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Freeway Operation in Germany Experiences in Hessen

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Freeways in Germany

- Length of network 12.174 km
  - 4 lanes 9.007 km
  - 6 lanes 3.079 km
  - 8 lanes 88 km
- Average daily traffic volume 49.400 veh/day
  - same in Hessen 62.300 veh/day
  - Truck traffic ca. 10 %
- Speed restrictions in Hessen: 1/3 of freeways

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Framework and Responsibilities

- Federal government
  - owner of freeways and federal highways
  - Federal Highway Extension Plan
  - financing of road and telematic infrastructure as well as its maintenance
- State governments
  - acting on behalf of the federal government
  - planning and its realization
  - performing maintenance and operation
  - financing of all the planning and operating activities
  - taking care of traffic safety and traffic regulations

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Traffic Situation Today

- Bottlenecks and missing network links
  - Limited budgets
  - ecological constraints
  - Increasing maintenance needed
- Increasing traffic volume until 2015
  - Passenger road traffic 16%
  - Truck traffic 60%

  Consequences:
- Congestion and mobility restraints

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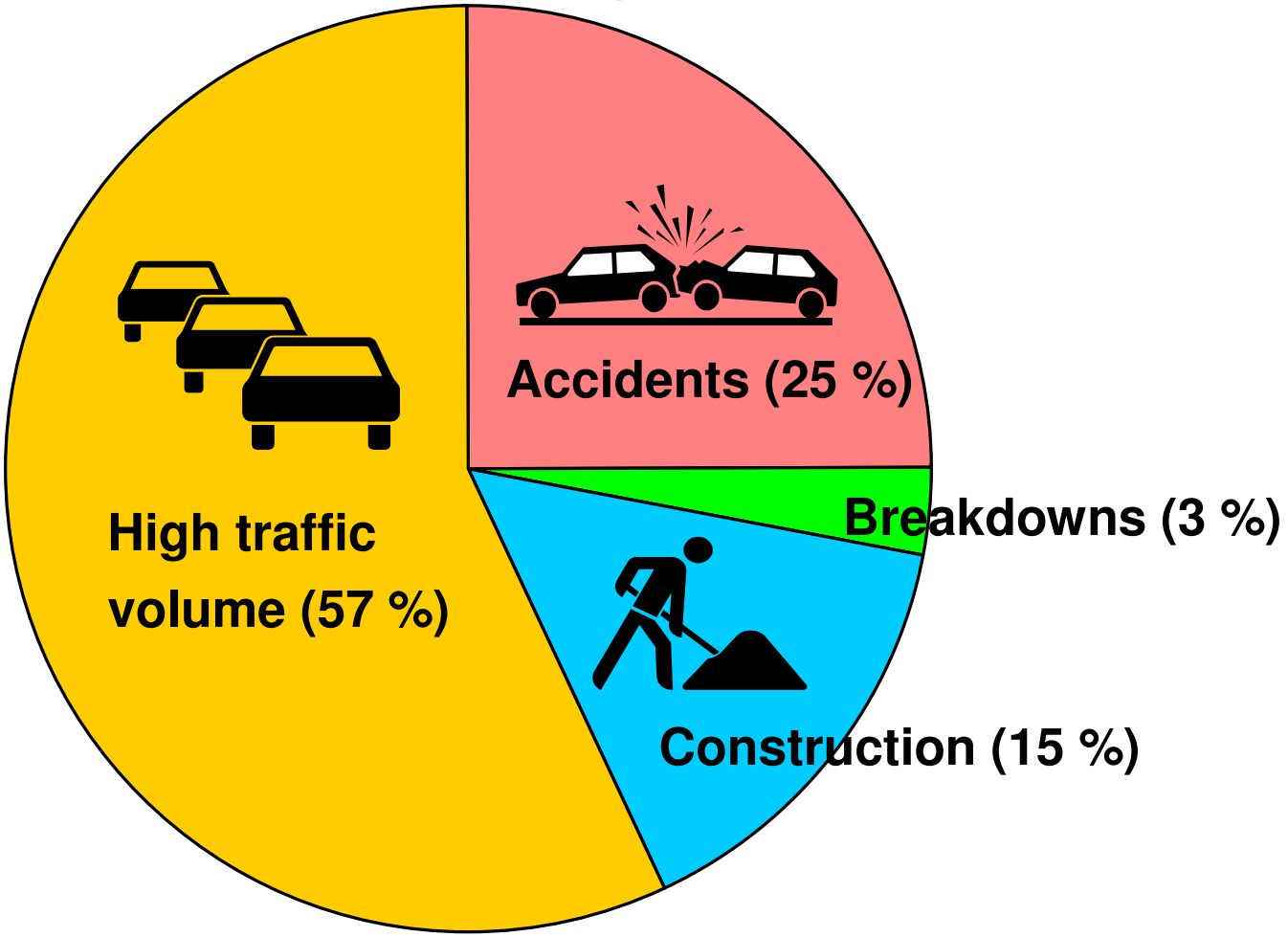
Sources of Congestion



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Main Objectives of Freeway Operation

- Maintain/increase traffic safety
  - harmonizing traffic flow
  - hazard warnings
  - dynamic in-vehicle information (RDS-TMC and traffic responsible navigation systems)
- Maintain/improve mobility
  - optimal use of network capacity (variable direction signing)
  - temporary increase of road capacity (variable speed control, temporary use of hard shoulders)

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Description of Traffic Performance

- Data collection
  - loop detectors and other sensors
  - floating car data
  - video cameras
- Data processing
  - traffic flow, speed, headways
  - level of service
  - congestion estimation and prediction
  - travel time estimation
  - share of truck vehicles

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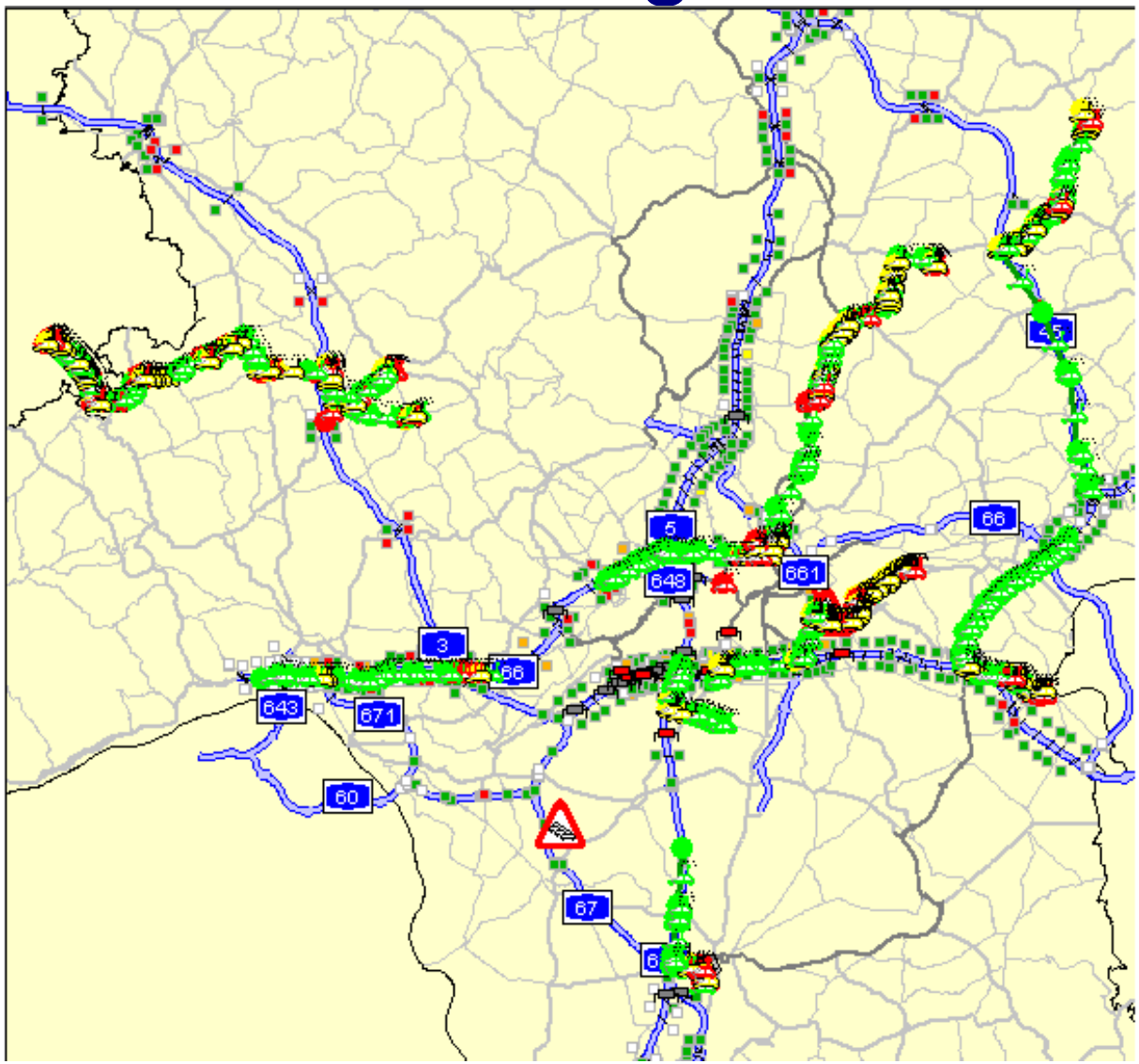
DIANA - Floating Car Data



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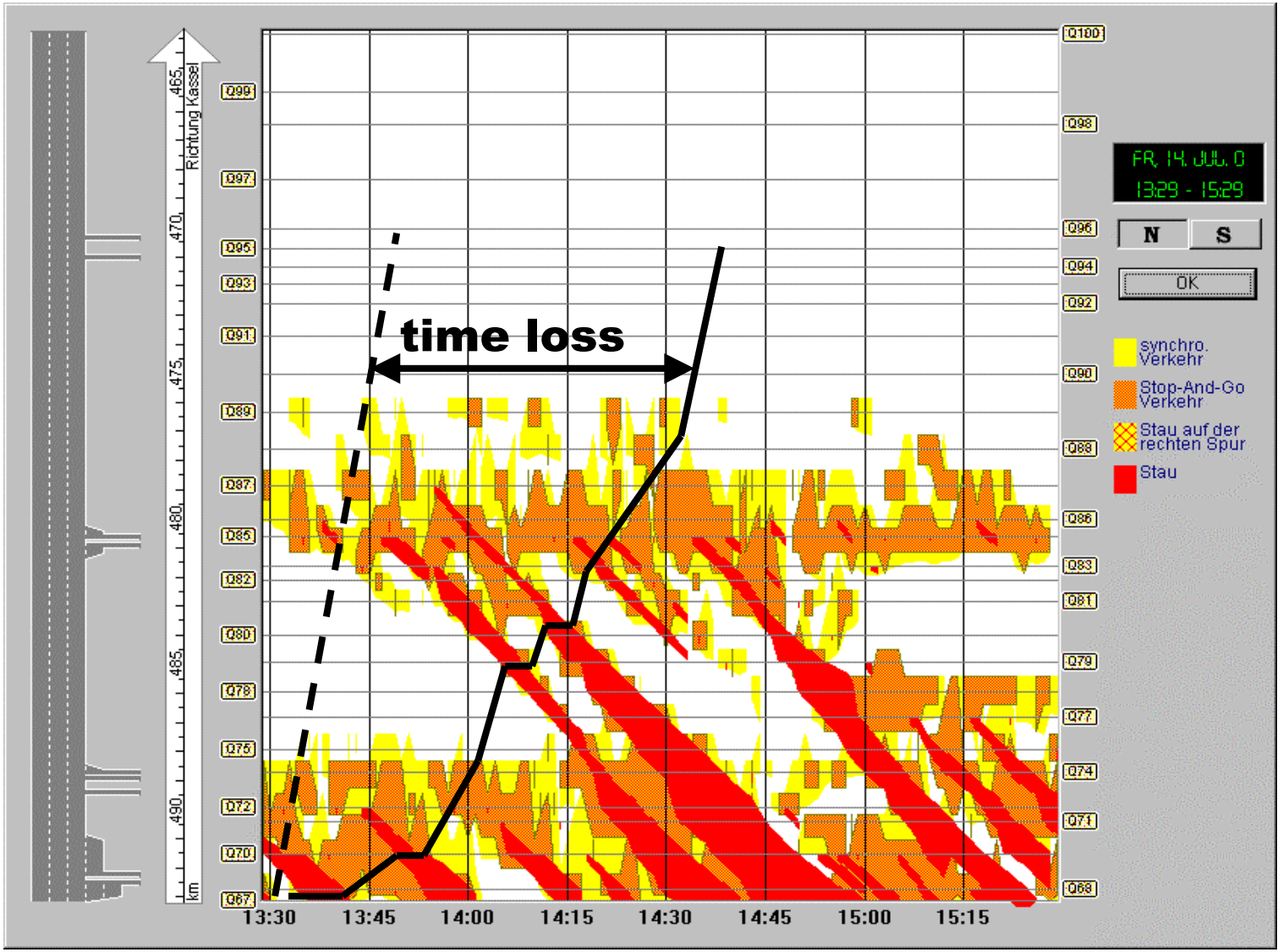
Histogram of congestion



synchronized traffic

congestion

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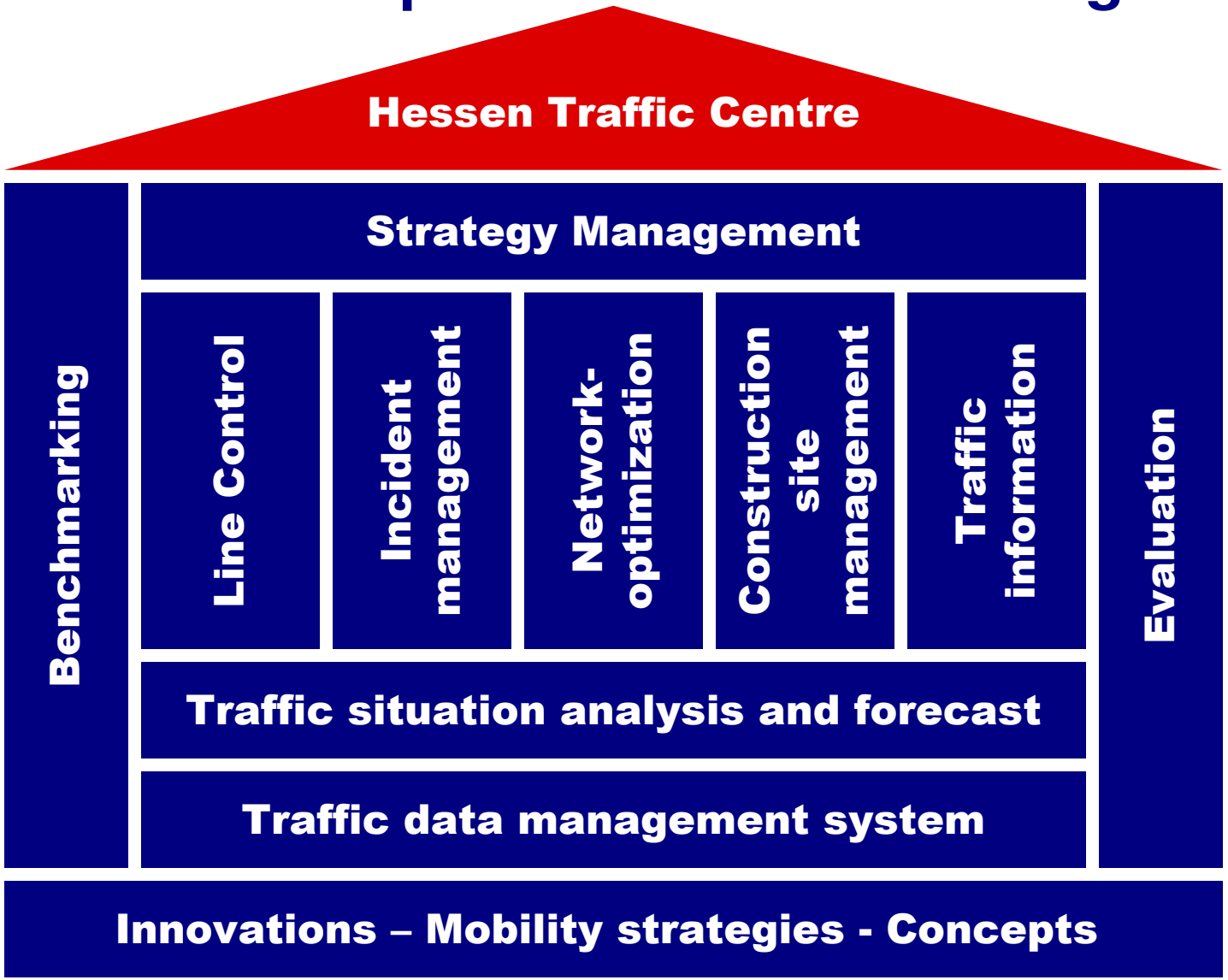
Core elements of pro-active traffic management



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Intelligent Use of Road Infrastructure

- line control (Variable traffic signs)
- network control (variable direction signs)
- intersection control (variable lane signalization)
- ramp metering
- temporary use of hard shoulder
- variable direction signing including congestion warnings and travel time information
- estimated travel time information

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Line Control System
A5 Friedberg - Frankfurt

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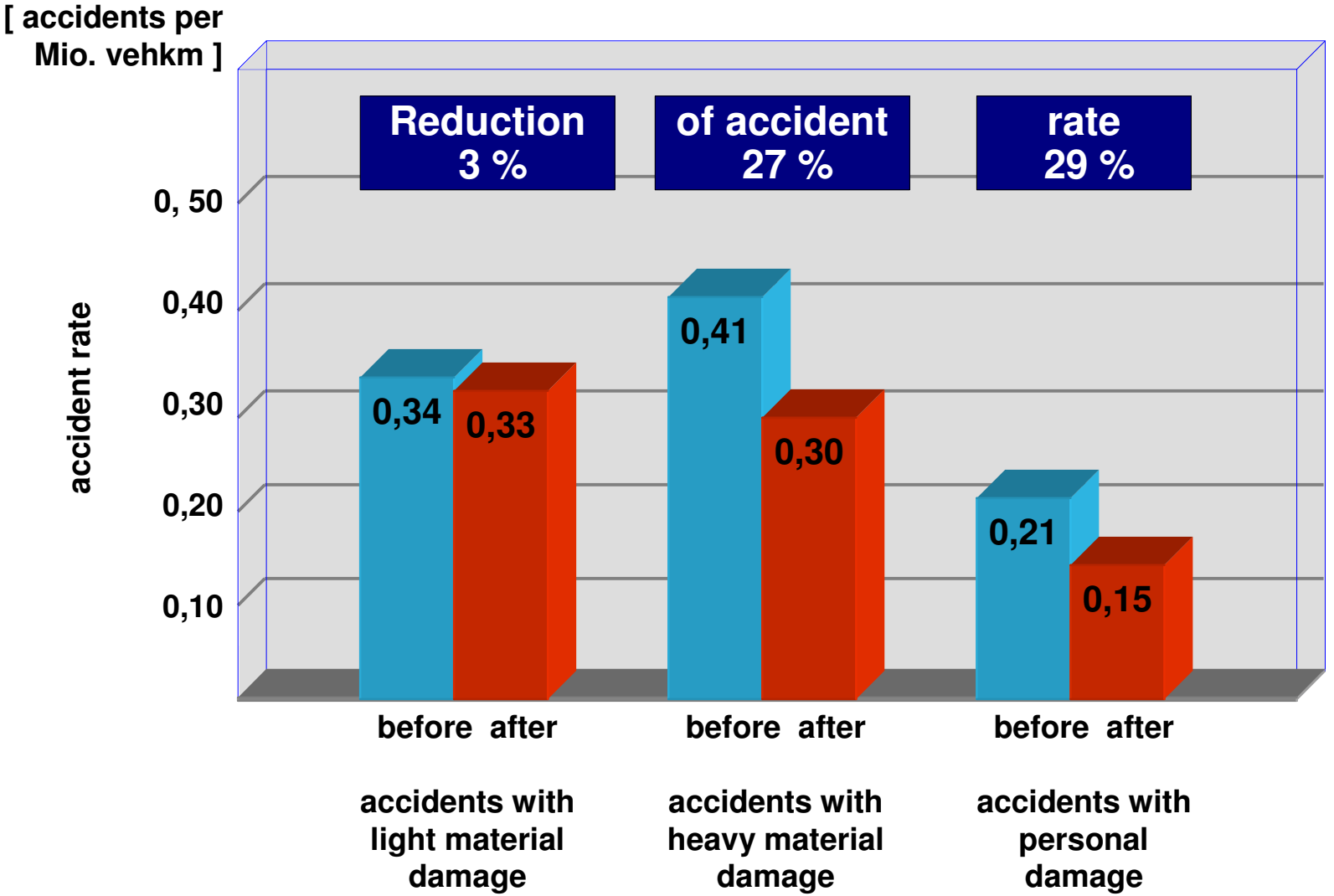
Benefits of Line Control Systems



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Variable Lane Signalization

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Temporary Use of Hard Shoulder

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Variable direction signing including congestion warnings and travel time information

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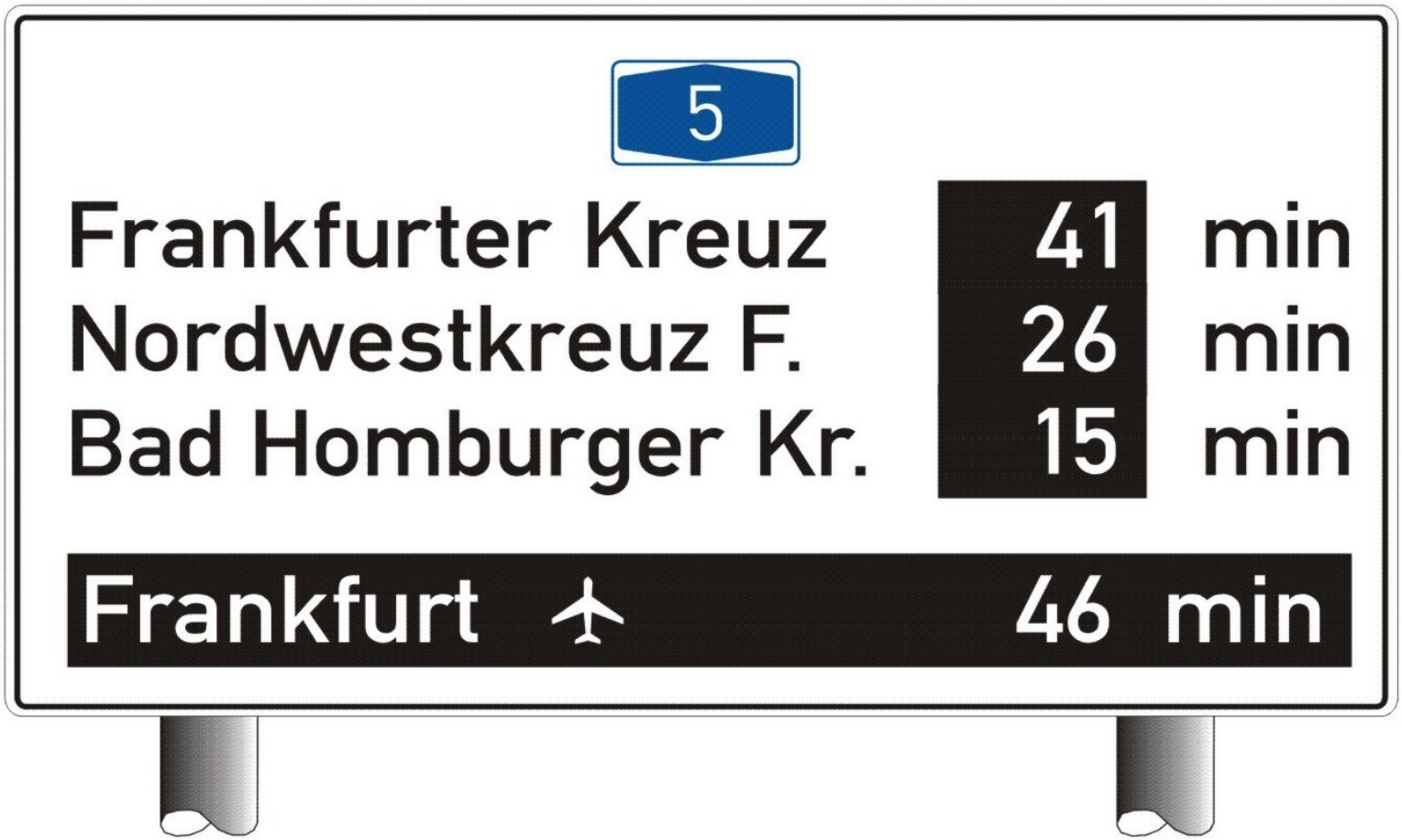
Estimated Travel Time Information



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Construction Site Management

- Objective: reducing travel time delays/congestion
  - better timing of short term construction sites
  - optimization of the planning of successive long term construction sites with respect to induced traffic disturbances
  - approval of applied construction sites
  - monitoring of the approved timing

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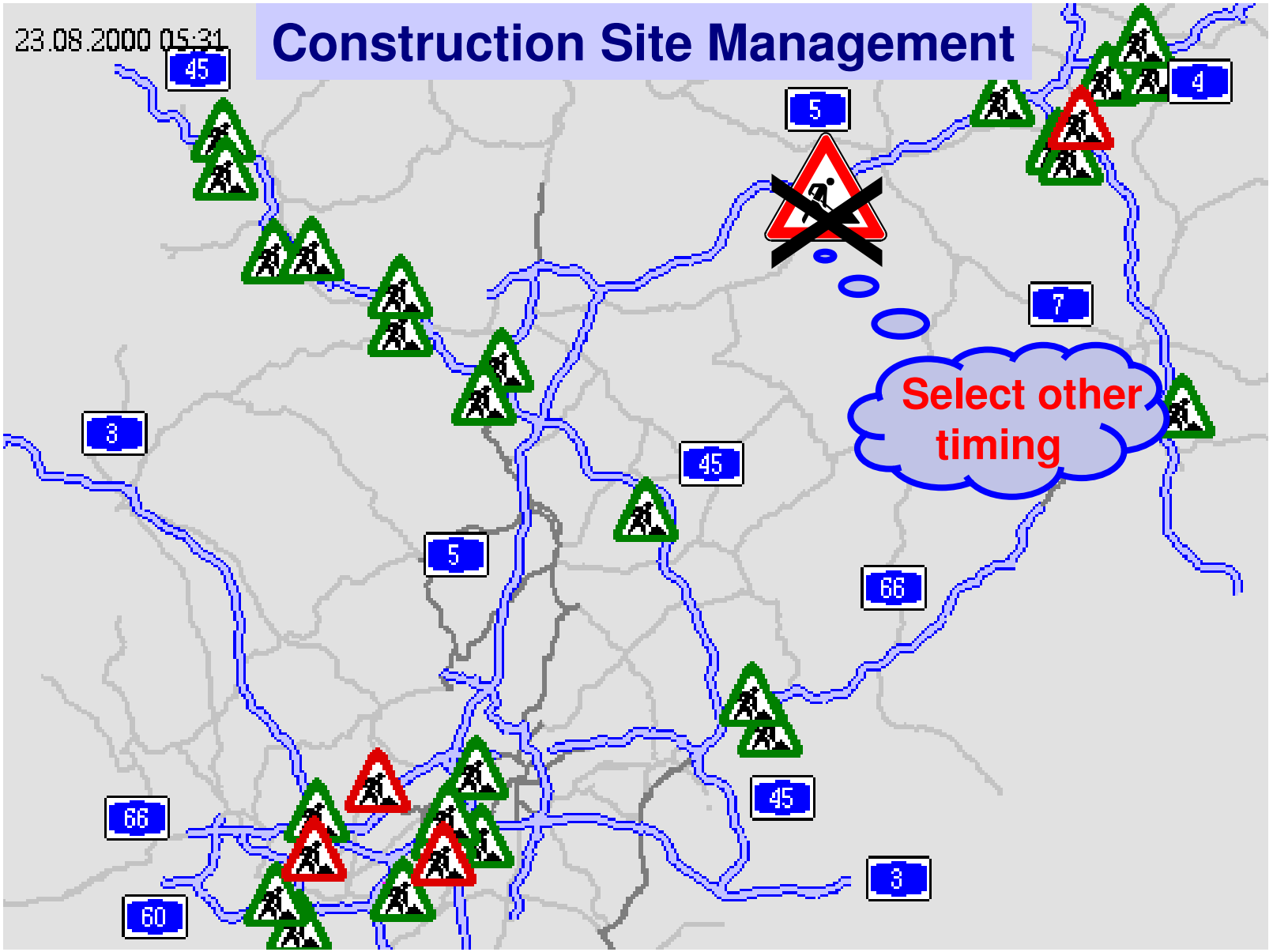
23.08.2000 05:31
Construction Site Management
45
5
4
7
3
45
5
66
66
45
3
60
Select other timing

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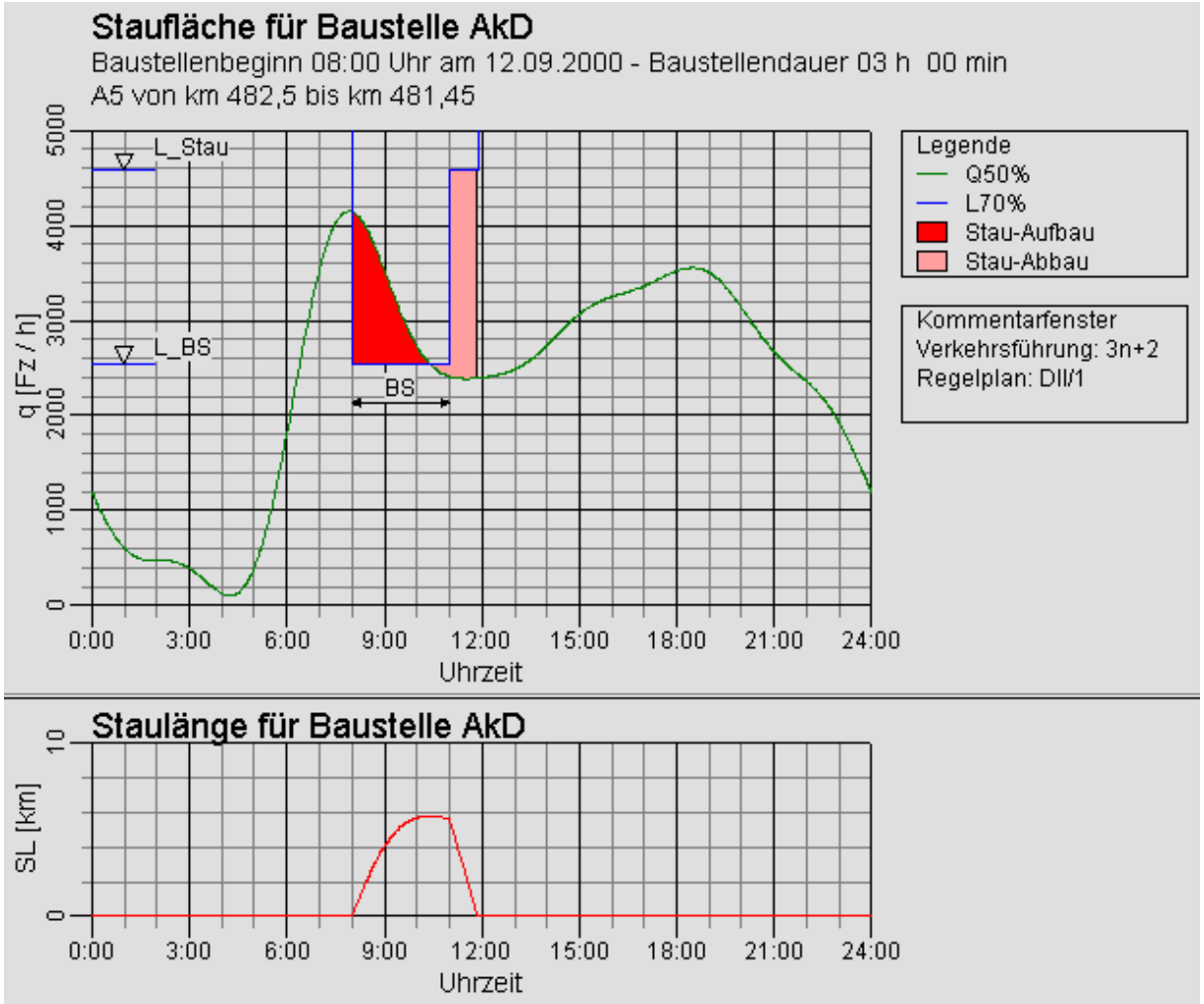
Evaluation of Short Term Construction Sites



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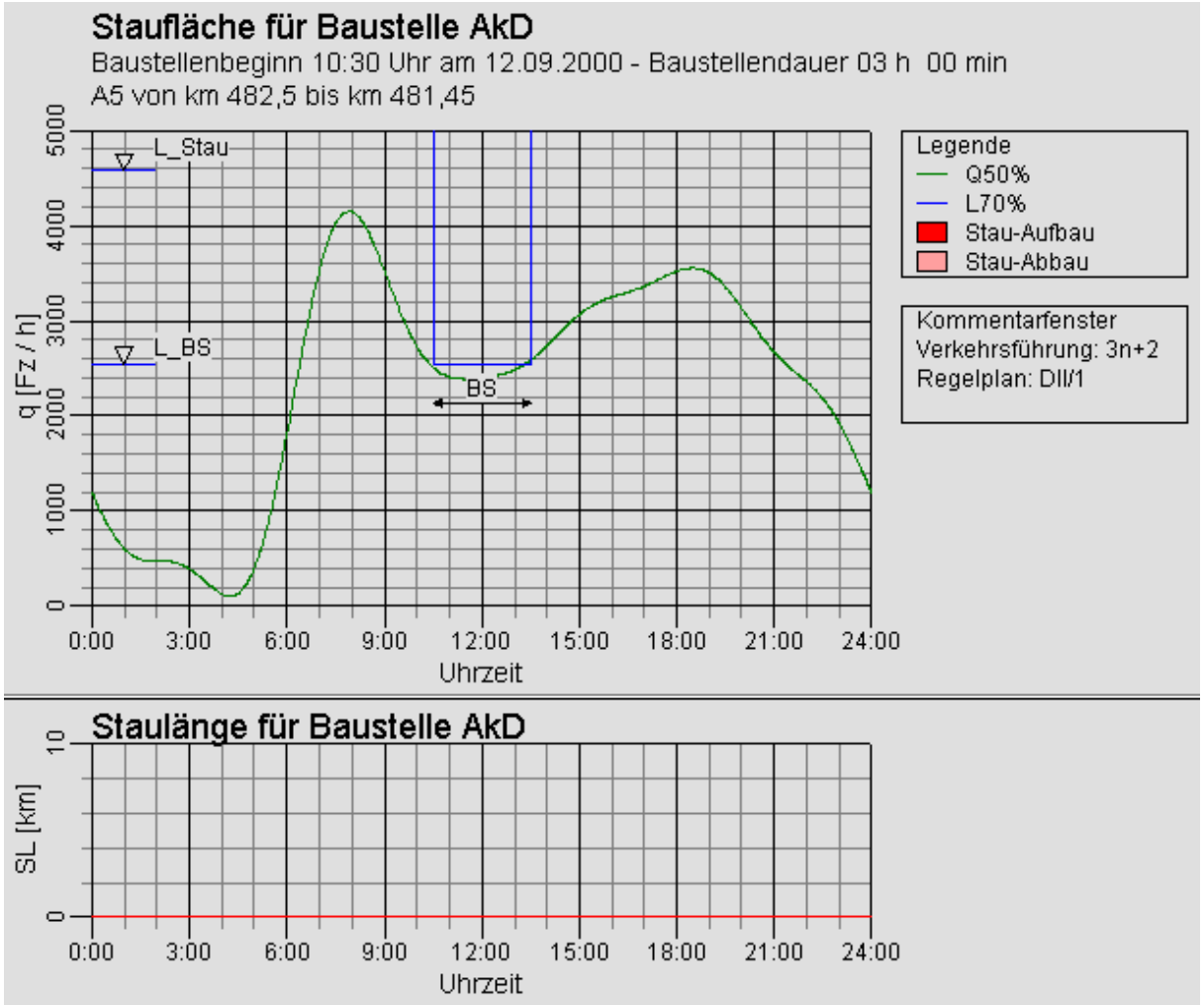
Evaluation of Short Term Construction Sites



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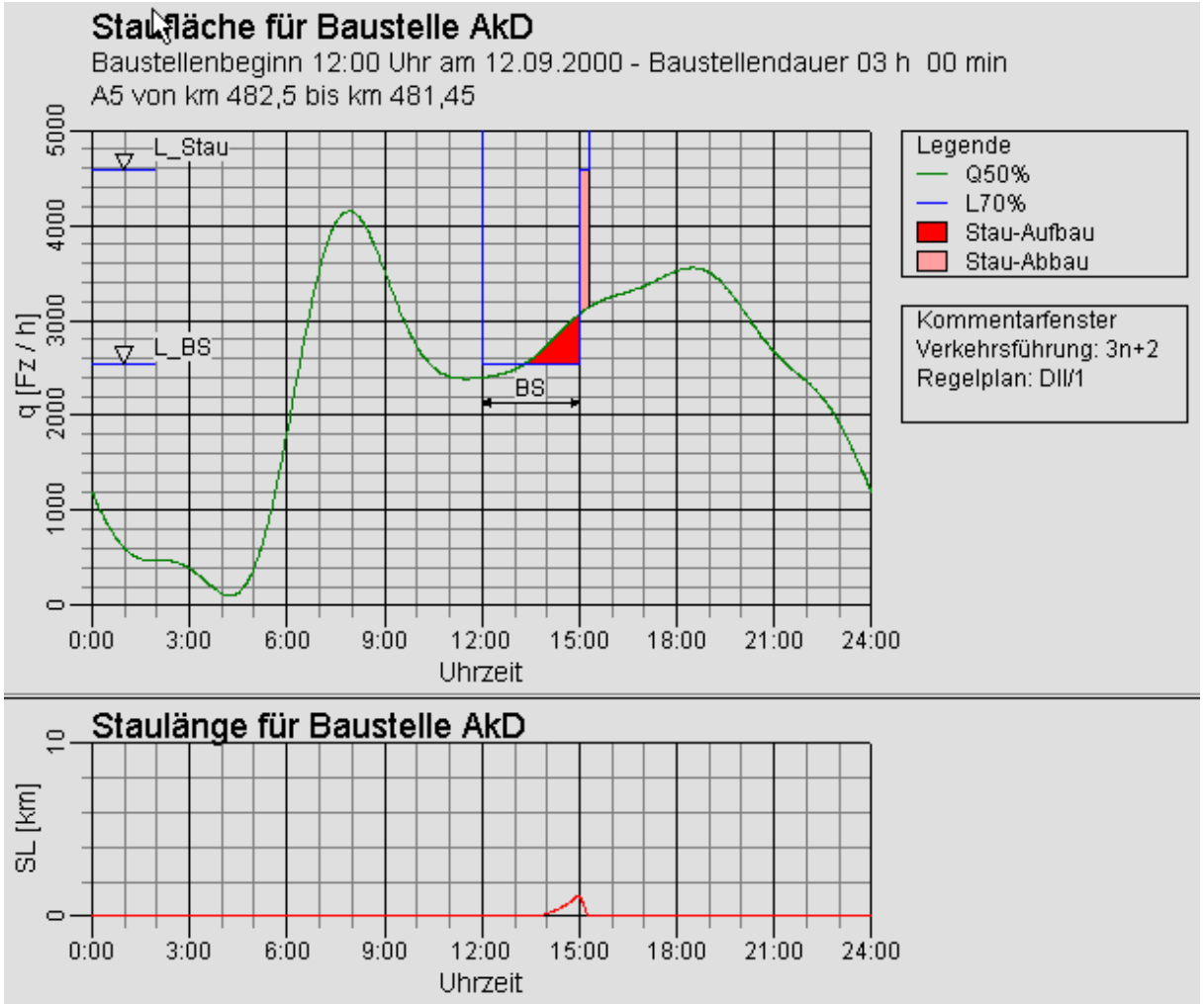
Evaluation of Short Term Construction Sites



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Benefits of Intelligent Traffic Management

- Reducing heavy damage accidents up to 30%
- Travel time reduction up to 20%
- Increasing line capacity up to 25 % at least temporarily
- High acceptance of variable traffic signs as long as the indicated speed limit seems to be reasonable
- Less disturbances through an optimal construction site management
- Less congestion in transferring traffic to alternate routes preventively

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Intermodal Strategy Management

Accidents

Delays

Events

Construction Sites

Disturbance PT

Disturbance RT

Problem Pattern

Strategy Realzation

Strategy Library

01 03 05 06 07 09 10

11 12 13 14 15 17 18 19 20

Strategy Selection

04 08 02

Activation

16

Priority: 1. 2. 3. 4.

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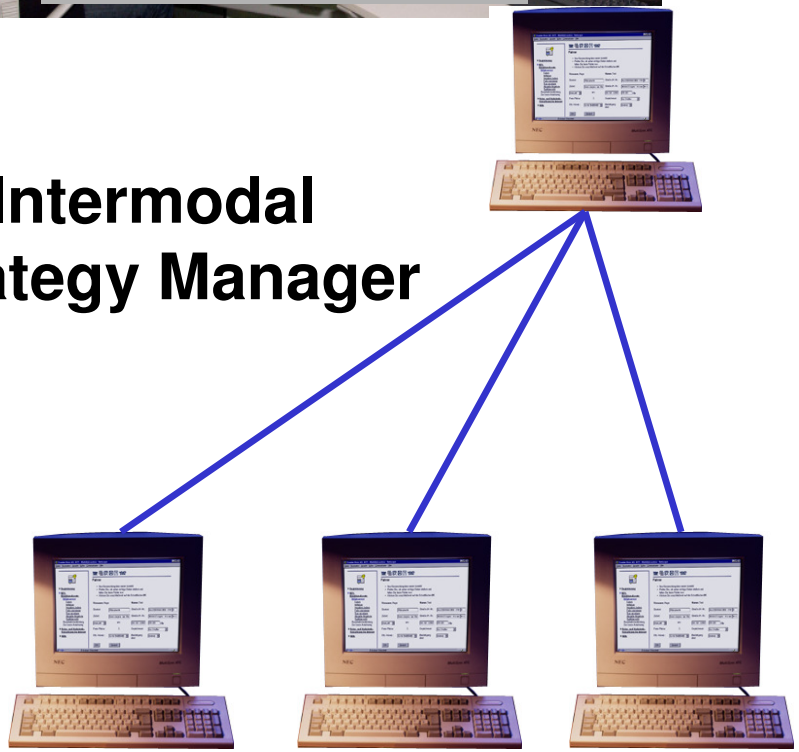
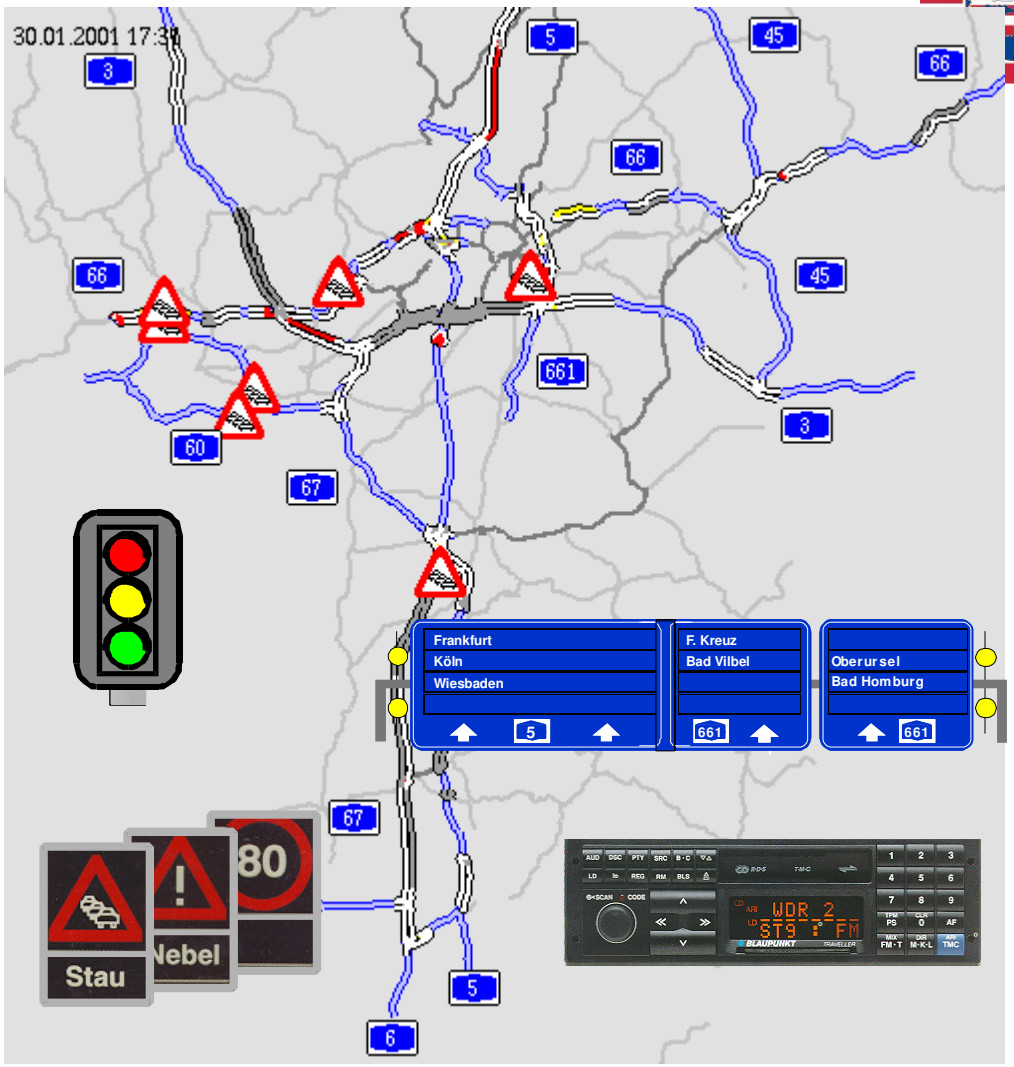
Intermodal Strategy Manager





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Linking “intelligent” vehicles to “intelligent” road infrastructure

Vehicle to vehicle communication:
- exchange of hazard warnings among vehicles

Vehicle to infrastructure communication:
- transmitting of hazard information to traffic control center,
- from there hazard warnings or detour recommendations to all vehicles

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Benchmarking (congestion time)

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Benefits of Intelligent Traffic Management

- Utilization of synergy effects achieved by cooperation of car manufacturers with road infrastructure operators in public-private-partnerships
- Results:

- Increased traffic safety and less congestion
- Improved mobility

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Thank you for listening