



Rijkswaterstaat
Ministry of Infrastructure and the
Environment

Fieldtest A16 Road Works Warning

Photograph: Stephan Tellier – Compass

The time has come for the next step in smart mobility: Cooperative Intelligent Transport Systems (C-ITS). With C-ITS, vehicles and roadside systems are permanently connected with each other using wireless communications. Road users receive real-time information about the situation on the road and around their vehicles. On Wednesday 11 November 2015 the Dutch project team Cooperative ITS Corridor of Rijkswaterstaat tested the functionality of the Road Works Warning service in a field test. This was the first test undertaken at real road works.

One corridor, two services

Rijkswaterstaat is developing two use cases for the Cooperative ITS Corridor project: Road Works Warning and Probe Vehicle Data. Both services use C-ITS technology. One of the objectives of the Road Works Warning use case is to give road users an early warning of road works on their route. They are also informed about related traffic management measures such as changes in lane layout and the speed limit. Providing information to road users in real time should improve safety and reduce the number of collisions at road works.

Fieldtest in 'real life' setting

The Road Works Warning field test was undertaken in a real-life setting. In the night of Wednesday 11 November, maintenance work was done on a DRIP (Dynamic Route Information Panel, a type of variable message sign) on the A16 highway.

This required temporary traffic management measures. Several lanes were closed so that equipment could be positioned for the maintenance work.

- DRIP location: A16 highway, near Dordrecht, km 29.790 Li.
- Temporary traffic management measures: starting at A16 highway km 32.396 Li and ending at km 29.370 Li.

Two communications systems

During the field test, the temporary change in lane layout was presented in real time in two test vehicles which passed the road works site several times that night. The road works were announced in the vehicle and the temporary traffic management measures were displayed on a On Board Unit (OBU). Two communications systems were used for this:

- Cellular: a "connected" message was transmitted from a central station at a greater distance and received via the 3G/4G network. This message indicated where the road works started. In this field test the driver was informed that road works started within the next three kilometres.
- ETSI G5: A Road Side Unit (RSU) used WiFi-P to send DENM (Decentralized Environmental Notification Message) information to the cars. These messages indicated the current lane layout for each road segment. The DENM messages were defined by MAPtm, as an assignment by Rijkswaterstaat.



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Road Side Unit

To provide the Road Works Warning service (based on high-speed data exchange between roadside units and vehicles), roadside units will have to be installed at regular intervals along the roads. The field test used hardware supplied by Cohda.

Software development

During the field test the messages were displayed in the cars using an On Board Unit consisting of Cohda hardware together with a TomTom bridge. This bridge provides a range of features for third-party software development. In this way, information about road works can be presented to road users on existing navigation systems. Altran has made a demonstration design for the field test. This is not a final design or guideline.



Test vehicle equipment

Two test vehicles were used for the field test. These cars, common models of European makes, were fitted with the on-board units, dedicated antennas with a range of approximately 800 metres and navigation equipment to display the temporary traffic management measures. A CAN (Controller Area Network) interface supplied by Beijer Automotive translated the CAN data and

provided it to the On Board Unit. This uses information from a database with vehicle sensor details for almost all European vehicles.

Seamless connection between systems and vehicles

To enable the Road Works Warning field test, Rijkswaterstaat asked a number of suppliers to combine their specialist expertise. Cooperative ITS also means that all suppliers and other stakeholders have to work together to ensure a seamless connection between their systems and the vehicles. End users should be able to use C-ITS services, irrespective of the vehicle, supplier, network operator, country or road operator.

Participants in the project

- Rijkswaterstaat (management and development)
- Compass Infrastructuur, Rotterdam
- Altran, Eindhoven
- Beijer Automotive, Schijndel
- MAPtm, Utrecht

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