



UPR/MIT/TU Professional Development Program  
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Mayagüez, P.R.



## **Executive Summary**

### **Resource Allocation and Management During and Between the Transition Of Phases (Planning - Construction – Operation)**

by

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## Executive Summary

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Tren Urbano goes through three different phases throughout its development. The first phase is called Planning. This is the phase where the design of the Tren Urbano takes place following certain specifications and limitations and addressing certain needs. After the Tren Urbano is planned, it enters the second phase which is called Construction. In this phase, the Tren Urbano is constructed the way it was planned and designed in the previous phase. Finally, it enters the third phase, which is referred to as Operation. In this phase the Tren Urbano becomes operational and functional.

In each one of these phases the participation of different kinds of resources is required. For example, in the Planning phase, planners, designers, engineers and architects are required. Contractors, engineers, designers, and architects are required in the Construction phase. Finally, in the Operation phase, Tren Urbano needs experts in computers, maintenance, and security.

Currently, Tren Urbano has no methodology or guides to estimate the kind and number of resources they need in each of their phases. They also lack the methodology to manage the resources in the transition between phases. What they currently do is that they contract the services of an international consulting company to do the allocation and management of their resources. This company charges large amounts of money for their services. Tren Urbano could save that money if they had the guides or methodology to do the allocation and management of resources themselves.

That is precisely the objective of this research, to develop the guides and methodology Tren Urbano needs to estimate the kind and number of resources required in each of the phases. The guides will also include a methodology to manage the

resources in the transition between the phases. The implementation of these guides are expected to improve the utilization of the resources, increase the number of phases finished on time, and reduce the amount of money used in the trade, allocation and management of resources.

The first step in the development of this research was to select the tool that was going to be used in order to estimate the number of resources that were to be assigned to each phase. After several meetings with Industrial Engineering professors and considering different alternatives, the selected tool was the Critical Path Method (CPM).

CPM is a tool that is used to coordinate the utilization of resources completing the mission of a project economically and on time. It is also used to determine the critical path and duration of the project. The critical path is the sequence of critical activities that control the duration of the project.

In order to be able to use the Critical Path Method, some information needs to be gathered. The required information is: (1) The activities that comprehend each phase. This is the different activities of which each phase is composed. (2) The predecessor(s) of each activity. These are the activities that are required or need to be completed before each of the activities under consideration. (3) The duration of the activities. This is the length of time (in terms of days, weeks, months) that each activity lasts from beginning to end. (4) The resources required by each activity. This is the different resources that participate in the activity. (5) The number of available resources. This is the number of resources that are available to participate in the activity. Once all this information is gathered, the CPM could be used to allocate the different kinds of resources to each activity and phase of Tren Urbano.

The work done throughout this semester has been the search of all this information. Some information has been found, but there is still information that needs to be gathered. Several professors have voluntarily offered their help in the search of this information. Meetings with these professors must be arranged in order to acquire the required information or at least get a reference on where the information could be found.

Once all the required information is gathered, the CPM will be applied and the allocation of resources will be performed. The critical path of each phase will be determined along with its duration.

Information on how the allocation and management of resources has been performed in similar projects to Tren Urbano will be gathered, applied to Tren Urbano and compared with the results obtained by CPM. Results will be compared and conclusions and recommendations will be made.