

steel CONSTRUCTION

OFFICIAL JOURNAL OF THE SOUTHERN AFRICAN INSTITUTE OF STEEL CONSTRUCTION

Volume 39 No. 4 2015

FACTORIES & WAREHOUSES

SPENCER'S SURVIVAL KIT
for steel fabricators during hard times

Steel brings historic mill buildings
BACK TO LIFE



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Front Cover: Cell C Warehouse
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Volume 39 No. 4 2015

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editor's note

I was searching for “some good news about the bad economy” and could not really find anything. I wrote it down to – bad news is always news. I then went on to a more neutral subject – economic trends, but thought let's see what they (the experts) wrote about 2015.



The unifying theme is that the global economy is taking longer than expected to recuperate from the bursting of the debt bubble during the last decade. Three years ago, the IMF projected that the world economy would be back on track by 2015, growing at 4.8 percent. (www.bloomberg.com)

Not really news is it? Since we are now in 2015 and yes, it is taking longer to recuperate. However, Bloomberg did not anticipate the collapse of Greece's economy for example.

I am no economy expert, but what I did see is that no matter how adverse the current situation, there are always entrepreneurs and companies who spot the opportunity and go for it at the right time, even though the risk might be slightly exhilarating.

Take for example our feature for this Issue – Factories and Warehouses. We have seen large steel warehouses popping up all over the place. Why? Because South Africa is importing (similar to other countries) a lot of goods from the East mostly. These goods need a facility for storing and distribution.

Spot the gap? As a developer, start building warehouses and sign up the tenants. Build them in steel with long spans and as light as possible, near the harbour – easy in easy out. Build seven according to the same design – e.g. standardisation e.g. cheaper, quicker and more efficient.

Maybe we should search less for the bad news and more for the opportunities that arise from adversity?

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Renew your **strategy** and **prosper**

By Paolo Trinchero, Chief Executive Officer, SAISC

“We too have a number of areas where we are **market leaders.**

One just has to look at our **STEEL AWARDS** entries to see the talent and expertise out there.

We need to consider our **strengths** and look for **OPPORTUNITIES** not necessarily in South Africa where these skills are **needed.**”

One of the leading lights (*no pun intended*) in the construction industry has been the renewable energy sector. Every month or so another project comes on line within budget and on time. Going back to 2009, I remember a number of European companies coming to South Africa to promote renewable energy. Supported by local and international players they have managed to build an industry to be proud of, and an industry which we could play a role in for export into the rest of Africa.

So despite a very severe downturn in 2009, these European companies saw an opportunity in South Africa and made it happen. This was not an overnight or individual company's success. It was a combined effort of a number of associations, companies, developers, financiers and government.

We too have a number of areas where we are market leaders. One just has to look at our Steel Awards entries to see the talent and expertise out there. We need to consider our strengths and look for

opportunities, not necessarily in South Africa, where these skills are needed.

There is no doubt that we have developed expertise in the energy sector including building power stations. We need to leverage our combined capability and market to other countries. We recently took a delegation comprised of DTI, Treasury and SARS decision makers to Kusile Power Station and Genrec Engineering. The scale and complexity of this project is world-class despite all the negative press.

What about the mining, agriculture and petrochemical sectors not to mention all the other types of projects our members have been involved in over the years? Considering our appetite for shopping centres in South Africa we should be the leading contractors of most developments in Africa as the Chinese are on rail roll-outs. What we need is a much larger collaboration of owners, developers, financiers, project professionals and contractors.

The difference from our side will be our willingness to partner with local companies as we have become used to developing smaller players and working within the empowerment space here in South Africa.

Innovation and competitiveness are key to us surviving the rough patch we are currently experiencing. The world is constantly changing at a rapid pace and we must make sure that we are prepared with an educated and skilled workforce.

It's time that we began to move away from the problem and work towards a possible solution.

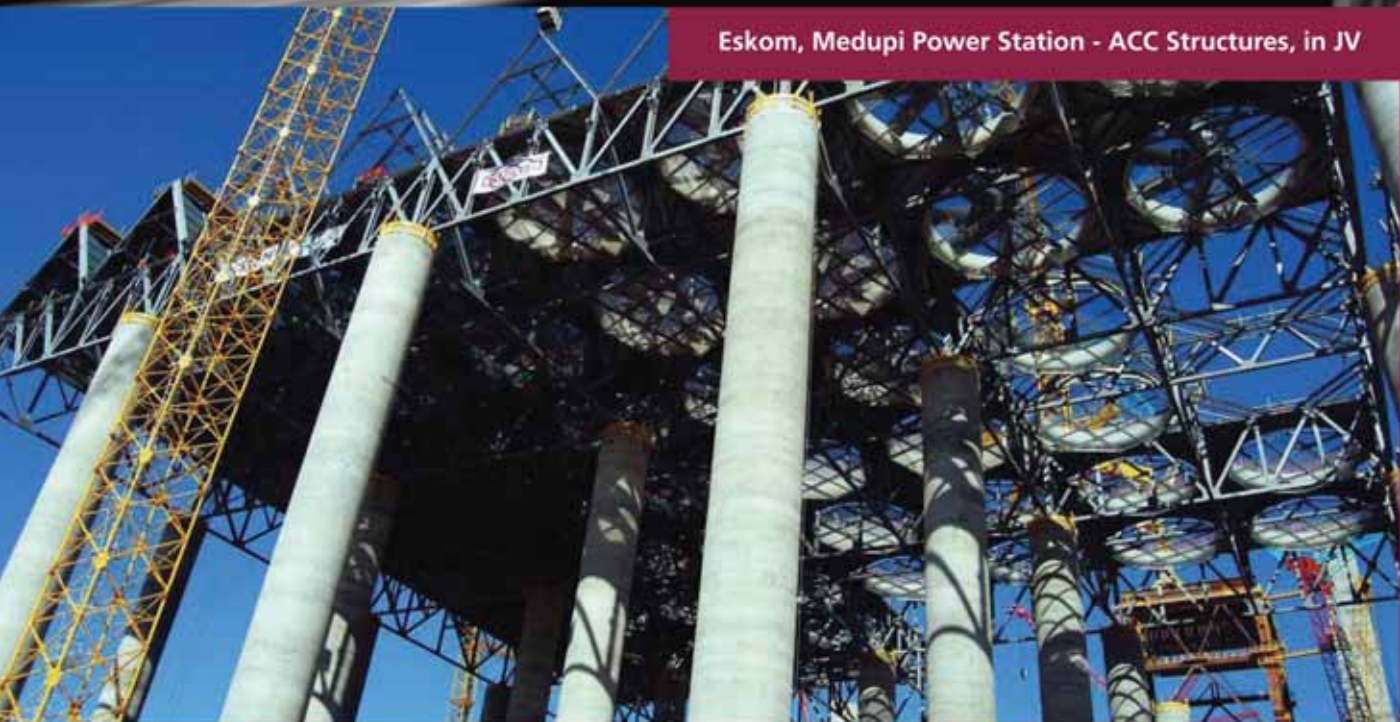
LEFT: Kusile Power Station.





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 Mitec, 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.



Siegfried (Sig) Holtzhausen

6 June 1929 – 1 July 2015

The steel construction industry has lost one of its true doyens. Sig Holtzhausen passed away on 1 July 2015 at the age of 86 after a long and fruitful life.

It is indeed the mining industry that has seen fit to erect numerous monuments to Sig's skill in the form of mine headgears scattered over the 'veld' from the Northern Cape to Zambia. He received his Honorary Life Membership from the SAISC in 2007.

Siegfried Holtzhausen grew up during the difficult years of the Great Depression in the 1930s, but had the opportunity to come to Wits to get a degree in civil engineering.

Thereafter he summarily became a member of the steel construction industry when he joined Alpheus Williams and Dowse, one of the many names studding the landscape of the history of our industry. There he became a real steel man with great skill in the design of steel structures, and also found his feet in what was to become his speciality: the design of structures for the mining industry, such an integral part of what our industry was all about for many years.

It is indeed the mining industry that has seen fit to erect numerous monuments to Sig's skill in the form of mine headgears scattered over the 'veld' from the Northern Cape to Zambia. We tend to identify these iconic structures with Sig, who has not only designed many of them, but has been responsible for some innovative breakthroughs.

But he has also proved himself adept in many other types of structures. His work can be seen above the ground in all manner of mining-related structures, but much of it is also hidden thousand of metres underground or is constantly speeding up and down mineshafts. Yet others are visible as the enormous industrial buildings housing industrial processes and plant for a variety of industries.

Sig has made many contributions to the industry, and we should be particularly thankful for his work as a member of Dr Geoff Krige's Mining Structures Committee. We are very proud of the work this Institute committee has performed, compiling a set of standards that confirm South Africa's world leadership in the mining field.

Sig's professional career of more than 60 years has been long enough to allow companies he worked for to become lost in the shrouds of history, but some 37 years ago he became a senior partner of a firm of consulting engineers that's still very active in the industry: DA Walker Ahier and Holtzhausen, now just called WAH Engineering. He was surely an example to all of us as a man who knew how to make a contribution to the society he lived in.

Sig is survived by his wife, Maureen, of 61 years and his children, Mark, Christopher and Elizabeth.

Rest in peace Sig the structural steel and mining industry are poorer with your passing.



RIGHT: Sig Holtzhausen receiving his Honorary Life Membership from then Chairman, Molefe Kgomo.

SAISC Steel Awards 2015

THE 34th EVENT AND THE 5th STEEL AWARDS
PHOTO COMPETITION

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Riversands Incubation Hub



William Nicol Showroom



Steyn City Gatehouses, William Nicol Drive and Cedar Road



Steel Spire on top of The Sandton Tower



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Sandton City Atrium on 5th Facade Support Structure

Your project could be here in 2016...



Multichoice City



Dorp Street Facade



Society House Hotel and Retail Upgrade

Steel Awards 2015

Hot Rolled Structural Steel

Photo Competition Entries



Photo Competition Sponsor – Cadex Systems SA

WAREHOUSE WAREHOUSE WAREHOUSE WAREHOUSE WAREHOUSE WAREHOUSE WAREHOUSE WAREHOUSE WAREHOUSE WAREHOUSE WAREHOUSE WAREHOUSE



New Distribution Centre, Value Logistics



DHL Supply Chain



Ndabeni Electrical Depot



Warehouse Upgrade Kumba



208 Gale Street Shree Property



ARMCO Galvanizers Boksburg - Refurbished Roof over Process Tanks



New Ferrochrome Furnaces Factory



MAN Diesel and Turbo Facility Hilltop Industrial Park

CLADDING CLADDING CLADDING CLADDING CLADDING CLADDING CLADDING CLADDING CLADDING CLADDING CLADDING			TUBULAR TUBULAR TUBULAR TUBULAR		
					
Multichoice City (Cladding)	St Peters College Auditorium	Newtown Junction	The Watershed, V&A Waterfront		
					
Covenant Fellowship Church International (CFCI)	Cell C Warehouse, Midrand	Rosebank Mall Upgrade	University of Pretoria Amfi Roof Structure		
MINING AND INDUSTRIAL MINING AND INDUSTRIAL MINING AND INDUSTRIAL MINING AND INDUSTRIAL MINING AND INDUSTRIAL					
					
Twefontein Optimisation Project – Stackers	Medupi Power Station – Air Cooled Condenser	Medupi Power Station – Coal and Ash Terrace	The Edge Restaurant, Naval Hill		
					
Pineslopes Play at Height Bunjee Tower	Parade Infill Deck Cape Town Station	Sentech Masts	Kirstenbosch Centenary Tree Canopy Walkway ('Boomslang')		
This year will be the 5th Steel Awards Photo Competition. All the Steel Awards entries take part in the competition by submitting one of their project photos as a photo competition entry. Since the competition was launched in 2011, the standard of project entry photos received has increased significantly and more and more professional photographers are commissioned by the project nominators for stunning structural photographs. For those who are not quite there yet – learn from your peers and get clicking! (see LSF entries on page 34)					
					
			SKA Meerkat Radio Antenna Positioner – Back-Up Structure		
RESIDENTIAL RESIDENTIAL RESIDENTIAL RESIDENTIAL RESIDENTIAL RESIDENTIAL CATEGORY RESIDENTIAL CATEGORY RESIDENTIAL CATEGORY					
					
House for retired couple, Zinkwazi Beach	House De Clercq – Cape Town	House Molenaar, Paarl	Davertry Road Bridge		
		Your project could be here in 2016...			
Breakwater Apartments	New gym and entertainment area for existing residence			Buscor Whiteriver Bus Terminus	

Industry NEWS IN BRIEF

Energy crisis forces SA industry to innovate

South Africa's energy supply challenge has created opportunities for companies to innovate in their use of energy, and to become a world leader in industrial energy efficiency.

SA was already exporting its industrial energy efficiency knowledge and skills to 17 countries, said Ndivhuho Raphulu, director of the National Cleaner Production Centre of SA (NCPC-SA). This follows a successful global pilot programme run in SA by the UN's Industrial Development Organisation (UNIDO).

"The energy shortage gave us real impetus to build skills and capacity with our Industrial Energy Efficiency (IEE) Project," Raphulu told the delegates on the opening day of the IEE Conference and Manufacturing Indaba KZN.

BELOW LEFT: The Silo Hotel will be housed on the uppermost floors of the Grain Silo building, with the Zeitz Museum of Contemporary Art Africa (Zeitz MOCAA) being housed below.

Credit: Heatherwick Studio, supplied by the V&A Waterfront

BELOW RIGHT: Pandae's Super Mezzanine Parking Floors solution includes full project management.

OPPOSITE PAGE: Vaughan Hattingh, director and adjudication practitioner with MDA Consulting (Pty) Ltd.

The IEE project has empowered over 100 companies to save more than R1.1 billion in direct energy costs over five years, and to train 119 energy efficiency experts.

Hemant Grover, technical manager at NCPC-SA, said the 1340GWh savings enabled by the IEE project exceeds all energy generated at SA hydroelectric power stations by 30%, and equals 10% of the country's nuclear power generation. The IEE savings would power 118 000 SA mid-income homes for a year.

"Energy efficiency is energy that does not need to be created," said Grover. "We need to start seeing it as a primary energy source, particularly under SA's challenging conditions."

"Going green is now the competitive thing to do," said Reinet van Zyl, sustainability manager at ArcelorMittal SA in Saldanha, which joined the IEE programme at a time when rising power costs and global competition almost forced them into a corner.

"We weren't competitive and didn't know how to change that, but the IEE programme and NCPC experts empowered us to see opportunities and make changes."

Van Zyl said the steelmaker has cut its LPG consumption by 49%, saved 20MW in baseline energy demand and already paid

back its R15m investment in energy efficiency. "NCPC made the difference by changing not just the way we operate, but also the way we think."

V&A Waterfront announces the ultra-luxurious Silo Hotel

A few years ago the V&A Waterfront publicised its R500 million philanthropic undertaking in the conversion of the historic Grain Silo complex into the Zeitz Museum of Contemporary Art Africa. More than a year into the ambitious redevelopment of this heritage landmark, an exclusive 5 500m², 28-key hotel, managed and operated by The Royal Portfolio, has been announced.

The Silo is an exclusive hotel in all aspects, including its special location atop the Museum with 360 degree mountain and sea views. Renowned industrial designer Thomas Heatherwick of Heatherwick Studio, London is the architect for the reimagining of the Grain Silo complex, which combines both the museum and the hotel above it.

From the outside, the greatest visible change to the Grain Silo's monumental structure will be the addition of pillowed glazing panels, inserted into the existing geometry of the upper floors, which will bulge outward as if gently inflated. By night, this will transform the building into a glowing lantern or beacon in the harbour.



In an independent economic impact assessment commissioned in 2012 and updated in 2014, findings indicated that future developments at the V&A Waterfront would contribute R223.7 billion to the nominal GDP by 2027, over and above the R259.1 billion contribution of the past 12 years. In addition to the contribution to GDP, development at the V&A Waterfront is responsible for impressive direct and indirect job creation. At its peak, the Silo District development, at a cost of R1.5 billion, will have 2 000 workers onsite.

Solving the problem of insufficient parking space

The majority of motor dealerships worldwide experience severe parking constraints that impact negatively on customer experience. Local dealerships can dramatically increase storage space for their new and used vehicles with scientifically-engineered stand-alone steel structured 'Super Mezzanine Parking Floors'.

The mezzanine floors, designed and developed locally by commercial and industrial solutions specialist Pandae, can be installed at the dealership without having to increase the size of its current premises. Pandae CEO Ryk Coetzee notes that this is a cost-effective alternative solution to expensive off-site parking, which often results in avoidable damages to new vehicles.

"Pandae's Super Mezzanine Parking Floors solution includes full project management – from measuring, plotting, and 3D CAD visioning of the proposed

parking area, and obtaining city council approval – to handing over the completed parking floors along with all relevant engineering certification. The mezzanine floors can be designed and branded with the company's logo and corporate identity to ensure maximum return-on-investment," he explains.

The installation process does not require a shutdown period, as the contractors work around the existing facilities. Whether the mezzanine is built within a main building, or outside above auxiliary structures, Coetzee states that construction is executed with minimum disruption to business. What's more, finance options provide additional scope for tax benefits.

"The operating lease or instalment sale agreement allows for off balance sheet financing. The asset and associated liabilities are excluded from the balance sheet, thereby ensuring that the dealership's gearing is not affected, while it enjoys the full benefit of the mezzanine over the term of the rental contract," he continues.

Coetzee points out that the long-term potential profitability of the dealership can be dramatically increased with the Super Mezzanine Parking Floors solution, as it supports more vehicle stock. "This solution not only solves the problem of insufficient parking space, but can also pay for itself within a few years, to ultimately increase both the lifespan and viability of the dealership," he concludes.

Regulations to legislate prompt payments are a game changer for the construction industry

New proposed regulations governing payments and dispute management under construction works contracts are expected to profoundly change the way the South African construction industry operates. The Construction Industry Development Board (cidb) Prompt Payment Regulations and Adjudication Standard appeared on Friday 29 May 2015 in the Government Gazette Notice 482 of 2015.

These regulations address a crippling constraint to effective infrastructure development by introducing processes to ensure the life blood of the industry, cash flow, actually flows. They legislate a standard set of payment provisions and introduce adjudication as a mandatory first

step for resolution of disputes in both the public and private sectors.

Similar payment regulations have been introduced by statutory intervention in the United Kingdom, Singapore, Hong Kong, New Zealand, Australia and most recently Malaysia. Wherever these regulations have been applied internationally, they have made a fundamental difference by freeing up cash flow.

According to Vaughan Hattingh, director and adjudication practitioner with MDA Consulting, "Delayed payment has a destructive effect on the sustainable development of the construction industry. The proposed regulations prevent withholding of payments without going through a defined procedure. They give contractors a statutory right to suspend works, to charge interest on late payments and they introduce a mandatory form of statutory adjudication to resolve disputes."

Euan Massey, director and adjudication practitioner with MDA Consulting, notes that, "The practice of withholding payment due to employer budget constraints or linked to performance or until completion of a project and delays in resolving disputes have resulted in contractors financing projects. The new regulations will compel parties to resolve disputes through adjudication within 28 days. Importantly the 28 day window may only be extended by 14 days in prescribed circumstances. These proposed interventions will have profound consequences for the South African construction industry."

Massey explains that enforcement of the adjudicator's decision is critical to the success of the prompt payment regulations in realising the primary objective of freeing up cash flow. "For several years, South African courts have supported the adjudication procedure by implementing a robust approach in enforcing adjudicators' decisions repeatedly; determining that adjudicators' decisions are enforceable as a matter of contractual obligation and that furnishing notice of dissatisfaction does not prevent enforcement. Parties are required to comply with and promptly implement the adjudicator's decision. In this way, disputes will be dealt with cost effectively and expeditiously," he says.



SPENCER'S SURVIVAL KIT

for steel fabricators during hard times

By Spencer Erling, Education Director, SAISC



This article is not really rocket science, in fact much of it is common knowledge. If our industry is to survive we need to have a survival strategy and if possible still go for the 'low hanging fruit' ways to be more productive. The SAISC's **eTOOLKIT** for connections is one such 'fruit'. Read our other article in SC Issue No 1 2015 on page 28 on workshop productivity to find out just how many hours you can save in your workshop by using optimised, purpose designed, fit for purpose connections which is what the **eTOOLKIT** gives you.



Cash flow, cash flow, cash flow and more attention to cash flow!

Without cash we end up calling in the Business Rescue team. Cash is the oil that keeps the wheels of industry turning. That said what can we do to improve cash flow?

Clearly keeping a careful eye on debtors is key. After all, that is cash that is owed to you. Keep those companies that owe you money on a tight leash, do not do more work for them if they fall behind in payments. Yes, even JBCC and FIDIC have methods by which you can do this if you stick to the rules.

Fight for advance payments.

I recently sat with the FD of fabricator that does just that. The result is they pay 30 days (and sometimes even faster) for those settlement discounts. The total amount in a year of settlement discounts represents a big chunk of their profits over the year. Oh and yes, they do make profit in these tough times. Those companies that do not offer settlement terms, well they can wait for their money. Remember that a 2.5% discount at the end of each month represents a 30% return on investment over a year, which is better than you can do on any other investment.

Alternatively offer your customers an early payment settlement discount.

Especially if you can leverage that payment into further settlement discounts for your selves.

Check potential customers out carefully. Insist on the 10% payment guarantee that many contracts provide for. If the customer cannot provide such a guarantee surely there is a warning message that you should carefully consider. Remember that some of our major quoted civil engineering companies have shown serious losses over the last few years, their financials are in public domain – look at them!

Keep your ear on the ground. Some companies have a reputation for finding any excuse not to pay, are you considering doing business with them? If you are, you need to tie them up carefully to ensure you get paid per contract. One sure way of not getting paid per contract is not to perform well. So make sure you do your best for every project that their contract manager does not want to find an excuse not to pay you.

How and when you spend your hard earned cash. This is equally important to cash flow. Surely the best first prize a fabricator can score is to buy the steel he needs for the month's production at the start of the month and where ever possible deliver the steel in that month. That would mean when you get paid at the end of the following month would be when you need to pay to get that all important settlement discount. To me it just does not make sense to buy steel late in the month unless it is actually holding up a job.

Plan your month's production based on what you can get out that month.

By not buying late in the month you effectively get an extra month's credit. Consider concentrating on finishing smaller jobs one at a time using a big effort in the works rather than have a whole lot of jobs not finished by month end. This applies to not only the steel but consumables, bolts, paints etc. We are aware of certain steel shortages resulting in your having to buy it when it is available. Make sure you look at the availability of materials at all merchants.

Minimize free stock holding. Have you been through your off-cuts carefully and found a use for them? After all they come free, you have already paid for them.

And finally, if you do have cash in the bank carefully manage it and make sure it is earning interest i.e. minimise the cash you keep in your current account.

Pricing policy

Remember those words of wisdom from Rob Churchyard of C & U (retired) in Durban "there are no lousy jobs, there are only lousy prices". Get the price wrong and it will cost you money. If you are too cheap you will lose money on the job. If you are too expensive you will not win the contract and potentially will lose money with an empty shop. So what can you do about pricing?

Understand your costs properly.

What does an hour really cost you in terms of the direct wages and their contributions (also called on-costs i.e. leave pay, public holidays, UIF, WCA etc.) on costs could be between 40 and 50% of the hourly rate, check yours out carefully.

Make sure you recover all your overheads.

In other words anything that is a cost that cannot be directly charged to a job such as consumables, electricity, rent, management, office costs etc. In this way you determine your cost of doing the job.

Only when you have determined what it will cost, to the best of your ability, to do a job, should you consider mark up (if any) which is a marketing decision.

These decisions would be based on how desperate am I for a job. Is it cheaper for me not to recover all my costs than to have my workshop empty? How busy or hungry are my opposition likely to be? How well suited is my company to do such a project compared to my opposition?

Are you doing your homework to find every possible enquiry? Do you have a salesperson banging on doors trying to find those enquiries? The days of sitting back and waiting for emails (many of which you just ignored!) are gone! For that matter have you investigated exports and are you export ready? We have a weakening rand and a falling steel price to help you!

Find out what the opposition are pricing. If there is a public opening attend it and note the prices. They will also tell you if the quote is qualified or not. Sometimes that qualification could be another cheaper offer. Alternatively, chase up the enquirer to let you know how you fared compared to others.

Work closely with a team of subcontractors.

They will come to the party if they know you can get the job by them quoting a really keen price. Remember they are probably as hungry as you are!

Are you really getting the best price for your buy-ins.

Steel is obviously the biggest item. There is software available that can do the work for you, check out which merchants have what products available at what price and then you can pick the eyes out of it. Remember that in a falling price regime as we currently have for steel, some merchants may be sitting with old 'expensive' stock, and it goes against the grain to sell it at a loss,





whereas another merchant may be sitting with newer cheaper stock and another merchant may be sitting with imported steel. So check prices carefully.

Finally remember if you really want a job, give the quotation the detailed investigation into what it will cost you it deserves. **Just pulling numbers out of previous tenders is not the way to win jobs.** What should always be at the back of your mind is how I get cleverer than my opposition, what cost saving alternatives can I come up with?

Productivity issues

Is my team operating as efficiently as possible with the equipment I have available to me in my works? Is my team both in the workshop and the office the right size? The days of being able to have separate dedicated people for HR, Safety, QA, Marketing and and and... are long gone. Do we have a team that can multi-skill? Can we train key personnel up to do other work etc.?

I have long advocated the importance of training and competent skills. Had you listened to my calls you would have a highly motivated well trained, skilled team of

guys who want to keep their jobs as much as you want your company to survive.

It is not too late to upskill. It is never too late to motivate you team to do better to survive and keep their jobs. Even the unions would understand that call, and yes they can assist when it comes to motivation, without extra money. They want their members to keep their jobs so that the union can survive. The whole food chain wants to eat, let's exploit that need and use it as a motivational tool. It is time to bite the bullet and get rid of that dead wood. Retrenchment is a horrible step to have to take, rather do it sooner than too late. Make sure your labour lawyer holds your hand through the process. Do not try to do it unassisted, there are too many pitfalls, even companies as large as Telkom are getting it wrong. If we have to go on to short time do it quickly, do not wait till people are hanging around and the rumour mill gets going. Rumours can be very destructive especially if they are not correct. The process is well set out in the main agreement for the metal industries (easy to find on the internet – just search for the metal industries main agreement) and stick to those rules. It is easy to implement.

Are we giving fully detailed work instructions to our workshops? Or are they battling to find information on their drawings? 3D detailing programs such as Tekla can largely improve productivity if only the correct information (reports) are generated to optimise productivity.

Do you ever talk to your workshop team about whether there are better ways of doing jobs? You will be amazed at the good ideas that come from that source.

Do you have a productivity bonus scheme going? I know it's not easy but have you considered all possibilities?

Now is not the time to be expanding or **spending on equipment, but there are still lots of opportunities with relatively small investments** to improve productivity and especially reduce handling costs. Have a look at our articles in SC No 1, 2 and 3 of 2015 for more on the subject.

I am sure I have barely scraped the surface of the subject. If you have ideas that you would like to share with your colleagues in industry, please let me have them. I would gladly do a follow up article.



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Plasma Table



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Python X



Medupi Power Station

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- Mainly serves the commercial and industrial markets, with smaller contracts in the domestic market.
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NEWS FROM THE USA

Steel brings historic mill buildings BACK TO LIFE

By Amanuel Gebremeskel, The 'roving engineer'



Amanuel, the Institute's Development Engineer, is currently back in the USA while his wife, Ribka is studying there for a year as part of a three year fellowship programme. Although he is on a sabbatical, he is still working part time for the SAISC and will be our American correspondent for Steel Construction.

While biking around North Carolina I pass a building that once hummed with the whirl of more than a hundred people operating 10 000 spindles. Now dormant it is a relic of a time when cotton was king and trains were the lifeblood of Southern commerce.

More than a century old the 5 000 square metre spinning mill was closed in 1976. But two years ago its owners believed that it had some life in it yet. They hoped to turn the building and the surrounding land into a sports and retail complex with the help of the state mill rehabilitation tax incentive which would offset the cost of renovating this historic structure.

Over the past several years many other owners of cotton and tobacco mills around the state believed the same and the results are spectacular. The use of structural steel in these projects, using some steel reclaimed from the existing buildings but mostly new, allows for the most fascinating architectural expressions. The ease with which planning and construction can commence while preserving the historic character of the structures can't be achieved any other way.

In 2004 the South African National Treasury launched an urban renewal tax incentive to encourage the refurbishment and construction of commercial and residential properties in South Africa's 16 major cities. The incentive translates into considerable financial benefits for investors, especially for refurbishing existing buildings. Companies that redevelop buildings in the country's inner cities get a 20% tax deduction from all income earned in the first five years after a building has been refurbished.

A developer must improve an entire building or at least a 1 000 square metre area. In order to qualify for the five-year write-off, investors must preserve a substantial part of the building's



existing structural or exterior framework, i.e., all four walls or all the steel frameworks of the existing building.

The US has similar building renovation tax incentives for investors. For instance a federal tax incentive is available for renovation expenditures incurred for a qualified building or a certified historic structure. The amount of the incentive is 10% of the expenditure for work done on non-historic buildings built before 1936, and 20% of the expenditure for historic structures. State incentives can add another 30% to the federal incentive.

To qualify the building must be used in a business. In the US, rehabilitation includes renovation, restoration or reconstruction of a building, but it does not include an enlargement or new construction. For instance, one such incentive allowed the repurpose of a complex with a R80 000 tax value before its renovation. After it opened as a commercial and residential space in 2011 its tax value rose to R160 million.

Most renovations aren't possible without the help of the incentives because the cost of preserving and repurposing a heritage building generally exceeds the amount of revenue the structure will generate while new tenants take root and build a customer base.

The only way to make a profit on these very large structures on many occasions is to invent a new enterprise and give it a new start. The incentives develop equity up front to help get the project done, and this turns it into a viable asset for the community.

With large urban areas that harbours old structures, and a fast pace of urbanisation, it is time for South African investors to engage local architects and structural engineers to evaluate the viability of such projects in their provinces. Technical competence to plan, design and erect renovations are available at very reasonable prices.

To aid this process the Institute has The Red Book that provides easy access to the relevant details and capacities of steel structures. Moreover the Green Book and **eTOOLKIT** provide easy methods of connecting such members to each other and the existing brick or concrete walls and foundations.

Fabricator and structural engineer members of the Institute can make use of these tools to arrive at reasonable project costs and complete them within budget.

Until next time – it's time to go biking again!



Three Wishes

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

There is growing evidence of improved co-operation between Government and Industry. This is welcomed and justifies extra-ordinary efforts from all stakeholders to ensure success.



The Department of Trade and Industry recently met with 20 Export Councils including representatives of the metal industry for a three-day TESA (Team Export SA) workshop. A presentation was made to the Minister, Dr Rob Davies, on the current state of the Structural Steel Industry which could be summarised as follows:

- Fabricated structural steel is a versatile export product based on a successful local industry adding value along the whole production chain: Conceive – Design – Draw – Fabricate – Paint – Assemble – Construct. A job creation multiplier of 100 decent jobs per 1 000 tons produced applies.
- 196 000 tons of fabricated structural steel products (HS7308) were exported in 2014 (Value R5.2 billion) mostly into Africa. This represents some 25% of South Africa's capacity and probably 50% of current production levels!
- A steady decline is reported in the industry due to the slower economy and this is made worse by steadily growing imports. Business closures are taking place.
- Appreciation was expressed that

fabricated structural steel, power line hardware, conveyance tubing and roofing products were designated in terms of IPAP 2015/16.

- Designation means that State Owned Enterprises (SEO) such as ESKOM, Transnet, Transnet Port Terminals, etc. as well as provincial governments and municipalities have to buy locally produced goods.

The major export strategies for fabricated structural steel (HS 7308) are:

- Build on successes and established relationships in Africa.
- Continue to liaise and contract with decision makers in the African mining industry based in Australia and Canada.
- Jointly pursue (Government and SA Inc) major projects such as Anadarko and the Pemba/Palma LNG project as well as the SIPS projects.
- Continue developing more cost effective and competitive supplies.
- Benchmark fabricators and constructors against major international competitors.

INDUSTRY NEWS: LOBBYING

When the designations were announced the Minister outlined their determination to ensure wide ranging compliance.

The Industry actively supports this and submitted its 'Three Wishes' to the Minister in the form of a stated problems and proposed solutions presentation:

1. **Problem:** Import statistics are not correct and import duties are frequently sidestepped.

Solution: Measure imports strictly and collect imposed import duties (15% on HS7308 products). Instruct all "Designated Products" to be

imported under the correct HS Codes even if part of larger projects.

2. **Problem:** Breaches are difficult to report and slow to be acted upon.

Solution: Appoint an inter-departmental Ombudsman / Tribunal with "a bad temper and good teeth" to investigate and act and involve the Ministers when necessary.

3. **Problem:** Buyers at SOEs (ESKOM, Transnet, Municipalities, etc), as well as the mining and other industries are reluctant and slow to implement local content requirements.

Solution: Arrange 'road-shows' and visits to buyers to communicate the intentions and practises of the DTI and Industry and to highlight concerns and solve practical problems.

There is growing evidence of improved co-operation between Government and Industry. This is welcomed and justifies extra-ordinary efforts from all stakeholders to ensure success.

All of the above will contribute meaningfully to ensure local content – Proudly South African.

Special delegation to Kusile and Genrec 2 July 2015

On 2 July 2015 the SAISC hosted a meaningful site visit programme with 27 participants representing the DTI, National Treasury, SARS Customs, the media and a few other organisations. Under guidance of Paolo Trinchero and Kobus de Beer the group visited the Kusile Power Station site and Genrec Engineering, gaining special insight into the accomplishments and challenges of our Industry.

The SAISC gratefully acknowledges the support of Mitsubishi Hitachi Power Systems Africa and Genrec Engineering to this initiative.



LEFT: Members of the Genrec team (from left): Steven Raley, George Madiseng, Lawrence Mathenjwa, Tammy van Niekerk and Chris Prinsloo with Kobus de Beer of SAISC on the far right.

RIGHT: Genrec CEO, Ferus Derwin, shares a light moment with Louis Pienaar of SARS Customs.



Factories & Warehouses



The new Steel Awards Factory and Warehouse Category is sponsored for the second year in a row by B&T Steel

DHL Supply Chain

Through a combination of simple but clever architectural relief, efficient structural design and a mixture of hot dip, pre-galvanized and painted steelwork, a visually appealing warehouse has been built quickly and cost effectively while still meeting the precise requirements of the client.



Photographer: Jason Bluff

DHL Supply Chain's new multi-user warehouse is situated in the Plumbago Business and Logistics Park on the western side of the R21, just a few kilometres north of Oliver Tambo International Airport.

The warehouse for DHL Supply Chain has been purpose-built for the technology and consumer industries, requiring a minimum clear height of 13.22m at the eaves, 14m at a point 15m away from the eaves and 16m in the central portion, for maximum racking heights. The stepped roof design allows for smoke ventilation and light, while providing a 16m central clear height and not adding significantly to the structural weight. Internal columns are full-height steel columns to ensure maximum slenderness and fit within a single pallet position in the racking. These columns are spaced at 28x25.8m centres to suit the rack spacing.

Canopies are positioned on both sides of the building to allow receiving on one side and despatch on the other side of the building, with storage in between. Cantilever canopies, 9 metres long, are provided at on-grade loading areas to protect forklifts during loading or off-loading and 5m cantilever canopies are provided at the docks.

The two gables have been fitted with a stepped facade to provide some architectural relief to what would otherwise be plain facades. In addition, the use of two sheeting colours on these gables has helped to create a visually appealing warehouse.

The main building measures close to 26 000m² in plan, with a total area including canopies of about 28 650m². With a steel weight of 570.6 tons, the weight per square metre is just under 20kg/m². This includes the full-height internal columns, steel perimeter columns above 5m-high concrete columns, and all gutters and downpipes.

This economic weight was achieved by designing the trusses to work as sway frames together with the steel and concrete columns across the width of the building. In the opposite direction, three large concrete columns extending to a maximum height of 16.5m are provided on one gable. These columns extend all the way up to the underside of the girders on one gable to take the vertical loads of the girder and to also carry the wind loads in the direction of the length of the building. This allows the bracing girders

PROJECT TEAM

Client:

J T Ross

Architect:

Empowered Spaces

Structural Engineer:

Sutherland (Pty) Ltd

Quantity Surveyor:

MLC Quantity Surveyors

Main Contractor:

Bantry Construction

Steelwork Contractor:

Mazor Steel

Cladding Supplier:

Roofing Guarantee

Civil Engineers:

VIP Consulting Engineers

FACT SHEET

- Tons of steel used: 570.6 tons
- Structural profiles used: Hot rolled, cold rolled, tubes and plate gutters
- Type of cladding: Novotexi to the roof and Nu-rib cladding to the sides
- Cost of steelwork: R15 million
- Total cost of project: R80 million

along the gable to span short distances and thus remain relatively light.

Excellent detailing of the structural steelwork by the steelwork contractor enabled the fast and hassle-free erection, which easily kept up with the erection speed of the pre-cast concrete columns and wall panels. All external steelwork was hot dip galvanized, as was the external steelwork on the other buildings in the development. This allows for a maximum maintenance-free life, and enabled quick erection with no painting required. All cold-formed purlins and sheeting rails were pre-galvanized for economy, as well as to eliminate the need for painting, so that only the internal hot-rolled steelwork and tubes needed to be painted after erection.

Through a combination of simple but clever architectural relief, efficient structural design and a mixture of hot-dip, pre-galvanized and painted steelwork, a visually appealing warehouse has been built quickly and cost effectively while still meeting the precise requirements of the client.



Cell C Warehouse (Office Building and Service Centre)

A feature of the warehouse is the distinctive circular Cell C logos at the gable ends of the warehouse, which are linked via an arched-ridge to the warehouse roof. As the office building and service centre form an integral part of the 'clever branding' of the warehouse a short description is included.



Description of project

The 10 000m² Cell C warehouse is part of the Cell C Campus development in Waterfall Park, incorporating the warehouse; a 25 000m² office building and a 5 000m² Customer Care Centre. The buildings are located in a very prominent position at the Buccleuch Interchange and needed to make a bold statement.

The warehouse

The internal column grid of the warehouse (24m x 24m as per the client's brief) dictated a roof system of girders at 24m centres, supporting trusses at 8m centres. The weight of roof-steelwork worked out to be approximately 15kg/m².

Both for reasons of economy and to suit the construction programme, columns were constructed using reinforced concrete; the concrete columns provided lateral stability to the building.

A feature of the warehouse is the distinctive circular Cell C logos at the gable ends of the warehouse, which are linked via an arched-ridge to the warehouse roof.

The office building

The architectural design of the office called for very thin roofs in elevation. This was achieved by halving a 305 I-beam diagonally and rotating the segments and re-welding to achieve a thin "brow" to the building.

The Cell C branding also features prominently on the building, repeating the branding on the warehouse.

The customer care centre

The roof design for the customer care centre was achieved with a conventional truss system constructed out of angles.

PROJECT TEAM

Client:

Atterbury Waterfall Investment
Company (Pty) Ltd

Architect:

Empowered Spaces Architects

Structural Engineer:

L&S Consulting (Pty) Ltd

Quantity Surveyor:

Norval Wentzel Steinberg

Main Contractor:

Group 5 Building (Pty) Ltd

Steelwork Contractor:

Central Welding Works

Structural Steel Detailer/

Detailing Company:

Bendraft Engineering Services

Cladding Supplier:

Global Roofing Solutions

Cladding Erector:

Tate & Nicholson

A Division of Southey Contracting



Photographer: Nico Theron

A clear glass roof light was required to displace Cell C's logo. This was achieved with rectangular hollow sections.

Steel

Steel with concrete columns is a regular building method for warehouses in South Africa. What makes this warehouse different and more complex are the C shaped gable ends.

Fabrication and transport

To minimise the amount of joints, components were fabricated to the largest size possible. This also attributed to limiting the transport limitations and number of trips required for the sections.

The general consensus from everyone involved with the project is that the team created an iconic feature very noticeable from any direction you approach the Buccleuch interchange.

FACT SHEET

- Tons of steel used: 351 tons
- Structural members used:
Lattice truss and girders
- Type of cladding: 0.58mm
Chromadek Charcoal, 26 200m²
Klip-Tite sheeting
- Total cost of project:
R100 Million
- Cost of steelwork: R8.1 Million

Cladding (*Walls & Roofs, Journal 3, April/May 2015*)

According to Rashaad Jogie from Empowered Spaces Architects, who designed the Cell C warehouse, the Klip-Tite roofing profile was specified based on the product's track record and proven performance.

He also points out that the unique shape of the warehouse roof required accurate bull-nosing, cranking and curving of the sheeting to create the suggested design, so the selected roof profile had to be able to accommodate these manipulations, which Klip-Tite did very well.

"We were happy with what was delivered at the end of the day and we haven't had any leaks thus far, which makes us very pleased with the choice of roof sheeting for the Cell C project.





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New Distribution Centre for Value Logistics

The new distribution centre is located next to the N1 in the Joostenberg Vlakte in the Western Cape. The centre consists of two warehouse structures namely the Value Logistics and Freightpak warehouses. The project also incorporates plans for further development.



Photographer: Adam Letch

PROJECT TEAM

Client:

Loudon Property Investments (Pty) Ltd

Architect:

Loudon Perry Anderson Architects

Structural Engineer:

Sutherland (Pty) Ltd

Quantity Surveyor:

JMHT Quantity Surveyors

Main Contractor:

Group Five Coastal

Steelwork Contractor:

Union Structural Engineering Works Pty (Ltd)

Structural Steel Detailer/

Detailing Company:

Union Structural Engineering Works (Pty) Ltd

Cladding Supplier:

Scheltema Roofing

Painter:

Nu Nation Protective Coatings cc

The new distribution centre is located next to the N1 in the Joostenberg Vlakte in the Western Cape. The centre consists of two warehouse structures namely the Value Logistics and Freightpak warehouses. The project also incorporates plans for further development

These warehouses are huge with columns spaced far apart with the double pitched roof supported on light transverse roof trusses which in turn are carried by long span longitudinal lattice girders between the columns. In this instance, the lower section of the columns is constructed using tilt up concrete columns. The substantial clear height inside the buildings accommodates the very high racking storage areas. Kliplok roof sheeting was used as cladding on both warehouses and rolled on site.

The Value Logistics warehouse is the bigger of the two warehouses, with a steel-and-glass adorned office building on the one side of the warehouse.

This warehouse is divided in three sections with the more flammable products such as paints etc. stored in the first section. The fire protection is so designed that a fire in this section will be contained and be prevented from spreading by the firewall between section one and two.

The Freightpak warehouse has an identical roof structure but is only 9 bays wide compared to the 17 bays of the Value Logistics structure.

Due to the tight programme, erection of both roof structures had to be done simultaneously, thus managing a large crew with multiple cranes on site. The roof girders were erected using a 90ton crane and held in position before the boxed trusses were hoisted into position using a 55ton crane.

The fact that truss boxes were assembled on the ground prior to erection saved time and working at height was substantially reduced.

FACT SHEET

- Tons of steel used: 930 tons
- Structural profiles used:
Universal beams, angular trusses, lattice girders and lipped channels
- Type of cladding: Kliplok
- Cost of steelwork: R21.5 million
- Total cost of project: R210 million

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208 Gale Street Shree Property Warehouse

What was initially implemented as a safety procedure for the site team turned out to be highly beneficial for the rigging teams as the lifting programme was drastically reduced, crane usage decreased, and overall safety was maximised.

PROJECT TEAM

Client:

Shree Property Holdings (Pty) Ltd

Architect:

Zadar Architects (Pty) Ltd

Structural Engineer:

Cousins Steel International (Pty) Ltd

Quantity Surveyor:

LD Baker & Associates

Project Manager:

Cousins Steel International (Pty) Ltd

Main Contractor:

Lfin Construction

Steelwork Contractor:

Cousins Steel International (Pty) Ltd

Structural Steel Detailer/ Detailing Company:

Cousins Steel International (Pty) Ltd

Cladding Supplier:

Cousins Steel International (Pty) Ltd

Cladding Erector:

Compass Cladding

Galvanizer:

Phoenix Galvanizing (Pty) Ltd



Photographs: Cousins Steel International (Pty) Ltd

The new warehouse facility at 208 Gale Street was conceptualised, designed, fabricated, erected and sheeted by the steelwork contractor. The initial brief from the client required a facility capable of handling bulk material transported from the Durban Harbour in shipping containers. This prescribed a large 60m clear span structure to be placed on top of the 4.5m concrete retaining walls.

The biggest challenge faced throughout the project was the erection and lifting of the main frames. The most efficient solution for the contractor was to join adjacent frames together on the floor and lift these as single bay box frames with intermediate members, namely bracing, sags, purlins all installed into position.

What was initially implemented as a safety procedure for the site team turned out to be highly beneficial for the rigging teams as the lifting programme was drastically reduced, crane usage decreased, and overall safety was maximised.

This amazing 60m span warehouse has a clear height of 9m at the eaves. The covered area is approximately 7 200m² without internal support, and total roof area comes to 8 400m².

FACT SHEET

- Tons of steel used: 190 tons
- Structural profiles used: Angles and tubes
- Type of cladding: Zinal AZ150
- Cost of steelwork: R5.5 million
- Total cost of project: R17.5 million



MAN Diesel Distribution Warehouse

Because of the diverse nature of the client's business and very specific needs, the structures needed to be compact, yet versatile, while keeping the processing constraints in mind.



PROJECT TEAM

Client:
Growthpoint Properties

Structural Engineer:
E.D.S. Engineering Design Services (Pty) Ltd

Quantity Surveyor:
MLC Quantity Surveyors

Main Contractor:
Lyncon Construction

Steelwork Contractor:
B&T Steel

Structural Steel Detailer/
Detailing Company:
KRU Detailing

Painter:
Dram Industrial Painting Contractors

This new development combines both structural steel and reinforced concrete, from the sub-structure to the super-structure. The new facilities comprise of two workshops, a 3 596m² structure for the Diesel division, a smaller 2 318m² structure for the Turbo division, and a 1 600m² double level reinforced concrete structure with an iconic main entrance oval roof.

Because of the diverse nature of the client's business and very specific needs, the structures needed to be compact, yet versatile, while keeping the processing constraints in mind.

The Diesel workshop consists of a heavy bay, with a clear height of 12.75m to the underside of the truss on the eaves. The heavy bay is furnished with a 32 ton crane with a 10m hook height and 20 ton crane with a 7.5m hook height, which is required to operate on two levels of gantry beams, within the same confined bay.

The light bay has a clear height of 10m to the underside of trusses on the eaves, complete with 20 ton and 10 ton cranes on the same gantry. The concrete works consist of a 6.6m deep pit in the heavy bay and a 3m deep pit in the light bay.

The Turbo workshop is 8.2m high to underside of the truss on the eaves with a 5 ton crane. The combined mass of the all of the structural steel is 278 tons. The large 10m grid spacing on the eaves required a light weight system. So Metsec Z profiles of 1.6mm thick sections were used.

The BIM capabilities of Tekla Structures improved the efficiency of the deliverables to proceed with the construction phase of the project.

With completion, all of the client's expectations were met, challenges resolved, and the team was proud to hand over this well engineered and fabricated warehouse.

FACT SHEET

- Tons of steel used: 270 tons
- Structural profiles used:
Columns, beams, IPEs, angles,
plate girders, lattice trusses
and Metsec

ARMCO Galvanizers – Roof Replacement

On inspection of the severe corrosion that had taken place, their in-house engineer came up with the solution of designing a structure that would be external to the ‘skin’ (sheeting) on the structure thus protecting it from the corrosive atmosphere that is inherent in the galvanizing process.



Photographer: Mike Bagley

ARMCO Galvanizers’ plant in Dunswart, Boksburg is situated on leased premises which are more than 30 years old.

The roof structure over the process area which holds the acid tanks and galvanizing bath was of a lattice truss construction with cold rolled purlins carrying mostly asbestos sheeting. It was so badly corroded that it was close to collapsing.

Under insistence from ARMCO, the property owner wanted to replace the roof structure over the process area at minimal cost while ARMCO wanted to remove the safety risk of the roof collapsing plus design a roof structure to bring in far more natural lighting without disrupting their operations.

PROJECT TEAM

Client:

Tate & Nicholson / ARMCO Galvanizers

Structural Engineer:

Tass Engineering (Pty) Ltd

Main Contractor:

Tate & Nicholson

Steelwork Contractor:

Tass Engineering (Pty) Ltd

Structural Steel Detailer/

Detailing Company:

Tass Engineering (Pty) Ltd

Cladding Supplier:

Tate & Nicholson / Modek

Cladding Erector:

Tate & Nicholson

Asbestos Sheeting Removal:

Rapid Spill Response (Pty) Ltd

Painting:

DRAM Industrial Painters

The client approached the contractor to undertake the structural rehabilitation of the building. On inspection of the severe corrosion that had taken place, their in-house



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- Warehouse Columbia Pharmaceuticals (250t)
- Menlyn Maine Central Square (250t) - Menlyn Maine Investment Holdings
- Fourways Bungee Tower and Sky Bar - Play at Height
- Nelson Mandela Square refurbishment - Liberty Properties
- Warehouse extension (250t) - ABI Devland
- Frankenwald Warehouse Extension (200t) - Capital Property Fund
- Mall of Africa Central Skylight, Bifurcated Columns (215t) - Novum Holdings
- Modderfontein Private Hospital (120t) - Group Five
- South African Breweries, Conveyors, Buildings, Stairs (120t) - SAB Alrode
- Stryker and Hilti Warehouses (120t) - Stryker and Hilti
- New Studios and Walkways (120t) - Sasani Studios



Contact details: Tel +27 (11) 975 0647 • Fax +27 (11) 970 1694 • E-mail tasseng@mweb.co.za

FACT SHEET

- *Tons of steel used: 15.3 tons*
- *Structural profiles used: Hot-rolled I-beams and CRLC Purlins*
- *Type of cladding: Underslung acid resistant fibreglass sheeting (MPG) with stainless steel channel bolt positive fixings*
- *Cost of steelwork: R576 610.00*
- *Total cost of project: R1 950 000.00*

engineer came up with the solution of designing a structure that would be external to the 'skin' (sheeting) on the structure thus protecting it from the corrosive atmosphere that is inherent in the galvanizing process.

Obviously the roof sheeting and cladding, and in particular the fixings of same needed to be corrosion resistant and the

client specified MPG acid resistant fibreglass sheeting with stainless steel channel bolt positive fixings as being the most suitable for use in this extreme environment.

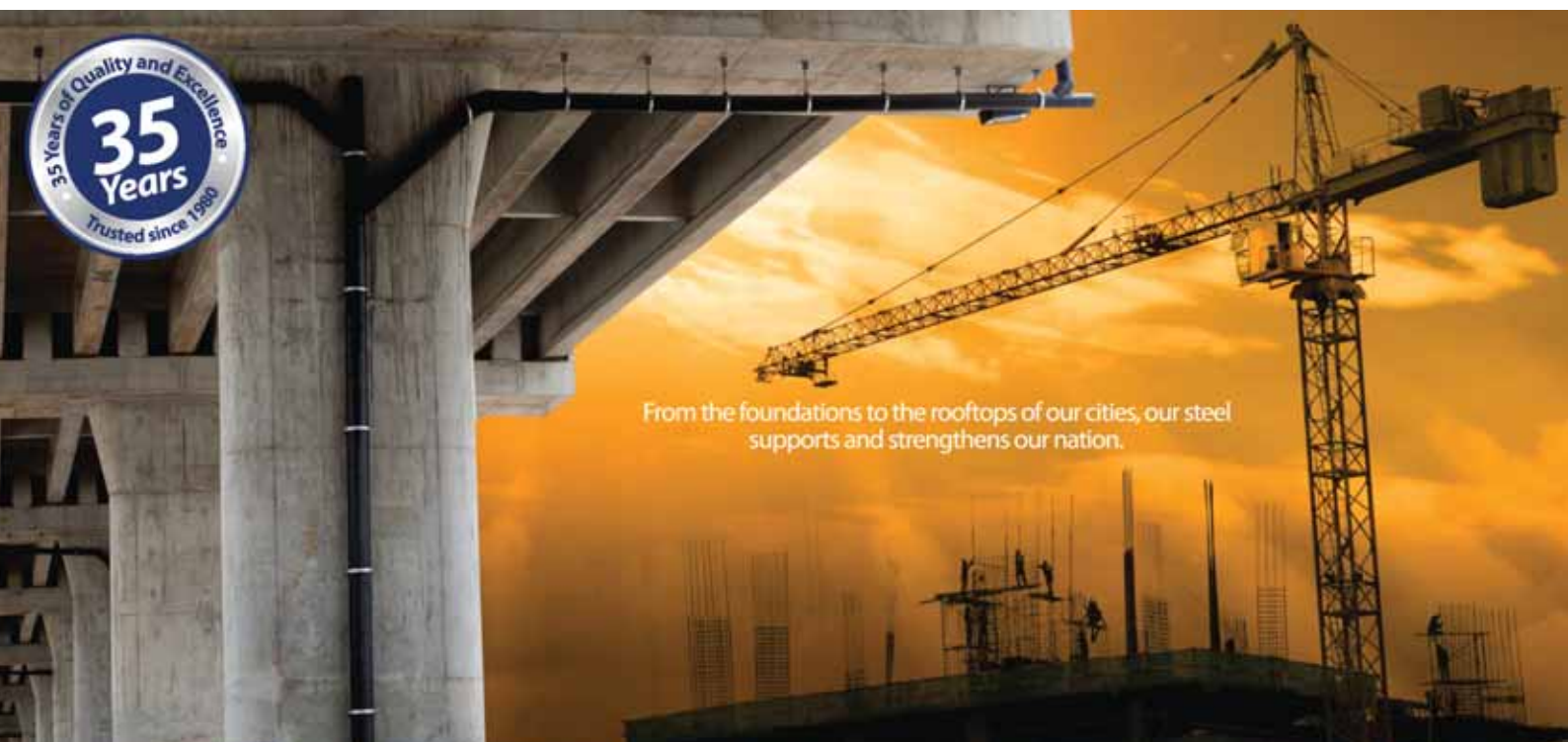
Since the roof structure and side girts were the most severely corroded elements in the structure with the columns only showing moderate signs of corrosion, the property owner elected to replace only these elements. As not to disrupt the plant's operations it was decided to undertake the refurbishment over the plant's shutdown period in December.

The steelwork contractor elected to use a hot-rolled I-beam rafter to replace the lattice trusses thus allowing for the use of underslung roof purlins and underslung sheeting to protect the steelwork from the corrosive fumes. To further economise on the cost of the structure it was painted in a standard Highveld paint specification of Zinc Phosphate primer with a single undercoat and final coat of enamel.

The necessity to complete the refurbishment of the roof structure over the four-week December shutdown meant that full dedication to the task at hand plus very careful programming was necessary in order to remove the asbestos sheeting, strip the existing lattice roof structure, install the new rafter roof structure and re-sheet the building with underslung sheets.

Only with the use of structural steelwork coupled with steel sheeting could such a task have been attempted and successfully completed.

The end result is an elegant and effective structure that will outlast its sheeting skin many times over.



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The eTOOLKIT

By Spencer Erling, Education Director, SAISC

SAISC's instant workshop productivity improvement tool

We have, for some time now (based on our experience), had a feeling that

the eToolKit connections would be easier and quicker to fabricate

than the standards used by our consulting industry.

We set about trying to quantify this...

It should be common knowledge to all our readers that between Prof Alex Elvin, Amanuel Gebremeskel and the author from the SAISC, we have produced the SAISC Connections **eTOOLKIT**, a specialist set of software/ebooks that designs connections.

This is a state-of-the-art programme that allows the user to design and optimise (a term which is explained below) the connections for a whole range of connection types.

We have spent a great deal of effort getting this knowledge through to design offices and their structural engineers. However many engineers do not feel the need to move out of their current (conservative) methods for a number of reasons:

1. Why should we, we have been building structures using our standards for years.
2. We have standard tables of connections that we consult and use (but don't remember who designed them or on what basis).
3. All persons have a natural resistance to change.
4. No one will pay me more to do individual calculations for connections let alone waste time optimising them.
5. And so on and so forth...

But the fact is that engineers are in many instances not designing connections. They are choosing them from their 'standards' or simply letting non-engineers make the selections.

This is adversely impacting the future of the structural steel industry in South Africa and its ability to survive, let alone profit. In the current dire market situation we find ourselves in, only too often we are losing work to Asian companies because we are just

"too expensive". This will be even more critical as we attempt to expand the use of structural steel in architectural projects.

So as an Industry we have to do something about reducing the cost of our structures. Through efficient, clever and optimised connection designs it is surely possible to achieve this goal.

The SAISC has done some costing exercises with some startling findings

We have, for some time now (based on our experience), had a feeling that the **eTOOLKIT** connections would be easier and quicker to fabricate than the standards used by our consulting industry.

We set about trying to quantify this...



ENGINEER'S SOLUTION

We approached several well-known structural steel designers and asked them to design five commonly found types of connections based on given loads. Unfortunately, only one took the trouble to reply, for which effort we truly thank him.

His answers were based on their company standards, so we received answers along the lines of "By inspection... our standard full depth end plate... giving plate thickness... number of bolts and size and place of welds will work"

eTOOLKIT SOLUTION

Amanuel then put eTOOLKIT to work. The results were very quickly obtained. Unfortunately we did not ask the engineer how long it took to choose the connections, or how long Amanuel took to design the connections. I am sure that would also have highlighted some interesting results.

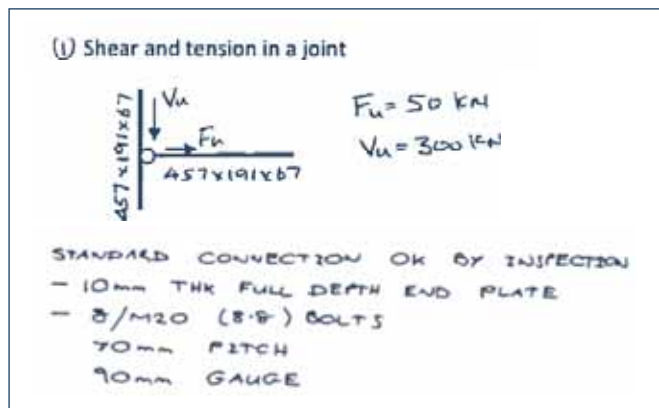
In every case Amanuel's solutions are lighter, involve less bolts, less welding and a minimal number of web stiffeners which in themselves are extremely labour intensive. For example a 70 x 10 flat bar web stiffener to a 406 I-beam will have a mass of about 2 kilograms and take about 20 – 25 minutes each to fit and weld which could equate to as much as 200 hours per ton.

- **Connection 1** carries shear and tension loads between a beam and a column.
- **Connection 2** carries flexure in addition to shear and tension.
- **Connection 3** transmits shear and flexure loads through a splice.
- **Connection 4** is a column base attachment while **Connection 5** carries shear and tension from a beam into a concrete wall.

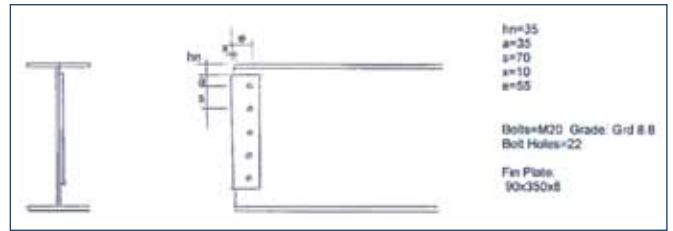
The solutions proposed by the engineer and Amanuel are illustrated below for **Connection 1**, **Connection 2** and **Connection 5**. The cost differences for all of the connections, with the exception of **Connection 4**, are also tabulated below because they were significant.

CONNECTION 1 - A connection that carries shear and tension loads

Engineer's Solution

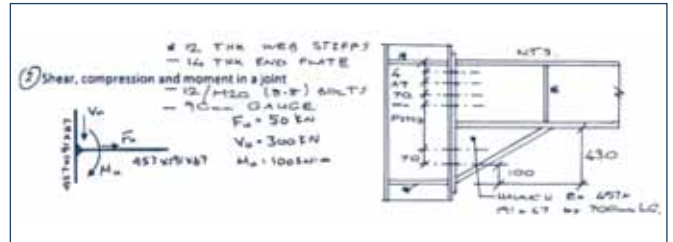


eTOOLKIT Solution

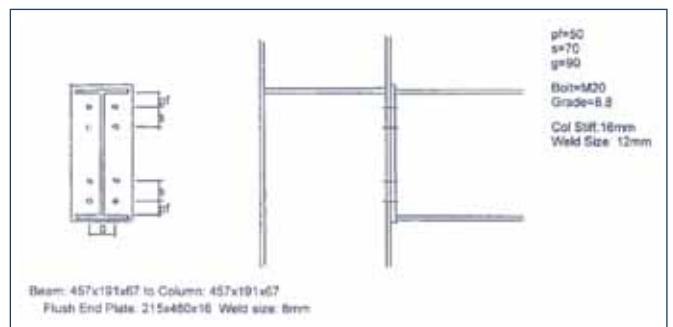


CONNECTION 2 – A connection that carries shear, tension and flexure loads

Engineer's Solution



eTOOLKIT Solution

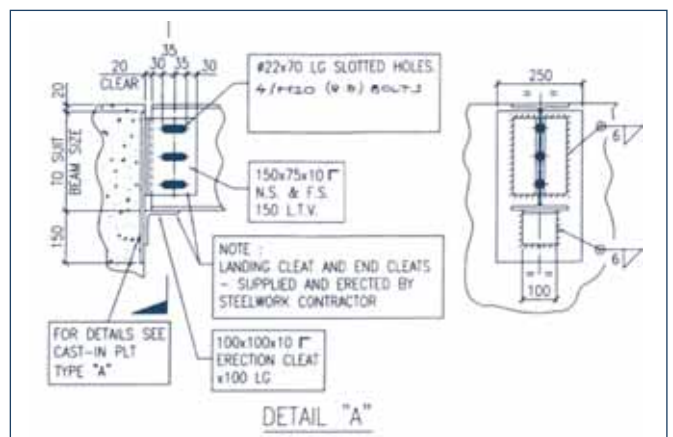


So the engineer in question chose his connections from standards. He did not design the connections. And yes, they are conservative.

CONNECTION 5 – A connection to concrete that carries shear and tension loads

Engineer's Solution

The engineer wrote "by inspection our standard detail for connecting to cast-in plates will work which includes a support cleat under the beam and a pair of cleats welded to the plate with slotted holes" and provided the following detail.





2014 FIFA WORLD CUP BRAZIL STADIUM
ITAIPAVA ARENA FONTE NOVA
REALISATION: 2012 - 2014
COATING SYSTEM DESCRIPTION:
HEMPADUR ZINC 17360
HEMPADUR FAST DRY 15560
HEMPATHANE HS 55610

Photo: ME/ Portal da Copa / Março de 2013

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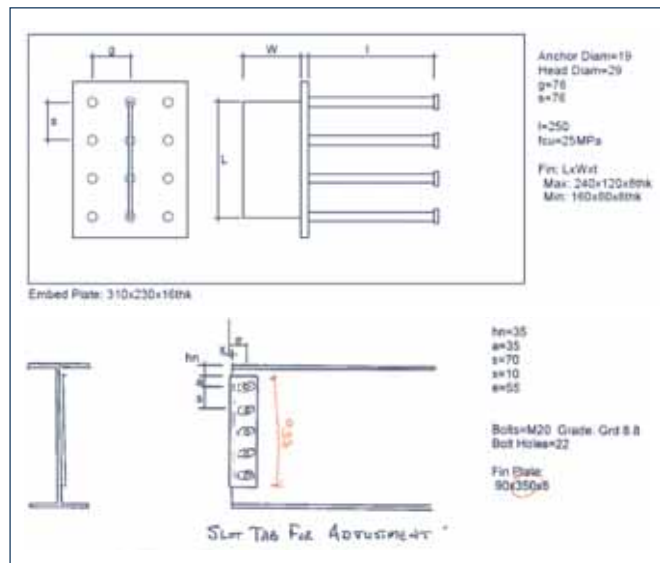


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eTOOLKIT Solution

For the same connection Amanuel's solution was more complete and used an embed plate anchored with headed studs. A fin plate with slotted holes to be welded onto the embed plate was also specified as shown below.

**The stand-out structural comments**

The Americans have been using shear tabs (fin plates) for beam to beam and beam to column shear/axial connections. There has to be a reason why. In SA we have generally chosen to use welded 'flexible end-plates' and/or bolted double cleats for these connections. Lots of

tables and information for these connections are to be found in the Red and Green books.

There is no doubt in my mind that we need to shift to shear tabs for our connections, they are simpler and faster to fabricate. They are less likely to distort from welding and so are very cost effective.

The **eTOOLKIT** will design beam end connections any way you want i.e. flexible end-plate, shear tab, double cleats and also new in SA, single cleats.

Optimising the connections is one of the **eTOOLKIT**'s strong points. By optimisation we mean that each aspect of the connection should be approximately equally strong i.e. no weak links nor any that are too strong. For example the number and strength of the bolts should just be sufficient enough to cope with loads and so with the welds.

The cost comparisons

The attached table spells it out. Whilst we cannot consider every single workshop – what steel and bolt discounts they get; what their hourly costs are and in fact what equipment they have available in their works; what welding process they use and how quick and efficient their welders are; what site costs would be (for the time taken to install and tighten bolts etc.), all of which would impact on the comparisons – we can make assumptions and move forward.

So the author put a spreadsheet together which enables users to enter their variables mentioned above. But for this purpose the author assumed some figures based on current rules of thumb. He also

Comparison of prices consultant design versus SAISC design						
Connection Number	PRICE PER CONNECTION PER BUILD UP				Savings	
	Consultant		SAISC design		SAISC/Consultant % age	
	Old equipment shop	NC equipped shop	Old equipment shop	NC equipped shop	Old equipment shop	NC equipped shop
1	1139	807	610	449	53.53	55.60
2	3810	3226	2222	1782	58.31	55.24
3	3695	2094	2225	1384	60.22	66.09
5	1848	1543	387	382	20.93	24.75

CAN YOU AFFORD NOT TO BUY AND USE AN eTOOLKIT?

Can you afford not to convince the engineer by quoting lower prices – to allow you to use these state-of-the-art optimised connections – both in the interest of the client and the future of our industry?

For a copy of the spreadsheet so you can check out your own comparisons please contact Spencer.

For an eTOOLKIT demonstration, please contact Amanuel or Alex (through Spencer) at the SAISC.

Comparison of masses consultant design versus SAISC design			
Connection Number	Consultant	eToolkit	Saving % reduced to
1	6.4	1.8	28
2	58	22.2	38
3	31.4	16.8	54
5	13.4	2.9	22

reviewed the numbers assuming mainly old fashioned methods for drilling holes compared with NC equipment doing the holing.

What the table shows is that savings of around 40% are possible when comparing the cost of an optimised **eTOOLKIT** connection with an answer chosen from standards. In one startling case a 66% saving is possible. Mass savings of around 50% for the connection are also possible.

SAISC SCHOOL OF DRAUGHTING

STUDENTS VISIT

MONOWELD GALVANIZERS



On 20 May 2015 the students of the SAISC School of Draughting visited Monoweld Galvanizers in Germiston, previously known as Robor Galvanizers.

They attended a presentation explaining the processes of galvanizing, specifications, design and detailing requirements. The Monoweld staff then took the students on a tour of the plant where they experienced the complete process from beginning to end.

Emphasis was placed on the importance of communication between the detailer and the galvanizer.

The SAISC School of Draughting would like to thank Monoweld Galvanizers for opening their facilities for the students to learn more about the galvanizing process.

By Lechane van Zyl, Facilitator: SAISC School of Draughting



ABOVE: Students experienced the complete galvanizing process during the tour of the facilities.



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Please contact Jenny Claassens for enquiries or further information on 011 876 2300 or e-mail jenny@saisc.co.za



Sealtight Vaal – LWS Mini Warehouse



Little Africa – Parys Farm House



Mediclinic Midstream, Centurion

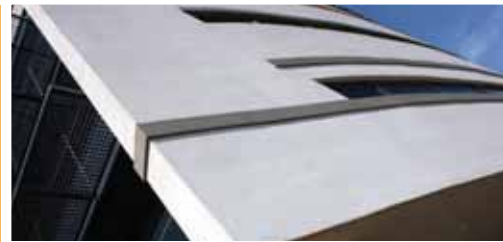
Steel Awards 2015

Light Steel Framing Photo Competition Entries

**Your Light Steel Frame project could
be here in 2016...**



Sasol Chemcity – Incubation Facilities and
Main Incubator Office Building



Summit Place and Protea Fire & Ice Hotel



Campsbay Extension

**Here are the light steel framing projects'
Photo Competition entries.**

See the hot-rolled steel entries on pages 6 & 7

TELL US WHICH ARE YOUR FAVOURITES BY

POSTING ON OUR



PAGE



Hartenbos Apartment Revamp



Langebaan Double Storey



House De Clercq and Cottage, Mount Verde, KZN



Lenasia



Rand Park Ridge



SA Army



Valhalla Park



Riversands Incubation Hub, Diepsloot



Lady Pohamba Private Hospital – Windhoek



Anistemi Retirement Village (House 3735)



Northgate Shopping Centre Extension



Kuruman Casino Facade



Emergency ECDC – ACM Project –
Nobuhle Junior Secondary School



House Badenhorst



Balmoral Lodge



Burger King Norwood



Clifton Extension



Copperleaf 1



Far Hills Estate



Fresnaye Double Storey



Houtbay Harbour House



KFC Umtata



Lynwood



McDonald's Plumstead



Mooi City



Waterfall Estate, Johannesburg



Fresnaye 3 Storey



Smokey Grove



LSFB entries for Steel Awards 2015 EXCEED EXPECTATIONS!



By John Barnard, SASFA Director

We received entries for LSF roof structures, and the judges were impressed by the low mass of the steelwork – around 7kg/square metre! It also offers logistical advantages, and the low mass makes erection an easy task.



As a sign of the growing impact LSF is making in the building industry, the SAISC received a record number of LSF project entries for this year's Steel Awards – no fewer than 40 LSF projects were submitted!

The entries were submitted by six SASFA members, with the largest number coming from Silverline. It is notable that most of the entries (65%) are for projects in the Western Cape and Gauteng, with a few projects in most of the other provinces.

50% of the entries are for residential projects, with 40% for commercial, school, office and hospital buildings, the rest being industrial projects. The residential projects ranged from up-market houses in the Western Cape, Gauteng and KZN, to a retirement village in Klerksdorp and upper floor additions to houses in Clifton and Campsbay.

Having won the LSF category last year, a further seven MacDonald's outlets were submitted by Silverline. Again the speed of construction was the key advantage offered by LSF in this market. Other players in the fast food market have also 'seen the light' – both KFC and Burger King outlets are covered in entries for commercial projects.

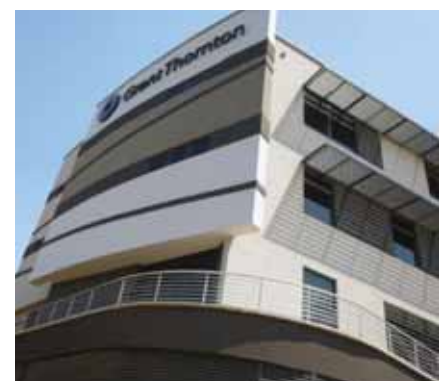
Another example of the versatility of LSF was the project for the SA Army Foundation consisting of a conference centre with 20 luxury bedrooms providing accommodation for attendees. This was completed in a period of eight months and the senior Defense Force personnel are very satisfied with the outcome.

We were particularly pleased to have received an entry from Dr Hennie de Clercq, previous CEO of the SAISC. He built an energy efficient house in Cape Town, of course using light steel framing, and some heavy steelwork.

On top of this are entries for a school building, transformation of an existing office building into an apartment building, and even a casino in the Northern Cape.

We received entries for LSF roof structures, and the judges were impressed by the low mass of the steelwork – around 7kg/square metre! It also offers logistical advantages, and the low mass makes erection an easy task.

It was of interest to note that more than 40% of the LSF projects entered contained some heavy structural steel as well.



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Russell Barngrover
Executive Vice President
SteelFab, Inc. - Charlotte, NC

Change in annual sales:

\$325 million to \$507 million.

Change in annual tonnage:

75,000 tons to 102,000 tons.



Russell Barngrover • **Glenn Sherrill** • **Ron Sherrill**
Executive Vice President President CEO

Peddinghaus

*Figures based upon independent study, production results may vary based upon part complexity

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SPAN TABLES:

The *FOLLY* of believing one size fits all

By Dennis White, Director SAMCRA



For over fifty years the spacing of purlins and girts on structures have been based on spanning tables published by the manufacturers of the various cladding systems (profiled sheet together with fasteners/anchoring clips, etc.) irrespective of the geometry, permeability and location of the structure.

In recent years there has been an increase in the incidents of both roof and side cladding being blown off during storms. Whilst a number of these storms have been more ferocious than normal, many have not and on investigation it has been found that the damage was the result of inadequate spacing of the purlins and girts. For over fifty years the spacing of purlins and girts on structures have been based on spanning tables published by the manufacturers of the various cladding systems (profiled sheet together with fasteners/anchoring clips, etc.) irrespective of the geometry, permeability and location of the structure. Prior to the publication of SANS 10160 Part-3 in 2010 loading resulting from wind action was invariably viewed from the point of overall forces acting on the cardinal elevations of the structure as a whole and local effects were generally ignored. Regrettably a large number of designers still adopt this process.

It is important to note that the majority of cladding systems available in the local market have been imported, including the span tables. Pierce-fixed systems originated from Europe and concealed-fixed from Australia. The European systems were developed between the late 1800s (corrugated iron) and 1950s (trapezoidal) and designed to be used on roofs inclined at ten to fifteen degrees and to support mainly downward forces. The concealed-fixed systems were developed in the 1960s and

designed to be used on flat roofs i.e. roofs inclined at less than five degrees, which are subject to high uplift forces.

During the late 80s and early 90s many international wind loading codes were substantially changed and improved to incorporate new scientific research. Whilst most reputable manufacturers modified their span tables, based on the results of performance testing, current tables remain based on the one size fits all principle.

A critical point often overlooked by designers is that span tables often have qualifications pertaining to the ultimate uplift load a system can withstand or geometrical and permeability criteria that have to be met. Both of these qualifications are often less than that required or relevant to the structure in question. The positioning of louvres, large overhangs, contents and large plant stacked or located immediately behind large openings as well as temporary conditions during construction such as missing shopfronts, regularly produce forces greater than those considered when developing the span tables.

It is important to note that span tables cannot be reliably derived from mathematical models and have to be based on performance tests. When developing span tables different loading conditions have to be considered.



The first is a point load, applied at any point on the profiled sheet which caters for the loading applied to the cladding during installation and maintenance of the cladding system. This does not include loading for the installation and maintenance of items of plant, glazing, etc. located on a roof. Cladding systems are designed as non-trafficable in terms of SANS 10160. This load is often the critical factor in determining the spanning capabilities of a cladding system.

The second is a uniformly distributed upward load designed to represent the dynamic wind pressure applied to a cladding system. These loads are applied to full-scale models of sections of the system. Current tables do not differentiate between ultimate and serviceability limit states. Whilst one size fits all may apply to the point loading conditions it certainly does not apply to that for wind loading.

The new code, written by SAMCRA in association with the SABS, for the design, testing and installation of self-supporting metal cladding will require manufacturers to publish two-part span tables. The first part will address the spacing of purlins and girts in order to support the point load conditions and the second the ultimate and serviceability spacing for wind loading.

It is anticipated the new code will be published during the first quarter of 2016.

OPPOSITE PAGE: Contents stacked or located immediately behind large openings regularly produce forces greater than those considered when developing the span tables.

BELOW: Storm damaged cladding is often the result of inadequate spacing of the purlins and girts.



CALENDAR OF *Events*

BOOK NOW FOR STEEL AWARDS 2015

Awards dinner in
Johannesburg /
Durban /
Cape Town:
3 September

For information
contact:
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Diarise the next Steel Academy Courses!

27 – 28 August
Portal Frame Course

17 – 18 Sept
Moment Connections
Course – (which will include
some Basic Connection
Course information)

1 – 2 October
Industrial Building Layouts
Course

22 – 23 October
Moment Connections
Course – (which will include
some Basic Connection
Course information)

5 – 6 November
Heavy Industrial Buildings
Course

19 – 20 November
Portal Frame Course

26 – 27 November
Basic Connections Course

FOR MORE
INFORMATION CONTACT
Reubenette Andrews at
reubenette@saisc.co.za or
011 726 6111

AUGUST

27 Sophia Gray Congress in Bloemfontein

SEPTEMBER

- 01 17:30 – Visiting architect, Friso van der Steen: Public Lecture with Pretoria Institute for Architecture (PIA) www.pia.org.za
- 02 17:30 – Visiting architect, Friso van der Steen: Public Lecture with Cape Institute for Architecture (CIFA) www.cifa.orz.za
- 03 Steel Awards (Gauteng) – Emperors Palace
- 03 Steel Awards (Western Cape) – Table Bay Hotel
- 03 Steel Awards (KZN) – Mount Edgecombe Country Club
- 07 – 11 Post-graduate Steel Course, UCT
- 10 SASFA Industry Meeting, Cape Town
- 14 – 19 SASFA Builders Course, Cape Town

OCTOBER

- 15 Steel Day and Breakfast Talk, Johannesburg
- 22 – 23 SASFA Code & Engineering Course, Johannesburg
- 26 – 27 SASFA Code & Engineering Course, Durban
- 29 – 30 SASFA Code & Engineering Course, Cape Town

NOVEMBER

- 09 POLASA AGM and Industry Meeting, Johannesburg
- 12 SAISC and other subsidiaries AGM and Cocktail Function



STEELDAY
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ENQUIRIES: EVENTS: marle@saisc.co.za COURSES: reubenette@saisc.co.za
SASFA: john.barnard@saol.com POLASA: kobus@saisc.co.za SAMCRA: dennis@saisc.co.za

SOCIAL SNIPPETS

By Marlé Lötter, Events Manager, SAISC

SAISC breakfast and mini exhibition for fabricators

11 Jun 2015, Sunnyside Park Hotel

Close on 90 fabricators, erectors and other interested parties signed up to find out about relevant new developments from Bolt & Engineering Distributors, Retecon/Ficep, Peddinghaus, Paul Caplan's estimating software and also the SAISC's Steel Connections eToolkit.

ABOVE LEFT: Craig Bister (right), presenter for Bolt & Engineering Distributors with a colleague.

ABOVE RIGHT: Presenters: Patrick Pereira for Peddinghaus and Hans-Peter Neth for Retecon/Ficep

RIGHT: Presenter, Paul Caplan (far right) with Prof Alex Elvin, co-creator of the eToolkit (2nd from left) with other breakfast guests.



POLASA Industry Meeting

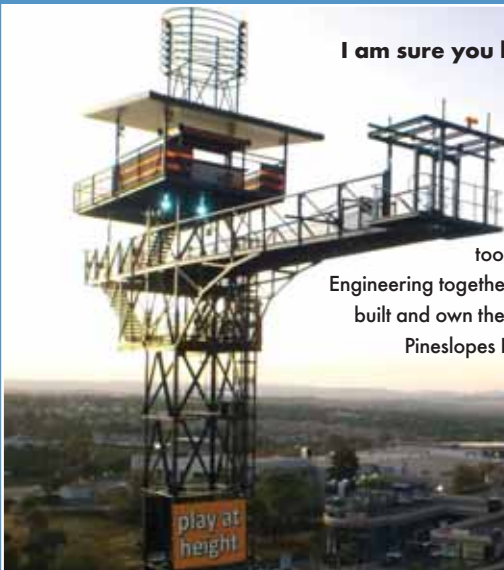
22 June 2015, Country Club Johannesburg (Auckland Park)

30 participants with a special interest in the SA powerline industry attended this session of feedback and meaningful discussion under the guidance of Kobus de Beer and POLASA Chairman, Gary Whalley.



I am sure you have seen this structure among the Steel Awards 2015 entries.

Yes, it is an entry but the steelwork contractor who built it decided to hold onto it for some personal recreation and maybe diversify the steelwork business too. Not really, but a few of the directors of Tass Engineering together with Trowbridge Higson-Smith & Associates built and own the Play At Height Bungee Tower and SkyBar at Pineslopes Boulevard Shopping Centre and clearly have some fun of their own too.



INSET ABOVE:
Tim Tasioulas testing their handiwork.

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Cape Gate (Pty) Ltd

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Columbus Stainless (Pty) Ltd

Representative: Lucien Matthews
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matthews.lucien@columbus.co.za
www.columbus.co.za

Scaw South Africa (Pty) Ltd

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rviljoen@scaw.co.za
www.scaw.co.za

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Fax: (043) 707-2700
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Uitenhage Super Steel cc

Representative: Ginkel Venter
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Fax: +27 41 992 5923
ginkel@uss.co.za

Gauteng**A Leita Steel Construction (Pty) Ltd***

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Boksan Projects cc

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Fax: +27 11 316 1645
laszlo@boksan.co.za

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