Making urban logistics in big cities more sustainable: a rail transport solution for Rome

Francesco Filippi and Andrea Campagna
Centre for Transport and Logistics (CTL), Sapienza Rome University

The Lazio Region’s Mobility, Transport, and Logistics Plan has the objective of reducing congestion and pollution in Rome. One of the worst polluters is freight distribution with diesel trucks. A strategic measure of the Plan is the use of the several rail stations inside the urban area of Rome as distribution centres. The project is called Roma Rail Logistics (RRL).

The first part of this paper presents the project, which is still in a preliminary phase. The second part presents the data collection of a pilot study for the distribution to retailers in the historic centre of Rome with a transit point and electric vehicles. This data collection can provide data to the project on energy consumption of electric vehicles during their actual operative services and completes the data collected on diesel vehicles in a previous study (Alessandrini et al., 2012).

The Centre for Transport and Logistics (CTL) is developing the Mobility, Transport, and Logistics Plan for the Lazio Region. The Rome Rail Logistics (RRL) project is an important element of the Plan. The project foresees using the rail network rather than trucks to transport freight within the city of Rome to Multimodal Urban Distribution Centres (MUDC) and thence by low- to zero-emissions vehicles. It foresees the use of rail for the urban distribution of freight in Rome. Several MUDC will be served by train from two freight villages north of Rome, one near the port of Civitavecchia and the other at Orte, an important transport hub.

The MUDC will work as cross-docking distribution centres with minimum space. They will receive the freight from trains and will distribute it on low- or zero-impact vehicles. This will facilitate night distribution.

Previous experience

The City of Rome opened the way towards a comprehensive policy that takes city logistics into account. With the 2008 Urban Master Plan, the city reserved land for multimodal logistics.

The use of the train is not new to Rome. An earlier experience was managed by Omnia Logistica, a sister company of FS, the Italian Railways, which operated a logistics service for the city of Rome.

The Logistics system was based on three freight villages, two in the North of Italy and one in the South (see Fig. 1), with multi-client block trains to the San Lorenzo urban freight terminal of Rome. There the railcars were unloaded and small trucks loaded for distribution. One hundred pallets were moved per day in a warehouse of 5500 m².
Each delivery truck had a capacity of 8 tons and 12 pallets; diesel consumption was 4 km/litre. Six vehicles managed up to 21 deliveries per day for 40 retailers in two time windows, 10:00–12:30 and 15:30–19:00. The main kinds of freight carried were:

- Mineral water;
- Paper and products;
- Fruit juice and preserved foods;
- Miscellaneous non-food products for large retailers;
- Cement.

**RRL project rail network and MUDC**

The Lazio rail network (Fig. 2) is centred on Rome. The logistics system is based on a rail line to and from the freight village near the port of Civitavecchia, crossing the urban area of Rome with stops at six MUDC, operating in cross docking, to the freight village of Orte, north of Rome.

The rail line, the two freight village terminals, and the six MUDC are shown on the map in Fig. 3. The catchment area is the entire urban area of Rome inside the outer ring road, with a population of 2 million.
Fig. 2 The Lazio rail network

Fig. 3 The freight villages and multimodal urban distribution centres (MUDC)
The Supply Chain

A 4PL provider orchestrates the entire supply chain from the suppliers to the retailers or, for online commerce, the final consumer (Fig. 4). The 4PL is a consulting firm specialising in logistics, transport, and supply chain management. It must be an independent, accountable, non-asset based integrator of a client’s supply and demand chains.

![Fig. 4 Managing the distribution chain](image)

The resupply orders of individual retailers and consumers in the city of Rome are transmitted to the suppliers and MUDC by the 4PL, served by RL, and consolidated in a daily overall order which is sent to suppliers with a lead time of three days to two weeks, according to type of freight and distance from the suppliers.

The suppliers coming from the north transport their freight by train or truck to two freight villages or by ship to Civitavecchia. Suppliers in Lazio and the South of Italy transport freight by train or truck to the Roma Smistamento MUDC by 18:00 the evening before the delivery day.

In the two freight villages goods are packed on multi-product pallets, which are directed to the final retailer. The pallets are thus loaded by the operators on rail convoys by means of forklifts and are subsequently transported to cross-docking warehouses in the city during the night.

The pallets are transferred to electric or methane-powered vehicles with a maximum capacity of 8 tons and 12 pallets. Most cross-docking takes place in the morning. The warehouses can handle up to 1000 pallets per day.

The road vehicles make several trips to deliver the freight to the individual retailers. The trains return to the two freight villages and leave in the evening with a new load.

The road vehicles from the production and distribution centres of the individual suppliers are unloaded and then transferred to rail cars with a capacity of 43 or 46 pallets (similar in size to those used by Trenitalia Cargo). In the freight villages the freight is then reorganized and pallets prepared for the final retailer (as usually occurs in cross docking).
The trains have an average of 20 cars, according to demand and possibly season, up to a maximum of 22, so that the whole weekend can be covered on Friday or Saturday. The rail cars are circa 22 m long, for a total maximum of about 500 m per train. This is the maximum length to avoid the need to break up the convoy for loading and unloading of freight, which would require more time and greater expense.

For an average train composed of 20 cars the total capacity is 900 pallets per day, for 20 workdays or 18,000 pallets per month.

The final delivery is made by methane vehicles, with a capacity of 20 pallets each. The number of vehicles varies each day according to demand.

The reduction of heavy traffic in the Rome area and the use of these vehicles in the urban area will allow considerable reduction of the environmental impact and enhance the company’s image.

The paper will focus in the evaluation of the sustainability of the distribution from the MUDC in the urban area from the financial, economic and environmentally aspects. At the same time will be evaluated the technical feasibility and the organisational barriers to the exploitation of the project. A SWOT analysis with the contribution of the main actors will conclude the paper.

References


