

Trench excavation occurred next to national roads known for high-speed traffic



FibreCo – South African Fibre Optic Cable Project – Johannesburg to East London

FINALIST Technical Excellence Category

KEY PLAYERS

Client

FibreCo (Pty) Ltd

Professional team

UWP Consulting (Pty) Ltd
in association with SIVEST,
MCORP, Nemaï, SRK and ARQ

Main contractor

ZTE Corp

Sub-contractors

Stefanutti Stocks, Sizwe, Nterra

OVERVIEW

An ambitious project by FibreCo Telecommunications to install approximately 1 000 km of fibre optic infrastructure from Johannesburg to Bloemfontein along the N1 freeway, and from Bloemfontein to East London along the N6, in 12 months, has proved successful thanks to correct planning and resourcing from the very early stages, as well as an inclusive problem-solving approach.

The FibreCo project included 12 repeater sites, three point of presence (POP) sites and all associated transmission equipment for the length of the project.

Conceptualised in 2009 to facilitate affordable and reliable high-speed internet access for South African citizens and businesses, this is the country's largest open-access, long-distance fibre optic network which allows operators and public and private enterprises direct access to their own optical fibre infrastructure.

Fibre optic networks offer unrivalled stability and are capable of transmitting large quantities of data at significantly higher speeds than any other medium. FibreCo's fibre optic infrastructure will help to transform the country's telecommunications landscape.

PLANNING

From the outset it was clear that an "out of the box" approach would be required to make the project a success. A single-minded and focused team was needed to achieve the stringent timeline, and FibreCo opted for a partnership approach with its consultants.

The project was divided into different life cycle stages (planning, implementation, operation and maintenance/closure). Detailed programmes and risk analyses of each stage were performed.

All possible risks were identified up front and mitigation strategies for each risk were agreed upon. From the outset, risk meetings were held frequently and the risks were re-evaluated and strategies adjusted as required.

The single biggest challenge was the geographic spread of the works, which was located over several provinces, through numerous local authorities and along several regions of infrastructure owners.

SRK was tasked to obtain the Environmental Impact Assessment (EIA) and Department of Water Affairs approvals, while UWP was responsible for planning and addressing construction-related issues, wayleave approvals and the tender process.

Long lead times and sufficient allowances for these lead times were made for obtaining the Record of Decision (ROD) for the EIA from the Department of Environmental Affairs, authorisations for crossing water bodies from the Department of Water Affairs, and wayleaves from the different authorities.

GEOTECHNICAL STUDY

One of the major construction risks of a trenched linear project is the volume of rock that will be encountered along the routes and how this will impact on cost and time.

A detailed geotechnical study was undertaken by a team of six specialised firms, each with individual knowledge of different parts of the project route. The team was headed by ARQ Consulting.

This process resulted in 80% to 85% accuracy of the quantity estimates included in the tender process, and the findings of the investigation were shared with all the prospective contractors involved in the tender process.

Detailed submissions for the approvals of crossing of water bodies were also prepared. In total 937 water crossings were identified, which resulted in 703 general authorisations and 234 water use licences issued by the Department of Water Affairs over an 18-month period.

Wayleave applications were sent to more than 150 authorities and over 2 500 drawings were produced for submission. Each wayleave application had to be followed up personally, resulting in numerous meetings and phone calls.

Most of the works took place on the SANRAL road reserve and SANRAL's construction approvals were key to this project.

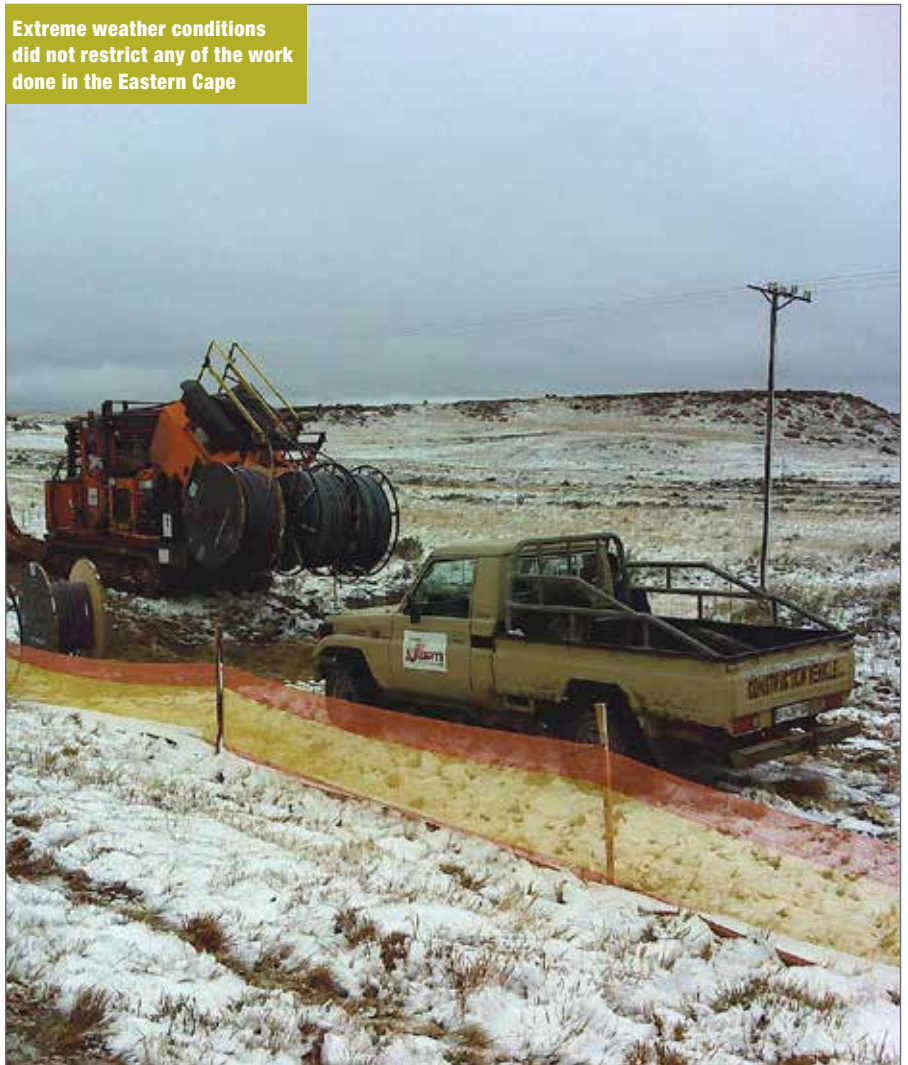
IMPLEMENTATION

Construction commenced in February 2012. During the very early stages of construction it became apparent that, although the conventional strict lines of contract management are beneficial, a partnership and proactive problem-solving relationship with ZTE would have to be adopted to make the project a success. Achieving a working balance between a contractual and "partnership" relationship with the contractor proved challenging, and many hours were dedicated by management on both sides to accomplish this. FibreCo was extremely understanding in this process.

On average 589 local labourers were on site every day



Extreme weather conditions did not restrict any of the work done in the Eastern Cape



Weekly project meetings were held with the contractor's management team. These were problem-solving and proactive decision-making sessions rather than strictly contractual meetings.

The only construction strategy that would result in completion of the

project within the tight deadline was by working simultaneously along the entire site with as many working fronts as possible.

Where the geographical spread of the project posed challenges, it worked to the advantage of this construction strategy,

as sufficient work space was available for the deployment of over 40 simultaneously active working fronts along the route. At the peak of construction more than 1 700 workers were on site.

During the implementation of the project, 156 039 man days were generated and 1 248 310 hours were worked by local labour. On average, 589 local labourers were on site every day.

UWP Consulting established and ran a full-time project management office in Johannesburg, as well as supervised the onsite construction process. In association with UWP, specialised services were provided by SiVEST for project controls, MCorp for the implementation and quality control of the optic fibre cables and transmission equipment, SRK as the environmental control officer, and Nema Consulting as the occupational health and safety representative.

UNIQUE CHALLENGES

The management and control of over 40 simultaneously active working fronts

with more than 1 700 site personnel along 1 000 km posed many unique challenges.

A communication system between the project management office (PMO) in Johannesburg and the site was established to keep the contractor and employer up to date. A web-based site diary system named *Contract Communicator* was chosen and this resulted in all consolidated and validated information from site being available to both the contractor and PMO on a daily basis. Quick and accurate decisions based on this information were therefore possible.

All contractual documentation, including drawings, letters, minutes of meetings, site instructions, monthly reports, etc, were issued and filed on a web-based project management system known as *Project Place*. This had the advantage that all the site personnel had access to the latest documentation and that revision control could be managed from the project management office.

To avoid delays, changes to the way-leaves due to construction difficulties were handled on a day-to-day basis. The

PMO had a dedicated engineering team in place to deal with these issues.

A rigorous quality assurance plan was also implemented on site. All the holding points were checked and signed off by the contractor and UWP. More than one million quality assurance forms were completed and signed during the course of construction.

Time extensions were granted for the late approval of water use licences, a truck drivers' strike and port interruptions during 2012. Most of the civil works were completed within the time and budget allowed, and within specification, while a slight overrun was experienced in the testing and commissioning of the transmission equipment.

CONCLUSION

The project is considered a landmark for fibre optic projects in southern Africa, and its success can be ascribed to FibreCo's holistic implementation view, thorough planning and stringent control of processes during construction, and an inclusive problem-solving approach. □



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