



A specially designed pipe lifting system.

## Tailor-made designs in lifting

Within the civil engineering and building sectors, the challenges posed by the lifting of materials and items of equipment during the construction programme frequently require customized solutions. This is particularly the case when working in remote locations in Africa, where electrical supplies may not be readily available, requiring high-powered manually operated pulling and lifting systems.

One company with extensive experience in this industry sector is Gauteng based company, Elephant Lifting Equipment, which has a history of innovative design as well as representing the world's foremost lifting equipment brands and manufacturers to provide a turn-key solution. The company's two core areas of specialisation are in the provision of services, entailing the supply and maintenance of equipment; and in the design and development of electro-mechanical installations.

Company director, Peter Turchetti, says that a recent example of Elephant Lifting Equipment's design capability has been demonstrated on the Sand Bypass Project, currently under way at the Ngqura Harbour development near Port Elizabeth. This project is being carried out by the CONNEC JV, comprising Concor Holdings (Pty) Ltd and Ngqura Empowerment Contractors (NEC). Concor Engineering Services approached Elephant Lifting with a request for a specially designed system for the lifting and position of sand filled bags used to construct a bund wall extending into the Indian Ocean.

The construction of the bund wall for the Sand Bypass jetty entails the placement of 8t sand filled bags. Turchetti says that lifting the bags didn't present a problem. The challenge was to design a solution which would allow the placement and release of the bags up to 6m under water. The loading cage for the bags was designed by Concor, with technical input provided by Elephant Lifting.

Comments Turchetti: "In carrying out the design brief it was understood that once lifted, the uneven shape of the bag would not allow a straight line clamping solution. This required Elephant to develop a four clamp device attached to an articulated beam system. This allows each clamp to find its own position during the lifting process without tearing the bag and in turn carrying a corresponding quarter of the load. This necessitated the design of a special jaw in conjunction with Concor and the bag manufacturer. The clamping device also provides for an automatic release system. This was achieved by developing a cam and spring mechanical reaction clamp."

Mechanical clamps have a basic requirement. The clamping force, for safety reasons, must be at least three times the reaction force. As each bag is positioned at the Sand Bypass project, a reduction in the reaction force to less than 100kg automatically results in the release of the clamping action. To date, the system has been highly effective.

### Load equalising beams

Working closely with project engineers, Elephant has developed solutions for just about every conceivable requirement, from storm water pipe installations to diverse materials handling applications. A particularly innovative addition is the introduction of load equalising beams. This latter device, initially developed in conjunction with Elephant Lifting, is used extensively by Group Five, a leader in the use of pre-cast concrete building techniques.

Load equalising beams allow for the lifting and positioning of concrete panels, beams and shutter assemblies along any linear, multi-point attachment. The beams can be custom designed on request to

any length and for any capacity. Turchetti explains that the key benefit of the system is that pulley blocks with attaching hooks are mounted to a steel wire rope (or chain) sling, allowing the load to be equalised across all the lifting points instantly. This automatic levelling device is especially beneficial in lifting precast panels, keeping oscillation to a minimum and with the lifting force precisely spread over all attachment points, prevents potential damage.

Group Five is using load equalising beams on various projects in Africa, including the Nova Vida housing contract in Luanda, Angola, as well as for the construction of accommodation units for hospital staff in Oran, Algeria. For each contract, Elephant Lifting designs and manufactures the lifting systems required according to details supplied by Group Five. This covers criteria such as panel sizes, weights and anchor points for staircases, floor slabs, and walls, etc.

Adds Turchetti: "Working closely with the contractor concerned, we will provide a complete lifting gear kit, including crane slings and attachments. This service also includes site inspection, for verification of functional requirements."

A recent example is a contract for Rolls Royce Diesel Power (UK) at a remote mine location in northern Tanzania. The absence of electrical power resulted in Elephant Lifting delivering a substantial quantity of manually operated pulling equipment, including earth anchors (as used by the military). This allowed Rolls Royce to carry out emergency modifications to a series of generators, which had to be removed from 40 foot containers.

Custom made clamps and lifting systems have also been delivered to Alusaf (carbon block recovery and cast-aluminium slab handling), Hulett Aluminium (25 tonne aluminium slab handling), ABB (electrical component handling), ChevronTexaco in Cabinda, Angola, the South African automotive industry, as well as major sea ports on the Eastern and Western seaboard of Africa.

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Load testing in progress



Load equalising beams, designed for the lifting of concrete panels, feature an innovative self-levelling pulley system.

