



Optimization in tramway networks planification:

*Optimization of design and allocation of stops and frequencies
depending on the costs of operation and maintenance of the line.*

DOCTORAL STUDENT: M^a CONCEPCION ORTEGA ORTIZ

TESIS DIRECTORS: D. JOSE LUIS MOURA AND D. LUIGI DELL'OLIO

2014-2015 COURSE

Plan of Research (1st year).

Content:

- ▶ Optimization in tramway networks organization: Optimization of design and allocation of stops and frequencies depending on the costs of operation and maintenance of the line.

Plan of Research (1st year).

Why:

- ▶ Actually main projects and planification of mass transport networks are designed in according to the needs of demand and orographic conditions and population of cities, to choose between mass transport systems such as
 - BRT (Bus Rapid Transit)
 - Trams and light rail.
- ▶ Designing taking into account operational and maintenance costs for long life cycle will help the selection and design of network operations more efficiently.

Plan of Research (1st year).

Goals

- ▶ To analyze the parameters to design and plan the tram networks in consolidated urban area
- ▶ To analyze the costs of operation and maintenance of the tramway networks
- ▶ To analyze the design of tram networks (vehicle size, frequency, ..) as well as the conditions and limits thereof (geometrical, operational, ..)
- ▶ To develop a model for optimizing operational and maintenance costs from the design and planning of the lines (frequencies, stops, ..)

Plan of Research (1st year).

SOWT (DAFO)

STRENGTHS

- Technical expertise in tramway projects for 17 years
- High interest in the Company to develop a new tool for planning
- Other thesis in relation with this one

WEAKNESSES

- Unknowdlege in specific tools (VISUM, Mathematics formulation)

OPPORTUNITIES

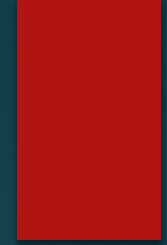
- More efficient design and planning in tramway systems
- A software tool to design

THREATS

- Not available data in operation and maintenace costs

Plan of Research (1st year).

Tasks and Schedule



Tasks	year 2015									year 2016		
	April	May	June	July	August	September	October	November	December	January	February	March
Research and analysis of articles about parameters and cost assignments in tramway transport networks	■	■	■									
Study of mathematic formulation to apply in the model and in the analytic cost calculation						■	■	■				
Study of demand models used in other doctoral student tesis.			■	■	■							
Specific course M829 Transport System Model and M825 Public and Private transport system model							■	■	■			
Understanding of VISUM software tool									■	■		
Real application in a tramway demand model in a new line in Zaragoza City.										■	■	■