

Outline for a Master's Thesis in the Risk Management Research Group

Topic: Optimization of Supply Chain after Disasters: A Case Study for Berlin

Context:

The high population in urban areas combined with a comparably high amount of congestion and other logistical constraints generate a challenging situation for logistic planners. This becomes especially difficult in times of disasters, when logistical infrastructure might be destroyed, people start to panic, and the possibilities to plan the transportation of humanitarian goods properly reduce drastically. Even though many different mathematical models to optimize the delivery to areas affected by disasters exist, the applicability of general models to an urban context is challenging.

The following aspects should be included in the thesis:

- (1) A literature review on mathematical models to optimize the distribution processes in urban areas, focussing on a classification of the important components of the models (e.g. types of models, dynamics, objective functions, in- and output parameters, restrictions).
- (2) Dependent on the results of (1), a case study for the city of Berlin should be calculated. Therefore, you will be provided with a disaster scenario and need to develop the mathematical model, look up the diverse parameters and solve the problem with the help of the GAMS-software.
- (3) Finally, the results of the optimization have to be visualized and discussed critically.

The thesis can be written in German or English.

Requirements:

Advanced knowledge in the fields of operations research, supply chain management, and programming is mandatory (and/or the motivation to acquire this knowledge).

Experience with GAMS is appreciated but not mandatory.

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