



**INTERMODAL TERMINAL FACILITY**



### HOLISTIC RAIL SOLUTIONS

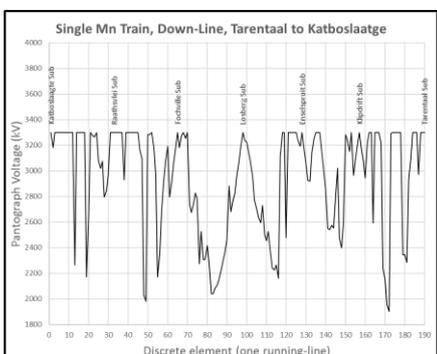
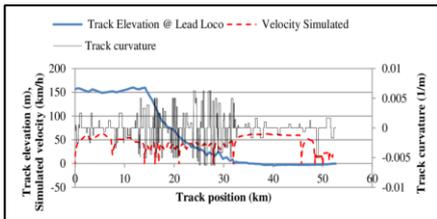
R&H develops optimised multidisciplinary railway solutions which aim to maximise investment returns while minimising capital commitment. To achieve this goal, a holistic systems approach is required so that the design team considers all facets of the solution early on during development. Efficient operations of the installed asset are guaranteed by integrating the train service design into the infrastructure development process.

### OPERATIONS & SERVICE DESIGN

The scope of R&H's Rail Operations Services encompasses operations optimisation, train design, standard operating procedure development, train and locomotive scheduling, crew roster planning, service implementation, regulatory compliance and operations readiness planning.

This includes:

- Analysis of current or projected tonnages and passenger traffic volume characteristics
- Measurement and analysis of route constraints
- Designing trains to satisfy demand, route constraints and budget
- Train section performance simulations
- Multiple train service interaction simulations
- Deriving operating staff requirements coupled to train working rules
- Designing maintenance facilities, location, equipment and staffing
- Deriving operating rules, maintenance procedures and staff training requirements
- Defining optimised train handling methods to maximise reliability and operating efficiency
- Producing trains working time tables and diagrams, operating procedures and safety instructions



## SIMULATIONS

For a railway system to transport a given tonnage or number of passengers optimally, it must run suitable trains to optimised schedules. At R&H we use sophisticated train simulation software tools to design trains and time tables for simple or complex networks. We understand that train design is a vital part of full-service design and subsequent infrastructure configuration.

Simulation tools include the latest international technology, as well as proprietary developed software, for example OpenTrack, PantoPower and TSWin.

## LOCOMOTIVE AND WAGON ENGINEERING

Clients need to ensure their locomotives and wagons are safe, efficient and productive. We offer peace of mind by firstly assisting with the specifying, procurement and commissioning of fit-for-purpose equipment, and secondly by measuring performance parameters and conducting regular condition inspections. Combined measurements of tractive effort, power output, braking performance, wheel-on-rail forces and other performance parameters, as well as visual inspections, are used to assess design and maintenance deficiencies. Recommendations for improved procedures and training to address these deficiencies are then made.

## LOGISTICS STUDIES AND PROJECT DESIGN

As an integral part of the holistic design approach, our operations team has been performing logistics studies from conceptual- and feasibility-level through to end-state project operations design on various national and international rail corridors. These include bulk material and heavy-haul transport systems, rural and local commuter rail systems, mining business development, and cross-border corridor optimisation and integration. When required, it also included the design of new and retrofitted support facilities to support the holistic railway systems' operations.

## PERFORMANCE MEASUREMENT

R&H uses flexible, real time instrumentation and data acquisition equipment, which is attached to locomotives, wagons or track to scientifically measure and record performance parameters on the specific railway system. This includes measurement of both rolling stock and infrastructure condition and performance. Computer simulations and mathematical analyses are done under the conditions of the specific system. Our equipment is portable and can be set up onto, and dismantled from, rolling stock and / or infrastructure within minutes, ensuring no major disruptions to productivity.

## RECENT PROJECTS

Recent projects where we have provided the above services either as part of the holistic multidisciplinary design effort or as a stand-alone service include:

- Navitrade Masterplan Concept Development (2019); Grindrod
- Electrical substation and OHT capacity simulations (2019); Impala Platinum
- Coal Line Ops Model Development and Simulation Study (2017 to 2018); Transnet Freight Rail
- North-South Corridor Supply Chain Study (2017 to 2018); NEPAD Business Foundation
- Tambo Springs Intermodal Facility rail simulations (2016 to 2017); Transnet Freight Rail
- National Railways of Zimbabwe Recapitalisation Operating Model (2016); Transnet Freight Rail
- Swaziland Rail Link FEL-3 Operating Model (2013 to 2015); Transnet Freight Rail
- National Rail Long Term Planning Framework Development (2012 to 2016); Transnet Group Planning
- Ore Line 82.5Mtpa FEL2 Study (2012 to 2014); Transnet Capital Projects
- Sena Line Upgrade Simulation Study (2011 to 2012); Rio Tinto Coal Mozambique
- Nacala Corridor FEL3 and FEL4 service design (2010 to 2013); Vale Mozambique Limitada
- Locomotive Refurbishment Commissioning Tests (2008); Impala Platinum
- Moloto Corridor Development Initiative (2006 to 2010); Mpumalanga DoRT and National DoT
- Rolling Stock Performance, Braking Efficiency and Wheel-Rail Interaction Tests (2006 to 2010); RPM Rustenburg