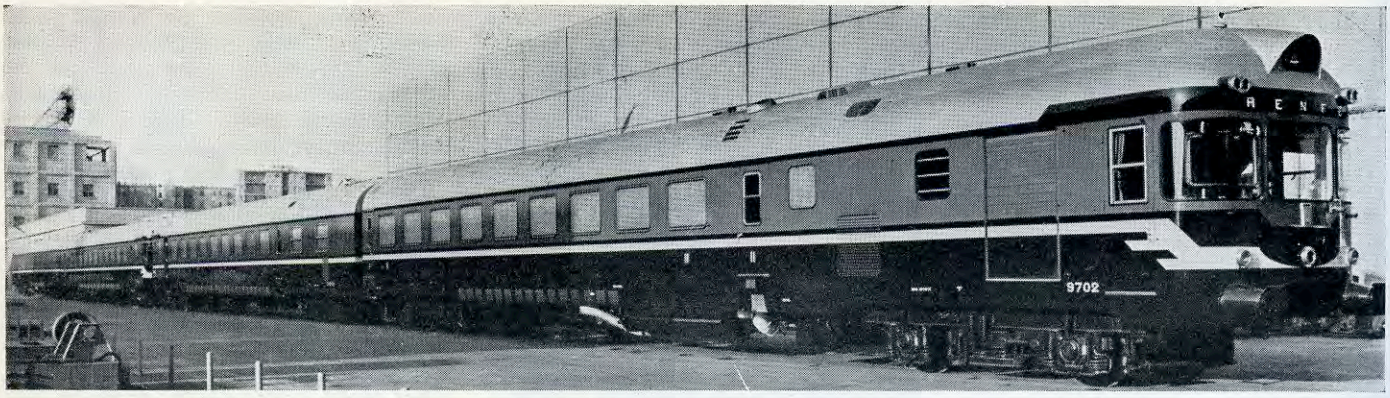


Fiat four-car train of 1,600 b.h.p., 256 seats in four air-conditioned saloons

DIESEL-TRAIN SERVICES IN SPAIN

Air-conditioned sets with 8½ hp per tonne of tare for long-distance services up to 700 miles

JUST BEFORE THE end of 1964 the first two of 30 four-car diesel trains were put into preliminary service on the broad-gauge lines of R.E.N.F.E., and the others are being delivered gradually during the course of this year to take up a number of important cross-country services in Spain, as well as a number on some of the main lines radiating from Madrid.

As with the new Talgo trains, these new Fiat railcar-trains conform to the recent R.E.N.F.E. policy of providing accommodation of the two upper classes in all fast day-time trains; at the moment, there are still first, second and third-class seats provided in Spain, but from 1967 third class is to be abolished, and R.E.N.F.E. will then come into line with the other national railways in Western Europe.

Supplied by Fiat, and built partly at the Milan works of Fiat's associate, O.M., and partly by CAF and Material Movil in Spain, each four-car set is made up essentially of two twin sets, each of which comprises a railcar and a control trailer, so that a two-car unit could be run in either direction as required.

Interior of 48-ft first-class saloon

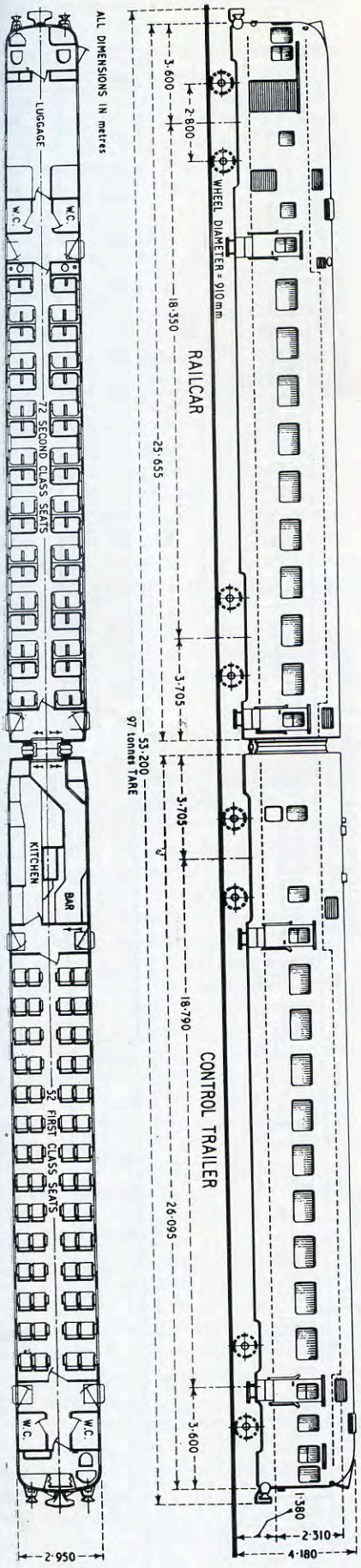
Seat layout

The arrangement and the seat layout of a two-car set is shown in the accompanying diagram. Stone's air-conditioning is installed in the passenger accommodation and this and other auxiliaries are supplied from a diesel-generator set.

These trains are the modern developments of the so-called TAR trains supplied by Fiat to Spain (and also to Portugal) around 1956-57, and which have been running on long-distance services ever since. Power in each twin-car set is provided by an O.M.-Saurer horizontal 12-cylinder pressure-charged engine with a U.I.C. output of 850 b.h.p. at 1,500 rev/min but derated somewhat to suit Spanish conditions. The drive is through O.M./S.R.M. hydraulic transmission. Further brief particulars were given in our issue of November 20, 1964.

Train services

The services for which these new trains are being scheduled as they are put into commission, include daily runs from 800 to 1,132 km, the latter distance involving the train being in service from 8.00 to 22.15. This maximum run of 1,132 km is accomplished by the train sets operating the Sevila-Alcazar-Valencia-Barcelona service, in which there is a daily run in each direction. Other services, some daily and others two or three times a week, include: Madrid-Coruña-Vigo, Madrid-Gijon-Santander, Madrid-Castejon-Pamplona-San Sebastian, Madrid-Alicante-Cartagena, Medina-Badajoz-Sevila, Barcelona-Valencia, Sevila - Cordoba - Lineas - Albacete - Valencia, Leon-Salamanca-Sevila (805 km), Irun-Venta de Banos-Leon-Coruña-Vigo (916 km), and Bilbao-Zaragoza-Barcelona (702 km).



Two-car single-engine half of 5-ft 6-in gauge four-car diesel-hydraulic train for Spain (see previous page)

SELF-DISCHARGING WAGONS OF HIGH CAPACITY

TWO TYPES OF high-capacity wagons under current construction by Orenstein-Koppel & Lubecker Maschinenbau exemplify two methods of modern hydraulic side-door opening, and also the requirements for public railways and private industrial systems.

The side unloader for public railways is a bogie wagon of 75 m³ capacity on a tare of 24·5 *tonnes*, and has a maximum loading capacity of 55·5 *tonnes* when track conditions can take the resulting 20-*tonne* axle load. This wagon is 12 m (39 ft 6 in) over buffers, is fitted with Knorr KE air brakes, has roller-bearing axleboxes, and U.I.C. standards of construction; body and framing are of copper-bearing St.52Cu steel.

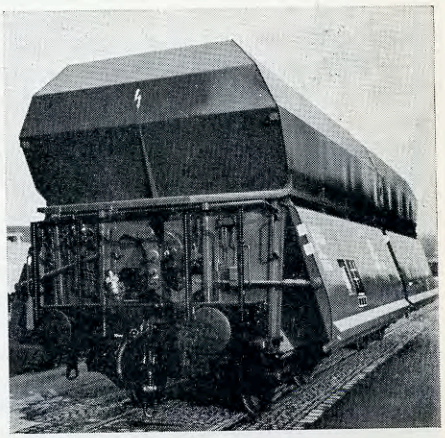
The wagon floor is of saddle type; each side is hinged at waist level and is in two sections, which can be opened together or separately. The actuating medium is hydraulic pressure generated by an axle-driven pump, operating in conjunction with an hydraulic accumulator. An operating cylinder at each end moves the door linkage through double-arm lever. This operating mechanism can be controlled either by hand with the operator on the end platform of the wagon, or through electric remote control from the ground.

A second type of wagon, intended more particularly for steelworks coke and coal traffic, has flat sides hinged near the top on a substantial ring frame, and the whole length of side, about 7 m (23 ft), is opened and closed as one piece. The hydraulic operation can be controlled either from the wagon end or electrically from a more remote position, but the hydraulic system is somewhat different. It is stil maintained by an axle-driven pump and hydraulic accumulator, but has two telescopic cylinders.

These wagons, within an overall length of 9·885 m (32 ft/4 in), and a body length of approximately 7·4 m (24 ft 3 in), have a carrying capacity of 76 to 80 *tonnes* on a tare of 23½/24 *tonnes*, but the resulting axle load of 26 tonnes is suited only to industrial railways with heavy tracks.

U.I.C. standards are applied for the wheel-and-axle sets, roller bearings and running gear, but the bogie wheelbase at 1·8 m is shorter than on normal line-service high-capacity wagons.

Maximum wagon height is 4 m (13 ft 1½ in), and overall width 3·07 m (10 ft 1 in). These cars also are equipped with Knorr KE-G brakes, but in view of the high laden weight each wheel has two brake shoes.



End view of 55-tonne capacity self-discharging wagon for main-line service