

Roadwork zones on motorways

Elisabeth Lunman
Eva Liljegren
Lee Palmer
Ulf Danielsson



TRAFIKVERKET
SWEDISH TRANSPORT ADMINISTRATION

Procurements

- Regulations (law) are the basis for all the procurements
- Specific requirements in each contract
 - TRVK Apv and TRVR Apv
(Technical requirements for roadworks and technical recommendations for roadworks)
 - Regional requirements
 - Regional complement (restrictions)
 - At least two lanes open
- The employer is responsible for health and safety in the working environment
- Includes personnel responsibility, competence, implementation and safeguarding
- The client have the contractor responsibilities
 - This means that the client must make sure that it is possible to apply good working methods with regards to health and safety

Priority requirements

- 3 main principles
 - **Warn**
 - **Guide**
 - **Protect** (road users and road workers)
- The speed of passing traffic must not exceed 70 km/h during intermittent works on motorways(Director-general decision)

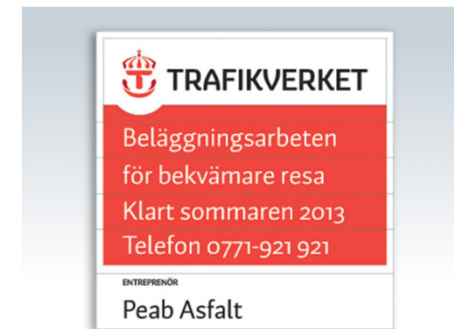
Basic philosophy for functional support

- Traffic engineer: Early involvement in the process
- Requiring of protective devices, roadside warnings and information
- Optimal dates and times for the implementation
- Supervision in the planning process for accessibility and traffic safety
- Ensuring possibilities for safe working environment measures.
- Right requirements in the procurement
- Mobility management



Pre-warning road-users: Information before the start of roadworks.

- Traffic control centres VMS
- Newspapers – Radio – GPS - Websites
- Roadside Information signs



Warning road-users: During roadworks

- Intermittent works



- Stationary works



Mobile VMS

To increase traffic information the Swedish Transport administration can demand the use of VMS in procurements



Utvärdering av mobil
förvarningsportal

Variabel meddelandeskylt på trailer med portalarm

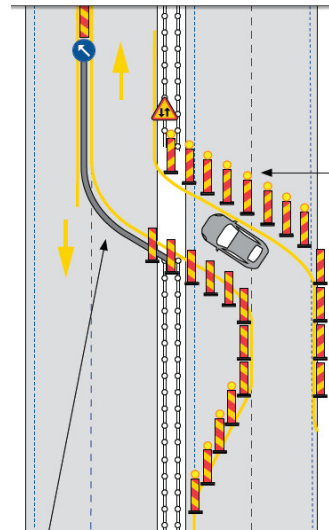
Januari 2013



Guiding road-users through the work zone



Chicane



Cross-over



Equal merging lane

Two-way traffic on motorways



Protecting road workers and road users



Buffer zone =
 $\frac{1}{2} \times \text{regular speed} + 10 \text{ m}$



Tapered to the road
edge with 6 angle or
1:10



Crash cushions
protecting the ends
of barriers

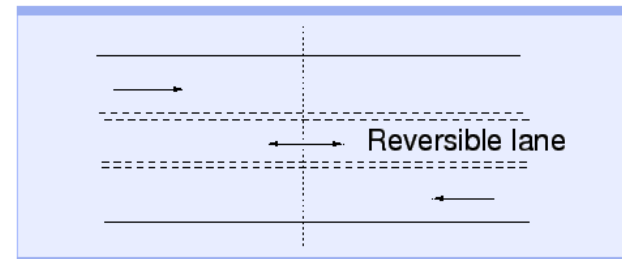
Other methods and possibilities

- Quick bridge over the work zone of an existing bridge. Traffic free environment



- Reversible lanes 2 +1

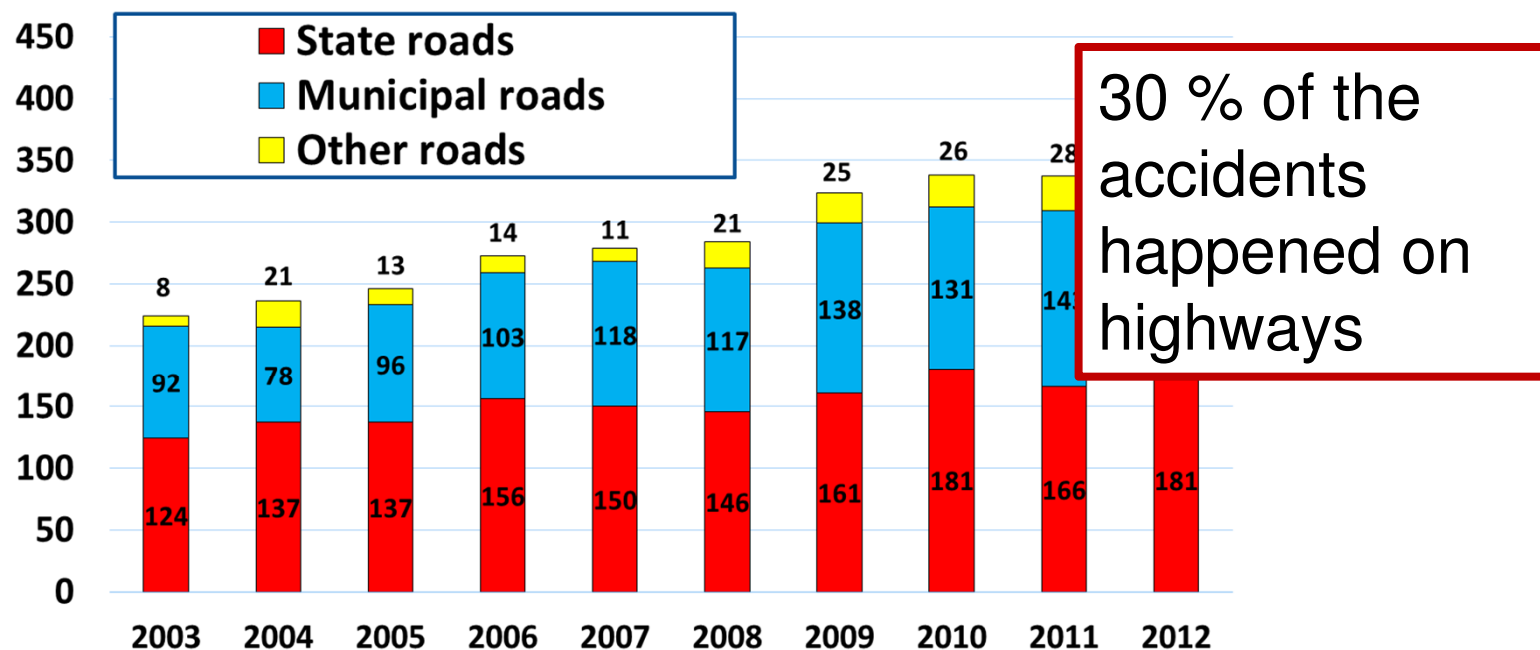
Advantages when used with VMS



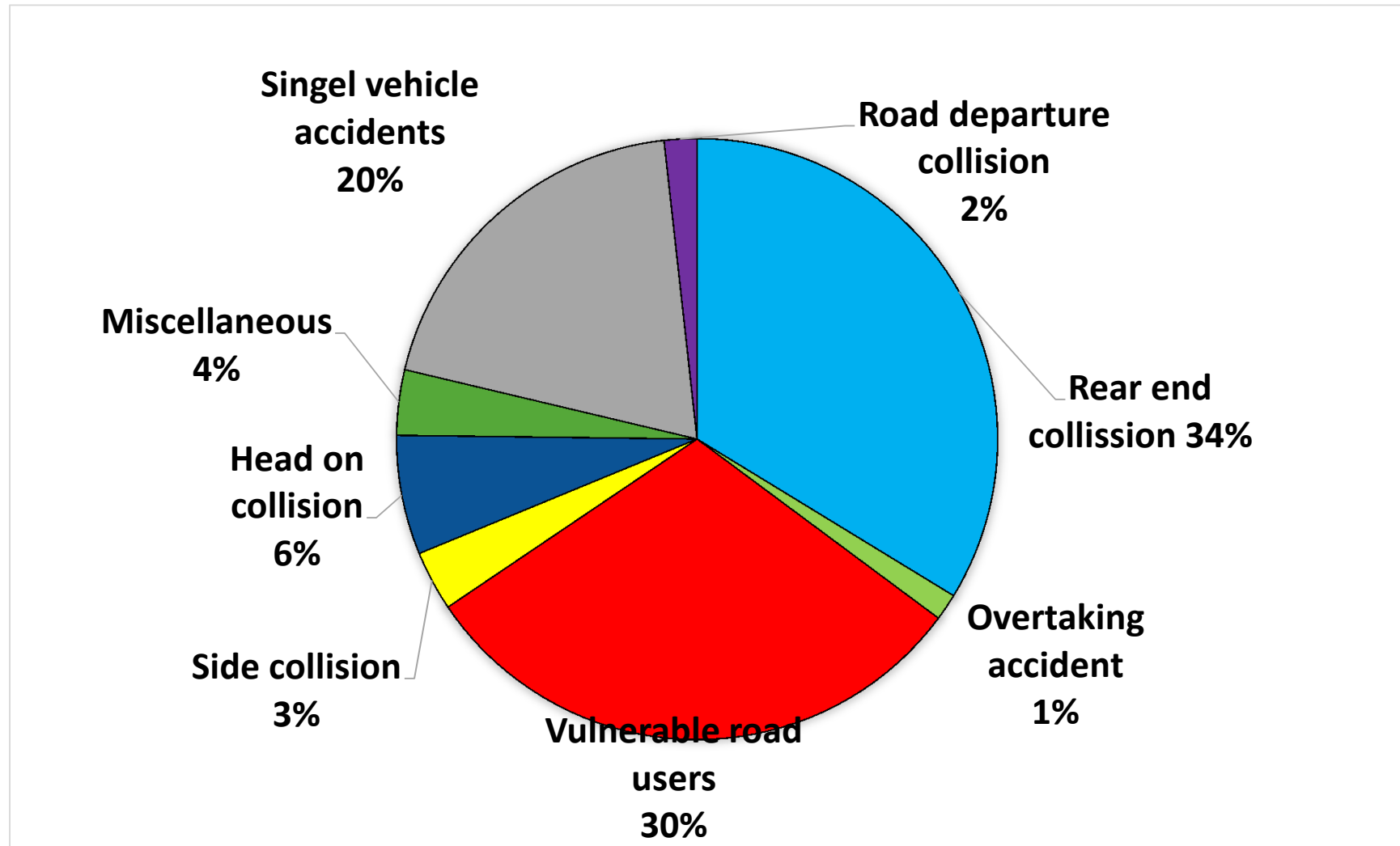
Traffic accidents in connection to road work

- Data from STRADA 2003-2012
 - Accidents reported by the police and by the emergency hospitals
 - Accidents with personal injuries
 - Free text search with approximately 30 words
- Data from fatal accidents and from Internet
- All types of roadwork, including winter
- All types of roads and road owners

Number of accidents (all road types)



Type of accidents (all road types)

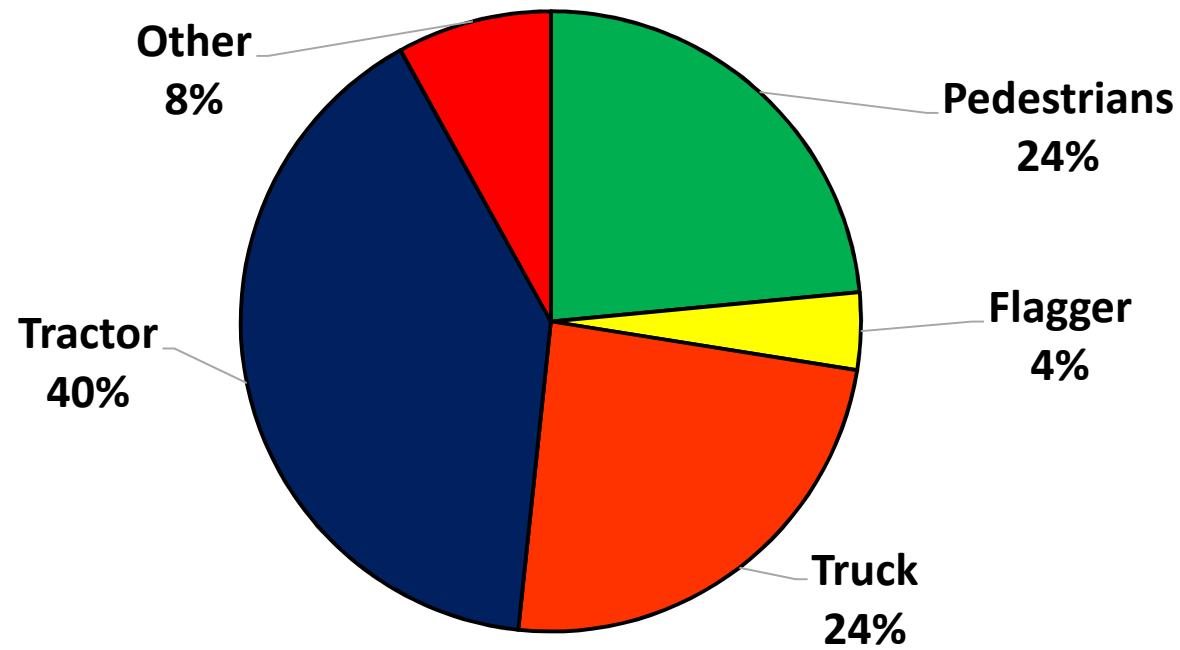


Injury severity 2003-2012 (all road types)

- 2 935 total number of accidents
- 44 fatal accidents (1,5% of total)
- 363 accidents with severe injuries (12,5%)
- 2 528 accidents with minor injuries (86%)

- 6 road workers killed (including 2013)

Type of accident with injured road workers



Barriers and TMA

- Protect both road workers and road users
- Barriers and TMA are important
 - In 4% of the accidents a barrier or TMA was hit
 - Four fatal accidents (no road worker killed)

Volvo V70 versus TMA



Controlling roadwork

- About 900 controls each year.
- A control can consist of many control aspects, such as TMA, education, vehicles, clothes
- Each control was classified as green (OK), yellow (minor faults) or red (major faults)

During 2014 research is carried out as to analyse the data from the controls, regarding their severity based on potential consequences, for example potential fatal accident.

3 398 controls on TMA and traverse protection (2008-2013)

- 263 controls with no protection at all
- 362 controls incorrect usage
- 171 controls with buffer zones faults
- 156 controls with other faults



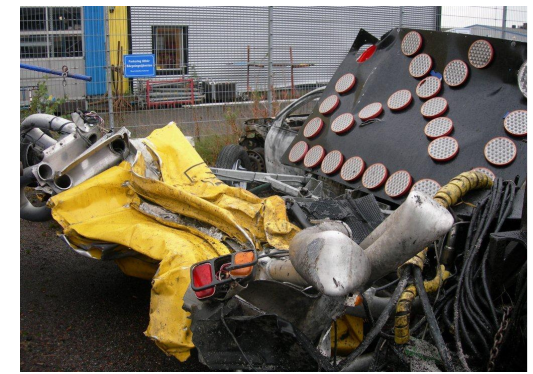
Road Assistance – financed by Trafikverket

- Improve road safety and accessibility.
- Accidents, breakdowns and obstacles on the road.



Svåra arbeten på motorväg

- E6 north of Gothenburg, Tractor accident
- Requirements från **beställaren** were clear, The contractor failed to follow the requirements and this resulted in fatal consequences. Road E6 was closed for 12 hours in the northbound lanes and a single lane was open in the southbound direction.



Other types of works on motorways

- Recovery och reparation when heavy goods vehicles break down.
 - The Swedish work environment authority requires TMA to be used in Stockholms och Uppsalas counties on **the E4, E18, E20, 73 och 222** when carrying out the recovery of heavy goods vehicles.

