

# NORTH-SOUTH RAILWAY, SAUDI ARABIA

## MANDATE

The 2,400km North-South Railway project represented a major railway expansion in Saudi Arabia, effectively tripling the size of their existing network at the time. The primary purpose of the railway was to transport phosphate and bauxite from new mines in the interior of the country (Al Jalamid and Az Zabirah) to Ras al Keir, near Jubail, a new industrial city on the Arabic Gulf, for processing and shipment. The railway also transported passengers and general freight. The railway featured branches to the Jordanian border and to Riyadh and ultimately had to connect to the wider Gulf Corporation Council (GCC) rail network and to SRO and the Landbridge.

## DESCRIPTION

Within an international consortium, SYSTRA Canada (formerly CANARAIL) carried out the following:

1. A **Feasibility Study** followed by the **Detailed Design**. The mandate included a track alignment study, operating plan, functional specifications of systems and rolling stock, preparation of tender documents for construction, and economic and financial evaluations.
2. **Implementation Supervision Consultancy** divided into the following components:
  - Comp. A.: Project Management Support.
  - Comp. B.: Contracting Strategy, Prequalification of Contractors, Technical Support in Invitation and Evaluation of Technical Bids.
  - Comp. C.: Supervision of Construction and Contract Administration.
  - Comp. D.: Support for Rolling Stock Procurement, Including Supervision During Manufacturing and Commissioning.
  - Comp. E.: Assistance in the procurement of a rail operator.
  - Comp. F.: Design review.
  - Comp. G.: Detailed Design of Facilities, Including Maintenance Shops, Track and Maintenance Gang Facilities, and Passenger Stations.
  - Comp. H: Detailed Design of Signalling and Telecommunications Systems.

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**SAR**  
الشركة السعودية للخطوط الحديدية



### CLIENT

Saudi Railway Company (SAR) and Public Investment Fund (PIF) (Ministry of Finance of Saudi Arabia)

### COUNTRY

Saudi Arabia

### DESIGN STAGE

2004-2005

### VALUE OF PROJECT

US \$21.5 M

### SUPERVISION CONSULTANCY

2005-ongoing

### ASSOCIATES

SYSTRA, K&A & LBG

### TYPE OF SERVICES

Feasibility Study & Supervision

## FURTHER DETAILS

### 1. Design Phase

The line was designed to heavy haul railway standards in terms of axle load and gradients to take advantage of the efficiencies that these provide in the transport of mineral traffic. The overall scope of the railway comprised 480 million cubic metres of earthworks, including 300km to be constructed through the heavily duned an Nafud Desert, 25 railway bridges, 32 grade-separated road and highway crossings, 2,400km of main line railway track, 6 passenger stations, 8 inter-modal terminals, 3 mining terminals, and 2 major railway maintenance yards. The feasibility study also included 40km of rail line through urbanized areas of Riyadh in order to connect the international airport to the city centre. SYSTRA Canada was the lead partner in a joint venture (JV) with SYSTRA and KHATIB & ALAMI (K&A).



Within the Consortium, SYSTRA Canada was responsible for project management, technical definition of the railway transportation system, preliminary design of the alignment, construction standards and specifications for track work and shops and functional specifications for signalling, telecommunications and rolling stock.

### 2. Construction Phase

After having led the feasibility and preliminary studies, and the detailed design of Civil Works and Track infrastructure, SYSTRA Canada and SYSTRA teamed with Saudi Consolidated Engineering Company – K&A and the Louis Berger Group (LBG) for the Implementation Supervision Consultancy contract. The JV employed approximately 250 permanent employees in Saudi Arabia.



In addition to its primary role in the project management and contract administration of the entire project, SYSTRA Canada played a lead role in all railway technical activities related to the design and supervision. SYSTRA Canada also handled the following sub-scope.

#### Component D: Rolling Stock Procurement

SAR acquired new locomotives and various types of freight wagons and coaches, as well as Maintenance of Way Equipment. Not only did SYSTRA Canada provide support throughout the procurement process, but it also held the following responsibilities:

- Management of Component D;
- Validation of the rolling stock types and models;
- Preparation of implementation plans;
- Preparation of technical specifications and tender documents;
- Technical input during evaluation and contract award;
- Manufacturing supervision and quality control services as well as commissioning services (consisting of factory acceptance tests and site acceptance tests).

### **Component E: Assistance in the Procurement of a Rail Operator**

Local personnel with railway operation experience being hard to find, SAR decided to hire a rail operator for the next five years. Before preparing a request for proposal to find one, or more, operator, SAR had to take several decisions regarding the methods used in the past to operate the network, as well as the contractual arrangements to be taken between the operator(s) and SAR. The network has been operated as a concession or under a simple management contract agreement. SYSTRA Canada's mandate was to present the various options and make specific recommendations.

This component includes:

- Provide a detailed analysis and present the various possible options to select a rail operator;
- Review the existing legislative framework in Saudi Arabia applicable to railway operations;
- Prepare the operating contract model;
- Define the bids' evaluation grid and assist SAR in the evaluation of the bids and completion the operations contract.

### **Component G: Detailed Design of Facilities, Including Maintenance Shops, Track and Maintenance Gang Facilities, and Passenger Stations**

SYSTRA Canada participated to the detailed design of the facilities. The tasks of its specialists were to:

- Identify the technical and functional needs of the rolling stock maintenance workshops;
- Develop the structure of the various buildings and determine the procedures related to the activities performed;
- Prepare technical specifications based on the most recent standards of all heavy industrial equipment;
- Prepare the technical bids' evaluation criteria, evaluate the technical bids, participate to the completion of the contracts, supervise the fabrication and the commissioning of the maintenance equipment.



### **Component H: Detailed Design of Signalling and Telecommunications Systems**

SYSTRA Canada participated to the detailed design of the signalling system (ERTMS Level 2) and the telecommunications systems.

SYSTRA Canada's experts analyzed the needs in order to identify the best solution for SAR. The functional and technical specifications were developed on this basis and incorporated into the tender documents.