BETTER SAFETY AND TRAFFIC FLOW OPTIMISATION:

THE ASF « SPEED CONTROL »

EXPERIMENT ON THE A7 MOTORWAY
The Trans European Road Network

2005: 60,000 km

In France: 10,000 km

Turnpike: 7896 km
ASF at a glance

A subsidiary of Vinci Group

2568 km

1st network in France
2nd in Europe

37% of the French toll network

1.5 Million daily vehicles

2005 turnover: €2.47 Billion
+ 3.6% compared to 2004
Heavy traffic sections
(> 30,000 veh/day)

2 cross-border areas

3 North/South corridors
A major international link between northern and central Europe towards southern European countries

One of the intercity motorways with most traffic in Europe

A 2x3 lane motorway flowing:
- 75,000 veh/day (AADT)
- 115,000 veh/day (ASDT)
- 165,000 veh/day during peak days
- 20% of HGV (AADT)
- 30% of foreign drivers notably during summer
The A7 motorway: a saturated route

- Traffic constantly increases over the last years: +3% per year
- No possibility in a short-term to enlarge this motorway
- Alternatives routes (secondary network) with low capacity
  - An increased disturbance for road users
  - A greater difficulty for ASF to manage daily traffic
Act right away

- ASF has engaged itself in a voluntary approach to enhance its methods and operations’ tools

- Many potential solutions have been identified to contain the saturation level of the A7 motorway:
  - Ramp metering
  - Banning of overtaking for slow vehicles
  - Toll modulation
  - Speed control
The experimental background

- Objective
To evaluate the performance and feasibility of a life-size speed control system on the A7 in the Rhône river valley

- Principle
A homogeneous and adjusted flow runs better

- A technical challenge
- Create a suitable algorithm that can activate the start-up of the experimentation in real time
- Apply efficiently a dynamic speed limit by stages (110, 90, 70 km/h), during heavy traffic periods
- Implement an effective « information diffusion system »

- Gains expected
- A gain in traffic capacity
- A gain in safety, through a “standardisation” of speeds:
  - Less lane changes, less risks of rear-end collisions
  - A direct gain for drivers but also for ASF’s personnel
- A gain in driving comfort (less stress and fatigue linked to “accordion driving”)
Optimizing the traffic flow

Speed

110 km/h
90 km/h
70 km/h

Flow

Fluid traffic status

Speed control activation

Optimal traffic status

Saturated traffic state

Optimizing the traffic flow
The speed control algorithm

- **Input**
  - *real-time traffic data* (vehicle classification, traffic volumes, average speeds and lane occupancy rates) coming from double-loop sensors installed every 5 km on the corridor

- **Main functionalities**
  - *Anticipation* (at 30 to 45 minutes) of the appearance of destabilisations in the traffic flow
  - *Generation of traffic alarms* associated with “speed orders”
  - *Command of on-site diffusion equipments*
The « speed control » information strategy has been defined in coordination with public authorities.

To obtain higher efficiency, the display is not a recommendation, but is compulsory.
A comprehensive ‘information diffusion’ system

- **On-site displays** of the current « speed limit » through:
  - 1 information sign every 10 km:
    - 6 VMS (on overhead gantries): text + pictogram
    - 5 additional info signs (on motorway bridges): pictograms only
  - Use of toll entry VMS to warn entering customers

- **Leaflets and posters** at the level of plazas, in order to best explain the experiment

- **Intensive use of the ASF dedicated information radio** (107.7 FM):
  - 1 message every 7-8 minutes
2004 experiment
- From July 31st to September 6th
- 90 km from Orange to Valence (northwards)
- Summer interurban traffic (high proportion of foreigners or occasional users)
Reminder of 2004 results

Respect of the speed orders:

- 110 km/h order is respected by 80% of drivers
- 90 km/h order is respected by 30% of drivers

Customer satisfaction survey:

- 75% think they benefited from the operation (75% in 2004)
- 77% find the operation not restraining (77% in 2004)
- 61% considered that the speeds displayed were mandatory
- 87% find the operation useful or very useful
**Reminder of 2004 results**

- **Congestion volumes**
  - Decrease of congestion volumes by 16% during the speed control activation:
    - 30 000 hours of congestions saved corresponding to € 1.3 Million of socio-economic gains

- **Number of accidents**:
  - Decrease of the total number of accidents by 48% during the activation of the measure on a light sample however (20 accidents)

- **Use of the system**:
  - Activation 31 days in summer (mainly in August)
  - Average time of activation: 4h00
  - 110 km/h speed instruction activated 75% of time
  - More than 530,000 vehicles concerned by the measure
The 2005 project

- Follow-up to the speed control on the A7 motorway northbound

- Extension of the measure to the A7 southbound
  - Deployment on a 160 km-long section with the same operational principles (=> 1 information point every 10 km)
  - Launching in July 2005
  - Activation from 7/1st to 4/9th
The 2005 project: First evaluation results

Southbound results:

- Respect of the speed orders:
  - 95% of respect for the 110 km/h order
  - 40% of respect for the 90 km/h order

- Customer satisfaction survey:
  - 80% think they benefited from the operation (75% in 2004)
  - 83% find the operation not restraining (77% in 2004)
  - 68% considered that the speeds displayed were mandatory (61% in 2004)
  - The operation is considered useful by:
    - 80% of drivers at the start of the journey on the A7
    - 84% at the half-way stage
    - 91% at the finish
The 2005 project: First evaluation results

Southbound results:

- Congestion volumes
  - Decrease of congestion volumes by 38% during the speed control activation:
    - 200,000 hours of congestions saved

- Number of accidents:
  - Decrease of the total number of accidents during the activation of the measure on a light sample however (20 accidents)

- Use of the system:
  - Activation 1 day out of 2 in summer
  - Average time of activation: 6h30
  - 110 km/h speed instruction activated 85% of time
  - More than 850,000 vehicles concerned by the measure making up nearly 25% of the total summer traffic
**Northbound results:**

- **Confirmation/Improvement of the major trends observed in 2004:**
  - Decrease of the total number of accidents
  - Decrease of the congestion volumes
  - Increase of the traffic flowed during peak-periods

- **Respect of the speed order**
  - 86% of respect for the 110 km/h order (80% in 2004)
  - 43% of respect for the 90 km/h one (30% in 2004)

- **Increasing use of the system:**
  - Time of activation: 6 hours (4 hours in 2004)
  - 110 km/h used nearly 90% of time (75% in 2004)
Global analysis of the results

Very positive results

- The speed control system *improves the level of service* of the axis
- A measure *very well understood and appreciated* by customers:
  - Positive effects on driving comfort
- Confirmed *gains in terms of capacity and safety*:
  - Decrease and homogeneity of speeds
  - Decrease of the number of accidents
- Positive effects on the peak traffic flows
- Interesting savings in terms of congestion volumes
Prospects

- 2006: Operational running of the measure in both directions

- 2007-2008: Studies for the extension of the measure to other highly trafficked parts of the ASF network
Thanks for your attention