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## YOUNG ENGINEER OF THE YEAR: WINNER

# Dr Willem Sprong (GIBB)

**G**IBB, ONE OF Africa's largest multi-disciplinary engineering and science-consulting companies, is a company that seems to attract and retain people who are 'out of the ordinary'. These are people who are on the cutting edge of their professions and endowed with the same visionary and determined commitment to engineering and science excellence as is encompassed by GIBB's vision and mission.

Dr Willem Sprong is one such GIBB 'star': At the tender age of 34, Dr Sprong is director of electrical engineering at GIBB and boasts a professional, social and personal

history that speaks volumes about the man that he is.

Dr Sprong has been registered as a professional engineer with the Engineering Council of South Africa since 2002, is a member of the South African Institute for Electrical and Electronic Engineers, and is a member and chair of the Lowveld Subsection of the Permanent Way Institute of South Africa.

Sprong was the project leader of the GIBB team appointed as the consulting engineers by the Ekurhuleni Municipality to handle the R40 million Winnie Mandela Park Project, which involved the electrification design and project management of 5 100 houses

in Thembisa, Gauteng. GIBB's scope of involvement included the upgrade of a substation to feed the area, which was upgraded from 30 to 60 MVA to cope with the power demands in the area and provide bulk electrification supply to a nearby shopping centre. Notably, as is always preferred by GIBB, Dr Sprong insisted that all of the five subcontractors involved were sourced from the local community and, as far possible as, skills transfer measures were implemented to equip these subcontractors with the sustainable skills necessary to enable them to qualify for larger projects going forward. **35**



## PROJECTS WITH A VALUE BETWEEN R10 MILLION AND R100 MILLION: WINNER

# The illumination of Cape Town Stadium and surrounds

**T**HE EVENT FLOODLIGHTING at the Cape Town Stadium, the only South African football stadium which, at time of writing, complies with the new FIFA Class V Standard for international televised events. GIBB has developed engineering solutions, which place the Cape Town Stadium lighting at the forefront of football stadiums in the world and put South Africa on the map as a world-class sporting destination.

GIBB is a member of the Cape Town Stadium electrical engineering joint venture. GIBB provided consulting engineering services for the event floodlighting, roof, facade, podium deck and turnstile lighting, as well as lighting in the stadium precinct and the Green Point Urban Park redevelopment. Other electrical and related engineering services for the stadium were provided by other members of the professional team.

A project of this scale and nature depends on good team work, and the success of the Cape Town Stadium lighting installations (and project as a whole) is thanks to the dedication of the many organisations involved.

The general lighting concept for the stadium relies on 'phototropism', or the natural attraction of people towards bright lights. A hierarchy of increasing lighting intensity and light colour temperature is used to draw people towards the stadium. In other words, the increasing intensity of the lighting solutions draws spectators towards the central focus of the event, the field. In the stadium precinct, warmer-colour lamps (warm white metal halide) are used to illuminate roads and pedestrian areas. The main pedestrian routes are illuminated at higher levels to encourage pedestrians to use these routes and to promote pedestrian safety and security.

**RIGHT** Andrew Chislett (CEO of Glenrand MIB), Richard Vries (GIBB), Dennis Forster (GIBB) and Zulch Lotter (president of CESA)

Illumination levels increase again at the turnstiles, podium stairs and on the podium deck. Even higher levels occur at the stadium perimeter, where people enter the stadium. These higher light levels have the effect of reducing the possibility of criminal activity and heighten the possibility of interaction between fans and increase the sense of anticipation in the hours prior to the game. The light-colour temperature is higher (cooler) than outside.

The focal point – the playing field – is illuminated to levels that are orders of magnitude higher than the other lighting solutions in the stadium surrounds (3 500 lux maintained average horizontal illumination), and at a much higher colour temperature (4 400 K) approaching the daylight spectrum.

The increasing light levels also have the psychological effect of increasing excitement as the visitor nears the playing field and the level of lighting on the field make it the focal point of the sports experience.

The Cape Town Stadium presented technical, programme, logistics and budgetary challenges. GIBB – along with other members



### Project team:

- GIBB in conjunction with the Cape Town Stadium 2010 Electrical Engineers Joint Venture

of the professional team, the construction contractors and suppliers – were able to overcome these challenges successfully to deliver one of the best illuminated football stadiums in the world today. **as**



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## SOCCER STADIUM: COMMENDATION

# Cape Town Stadium

**SOME OF THE** highlights of this project include:

- The overcoming of numerous technical and non-technical challenges while providing information timeously to the contractor
- the incorporating of innovative and unique solutions to resolve constructability and design challenges
- successfully incorporating and coordinating design expertise, contractors and construction materials from around the world, namely South Africa, Kuwait, Spain, Poland,

Germany, Mexico, Thailand and United States of America

- the transferring of skills regarding new construction materials and techniques
- the designing of a unique roof and facade structure incorporating new materials.

The project was completed successfully on time, despite a late start, multiple design revisions and difficult site conditions.

After South Africa was awarded the FIFA 2010 Soccer World Cup, Cape Town was offered eight matches, including a semi-final. The Cape Town City Council decided to



### Project team:

- BKS
- Iliso Consulting
- GOBA Consulting Engineers and

### Project managers:

- Henry Fagan and Partners
- KFD Wilkinson
- GIBB



construct a new stadium, meeting the special requirements of a semi-final. The objective was a facility that would not only serve the needs of the tournament, but also be sustainable in the long term.

During their 40-month involvement in the project, the structural engineers faced many diverse challenges. They tackled these head on, while remaining adaptable, developing innovative solutions and placing a high premium on coordination. **35**

**LEFT** Andrew Chislett (CEO of Glenrand MIB), Zulch Lotter (president of CESA) and Gerrit Basiaanse (BKS)



SOCCER STADIUM CATEGORY: WINNER

# Nelson Mandela Bay Stadium



**T**HE CLIENT, Nelson Mandela Bay (NMB) Municipality, had to deliver a stadium able to accommodate FIFA overlay requirements. These requirements were provided and monitored by the local organising committee. No clear brief was available at the start of the project. The project management team developed an inception report incorporating a business plan with the assistance of a key number of specialist consultants. At that stage, the proposed site and limited FIFA Design Guidelines were available. The FIFA document required a capacity of 45 000 seats and the outcome of the business plan indicated that a facility with a capacity of 27 000 permanent seats (at the time of the study) was viable.

It was, however, agreed that with a view to competing with the Big Four (Cape Town, Johannesburg, Durban and Pretoria), a facility with 40 000 permanent seats and 6 000 temporary seats would form the basis of the design. The design (legacy phase) was to be adaptable to accommodate the FIFA requirements (overlay phase).

The roof design is an engineering masterpiece. The pitch level, being 1 m below the overflow weir level of the North End Lake, situated within 50 m from the stadium, proved to be a challenge and the expansive in-situ soil plus the high water table had to be catered for.

The design of the precast elements ensured that concrete of the highest quality was produced with the element mass restricted to enable placing of the elements to be practical. The precast design contributed to a fast-tracked construction programme.

The management of the 52 consulting firms ensured that an integrated design was attained.

The transfer of skills was a client requirement adhered to at all times and an independent planner formed part of the design team and a combined construction programme was developed for the design and construction of this fast-tracked project.

The design of the completed stadium – incorporating efficient spectator ramps within the structure, notwithstanding resistance from the architects – resulted in a pleasing structure within the spacial context. A stadium with excellent sight lines and limited distances from the pitch for all spectators resulted in a spectator-friendly product.

The consulting engineer was the leader of the four disciplines (architect, roof engineer, all other engineering disciplines and quantity surveyor) responsible for the concept design. High emphasis on local conditions and specifically rugby requirements had to be enforced on the German architects in terms of shape and orientation.

The NMB Stadium is the only stadium with spectator ramps where a European architectural firm was involved. The engineer ensured that the wind comfort for spectators was rated as one of the primary design

## Participants in the BKS-BTKM-PMMSA Joint Venture

- Aurecon
- BKS
- Iliso Consulting
- KV3 Engineers
- Nodana Consulting Engineers
- GOBA
- Richard Nzuzo and Associates
- GIBB
- ARQ
- WSP Group
- SSI Engineers and Environmental Consultants
- Clinkscapes Maughan-Brown
- PD Naidoo and Associates
- Stemele Bosch Africa

parameters for the roof design. The final roof design was the third attempt and resulted in enclosed walkways at levels four and five. The structural design of the precast elements guided the architects in establishing the back-of-house facilities. 35



**RIGHT** Andrew Chislett (chief executive officer of Glenrand MIB), Thembu Matunda (Bham Tayob Khan Matunda Inc), Zulch Lotter (president of CESA), Mike Boule (Project Management Solutions Africa) and Gerrie Albertyn (BKS)