ABSTRACT

In the following years, due to the construction of the line 9, the subway in Barcelona will experience the biggest transformation since it was inaugurated in 1924. The new infrastructure will become the longest subway line of all Europe, with almost 48 kilometres and 52 stations.

Its route will cross Barcelona with the purpose of connecting neighborhoods of the city with a great demand of public transport, and reach the areas without subway service (Singuerlin, Llefià, Santa Rosa, Bon Pastor, Can Peixauet, Zona Franca and El Prat) as well as major communication centers (the Airport, La Fira de Barcelona, La Sagrera TAV, or the new Ciutat Judicial).

The line 9 was designed with the aim to satisfy the demand for passenger service presenting a safe, regular and fast service with high services trade and customer attention without increasing the industrial costs.

These goals are assessed by a high automation degree and the centralization of the supervisory control. The consequence of this policy is marked by innovation infrastructure. The closure of platforms, the central commanding, and the automatic driving of trains could be a few examples.

The present study examines the compliance degree of the quality objective during the period of development. The working methodology is based in verifying if the offered services are sufficient to satisfy the users needs. The offered services are defined by the self constructive project while the users forecast is obtained from the study of demand corresponding to the own infrastructure.

The study of demand is the first step in any planning process. It is important because it allows to define the trace attending only to the criteria relative to the degree use of the infrastructure. Due to its importance, not only it is described, it is also analyzed the relations between the demand and the tracing, that in a beginning may seem to be incoherent.

As a direct consequence of the trace, the area has a high degree of heterogeneity and because of that it is needed to build the tunnels to great depth. Reasons why it has been decided to opt for a new constructive system: the perforation of the tunnel with a tunnelling machine of 12 meters of diameter and the execution of the stations with a dried well in such a way that the platforms remain integrated inside the tunnel.

Once analyzed the demand and the constructive project, we proceed to the analysis. It is necessary to verify wether the mechanisms and the size of the project can give an adequate response to the users needs.

Specifically, the following questions are studied: to adjust the supply of transport demand; to obtain the optimal system of ideal displacement between the platform and the entrance hall, and vice versa; and the evacuation system capacity in case of emergency.

At the end we conclude, except for some very specific issues, that the project of the line L9 effectively solves the aspects studied in this thesis. However, it also presents proposals to improve the efficiency of some aspects of the system.