning has become short term. We want a short term fix to solve long term challenges. Having completed such an exercise in January we were pleased to discover that a number of our strategies and goals remain the same. Some long term and unfortunately some short.

SAISC STRATEGY FOR 2014

The year is steaming ahead as we are now in April. Many of you may have participated in strategic reviews, SWOT analyses and the like already this year. We seem to be living in a world of constant change and constant challenges and we feel the need to review our circumstances on a daily, hourly and minute by minute basis.

One of the problems of being constantly bombarded by information and review is that our planning has become short term. We want a short term fix to solve long term challenges. Having completed such an exercise in January we were pleased to discover that a number of our strategies and goals remain the same. Some long term and unfortunately some short.

What stays the same?
We know we need skilled and talented people, so we need to nurture our staff particularly in the tough times. Education and training remain key objectives of the Institute with the results often seen in the future. It was heartening to note that many of our council and board members who are now senior decision makers in the industry came through some form of bursary and training scheme of the SAISC and its members. Let us make sure that we have a flow of similar individuals in place to keep the industry moving forward and ensure its continued success.

Research development and innovation remain key to ensuring that our industry remains competitive and relevant. So, it is important to provide a budget for these initiatives -unfortunately one of the first items to go when conditions are difficult.

What is changing and what are we doing about it?
For some time now we have been active in trying to promote local manufacture and protect the industry from a less than level playing field. Issues of localisation, designation, import tariffs and balance export tariffs are being worked on by our business development team.

There are a number of challenges around competitiveness and input costs which are always on the agenda. We see innovation playing a major role in moving forward.

Our digitization project is on track to provide a quantum leap in design and educational tools to assist engineers.

South African engineers, fabricators and detailers have been asking for digital versions of SAISC publications for a while now. The Institute is responding to this popular demand by releasing the first eTOOLKIT relating to connections. The digitization project goes well beyond creating PDF copies of the Green Book by providing new ways of solving standard connection types using simple, fast and intuitive tools.

The Connections eTOOLKIT provides a digital version of relevant chapters of the Green Book as well as brand new ways of presenting the capacities of simple, moment, splice and column base connections. While a table in a book can at best accommodate two variables, the creative methods used in the eTOOLKIT allow for multiple variable inputs and outputs. Such an approach allows for the entry of user specific connection types, with relevant capacity outputs that can handle combined loading and display controlling limit states.

Read more on page 36.

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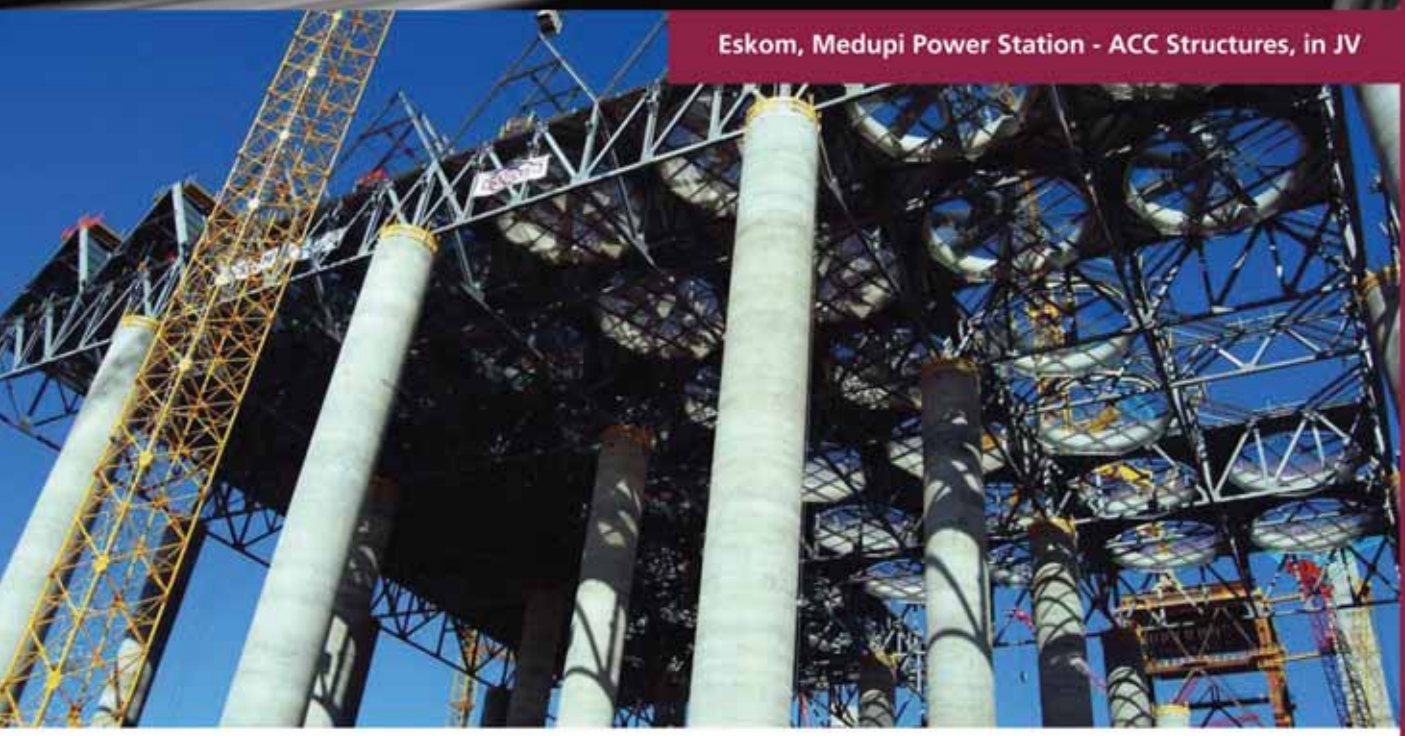
STEEL CONSTRUCTION AND ENGINEERING



Eskom, Medupi Power Station - ACC Structures, in JV

Established in 1987, Cadcon, as a vibrant and reputable entity, has grown into a leading steel construction, designing and engineering organization involved in major projects in and around Southern Africa and internationally. Cadcon operates from their 15 400 m² workshop and office facilities in Centurion, Pretoria, housing state of the art machinery and latest technology CNC plate, beam, angle, cutting, drill and saw facilities serviced by 20 overhead cranes. Cadcon has also implemented the FabTrol System providing drawing management, material nesting, purchasing, inventory control, production and CNC management, shipping and more.

Eskom, Medupi Ducting Supports, Lephalale

Planning and completion of various significant and complex national and international projects on time, for commercial, industrial, mining and plant sectors, serves as testimony putting Cadcon as a leader at the cutting edge, in a rapidly growing and competitive environment. Cadcon has valuable experience in exports of steel products internationally and strong innovative contributions to the whole of Southern Africa.

Overall Winner SAISC Steel Awards 2011
Sandton City - Protea Court Rooflight, in JV

Furthermore, Cadcon's unique packages include the design and supply of buildings through Mictec, Cadcon's in-house engineering design department. Additional services include crane, truck and trailer hire.

Cadcon operates their full production process from the delivery of raw material, fabrication, abrasive blasting, corrosion protection, erection and finishing to the proud delivery of the final product through their team of graduates and dedicated artisans. Cadcon's methodologies and processes results in their ability to provide their clients with turnkey solutions at optimum efficiency; **STRIVING FOR EXCELLENCE AND PEACE OF MIND IN STEEL CONSTRUCTION**, this being the cornerstone of Cadcon's success and competency.

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EFFICIENT ENGINEERING

QUALITY AND DELIVERY AT THE RIGHT PRICE ON TIME

By Viv van Zyl, SAISC
Membership Consultant

Efficient Engineering is as efficient as its name suggests. The company employs a team of highly qualified and experienced welders and boilermakers, who manufacture to international quality standards, using state-of-the-art machinery and industry leading manufacturing processes.

Efficient Engineering's facilities now boast a total of four buildings on three sites with a total of 21 800m² of manufacturing space in Elandsfontein.

Where does one start when describing an industry leader like Efficient Engineering?

Efficient Engineering is not just another name in the steel fabrication, CNC machining, manufacturing and heavy engineering industry. It is a company that prides itself with a team of highly qualified professionals, with more than 40 years of experience.

The company was founded in 1968, as a one man operation, based in Ophirton, Johannesburg with a rental space comprising of a 3m² bench. The owner, Giuseppe Cimato, manufactured the cabs and operator cabins for forklifts and trucks. He would cut, machine and weld the majority of components, while contracting the grinding tasks out due to his limited capacity.

Quality was Giuseppe's founding motto and the cornerstone he built his company on. As this small scale engineering firm started thriving, its focus shifted to heavy engineering. To keep up with these new developments, and the increasing demand for high quality workmanship, larger premises were required and the company moved to a new factory in Sebenza.

Their specialist capabilities include stacker reclaimers.

Efficient Engineering manufactures dragline buckets.

Giuseppe's son, Tony, joined his father in the family business in 1983, working as a boiler maker. In 2000, with over 16 years of hands-on experience in the company, Tony was given the opportunity to manage the business, after his father's retirement.

For the next six years the company grew from strength to strength and the Sebenza operation expanded into a 4 000m² facility. The constant demand from major industry players continued, and Efficient Engineering outgrew the factory space in Sebenza. A considerably larger production area was vital to Efficient's growth.

In October 2006, Phase I of the new factory was erected in Elandsfontein which could provide for a 6 300m² production area and Efficient Engineering's new head offices. These new facilities enabled the company to manufacture larger components, and allowed them to keep their machine blasting and painting capabilities.

The demand for Efficient Engineering's high quality workmanship continued and lead to the construction of Phase II at the end of 2008. Phase II added another 4 200m² of production space. A few months later, in March 2009, Phase III was completed, with a 2 000m² workshop dedicated specifically to sheet metal fabrications.

In 2012, Phase IV and Phase V were commissioned. Phase IV provides for an 8 600m² fabrication facility, administration offices, staff ablutions and a canteen. The fabrication facility houses a 100 ton crane with a 50 ton auxiliary hoist and height of 19m under hook.

The company's facilities now boast a total of four buildings on three sites with a total of 21 800m² of manufacturing space. Efficient's current through-put amounts to about 1 000 tons per month.

Efficient Engineering is as efficient as its name suggests. The company employs a team of highly qualified and experienced welders and boilermakers, who manufacture to international quality standards, using state-of-the-art machinery and industry leading manufacturing processes.

THE LIST OF MANUFACTURING CAPABILITIES INCLUDE:

- Reactors
- Pressure vessels – horizontal and vertical
- Heat exchangers – fixed, floating and U-tube bundles and coils
- Boilers – steam and mud drums
- Packed columns/scrubbers, dynamic structures etc.
- Evaporating and crystallizing pans
- Pressure filters/vacuum filters
- Distillation columns
- LPG bullets and road tankers
- Silos
- Base frames for heavy machinery of various kinds
- Storage tanks to API 620, API 650, BS 2654 and EN 14015
- Plant process piping
- Ducting
- Fired heaters and process piping
- Free-standing stacks
- Scrubbers
- Furnaces
- Hoppers
- Forced draft coolers
- Rotary kilns and base frames
- Modular electrical sub-stations
- Terrace coal and ash handling plants
- Bowls for off highway mining truck, rigid and articulated dump truck
- Wheel loaders and TLB buckets
- Dragline parts such as bases, booms, rigging, buckets
- Electric mining and hydraulic shovel spares
- Exploration and reduction drills
- Earth moving equipment
- Structural steel sections, e.g. conveyors
- Ship loaders and un-loaders
- Crane beams
- Continuous reclaimers and stackers
- Tippers and chutes
- Charge buckets etc.
- Bucket wheel scrapers
- Wagon tippers
- Tripper cars
- Service trucks
- Water tankers
- Photovoltaic structures and enclosures etc.
- ADT and rigid truck based water tankers
- Diesel bowers and service units

Efficient Engineering's proud products.

The company holds an ISO 9001:2008 certification as well as an ISO DIN EN 3834-2 certification awarded by TÜV Rhineland inspectorates.

Efficient Engineering recently went through a benchmarking audit and received favourable recommendations from the international group UNIDO SPX. They exceeded the benchmark average and are positioned well above industry norms.

Efficient is a proud contributor to South Africa's BBBEE programme and has a Level 5 BBBEE rating as well 'Value Added Supplier' status.

After establishing themselves as a leader in the fabrication of earth moving and materials handling equipment, Efficient Engineering opted to diversify into another area, namely the fabrication of pressurised equipment for the chemical, petrochemical and nuclear industries.

To be a leader in these industries, they had to appoint a competent team of engineers in the various fields of pressure vessel design, welding, quality assurance and control, procurement, project management, fabrication, inspection and testing. Efficient Engineering is now in the fortunate position to have all of these disciplines in-house and is driven by a team with many years' experience.

The company's long list of capabilities includes off-site modularised substation construction. They have been producing high-end modular and non-modular enclosures for use in a vast array of applications for many years. The design and fabrication of these units have been perfected over time and they are now in a position to produce a world-class product for their local clients.

Their list of facilities includes over 40 overhead cranes with some having a maximum capacity of 100 tons; blasting and painting under roof; machine shop facilities; in-house heat treatment; highly sophisticated software; state-of-the-art welding machines and equipment.

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- Franklin Electric (Howden)
- Foster Wheeler
- Group 5
- Hatch (TFM Mining)
- Hytec
- IFS (Industrial Fluid Solutions)
- IMS Engineering
- Joest (Vibrating Screens)
- KBR (Kellogg Brown and Root)
- Komatsu
- Kumba Iron Ore
- Malvern Engineering
- Megchem (Pty) Ltd
- Optimum Colliery
- PetroSA
- RBCT
- RNE Engineering
- Rockwell Automation
- Sasol Technology
- Sasol Synfields
- Sandvik
- Sirius Projects
- Schneider Electric
- Sedgman Mine
- Senet
- SH & E (Special Handling Equipment)
- Siemens
- SNC Lavalin
- Takraf (Tenova)
- ThyssenKrupp
- Transnet

Robor supplied the steel tube for the Melrose Arch Galleria Roof

[Tubular steel's creative dimension]

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INDUSTRY NEWS IN BRIEF

VOORTMAN STEEL MACHINERY OPENS VOORTMAN EXPERIENCE CENTRE

SAISC Member company

With the opening of a new showroom and training facility, Voortman Steel Machinery underlines its objective to offer customers only the very best. In the Voortman Experience Centre in Rijssen, the Netherlands, customers are invited to experience the steel processing solutions Voortman has to offer.

All Voortman's beam, plate, flat and angle processing machinery are ready to demonstrate their capabilities within the 2 500m² showroom. All of the machines showcased in the showroom are able to process steel, and Voortman is able to do so on demand.

Next to the showroom, the Voortman Experience Centre houses a 1 100m² office space with modern meeting rooms to discuss several solutions Voortman can offer for any steel business, as well as an auditorium for presentations to bigger groups.

Throughout the year, Voortman will organise several events for interested parties. The events will focus on specific issues and processes which are of interest to the visiting group.

Apart from events, Voortman will also organise training days for machine operators. With machines ready to be used and a fully equipped training room, operators and other employees will be trained to use the machines optimally. Their training department has carefully set up training schedules that will guide customers' staff through the machine and/or software capabilities, increasing their efficiency and knowledge about the machines.

The training includes theoretical, simulation and practical training, all conveniently in one venue.

Voortman Experience Centre.

SOCIO-ECONOMIC INPUTS INCLUDED IN GREEN BUILDING ASSESSMENT CRITERIA

The Green Building Council SA (GBCSA) has launched a new pilot Socio-Economic Category for Green Star SA rating tools in Gauteng, which will recognise the socio-economic achievements of green building projects.

Sponsored by Old Mutual Property, the new pilot Socio-Economic Category (SEC) is a world-first with the GBCSA taking the lead to develop this first set of socio-economic criteria for building rating tools focussed on a developing country context, as well as an international framework for adaptation in other developing countries, in association with the World Green Building Council.

Old Mutual Property Managing Director, Peter Levett, said he was delighted to be associated with such a progressive initiative. "The introduction of the pilot Socio-Economic Category is a critical move towards building a more sustainable property development environment in the developing world," he said. "We applaud the Green Building Council South Africa for leading the way in the quest for a more positive socio-economic impact from the property industry."

Registered green buildings are invited to test the SEC in the pilot phase, which will last until December 2014. Projects that achieve a rating for the SEC pilot will get additional recognition for this, alongside their Green Star SA rating.

Development of the SEC is a pioneering move that takes the GBCSA beyond assessment of traditional 'green' criteria for buildings. The inclusion of social and economic factors is important to address broader sustainability issues, which are particularly relevant for South Africa and other developing countries. Societal challenges such as poverty, unemployment, lack of education and skills, and poor health can all be addressed, to some degree, through the process of designing and constructing green buildings.

"In the same way that Green Star SA tools have inspired transformation towards 'greener' practices in the property industry, we trust that this Socio-Economic Category will help facilitate greater realisation of the socio-economic upliftment potential of building projects," says GBCSA CEO Brian Wilkinson.

The SEC has seven possible credits under Green Star SA. These focus on: employment creation; economic opportunity; skills development and training; commu-

nity benefit; empowerment; health and safety; and mixed income housing.

ILISO CONSULTING ENTERS INTO LONG-TERM PARTNERSHIP TO FORM NAKO GROUP

ILISO Consulting has announced that it has entered into a long-term partnership with Lategan Bouwer Engineers (LBE) and Triocon Consulting Engineers to form the Nako Group, the first African-owned, multi-disciplinary consulting engineering powerhouse.

Each of the consulting engineering companies brings with it a unique strength in one particular area of operation and with this in mind, the Nako Group will actively be pursuing contracts across Africa to deliver a range of specialised world-class engineering services.

According to Felix Fongoqa, currently the Executive Chairman of ILISO Consulting and the newly appointed Executive Chairman of the Nako Group, engineering is key to the opportunities for extensive infrastructure development across the African continent. "We believe the time has come for us to demonstrate that we can do things for ourselves as Africans, and take on the challenge to build a global giant out of Africa," says Fongoqa.

With a strong presence across Africa and a formidable team of experts, the Nako Group is comprised of a diverse and impressive engineering portfolio. Specialising in a number of different engineering disciplines, Nako Group has collaborated with strategic partners from various countries, including Botswana, Lesotho, Mauritius, Namibia, Nigeria, Swaziland, Uganda and Zambia, to deliver sustainable engineering solutions that are tailor-made for the African landscape.

"Our large team of innovative engineers is committed to providing technical excellence through the use of engineering solutions that are custom-built to the needs of each of our individual clients," says Fongoqa.

Felix Fongoqa, Executive Chairman of ILISO Consulting.

Some of the more notable client projects that the members of the Nako Group have worked on include: the award-winning Nelson Mandela Bay Stadium, the First National Bank & Wesbank Fairland Office Park, the Medupi Power Station, the Eskom Koeberg Nuclear Power Station, the Botshabelo Health Laboratories Complex for the Lesotho Department of Health in Maseru, the Natal Portland Cement's (NPC) R800-million expansion of its Simuma Factory in the Oribi Gorge area near Port Shepstone, the development of a Second Propylene Plant at Sasol in Secunda and the 500km Chobe/Zambezi Pipeline for Botswana's Department of Water Affairs.

Reflecting on the formation and philosophy of the new Group, Fongoqa says, "We look forward to taking Africa to new heights with our world-class engineering and project execution skills."

NEW AFRICA PRIZE HIGHLIGHTS ENGINEERING AS KEY DEVELOPMENT DRIVER – SOUTH AFRICAN ENGINEERS URGED TO SUBMIT ENTRIES

Engineers from South Africa and other Sub-Saharan countries are invited to enter a major new prize which rewards innovation and entrepreneurship in engineering.

The Royal Academy of Engineering (RAEng) announced the launch of the first Africa Prize for Engineering Innovation and called for entries from engineers connected with universities and research institutions in Sub-Saharan African countries.

The Africa Prize for Engineering Innovation is Africa's biggest prize devoted to engineering innovation, covering all disciplines from mechanical, civil and computing to biomedical, oil and gas, mining and electronic engineering.

"Engineering is crucial to social and economic development in South Africa and internationally," said Malcolm Brinded, a Fellow of the RAEng and Chair of the judging panel for the prize. "The Africa Prize for Engineering Innovation aims to recognise the importance of African engineers and to stimulate innovation and entrepreneurship, while encouraging young people to become engineers by creating successful role models."

"This new competition is designed to incentivise engineers to use their passion to develop innovative solutions to their country's challenges. The Africa Prize will demonstrate how engineering is at the heart of economic development."

Engineers from all disciplines are invited to submit innovations with a social, economic or environmental benefit. Entries must be early-stage innovations which have the potential to be scaled-up and are ready for commercialisation. The deadline for entries is Friday 30 May 2014.

A shortlist of entrants will benefit from six months of extensive mentoring, training and support in commercialising their innovation. The overall winner will receive £25 000 and there will be an exhibition of all finalists' entries.

The Africa Prize for Engineering Innovation is supported by the Shell Centenary Scholarship Fund, Consolidated Contractors Company, ConocoPhilips and the Mo Ibrahim Foundation.

Find out more at *www.raeng.org.uk/AfricaPrize or africaprize@raeng.org.uk*

INDUSTRY NEWS

A NEW MULTI-STOREY BUILDING IN THE VICTORIA & ALFRED WATERFRONT PRECINCT, CAPE TOWN

A steel framed composite structure was selected both for speed of construction and the reduced mass of the new three-storey apartment extension which is being constructed on top of an existing concrete structure.

As part of the SAISC's drive to promote steel in the construction of multi-storey buildings, Steel Construction is focussing on some success stories in the industry. Here is one example in the Western Cape where the speed of erection and the relatively light dead mass of the steel structure system was the ideal solution for an extension upwards of an existing reinforced concrete structure which allowed steel to show what it can do in multi-storey applications.

In July 2013 Union Structural Engineering was awarded the specialist steel sub-contract to detail, fabricate and erect 700 tons of structural steel for a new apartment building in the Victoria & Alfred Waterfront district in Cape Town. The development that is underway is for apartments in the Portswood Ridge and Breakwater precincts. They are due to be released for letting to the market in the third quarter of 2014. The Waterfront development company retains ownership of about 270 rental apartments (flats as we South Africans like to call them!) in the Portswood building. Set back from the immediate water's edge, these apartments will prove to be more affordable than the high-end apartments in the Marina, and should provide a further source of regular revenue for the Waterfront.

A steel framed composite structure was selected both for speed of construction and the reduced mass of the new three-storey apartment extension which is being constructed on top of an existing concrete structure.

The original existing parking garage consists of a reinforced concrete (RC) structure with columns spaced at 8m x 8.5m which layout is not suitable for apartment layouts. To overcome this problem, all loads from the new steel building are transferred through a series of RC transfer beams built on the roof of the existing parking deck. By providing the system of RC transfer beams the designers now had flexibility with regard to the column positions on the upper floors.

For the technically minded, the typical concrete floors to the apartment block have been design as a composite 140mm thick Bond-Dek slab and steel beam system. The Bond-Dek system was chosen for its reduced mass when compared

The new three-storey apartment extension is constructed on top of an existing parking garage.

The roof over the upper floor of apartments consists of light steel portal frames and cold rolled purlins.

to a conventional full thickness cast in situ concrete slab. By making the steel and concrete act compositely, it reduces the weight of steel used in the structure and of course the price thereof. Composite action was achieved by the use of shear studs on all steel beams.

The roof over the upper floor of apartments consists of light steel portal frames and cold rolled purlins which in turn support the insulation and roof sheeting. The external facade of the building is of cavity brick work that is supported by steel beams suitably designed for the extra loads and accommodates the brickwork using shelf angles at every level.

Internal walls are made of dry walling systems. The vertical bracing to carry lateral loads is carefully located and housed within the dry walling systems.

All in all, a win-win system for the whole contracting team.

SAMCRA TAKES THE FIRST STEPS TO REVITALISE AND ENHANCE THE STANDING OF THE METAL CLADDING INDUSTRY

By Dennis White, Director SAMCRA

This code of practice will cover the design, installation and testing for structural performance of all self-supporting, single skin, metal cladding systems as a whole and not just the individual cladding profiles.

SAMCRA
SOUTHERN AFRICAN METAL CLADDING AND ROOFING ASSOCIATION

Following the successful public launch of SAMCRA on 30 October 2013 work has begun on the final working draft of the new SANS code for metal roof and side cladding. This code of practice will cover the design, installation and testing for structural performance of all self-supporting, single skin, metal cladding systems as a whole and not just the individual cladding profiles. The code will address the use of graded material which is clearly marked (branded). The branding will include the name of the manufacturer of the coil, base metal thickness, mechanical strength plus coating type and thickness.

The code will include a section on the impact of atmospheric pollution and corrosion on the durability of the various coatings available for the cladding and fasteners. A section on the compatibility of materials used for ancillary items will be included together with a section on the impact of different types of insulation on the overall performance of a cladding system.

Requirements for the safe and proper installation of the cladding system which will ensure its weather tightness will also be included.

An addendum will detail procedures for the testing of a cladding system to assess its structural performance together with the compilation of information, derived from the tests, for the purpose of specifying a cladding system. Other addendums will contain data to assist specifiers and engineers on abnormal and special applications for cladding.

Other items on our agenda for 2014 are a series of workshops for specifiers and the publication of technical bulletins.

For more information on SAMCRA contact Dennis White at dennis@saisc.co.za.

Midvaal Structures

BEE Level 5 BWO company





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Plasma Table

Medupi Power Station

Python X

Medupi Power Station

- Offers an in-house detailing and architectural studio to assist customers from the early design stages right up to the final construction of their steel construction project.
- Works with a variety of roofing solutions, from small portal frame-type structures, through to 60-metre-span lattice girder designs.
- Mainly serves the commercial and industrial markets, with smaller contracts in the domestic market.
- Exports its solutions to various African countries – including Angola, Mozambique, Malawi, the Democratic Republic of Congo, and Swaziland.

Midvaal Structures specialise in the cost effective building of steel structures for churches, factories, warehouses, hangars, shopping centres and offices.

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POLASA – CREATING A PLATFORM FOR ENGAGEMENT TO SAFEGUARD JOBS

By Kobus de Beer,
POLASA Secretariat and Industry Development Executive, SAISC

The transmission line industry in South Africa is at a watershed, having developed and built up capacity over the last five years, it is now experiencing a dramatic reduction in volumes, resulting in job losses and business closures. The need to ensure that the learning curve that the industry and Eskom have paid dearly for is not lost due to lack of roll-out of new projects in the immediate future is paramount.

Previous articles explained that the transmission line industry in South Africa is at a critical point in its evolution in relation to the Eskom Transmission Build Programme. The industry is in crisis having suffered significant job losses in the last year and with up to 5 000 jobs at risk in the short term.

The articles explored the various challenges faced by government and industry. In order to balance the analysis, the industry review of Eskom's position is relevant and should stimulate healthy discussion, which is the main purpose of the industry paper that was prepared by POLASA.

ESKOM ENVIRONMENT

In addressing the Eskom environment, it is acknowledged that the views expressed are a perception of the issues that impact the industry. Eskom's participation in identifying and addressing these issues in order to create an enabling environment to undertake transmission line construction would be most valued.

Capex availability within competitive environment: The constrained increase of 8% granted by NERSA (National Energy Regulator of South Africa) poses a challenge to Eskom and results in an increase in the competition for available funds to address Capex. This is likely to impact on the TDP and the transmission line construction programme contained therein (indicative 1 000km per annum).

TDP: The TDP (Transmission Development Plan) clearly communicates the intention of Eskom's transmission team to the market and defines its chief priorities of providing sufficient transmission infrastructure to evacuate power from new generation sources and achieving N-1 grid reliability. However, a comparison between the TDP of 2009 and the TDP of 2012 reveals a slide in the roll-out of the infrastructure by up to three years. While the TDP is a high level plan, it is difficult to establish a link between this and actual projects that are being rolled out with any degree of certainty. In addition, is the TDP a commitment to build new infrastructure against a given time-line, or does it represent more of a statement of ambition?

The TDP is utilised by industry participants, as well as other stakeholders, to plan future investment and developments, and while dynamic adaptation to

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ever changing needs is imperative for a vibrant industry, a certain degree of consistency between the plans contained within the TDP and the projects actually issued to tender needs to be present.

"No risk" approach to projects: It is accepted that Eskom has commenced projects in the recent past while aware of certain risks to those projects around access and permitting. It is also considered to be a reasonable desire for Eskom to eliminate as much risk from its projects as practicable prior to construction commencement. Eskom's decision not to issue transmission line work for construction before all permits, right of way and risks are addressed is therefore understood.

However, the continued delays in meeting the multitude of requirements to eliminate such risks have resulted in the unintended consequence that this decision is now jeopardising jobs as well as the industry and its capacity to meet Eskom's transmission line construction needs in the short and medium term.

Compact achievement: In the financial year ending 31 March 2013, Eskom's compact with Government was to deliver 900km of transmission lines. In the period 737km were constructed or 82% of target. The requirement for the financial year ending 31 March 2014 is 837km of lines with more than 80% of this already contracted and under construction (these contracts were awarded in 2011) and it seems probable that the compact will therefore be met.

The compact for the year ending 31 March 2015 is not yet agreed, however, it seems unlikely that more than 200km of lines will be built unless more projects are issued to the market for construction.

Operational structure: It appears that an unintended consequence of Eskom's restructuring in the recent past has been the creation of additional hurdles in the efficient roll-out of projects.

Contractual framework of engagement: The New Engineering Contract (NEC3) was designed to facilitate better project execution based on the premise of a project manager who would act reasonably independently, in the best interest of the project. In the current contractual engagement, the definition of roles between Employer and the Project Manager are blurred. In addition, the committee approach to compensation events based on its current timing results in the delay of resolution of matters that are impacting (or may impact) the construction of the project.

Supervision: As with contractor Limited Duration Contract (LDC) employees, it is noted that Eskom employs its technical line supervision through consultants. In keeping with the approach of contractors within the industry, the consultants also appoint these supervisors on Limited Duration Contracts which exposes projects to a similar risk experienced by contractors in terms of productivity i.e. when no new future work is apparent, LDC supervisors may attempt to extend the construction period through mechanisms at their disposal to slow down the contractor.

Local labour: While recognising that the Eskom aspiration to empower local communities through which transmission lines are built is noble, the following

impacts are made on project execution:

- Minimum requirements to qualify personnel to undertake work on the lines are lengthy and expensive;
- Transmission lines traverse many communities and, when local labour must be drawn from each community to be crossed, this poses a logistical challenge;
- The continual introduction of new unskilled personnel into the construction process poses productivity and safety risks.

If this is one of the 'costs' of constructing transmission lines, then the above impacts need to

be acknowledged and joint solutions sought to address the challenges posed by the use of local labour.

Definition and stabilisation of specified requirements: Standardisation of project specifications in terms of technical and SHEQ requirements is seen as key to more efficient line construction. Contractors experience varied requirements, in spite of standard specifications, within Eskom in terms of method statements; health and safety; environment; and quality.

Distribution crossings: Increasing difficulty in arranging outages for the crossing of distribution lines would indicate a need to align priorities between new build transmission and existing transmission and distribution to facilitate better cooperation.

Time to get projects to market: Understanding that Eskom has an obligation within its mandate to ensure that its procurement process is above scrutiny, delays within the procurement process are a concern in relation to the urgent need to get projects into the market.

Line contracts:

- In order to reduce the lead time between tender issue and award, the time given to the contractor to prepare the bid is consistently reduced, while the period for tender evaluation is lengthened;
- Tender validity periods are typically exceeded with contractors asked to extend validity of their bids;
- The fixed completion dates on projects result in the lengthened tender period eating into the time available for construction.

Panel approach: The proposed 'panel approach' has been mooted as a mechanism to speed up tender award periods and is therefore viewed in a positive light. However, the original communicated award date was 1 April 2013, which was revised by an extension to validity requested by Eskom to 30 September 2013, six months later than originally communicated by Eskom.

CONCLUSION

The economic development imperatives in South Africa clearly demand a robust and expanded transmission line grid to enable the effective transport of electricity from the point of generation to distribution.

The transmission line industry in South Africa is at a watershed, having developed and built up capacity over the last five years, it is now experiencing a dramatic reduction in volumes, resulting in job losses and business closures.

The need to ensure that the learning curve that the industry and Eskom have paid dearly for is not lost due to lack of roll-out of new projects in the immediate future is paramount. The industry capacity and capabilities, which have grown exponentially over the last five years in order to respond to the needs of the country in general, and Eskom in particular, are at serious risk of being lost. This would not only have an immediate effect on the livelihood of several thousand South African employees and their families, but may ultimately hamper the achievement of the aspiration of "electricity for all" within the time frames envisaged by the NIP.

It is imperative that industry, in collaboration with its key customer Eskom and Government, find effective ways to avoid job losses while developing a strong and sustainable industry capable of delivering on Eskom's requirements, and matching its aspirations to support the SADC region and in turn Africa.

In light of the fundamental supporting role that transmission line infrastructure plays in the context of many of the SIPs identified within the PICC, it is proposed that projects to construct transmission lines be classified as being in the "national interest". In this context it may be possible to create an enabling environment to fast track the required permits, licenses, route acquisition and safeguarding of assets involved in the construction of transmission lines.

Industry is committed to making available appropriate resources and representatives to engage with the South African Government, Eskom, labour and other affected stakeholders to seek solutions to the current challenges experienced in the transmission line construction industry.

It is proposed that a workshop be convened at the earliest opportunity to give effect to the proposed engagement.

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THE GROWTH OF LIGHT STEEL FRAME BUILDING ACCELERATES

2013 OVERVIEW

By John Barnard, SASFA director

The total LSF market is forecast to grow by 15% during 2014, compared with 2013. The SASFA manufacturing members report good demand for middle and upper income housing, schools and classrooms, and roofing structures for low cost housing projects.

This report covers the building statistics for South Africa during 2013, and discusses a survey amongst LSF manufacturers regarding building activity during 2013, and their forecasts for 2014.

SUMMARY

The mass of steel used in South Africa to profile LSF sections increased by 6% during 2013, compared with the previous year. Exports declined by 30% largely due to the establishment of manufacturing capacities in the neighbouring countries, while the local market for LSFB grew by 21%, considerably more than the 7% growth recorded for the building industry (floor area of buildings completed) in South Africa.

As the volume of steel used purely for light steel roof structures remained fairly constant, all the growth came from steel used for complete LSF buildings, almost doubling the previous year's figure for this sector!

BUILDING INDUSTRY STATISTICS (STATISTICS SA)

The floor area of all buildings completed in South Africa during the past year, including additions and alterations, is reported to be 10 million m² – showing a welcome growth of 7% compared with that of the previous year. New residential buildings (including alterations) made up 68% of the area of all buildings completed, and showed a 3% growth on the previous year. The largest sector in the residential market was dwellings larger than 80 square metres, followed by flats and townhouses. A significant 24% of all buildings (residential and non-residential) completed, comprised of additions and alterations.

Industrial buildings and warehousing formed the major sector in the non-residential market, with 40% of the floor area, followed by office buildings (32%). The latter sector showed massive growth during the past year, more than doubling the floor area completed during the previous year.

Based on building plans approved, we can look forward to a 16% growth in building activity during the next 12 to 18 months, keeping in mind that there is a lag of some nine months between plans approved and buildings completed.

SOUTHERN AFRICAN LIGHT STEEL FRAME BUILDING ASSOCIATION

LIGHT STEEL FRAME BUILDING PERFORMANCE

SASFA has again carried out its annual survey to quantify the level of light steel frame building (LSFB) activity in the market. As in the past, SASFA approached the South African manufacturers of light steel framing to determine the volume of thin gauge, high strength, galvanized steel sheet they had processed during the past year, as a measure of the building activity in the industry.

The manufacturers reported throughput of 24 200 tons of high strength galvanized steel sheet, reflecting 6% growth compared with production in the previous year. Supply into the local market increased by an astounding 21%, while exports from South Africa into Sub-Saharan Africa declined by 30%. This decline can be ascribed to profiling capacity that is being installed in the neighbouring countries.

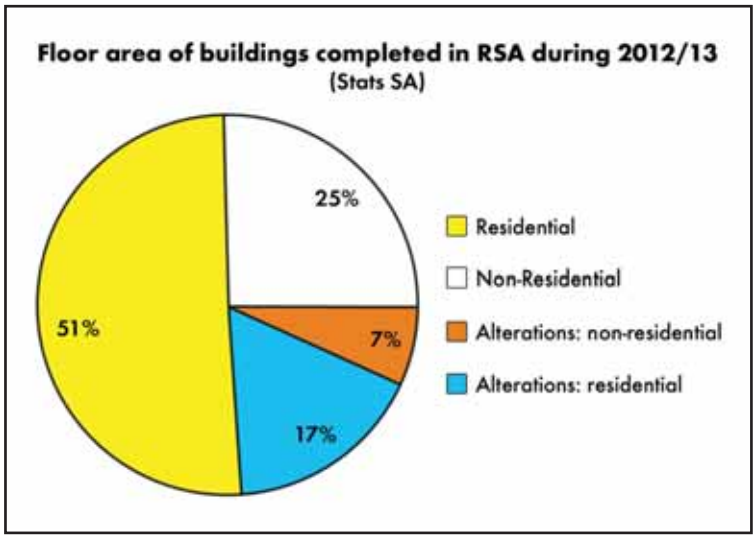
During 2013, LSF roof trusses used with masonry or in industrial buildings constituted 54% of locally sold LSF. Roof structures covering a total floor area of 1.31 million m² was produced, on par with that during the previous year. Based on Stats SA statistics for buildings completed (excluding low cost housing), light steel roof trusses have captured 13% market share during 2013.

According to industry feedback, complete buildings - wall panels with roof structures – covering a total area in excess of 500 000m² were built in LSF in South Africa during 2013, which is an 80% increase on the 2012 performance!

This growth in demand is remarkable, as the official building statistics supplied by Stats SA indicates a growth of only 7% in total floor area of new buildings completed during 2012/13. This once again underlines the rapidly growing acceptance of LSFB by architects, engineers, builders and clients.

But LSFB does not only consist of steel. Based on average ratios of walling area to floor area, LSF has in 2013 resulted in a demand for:

- 0.6 million m² of external cladding (typically fibre cement board),
- 0.9 million m² of bulk insulation (typically glasswool),



- 1.3 million m² of internal lining or gypsum board, and
- 0.6 million m² of vapour permeable membrane used in external walls.

The total LSF market (local and export, trusses and complete buildings) is forecast to grow by 15% during 2014, compared with 2013. The SASFA manufacturing members report good demand for middle and upper income housing, schools and classrooms, and roofing structures for low cost housing projects. A large affordable housing project in the Cape is being built using LSF. It is increasingly being used for external (and internal) walling of multi-storey office and commercial buildings. A growing volume of additions to existing buildings is also reported.

A number of project enquiries have also been received from neighbouring countries.

The fact that the government announced that innovative building technologies will increasingly be preferred for projects to build new schools, clinics and student accommodation, will add additional growth potential.

In view of all the above, the forecast of 15% growth in the use of LSFB in 2014 may in time prove to be conservative!

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SOUTHERN AFRICAN INSTITUTE OF STEEL CONSTRUCTION

Steel leaves a legacy.

This sheeting mimics the clouds, making the addition almost disappear on a cloudy day, and the light colour aids in temperature control inside.

AFRIKAANSE HOËR MEISIESKOOL PRETORIA

ADDITIONS TO THE EXISTING HALL

Text and photos supplied by Mathews & Associates Architects

Steel was chosen because it was the easiest way to connect to the old building. The structural steel made it possible to create the sculptural shape without having to alter the existing structure too much. By re-using the existing hall as much as possible the project proved to be sustainable.

Commissioned by the then principal Miss Steijn, the original hall was designed by Burg Lodge Burg (now Bild Architects) in the modern architectural language of the day, namely the late 50s. This was a conscious decision to purposefully not mimic the architectural style of the old buildings on site. With the latest additions, funded by an inheritance left by Miss Steijn, the architects wanted to continue in this bold tradition and maintain the visionary spirit of designing true to the contemporary architectural spirit while respecting and drawing on the values of the original building. Though the 55-year old hall is not protected by heritage legislation, an NID (notification of intent to develop) was submitted to the heritage agencies due to the architects' passion of preserving the modernist legacy and the memory of this iconic institution. Therefore, using the Burra Charter (the Burra Charter defines the principles and procedures for conservation of heritage places), contemporary design has been juxtaposed with the existing in such a way that the old and the new are clearly expressed and distinct from each other.

The program called for an extension to accommodate the entire matric class and a new foyer to compensate for the increase in numbers. It was decided to place a new gallery on top of the old hall, thereby saving land and retaining the 60s' facade. The architects reverted to a 'strap-on' concept, like Herzog and de Meuron's CaixaForum where the new was added on top of the old. On the exterior a steel channel is used to distinguish the old from the new – during the day a shadow line is formed, while at night a strip LED light pronounces the connection. Inside the existing concrete beam is exposed to indicate this connection where old and new never quite touch. Referring to Scharoun's Berlin Philharmonic Hall, and in keeping with the modernist philosophy, the acoustics, sight lines and ventilation were used as the design generators.

Steel was chosen because it was the easiest way to connect to the old building. The new structure was added on top of the existing concrete structure, with off-white sheeting used for cladding. This sheeting mimics the clouds, making the addition almost disappear on a cloudy day, and the light colour aids in temperature control inside. Ventilation louvers also let hot air escape during summer, while they are closed during winter.

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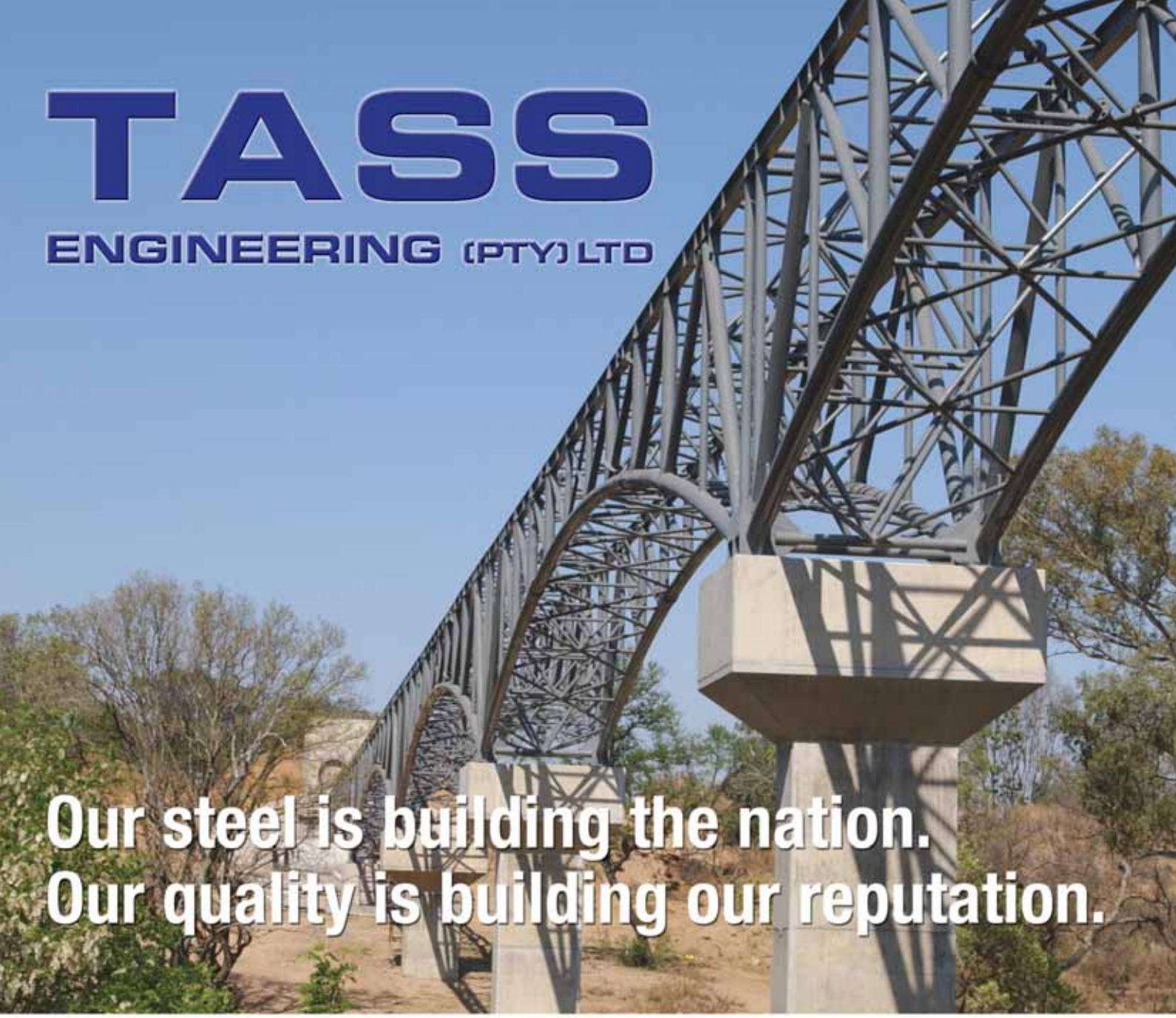

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- Mayfield Shopping Centre (350t) - Investec / AM Developments
- Razomart Warehouse (350t) - Razomart
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- DSTV Head Office, Randburg (100t) - Multichoice
- Sedibeng Brewery Extension (650t) - Heineken
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CaixaForum, Madrid.

Berlin Philharmonic Hall.

project team

Developer/Owner:
Afrikaanse Hoër Meisieskool Pretoria

Architect:
Mathews & Associates Architects cc

Structural Engineer:
Aurecon

Quantity Surveyor:
Pentad Quantity Surveyors

Project Manager:
Mathews & Associates Architects cc

Main Contractor:
C.F. Zietsman Construction

Steelwork Contractors:
Jomi Steel, Ranco Ondernemings

The structural steel made it possible to create the sculptural shape without having to alter the existing structure too much. By re-using the existing hall as much as possible the project proved to be sustainable, even though there were many problems and variation orders due to all the challenges of working with an existing building.

The shapes and materials of the existing building also generated the new facade, with materials used of the same palette and shapes of new elements, such as the new fire escape balustrade wall being influenced by the existing facade forms. Existing materials were re-used where possible, including the parquet floors and original entrance door, where future generations will pass through just as those from the past. The face brick used for the service duct contrasts with the existing, but also ties the building to the rest of the school, where a similar brick was used. With the existing organ being moved for acoustical reasons, it was refurbished in dark grey and renamed the *Phantom Lady.*

The internal staircase has a view window and skylight at the end, illuminating the passage by day and expressing the function at night. It also illuminates a graphic image of Miss Steijn, placed on the wall as one ascends the stair.

Art was used extensively as architectural elements. A new garden surrounds the *Bokkie* by Elly Holm, while the sculpture *Idealisme,* by Elza Dziomba, is visible through the new foyer while one stands on Willem Boshoff's *Kompasroos.* Further down the passage the poem *Ontkenning 3,* by Fransi Phillips, is visible and even the school's coat of arms, custom made with bent steel flat-bars, has a sculptural quality.

This project allowed for an iconic and poetic solution to a difficult problem, with the school children experiencing this sensitive design intervention first hand and experiencing how the building has been designed to instil confidence in the future, providing a sense of achievement and celebrating the continuing influence of Afrikaans as an academic language now and in the future.

A collage of the old school hall before the extension.

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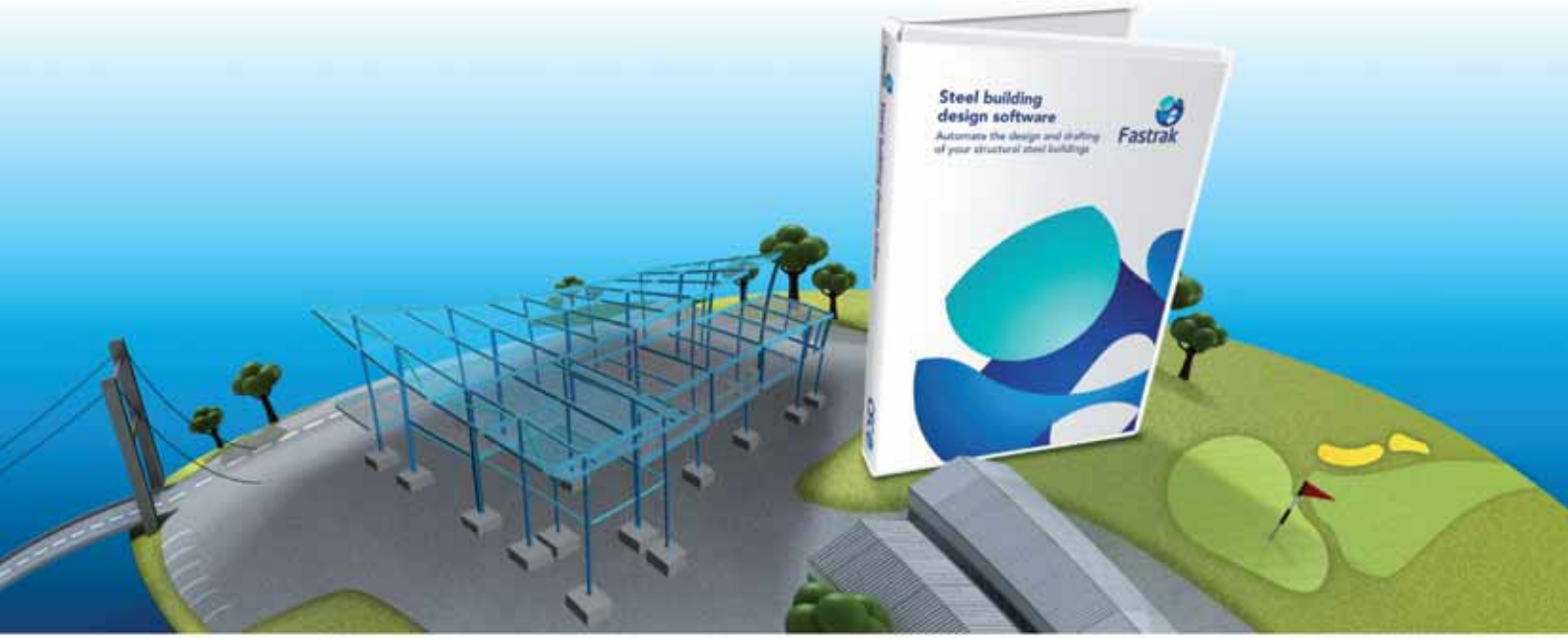

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Tyger Valley Centre Food Court after refurbishment.

TYGER VALLEY CENTRE MASTER DEVELOPMENT PLAN PHASE 1

Text and photos supplied by Bigen Africa Services

Structural steel was the natural material of choice since the new roof is a partial replacement of the existing steel roof structure.

The project involved the extensive refurbishment of the Tyger Valley Shopping Centre to refit and modernise the centre and lift the ambience of the shopping experience. The work in the arena (food court area), including the new structural steel roof and applied finishes, is the central feature of this refurbishment.

Structural steel was the natural material of choice since the new roof is a partial replacement of the existing steel roof structure.

The architectural roof design consists of a 22.5m wide curved roof running east-west with parallel beams at 7.5m, with no support steelwork visible across the 22.5m width to support the parallel beams. Six groups of three aesthetic struts each at 15m, fanned out from the top of the existing reinforced concrete columns. The only means of providing support to the parallel beams was to use the central strut of four of the groups of struts as structural support elements. The severity of the changes to the existing roof structure and the fact that the diagonal struts would have introduced unwanted forces into the existing girders, led to the decision to leave the outer two struts of each group as aesthetic elements only.

Tyger Valley Centre roof before refurbishment.

The new arena roof covers 1 181m² and was established by the removal of the old 20m x 22.5m pyramid structure and portions of the adjacent roof, including three girders. The existing roof was almost split in two and this had a significant impact on the lateral stability of the portions of existing roof that remained.

Support for the new arena roof had to be established at existing columns and girders. As such the new structure consists mainly of a series of steel columns fixed on top of the existing girders 22.5m apart, four curved beams at 7.5m, of which the central two beams span 15 m between support struts and terminate at a dropped section in the roof. From this drop in the roof two trusses span 22.5m to the edge of the existing arena structure.

Significant cross bracing was used throughout the new roof to ensure the stiffness of the new 'cap' placed on the existing structure.

The approximately 10m long support struts are 219.6 x 10 CHS and the 11.7m aesthetic struts 219.6 x 4.5 CHS. The support struts have a compression beam at the top hidden within the roof space. At the bottom ends where the struts connect at the existing girder supports, ties were introduced to keep the struts from 'kicking out'. The architect originally preferred not to have the ties, but in the end it was neatly integrated into the design. From a structural point of view, the decision was taken to limit the additional loads introduced into what remained of the existing roof structure. (The alterations to the roof already changed the balance of forces resisted by the reinforced concrete frame and an additional floor, the upper mezzanine level, was also being added.)

The connection detail of the struts and tie to the existing girder pedestal support produced a unique challenge. From an engineering perspective the connection had to be as compact as possible, but the architect required that the struts and ties terminate in front of the bulkhead. A two-tiered connection was developed. The primary connection plates were made up to fit 'inside' the existing pedestal where it was bolted for installation purposes and finally welded to the pedestal. Secondary connection plates were bolted to the primary plates and laterally stabilised by interlinking the secondary plates with angle struts. The secondary plates punch through the bulkhead where it forms neat protrusions and points of connection for the struts and ties.

The approximately 240m² roof link structure had to cut through an existing curved roof and be supported on the existing parking deck where the previous entrance structure used to be. The tall structure has approximately 12m clear from floor to ceiling. The stability for this structure was achieved by bracing the link roof back to the main arena roof and also fixing it to the existing Cape Town Fish Market (CTFM) structure. A floating ramp had to be constructed to link CTFM to the new upper mezzanine floor in the arena. Support for this ramp was achieved by providing solid rod hangers from the new roof link structure. At the lower end of this roof a glass box had to be accommodated to achieve the architect's vision.

The construction of the roof faced many challenges of which a few are listed below:

- While the entire arena was gutted and refurbished with roof construction taking place overhead, a thoroughfare through the arena had to be maintained to ensure a link between the shopping centre areas on either side of the arena, while also ensuring the safety of the shopping centre's customers. While the roof was being constructed through the rainy season, the provided access route had to be kept free from rain water penetration.

Tyger Valley Centre roof after refurbishment.

- The new columns on the existing girders had to be fixed by using existing bolt holes in the lattice girder top cord over a distance of 52.5m. The entire new structure hinged on the alignment of these columns so tolerances had to be carefully controlled. Site measurements were made very difficult since the shop drawings had to be completed prior to the existing roof portion being removed or any access being provided to this part of the roof structure. Fortunately the steel contractor who constructed the original roof was also appointed for these alterations and they still had the original shop drawings.
- The main roof beams had to be rolled to achieve the required curvature. Tolerances in the rolling process affected the connections between the curved beams and the columns mounted on the existing lattice girders.
- Building on an existing structure necessitates one to work with the inherited construction tolerances. As it turns out, the girders along one side of the roof were higher than those on the other side. This was not noticed prior to construction of the new roof. The height difference between the girders over 22.5m had a small effect and adjustments to the connections could be accommodated without too much drama.

project team

Developer/Owner:
Pareto Ltd / Metropolitan Life

Architect:
Bentel Associates International

Structural Engineer:
Bigen Africa Services / Nadeson Consulting Services

Quantity Surveyor:
LDM Consulting

Project Manager:
Msingi Construction Project Management / Ariya Project Managers

Main Contractor:
WBHO / Rainbow Construction JV

Steelwork Contractor:
Anchor Steel Projects

The outer two struts of each group act as aesthetic elements only since they would have introduced unwanted forces into the existing girders.

- After the use of a crane was initially abandoned and mobile cranes had access and reach limitations, the planning for construction was done based on manual labour for delivering the steel elements at working height and installing them. A scaffold structure (dubbed 'the bird cage') covering the entire arena was then built from the arena basement up to the new roof level. The client then requested that the completion of the arena roof was fast-tracked and the use of a crane became imperative. Additional money was made available and with careful design and planning, a crane base could be squeezed into a suitable position.
- The ties between support struts span 22.5m and had to be manufactured in 7.5m sections. Once in place on site, the tie portions had to be connected to each other and the supports, with hangers to support them at the splice positions while ensuring a measure of pre-loading.

Despite the challenges from a design and construction point of view, the project was completed on time and within budget.

The main roof beams had to be rolled to achieve the required curvature.

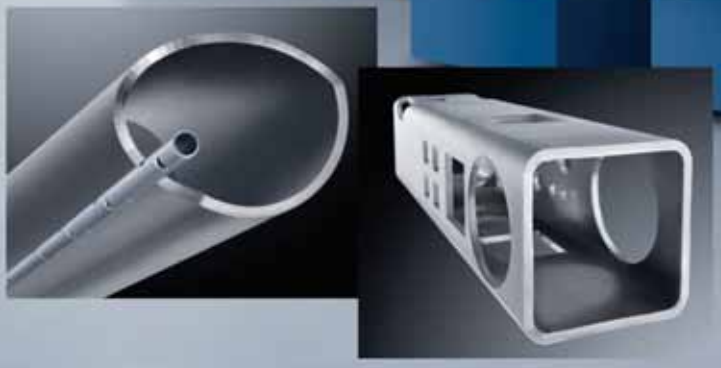
Specialists in 3D profiling

HGG

- Combining benefits of chuck-type machines for accuracy and benefits of roller bed machines for optimised logistics.
- Shorter fitting and welding times.
- Highly accurate cutting.
- Easy pipe movement of all lengths and sizes.

TRUMPF

The benchmark....



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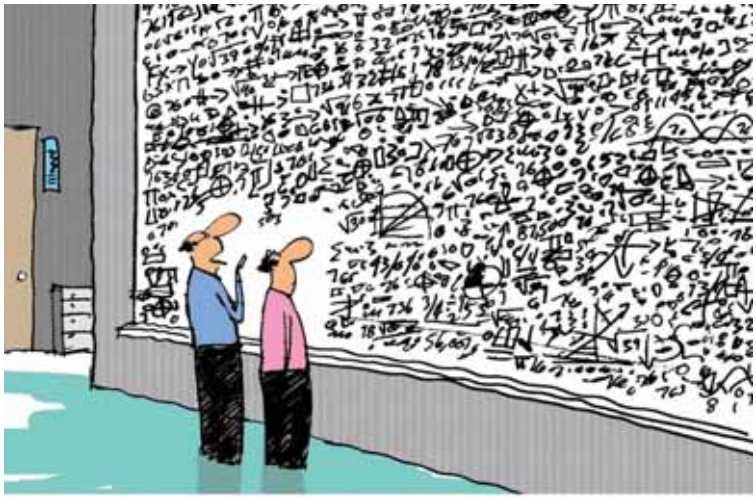
SPENCER'S THEORY AND GUIDANCE ON SELLING STEEL PROJECTS THROUGHOUT THE WORLD

By Spencer Erling,
Education Director, SAISC

Remember your first objective is to "get your foot in the door" to enter into negotiations and to bring home the job.



"...And that, in a nutshell, is my marketing plan. Any questions?

All business should be done in a face to face manner, with relationship building the prime objective. Foreign buyers want to meet, know and be assured that top management are totally involved in their project, they want to feel they are the most important purchaser/client in the world. If not they think "Oh these guys don't really care".

Neels van Niekerk and the ISF can really only be the catalyst for making contacts and introductions, remember it is the contractor who has to then run with the contact, who must turn that into work, the contractor does the work – not ISF.

So let's assume you go with Neels to a mining exhibition in ABC country. You meet, chat with and set up contact with the DEF purchasing company in that country.

When you get home, do you write a letter saying how pleased you were to make the contact and how excited you would be to get the opportunity to quote on some work for them, maybe including some marketing information about your company? If not, you jolly well should be.

Do you follow that up with a phone call a week, a month later, saying, "I hope you received my letter? Have you got anything that I can quote on? If not is there something coming up? If not do you mind if I make contact from time to time? Do your colleagues have something? Maybe you can give me few leads to your opposition?" And so on.

At last you get an enquiry. For goodness sake peruse it or delegate someone else to do it, the moment it comes in.

Now is the time for a quick response, thank the person whilst acknowledging the enquiry immediately once you have had a quick look, and if there are some questions ask them there and then and most importantly confirm you will quote on time or ask for extension if possible there and then.

If for some reason the quote is not for your company respond as early as possible, explain why, maybe even with a phone call, remember you do want to get his next enquiry.

Contact: Neels van Niekerk, Director ISF
Email: neels@isf.co.za
Tel: +27 (0)11 726 6111

I truly believe if you are keen to win a tender then you have to give that tender your best shot. It does not help you to use the shot gun approach and guess a rate for the job. Giving it your best shot means a detailed analysis, to the best of your ability, to determine what the job will cost you. Accurate assessment of material, labour, overhead, shipping etc. costs are essential for you to be as competitive as possible. And don't forget to ask for any export assistance you may be able to take advantage of.

Once you know what you think your costs will be, then you take a (risk based) marketing decision i.e. decide on a mark-up.

Always submit your price exactly in the format requested. Put yourself into the shoes of the buyer who gets a bunch of quotes not in his requested format making comparison very difficult and frustrating. You don't want him to think: "*&^%, I will never send that guy another enquiry."

If you want to propose an alternative (more cost effective or technically better) do so, but always price what was asked for as asked for.

Within a day or two now is the time for a phone call, "Did you get my quote? Did it make sense to you? When can I come and see you to discuss it? When can I call you again to see how I did?" Etc.

Remember your first objective is to "get your foot in the door" to enter into negotiations and to bring home the job.

Follow up contact is essential because even if you do not get the job, there is a good chance he will give you a few pointers about where you were too high, too slow, quality etc.

By the way, this will apply equally to our own market.

Now I know and have experienced the disruption to your working life (not even considering the cost of flying to somewhere) but really guys, if you want to get export work, you have to treat your customer the same as if he was in Springs, you would jump into your car at the drop of a hat if you thought it would bring in the work. The same applies to the guy in Lusaka or wherever.

Remember, building a relationship should be your first and most important step in exports, the next step is to keep that going. You will be amazed at how that leads to new opportunities. Success breeds success.

Now go out there and get some jobs!

WHAT'S NEW AND EXCITING IN THE PEDDINGHAUS LINE

By Spencer Erling,
Education Director, SAISC

Do not forget, you do not have to buy all the machines at once, but you can plan and dream for the future, because the increased profits you should achieve by a planned investment spread over years will pay for the second machine and the third and so forth.

Peddinghaus Corporation was founded in 1903. It is a family run business with the fourth generation now in control, Anton in USA and other countries, Cilla in Europe. Their early machines were hand operated punch and shears. It was in the 1930s that they mechanised these machines, so when I joined the structural steel fabrication industry in 1967, Peddinghaus were synonymous with and famous for their punch and shear range of machines.

Their next major move was in 1974 into (NC) beam drill lines. My own relationship with Peddinghaus was continued when we purchased a three-head microprocessor controlled drill line and hydraulic template plate and profile punch machines which were state-of-the-art for the time (we could not afford a nine-spindle drilling for which drilling data was inputted with paper-tape) and what a difference it made to our production capacity!

Peddinghaus became a member of the SAISC in 2012 and have been very involved in many of our projects both as sponsors and participants. It seems to be company policy to join the equivalent of the SAISC in each country they operate (BCSA in UK, Instituto Mexicano de la Construcción en Acero A.C. in Mexico, Deutscher Stahlbau Verband in Germany etc.).

What is so exciting to see is their enormous range of machines and models:

- Drill lines – four to choose from
- Plate processors – four to choose from
- Angle/detail machines – four to choose from
- Thermal cutting/coping – two to choose from
- Automated layout marking
- PeddiWriter
- Band saws – four to choose from
- Ironworkers (using the American term to describe punch and shear's machines) – three to choose from
- Shot blasters
- And software

So it is not surprising that I have opted to delve into just a few of their products highlighting what is new and exciting (you can of course visit their website www.peddinghaus.com for much more information and detail).

DRILL LINES

The drill line choices include the latest innovation in Peddinghaus drilling technology which is capable of drilling, tapping, countersinking, milling, and four-axis layout marking which could include a five station tool changer (making their three spindle machines extremely versatile), lead screw spindle motion, and an all new comprehensive clamping system.

Other developments in the drill line range include a compact shop footprint model, SignoScript carbide part marking, 1800 RPM spindle speeds, Smart Spindle II technology and automatically adjusting roller measurement micro-mist coolant.

DG1100-Hero.

Peddinghaus claims that with the combination of time tested Peddinghaus technology and these new enhancements makes their machines the most innovative drill lines in the world today.

PLATE PROCESSING

What surprises me most when I chat to companies who have invested in modern NC machinery that in some form or another, those that have gone the plate processing route comment that had they realised what a difference plate processing has made for their productivity, they would have bought that machine first! Or that it is the plate processor that works round the clock. Makes you think... (Well, at least I hope so!).

The High Speed FDB utilises an eight tool rotary tool changer that travels with the spindle throughout its full range of motion. It can offer sufficient power for milling, drilling, an impressive 2250 RPM drilling speed and more. Plasma and punching options, together with a small footprint model are available.

A new innovation from Peddinghaus, the HSFDB-C, now applies bevel cutting to their unique pass through design of material handling. Peddinghaus' plate machines utilise a unique roller measurement system, which allows for less operator intervention during the material handling process, and lower scrap ratios due to tighter nesting and unique cutting capabilities.

ANGLE DETAILING

Precision, accuracy, intelligence, and strength combined with comprehensive material dimensioning makes the Anglemaster-HD exceptional. By sensing the thickness of materials, the system is both the fastest Anglemaster offered by Peddinghaus, and the most powerful, capable of processing materials up to 25mm in thickness.

The Peddinghaus Anglemaster REVOLUTION model is a groundbreaking design that features

One of the Peddinghaus drill line machines.

an industry first: a rotating punch press capable of processing both legs of angle, part marking on both sides of angle, and processing plate material loaded from either side of the conveyor.

The Peddinghaus AFCPS-823 Anglemaster utilises the technologies of hydraulic punching and shearing with one unit for processing angle iron, channel and flat bar detail components.

THE RING OF FIRE

What a name, but what a machine! It is no ordinary coping (notching as we generally refer to it in SA) machine. The Ring of Fire is able to accommodate whatever bottleneck you may have.

So if you:

- Have an overloaded drilling machine? Send floor beams and miscellaneous sections to the Ring of Fire to expedite production.
- Cannot justify the cost of a miter saw? The Ring of Fire can cut to length, and miter cut any section with ease.
- Want to achieve four-axis layout marking? The Ring of Fire can perform layout on all four sides of a profile, eliminating the need for additional mechanisms for drill lines, or a standalone option that cannot perform other processes.
- Need clip angles, purlin cleats etc. but don't need an angle line? The Ring of Fire is ideal for all angle components, from angle bracing to clips - it can cope, notch, and place holes.
- Want to make lots of stair stringers, or maybe just want to notch beams?

This is another one of those “makes you think” machines...

THE PEDDIWRITER

Yet another industry first from Peddinghaus, the PeddiWriter does the work of an entire team of layout personnel. Whether it's accuracy or efficiency your business needs to remain competitive, the PeddiWriter provides both – streamlining production, and minimising the opportunity for error.

HANDLING

The amount of money we waste in handling our steel, picking it up and putting it down at the next

The PeddiWriter.

station etc. is dramatic. Peddinghaus has a wide range of solutions and of course will help you find the ideal solution for the (maybe crazy) configuration in your works.

CONCLUSION

Even if you think you are too small for modern equipment, think again. If you have older generation equipment, modern technology is making the new machines even faster (1mm a second drilling time in days gone by, today a 22mm diameter hole in 20mm plate takes 2 to 3 seconds.).

If you have not yet gotten into plate processing, you cannot afford to sit around any longer.

Do not forget, you do not have to buy all the machines at once, but you can plan and dream for the future, because the increased profits you should achieve by a planned investment spread over years will pay for the second machine and the third and so forth.

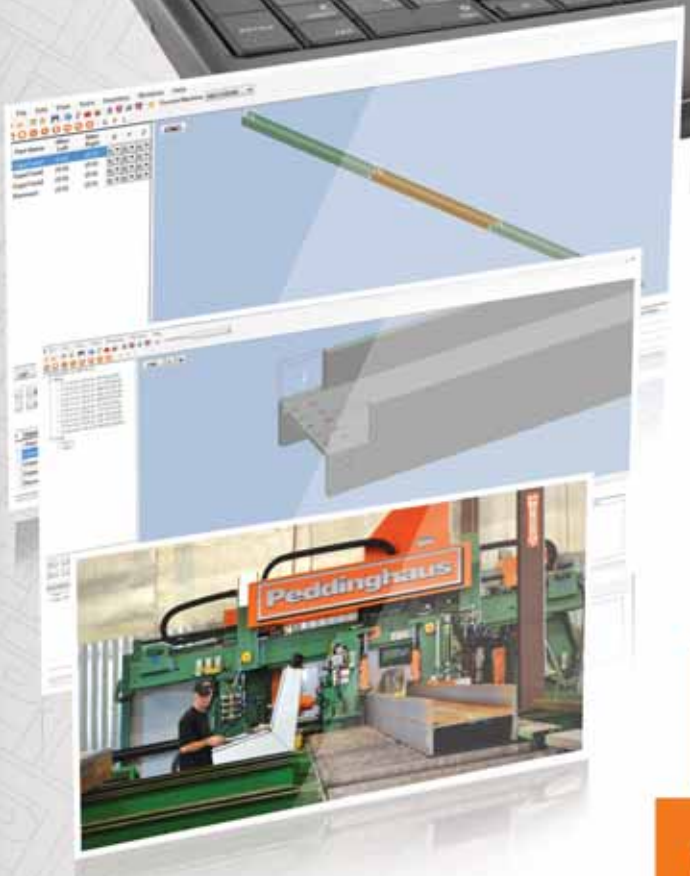
You can contact Peddinghaus South Africa through Patrick Pereira at patrick-pereira@peddinghaus.com or + 27 82 821 6974.

Ring of Fire.

Peddinghaus

3D CAD/CAM SOFTWARE

RAPTOR



- Faster importation, development, and exportation of part files than ever before
- Direct Tekla integration for streamlined programming of layout information, and cope data
- Import and export pre-nested DSTV+ files
- Apply automatic enhancements to large volumes of DSTV files with the click of a button
- Automatic batch nesting of existing part files
- Capable of importing and exporting Peddimat files for total compatibility with existing Peddinghaus machinery

- Ideal for programming:
  CNC Drill Lines | CNC Band Saws | CNC Angle Lines
  CNC Coping Machines | CNC Layout Marking Machines

www.peddinghaus.com/raptor

www.peddinghaus.com | info@peddinghaus.com | +1 (815) 937-3800
web email phone

THE SAISC CONNECTIONS eTOOLKIT

The net result is that too many steel structure designs are issued for construction with inadequate attention paid to the connections and their details. This is a serious concern for the SAISC and the industry and, so, after a tremendous effort by the SAISC team the new connection design eTOOLKIT was developed.

The SAISC has developed a digital tool that enables the structural engineer to design the appropriate structural steel connection at the 'press of a button'.

SAISC education director Spencer Erling says that this eTOOLKIT will revolutionise the steel construction industry. "Imagine a digital tool on your laptop, tablet or smart phone, that is so intuitive you will be up and running in a minute and within a few 'clicks' the capacity of the connection is displayed."

The entire process is as simple as it gets:

Click on the SAISC standard connection you want to use (there are 5 major groups, from which you can choose your particular requirement with sub groups e.g. major group, moment connections, sub group, with a haunch etc.).

Select the member sizes you wish to join (a full data base of sections is available to choose from).

Select the bolt diameters, number of rows of bolts and the plate thickness.

Push the calculate button and instantaneously the capacity of the connection is displayed.

But there's a lot more to this programme:

By placing your cursor on the box you are told what "the weak link in the connection is", allowing you to refine the connection design. This is really a 'jackpot' feature of the programme.

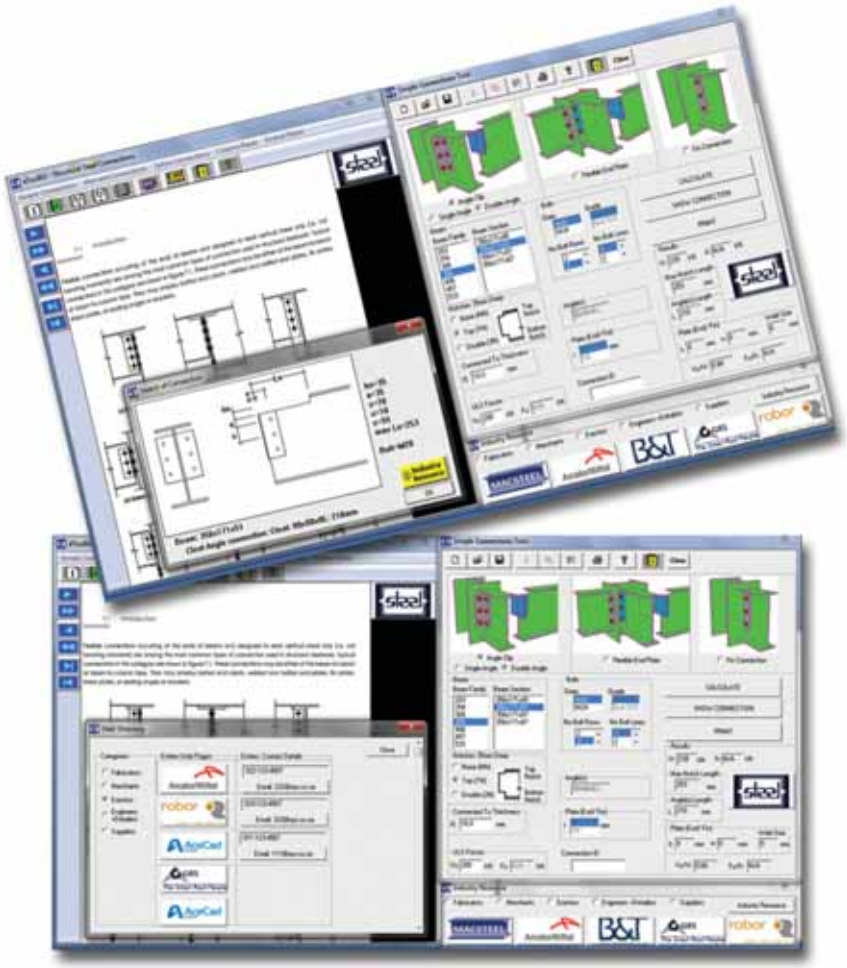
Once you know the "weak link" the process is just as simple:

Enter all the loads from the analysis (axial, moment and shear) and a design check is performed.

Click to see a to-scale sketch of your connection with all stiffeners, dimensions and weld sizes specified, which you will be able to transfer to the construction drawings!

Click to open examples, discussions and commentaries relating to your design so you can refresh your memory at an instant as to what was said in the SAISC Green Book about your particular design.

Save and/or print out summary of the connection design and file this in logical paper and/or electronic traceable manner.



A screenshot of the SAISC Connections eToolkit with advertising and sponsorship opportunities.

BACKGROUND TO THE CREATION OF THE CONNECTIONS eTOOLKIT

Connection design is a critical part of the structural steel construction process. The late Bernard (Tommy) Thompson of Dorman Long Africa famously said: "Steel structures do not fail because of inadequate member design; they fail because of inadequate connection design".

SANS10162:2005 sets down the rules for designing steel structures. To simplify the designer's life, the SAISC publishes The South African Steel Construction Handbook, popularly known as the Red Book, which turns the code formulae into tables. This 'bible' of the industry also provides guidance and general information to help the steel designer.

In 2013, to complement updated versions of the Red Book, the SAISC published a new hard copy version of the Green Book, which brought connection design up to date. The book is notable for its guidance and includes a plethora of simplifications, where appropriate.

"Once again, there is a great deal of text to explain "what and how" but also examples to guide the designer through the maze of formulae and methods," says Erling. The book has become a desktop companion to those involved in connection design and more than 300 designers have attended the SAISC courses on connection design based on the Green Book.

Notwithstanding the simplifications, connection design done by hand can be a laborious task, especially if the designer desires to optimise the efficiency (i.e. cost in rands and cents) of connections. "The net result is that too many steel structure designs are issued for construction with inadequate attention paid to the connections and their details. This is a serious concern for the SAISC and the industry and, so, after a tremendous effort by the SAISC team the new connection design eTOOLKIT was developed," Erling says.

"A tool of this type has been dreamt about for years and in April 2014 it will be publicly launched and the dream will become a reality," Erling concluded.

For more information, advertising and sponsorship opportunities contact Amanuel Gebremeskel at amanuel@saisc.co.za.

CALENDAR OF EVENTS

STEEL AWARDS – ENTRY DEADLINE
30 April 2014
For more info contact renee@saisc.co.za

SAISC CONNECTION ETOOLKIT LAUNCH
12, 13 and15 May 2014
Durban, Cape Town and Windhoek

SAISC LOADING COURSE
16 May 2014
Windhoek, Namibia

SAISC GOLF DAY
21 May 2014
Royal Johannesburg Golf Club

BASICS OF STEEL COURSE
9 & 10 July – Johannesburg
14 & 15 July – Durban
21 & 22 July – Cape Town

STEEL AWARDS 2014
18 September 2014
Johannesburg – Emperors Palace
Cape Town and Durban – Venues TBA

SAISC AND SUBSIDIARY AGMS
13 November 2014
Country Club Johannesburg, Auckland Park

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

DRILLING HOLES IN HARD WEARING PLATES

By Spencer Erling,
Education Director, SAISC

The more stable the machine, the easier to drill the hole! Machine tools such as boring mills and bed type milling machines will definitely improve productivity especially when using cemented carbide drills.

If you have ever tried to drill a hole in a hard wearing plate and found that after the hole starts no further progress is made, in fact all you seem to be doing is 'polishing' the inside of what has been drilled, then read on and find out what to do to prevent this from happening in future.

What does the name of hard wearing plate mean?

Hard wearing plate is sold under various trade names followed by a measure of the hardness. Common levels of hardness are 350, 400, 450 and 500 (Brinell hardness).

At entry level, what equipment should be used for holing hard wearing plates?

I guess there are very few fabrication shops that do not have a good old fashioned 'boiler shop drill' (otherwise called radial or column drilling machines) which can be set for various revs per minute as well as adjustable feed speeds. But without the advice that follows the scenario of the introductory paragraph is a common cause of failure.

The name of the game is to reduce vibration to ensure efficient drilling through the plates, and the way to do this is:

- Keep the distance from the drill head to the column of the machine as close as possible.
- It is important to securely clamp the plate to be drilled on steel blocks located as close as possible to the holes to be drilled.
- Minimise the distance between the drill tip and the support arm – most easily achieved by using very short spindle stick out and short drill bits.
- To prevent the drill bit from breaking, it is good practise to disengage the feed briefly just before the drill breaks through. Restart the feed when any vibration or play has ceased.
- It is important to use liberal amounts of coolant at the drill head. There are specially designed coolants that do improve productivity even though they appear to be relatively expensive. A suggested rule of thumb for coolant flow is the number of litres per minute = drill diameter in mm.

A radial drilling machine.

What about the drill bits?

For the occasional once off holes, standard HSS (High Speed Steel) drill bits are adequate.

For production runs HSS-E (micro alloyed) or HSS–Co (cobalt alloyed) drill bits are recommended. The 8% cobalt drill with a small helix angle and a robust core that can resist high torques is ideal.

Table of recommended drill feed speeds in mm/rev and the revs can be selected from the table:

Diameter	Brinell 350	Brinell 400	Brinell 450	Brinell 500
	Feed rate in mm/sec Speed in rpm			
5mm	0.07 / 760	0.05 / 570	0.05 / 445	0.05 / 320
10mm	0.10 / 380	0.10 / 290	0.09 / 220	0.08 / 130
15mm	0.16 / 250	0.16 / 190	0.15 / 150	0.13 / 85
20mm	0.23 / 190	0.23 / 150	0.20 / 110	0.18 / 65
25mm	0.30 / 150	0.30 / 110	0.25 / 90	0.22 / 50
30mm	0.35 / 130	0.35 / 90	0.30 / 75	0.25 / 45

What is the next step up from entry level machines?

The more stable the machine, the easier to drill the hole! Machine tools such as boring mills and bed type milling machines will definitely improve productivity especially when using cemented carbide drills.

In our industry holes will always be larger than 12mm diameter and so 'indexable insert drills' are recommended for high productivity at the expense of a wider tolerance than the slower brazed or solid carbide drills. Since most structural applications will be liner plates this lower precision will not be an issue.

- Once again coolant plays an important role in economical drilling of holes.
- Cutting speeds and feed rates are available on request from the writer.
- Counter boring, countersinking and tapping bits are available for cemented carbide bits. Tapping can be done in blind-hole or through-hole applications using the correct bits.

Still not coming right?

Contact the writer for useful trouble shooting suggestions.

The writer wishes to thank SSAB for this information which has been extracted from their brochure Eng10-2009.

ERRATA – SHOP WELDED SPLICES IN BEAMS:

IS THERE A RIGHT WAY OF DOING THEM?

By Spencer Erling,
Education Director, SAISC

This article appeared in Steel Construction no 1 2014 with some errors to the drawings. The editor apologises for this lapse in the standard of the magazine. We have published the complete article again with the correct drawings.

The SAISC gets numerous suggestions and/or requests to supply the correct detail for a shop welded splice for beams. Some of the proposals include:

Figure 1:

Z step in the middle of the beam

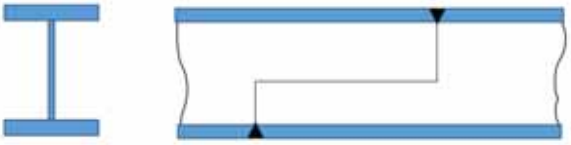


Figure 2:

Z step along the flanges

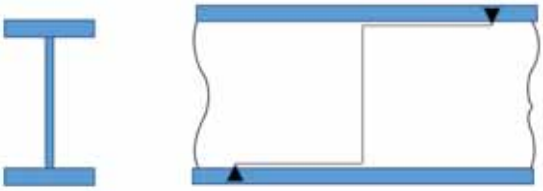
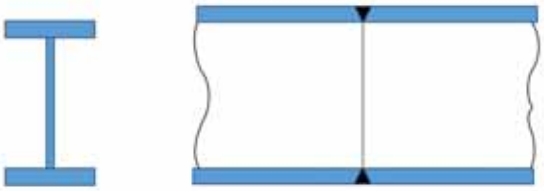


Figure 3:

No Z step



WHICH WOULD YOU CHOOSE?

In all cases we have assumed:

- That the correct weld procedure specifications are in place.
- That welders are trained and coded to work with those procedures i.e. we trust our welders.
- All welds to be complete joint penetration (CJP or full penetration butt welds as we know them).
- All welding consumables to be E70 or equivalent.
- NDT will be carried out for highly (tensile) stressed components.

Figure 1 - Why not?

1. The basis of this Z shape is that the additional welding (all be it on the neutral axis of the beam) will make the connection 'stronger'.
2. As an engineer looking at the stress distribution across the depth of the section you will expect and find that there is no stress on the neutral axis, so the weld will be of no benefit.
3. What about locked in welding stresses?
4. Which weld would you do first to minimise welding stress resulting from shrinkage when the weld pool solidifies and cools down? (weld sequence?)
5. Doing the weld C first leaving the rest of the web and flanges to follow.

6. Whatever sequence is followed the last weld will always be locked in and unable to contract during cooling resulting in (tensile) stresses in the weld. If they are large enough it will result in cracks in the welds.
7. Of the three examples this is not the worst case (see below figure 2)
8. Obviously the extra welding means extra costs.

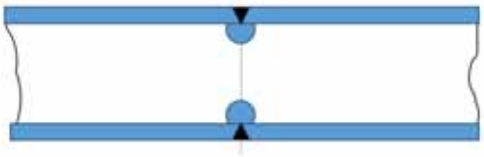
Figure 2 - Why not?

1. In this case, the extra welding does increase the connection strength. But what for? Having a weld strength exceeding the section strength is the same as having a strong link and otherwise weaker links elsewhere in the chain - it does not make the beam stronger.
2. The CJP welds under the flange will be very difficult to achieve.
3. The locked in stresses will be the worst for the three methods shown.

Figure 3 - Why yes, but what else do we need?

1. As the E70 welding consumables have an ultimate tensile strength that matches the strength of our S355JR steel, a CJP weld will be the same strength as the beam (all links in the chains are the same strength!)
2. The CJP needs the addition of mouse holes under the flange to make it possible to do the full penetration to the welds in the flanges (USA call them rat holes). AWS D 1.1 gives dimensions for the mouse holes (at least 25mm radius). The mouse holes make it possible to do the back grind into the root weld which is required to achieve CJP welds.

Figure 3a - Mouse holes shown



3. With the presence of the mouse holes, the shrinkage locked in weld stresses are minimised.

In summary, the only method that the SAISC advocates is the method shown in Figure 3a always subject to the following and all being correctly used:

1. Weld procedure specifications in place
2. Qualified welders
3. E70 consumables
4. Mouse holes
5. ND testing to highly stressed

SOCIAL SNIPPETS

By Marlé Lötter, Events Manager, SAISC

ISF STRATEGIC PLANNING SESSION

21 January 2014, Afrique Boutique Hotel, Boksburg

ABOVE AND BELOW: Members attending the ISF Strategic Planning Session of 21 January 2014 at Afrique Boutique Hotel, Boksburg.

SAISC STRATEGIC PLANNING SESSION

29 January 2014, CCJ (Auckland Park)

ABOVE: SAISC Council members who participated in the SAISC Strategic Planning Session hosted on 29 January 2014 at the Country Club Johannesburg (Auckland Park). The session was facilitated by Charles Dednam of Charles Dednam Research and Business Strategy Consulting cc (Back row, far right). with Kobus de Beer of SAISC.

ABOVE RIGHT: Lunch time at CCJ after strategic planning SWOT sessions.

DORMAN LONG / DORBYL GET-TOGETHER

27 February 2014, Harvard Cafe, Rand Airport, Germiston

BELOW: The Dorman Long / Dorbyl Get-together of 27 February 2014 was convened by Kobus de Beer of SAISC. Here are some of the 36 'old boys' (and a few girls!) with links to Dorman Long, Dorbyl or DSE, having a great time with former collegues at the Havard Cafe at Rand Airport in Germiston. Five of these loyal stalwarts of the structural steel industry were over the age of 80!

SAISC DONATION TO FOREST TOWN

BELOW: SAISC donated redundant computer equipment to wep@work, an initiative in partnership with the Forest Town School for learners with special needs, including cerebral palsy. They build and sell refurbished equipment to raise funds. The donation was received with truly inspirational cheerfulness. Read more about the wep@work and Forest Town: http://wepatwork.org.za/

SAISC BREAKFAST WITH FRANS CRONJE OF THE CENTRE FOR RISK AT THE INSTITUTE OF RACE RELATIONS

5 March 2014, CCJ (Auckland Park)

ABOVE LEFT: Frans Cronje, CEO of the Centre for Risk at the IRR, shared very special insights into the major trends that have shaped South Africa since the 1994 election, also offering interesting views of possible future scenarios for our country. In conclusion a presentation with panel discussion was conducted by Paolo Trinchero, Spencer Erling and Kobus de Beer of SAISC and Frans Cronje, focusing specifically on the past and future implications for the SA structural steel industry.

ABOVE CENTRE AND RIGHT: Guests at the SAISC Breakfast of 5 March 2014.

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Ceiling, partitions and commercial refurbishment
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Efuel Africa cc
LSFB projects
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Eight J Construction Projects cc
Residential and light commercial developments
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Ginger Projects (Pty) Ltd
Construction and landscaping
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Group Five Housing (Pty) Ltd
Developer and builder
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Halifax Projects
Supply and fit of LSFB systems
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Hazycrest Construction
Erector and builder
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Jan Koster Buildings
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La Quinta Zambia Ltd
Property developer (student hostels)
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Lakeshore Trading 102 cc
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Midfix
Residential LSFB
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Legna Creative Enterprises cc
Erector and builder
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Light Steel Projects & Maintenance
Erector and builder
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RH Construction (Pty) Ltd
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LSFB builder, ceilings, partitions, turn-key projects
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Sidepoint Trading 97 cc
Construction & alternative building
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Silverline Group
Developer and builder of LSFB
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Top Plan
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Vorsprung Projects
LSFB, ceilings & partitions
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Zeranza 155
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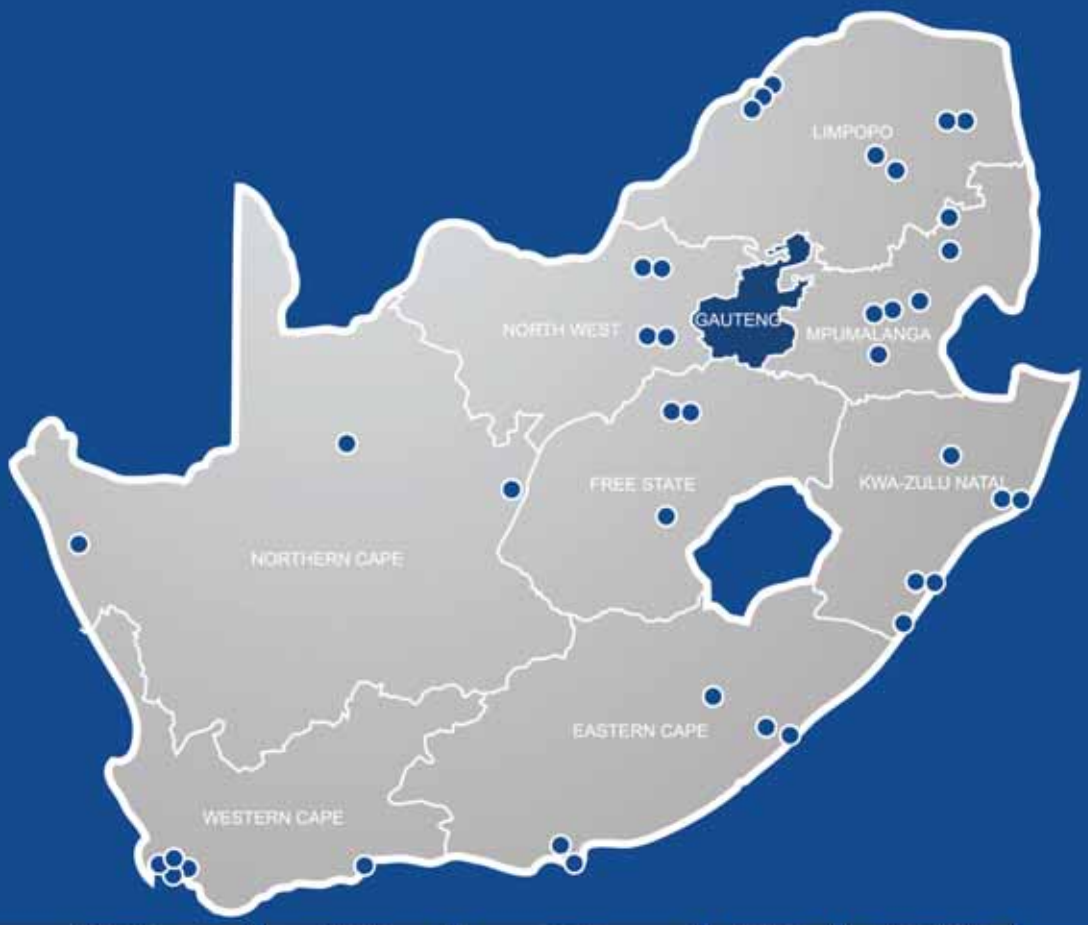

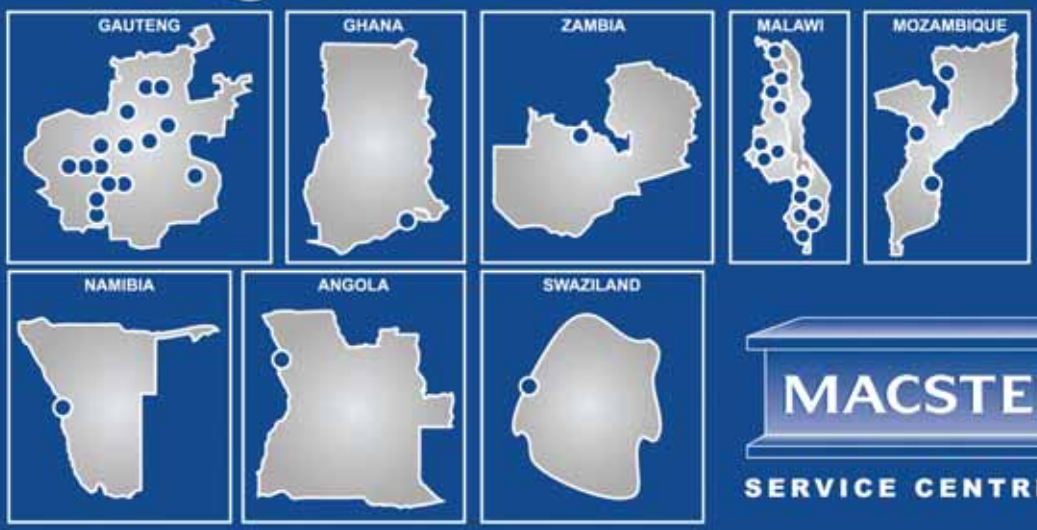

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