

III. ABSTRACT

This Project presents a new way of designing bus networks . This new model is a modification of the Ceder and Israeli (1998) model which is used to calculate the travel times and the commercial speeds of buses (this information can be found in *Transit capacity and quality of service manual 2003*.) The main improvement in the new model is that it does not consider the bus travel time as constant, like the previous models, but allows the variation of these times depending on the bus flow in every corridor.

The new model uses a computational tool (*Decision Support System*) to generate bus lines. The algorithm permits one to apply the model and analyze strategic problems that are found in the design of transport networks.

The algorithm is applied to various types of cities and demand in order to analyze concrete problems. The results of these studies are as follows.

The balance between operator costs and user costs is essential in determining the number of lines that the network must have. Cost balance is the option that minimizes the total cost but it may not be the ideal option because there are other important factors that influence the final decision.

If we compare the network generated by the new model's algorithm, one that considers the effect of the congestion when creating lines, with one that does not , we see the importance of changing the travel time depending on the flow. In different theoretical cases in several different types of cities the commercial speeds of buses are 10 percent slower in the networks that are generated without taking into account the traffic flow.

In conclusion networks that consider the effect of congestion have commercial speeds between 12 and 13 km/h, whereas networks generated ignoring the traffic flow have an average speed of 10 km/h.