



Mott MacDonald PDNA for TRANSNET

Swaziland Rail Link Davel to Richards Bay: New Link Engineering Study

Background

Project Value: US\$2bn | Duration: 2013-2015

Transnet, in conjunction with Swaziland Railway are investigating the feasibility of a new connecting railway line through Swaziland, i.e. the Swaziland Rail Link (SRL). The route lies between Lothair in Mpumalanga Province

via Matsapha to Sidvokodvo in central Swaziland. The new line is the backbone of a planned strategic link to Swaziland and the export Ports of Richards Bay and Maputo.

Key Features

Detailed route planning and alignment design of the SRL evolved from the FEL-2 pre-feasibility stage, having a fairly low level of definition. Raising this to detail design, now with environmental and land owner input, led to numerous alignment revisions and redesign.

Topography, particularly the descent into central Swaziland results in embankments greater than 30m in height and cuttings around 30m in depth.

Step downgrades for loaded trains pose particular challenges in bridge design and perway interaction at high and slender bridge structures.

This is exacerbated by the train design requirements of up to 200 high capacity wagons using Distributed Power for traction.

Services Provided

RCE Consultants provided the following services:

- + Detailed design of 146km of new and heavy haul railway line
- + Design and placement of eight crossing loops
- + Design of 226 structures including 9 incrementally launched and 19 cast in viaducts as well as 59 over / underpasses

- + Slab track design to allow use of slender and high incrementally launched bridge technology
- + Earthworks, mass haul planning, spoils and borrows for in excess of 10 million m3 cut and fill
- + Pioneering train handling and capacity modelling, involving DP traction

Outcome

The detailed engineering design of a 146km new railway link connecting Lothair on the TFR network to Sidvokodvo on the Swaziland Railway network has been performed.

The adverse topography of the route, especially via the Usutu valley in Swaziland, posed exceptional design challenges.

This heavy haul line is designed to 26 ton axle load standard and includes the operation of trains consisting of up to 200 wagons using Distributed Power technology.