Master's Thesis

Investigation on Clustering Mixed Traffic Zones with Individual Transport Influences related to Capacity of Urban Rail-bound Transport

1. Introduction

Railway infrastructure involves high investment money from public funds and has limited space available for expansion which ultimately force all the stake-holders to increase the efficiency of the railway operations using the existing infrastructure.

2. Objectives of the Research

Urban Rail-bound Transport (URT) is a product of public transportation and operates in mixed traffic zones along with individual transport (IT). The objective of this research is to investigate the influence of IT on the capacity of the URT in mixed traffic zones using simulation method. Clustering of traffic zones having similar characteristics is also intended.

3. Methodology of Research

A four way signalized level crossing has been simplified and sub-divided into different possible cases with respective scenarios, each representing a certain infrastructure, traffic situation and traffic movement at the same crossing. Models representing each scenario have been simulated in RailSys and PULEIV. Only Motorized Vehicles (MV) as part of IT has been considered in this research.

4. Analysis of Results

In this research the capacity of the infrastructure in all the cases formed is reducing progressively with the increase in the amount of MV in a mixed traffic zone. This is due to different traffic situation and traffic movement at the crossing. Due to increase in waiting times because of MV, the waiting time curve will shift to the left and becomes sharper.

5. Conclusions of Research

- URT operating in a traffic zone without the influence of MV traffic always yield the highest capacities in each of the scenarios

- The scenarios in which there is a conflict of movement between the URT lines itself, the capacity will drop subsequently

- The drop in capacity will be maximum when the number of MV at the crossing reaches its saturation and over-saturation traffic flow levels

- The capacity drop is also related to movement conflict between MV and URT. The higher the movement conflict between them, the more will be the capacity drop and vice versa

- Capacity drop for URT due to MV in mixed traffic zones can be explained better with a linear mathematical relationship

Master Thesis of: **Muhammad Bilal Paracha**
First Supervisor: **Prof. Dr.-Ing. Ullrich Martin**
Second Supervisor: **Prof. Dr.-Ing. Markus Friedrich**
Tutor: **M.Sc. Di Liu**
Master Programme: **Infrastructure Planning**
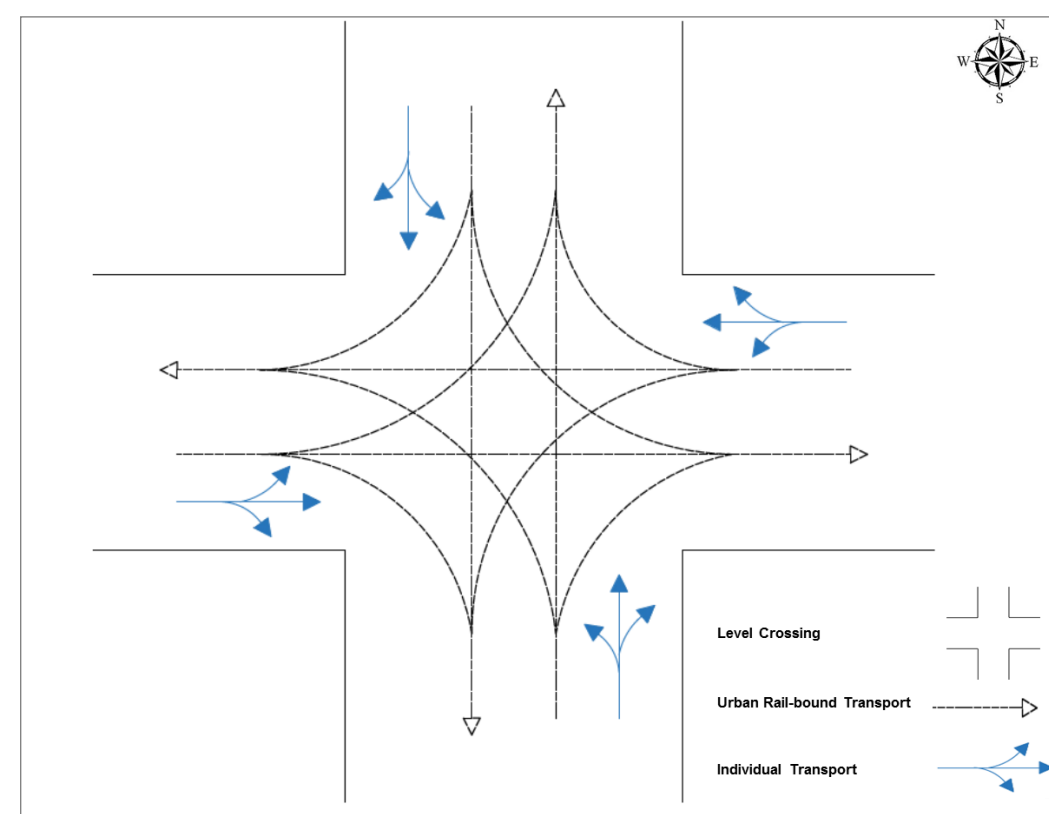Study Period: **June, 2015 till November, 2015**

Photo: Muhammad Bilal

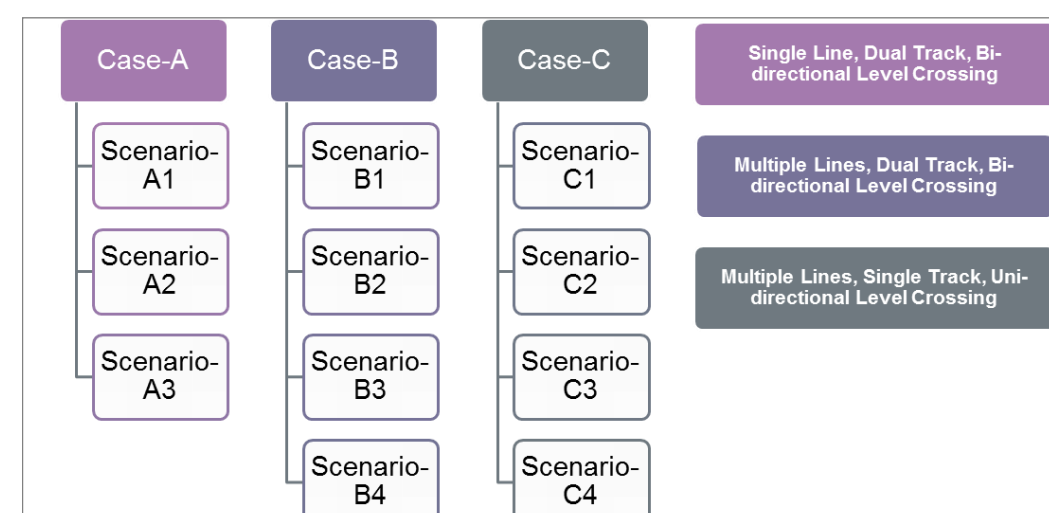Fig-1: Four Way Signalized Level Crossing
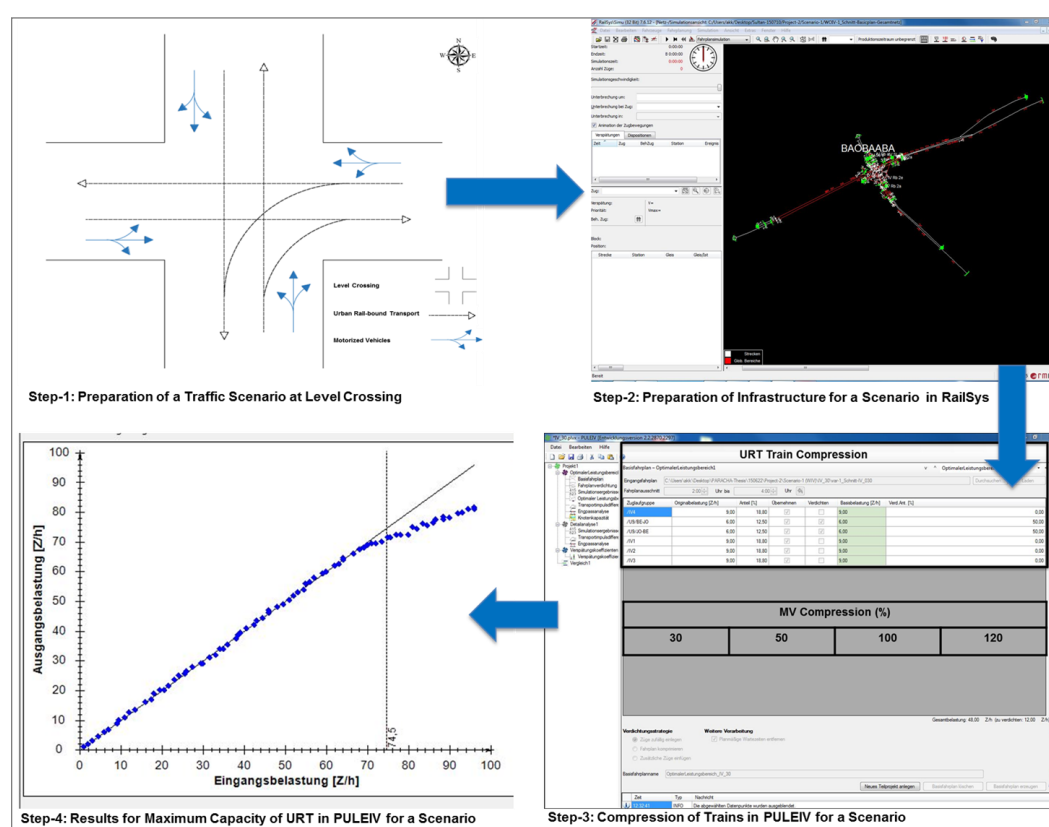
Fig-2: Formation of different Traffic Scenarios
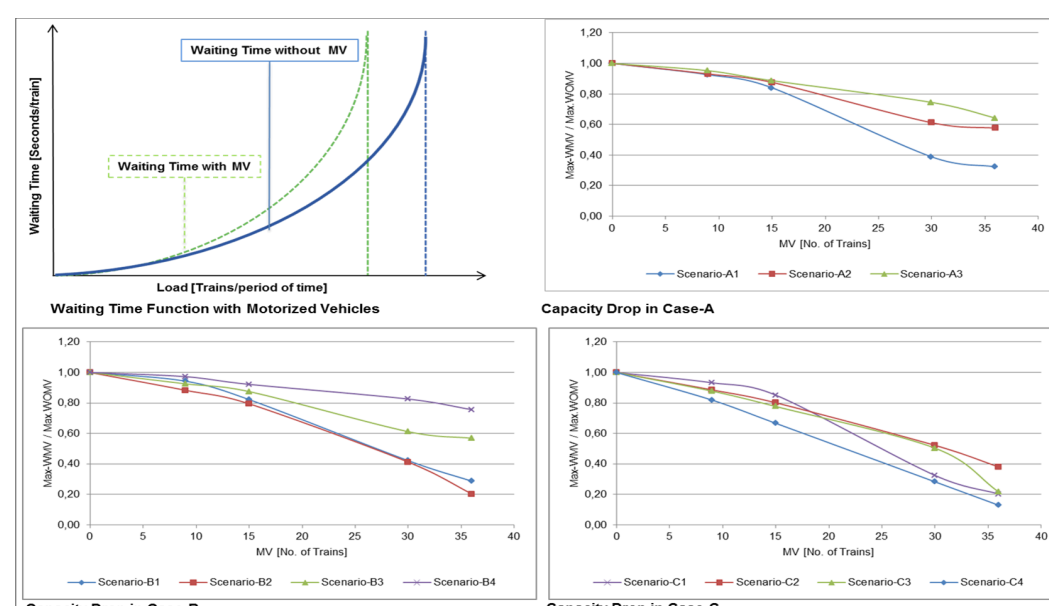
Fig-3: Model Building with Simulation in RailSys & PULEIV

Fig-4: Results of Research

Institut für Eisenbahn- und Verkehrswesen

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Universität Stuttgart