

Development and evaluation of traffic management strategies in the event of road blockage

Master's Thesis of Olympia Diamantaki

Mentoring:

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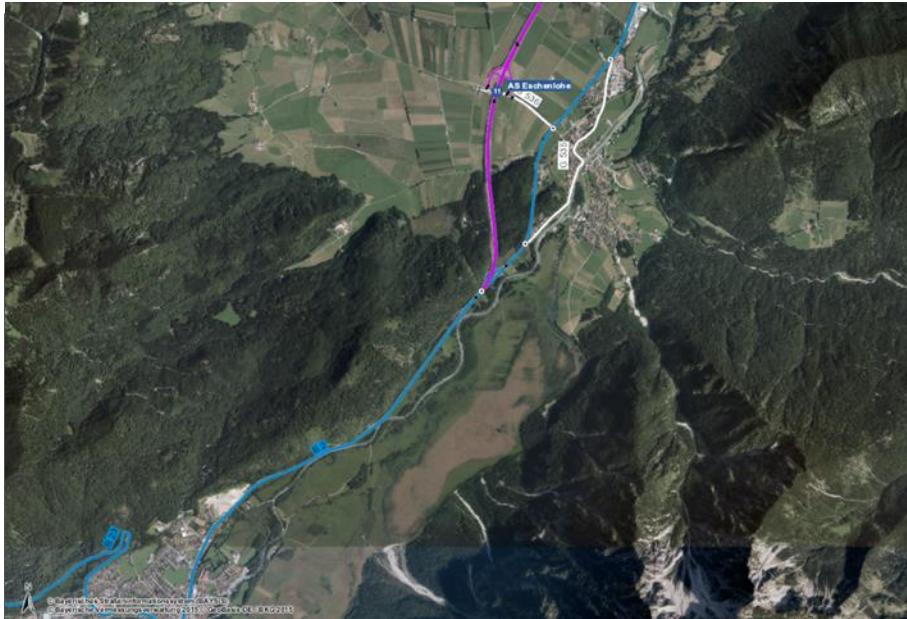


Figure 1 Overview of the study area

Development of the alternative scenarios

- Scenario 0: Current situation.
- Scenario I: Closure of tunnel and obligatory rerouting of federal traffic into the motorway.
- Scenario II: Scenario I and lane reduction in the north of the motorway intersection.
- Scenario III: Scenario I and extension of the merging lane on the motorway
- Scenario IV: Scenario I and undesired rerouting of B2 traffic via Eschenlohe
- Scenario V: Scenario I and HSR (Hard Shoulder Running)
- Scenario VI: Scenario III and speed limitation on the motorway
- Scenario VII: Non-signalized scenario (Pedestrian zebra crossing)

Aim of this master thesis is to provide a framework of alternative traffic management strategies that alleviate the undesired effects of an obligatory traffic rerouting on a highway. The study area includes the motorway section (A95) and its continuation (B2 federal road) between Eschenlohe and Oberau (south Bavaria). A potential closure of the B2 tunnel would lead the federal traffic to a compulsory redirecting into the motorway and hence to considerably higher volumes for the highway. In that case, congestion as well as deterioration of safety level and emission rise are to be expected.

Therefore, a series of mitigating concepts (e.g. lane reduction, hard shoulder running, etc.) have been developed, simulated and evaluated in terms of mobility, safety and pollution. For the realization of the different scenarios, the microscopic traffic simulation software VISSIM was used. Additionally, for safety and environmental assessment SSAM and ENVIVER were applied.

Traffic queue on the motorway

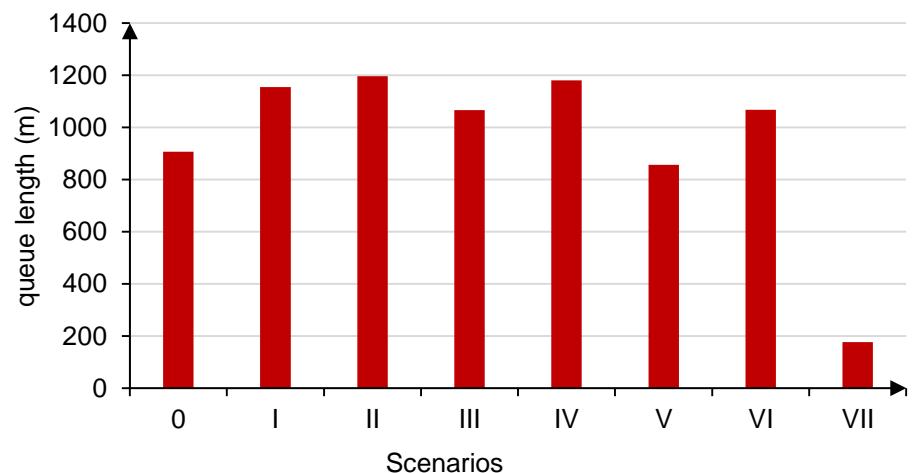


Figure 2 Mobility assessment: traffic queue on the motorway (m)

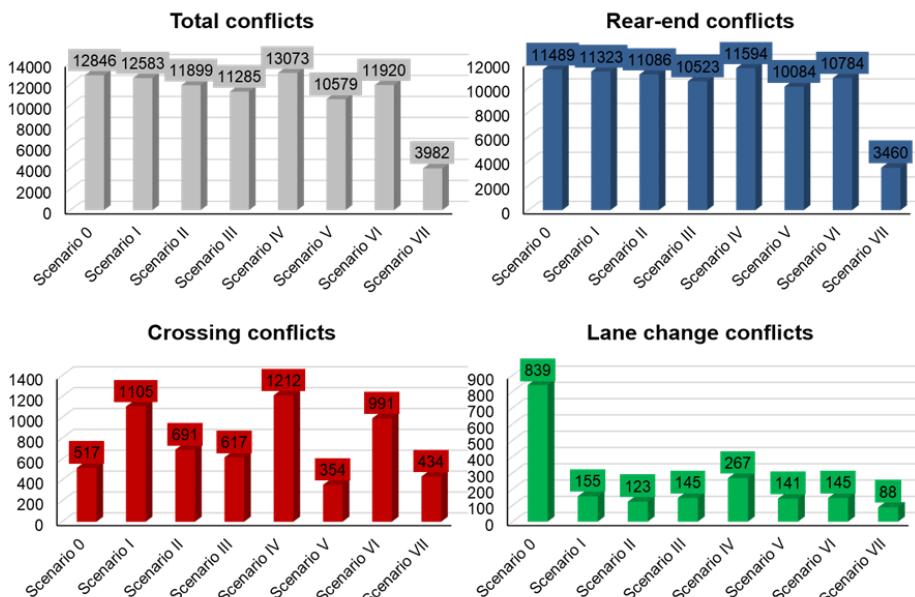


Figure 3 Safety assessment: Conflict classification

The analysis illustrated a strong correlation between motorway congestion and the existence of traffic signals in Oberau. In detail, a possible replacement of traffic control by pedestrian zebra crossing and priority rules would result to an important reduction of traffic jamming both on highway and federal road. Furthermore, the number of expectable incidents is to be reduced. The research showed also that most solutions concentrated on the motorway section (e.g. lane reduction, speed limitation) brought only a mere improvement of traffic flow conditions on the study area. Good results in terms of mobility and safety were recorded by hard shoulder implementation as an instant consequence of motorway capacity increase. With respect to pollution evaluation, there are no notable findings among the different traffic strategies.