

## Cost-effective design for bulk terminals



*Port material handling and storage facilities for 90,000 tonnes of bulk product.*

Ausenco has built a reputation on the delivery of innovative and cost-effective project solutions for mining clients, a philosophy that is carried through to its work in the transportation and bulk terminal market," writes Joel G. Shirriff, P.Eng., GM Optimization & BD, North America, Global Practice Lead, Terminals & Transportation. Ausenco brings value to all its clients' projects, from the concept development phase through to engineering, procurement and construction management (EPCM), commissioning and operations.

It should come as no surprise that the demand for new bulk shipping terminal capacity is closely tied to the development of new mining and mineral projects. Challenging commodity markets are not only driving a need to reduce costs at the mine sites, but also for the outbound logistics and terminal infrastructure required for these projects. Whether the project requires a new greenfield terminal or the upgrading of an existing facility to take on another product stream, customers expect results with minimal capital outlay to help maintain project feasibility, while sustaining high levels of operational efficiency, environmental sensitivity and safety.

A recent example of Ausenco's value-add philosophy in action is its delivery of the rail and port solution for TiZir's Grande Côte Mineral Sands Project in Dakar, Senegal. On 30 June this year, this project won the 'Premier Transport Project of The Year' category at the 8th African Transport Awards. Ausenco's project scope included two main components: rehabilitation of the railway from the mine to Dakar: rebuilding 100km of existing railway and construction of 25km of new railway; and construction of a new storage and shiploading facility in the Port of Dakar. Ausenco collaborated with Tizir to fully understand its needs in the development of terminal concepts, and worked with

a number of equipment vendors to incorporate their specialized products into a customized solution that would not only work in the tough African environment, but offer a cost-effective means of moving their product to market efficiently and safely.

The port component of the work presented two main challenges: making use of an existing brownfield site with limited access for train receiving and storage, and loading bulk carriers with product at an existing wharf shared with other general cargo users. Because Ausenco offered its client a holistic transportation solution, it was able to optimize the train configurations in combination with how they could best be managed at the port. The customized bottom dump wagons are discharged at the port using a special 'low profile' belt feeder system to minimize excavation on site. This mineral sands cargo is both valuable and water sensitive, and needed to be stored in an enclosed building. Using its global procurement team, Ausenco sourced a very reasonably priced pre-fabricated steel building from a vendor in Egypt, which was shipped in modular sections to ease erection requirements on site. Often, covered storage systems incorporate an overhead conveyor to drop cargo to the floor, but in this case Ausenco strategically opted for dual radial stackers along the wall of the building to reduce the structural loads on the building and provide redundancy in the equipment.

Reclaim of product from the building is done with front end loaders into fixed hoppers that feed onto a common belt conveyor. As the storage site is remote from the loading berth, a pipe conveyor is employed to negotiate the multiple obstructions posed by existing infrastructure. Not only did this concept with its combination of horizontal and vertical curves reduce the number of separate conveyors and transfers employed along the

route, it provided an enclosed system to minimize the potential for spillage and dust. The need to share the berth with other port users requires a mobile shiploader to be used, and the pipe conveyor discharges to a series of portable grasshopper conveyors that, in turn, feed a self-propelled shiploader on rubber tyres that includes shuttling and luffing functions on the boom to load Handysize ships at 1,200tph (tonnes per hour). Once loading is complete, the machines are moved into a secure storage area to free up the dock.

This project presented intriguing design challenges, as well as a range of challenges in project delivery and execution due to brownfield conditions in an existing congested African port, with a scarcity of skilled trades in the region. Maximizing modular construction and pre-assembled materials handling equipment was a critical element in both minimizing the capital costs, and simplifying the site works and the labour requirements to complete the installation. Ausenco managed a number of different local and international contractors during the project implementation, and completed the project with zero lost time accidents on more than three million man-hours of work. This impressive accomplishment was due to good planning during the early design of the project, and good management of the site activities which included the training and engagement of the workforce to take ownership of Ausenco's 'Zero Harm' philosophies.

One of the key recurring elements to Ausenco's success is client engagement, and truly understanding their needs and learning what 'keeps them up at night'. In bulk terminal development, there is no 'one size fits all' arrangement, and what works for one operation may not necessarily work for another.

Each project has its own specific drivers ranging from commodity type, geographic location, constructability, project life, levels of automation, and maintenance expectations. Ausenco strives to not only provide a cost-effective design for its clients' initial investment, but also to minimize the total cost of ownership seen over the project life cycle. Customizing the terminal design to meet all these needs is vital to deliver the desired results.

At Ausenco, staff are proud to provide ingenious solutions for the company's global clients in the bulk terminals sector.

#### **ABOUT AUSENCO**

Ausenco is a global, diversified engineering, construction and project management company providing services in Minerals & Metals, Process Infrastructure, Environment & Sustainability, and Oil & Gas. The company delivers new and better ways to add value to clients' projects no matter how demanding and it delivers results in some of the world's most challenging environments. Listed on the ASX in 2006, Ausenco's growth strategy is focused on sector, solution and geographic expansion. The company operates from 31 offices in 19 countries.

#### **ABOUT TiZiR**

TiZiR Limited is a vertically integrated zircon and titanium business which owns the Grande Côte Mineral Sands Project in Senegal and the TiZiR Titanium and Iron Ilmenite Upgrading Facility in Norway. The company is jointly owned 50/50 by Mineral Deposits of Australia and Eramet of France. TiZiR benefits from Eramet's broad expertise in mining, metallurgy, logistics, R&D and marketing, and from Mineral Deposits' development expertise and mineral sands mining experience.