

# Which bulk vessel loading system will meet future commodity export capacity?

## Throughput analysis of a berth using dynamic simulation modeling

Industry: Transportation  
Location: Northern Cape, South Africa  
Competency: Simulation Modeling  
Option Analysis  
Logistics

### Problem Statement:

The Transnet Saldanha Multi-purpose Terminal (MPT) had exported and imported a variety of bulk and break-bulk commodities amounting to the terminal's capacity. Volumes were expected to grow in the upcoming 3 years, with future growth expected thereafter. In order to meet the anticipated future demand, the need had arisen to review the operating methods for bulk exports. As part of a FEL 2 study, an EPCM company appointed Ceenex to conduct a comprehensive throughput analysis. The objective was to analyze the operational needs and quantify the time and space requirements for various bulk commodity vessel loading systems to achieve the required export for bulk commodities on a single berth.

### Solution:

Ceenex developed a detailed **dynamic simulation** model of the MPT to test which of the three bulk vessel loading options would meet future commodity export demand. Option A modeled the current operation, Option B a skiptainer system and Option C a localized stockpile using conveyors and mobile ship loaders. Nine export commodities with predicted annual tonnages arrived either via road or rail. Vessel sizes and arrival times varied but were modeled to achieve the annual demand. Sensitivity analysis was done on various entities to identify the system bottleneck for each option.

### Impact:

The results concluded from the simulation study showed that the current operation would be inadequate to meet future berth export tonnes. Implementing either of the other two proposed vessel loading operations would meet the future demand. The system bottleneck was the vessel loading rate constraining export capacity. Improving the vessel loading rate by using more equipment or faster equipment will have a direct impact on berth throughput.

