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AUGUST / SEPTEMBER 2018
VOL. 42 ISSUE 4

KUSILE POWER STATION ABSORBER STRAKES: INSIGHTS INTO THE DESIGN, FABRICATION AND TRANSPORTATION PROCESS

STEEL TO THE RESCUE: MEETING THE AFRICAN CONTINENT'S RAPID URBANISATION NEEDS

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COVER PHOTO: Kusile Power Station – Absorber Strakes
PHOTO SUBMITTED BY: Genrec

FEATURES

THE SOUTHERN AFRICAN INSTITUTE OF STEEL CONSTRUCTION

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SAISC COMMENT

PAOLO TRINCHERO
CEO, SAISC

PERSISTENCE AND COLLABORATION **IN THE FACE OF ADVERSITY**

WE WOULD LIKE TO ENCOURAGE OUR MEMBERS TO CONTINUE TO CONTRIBUTE TO THE CONVERSATION, PARTICULARLY WITH RESPECT TO THE URGENT PRIORITIES THAT NEED TO BE ATTENDED TO.

Steel Awards judging has wrapped up and I must say we are really impressed with the entries this year. Despite massive challenges being felt across the industry our members are still able to deliver projects which show innovation and excellence.

Things are moving slowly on the economic front and we seem to be a conflicted country and industry in just about every respect. I guess it's only natural to put survival ahead of collaboration, but in the long term industry collaboration will show benefits for all.

Following on from our industry meetings and CEO forum we have developed an industry paper and a number of to do lists which we will share with our members, other associations, labour and government stakeholders. We have done a great deal of work over the last few years and need to continue to push on and get our beloved steel industry back on track.

We had a wonderful site visit to Kusile Power Station and HSM *(Ex Highveld Steel)* together with the dti, DMR, ITAC and a few members which was a real privilege. HSM stands out as to how you can revitalize a business in business rescue. Thank you to everyone involved.

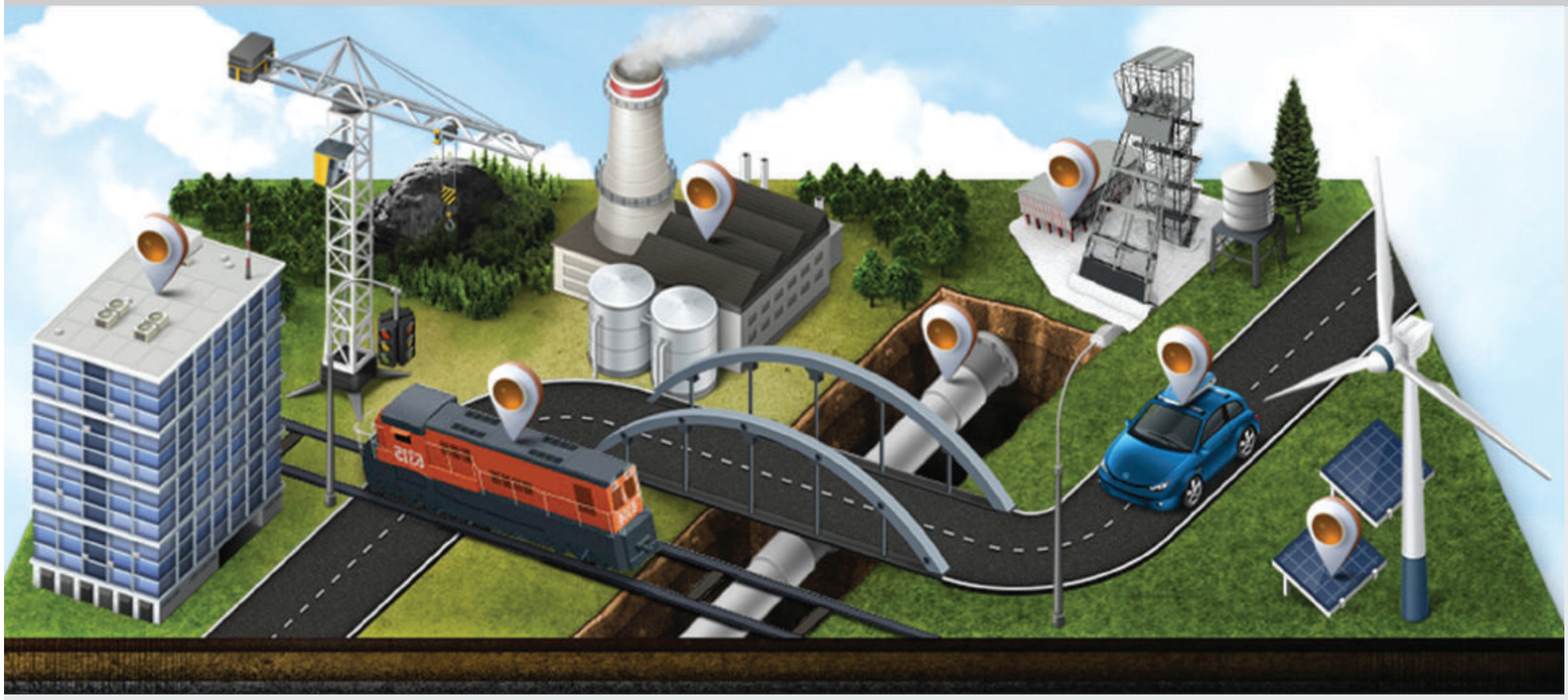
On the project front there are certainly some green steel consuming shoots on the horizon so we must ensure that we stay positive and hopeful that we can stop the bleeding in our industry and begin to regrow *(Renewable Energy Projects, Mercedes Benz Investment, IDZ investments)*.

We would like to encourage our members to continue to contribute to the conversation, particularly with respect to the urgent priorities that need to be attended to. I again have highlighted a few below but there are many more.

- Market demand. We need our mining industry to recover.
- Pressure on margins, inventory, cost cutting. Industry is caught in a downsizing loop.
  (What can we do that is not commercially sensitive and steers clear of competition concerns?)
- Overcapacity across the industry.
  (Discussions around rationalizing parts of the industry are high level and would require competition commission engagement.)
- Industry relationships and collective action. "The Steel Supply Chain"
- Government Policy including procurement and BBBEE
- Access to new investments
- Export competitiveness

It is still my view that competitiveness needs to form part of our relentless focus to rebuild our steel industry. It is the only certainty we have that countries and companies that invest in innovation, people and skills will survive and grow.

With the above in mind what does the SAISC do and what should it do to keep the industry moving in the right direction? Where do you think we should focus?



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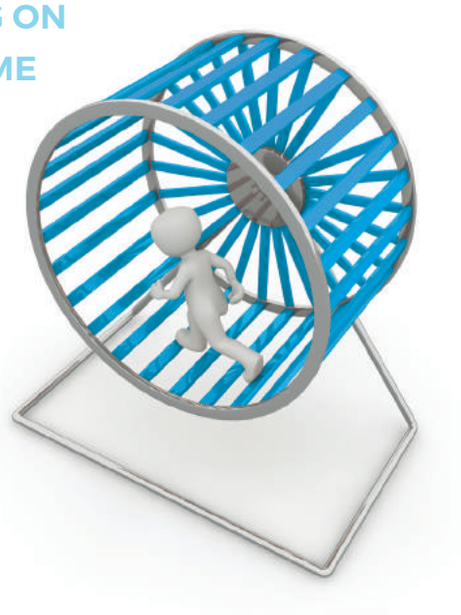
EDITOR'S NOTE

DENISE SHERMAN
MARKETING MANAGER, SAISC

ESCAPING **THE HAMSTER WHEEL**

ARE WE ACHIEVING RESULTS, OR ARE WE RUNNING ON A HAMSTER WHEEL, PERPETUALLY FACING THE SAME ISSUES AND CHALLENGES WITHOUT ANY REAL END IN SIGHT?



A couple of months ago our family welcomed its newest member. Before you start sending through hearty congratulations emails, allow me to clarify. Through the careful and calculated machinations of our children, my husband and I were coerced into allowing a dwarf hamster into our house.

Those of you who have been down this road will know that hamsters have two settings… "off" and "run on my hamster wheel at break-neck speed." What place does this information have in an editor's note for Steel Construction? I'm a great lover of metaphors and philosophy, so the hamster's habits got me thinking about parallels with the steel construction industry. How effective are the activities we are pursuing, as individuals, companies and as an industry? Are we achieving results, or are we running on a hamster wheel, perpetually facing the same issues and challenges without any real end in sight? Movement, especially frantic movement, does not necessarily equate to progress.

So how do we escape this wheel? Perhaps, acknowledging that we're on a wheel is a start. We need to gnaw our way through our cages, unhelpful paradigms, faulty assumptions and perhaps even unconscious bias that prevents us from making real progress. We're an industry of men and women with tenacity and energy.

Let's take a step back, off the hamster wheel, and seek out opportunities instead of fixating on the many negatives. Let's make some real progress. Let's stuff our cheeks full of dried fruit, seeds and nuts, and make a run for the wild!

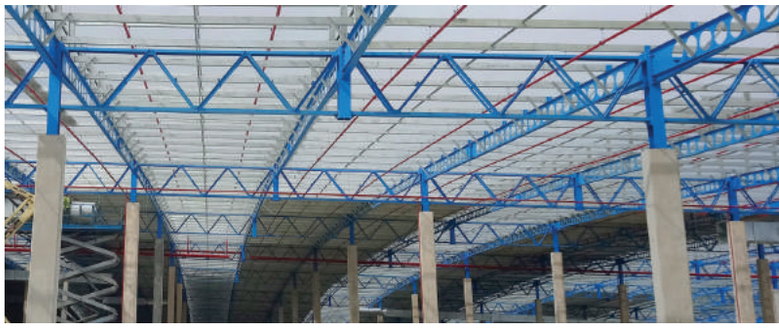
SAISC CALENDAR 2018

EVENTS

28 September	Steel Day Breakfast (AR and VR in the Built Environment)
11 October	Steel Awards (JHB/CT/DBN)
7 November	POLASA, SASFA, SAMCRA, ASTPM, STEASA and ISF AGMs
7 November	SAISC AGM
7 November	SAISC Cocktail Function

PROJECT **PROFILES**

WAREHOUSE AND INDUSTRIAL



CORRUSEAL WAREHOUSE

PROJECT TEAM

Nominator – Macsteel Service Centre SA I **Client/Developer** – Corruseal Group
Structural Engineer – Alan McNaughton & Associates I **Main Contractor** – JNM Construction
Steelwork Contractor 1 – Avellini Bros (Pty) Ltd I **Steelwork Contractor 2** – Union Steel I **Steel Erector** – Union Steel
Cladding Manufacturer – Blue Scope Steel I **Cladding Supplier** – Global Roofing Solutions
Cladding Contractor – Chartwell Roofing (Pty) Ltd

The 135 000m² site is situated in Croydon in Cape Town and is bounded by the R102, the Eerste River, the railway line bordering Stellenbosch and the Steyne Road. Their requirement was a factory/warehouse of approximately 30 000m² and associated offices of approximately 500m² on two levels. They stipulated that the factory/warehouse should have a width of at least 150m and allow for future extension.

The first challenge was to determine the overall shape of the structure. Due to the overall size of the building, the most efficient roof structure was determined to be a barrel vault. A double pitched roof would have resulted in an unnecessarily high apex with concomitant high gables and a significant increase in the quantity of steelwork and sheeting. Costs of services too would have increased. Valley gutters were not considered to be an option because of the potential for roof leaks. A distinct advantage of the barrel vaulted roof is that when the slope is very flat rainfall runoff is negligible, but when the runoff is at its maximum, the slope is at its steepest.

An extremely large radius of 600m was selected for the curve of the roof for aesthetic as well as functional reasons to limit the height of the crown of the roof to reasonable proportions. Natural lighting was introduced through the use of monitors which also enhanced the general aesthetics of the structure. Secret fix Klip-Tite sheeting was selected for

its slightly deeper profile and its advanced clipping system. Sheeting was kept to manageable lengths by dividing the curve into three approximately equal sections, with the middle sheet raised by 80mm to avoid a butt joint at the crown where slopes were extremely flat.

The curve of the roof made the use of cellular beams an obvious choice because of the ease of introducing a radius to the rafters. Cellular rafters were selected for their aesthetic appeal and elegant proportions.

The second challenge was to determine column centres which would accommodate Corruseal's large manufacturing plant, operating system and warehousing requirements. Through a process of trial and error, the optimum grid for the structure was 6.75m in both directions. Columns were fixed at 20.25m x 13.5m centres with the curved cellular rafters spanning the 20.25m dimension and transverse parallel chord girders spanning 13.5m. The overall size of the building (centre line to centre line) was set at 162 x 162m.

The structure was initially designed using steel columns. However when it came to determining where to locate internal vertical bracing, every position selected clashed with Corruseal's operation and reinforced concrete columns were the only alternative. This decision led to the columns being precast which helped to reduce the overall duration of the project.

For functional and aesthetic reasons cantilever rafters were introduced at the eaves. This will ensure that rainwater will be discharged away from the sides of the building in the unlikely event that the gutters will be overtopped. The cantilevers would obviate the truncated appearance on the sides if they were left off.

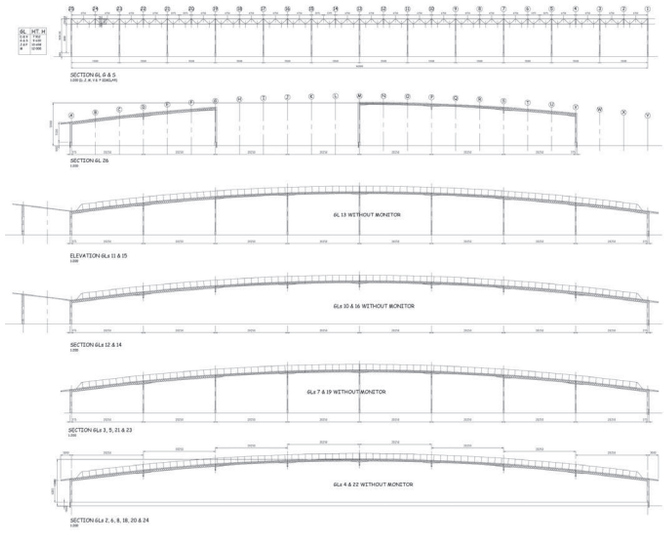
Detailing of the steelwork was achieved using Tekla software which ensured that only a few minor issues had to be dealt with on site.

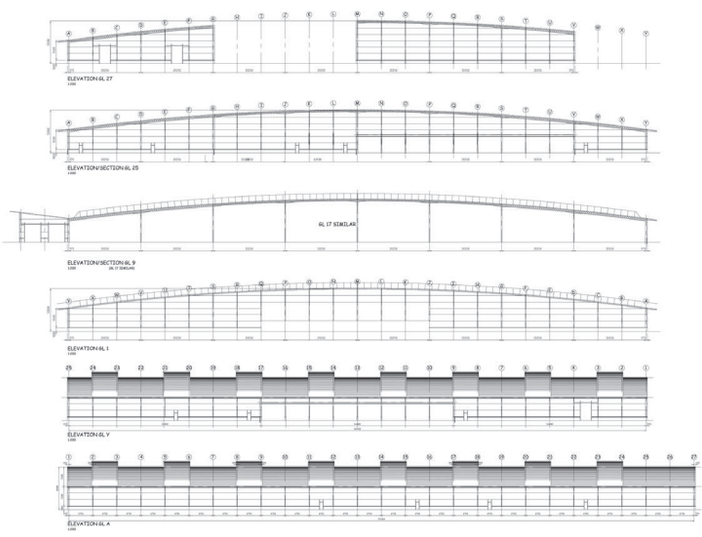
Tons of structural steel used: 596 Tons

Structural profiles used: Curved cellular beams and structural sections

Cladding profile/type used: Klip-Tite 700 AZ 200 Zincalume 0.53

Cladding area/coverage and tonnage: 30 000m²





GIBELA NEW MANUFACTURING FACILITY – DUNNOTAR

PROJECT TEAM

Nominator – AECOM I **Client/Developer** – Gibela I **Architect** – AECOM I **Structural Engineer** – AECOM
Engineer – AECOM I **Quantity Surveyor** – AECOM I **Project Manager** – AECOM I **Main Contractor** – Trencon
Steelwork Contractor 1 – Churchyard and Umpleby I **Steelwork Contractor 2** – Churchyard and Umpleby
Steel Erector – Louwill Lefa I **Cladding Manufacturer** – Powersteel (Louwill Lefa)
Cladding Supplier – Global Roof Solutions (GRS) I **Cladding Contractor** – Global Roof Solutions (GRS)

What is the purpose of the structure/project?

The purpose of this project was to provide a ±50 000m² industrial facility designed for the manufacturing of 580 trains for PRASA (Passenger Rail Association of South Africa), accommodating overhead cranes ranging from 2t to 2 x 10t tandem cranes.

What was the brief to the architect?

The brief to the Architect was to design a facility which encompassed the entire manufacturing process, from the extrusion of the raw steel, assembly of the coach, electrical wiring and internal fitting, filming, static testing and through to the final dynamic testing of the completed train.

Was the project envisaged in steel from the start? If not – why was it built in steel in the end?

Mostly yes. There were several iterations of the design to value engineer the buildings. The initial gable structure was concrete, but later changed to steel to speedup construction and reduce the size of the foundations.

Give a brief description of the structural framing. What type of sections were used (e.g. hollow, cellular, I beams, etc.) and why?

The main frame of the buildings consists of both lattice columns and I-Columns at 8 meter grid spacing. The roof consists of steel trusses made up of angle sections. Purlins and girts consists of Metsec profiles. Metsec purlin and side rail systems are manufactured from higher strength steel, with minimum yield strength of 390 MPa in comparison to the common and local Z and C sections, which generally have yield strength in the order of 200 MPa. This allows for larger purlin and girt spacing and an overall lighter structure.

The Gate House roof consists of curved cellular beams. This was mostly an architectural feature, because it is the main entrance to the site.

Were there any challenges in the fabrication of the project from the engineer's design – if yes, please tell? Tell more about fabrication and erection process if it was complex, difficult, innovative etc.

Some roof spans were more than 29 meters. This meant splicing of trusses for ease of erection. The erection process was quite conventional. It was a challenge to obtain the correct curvature for the curved cellular beams at the building entrance.

What is special/unusual/innovative/aesthetic about the steelwork/cladding in this project?

One of the buildings has a 12.5 meter cantilever canopy, with a gutter on the edge, spanning over a 10 x 48m hardstand which would be used as a laydown area. The client required a clean working space below to ease the movement of vehicles.

How did the project team work together (e.g contractor involved early, challenges/ease of communication etc.)

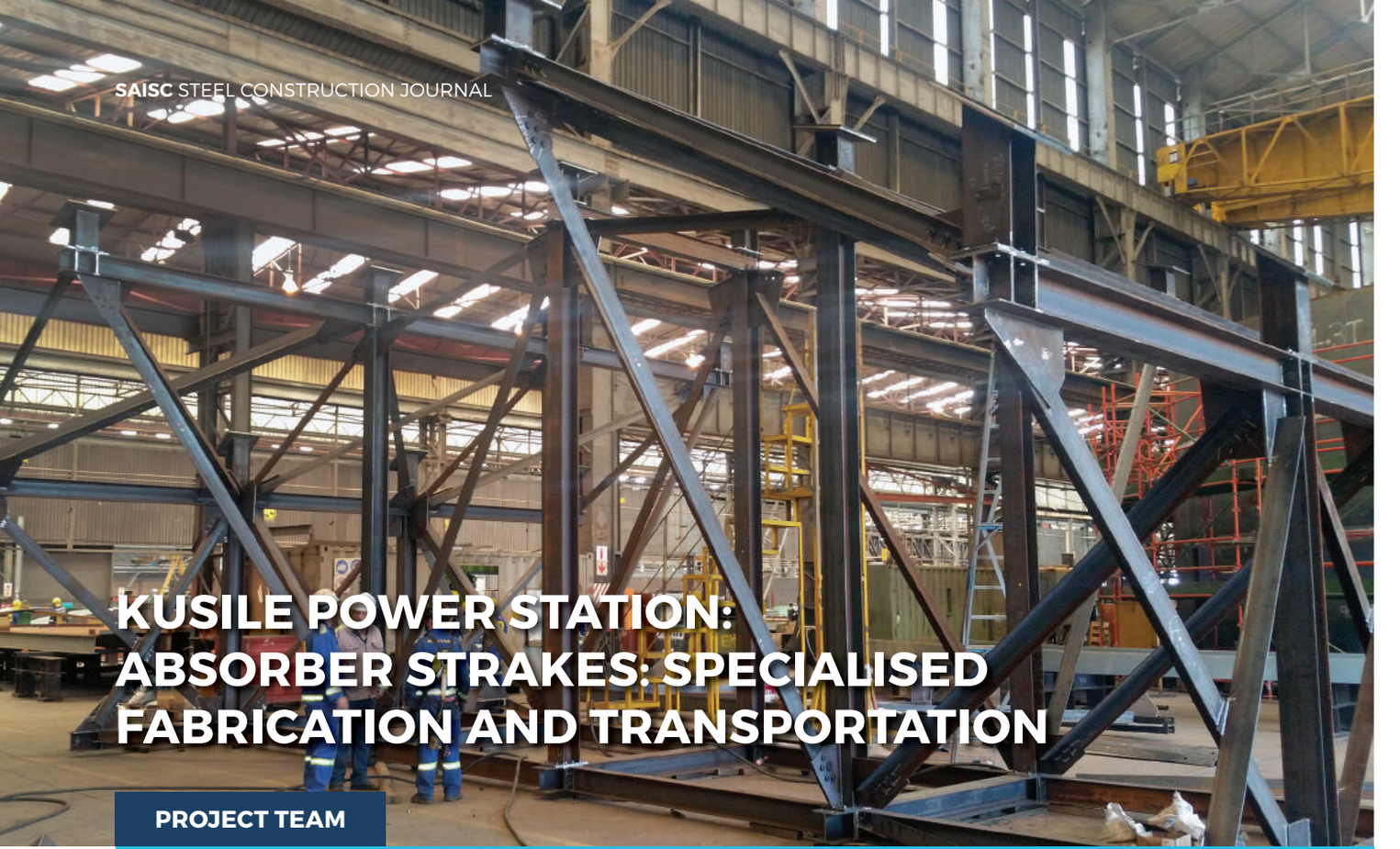
The engineer communicated directly with the steel fabricator to finalise fabrication drawings. The contractor was copied in all communication and witnessed the meetings. The engineer shared the 3D Revit models and hard copies (serving as the master files) with the fabricator to ease in the translation to Tekla structural steel. The fabricator also shared his Tekla 3D model as supporting documents with his set of fabrication drawings. This workflow was implemented in an effort to speed up the approval process.

Tons of structural steel used: 2396

Structural profiles used: Curved cellular beams, Metsec purlins, Hot rolled sections

Cladding profile/type used: 0.55mm Saflok 700 profile (roof) 0.55mm Trimflute profile (vertical/side)

Cladding area/coverage and tonnage: 77 352m²



KUSILE POWER STATION: ABSORBER STRAKES: SPECIALISED FABRICATION AND TRANSPORTATION

PROJECT TEAM

Nominator – GENREC I **Client/Developer** – GE (at time of project) I **Structural Engineer** – LSL Consulting
Engineering Manager – GENREC I **Main Contractor** – GENREC I **Steelwork Contractor** – Burger & Company
Steelwork Contractor – Nessa Engineering I **Steelwork Contractor** – One Steel

Nature of the project

The purpose of the project was to decrease "time to site" as well as "time on site" as well as to simplify onsite erection. Manufacturing the Absorber Strakes in the largest possible assemblies enabled a market improvement in fabrication and manufacturing quality.

The largest components moved were 120o segments of a 20m diameter, 9m high, circular absorber tower section, fabricated from 14mm steel plate.

The following considerations came into play when determining the feasibility of the "large assembly transport":

Positive considerations

Conditions inside the fabrication workshop at Genrec were controllable and assembly could take place without interference from the elements.

Quality control was easier, and automated welding methods could be used.

Time to/on site (i.e. site costs) was drastically reduced.

Negative considerations

Bespoke transport cradles, as well as lifting equipment needed to be designed and fabricated. This was mainly due to the flimsy nature of the 120o segments.

Due to the highly specialised nature of the design, specialist design expertise would have to be outsourced.

It was decided that the positives outweighed the negatives and LSL Consulting Engineers were appointed to design the lifting and transportation equipment.

Design process

Since the absorber towers are not constant in diameter, some sections were reducer sections and some were smaller sections. Therefore, a "one size fits all" system could not be used. All in all 4 different lifting arrangements and transportation cradles were used.

Due to a design process involving people from management right down to the factory floor, it was possible to design the

different cradles and lifting beams in such a way that they could be disassembled and modified to suit the specific requirements of the particular component to be moved. Thus the same cradle components could be re-used.

As far as possible, standard hot-rolled structural sections were used (I-beams and H-profiles) due to ease of availability. Specialised spreader beams were however required to carry out the "top-and-tail" operations required to rotate the absorber segments from a vertical manufacturing position, to a horizontal transportation position. The spreader beams were manufactured using bespoke box girders due to considerations of lifting capacity.

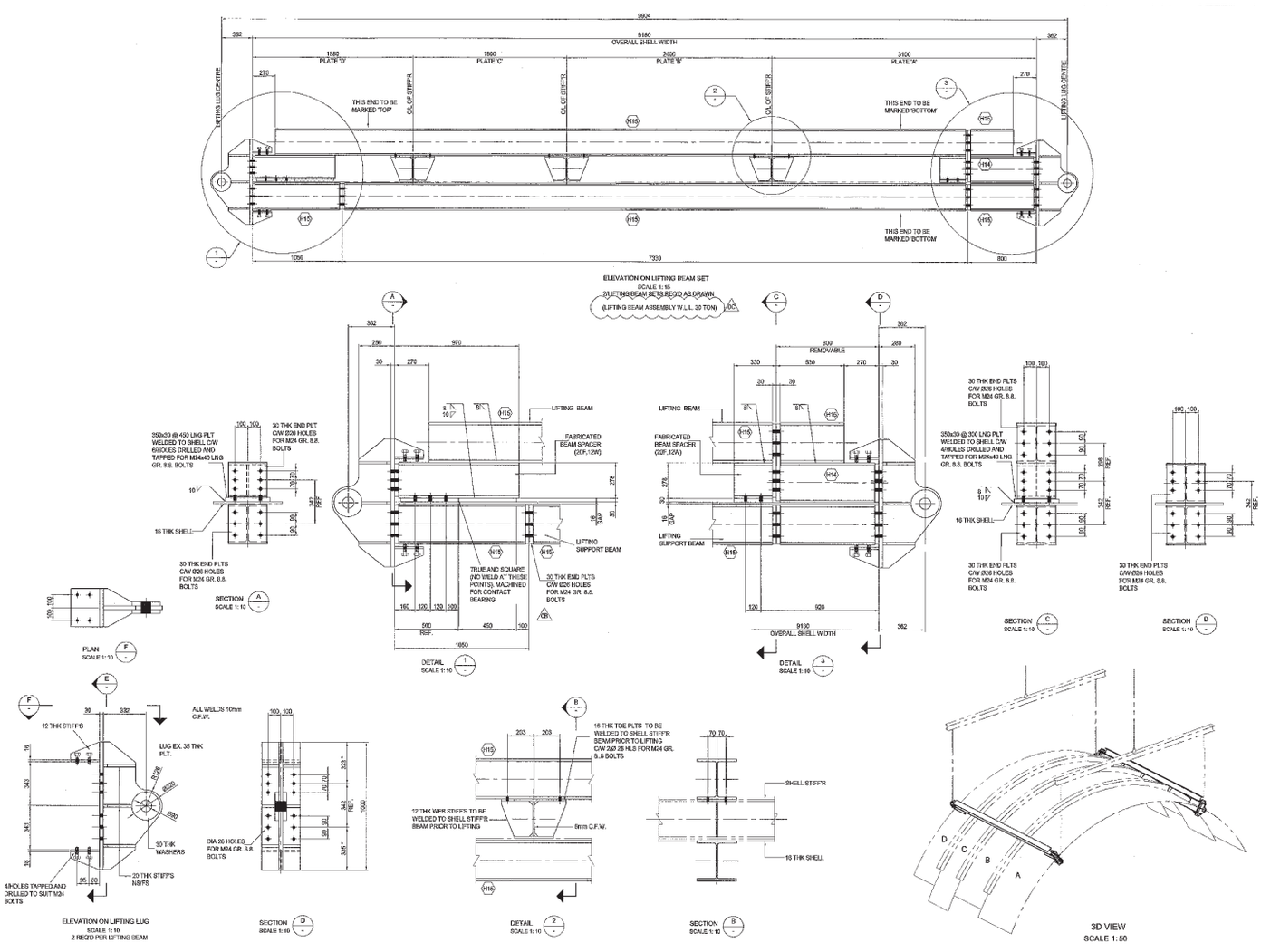
The most interesting part of the process was that the spreader beams, as well as the lifting beams which clamped onto the shells, had to be positioned in such a way that the centre of gravity of each shell would act as the rotational pivot point.

Fabrication and Transportation

Fabrication of the cradles were done partly in-house and partly outsourced, and transportation and transport co-ordination was outsourced to a specialist contractor.

Tons of structural steel used: 309

Structural profiles used: Box girders, I-beams, H-sections



PEPKOR WAREHOUSE

PROJECT TEAM

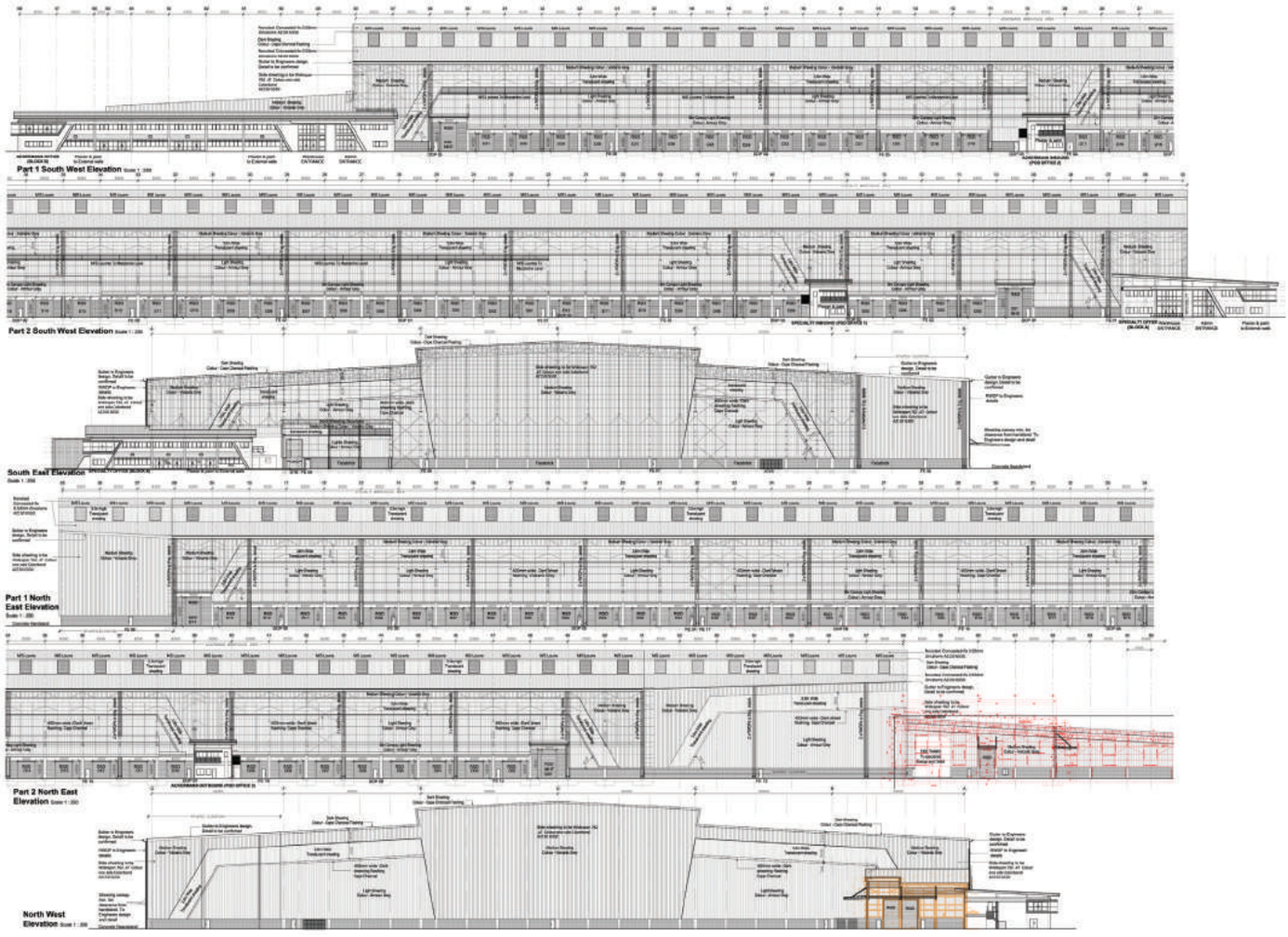
Nominator & Structural Engineer – EDS Engineering Design Services (Pty) Ltd
Client/Developer – Rokwil Property Development I **Architect** – T C Design Architects I **Project Manager** – Dave Armstrong
Quantity Surveyor – MHS Consulting Quantity Surveyors I **Main Contractor** – Abbeydale Building and Civils (Pty) Ltd
Steelwork Contractor – Cadcon Steel Construction and Engineering I **Steel Erector** – Fanie Leibrandt Steel Erectors
Cladding Manufacturer – Macsteel Service Centres (Pty) Ltd I **Cladding Contractor** – Impact Engineering (Pty) Ltd
Cladding Supplier – Macsteel Service Centres (Pty) Ltd I **Corrosion Protection/Galvanizing** – Dram Industrial Coating

The purpose of the Pepkor Warehouse in Hammarsdale is to serve as a distribution centre for the Pepkor group. The distribution centre consists of the following aspects:

- Total of 80 000m² of covered warehouse space (180m wide and 440m long).
- Main Ackermans office and a main Speciality office with 3 000m² and 1 800m² respectively.
- A total of 4 node offices of 500m² each.

The brief to the architect and the team for the structural portion of the project was the following:

- Warehouse to be ±55 000m² for Ackermans and ±25 000m² for Pepkor Speciality in one building as per the layout plan.



- Approximately 17.35m clear height to underside of eaves.
- Reinforced concrete and structural steel all to structural engineer's design incorporating appropriate corrosion protection where necessary.
- Internal column spacing based on a 33.2m x 30.5m grid (4 doors @ 8.3m centres = 33.2m).
- The structure steel was strengthened locally to allow for the installation of solar panels to a roof area of approximately 15 000m².

The warehouse was always envisaged to be constructed mainly out of structural steel. The main support columns of the warehouse were designed and constructed out of concrete up to 12.6m and 17m from FFL. The remainder of the structure was constructed out of structural steel.

The structural system used for the building was based on a girder truss system carrying lateral trusses that makes up the main elements of the roof. Various steel profiles were used for the building from hot rolled I-beams, angle irons, circular hollow sections, cold rolled lipped channels and so forth.

The remarkable aspects of this project were the speed at which the steelwork was erected as well as the completion of the overall project. A total of 2 500 ton of structural steel was erected (main warehouse 2 180 tons and canopies/offices 320 tons = 2 500 tons), with the erection commencing on 14 November 2016, and reaching completion of the main warehouse structure (2 180 tons) at the end of March 2017 (which includes a builder's break). This remarkable achievement took place over a period of 90 working days to erect on average of 24 tons per day over a period of 4.5 months, using on average 8 cranes on site over the same period.

A sensitive construction program had the steel contractor under pressure from 19 August 2016 which was the date of appointment. Cadcon Steel Construction decided to enter in a joint venture with A. Leita Steel construction to reach the delivery various dates for erection. The on-site production required to meet the construction program resulted in an average of 485 ton of structural steelwork to be erected per month.

The entire project team worked together successfully throughout the entire duration of the project. Effort was made to design the structure in a manner that suits the various contractors involved at each step of the project to reach the various project milestones.

Tons of structural steel used: 2 500 tons

Structural profiles used: Hot rolled I-, H-, angle section, cold rolled lipped channels

STORTEMELK HYDROPOWER

PROJECT TEAM

Nominator – Earthworld architects & interiors I **Client/Developer** – REH Group
Architect – Earthworld architects & interiors I **Structural Engineer** – Aurecon I **Main Contractor** – Eigenbau

Architect's motivation

Situated in the rolling foothills of the Drakensberg Mountains, along the banks of the Ash River, the Stortemelk Hydroelectric Plant attempts to celebrate the importance the plant holds in producing clean, responsible electricity in South Africa.

Comprised of a number of building skins, the design approach intended to create different experiences of the plant from the exterior, & from within the interior. Clad in Corten Steel and Polycarbonate sheeting, the architecture is intended to be of its landscape, while still allowing for good light quality to penetrate into the plant interior. Articulating the façade with slotted window openings allowed for the perception that the electrical production of the plant is spilling out into the surrounding environment, creating a beacon in the landscape.

On approach to the site, the Corten sheeting reaches up into the skyline, announcing the building and adjacent river from a distance. The lightness of the steel construction is then contrasted by the far more stereotomic design of the rest of the plant, which protrudes from the river bank as a plinth.

The challenge in the project was to create spaces for production, with minimal human interaction. Working hand-in-hand with an exceptional client made the realization of this celebration of production possible, creating architecture with respect for the responsible electrical generation the client creates.

Client's motivation

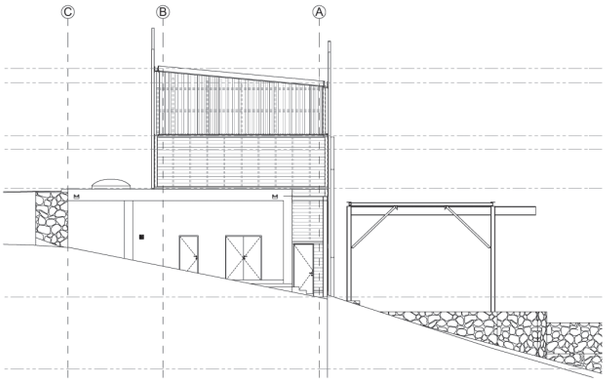
The client's brief for the Ash River site was to create a housing for a hydro-electric plant that blended seamlessly with the surrounding landscape while also celebrating the responsible production of electricity. Many of their hydroelectric sites have been in operation for decades, which therefore requires an approach that does not become a burden on the landscape or surrounding community.

The response to this brief from the architect achieved every aspect that the client required, succeeding in both blending into the landscape, while also celebrating the plant's functions. Beyond this, the design managed to create a spectacular light quality in the work areas of the plant through the use of polycarbonate sheeting.

The plant stands as the perfect mediation between the production of electricity from the river, and a well-considered addition to the Golden Gate landscape. In its entirety the client believes this piece of production architecture fits wholly within their ethos of responsible creation, standing as a testament to what can be achieved without negatively affecting the unique countryside.

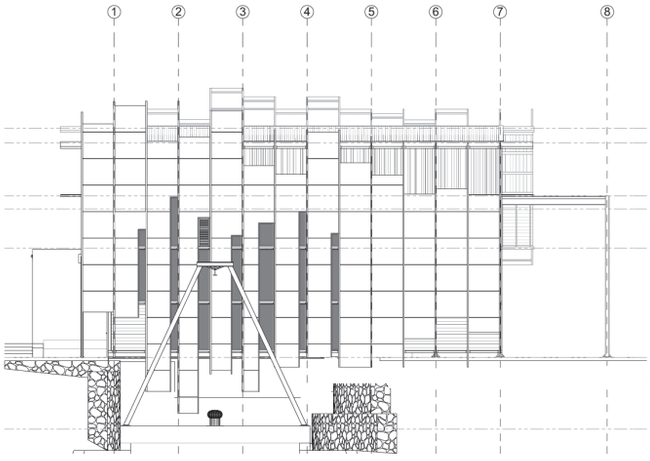
Profiles used: 406 x 140 x 46mm galvanized steel I-Beams and Columns, IPE-AA 120 galvanized, IPE 200

Type of cladding: 3mm Corten sheet panels and polycarbonate sheeting



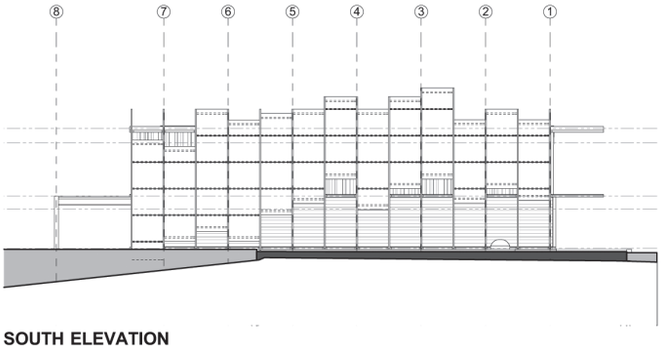
EAST ELEVATION

1m 5m 10m



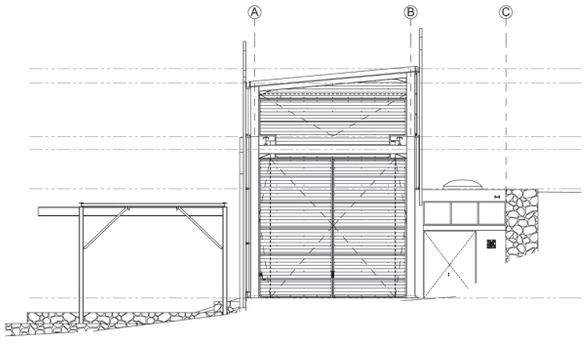
NORTH ELEVATION

1m 5m 10m



SOUTH ELEVATION

1m 5m 10m



WEST ELEVATION

1m 5m 10m

TRADEPORT CITY DEEP

PROJECT TEAM

Nominator – KRU Detailing cc I **Client/Developer** – Fortress Fund Developers I **Architect** – ICM Architects
Structural Engineer – EDS Engineering Design Services I **Structural Steel Detailer** – KRU Detailing cc
Engineer – EDS Engineering Design Services I **Quantity Surveyor** – Quanti Cost Quantity Surveyors
Project Manager – Fortress Fund Developers I **Main Contractor** – SE Steel Fabrication
Steelwork Contractor – SE Steel Fabrication I **Steel Erector** – SE Steel Fabrication
Cladding Manufacturer, Supplier and Contractor – Pinnacle Cladding

What is the purpose of the structure/project?

The main purpose of the structures is to serve as a warehouse facility.

What was the brief to the architect?

The architectural brief was to design a warehouse that had large internal column spacing, creating a versatile open storage area and dedicated racking layout with minimal loss of space due to column interference. The warehouse spanned over a total of 30 000m^2 in total comprising of three storage segments inside with a 12m clear eave height.

Was the project envisaged in steel from the start? If not – why was it built in steel in the end?

The structure was designed as a combination of a face brick plinth wall with cladding onto a steel structure above plinth wall with roof structure and canopies. A structural steel truss system comprising of large span girder trusses and secondary lattice trusses was chosen to provide the required clear span attributes.

Give a brief description of the structural framing. What type of sections were used (e.g. hollow, cellular, I-beam etc) and why?

A combination of hot-rolled H-, I- and angle iron sections were used in parallel with cold rolled lipped channels.

Were there any challenges in the fabrication of the project from the Engineer's design – if yes, please tell? Tell more about fabrication and erection process if it was complex, difficult, innovative etc.

The uniformity in structural shape and sections selected for the design made the fabrication process easy, which enabled the erection process to be streamlined.

How did the project team work together (e.g. Contractor involved early, challenges/ease of communication etc.)?

The use of Tekla Structures as primary draughting tool facilitated in the communication between design, engineer, structural steel detailer and contractor. Quick response, effective communication, and the ease of understanding

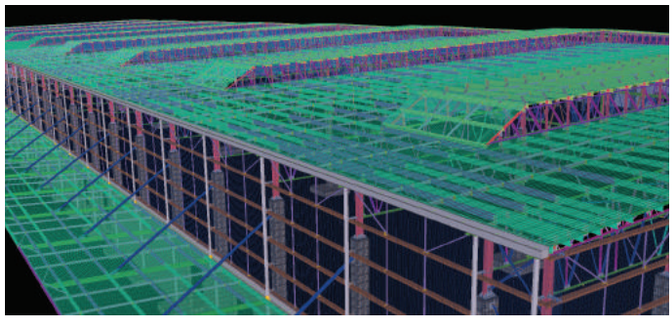
the structural scope, that combined with professional team meetings and inspections.

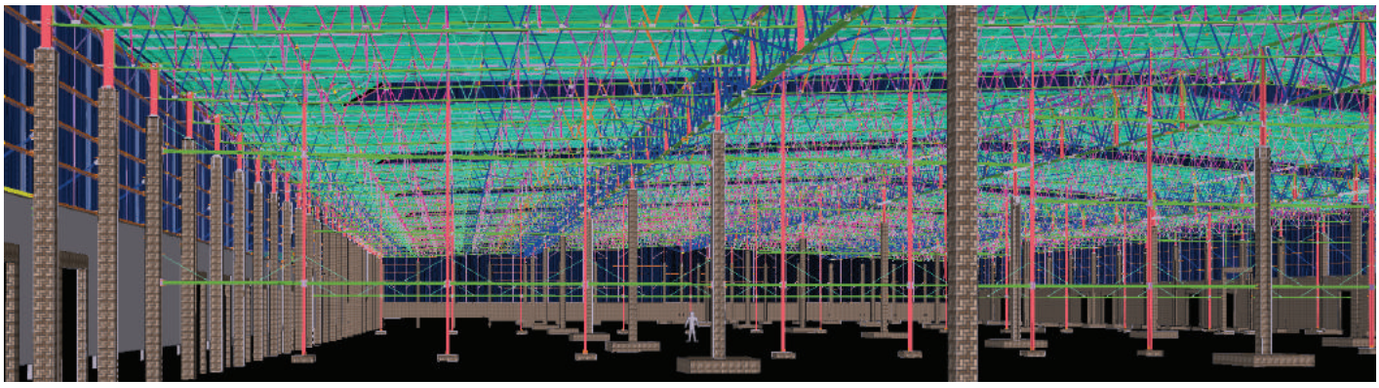
Tons of structural steel used: 720 Tons

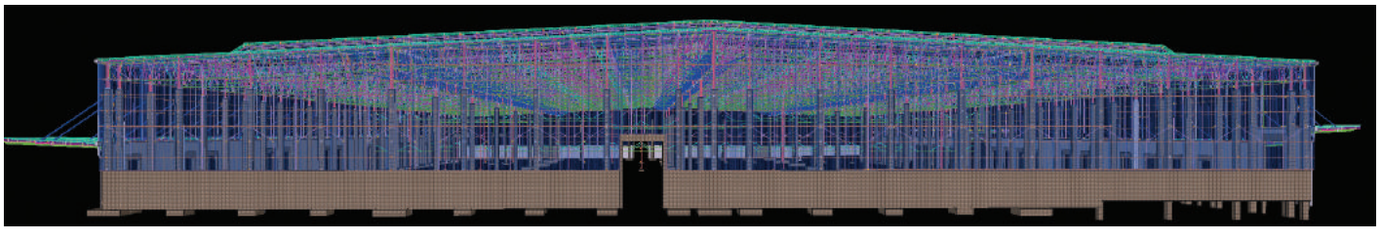
Structural profiles used: Profiles used were standard columns, beams, lattice trusses and girders (angle irons), some of the ties were circular hollow sections and the purlins and girts used were pre-galvanized 2mm lip channel sections

The completion date of cladding: September 2017

Cladding profile/type used: NOVOTEXi Roof Sheeting







OPINION

AMANUEL GEBREMESKEL
TECHNICAL DIRECTOR, SAISC

STEEL TO THE RESCUE – MEETING THE AFRICAN CONTINENT'S RAPID URBANISATION NEEDS

I was surprised to learn that the celebrated author Simon Sinek lived in Joburg for a while as a child. In his 2009 book, *Start With Why*, he compares the two main ways to influence human behaviour – manipulation and inspiration. Sinek argues that inspiration is the more powerful and sustainable of the two.

Sinek says that people are inspired by a sense of purpose or "Why", and that this should come first when communicating, before "How" and "What".

Why we do what we do

Urbanization presents an incredible opportunity for those of us who are motivated by a desire to build things for people. For instance we can design, fabricate and construct inspiring residential, office, shopping and leisurely buildings in order to create viable cities that can absorb millions of people a year. This opportunity exists for us not only in South Africa but all over the continent.

How we do what we do

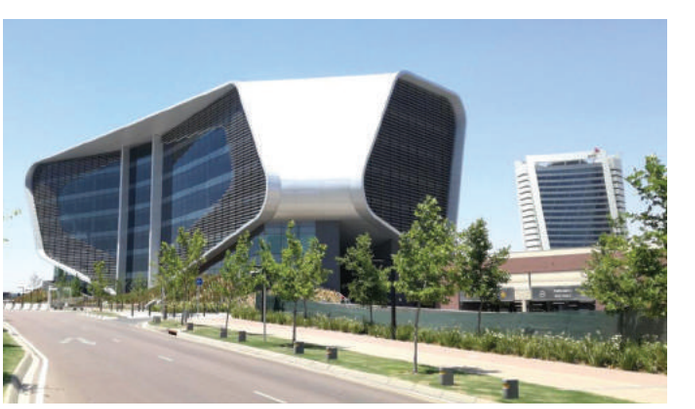
We are able to solve many of the problems that arise when building such monumental structures by innovating. For instance anything that we can do to reduce the amount of fresh water that is used in construction can leave more water for human use. One way to do this is to avoid the use of formwork that requires cleaning, and to use less materials in general.

Innovation typically involves successful commercialization of new products and services, or at times older ones that are to be used in new ways. Over the past century adoption rates of successful innovations have been getting faster. This means, in order to benefit from urbanization, we need to urgently support all those people who are involved in innovation. There is little time to spare.

What we do

We conceptualize, design, fabricate and erect. We do this safely by fabricating as much as possible in a factory and assembling the pieces on site. Integrating the concrete formwork into the permanent structure, while achieving high strength through composite action, is one of our most valuable secrets. There is little debris during construction and there is no waste to haul back to construction dumps.

Steel framed residential building in Cape Town.



Midrand office building cladded in steel.

Modular composite shear wall that does not require climbing formwork.

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POLASA NEWS

GARY WHALLEY
Business Unit Managing Member,
Babcock Ntuthuco Engineering

POLASA
POWER LINE ASSOCIATION OF SOUTH AFRICA

THE TRANSMISSION LINE INDUSTRY IN SOUTH AFRICA

"A SINKING SHIP?"

Introduction

The South African local transmission line industry finds itself in extremely choppy waters. No new high voltage transmission line projects have been launched into the market since late 2016.

Eskom, as the sole provider of high voltage transmission line infrastructure, faces a severe cash crisis which calls into question its ability, or desire, to launch necessary new capex projects to market when it is struggling to address its operating cash needs. While there is a need for additional infrastructure to evacuate power from its new power stations and reinforce the network's capability to supply remote demand areas, its regulated grid code requires an N-1 grid capability not yet addressed.

The local South African transmission industry, having largely delivered on Eskom's projects, finds itself in distress, experiencing significant job and capacity losses through business down-scaling, distress or business exits from the sector.

Is the local industry doomed to failure or will a concerted South Africa first approach between stakeholders create a sustainable industry able to under-pin South Africa's grid requirements as a first priority.

Executive summary

This paper is an attempt by POLASA to table the significant issues that must be addressed and resolved by stakeholders to avoid further job losses, loss of manufacturing capability and the destruction of a local industry, which would result in South Africa becoming a price taker for critical and necessary transmission line infrastructure.

Despite its niche nature, with peculiar skills and unique operating environment, this industry plays a vital and critical role in enabling Eskom to meet its mandate of delivering critical transmission infrastructure, to integrate electricity generation with its broader electricity distribution, to underpin the growth and development of the nation.

The paper primarily focusses on the transmission line construction industry but is indicative of all underpinning manufacturers and suppliers to this industry who are facing short-time, retrenchments and business closure as a result of the current state of the industry.

Framework

In a consistent manner Eskom has, from 2006 onwards, exhorted the local transmission line industry to invest in and increase its capacity to deliver on its requirement to build 1 000km of transmission lines per year. In keeping with Eskom's social mandate, local industry was encouraged to incubate smaller contractors to further enhance and develop capacity, as well as ensure that safety of the industry remained a non-negotiable imperative.

POLASA's mission reflects Eskom's position, seeking to establish and support a "viable and sustainable power line industry".

In a concerted and earnest response, the local industry increased capacity over the period from 2006 to 2018 through:

- capital investment in specialist equipment and new technologies;
- extensive recruitment and training of personnel;
- incubation of smaller contractors to increase capacity;
- concentrating on localization of manufacturing, skills and expenditure for the benefit of the areas of operation and the country;
- transformation of local companies to address the imperative of BBBEE; and
- the establishment of POLASA in 2013.

The demand for transmission line infrastructure peaked in a bubble of work released by Eskom to the market in 2011 when 1 700km of lines were

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put out on enquiry. A concerted effort by local industry saw it win and execute 40% of these projects or about 680km through 2011 and 2012. The balance of contracts were awarded to five multinational companies who struggled to deliver the circa 1 000km through 2011, 2012 and 2013.

By 2013, the local industry faced a "burning platform", with some 5 000 jobs jeopardized and a complete interruption of work for 12 months due to a lack of projects being put into the market by Eskom, despite its ongoing insistence that the imperative to continue increasing capacity to address 1 000km of new transmission lines per annum. POLASA published its "Burning Platform" Industry paper as a platform to engage stakeholders on the crisis in the industry. Inherent risks in the roll-out of transmission infrastructure were identified. Eventually four of the five multinationals involved in the industry left South Africa, some vowing not to return due to inherently difficult operating environment.

"Sinking Ship?" or "Sinking Ship!"

Despite extensive engagements with stakeholders from 2013, another peak in demand arose in 2015 when Eskom launched some 2 200km of transmission line enquiries to market.

Despite the intensely difficult operating conditions, the local industry has risen to Eskom's needs. To date, of the 1 300km of this tranche of work which is completed, 92% or about 1 200km has been built by local companies. Of Eskom's Shareholder Compact kilometers, local industry delivered 95% in 2016/2017 and 100% in 2017/2018. The local industry certainly has not been without fault in its delivery of these kilometers, struggling to deliver work contractually on time and within contracted cost.

The majority of the 900 kilometers left to build are in the hands of multinational companies that continue to struggle to deliver transmission line infrastructure in South Africa. In certain instances, Eskom has been obliged to remove contracted work from these companies due to non-performance arising from parent companies being in business rescue in their home countries, either at or around the time of contract award from Eskom.

In the interim, the local industry is confronted by the crisis of no new work coming to market for over 18 months and unless serious interventions are made, over 6 000 jobs will be lost at a time when the country can ill-afford additional unemployment.

Local companies, whether large contractors, smaller incubatee contractors or secondary suppliers are in financial distress, are downsizing or exiting the industry. The inherent risks identified in 2013 remain unchanged and have in fact been exacerbated by the sociopolitical environment in the country. Without intervention it is highly likely that the local capacity to deliver on new transmission infrastructure will be destroyed.

Is this sustainability?

Over the period 2009 to 2018 eighteen contractors have participated in the construction of Eskom transmission infrastructure. During that time fourteen contractors or 77% have exited the South African Industry. The minority of these voluntarily due to the extreme challenges posed. But the vast majority through business imperative, voluntary liquidation or business rescue.

In the last twelve months incubatee contractors are in severe business distress and face the real prospect of business failure.

The award of contracts to multinational companies has repeatedly resulted in:

- Project delivery either exceptionally late or completely failed;
- Various South African smaller subcontractors in business distress through non-payment for work done;
- Local contractors sanitized from participating in necessary transmission infrastructure

construction, despite now having excess capacity to build;

- Minimal to no Supplier Development and Localisation having been contractually obliged, as well as no incubatee development obligation being contracted – contrary to such contractual requirements being imposed on local contractors.

No industry can achieve sustainability when there is no continuity of work.

Unintended consequences?

In the early part of the new century, faced by an exceptionally large infrastructure demand, Eskom established its Group Capital Power Delivery Projects structure. In this structure, project delivery was primary and various functional departments, fundamental to successful project delivery, were subjugated to Power Delivery Projects. These included lands & rights, procurement, engineering and SHEQ.

In circa 2010 this structure was dismantled, and each department was made independent of Power Delivery Projects. The result was a loss of focus on project delivery, with each department developing and working towards its independently identified priorities.

One cannot fault the procurement strategy of achieving the lowest price for a contract from the Eskom Commercial team in its efforts to deliver cheap electricity to the country. However, the question of whether that strategy has deliberately resulted in the current and prior crises in the local industry, or these crises have been the unintended consequence of that strategy.

Were the 2011 and 2015 "bubbles" of work an intentional strategy to elicit lowest prices through creating a boom or bust demand cycle of work on the industry?

The drive for cheapest price has resulted in some unusual procurement practices which smack of the extreme leverage of customer power:

- Transmission line construction projects are competitively bid as would be expected:
- However, despite a stated commitment to transparency, in Eskom funded projects, no bid prices are read out at tender opening;
- Then on evaluation as the most competitive bidder, a process of further aggressive negotiation is undertaken with the preferred bidder to extract further discounting or cost reductions; and
- Contract award prices are not published.

Once the project is awarded, the procurement team has completed its mandate and has no accountability for the completed cost of the project.

In certain well accepted project environments, the cheapest price bids are eliminated to remove the risk to successful project execution of an underpriced contract and a resulting underperforming contractor.

On award of contract the project is handed over to the Power Delivery Projects team whose mandate, quite understandably, is founded on the successful delivery of the project: safely; on time; to specified quality; and within budget (defined by the contract price).

In the circumstances the project team, through contractual terms and leveraging of customer power, seeks to manage its risk through acts that severely impact the contractor's cash flow:

- The demand for excessive contract security through:
  - high payment retentions which reduce free cash flow to fund project operations; and
  - high performance guarantees. This requirement particularly constrains smaller emerging contractors who must obtain such guarantees out of credit facilities from their banks (which are already reluctant to extend such facilities due to the emerging nature of the contractor).
- Further constraint on free cash flow by:
  - the introduction of unrealistic interim completion dates with associated penalties. Even where such penalties may be later reversed on successful meeting of the overall completion date, free cash flow during critical construction operations is reduced;
  - slow resolution of Compensation Events (CE's) resulting in Contractors incurring construction costs arising from CE's but only recovering these much later when settlement is finally reached on the CE.
- Compensation event management through:
  - the subjugation of the NEC Project Manager to a Compensation Event panel which excessively delays resolution of the CE. This effectively nullifies the intent of the NEC which mandates the Project Manager to act in the best interest of the project and resolve CE's as they arise;
  - Pass on risk to contractor despite the contractual definition of where that risk lies or, in circumstances where risks not contemplated by the contract arise neither of which are priced for by the contractor.
- Then, despite extensive and intense contractor capability qualification, micro management of every aspect of the contractors' performance on site through often externally contracted site management and supervision with little or no experience in the transmission line industry resulting in excessive delays and unnecessary on-site conflict.

The way forward to sustainable

POLASA seeks to engage with its client at the proposed PDP Indaba to flesh out the risks to sustainability of the industry to deliver on the critical transmission line infrastructure and seek solutions to avoid the cyclic nature of work that leads to inevitable job losses.

Further positive stakeholder engagement is being sought by the Association to positively engage with its broader stakeholders including; executive management of Eskom; government ministers and broader industry stakeholders.

It is the local industry's view that it is imperative to create a sustainable industry and that the local industry have indeed shown through empirical evidence that it has the ability and capacity to support the transmission roll-out plan through re-aligned Supplier Development & Localisation.

SAMCRA FEATURE

DENNIS WHITE
DIRECTOR, SAMCRA

SAMCRA
SOUTHERN AFRICAN METAL CLADDING AND ROOFING ASSOCIATION

COLOUR COATED **CLADDING**

With the increased use of colour coated metal cladding in the residential market we feel it is important to make consumers aware of what influences the performance of these materials in the different environments experienced within the RSA.

The colour coating on coil used in the manufacturer of cladding can range from a thin layer of paint (5 microns) applied atop a chemically treated metallic coating to a multilayered system comprised of a pretreatment, primer and top coat (18 to 30 microns thick). Whilst the finished colour may initially look the same the overall performance of colour coated products in a given environment is dependent on the combination of the paint system, thickness of individual layers, plus type and thickness of the underlying metal coating.

In addition to providing the colour and finish (gloss, matt or textured) the top coat provides the barrier against the effects of solar radiation such as fading and chalking plus influences the amount of heat absorbed by the cladding. There are numerous formulations for these coatings each designed to meet the rigors of the environment in which they are to be installed. The most common of which are polyester or polyurethane based.

The principal function of the primer coating is protection against corrosion of the underlying metallic coating. This layer needs to be of a thickness that is not penetrated by minor mechanical damage during handling and installation.

Finally the metallic coating protects the underlying steel core particularly at cut edges and deep scratches. The effectiveness of this layer is directly proportional to its thickness and composition in a given environment e.g. galvanised or aluminium/zinc alloy.

Not all paint systems are equal. Performance of paints is directly linked to their formulation plus quantity and quality of the ingredients used. Paint systems with the same formulation composed of lesser quantity and quality of materials will not have the same durability as those made with better quality materials. The extremely high levels of UV radiation experienced in Southern Africa quickly reveal the quality of the pigments and resins used. It is therefore advisable to specify brands with a proven track record rather than accept an unproven paint system.

Reputable coil manufacturers mark their products with their registered brand name plus details of the type and thickness of the underlying metallic coatings. In addition they provide performance warranties/ guarantees and technical assistance.

Most importantly do not rely on the given name of a colour to ensure you are getting a specified product. In order to ensure you are getting the coating system you require we recommend that you specify the trademarked system plus the related colour when purchasing colour-coated cladding. Furthermore include the provision of a written warrantee/guarantee, issued by the coil producing mill, as a contractual requirement of your purchase.

CONNECT WITH SAMCRA: **Contact:** Dennis White **Email:** dennis@saisc.co.za **Web:** www.samcra.co.za

STEASA NEWS

KEITUMETSE MOUMAKOE (K.M)
DIRECTOR, STEASA

THE STEEL TUBE EXPORT ASSOCIATION OF SOUTH AFRICA

ATTENDS BRICS BUSINESS FORUM

The Steel Tube Export Association of South Africa was cordially invited to take part in the BRICS Business Forum on the 25 July 2018 at the Sandton Convention Centre. The business forum formed one of the pillar collaborations among representatives from the various BRICS nations who were made up of captains of industry, heads of state-owned entities, government leaders, civil society groups and media sectors of the respective nations.

South Africa played host to the 10th BRICS Summit which ran from 25 – 27 July 2018 after taking over the rotational chairship of the emerging economies grouping Brazil, Russia, India, China and South Africa (BRICS). The theme for the 10th BRICS Summit was: "BRICS in Africa: Collaboration for Inclusive Growth and Shared Prosperity in the 4th Industrial Revolution". The theme is reflective of the core priorities of each one of the BRICS members, notably to strive towards the creation of an inclusive society and global partnerships that will bring prosperity to all humankind.

The Minister of Trade and Industry, Dr Rob Davies, Deputy Minister Mr Bulelani Meganiche and the Chairperson of the BRICS Business Council, Dr Iqbal Survé delivered speeches at the opening session of the forum. Their addresses were followed up by four thematic sessions that cover various topics. The Ministers of Trade, Commerce, Industry, Economic Development and External Relations of the five BRICS countries were all panelists in the sessions where "The Role of BRICS in Trade and Investment facilitation amidst a Changing Global Political Economy" was discussed.

The five BRICS countries account for 26 percent of the world's landmass and are home to 43 percent of the world's population. The bloc is composed of emerging markets and the developing world. There has been substantive progress achieved since South Africa joined in 2011, as seen for example in the launch of the Africa Regional Centre of the New Development Bank (NDB) in South Africa. The formation has strengthened its cooperative mechanism for institutional development, most notably witnessed in the creation of the New Development Bank and the recently launched Africa Regional Centre in Johannesburg.

The business forum provided a platform to showcase the economic prowess of the African continent with a particular focus on advanced manufacturing, energy, technology, rail, aviation, information and communication technology, financial services and beneficiation (agro-processing and mining), as well as to enhance the flow of foreign direct investments from the BRICS bloc into the continent. The Business Forum also provided an opportunity to facilitate the creation of manufacturing value-chains on the African continent, to stimulate dialogue on the utilisation of financing packages offered by the New Development Bank, and to promote synergies with development finance institutions on the continent.

A key commitment needs to be made by the BRICS nations not to trade amongst themselves in products or commodities that are commonly manufactured in the respective nations but rather look to trade in products and commodities that are not produced in their respective countries. This would ensure the sustainability of each countries manufacturing sectors i.e steel and prevent the demise of one nations industry by another.

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THE SOUTHERN AFRICAN INSTITUTE OF STEEL CONSTRUCTION

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steel awards 2018

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Contact Liezel Weber Tel: +27 (11) 726 6111 Email liezel@saisc.co.za or visit our website www.saisc.co.za for more information

CADEX SYSTEMS SA **PHOTO COMPETITION**

The CADEX Systems SA photo competition is a key feature element of the SAISC Steel Awards. Currently in its 7th year, the photo competition has expanded in order to promote the use of steel to a broader audience. Photographs submitted by project nominators have been shared on the Steel Awards' Instagram account (@SteelAwards) and on members own accounts using the hashtags #SteelAwardsPC and #BeautyOfSteel.

"We're constantly looking at new ways to engage with specifiers and promote the benefits of steel" says Denise Sherman, Marketing Manager of the Southern African Institute of Steel Construction. "Instagram is a very visual platform, and we're excited about the opportunities it presents to showcase the fantastic work our industry produces." she concludes.

The shortlisted and winning photographs will be showcased at the Steel Awards event on 11 October 2018. If you haven't already done so, cast your "vote" for the best photograph by double tapping the image in Instagram. Where images were not specified for the competition by project nominators, the SAISC team picked the top images submitted as part of a Steel Awards entry. These were selected purely for their artistic appeal, and include the following:

1 33 Baker Street
2 Silo 6
3 Ashgate
4 BMW Paintshop Re-roof
5 Campus Square Shopping Centre
6 Cilmor DC Cape Town
7 Pienaar
8 Club 2
9 Corruseal
10 Discovery Head Office Sandton
11 Discovery Head Office Sandton
12 Durban Girls High Facility Centre
13 Empowered Spaces Office High Definition Interiors
14 Gilson
15 Future Africa Campus
16 Graskop Gorge
17 Gibela New Manufacturing Facility - Dunnotar
18 Macro Riversands
19 Go Durban Integrated Rapid Public Transport Network (IRPTN)(Bus Stations)
20 Heineken SA Project BIG
21 Ngezi Lounge
22 Kusile Absorber Strakes
23 Hoopstad Westfert Fertilizers
24 House Matthews
25 Inoxa
26 Invicta
27 JRA Gantry
28 Kaap Agri
29 Libertas Office Park
30 Loftus Park
31 Momsens BIkes (Two Wheels Trading)
32 Limpopo Mall
33 Grain Silo - Internal during Installation
34 St Johns
35 Gateway West
36 Labus
37 Pepkor
38 MacEdwards House Extension
39 Old Apostolic Church Roof
40 Mediclinic Stellenbosch
41 PWC Tower
42 Gateway West
43 Our Lady of Lourdes - Rivonia
44 WIlcox Road
45 Woodlands Dairy
46 City Logistics
47 Mintek
48 Nike - The Pulse
49 RCL Foods
50 Rosebank Link
51 Time Square Hotel
52 Soweto Sports Centre
53 Spectacle Warehouse
54 Tradeport City Deep
55 VIdeojet Paarl
56 Sun Arena
57 Schmitz
58 Woolworths DC - Cape Town
59 Victor Daitz Mathematics Centre, KES
60 Gibela Train Station - Cladding
61 Wupperthal Pedestrian Bridge
62 Stortemelk Hydropower
63 Wilcox Jones
64 Pre-eminence Studio
65 Macro Riversands
66 Mercedes
67 Van Rooyen
68 Whalecoast Mall
69 Silo 3


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CENTRE
WELCOME

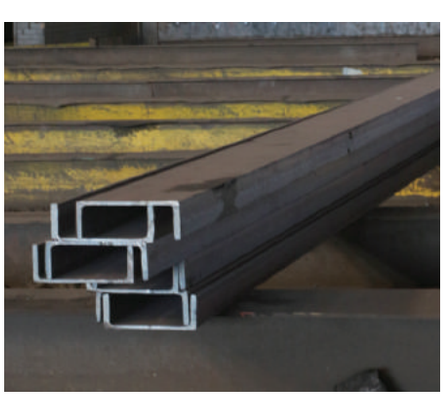
THE GOOD NEWS

UPDATES FROM OUR TEAM, OUR MEMBERS AND THE BROADER CONSTRUCTION INDUSTRY

HSM INDUSTRIAL PARK SITE VISIT

A team from the SAISC, as well as key representatives from the DTI, DMR, ITAC and other stakeholders, visited the Highveld Industrial Park on 21 June. All in attendance were pleasantly surprised and suitably impressed with the incredible progress achieved despite some seemingly insurmountable difficulties.

After a brief introduction and inspiring presentation on the trajectory of Highveld Industrial Park, visitors were treated to the "once-in-a-lifetime" experience of seeing the structural mill in operation. These visits have an important influence on the insights and attitude of various Government officials and provide a fantastic opportunity for engagement. The road ahead requires tenacity, innovation and effective stakeholder engagement in order to benefit the local community and the economy as a whole.



TELL US YOUR GOOD NEWS!

Let us know what you're celebrating as a company, or what you're proud of that we can share with the industry! **Email denise@saisc.co.za**

WOMEN OF **STEEL**

On 17 August the SAISC made history by hosting its first "Women of Steel" event, at the Johannesburg Country Club – Auckland Park. The positive response from ladies across the industry was phenomenal and the event was a resounding success, boasting a full house of professionals, managers, administrative staff and even engineering students from 3 different universities!

"Women of Steel" was initiated by the SAISC as a mechanism for recognising the vital role that women play in the industry, and to encourage them to be proactive about connecting and contributing. SAISC CEO, Paolo Trinchero, delivered a short welcome and implored attendees to engage with the SAISC on an ongoing basis. "We believe that we need a lot more diversity within the SAISC, and that speaks to gender, to race and to the

South Africa that we live in." says Trinchero. The SAISC welcomes input from all individual and company members, and would like to encourage active participation – from grassroots to boardroom level.

The SAISC would like to thank guest speakers Eileen Pretorius (Procurement Director from Aveng Trident Steel), Nicolette Skjoldhammer (Managing Director of Betterect) and Raksha Mahabeer (Entrepreneur and Co-Owner of Summertime Creative Agency) for sharing their insights. The event was punctuated with knowing nods, laughs, tears, and above all inspiration for the future of women of steel.

The impact of the event can be elegantly summed up in the feedback received from final year civil engineering student, Gaelle Mabasa:

"Thank you so much for last weekend's Woman of Steel function. It was very enlightening. I am a very shy girl and I always hate leadership roles or speaking up. Friday gave me a little push. Thank you so much!"

eNCA news produced a short video insert on the event which can be found here: *https://www.youtube.com/embed/iTiQ1VSa0rM*

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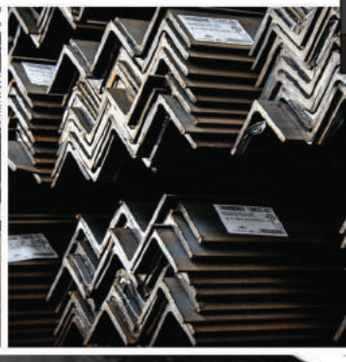

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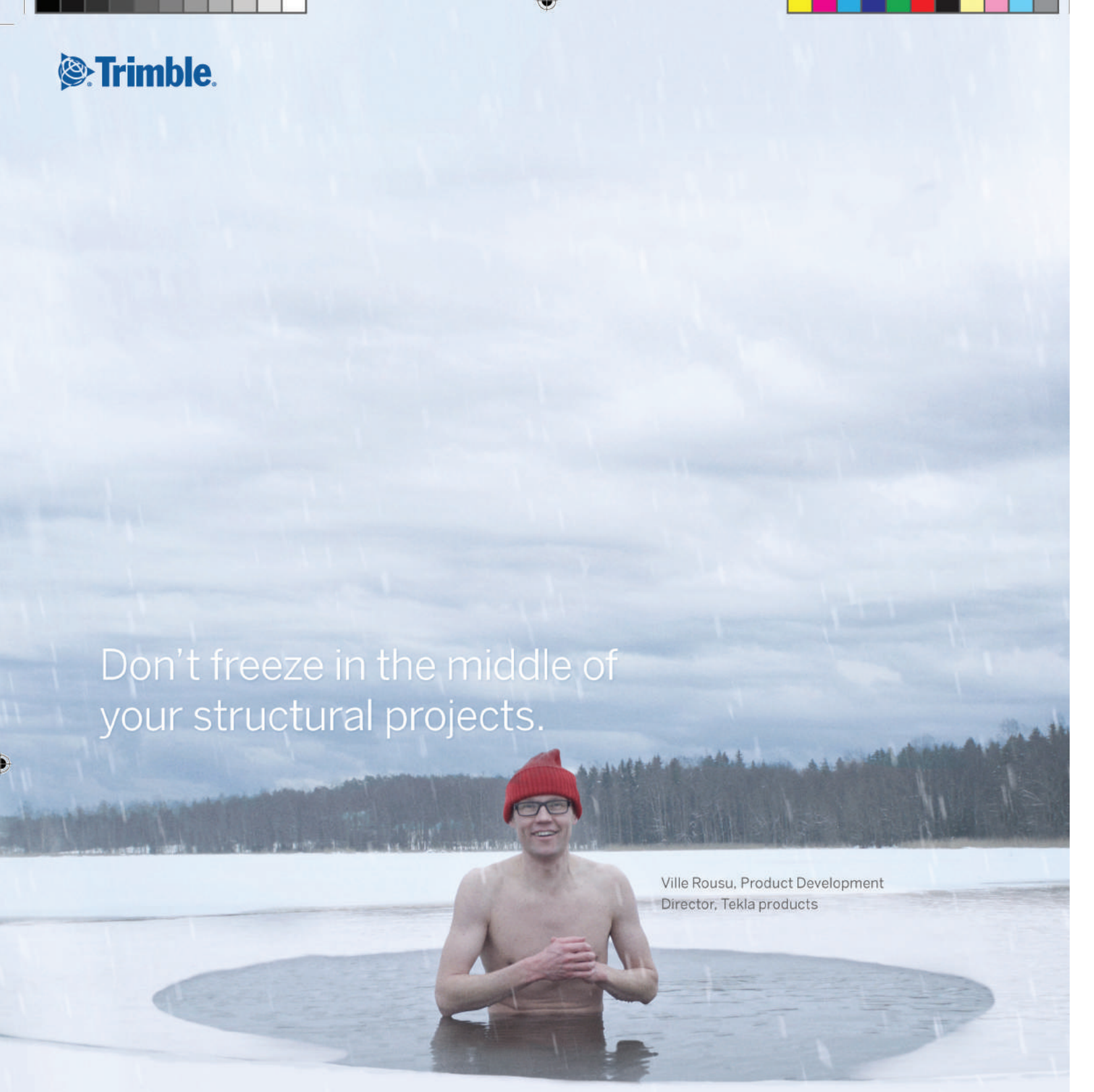

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