USE OF ITS DURING MAJOR ROAD WORKS

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• Background
• Success criteria and strategy
• Traffic management systems and services
• Experiences so far
MOTORWAYS WITH ROAD WORKS

- M3 – The artery of Copenhagen connecting 5 motorways + link to Malmö, Sweden
- M10 – The most loaded motorway in DK
SUCCESS - CRITERIA

- The traffic flow quality shall be maintained at an acceptable level
- As much traffic as possible shall be kept on the motorway in order not to load the surrounding road network
- The extent of accidents with persons injured on the road section to be widened shall not increase in the construction period.
- At least 70% of the road users shall when asked state satisfaction with the traffic information
TRAFFIC MANAGEMENT CHALLENGE

Conditions

• Traffic must get through while the road works are in progress
• Capacity fully utilised in the peak hour
• 2 x 2 or 3 narrow lanes in use only
• Approaches and exits shall be kept open
• Bridges to be rebuild or replaced
• Traffic management costs = approx. 10% of total cost of the extension
IF NO TRAFFIC MANAGEMENT SYSTEMS ARE USED?

- Number of injuries = 2 times the number before road works

- Number of material damages = 2 times the number before road works

- Number of incidents = increase of 25%
HOW TO FULLFILL THE SUCCESS CRITERIA?

Strategy:
• To avoid incidents and accidents as far as possible
• To keep traffic as fluent as possible
• To control and warn when queues are forming anyway
• To clear the road as fast as possible after incidents
• To maintain the largest possible proportion of traffic on the M3 and M10 in the construction period

Measures:
→ Ensure a current overview of the traffic status (provide the necessary data collection)
→ Use of ITS
→ Upgrade the traffic information centre into a traffic management centre
→ Tighten up the emergency handling procedures
USE OF ITS – SYSTEMS AND SERVICES

- Variable information signs on the M3 and M10
- Variable speed signs on M3
- Fixed information signs with a variable text part on roads leading to the M3
- Visual monitoring (cameras)
- Monitoring: Data collection system (replaces the existing ”TRIM” data collection system)
- Emergency roadside telephones
- Travel time measurement system on an alternative route (the Ring 3)
- Central IT system
- Automatic telephone service
- New information services on the internet
USE OF ITS
EXPERIENCES SO FAR FROM THE M3

- Development in number of injuries and material damages:

<table>
<thead>
<tr>
<th>Period</th>
<th>Number of injuries</th>
<th>Number of materiel damages</th>
</tr>
</thead>
<tbody>
<tr>
<td>One year before road construction</td>
<td>11</td>
<td>29</td>
</tr>
<tr>
<td>First year with road construction</td>
<td>9</td>
<td>31</td>
</tr>
</tbody>
</table>

- Number of incidents = 2 per day (5 before the construction work started)
- 10% diverted traffic (primarily to O4 and in peek hour)
- Traffic is generally running more smoothly
MOTORRISTS’ UNDERSTANDING OF VMS

82% understand the variable speed limits correctly

96% understand the VMS and signals as intended. However 42% does not understand at which point the lane closure takes effect.

88% understand the information regarding queue as intended.

In case the queue information is supplemented by information regarding the distance to the rear end of the queue ahead, 61% understands the information as intended – the rest of the respondents do not.
MOTORISTS’ ATTITUDE TOWARDS VMS AND SIGNALS ON M3

General attitude towards variable speed limits

<table>
<thead>
<tr>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very positive</td>
<td>10</td>
</tr>
<tr>
<td>Positive</td>
<td>50</td>
</tr>
<tr>
<td>Negative</td>
<td>30</td>
</tr>
<tr>
<td>Very negative</td>
<td>0</td>
</tr>
<tr>
<td>Don’t know</td>
<td>0</td>
</tr>
<tr>
<td>Not answered</td>
<td>10</td>
</tr>
</tbody>
</table>

Safety

<table>
<thead>
<tr>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very safe</td>
<td>20</td>
</tr>
<tr>
<td>Neither nor</td>
<td>60</td>
</tr>
<tr>
<td>Less safe</td>
<td>10</td>
</tr>
<tr>
<td>Don’t know</td>
<td>0</td>
</tr>
<tr>
<td>Not answered</td>
<td>0</td>
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</table>

Traffic flow

<table>
<thead>
<tr>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better flow</td>
<td>50</td>
</tr>
<tr>
<td>Unchanged</td>
<td>20</td>
</tr>
<tr>
<td>Less better flow</td>
<td>10</td>
</tr>
<tr>
<td>Don’t know</td>
<td>0</td>
</tr>
<tr>
<td>Not answered</td>
<td>0</td>
</tr>
</tbody>
</table>
IMPACTS OF VARIABLE SPEED SIGNS

• Evaluation have been carried out on the M3 on a short stretch without construction work (and only 2 observation points)

• VMS have led to a slight decrease in travelling speeds (depends on the situation)
• A greater part refuse to comply with the speed signs (heavier sanctions)
• No increase in traffic flow (most likely due to the location as bottleneck)
• The drivers drive more closely – gap between vehicles have decreased (not affected safety)
• The general experience with use of ITS during major road works is very positive!
• Success criteria have been fulfilled!
• The Danish Road Directorate will continue the use of ITS at road works
• Use of ITS is during road works is a big challenge – must consider technical solutions very carefully
• Difficult to evaluate!
• Trial with variable ”flap” signs at road work was very positive
• Will be used next week in ”real life”
Thank you for listening

Any questions?

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