

PUERTO CABELLO-LA ENCRUJADA RAILWAY - VENEZUELA

The Railway Transport System of the Central Region concerns the connection between Caracas, the Tuy Valley and the Valleys of Aragua, Valencia and Puerto Cabello, with electric trains for passenger and goods transport on short and long distances. The double track electrified railway line Caracas - Cúa Section is only the first phase of the Railway Transport System linking Caracas to the Tuy Valley. It will reduce the traffic congestion of the capital by connecting the metropolitan area to a large urban developing area.

The contract includes also the following activities:

- executive design of the whole rail line;
- civil engineering works;
- supply of superstructures;
- supply and installation of equipment and systems;
- personnel training for plant operation;
- starting of operation of the Integrated System.

This first phase rail line starts at Coche, southerly to Caracas, where a new multipurpose interchange railway station will be constructed; this included a rail station, the Mercado subway station on line 3 and the Western station for urban and interurban transports. Starting from this junction the 41.4km long railway line extends towards the Tuy Valley, crosses mountainous zones with 24 tunnels (overall length 20.1km), the fairly flat terrain with 13km of embankments (earthmoving works total volume 4,500,000m³) and 28 bridges and viaducts (total length of 8.3km), therefore permitting a fast trouble-free route.

Overall contract works are divided into the following three main sections:

- **Section A** - Civil Works relevant to lots 1, 2, 5 and 6 (section overall length 27.6km), to be executed by the Consortium lead by IMPREGILO S.p.A with a participating share of 36.40%.
- **Section B** - Civil works relevant to lots 3 and 4 (overall length 14.7km) to be executed by Astaldi S.p.A..
- **Section C** - Supply and assembling of plants, equipment and installation for the overall line (to be executed by IMPREGILO S.p.A as sole contractor).

Three other stations are foreseen to meet the demand for passenger transport, together with yards and workshops for track material maintenance and transfer and clearing of goods.

The contract foresees also the construction of a multipurpose interchange station, the connecting rail network to Caracas together with the operation yard and the area destined to military forces.

Besides what above mentioned, the Integrated System includes:

- Signalling and control system made of three under systems: automatic protection system, control and supervision of trains operation;
- Telecommunication System principally made of a primary transmission under system (through optical fibres), of a Control Centre from which Integrated System operation can be wholly monitored, and of the various other under systems (telephone system for train operation, customers announcement, radio telecommunication on trains and central control yard);
- Passenger trains made of two electrical multiple units, each composed of four carriages (two locomotives and two towed carriages).



Main technical features of the civil works of Section A

The following main structures were executed:

- Nine tunnels, for an overall length of 10km, with an excavated cross section of 88m².
- Fifteen viaducts (overall length 5.88km, wideness 10.20m), being of double cells viaducts type (total length 4,800m) or steel girders and concrete deck viaducts type (total length 1,250m).
- The four Caracas, Charallave Norte, Charallave Sur and Cúa stations.

The construction of the new rail line had also required fixed protection screenings (total surface 34,000m²), together with more than 24,500m of anchors and bars, and 88,500m of tie-rods (30 to 45tons).



Main features for electro-mechanical supply and assembling of Section C

The line will have a double track with international gauge of 1.435m. The UNI 60 type racks, equivalent to UIC 60 type, have a weight of about 60 kg/m and max. loading capacity of 22.5t per axis, for a total quantity of approx. 11,100tons.

Contact line included overhead conductors and catenaries for about 82km, together with masts and special supports in tunnel sections. Disconnecting switches of the electric power supply lines are also included.

Electric power supply and signalling included 40km of cables in raceways along the line and 33 insulated coupling boxes together with low charge disconnecting switches, plugs and 500W transformers.

The supply of eight multiple electrical unit, made of two locomotives and two towed carriages, is foreseen, for a total capacity of 1,094 passengers, of which 400 being seat. The maximum speed during operation will be 100km/h.

Control system mainly consisted of a control centre, four peripheral transit terminals and four peripheral power supply terminals.