steel CONSTRUCTION

Volume 36 No. 2 2012

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Tubular Structures

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

The Steel Awards 2012 call for nominations has been sent out – so we are waiting with baited breath for your entries. I am sure you can't wait either – to enter your projects that is (see page 4 for more info). We don't expect massive lots-of-tons-of-steel projects this year, but it is usually the best time to enter that little gem of a project you did and don't think 'big' enough to enter. Enter it!

We are doing the 'green' thing this year along with the rest of the world's glib marketing companies. But at least we have something to work with – read Hennie's comment on page 2 where he gives you the facts and not some more marketing waffle.

Looking at the big picture, steel gets a lot of 'brownie points', but what about the small things an individual can do – like you, the person reading this magazine (I hope). 'They' have been preaching it for years and years – reduce, reuse, recycle. Still South Africans have not really hopped on the battery powered bandwagon. How many households separate their garbage, use water wisely (we flush pure drinking water down the toilet!), think before they drive three times a day to the supermarket just around the corner etc? There are so many small things to do – don't wait for the big guys to get their act together. Just do it!

Enough of the preaching. Our second issue this year is all tubular: A profile on Tubular Holdings as well as their and our Chairman Mike Lomas, three great tubular projects and a technical article that clearly shows why you should use tubular structural steel.

steel CONSTRUCTION

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

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SAISC COMMENT

By Dr Hennie de Clercq,
Executive Director, SAISC

Even assuming that as much as 75% of the concrete is crushed and used as aggregate, and that 20% of the concrete is used again ('recycled' rather than 'downcycled') a concrete structure still has a carbon footprint more than 10% higher than its steel equivalent.

STEEL LEAVES A LEGACY

A steel structure for a building is greener than a concrete structure. That is the basic conclusion of a fascinating little booklet recently published by the British Constructional Steelwork Association and Tata Steel.

Considering that the word 'steel' occurs in the names of both organisations, it is perhaps not so surprising that they came to this conclusion. The world of sustainability is full of claims of some or other material being 'green', often on the basis of little more than that it looks earthy or natural, or even that it once had leaves! Distinguishing between 'greenwash' and solid information is seldom easy.

Reading this publication, however, it is difficult to come to any other conclusion as that they were very scientific, correct and fair. The various consultants they used are clearly not the sort of people who would have their names compromised by associating with causes and messages that can later be proved spurious or one-sided. Moreover, the Chief Executive of the UK Green Buildings Council wrote a foreword for the publication, in which he supports the basic premises it departs from.

The first assumption is that carbon footprint is the primary measure in terms of which environmental sustainability should be measured. There are other concerns, such as water consumption, pollution, etc, but CO_2 has become the major issue, in view of the concerns about global warming. It is also a good proxy for energy consumption, another one of mankind's big worries for the future.

The second assumption, and the one which is most controversial in the eyes of people peddling other materials, is that the whole life cycle of a product should be taken into account – 'cradle to grave'. It is comparatively easy to obtain information on the carbon footprint of various materials and products during their production – 'cradle to gate'. But what happens at the end of the life of the product is usually not mentioned or taken into account, because it is not pretty. Most materials end up in landfills, or they are 'downcycled', into applications that have considerably less value. A concrete structure is also likely to end up in a landfill or dump, or if it's crushed it can become aggregate again, but the cement – the high energy, high CO_2 part of it – is lost forever.

Steel is another story. Steel structures can relatively easily be modified at the end of their lives, and many of them can easily be disassembled and re-erected. But steel's beauty is that it is easy and rewarding to recycle steel by remelting (the price of scrap is currently in the order or R2 400 per ton), it takes much less energy to make a new product from scrap than from iron ore, and the quality of the recycled steel is no worse than the original. Your carport can come back in a Ferrari!

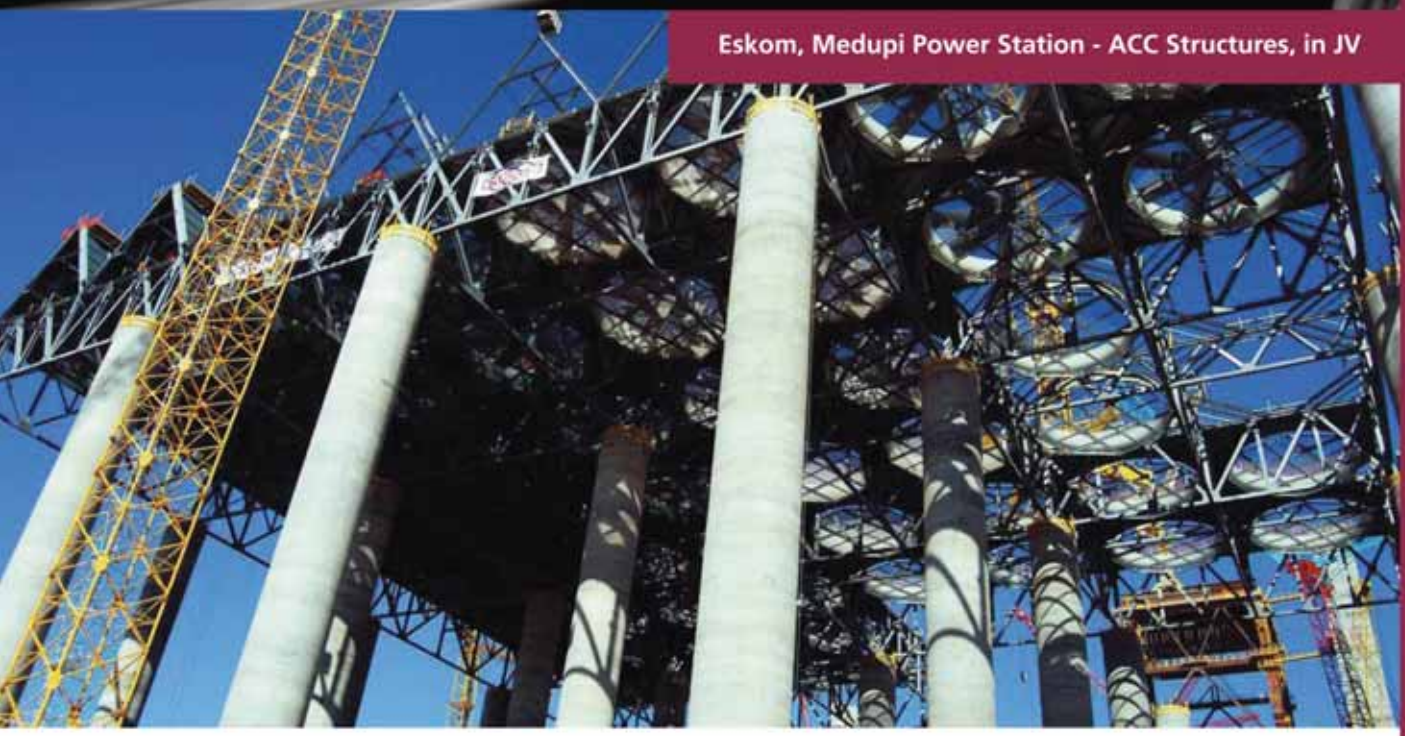
So, if you look at cradle to grave, the picture is quite interesting. They compared five buildings that were built recently, and designed a steel structure and the most economical concrete structure for each. They found that, on average over the five buildings, a steel structure has about the same carbon footprint as a concrete structure up to the end of construction (they took the carbon footprint of the construction process into account – something that is seldom done). At the end of the life of the building, the picture is quite different. Even assuming that as much as 75% of the concrete is crushed and used as aggregate, and that 20% of the concrete is used again (recycled) a concrete structure still has a carbon footprint more than 10% higher than its steel equivalent.

Of course, the proponents of materials other than steel are not eager to pursue the whole life cycle approach; it does not make them look good. But it is clear that to ignore the end of life of any product when looking at sustainability is like saying that recycling and reuse is no better than landfilling, which is patently wrong.

A well-designed steel structure is indeed a legacy which we leave for future generations, either as it stands or as a product those who come after us can use again in several different ways.

CADCON

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.

steel
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saisc steel awards 2012

AND THE 2ND STEEL AWARDS PHOTO COMPETITION

THE STEEL CONSTRUCTION AWARD FOR EXCELLENCE IN THE USE OF STRUCTURAL STEEL

DEADLINE FOR ENTRIES - 30 APRIL 2012

CATEGORIES

- No fixed categories – except the Tubular and Light Steel Frame Building Categories.
- Judges decide on the categories and winners based on the actual entries received.
- However, special attention will be given to sustainable development projects (green building, low environmental impact, community development etc.).

In 2011 the following categories were covered:

| Overall Winner | Tubular Structures | Light Steel Frame Building | Mining and Industrial | Architectural | Bridge

We do our best to give **ALL** projects entered some publicity – so please enter the projects you are most proud of.

CRITERIA

Does the project illustrate what can be achieved with steel?

Other factors to be considered:

| The importance of steel as a structural component of the project | Benefits achieved by using steel construction | Aesthetic appeal | Environmental/ sustainability consideration | Innovation in design, fabrication or construction | Technical prowess required for realising the project | Engineering expertise | Exceptional quality of workmanship | Tubular content | Export project | Satisfaction of client's brief, particularly cost and/or time efficiency | Special details: cladding, bolted or welded connections, or the like | Value to society/community development | Any other unique features |

CONDITIONS OF ENTRY

Go to www.saisc.co.za/steel_awards_2012 to see if your project qualifies

ENTRY FEES

A nominal entry fee will be charged this year for all nominations:

- Projects with a mass of less than 10 tons – Fixed rate of R500.00 (plus VAT)
- For larger projects a fee of R2 500 (plus VAT) will be charged which will entitle the nominator company to a discount of 50% on 2 seats at the Steel Awards dinner (your choice of venue – either Gauteng, Western Cape or KZN)

Once an entry is received, the person / company entering the project will be invoiced the relevant amount.

MATERIAL TO BE SUBMITTED

- The fully completed entry form
- Pictures of the project (one will be considered for the Photo Competition)
- A description of the project and a motivation for entering the project

For the details and to submit your entry go to: www.saisc.co.za/steel_awards_2012

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SAISC Chairman Mike Lomas.

MIKE LOMAS

SAISC'S NEWLY ELECTED CHAIRMAN, TALKS ABOUT LOCAL CHANGES REQUIRED TO EXPLOIT THE 'AFRICAN EXPLOSION'

Another vital element to the local industry's success in Africa will be its ability to work as a team. Working as 'South Africa Inc.' using mutual cooperation to win and supply contracts will be good for everyone in the end.

Mike Lomas has been involved with the SAISC for some years and the Institute is privileged to have him as the Chairman of the SAISC Board for the next two years. His CV reveals a man with excellent leadership qualities and he is well known for his insight into the murky waters of the global economy but also his deep understanding of the construction industry and how to 'gear-up' for future success.

We had a discussion with him about his views on the future of the steel construction industry in South Africa and he had a clear cut idea of what needs to be done:

In order for the South African steel construction industry to be competitive in Africa – where the world's next major economic growth spurt will occur – and especially the sub-Saharan region, there will have to be some important changes including the simplifying of border crossings in the SADEC region, infrastructure improvement around these borders and beyond, greater business innovation and the development of a 'South Africa Inc.' mentality within the local industry.

While South Africa is experiencing slow growth in steel construction activity, the major opportunities will certainly be beyond our borders especially in sub Saharan Africa where mining and engineering projects have great potential because of the yet to be exploited mineral wealth of the region.

We may not see the business activity levels of the boom of 2010 for a while yet but the dramatically growing GDPs of many key African countries are palpable and it is in these countries where our companies must be doing business.

The local industry will be competing in Africa mainly with the other BRICS countries – i.e. Brazil, India and China – and to do so successfully will require both innovation and the use of our competitive advantages brought about by location and other factors.

Our location in Africa is obviously a significant competitive advantage. But this will be neutralised if we do not make it easier to transport the fabricated steel to its various destinations. One of the first things that have to be done to facilitate this is to make it easier for trucks carrying the product to get through the borders.

Currently the situation is untenable with trucks often having to wait for days before they are processed adding significant cost to the delivered price of the product. If South Africa wants to compete against the Chinese and others, it simply must reduce the cost of doing business and the border issue is crucial in this regard.

Also, the road infrastructure around the border facilities and, of course, in the region as a whole should be improved as costs, through both time lost and physical damage to vehicles and product, are currently exorbitant.

It's not only reducing cost that will make the difference but also the way we do business. We will have to do things differently, more innovatively. For example, when the Chinese get an order they make the steel and ship it to the customer. There's no room for flexibility. But because of our locational advantage and because it's perhaps part of our business culture to be more malleable we could offer more flexible, 'tailor-made' solutions to African clients making it considerably easier and more attractive for them to conduct business.

Our innovation will have to extend to the renewable energy field, which is going to be crucial to doing business successfully in Africa and which will present South Africans with exceptional opportunities. The optimisation of OPEX through reduction in energy and water costs by, inter alia, putting the power source close to the end-users and introducing more energy and water efficient technologies is the way it will be done in an Africa that is not only vast but also has very poor infrastructure.

Another vital element to the local industry's success in Africa will be its ability to work as a team. We need to pool our knowledge while obviously still competing with one another. South African EPCMs must work in partnership with local fabricators to supply projects in Africa and we must, where possible, all share information about what is happening across the continent. Working as 'South Africa Inc.' using mutual cooperation to win and supply contracts will be good for everyone in the end.

In terms of the potential of the local market, after the bloodbath of 2008 when the asset value of the world was literally halved, the South African steel construction industry is making a slow but steady comeback.

It is clear that South Africa's financial disciplines were solid preventing a complete meltdown. Specifically in the steel construction industry, while there was a reduction in demand for steel products globally and in South Africa many projects were put on hold, we did not feel the full negative impact mainly as a result of the World Cup and the advent of major power stations.

Certainly this difficult period demonstrated very clearly the extremely high level of expertise and competence in the local steel construction industry, which augurs well for a future filled with various opportunities. The current unknown factor in terms of these opportunities is the government's planned expenditure on infrastructure and its willingness to act on it – although after President Zuma's State of the Nation address on February 9th there is some cautious optimism in this regard.

UP CLOSE AND PERSONAL

When you were small you wanted to be a...

Anything to do with cars or aeroplanes....

Hobbies & Sport

Sport: *I enjoy mountain biking and the adventures of long multiday cycle tours.*

Hobbies: *Photography, boating, fly-fishing, travel and reading*

Other interests: *Reading Financial Mail, mining & engineering magazines and world news*

Favourite character / icon / well-known personality

I would like to have met Steve Jobs and would like to know from Richard Branson how you run 300 companies.

Likes:

Commitment and enthusiasm

Dislikes:

Unfairness and laziness

At the moment you are reading...

Chapman piloting and seamanship – Charles Huswick

The man who cycled the world – Mark Beaumont

At home: A short history of private life – Bill Bryson

and listening to... *Classical Music*

When you are not at the office you are most likely to be....

Cycling and going to the bush

One thing you would like to achieve while you are Chairman of the Institute:

Support the current team with succession planning and future growth of SAISC

BIOGRAPHY

Mike Lomas graduated in civil and structural engineering and holds a postgraduate degree in water management. He studied business leadership at Stanford University, California.

After an initial period in the UK's petrochemical construction industry, he immigrated to South Africa and spent five years in structural engineering design focusing on steel and reinforced concrete structures.

He re-entered the construction industry in 1980 with Savage & Lovemore and worked on various projects including toll roads, railways, harbours and industrial plants.

Shortly after becoming the managing director of Savage & Lovemore in 1985, the business was amalgamated with Group Five and he was transferred to run Group Five Engineering, the structural, mechanical, electrical instrumentation and piping subsidiary. A position he held for six years whereupon he was appointed as the Group CEO, a position he held for a decade.

During the period of tenure as CEO, the group was internationalised. The internal operating structures were simplified and the group positioned to participate successfully in major construction projects.

Following retirement from the group, he was appointed as Chairman of Tubular Holdings, Council Member of The Institution of Civil Engineers representing the Middle East and Africa, member of the SA Road Agency Limited (SANRAL) Contracts Committee and Chairman of the SAICE – Joint Civils Division.

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- 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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STEEL FUTURE

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SAISC CONFERENCE 2013

5 - 6 MARCH 2013, JOHANNESBURG, SOUTH AFRICA

The Southern African Institute of Steel Construction invites
EVERYBODY WHO DEALS WITH STRUCTURAL STEELWORK OR LIGHT STEEL FRAME BUILDING
to submit abstracts for this conference
with special focus on steel as the construction material for the future.

Local and international experts will share their insight into exciting accomplishments, ground breaking research, innovative design and eco-responsible construction trends in the South African and global structural steel industry. Papers will be presented over the two full days and an exhibition will run throughout the course of SteelFuture.

PAPERS ON THE FOLLOWING TOPICS WILL BE CONSIDERED

- Sustainability and life cycle assessment
- Standards and standardised solutions
- Energy generation and distribution
- Fabrication of structural steelwork
- Africa as a market for steelwork
- Strategy for industry growth
- Contracts and construction
- Research and development
- Design of steel structures
- Mining-related structures
- Light steel frame building
- Multi-storey buildings
- Steel in architecture
- BIM and software
- Unusual projects

DEADLINE FOR ABSTRACTS

15 May 2012
(Papers by 6 Nov 2012)

Submit to
marle@saisc.co.za

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TUBULAR HOLDINGS

By Viv van Zyl,
SAISC Membership Consultant

The four pointed star logo for the Tubular Group is by no means an exaggeration of the company's position in the construction industry. Tubular Holdings (Pty) Ltd is one of the largest and respected privately owned companies of its kind in South Africa. They are loyal supporters of the Institute and have been Steel Awards sponsors for the past couple of years.

The company is divided into activity-driven, decentralised and autonomous entities with the focus on both international and local markets, specifically the manufacturing and mining sectors.

Tubular was established as a family-owned business in 1979 in Witbank (now eMalahleni). Their works are still based there, but the Group's head office is located in Bedfordview.

The company is able to take on a project from foundation-level up and through to the commissioning and final hand over. Tubular has well equipped workshops with automated CNC processes enabling them not only to achieve their fabrication needs but to constantly strive to improve the basic concepts of double handling, time constraints, accuracy and productivity. The company is committed to develop the skills of the local labour force as well as other African countries where some of their projects are located. Tubular is an accredited training institute with Merseta in order to maintain a high level of continuous skills development. They are ISO certified for health, safety, environmental and quality.

The company works frequently on projects in environmentally sensitive locations, so it is very important to them to protect and enhance the local natural environment. In this regard stringent controls and prevention methods that can affect the environment are put in place for every project. This policy sets Tubular apart from many other construction companies.

Their commitment to improve working relationships with their subcontractors, ensure that not only are Tubular's quality control systems and procedures applied and maintained, but that their safety record also remains untarnished. Ground level planning guarantees safer working conditions, quality, efficiency and innovativeness in their company.

Tubular Holdings serves the medium to heavy mining, industrial and petrochemical construction industries both locally and internationally.

Their scope of services include:

- Fabrication and erection of structural steel buildings for mineral and industrial plants, workshops, stores and ancillary buildings.
- Fabrication and erection of high and low pressure piping for mining processes, petrochemical and industrial plants.
- Fabrication and erection of vessels, silos and vertical tanks.
- Fabrication and erection of furnace shells, furnace roof hood sections and water cooling systems.
- Installation of crushing, screening and conveying plant.

Tony Trindade, CEO of Tubular Holdings.

Their commitment to improve working relationships with their subcontractors, ensure that not only are Tubular's quality control systems and procedures applied and maintained, but that their safety record also remains untarnished. Ground level planning guarantees safer working conditions, quality, efficiency and innovativeness in their company.

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Fax: +27 (0) 11 450 2160
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Website: www.tubular.co.za

Tubular's brand is appropriately a four pointed star.

- Mechanical installation of pumps, compressors, refrigeration plants, furnaces and large mills.
- Planning management and execution of turn-around projects.
- Supply, installation and commissioning of electrical and instrumentation.

The list of recently completed projects is more than impressive:

- Kalagadi Main Shaft and Vent Headgear.
- Amandelbult A Frame Project
- Amandelbult 75-210 KTPM Plant Upgrade
- Western Limb Project
- ASA Metals - Furnace 3&4
- Bokomoso Wonderkop
- International Ferro Metals
- Xstrata Lion Project
- Hernic Ferrochrome Expansion
- SA Chrome Horizon
- Lumwana Copper Project
- Sishen South Project
- Khumani Iron Ore Mine BKM Project

Tubular believes that good corporate governance is pivotal to its success. The Tubular group of companies are committed to maintaining high standards of governance thereby ensuring that the business is managed ethically, sustainably and within predetermined risk parameters.

Tubular strives to implement good governance in practical ways by not allowing form to replace substance. The group believes that this is fundamental to achieving its long term strategic goals and meeting the needs of all the group's stakeholders.

Corporate governance principles they strive to adhere to:

- Ethical leadership and corporate citizenship
- Boards and directors for effective leadership and strategy
- The governance of risk
- The governance of information technology.
- Compliance with laws, rules, codes and standards
- Internal auditing
- Governing stakeholder relationships

One can only take your hat off to a company that started off as a family business venture, just over 30 years ago in Witbank (now eMalahleni) - to have grown and achieved so much.

Tubular Holding's head office in Bedfordview.

INDUSTRY NEWS IN BRIEF

MORE PROJECTS IN MOZAMBIQUE: COSIRA GROUP EXPANDS ITS FOOTPRINT WITH LOCAL PRESENCE, LOCAL SKILLS

Steel Awards 2011 Partner Sponsor

South African-based Cosira Group has further cemented its pan-African strategy by opening up an office in Maputo, Mozambique.

The past fifteen years has seen Cosira's presence in Mozambique grow significantly through its involvement in various projects, including the current expansion of the Moma Heavy Sands mining project.

According to Chief Executive Officer John da Silva, Cosira Mozambique will offer the Group further growth opportunities in the next ten years, particularly in the mining sector such as coal, oil and gas, port infrastructure and energy in that country.

He says: "We believe that in order to be seen as a serious participant in Mozambique and the economy there, we had to embrace a strategy of having a local presence and employing local skills."

The new Cosira office, officially opened on 4 January 2012, is set to grow its capabilities over time, says long-time Cosira stalwart, and Cosira Mozambique Managing Director Francis Braz.

The Cosira Group has been, for the past ten years, investing heavily in its pan-African growth strategy, and has had projects active in Mozambique, Angola, Botswana, Nigeria, Equatorial New Guinea, Zambia, Zimbabwe, Sierra Leone and Namibia, among others.

Braz adds: "Expanding into the Mozambique mining industry will allow us to take advantage of the mega projects that are taking place on the African east coast using the satellite establishment in the Tete region as a central gateway point into East Africa, where we can quickly react to our client's needs."

Apart from the Moma Phase 2 expansion project, expected to be completed in July 2012, Cosira has been involved, through the supply of steel and platework, in the Benga Riversdale and Moatize projects in Mozambique.

GROUP FIVE ATTAINS HIGHEST CONSTRUCTION COMPANY CARBON DISCLOSURE RATING

Steel Awards 2011 Partner Sponsor

Group Five has achieved the highest rating of a JSE Top 100 listed construction company in the 2011 Carbon Disclosure Project (CDP).

Local carbon advisory firm, Promethium Carbon, achieved a first when three of its clients including Group Five were placed in the top ten of the JSE Top 100 CDP report.

The CDP questionnaire focuses on three key areas: climate change management; risks and opportunity identification; and greenhouse gas (GHG) emissions accounting and performance.

"To address carbon reduction, Group Five implemented a total quality management culture that underpins every aspect of its operations and reinforces the centrality of sustainability," said Celia Becker, country risk director Group Five.

A 'green team' was established covering all operating divisions and is responsible for the identification of opportunities and risks resulting from climate change.

In addition Group Five has commented on the Green Paper on Carbon Tax directly and via SAFCEC through BUSA. Group Five was also invited, and accepted, to participate in the carbon tax impact study to be performed by Treasury.

Cosira Mozambique Managing Director Francis Braz.

The study will provide an overview of the extent to which local firms have responded to higher electricity prices over the last three years, and will also consider the ability of firms to respond to further electricity price increases in future.

Becker said in the short term, employees are educated on climate-related issues by means of workshops and publications within the company.

In the long term, the energy division in the engineering and construction cluster, as well as the infrastructure development division, are responsible for identifying and implementing renewable energy projects, such as the Kalahari Solar Project. Becker said the demand for green buildings is on the increase, and internal procedures are continuously evolving to accommodate this.

"Group Five is actively pursuing opportunities in the renewable energy sector in Southern Africa and acquired a major shareholding in Kayema, a locally based company that specialises in solar water heating. Another business decision in 2011 was to actively be involved in the Green Business Council and help develop green star rating tools for the South African environment," Becker concluded.

INDUSTRY NEWS

BYSTRONIC CHOOSES FIRST CUT AS SOLE SOUTHERN AFRICAN DISTRIBUTOR

Steel Awards 2011 Partner Sponsor

During a recent visit by Bystronic's Area and Sales Manager (South Africa), Phillip Burgener, First Cut was awarded the sole distributorship rights in Southern Africa for the Bystronic range of products.

Bystronic has maintained a presence in South Africa since its inception in the late 1980s but has increasingly felt that its potential for growth and market penetration was not being fully realised through its existing channels. "We had received a number of calls and emails from customers in South Africa recommending First Cut as a possible distributor of choice for our products," says Burgener.

Bystronic is renowned for its range of waterjet and laser cutting solutions and bending solutions. The Bystronic product range amplifies First Cut's current market offering, allowing them to expand their footprint while at the same time providing Bystronic's existing customer base with the quality service levels that First Cut has become renowned for.

"Together with First Cut, we offer our customers full access to a team of experienced and knowledgeable technical specialists who will customise integrated solutions to the customer's exact needs," says Andrew Poole, First Cut's Managing Director.

"Bystronic has an extensive range of laser and waterjet cutting solutions developed for a range of customers, from small job shops up to large engineering conglomerates. While the laser cutting equipment is already proving popular with a number of local customers, waterjet cutting technology has not been given the exposure it needs in the market. We have already implemented plans to increase customer awareness with regard to this value-added technology."

"In addition to equipping First Cut with the necessary technical knowledge required to provide thorough customer service, we have an open door policy with all of our customers whereby they can contact Bystronic in Switzerland should they wish to direct any questions at our technical team. In all instances, we will work closely with First Cut to provide optimised productivity for our customers," Burgener concludes.

GLOBAL ENGINEERING AND CONSTRUCTION COMPANIES ADAPTING TO MEET CRITICAL DEMAND FOR INFRASTRUCTURE, FINDS KPMG SURVEY

As major urban areas strain to support rapidly growing populations adequately, the need for infrastructure is at an all-time high. This development is so pivotal that it is pressuring the engineering and construction industry to step up as never before to meet the challenge, and putting their efficiency and risk management processes to the test. These are some of the key findings of KPMG's 2012 Global Construction Survey: The Great Global Infrastructure Opportunity.

KPMG surveyed 161 engineering and construction companies around the world with revenues ranging from US$250 million to more than US$5 billion. Nine South African companies took part in the survey.

Just over 40 percent of respondents globally anticipate that the energy sector offers the greatest opportunity for revenue in the next 12 months. Second behind energy were roads and bridges tied with residential at 24 percent, followed by rail and mining. Gavin Maile, KPMG Africa Construction Leader said, "South African respondents were significantly higher with 78 percent, indicating that the energy sector provided the greatest possibility for revenue growth in the short term."

Companies are seeking solutions to address efficiencies in their procurement and supply chain. Nearly 60 percent of

Bystronic's Area and Sales Manager (South Africa), Phillip Burgener.

respondents say improvement in this area will improve profits and enhance cash flow. Almost 40 percent of respondents say the primary cause of inefficiencies in their supply chains were disparate processes and systems.

Survey respondents acknowledge that IT optimisation is critical to improving efficiencies, yet 50 percent say that overhauling IT systems takes too long and costs too much.

The survey revealed that 54 percent of respondents said they failed to identify issues in the bidding stage that later caused margin erosion in significantly underperforming projects.

What respondents say may be the primary barriers to public-private partnerships in infrastructure investment is a perceived lack of policies, leadership and investment by the public sector as well as a lack of initiative in the private sector.

"These results highlight that the lack of government commitment is not just a South African issue, but rather a global issue of balancing available resources and priorities, " Maile comments.

While respondents globally anticipate that energy (34%) followed by transportation (33%) will likely attract the most private sector investment for their companies, two-thirds see a lack of private sector initiative as another barrier to investment.

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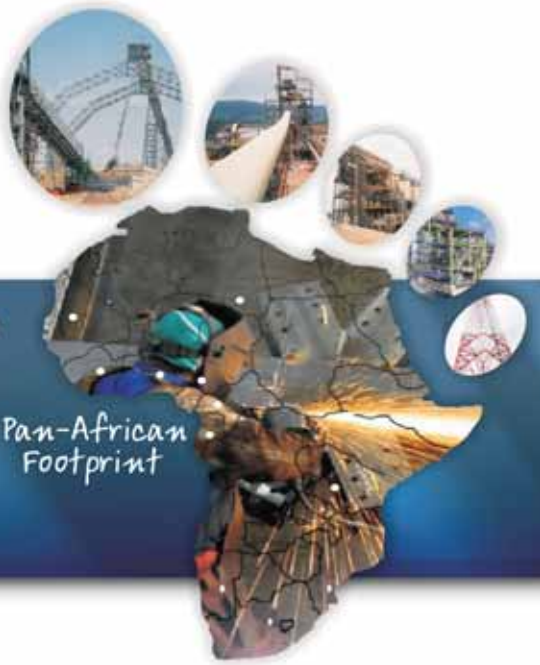

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WHERE IS THE SAISC ACTUALLY GOING?

AN EASY QUESTION TO ASK, A DIFFICULT ONE TO ANSWER BRIEFLY!

By Kobus de Beer,
Industry Development Executive, SAISC

It was a good example of positive engagement between peers discussing the real issues of our industry and trying to develop actions that would promote and grow the industry, and of course the role the SAISC can and must play in realising these dreams.

WHAT IS THE SAISC ACTUALLY DOING (IN A NUTSHELL)?

The Southern African Institute of Steel Construction is typically a hive of activity covering a remarkably wide field of activities for such a relatively small organisation. Areas covered are writing of textbooks and standards, conducting professional training courses for engineers, designers, architects, draughtsman, estimators, assemblers and many others interested in the use of structural steel in many applications. Much time is spent handling queries and providing professional advice.

The SAISC houses the structural steel export cluster ISF, the light steel frame housing association, SASFA and a specialist liaison function with government departments and major clients. The Institute maintains relations with many other South African and international associations and organisations. They publish six issues of the Steel Construction journal a year and celebrates the excellent use of structural steel with the prestigious annual Steel Awards function. International liaison to benchmark and keep abreast of developments is maintained and strengthened by annually bringing internationally renowned architects and engineers to South Africa to lecture and teach. The SAISC also organises an international conference on structural engineering applications e.g. in mining every few years.

WHY THE STRATEGY SESSION?

Executive Director, Dr Hennie de Clercq has the 'irritating' habit of regularly asking the question whether the Institute is still going in the right direction and if the efforts made are focused on the most relevant goals.

To address this question the SAISC embarked on a course of action to get clarity and buy-in on its objectives and priorities as well as input on the way forward. The first step was to appoint Louis Heyl of LHA consultants to facilitate the process and also contribute from their own vast reserve of experience. Step two was to send a questionnaire to all the members to get an idea of the the Institute's current image in the 'marketplace' as well as the members' view of how it was fairing to meet their expectations. Getting the newly elected members of the Board (from the November 2011 AGM) together in a session to 'think tank' issues arising from the results and formulate a plan forward was the third step of the process.

Members of the Board at the strategic session held in January 2012.

A concise, but remarkably incisive questionnaire was drawn up and submitted to all SAISC members. A surprising 36% responded, which is high for this type of survey, giving the feedback a good degree of reliability. This feedback report alone makes very interesting reading and was presented at a formal SAISC Breakfast meeting in February 2012:

- 75% of members are satisfied with the existing structure. Consensus is that the SAISC is performing well within the context of its current staffing levels and mandate;
- The current structure/staffing is insufficient to do more; it would be good to add one or two young engineers for research, development and marketing;
- Succession planning of senior (very skilled) staff is becoming a high priority;
- There is a shortage of professional engineers and structural design representatives on the SAISC Board;
- Funding needs to be increased to employ more staff;

The questions covered many areas such as testing members' familiarity with the SAISC's functions, its performance in various areas such as working committees, publications, promoting the image of the industry, professionalism, range of services offered, membership fees, communications, export development, new product development, education and training, interaction with government and many other facets, resulting in many comments and recommendations.

Marlé found an excellent venue in Glenburn Lodge set in the Magaliesberg, with a river running through and all the peace and focus beautiful natural surroundings can bring. Serious concerns were expressed at the session only starting at 11:00 on Thursday (the "normal starting time in the industry?") and the closing time being the same on the next day (the "normal Friday closing time for the Institute?") but it resulted in almost a full house of participants!

Thus a strongly representative group of leaders of our industry attended the strategic planning exercise and everyone displayed a high degree of interest and participation. Louis Heyl presented the findings from the survey and outlined the main issues that needed attention. The resulting discussions dealt with these and many other issues and gave an opportunity for participants to think 'outside the box' and sometimes right back into it!

To look at the industry, its participants and needs was wonderfully stimulating – the strengths made us feel proud and invincible, the weaknesses made us anxious to fix them, the opportunities made us excited and the threats made us realise how important it is to remain professional and competitive at all times. It was a good example of positive engagement between peers discussing the real issues of our industry and trying to develop actions that would promote and grow the industry, and of course the role the SAISC can and must play in realising these dreams.

THE OUTCOME (SO FAR)

After extensive and intensive debate and discussion the group agreed on and prioritised ten main goals or Key Strategic Objectives/KSOs to be achieved. It must be stressed that none of these presumed any 'slacking off' on any of the current activities and initiatives that are part of the SAISC portfolio.

1. Increase the funding of the SAISC to meet its legitimate needs;
2. Develop a succession plan;
3. Uphold and maintain quality standards in the industry;
4. Develop new market segments;
5. Lobby government for the benefit of industry;
6. Benchmark and address the inadequate international price competitiveness of the industry;
7. Develop a training plan;
8. Promote exports to the rest of Africa through ISF, especially with respect to mining;
9. Maximise the opportunities for steel in mining;
10. Promote light steel construction through SASFA.

Each of the above has many aspects to it. A 'champion' and a small working committee were nominated for each and work is being done to identify actions to be taken, responsible persons, the budget requirements and the proposed timeline. These will be prioritised and consolidated into the SAISC budget for the next year and will be monitored and reported on regularly.

The exercise made all participants realise how much can be done, but that there are limitations imposed by resources. Thus it is important to carefully select fewer actions and consistently apply effort to realise these. The process is not exclusive to current participants and every member and interested party is welcome to provide comment, criticism, advice and assistance to achieve these worthy objectives.

INDUSTRY REPORTS STRONG GROWTH IN LIGHT STEEL FRAME BUILDING

By John Barnard, SASFA director

The total LSF market (local and export) is forecast to grow by more than 20% during 2012, compared with 2011. The SASFA manufacturing members report good demand for middle and upper income housing, schools and classrooms, and roofing for low cost housing projects.

SASFA has again carried out its semi-annual survey to quantify the level of 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 actual throughput was 34% higher than the forecast made for 2011 at the beginning of last year. The growth in exports accounted for a significant proportion of the growth in demand, with a third of all production destined for the export market, mainly into Sub-Saharan Africa.

It is also notable that a growing share of the production is used for complete buildings (wall panels and roof trusses) as opposed to roof trusses only. This is a clear indication that LSF building is achieving wider acceptance in the market. During 2010, trusses constituted some 64% of total production, declining to 58% in 2011. Light steel roof trusses (used in the RSA market) covering a total floor area of 570 000m^2 were produced in 2010. It almost doubled to 1.1 million square metres during 2011. Based on Stats SA statistics for buildings completed (excluding low cost housing), light steel roof trusses have captured a 16% market share during 2011.

According to industry feedback, complete buildings (wall panels and roof structures) covering a total area of some 290 000m^2 were built in LSF in South Africa during 2011, and this is expected to grow by 30% to just under 400 000m^2 during 2012. Based on average ratios of walling area to floor area, this represents a demand for:

- 400 000m^2 of external cladding (typically fibre cement board),
- 1.25 million square metres of bulk insulation (typically glasswool bats), and
- 1.75 million square metres of internal lining or gypsum board.

The total LSF market (local and export) is forecast to grow by more than 20% during 2012, compared with 2011. The SASFA manufacturing members report good demand for middle and upper income housing, schools and classrooms, and roofing for low cost housing projects. A number of project enquiries have been received from neighbouring countries, and there are a few large housing developments in the pipeline in South Africa. Local architects are increasingly utilising the advantages of LSF for external walling of office buildings, with spectacular results. Apart from the striking facades achieved the use of LSF shaves weeks of the building schedules and allows reductions in the capacity of air conditioning equipment.

Riverwalk Office Park, Pretoria. External cladding in light steel framing, by GDS.

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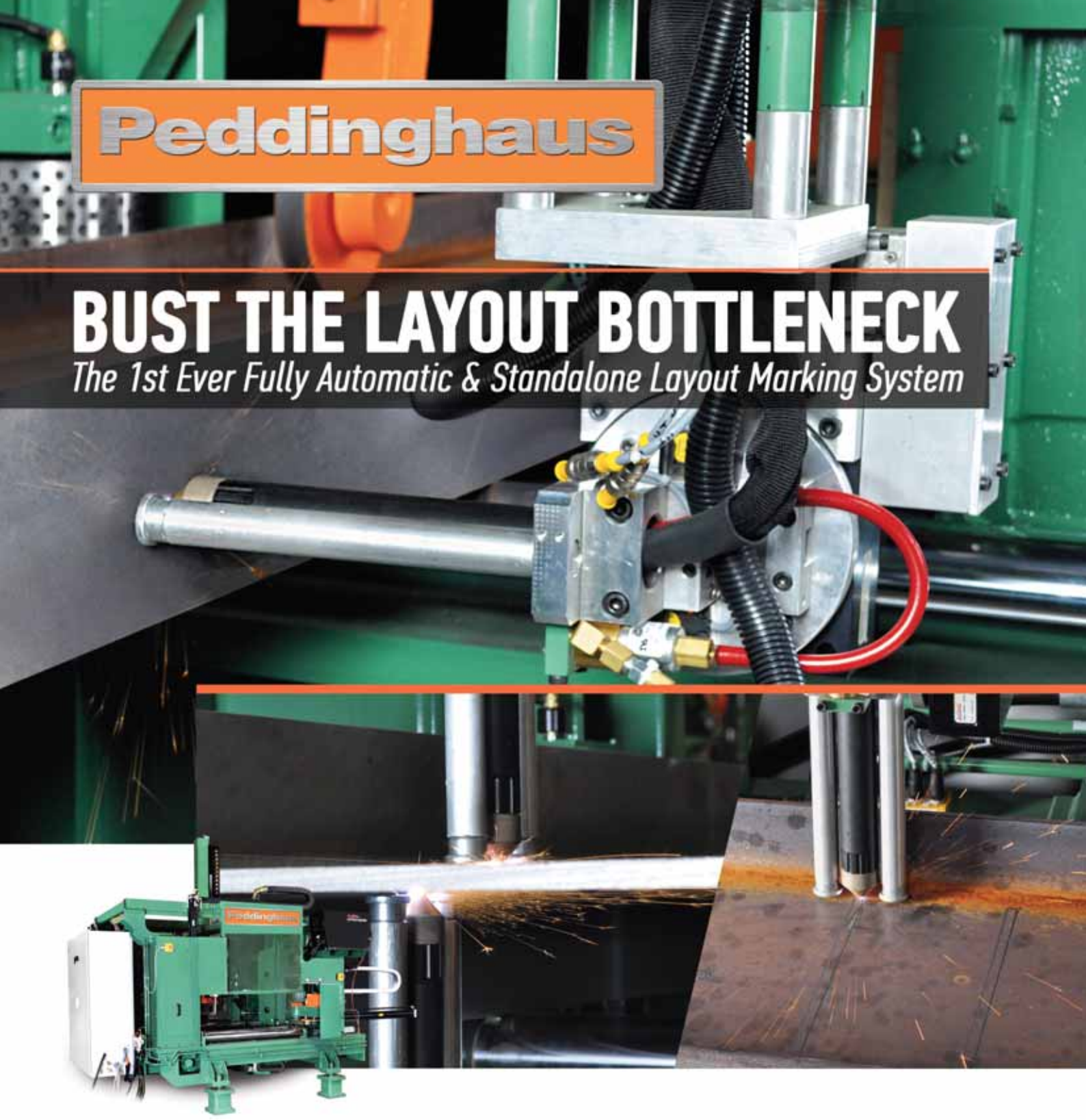

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SASFA NEWS

REPORT: LSFB TRAINING FOR BUILDING CONTRACTORS, GAUTENG – February/March 2012

By John Barnard

SASFA presented its six-day training course for building contractors at Saint-Gobain's facility near Midrand in Gauteng, from 27 February to 3 March 2012. This was the eighth time we offered the course and it was fully subscribed with 24 attendees.

The candidates were generally from managerial positions in the building industry, or directors or owners of established building companies, including two engineers, an architect, a chartered accountant and an auditor! Three attendees were from SASFA member companies.

The four-day section on steel frame manufacturing and erection was presented by John Barnard (SASFA) and Richard Bailey (consultant, previously from MiTek). Hannes Stevenson (Saint-Gobain) and Brendan Lowen (Everite) presented the second section on cladding, lining and insulation (one and a half day). As in the past, we had Hilti illustrate the use of their laser levels, as well as their range of anchor bolts and screw guns, and Speedfit Africa illustrated the installation of plumbing in LSFB using their product range. The full range of topics, from foundations and the properties of the materials, to erecting and bracing wall panels, and erecting roof trusses was covered. Not only were students advised on the correct way of doing things, but it was also explained why certain aspects were particularly important.

Saint-Gobain had cast a 6m x 4m slab on which a light steel frame structure, supplied by MiTek, was erected by the students as part of the practical component of the course. Each and every one was encouraged to get their hands dirty with the practical tasks.

Cladding, lining and insulation materials were supplied by Saint-Gobain, Everite for fixing to the steel frame. Marshall Hinds supplied the building wrap and Kare the fasteners for fixing the boards.

The students had to write two tests, to assess the level of their knowledge. They were also asked to rate the course on a daily basis, covering aspects such as venue, arrangements, course content, course notes and presentation. The average rating covering all aspects was in excess of 80%, and judging by the students' response, presentation of the course was certainly successful.

This six-day course for building contractors will be presented again in 2012 in Durban (23 to 28 July) and in Cape Town (22 to 27 October).

TRAINING COURSES FOR DESIGNERS: COLD-FORMED STEEL DESIGN FOR LOW AND MIDRISE LIGHT STEEL FRAME BUILDINGS AND A COURSE ON SANS 517 LIGHT STEEL FRAME BUILDING – 28 May to 5 June 2012

In order to replace the outdated South African Standard for Cold-formed Steel Design, the SABS has – on advice by the SA Institute for Steel Construction – adopted the Australian Standard AS/NZS 4600:2005 with minor modifications. The document was recently published as SANS 10162-2:2011. During March 2010, the SAISC contracted Prof Greg Hancock from Sydney University to present a course in South Africa to introduce designers to the Australian code.

To follow up on this venture, it was decided to arrange a 1-day course with focus on practical design aspects pertaining to low and midrise light steel frame buildings. We approached the Steel Framing Alliance (USA), and were fortunate to be able to obtain a world-class lecturer on this topic – Mr Don Allen, a professional engineer.

Don, previously Technical Director of the Steel Framing Alliance (SFA) and the Cold-formed Steel Engineers Institute (CSFEI), USA, has been involved in commercial and residential steel framing for the past 21 years. His designs include some of the light steel framing in the Georgia Dome and Atlanta Olympic Stadium, as well as hun-

Lectures in the classroom were alternated with practical sessions on the 'building site'.

After setting out the positions of the wall frames on the slab, the students were all amazed how quickly and easily the frames were erected.

dreds of steel framed projects across the USA. He has been involved in the development and testing of steel framed truss systems, and has a special interest in the role of structural materials in sustainable development: he is a member of the Committee on Sustainability for the American Society of Civil Engineers (ASCE) Structural Engineering Institute. He is a LEED® Accredited Professional, and is certified by the Structural Engineering Certification Board of the National Council of Structural Engineers Associations.

He will cover the major aspects of the Cold-formed Steel Design Code, and then highlight the framing specific codes in use in America. After comparing LSF with the alternative structural materials for low rise building (timber and masonry), he will cover the general provisions for midrise LSF construction. This will be followed by a number of case studies illustrating the different design considerations – such as non-structural curtain wall examples, light steel frame building and bracing in high wind zones, shear walls and their anchorage, light weight concrete floors and special detailing for fire walls.

Due to the growing interest in light steel frame building, it was also decided to offer a one-day course on the updated SANS 517:2011 Light steel frame building to assist designers, QS's, developers and other practitioners to understand and quickly implement the standard.

All the facets of the standard will be covered by local specialists Anna-Marie Sassenberg (AMS Civil & Structural Consultants), Barend Oosthuizen (By Design) and John Barnard (SASFA) – from foundations and the materials used for LSFB, to the steel structure with focus on the wall elements, suspended floors and roof structures. Durability and corrosion will be covered, as well as insulation and the installation of services.

Don Allen, previously Technical Director of the Steel Framing Alliance (SFA) and the Cold-formed Steel Engineers Institute (CSFEI), USA.

Visit www.sasfa.co.za , and scroll down to Upcoming Events for more detail on the courses, as well as a registration form.

CALENDAR OF EVENTS

SUPERVISORS COURSE - GAUTENG
Every Wednesday from 18 April – 25 July 2012

Contact spencer@saisc.co.za for more information

NORTH AMERICAN STEEL CONSTRUCTION CONFERENCE (NASCC)
18 – 20 April 2012

Dallas

Visit www.aisc.org/nascc

STEEL AWARDS 2012
Deadline for entries

30 April 2012

Visit http://saisc.co.za/steel_awards_2012/ for more information

LIGHT INDUSTRIAL BUILDINGS COURSES
23 – 25 April 2012, Cape Town

21 – 23 May 2012, KZN

4 – 6 June 2012, Johannesburg

Contact tiana@saisc.co.za for more information

CANADIAN INSTITUTE OF MINING, METALLURGY AND PETROLEUM'S CONFERENCE
6 – 9 May 2012

Edmonton, Alberta, Canada

Visit www.cim.org/edmonton2012 for more information

SAISC GOLF DAY
9 May 2012

Houghton Golf Club, Johannesburg

Contact marle@saisc.co.za for more information

IABSE DAYS
14 May 2012, Gauteng

16 May 2012, KZN

18 May 2012, Cape

STEEL AWARDS 2012
6 September 2012

Gauteng – Emperors Palace

Cape & KZN (TBA)

10TH INTERNATIONAL CONFERENCE ON ADVANCES IN STEEL CONCRETE COMPOSITE AND HYBRID STRUCTURES (ASCCS 2012)
2 – 4 July 2012

Singapore

14TH INTERNATIONAL SYMPOSIUM ON TUBULAR STRUCTURES
12 – 14 September 2012

London, United Kingdom

www.imperial.ac.uk/ists14

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

Vanderbijlpark

SAISC AGM
15 November 2012

STEELFUTURE 2013 – SAISC CONFERENCE
5 & 6 March 2013

Johannesburg

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

INTERNATIONAL CONFERENCE

Structures for mining and related materials handling

15 - 18 October 2012 Vanderbijlpark, South Africa

Provisional Programme: 16 & 17 October

DAY 1 **Key note address: To be advised**

THEME 1: MATERIALS FOR STRUCTURES

Case study – Hot dip galvanized steel on deep level *RE (Bob) Wilmot, Hot Dip Galvanizers Association SA;* **Technogrids in mining related structures** *Fritz van Eeden, Horne Group (SA);* **Steel shaft guide products** *AM Smith, D Hill and M Stockwell, Tata Steel Europe*

THEME 2: LIFE CYCLE OF STRUCTURES

Assessing hazards associated with deterioration of mine shaft structures *G Krige, Walker Ahier Holtzhausen (SA);* **Structural Assessment of CIP Tanks** *M Khan, TWP Projects (SA);* **Aspects to consider when using an engineering design company to conduct third party inspections of mining structures** *P Louw, TWP Projects (SA);* **A model to evaluate conveyor structures** *J Ccama and V Anyosa, EPCM Experts SAC Peru*

THEME 3: HEAVY EQUIPMENT

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

THEME 4: PROJECT MANAGEMENT

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

DAY 2

THEME 5: SHAFTS

Capturing mine shaft condition and scheduling maintenance electronically *A Veldtman, Prodispace & G Krige, Walker Ahier Holtzhausen (SA);* **Design of Tall Steel A-Frame Structures for Mine Hoisting** *B Mashford and T Tikka, Stantec Consulting Canada;* **Spillage handling infrastructure for the mid-shaft loading station at Konkola No 4 shaft** *A Bannerman & Z Pulic, TWP Projects (SA);* **Evaluation of shaft infrastructure to meet production upgrade** *I van der Wat & M Khan, TWP Projects (SA)*

THEME 6: DESIGN

Case study: Design of a light weight steel screen support structure (screening unit) *M Mmusi, TWP Projects (SA);* **Connection design for industrial structures – problems and solutions** *Bo Dowswell, SDS Resources (USA);* **Experimental Investigation and Modeling of Non-Uniform Stresses in Steel Silos** *P Trinchero, Macsteel (SA);* **Automated Optimization of Several Mining Structures** *A Elvin, University of Witwatersrand (SA)*

THEME 7: VIBRATION

Comparison of predicted dynamic response results to measured values for a screening plant *M Kahn & M Essack, TWP Projects (SA);* **Minimizing vibration by structural dynamic modification after structural monitoring** *K Li & A Elvin, University of Witwatersrand (SA);* **Human structure interaction: Can minor movement resonate a structure?** *N Elvin and A Elvin, University of Witwatersrand (SA);* **Soil-structure interaction in vibration analysis** *A Masarira, Anglo American (SA)*

PANEL DISCUSSION

Registration/Information

Tel: +27 (0)11 726 6111 / marle@saisc.co.za

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DUBE SQUARE CANOPY

By Mark Mallin, Senior Engineer,
Henry Fagan and Partners

Dube Square Canopy at night.

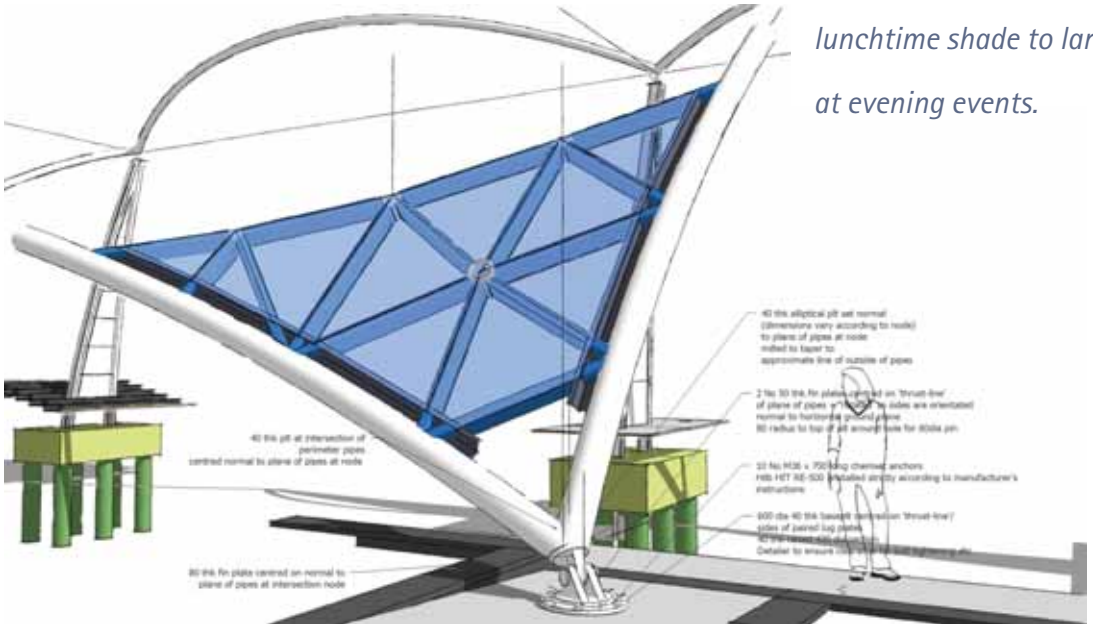
The conception, design and fabrication of this structure took place while a debate within structural engineering around 'Just because we can do it doesn't mean we should' has become increasingly vocal. The authors believe that in this case such complications and 'gymnastics' were justified due to the nature of the structure as a sculptural centrepiece to the new city and a catalyst around which the life of its inhabitants will take shape as they hopefully enjoy the space for everything from simple lunchtime shade to large gatherings at evening events.

Dube City is an urban mixed-use development taking advantage of all the connections and opportunities afforded by its location within walking distance of Durban's King Shaka Airport. It forms part of the massive Dube Tradeport development.

Having designed the infrastructure for the overall scheme, landscape architects CNdV Africa were requested to conceive a canopy structure to form the centrepiece of the Dube City's main public space, Dube Square.

DESCRIPTION OF THE PROJECT

The client wanted a free-form, iconic structure, able to give some protection from the elements, but with a light and transparent feel. This was developed with a series of inclined perimeter arches 'skipping' around the edge of a rippling gridshell surface rising towards the middle storeys of the surrounding buildings but set away from the L-shaped office building under construction to its rear.



A work in progress sketch developing ground node details.

Further development and structural rationalisation of the form introduced a large-scale 'ripple' across the structure's surface with the corrugations amplified to a maximum towards the centre of the structure where moments within the gridshell are greatest and fading out towards the perimeter arches.

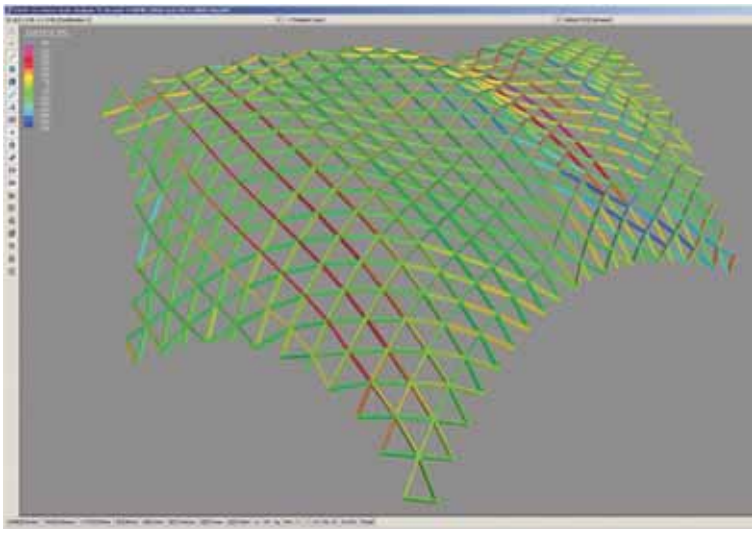
The front of the canopy is supported on two full 'ground to ground' arches, the largest of which spans 30m with a rise of approximately 3.8m. The two sides are supported on 'ground to top of column' arches. The back then consists of two shallow 'top of column to top of column' arches, spanning 22.5m and 15m respectively.

The roof is made up of a series of triangular panels, typically of 1.8m sides, joined together to form a gridshell which undulates to form a complex surface.

FOUNDATIONS

Much of the site consisted of landfill generated by the groundworks and levelling for the adjacent airport project. Piled foundations were therefore required with the pile groups designed by the geotechnical engineer to resist the thrusts generated by the supporting arches of the gridshell.

The complexity of the gridshell structure is in some way brought closer to the observer by the shadows cast at their feet on the square's surface.



The analysis model of the axial forces, tensions and compressions due to ripple corrugations.

REAR COLUMNS

The rear columns, extending approximately 1m below ground level, rise a further 10m above the square to meet the gridshell at the three rear node connections. In elevation the section tapers from 2.1m at their base to 400mm at the top expressing their 'stiff' direction to resist the bending moments resulting from the cantilevered columns resistance to the thrusts of the gridshell.

The columns lean back a total of 2m from their centre line expressing their reaction to the thrusts of the gridshell.

However, the columns are only 300mm wide when viewed from the front of the adjacent building's elevation to minimise their profile. They therefore provide little resistance to thrusts in this transverse direction. The whole system relies on the shell to mobilise its own membrane stiffness.

Originally envisaged as concrete, rolled H-Sections with infill plates were proposed by the engineer at tender stage for both quality control and speed of erection while minimising the number of trades involved. For ease of construction and accuracy the contractor proposed profile cut plate to achieve a more precise curve in lieu of the curved sections with excellent results.

Horizontal shadow gaps at the joints between the infill plates give further 'scale' and interest to the profile while the recess to the web plates allows for a narrow strip of lighting to continue up the column face reflecting the language of the landscaping below.

At the top of the columns the gridshell is raised off the column to a pin connection to achieve a lightness of touch when viewed from acute angles below.

GROUND NODES

The design team put a lot of time and effort into the appropriate detailing of ground connections, primarily because this was where the structure is closest to the ground and therefore most visible and tactile to the public.

As well as sitting at varying levels in hard and soft landscaping, these three details had to achieve a consistent language to resolve the inclined freeform geometry of the gridshell to the plane of the ground.

A profile cut splice plate was orientated on the centre line of the plane of intersection of the two pipe sections with a perpendicular circular plate resolving the orientation of the projecting fin-plate to be perpendicular to the ground plane connected through a large diameter pin.

GRIDSHELL MEMBERS

Many European examples for similar structures have been constructed to fully enclose and weatherproof the internal space while maximising the outside feel. To achieve this, the depth and especially width of the structural profile were usually minimised and the bespoke sections fabricated accordingly.

Since the primary purpose of this canopy was to provide shade, minimising this section was not such a driving force and at tender stage two alternative section profiles were proposed; the first using standard rectangular hollow sections for obvious programme and cost benefits due to their general availability; the second proposing a tapered profile with the width of the top wall determined by the minimum bearing required by the glass edges and the bottom fabricated from a solid bar with the side walls.

Both were of similar cost, with the reduced weight of the 'bespoke' option being offset by the increased costs of its fabrication. With the go ahead for construction the decision was made due to programme constraints to proceed with standard rectangular hollow sections and perimeter pipe. Perimeter pipes were rolled from 273 x 10thk circular hollow sections and the internal gridshell members from 200mm x 100mm rectangular hollow sections with either 6mm or 10mm wall thickness.

GRIDSHELL NODE CONNECTIONS

There are 304 internal node connections within the 980m^2 of the gridshell surface, all of differing geometries with a further 81 connections to the perimeter pipe.

The pros and cons of various options for connections were considered by the engineer at the design stage with the ease of site erection of bolted connections weighed against the machining and fabrication accuracies that were required.

For the tendered scheme a central circular node was proposed orientated at the average of the six adjoining planes it connected, with solid infill ends to the gridshell members machined to meet the external surface of the node. Bolts with shaped washers would bolt through from the inside node to threads in the machined pieces.

With the input of the contractor this concept was changed to a welded proposal eliminating the need for the solid machined ends and any pre-drilled holes in the node. The ends of the rectangular sections were instead cut to the profile of the outside surface of the node and directly welded into panels of nodes in the shop.

To accommodate the various orientations of the adjoining members, the circular node projects through the roof surface and is capped with a circular glass plate. Its internal end is either capped with a solid infill plate or light fitting. While at times up to 12m above people's heads these nodes are in some way brought closer to the observer by the shadows they cast at their feet on the square's surface.

ERECTION

Piling, pile-caps and plinths were first constructed for all six support locations with cast-in anchors for the connection of the base of the rear columns and oversized plinths recessed below the final landscape level to allow some tolerance on position of the ground connections relative to the concrete works.

project team

Developer/Owner:
Dube Tradeport

Architect:
CNdV Africa landscape architects

Structural Engineer:
Henry Fagan & Partners

Steelwork Contractor
STS Engineering

Steel detailing company
PSM

The rear columns rise 10 metres above the square to meet the gridshell at the three rear node connections.

The three rear columns were then erected and the perimeter arches installed. The length of these curved pipes meant site welding was required to achieve an uninterrupted arc and these were achieved with an internal collar pipe.

Bespoke tower structures were designed and fabricated by STS Engineering with an adjustable top fixing to provide the flexibility required for temporary support to the various orientations of the prefabricated node assemblies in their final position while the adjoining infill members were welded between them and the adjacent modules. This propping 'swept' across the structure as the gridshell infill completed from the building corner to the outer ground node gained its full structural integrity.

CONCLUSION

The conception, design and fabrication of this structure took place while a debate within structural engineering around 'Just because we can do it doesn't mean we should' has become increasingly vocal.

Why should contemporary capabilities of advanced analysis, geometry generation and automated fabrication be concentrated on 'solving problems that didn't need to be solved' on structures and geometries that are perhaps unnecessarily complex?

The authors believe that in this case such complications and 'gymnastics' were justified due to the nature of the structure as a sculptural centrepiece to the new city and a catalyst around which the life of its inhabitants will take shape as they hopefully enjoy the space for everything from simple lunchtime shade to large gatherings at evening events.

Its form and construction take many cues and influence from the forces acting on it and these are articulated in both logical structural solutions such as the large-scale ripple/corrugation of the gridshell surface and the more 'poetic' expression of structural actions such as the leaning form of the rear columns. Both are considered to equally contribute to its success.

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PICK N PAY RETAIL CENTRE – HURLINGHAM

All structural steel had to be erected by means of 18th century technology, yet expected to adhere to a 21st century construction programme. Innovative planning and a competent erection team ensured successful end results.

Moveable reconstituted timber louvers protect the building facade from the harsh western sun.

The innovative Hurlingham retail development at the intersection of William Nicol and Republic Roads in Sandton consists of a multi-level complex with a receiving basement, staff facilities, trading and mezzanine levels and a 300-bay basement parking area. The complex includes a flag-ship 5 600m^2 Pick n Pay supermarket, 750m^2 of adjoining line shops, and a cooking school. Construction of the R160 million project was completed in early 2011.

APPROACH

This complex project posed a number of key challenges – not least the tight budget and programme. These were actively addressed from the outset and were key drivers in the choice of a structural steel system, which would best articulate the architect's vision for this prominent site and suit the requirement for clear spans and maximum retail space. The client, Pick n Pay, is at the forefront of

The building's perimeter canopies are supported by raking circular steel columns, each of which terminated in an elegantly exposed solid steel pin connection.

current global store design trends – particularly with respect to sustainable practice. Achieving an energy efficient and sustainable development was therefore paramount to the brief and a key consideration throughout the design and construction process.

STRUCTURAL SCHEME

Arup developed a structural engineering design that enhanced the original architectural aspirations by incorporating three dimensional tree-columns that not only harmonised visually with the 'green' aesthetic but also significantly reduced the number of columns. This proved extremely beneficial in providing better circulation at ground level and efficient material usage.

Only twelve tree-columns were used to support the roof expanse, covering 5 600m^2, each made up of a 324mm diameter trunk and 219mm diameter branches – splayed at 95 degrees to one another. This tubular steel solution resulted in the creation of a striking three storey support structure for the voluminous floor-to-ceiling height of ten metres.

The beauty of the exposed steelwork is clearly evident in the additional tree-column located at the main entrance of the store, which in itself is a testimony to the versatility of structural steel. The imposing main entrance took its form from the desire to create a very visible announcement of the building's entry point. It also created a visual 'transparency', thereby highlighting the sense of interconnectedness of interior and exterior spaces. This architectural philosophy was expressed by utilising three highly efficient structural steel box sections, 300mm deep and towering some fourteen metres into the air. The enhanced torsional rigidity of rectangular hollow sections were fully utilised in creating this unique space.

With the extremely tight budget, Macsteel cellular beams proved to be an excellent solution combining a lightweight section – 37kg/m spanning 15 metres – and still suited the architect's vision of an open and airy feel. The cellular beams were also beneficial in their ability to provide simple routes for services and conduits. The customisation of the cellular beams allowed for the specification of filled voids to handle the high web shear forces encountered at the branch-beam intersections.

The building's perimeter canopies were supported by raking circular steel columns, each of which

terminated in an elegantly exposed solid steel pin connection. To protect the building facade from the harsh western sun, the architect, Bentel Associates International, opted for the use of moveable recon-stituted timber louvers. A bespoke lightweight steel support system was designed to support the facade that tied back easily into the main structure.

CONSTRUCTION CHALLENGE

All structural steel was supported off a suspended slab and as such a mobile crane was not allowed to traverse the slab creating an interesting challenge for the steel fabricators, Central Welding Works. All structural steel had to be erected by means of 18th century technology, yet expected to adhere to a 21st century construction programme. Innovative planning and a competent erection team ensured successful end results.

Access for a mobile crane was only available for offloading and a small portion of the erection process. Three different erection methods were used, the first being the utilisation of a mobile crane to erect the outer columns of the structure.

project team

Developer/Owner:
Pick n Pay Stores Ltd

Architect:
Bentel Associates International (Pty) Ltd

Structural Engineer:
Arup (Pty) Ltd

Quantity Surveyor:
Quanticost cc

Project Manager:
Abland (Pty) Ltd

Main Contractor:
Stabilid Construction (Pty) Ltd

Steelwork Contractor/s:
Central Welding Works (Pty) Ltd

Detailing Company:
Bendraft Engineering Services cc

The use of cellular beams provided simple routes for services and conduits.

Secondly, the tree-columns running through the centre of the building were erected by means of a 'pole' (a pole consists of a tubular pipe, a Tirfor lift and pulling machine and counter weights). The remaining portions of the building were erected by two mobile scaffold towers, an I-beam section running across the two scaffold towers and a hand winch to lift the steel members. Meticulous planning had to be done to ensure that the lifting position was relative to the fixing position so that minimum movement took place after the lift. To further add to the challenges on site, extreme care had to be taken to make sure that no damage was done to the finished floor.

Pick n Pay has embarked on the challenge of representing a new approach to both retail and design by way of enhancing customer experience and by committing to environmentally sound practices. The design team have successfully assisted Pick n Pay in achieving this goal. The innovative use of structural steel, specially tubular and cellular steel profiles, enabled quicker construction times (allowing retail operations to begin sooner); reduced the overall building weight and provided an architectural aesthetic that was both stimulating and inspiring.

The beauty of the exposed steelwork is evident in the additional tree-column located at the main entrance of the store.

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MALL OF THE NORTH

The design brief was to create a clean, modern aesthetic to the building, incorporating a sense of light and space - tubular steel played an integral part in achieving this objective.

The architect's representation of the clean, modern aesthetic of the Mall of the North.

The Mall of the North in Polokwane is the single largest property investment and development in the Limpopo province up to date. The 75 000m^2 mall opened its doors in 2011 and was fully let from the start with 180 top notch shops and restaurants. Over 250 000 people visited the shopping centre in its first four days of trading.

Not only is it a proud achievement for Limpopo but also for the use of tubular steel in a commercial setting. The design brief was to create a clean, modern aesthetic to the building, incorporating a sense of light and space and tubular steel played an integral part in achieving this objective.

Usually with large shopping centres a lot of the attention goes into the interior of the mall and the exterior husk is often a 'windowless' shell surrounded by an expanse of parking space. Not so with the Mall of the North. The structural steel frames of the four large entrances give the exterior shell of the shopping centre an inviting feel.

Steel-and-glass lobbies are constructed within the structural frames of the entrances.

The steel-and-glass ellipsoidal dome skylight creates a modern but also playful feel with the replication of reflections.

The entrances, although differing in detail, share a common theme with rectangular hollow sections creating the structural framework. These frames are clad with an intricate lattice of horizontal steel slats to provide shading for visitors to the mall from the hot Limpopo sun. Steel-and-glass entrance lobbies are constructed within these spaces.

The striking feature of the development is the central barrel-vault roof skylight situated above the entrance to the restaurant and entertainment court on the upper level. The skylight was constructed using circular steel hollow sections that span the mall at an angle. The complex geometry of this structure, and the need to avoid visible connections, required all the advantages modern day detailing software could offer.

Initially, the skylight was to be formed using a fully imported, inflatable plastic system. Due to programme and cost considerations, plus the client's preference to use local designs and materials, this was changed to a steel-and-glass ellipsoidal dome. The structure has overall plan dimensions of approximately 50m by 25m. Tubular steel sections form the structural frame, which resembles the veins of a leaf. The geometry of the skylight was designed jointly by L&S Consulting, the structural engineer, and MDS Architecture. Their aim with the design was to minimise the number of differently shaped cladding-panels as far as possible.

The deformations of the structure, under all practical load combinations, had to be carefully analysed and kept within stringent design limits in order to avoid damage to the glazing, or leaks between glazing panels. The sequence of glazing was also strictly controlled in order to avoid excessive asymmetrical loading of the structure during installation of the panels. The skylight is clad with 9.38mm laminated glass.

Construction tolerances were identified early on as a potential problem with the ellipsoidal roof-light structures, owing to the complex geometry of the frames and the concealed connection details which could not accommodate any significant lack-of-fit. Prior to manufacture of the steelwork, a comprehensive survey of the surrounding concrete beams was undertaken. This resulted in rapid and problem free erection of the steelwork on site.

Apart from the entrances and skylight structures, conventional steel girders and trusses form the roof to the development, which is supported on concrete columns at an internal column grid of 20m by 20m. The total weight of structural steel used on the development was 940 tons. All the steelwork was fabricated at OmniStruct Nkosi's factory in Roodepoort and transported by truck to Polokwane.

project team

Developer/Owner:

Flanagan & Gerard, Moolman Group and Resilient Property Income Fund

Architect:

MDS Architecture

Structural Engineer:

L&S Consulting

Quantity Surveyor:

Norval Wentzel Steinberg

Main Contractor:

WBHO Construction North

Steelwork Contractor/s:

OmniStruct Nkosi, Guestyn and Horak

Steel Detailing Company:

OmniStruct Nkosi (Pty) Ltd

THE MALL OF THE NORTH AS A SUSTAINABLE DEVELOPMENT PROJECT

www.mallofthenorth.co.za

With this shopping centre the developers showed that they were committed to responsible development, energy efficiency, sustainability and the implementation of green strategies through inspired design, construction and operational practices.

"As developers, it is crucial to ensure that our future commercial building assets are environmentally responsible and as energy efficient as possible. It is important that they enhance the localities in which they are situated," says Patrick Flanagan of Flanagan & Gerard.

Careful building measures have resulted in the reduction of heat loads, maximisation of natural light and the use of environmentally friendly, non-toxic materials. Environmental, social and economical factors have all been taken into account in the implementation of these strategies.

To start with, the use of local labour and materials wherever possible during construction has gone further than boosting the local economy. It has also helped to lower carbon emissions by reducing travel and transport needs. Borehole water was used during construction and extensive measures were taken to avoid soil erosion.

The Mall of the North's design incorporates insulation, white roofing, cavity walls, shading devices, revolving doors and energy efficient glass to help to thermally regulate the building. The lifts have been designed to store kinetic energy, which will be used for regeneration in the event of a power failure. Escalators have motion sensors so they will run more slowly when not in use. Solar geysers, gas systems, natural ventilation systems, metered taps and low flushing mechanisms in bathrooms all contribute to energy saving. In addition to using natural light to its maximum capacity throughout the centre, energy efficient globes with circuit timers and solar and motion sensors are used liberally to reduce unnecessary waste of energy.

Indigenous landscaping is used throughout to conserve water, and aloes that were rescued from the site before construction were returned and re-planted.

To make sure everything runs optimally the entire centre will be monitored by a BMS (Building Management System), with a central network that evaluates energy usage throughout the building.

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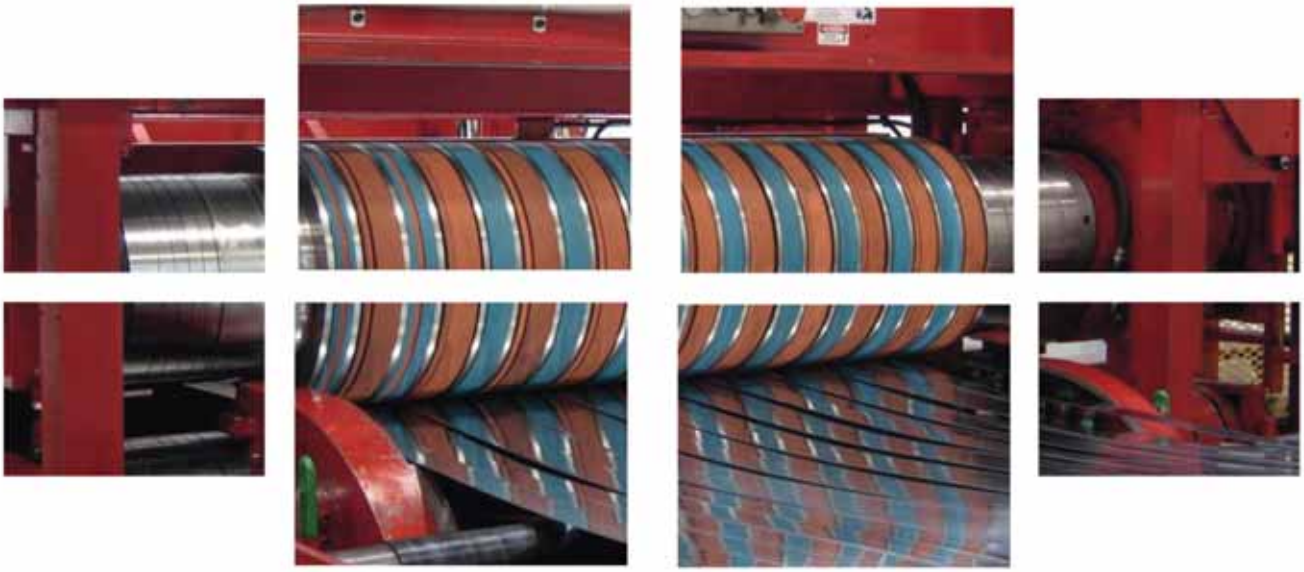

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GRADE 355 TUBULAR STEEL

AN ENGINEERING SOLUTION FOR MANY APPLICATIONS

AN UPDATE ON THE PREVIOUSLY PUBLISHED ARTICLE
(Steel Construction March 2010)

By Franco P. Mordini, Robor Market Development Engineer and Chairman of the Technical Committee of the Association of Steel Tube and Pipe Manufacturers of South Africa

Aesthetically pleasing solutions are possible using tubular construction. This is derived not only from the simple outline of the profiles themselves, but also from the absence of such items as gussets, battens, lacing, sub-bracing, lateral ties, bolts and the like.

Grade 355 tubes, also commonly known as structural hollow sections, was officially launched in February 2010 in Cape Town, Durban and Johannesburg. The launch was a joint venture between the Association of Steel Tube and Pipe Manufacturers of South Africa and the Southern African Institute of Steel Construction. Engineers are now taking advantage of an increased minimum yield stress of 355MPa and an ultimate yield tensile stress of 450MPa for designs.

Grade 355 Tube has enhanced the existing benefits of structural hollow sections. Tubes now compete on an equal footing with other steel sections as well as competing with other construction materials.

Grade S355 is now the customary standard in the 'small bore' structural range, i.e. size up to CHS 219 x 6, RHS 200 x 100 x 6 and RHS 160 x 80 x 6. Sizes greater than these dimensions are available but typically with a longer lead-time of approximately eight weeks.

STRUCTURAL BENEFITS

Structural benefits of tubes are apparent when one compares various different profiles required to resist the same compressive loads. In Table 1 below various different profiles are compared in resisting a compressive load of 800kN and an effective length (kL) of 3.0m. In the comparison the circular hollow section is lightest of all, followed by the square hollow section. The circular hollow section is 46% lighter than the 152 x 152 x 37 universal column. In members subject to mainly compression mass savings of up to 55% by mass are possible when compared to other profiles.

RELATIVE MASSES OF STRUTS					
C_r = 800 kN		kL 3.0m			
	Profile	Radius of Gyration min (mm)	Mass Kg/m	Resistance C_f (kN)	Mass ratio
○	CHS 177.8 x 6.0	60.8	25.4	836	1.00
□	SHS 150.0 x 6.0	58.4	27.2	850	1.07
L	200 x 200 x 16 Angle	39.4	48.5	1140	1.91
⅄	150 x 90 x 12 Back-to-back Angles	38.7	43.2	833	1.70
⊥	100 x 100 x 10 Star Angles Strut	45.0	35.6	810	1.40
I	152 x 152 x 37 Universal Column	38.7	37.0	860	1.46

Table 1: Relative masses of struts.

RELATIVE TORSIONAL STRENGTH				
	Profile	J (10^6 mm^4)	Mass	Mass ratio
○	CHS 88.9 x 4.0	1.93	8.38	1.0
□	SHS 75 x 5.0	1.77	11.1	1.3
L	200 x 200 x 24 Angle	1.80	71.1	8.5
I	533 x 210 x 122 I-Section	1.81	122.0	14.6
H	254 x 254 x 107 H-Section	1.75	107.0	12.8

Table 2: Relative torsional strength.

In simple terms the material in a tube is ideally positioned far away from the center of gravity of the profile and hence increases the radius of gyration. This reduces the slenderness ratio thus increasing the load carrying capacity of the cross–section. This material distribution results in a typically higher second moment of area with a higher section modulus. Another advantage of tubes is that the closed section increases the St. Venant torsion constant (j) hence increasing the torsional resistance of the member. This results in high flexural stiffness in all directions combined with a high torsional stiffness.

Table 2 is a comparison between different profiles where a St. Venant torsion constant of 1.7 x $10^6 mm^4$ is required to resist a torsion load.

In general, columns and beams made from tubes do not need to be checked for torsional-flexural buckling if they fall within the limits of the slenderness ratio or when the height to breadth of these sections does not exceed 2 to 1.

Another factor, often overlooked, is that because the tubular structure is lighter and therefore more efficient, a smaller foundation may result, with the potential of reducing costs. This is especially applicable where poor foundation conditions are encountered.

These structural efficiencies also give the architect and engineer options of reducing the number of columns in the structure. This effectively provides the developer with more usable space thus optimising the area under cover.

Low mass to strength ratio

The lower mass of the structure often provides the engineer with a competitive engineering solution. The lighter, yet stiffer structural members simplify the erection as longer spans can be pre-fabricated, thus increasing the speed and reducing the cost of erection.

From an environmental aspect less material is used without affecting the functionality of the structure. This is particularly important for long–span girders and trusses, where hot rolled section construction could require lateral stabilising during lifting.

Corrosion design

The smooth exterior presented by hollow section members together with the absence of gussets,

Testing done on galvanized tubular steel.

re-entrant corners, inaccessible surfaces (as in double angle members), bolt heads and nuts etc. can result in a major enhancement of the ease with which corrosion resistance design may be achieved. Particular benefits can be gained on structures where access is difficult for maintenance painting such as footbridges or sign structures over motorways.

Galvanizing of tubular steel

The vast majority of the S355 Tube manufactured locally is made with galvanizing friendly steel. The silicon content ranges between 0.15 to 0.25 – an internationally well recognised range that will produce good galvanizing. This silicon range is the same as that of Grade 355 steel plate and conventional long products, hence aesthetics are compatible. Previously Grade 300 steel was aluminum killed. As expected this has resulted in the need to slightly modify the galvanizing parameters. Generally the finish, when compared to low silicon steel, is less shiny. Typically the coating thickness is slightly higher resulting in an increased corrosion protection of the structure.

Modern high definition plasma and laser profiling machines have arrived in South Africa, simplifying the assembly of connecting profiles radically.

The phosphorus maximum content is also controlled. Statistical data received to date has measured a maximum of phosphorus of 0.02% and the average of 0.012%.

Concrete filled Tubes – an interesting option

Tubes offer an option to increase their load carrying capacity by filling them with concrete. This capacity can further be increased by the addition of reinforcement. Not only does the additional strength come with little extra cost, the fire resistance is increased significantly. Internationally this method has found favour with columns in high-rise construction.

Guidance with regard of designing of concrete filled hollow sections is comprehensively covered in SANS 10162 Part 1. But remember to allow an escape hole to permit the steam that would be given off due to the conversion of the water of hydration by heat to steam. Failure to do this could negate the fire protection of the system.

Aesthetical attractive appearance

Aesthetically pleasing solutions are possible using tubular construction. This is derived not only from the simple outline of the profiles themselves, but also from the absence of such items as gussets, battens, lacing, sub-bracing, lateral ties, bolts and the like. Curving of members is easily facilitated with circular hollow sections, and to a lesser degree with square and rectangular hollow sections. Remember that thicker profiles are less likely to suffer from secondary distortion during curving.

Other benefits

Reduced paint areas, refer to Table 3, and reduced wind resistance, refer to Table 4.

In Table 3 the circular hollow section has 43% less surface area than the equivalent star angle strut configuration resisting the same load. The relative ease with which the painting maintenance can be done is also apparent when one studies the various member configurations.

Similarly Table 4 compares the effect of wind force for the same design example. A star angle strut attracts 64% more force than the equivalent circular hollow section.

GRADE 355 TUBE SIZE RANGE

In Table 5 the size range is shown. Stocking of the sizes varies from manufacturer to manufacturer.

TECHNOLOGICAL DEVELOPMENTS IN PROCESSING OF STEEL

Modern high definition plasma and laser profiling machines have arrived in South Africa, simplifying the assembly of connecting profiles radically. This, ever developing, technology makes the profiling of tube intersection simple. The machinery provides the fabricator with a clean, ready-to-assemble component that can be simply welded together with ease. The machines not only profile and/or make slots at the ends of the members but can cut any shape that may be required along the length of the member.

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Structural Hollow Sections and Mechanical Tube - includes a full range of Structural Hollow Sections and Mechanical Tube.

Long Steel Structural Sections - includes universal beams, IPE sections, IPE AA sections, channels, bars and angles.

Conveyance Pipe - includes a full range of welded and seamless pipe.

Sheet and Plate - includes a wide range of Sheet and Plate with or without value added services.

Roofing and Cladding - includes Corrugated 762/610 and IBR 686 profiles in both galvanized and colour

Value Added Services:

Scaffolding - includes the supply, erection and dismantle of access scaffolding on a contractual basis.

Hybrid Structure System - combines graded Structural Hollow Sections with high-strength; lightweight pre-galvanized cold formed steel sections that can result in a mass saving of up to 44%. Substantial cost savings and faster construction are additional benefits.

Galvanizing - Robor can galvanize structures of varying sizes to a high quality finish in accordance to various specifications.

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Plasma and laser machines are supplied with either a 2D head or a 3D head. The 3D head is typically required for thicker material where weld preparation is required at the end of the tube.

CONCLUSION – ECONOMIES OF TUBULAR STRUCTURES

We have presented a strong case for using hollow sections in steel structures. The argument against their more general utilisation is of course based on cost. There is no debate that the purchase price per ton of hollow sections is higher than that of hot rolled conventional long sections. The previously often quoted 'high labour costs' have significantly reduced but will still be higher than for hot rolled labour. But these increases will in many instances be more than offset by the lower mass of tube profiles needed when compared with the equivalent hot rolled profile solution.

The case of members subject mainly to compression forces, that is columns and bracing, tubular construction, is well documented and will surely be cheaper in tubular construction.

However for other structural components, if all the aspects are carefully considered and properly assessed, in a great many applications tubular construction will be very competitive.

Should you have any queries contact Franco Mordini on FrancoM@robor.co.za or +27 11 977 2029 or +27 82 800 7965.

RELATIVE PAINT AREAS			
		mm^2/m	Area ratio
○	CHS 177.8 x 6.0	559	1.00
□	SHS 150.0 x 6.0	600	1.07
L	200 x 200 x 16 Angle	800	1.43
⊥⊥	150 x 90 x 12 Back-to-back Angles	960	1.72
⊥+	100 x 100 x 10 Star Angles Strut	800	1.43
I	152 x 152 x 37 Universal Column	912	1.63

Table 3: Relative paint areas.

RELATIVE WIND RESISTANCE					
		C_f*		C_f x b	Wind resistance ratio
1→ ○	CHS 177.8 x 6.0	1	1.20	213	1.00
1→ □ 2↗	SHS 150.0 x 6.0	1 2	1.65 1.60	248 339	1.16 1.59
1→ L 2↗	200 x 200 x 16 Angle	1 2	2.00 1.80	240 509	1.12 2.39
1→ ⊥⊥ 2↗	150 x 90 x 12 Back-to-back Angles	1 2	1.50 1.60	180 384	1.05 1.35
1→ ⊥+ 2↗	100 x 100 x 10 Star Angles Strut	1 2	1.75 1.62	420 275	1.64 1.07
1→ I 2↗	152 x 152 x 37 Universal Column	1 2	2.10 1.80	319 388	1.50 1.82
* Based on Tables 15 and 22 of the SABS 0160-1989.					

Table 4: Relative wind resistance.

AVAILABLITY OF 355MPa STEEL STRUCTURAL HOLLOW SECTIONS IN SOUTH AFRICA

Rounds

Outside diameter (mm)	Wall thickness t (mm)									
	2.5	3	3.5	4	4.5	5	6	8	10	12
48.3	■	■	■	■						
60.3	■	■	■	■						
63.5	■	■	■	■						
76.2	■	■	■	■	■	■				
88.9	■	■	■	■	■	■				
101.6	■	■	■	■	■	■				
114.3	■	■	■	■	■	■				
127.0	■	■	■	■	■	■				
139.7		■	■	■	■	■				
152.4		■	■	■	■	■				
165.1		■	■	■	■	■				
177.8			■	■	■	■				
193.7			■	■	■	■				
219.1			■	■	■	■	■	■		
273.1			■	■	■	■	■	■	■	
323.9			■	■	■	■	■	■	■	
355.6			■	■	■	■	■	■	■	
406.4			■	■	■	■	■	■	■	
457.0			■	■	■	■	■	■	■	
508.0			■	■	■	■	■	■	■	

Rectangles

Size dxh (mm)	Wall thickness t (mm)								
	2.5	3	3.5	4	4.5	5	6	8	10
50 x 25	■	■	■	■					
60 x 40	■	■	■	■	■				
76 x 38	■	■	■	■	■				
80 x 40	■	■	■	■	■				
76 x 50	■	■	■	■	■				
100 x 50	■	■	■	■	■	■			
120 x 60		■	■	■	■	■	■		
160 x 80		■	■	■	■	■	■		
200 x 100				■	■		■	■	■
200 x 150				■	■		■	■	■
250 x 100				■	■		■	■	■
250 x 150					■	■	■	■	■
300 x 140					■	■	■	■	■
320 x 200					■	■	■	■	■
340 x 180					■	■	■	■	■

Squares

Size dxh (mm)	Wall thickness t (mm)								
	2.5	3	3.5	4	4.5	5	6	8	10
38 x 38	■	■	■	■					
50 x 50	■	■	■	■	■				
60 x 60	■	■	■	■	■				
75 x 75	■	■	■	■	■	■			
80 x 80	■	■	■	■	■	■			
100 x 100	■	■	■	■	■	■	■	■	
120 x 120		■	■	■	■	■	■	■	
150 x 150				■	■	■	■	■	■
175 x 175				■	■	■	■	■	■
195 x 195				■	■	■	■	■	■
200 x 200				■	■	■	■	■	■
220 x 220				■	■	■	■	■	■
250 x 250				■	■	■	■	■	■
260 x 260				■	■	■	■	■	■
285 x 285				■	■	■	■	■	■

Table 5.

SOCIAL SNIPPETS

By Marlé Lötter,
Events Manager, SAISC

SAISC Committees Breakfast

SAISC Breakfast Talk

Dorman Long / Dorbyl Get-together

SAISC COMMITTEES BREAKFAST

2 February 2012

The SAISC usually hosts a function each year for the group of people that contribute quite a lot of their time and effort to the Institute by serving on the Board or other committees and being involved in some way or other. For the past few years it was in the form of a breakfast with an interesting speaker.

The SAISC kicked off 2012 with a strategy session with the Board *(see summary on page 12)*. So this was a perfect opportunity for Louis Heyl of LHA Consultants who facilitated the strategic session to present an overview of the outcome of the session to the guests at the committees' breakfast.

SAISC BREAKFAST TALK

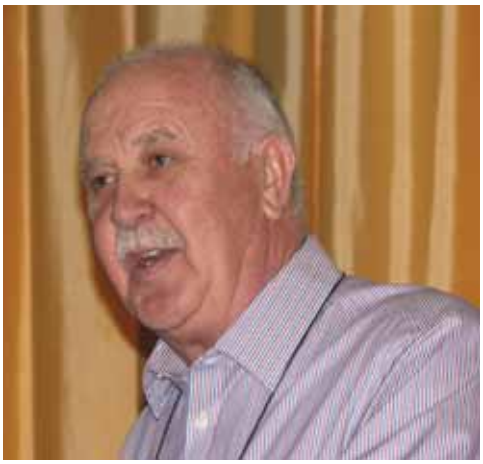
23 February 2012

Around 85 guests attended the SAISC Breakfast Talk on 23 February, hosted at the Country Club Johannesburg with Jim Guild of SAIW presenting special insight into the state of the SA Welding Industry.

The presentation focused on manufacturing and metal construction as welding is involved in 98% of manufacturing processes. Neglecting the essential industry of welding technology leads to a higher level of imported products and labour and has negative impact on growth and GDP. Jim highlighted the dire shortage of skilled personnel on all levels in South Africa as a critical challenge. It remains difficult to attract suitable people to welding-related careers, even though the industry ironically has good employment prospects for people across the spectrum from Grade 10 to postgraduate. While there are training initiatives in place, the outcome is still too slow and too small. According to Jim only 20 International Welding Engineers (IWEs) and 17 International Welding Technologists (IWTs) were registered in South Africa since 2003, while Germany has averaged 700 IWEs and 100 IWTs per year over the last 10 years. Clearly more training is urgently needed on all levels and in addition welding related research and technology development work on tertiary levels should be encouraged.

A copy of this presentation is available from pamella@saisc.co.za or on www.saisc.co.za (Recent Events)

Also visit the website of the SA Institute of Welding for further insight into this relevant industry – www.saiw.co.za



Jim Guild of the SA Institute of Welding, guest speaker at the breakfast talk held in Ferbuary 2012.

Kobus Marais of Robor with a question from the floor to guest presenter Louis Heyl at the SAISC Committees Breakfast hosted at the Country Club Johannesburg.

DORMAN LONG / DORBYL GET-TOGETHER

1 March 2012

Kobus de Beer, currently the Industry Development Executive for the SAISC, but previously also the MD of DSE, arranged another very special get-together for industry colleagues who shared some involvement with Dorman Long (Africa), later known as Dorbyl Structural Engineering, more recently as DSE Structural Engineers and Contractors and currently Aveng Grinaker-LTA DSE Fabrication. Looking through the Steel Construction journal archives of 1971 and earlier, the names of these organisations seem to have been ever present in advertising in the journal or whenever there was coverage of

Some well-known faces at the Dorman Long / Dorbyl Get-together.

structural steel projects. Many of these are still present and will remain as structural legacies for generations to come.

The event guest list boasted a wide age span from close on 50 to 84, but all could still make it up to the first floor of the Country Club Johannesburg! A good time was had networking and reminiscing over memorabilia – Gary Jones even handed out some Dorbyl tie pins that were very useful in a draughting office where wearing a tie was compulsory.

Anyone with questions (or answers) about the whereabouts of 'old boys' (and girls) or the next get-together are welcome to contact Kobus de Beer: kobus@saisc.co.za

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For more information contact Stalcor

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