

Navigation off course?



Mapping for Navteq. The SON report says its data is 'sufficient for finding the correct route'

ITS Solutions reports on a Dutch study which highlights concerns over guidance systems in low-trafficked areas.

Most mobile phone-based navigator aids routinely fail to protect residential areas in Dutch towns from through traffic, according to a Netherlands research organisation. They mostly perform well, however, in deterring motorway users from taking short cuts via secondary roads.

The Hague-based Stichting Onderzoek Navigatiesystemen (SON, Navigation Systems Research Foundation) has used location-specific tests to try and find why devices typically fail to identify what it describes as inappropriate routes in built-up areas – and avoid recommending them. The problem stems from software flaws, it concludes in its first-ever published report (on which it issued a press release in 21 languages).

SON sees these flaws as lying

within a category of software errors that should have been detected in trial runs and eliminated. The protection of low-trafficked pedestrian areas is a major government policy concern in the Netherlands (see panel) and SON sees these flaws as frustrating investments in residential districts which aim to keep out through traffic and lower speeds by implementing speed ramps, road narrowing and chicanes.

It is therefore warning of potentially serious consequences without industry action, official intervention and heightened consumer awareness. It highlights the risk of increased levels of road traffic accidents (RTAs), as well as the environmental consequences of roads not intended for heavy use being filled with traffic diverting from other routes.

Answering the question

whether mobile phone-based systems can navigate satisfactorily, it concludes that they can in principle, but that not all currently-available products do so. Its investigation also shows that the data supplied to cartographers and navigation system suppliers by specialist digital mapping companies Navteq and Teleatlas is sufficient for finding the correct route.

But, out of 13 products from seven countries tested, SON states that only the currently freely-distributed Nav4All always offered appropriate routes and met all its testing criteria. Available on mobile phones with Internet connectivity and a GPS receiver, the Dutch-developed service does not propose to introduce subscription charges until 1 January 2010.

In four separate tests, this always identified appropriate routes and avoided 'searching'

behaviour among drivers by providing clear spoken instructions backed up by a clearly-legible screen display. The other 12 navigators failed three of the tests, although most of them succeeded in the fourth.

The danger, says SON, is that inappropriate guidance will encourage motorists to behave as 'kid killers', driving through designated low-traffic residential zones that are not intended for through traffic. Specifically, it fails to detect the longer, but safer, routes that avoid such areas.

Another undesirable effect stems from the automatic re-routing function that navigators use in response to approaching road congestion. This can divert motorists from congested roads to unsuitable alternatives.

SON identifies four basic criteria for a mobile phone-based navigation system to work out the correct route from A to B.

1. 'Kid-killer' driving in designated low-traffic residential areas should not be permitted;
2. Through traffic should not be allowed on residential access roads in built-up areas;
3. Though traffic should not be allowed on residential access roads outside built-up areas; and
4. Motorway traffic should not be allowed to seek shorter routes by temporarily leaving the motorway

SON has developed a performance test for each of these criteria, partly as a means of checking the validity of ratings published in consumer magazines. All the tests, which SON has designed to be repeatable elsewhere, took place in locations linked by the A50 motorway in the east-central Dutch provinces of Overijssel and Gelderland.

The SON tests

Test 1, on 'kid killer' routes through designated low-traffic areas.

In The Netherlands, these areas are marked with road signs showing (among other pictograms) children playing against a blue background. Roads marked with such signs are designated first and foremost for residential activities (eg walking, playing, meeting neighbours) and, in terms of

vehicular use, for local-destination traffic only.

Dutch Government Traffic Regulations specifications state that pedestrians may use the full width of the street for walking and playing, with vehicles allowed to drive only at walking pace. Pedestrians have the right of way in all situations, and cyclists have priority over motorised traffic.

SON points out that driving over Dutch residential roads is not illegal since, officially, they are open to all users. It urges, however, that navigation software should take note of other concerns – specifically respect for the public environment and road safety – which should take priority over finding the shortest route. Not doing so should be considered as unacceptable social behaviour.

The SON test took place in the historic community of Hattem, which lies just south-west of Zwolle, the capital of Overijssel, on the edge of the De Veluwe forests. A city since 1299, it gained official protected urban zone recognition in 1972 for the mediaeval street pattern of its central area and market square, which are highly sensitive to adverse traffic pressures.

The City Council has since invested substantial sums in environmental protection, and restoration and renovation projects. It has also designated a route diverting through traffic around the city centre.

SON fed navigators with addresses near the northern and southern ends of Elskamp, a designated low-traffic residential street which offers a geographically direct route between the two points. It then checked whether devices were programmed to ensure that their recommended routes did not include the Elskamp short cut. All but one failed.

Test 2, on through traffic using residential roads in built-up areas.

SON divided roads into three categories: residential; through (high-speed); and connecting. It sees road selection as typically starting with a residential road leading to a connector which (over relatively short distances) leads in turn to another residential road; longer routes will often include a through road.

Within built-up areas, it says, vehicles should take the shortest possible route to the connector and then stay on it. The route selected should not advise drivers to leave the connector for a short cut via residential roads.

The test involved routes between another two addresses in Hattem: one appropriate, if circuitous; the other a 'short cut' via residential roads that included 19 speed ramps and a designated low-traffic residential area. All but one navigator failed.

Test 3, on through traffic using residential roads in rural areas.

SON sees residential roads in rural areas as 'the most dangerous of all'. Children, pedestrians, cyclists, mopeds and motorised vehicles (including farming equipment) all use the same narrow route which has a maximum speed of 60 km/h.

These roads also tend to be linked to connectors by interconnections rather than roundabouts.

The test was based on feedback from people attending conferences at the Golden Tulip Hotel in Epe, many of whom commented that, after they left the A50 motorway, their navigators directed them through forest lanes.

The test contrasted an appropriate if circuitous route with a short cut via a narrow residential road: A potentially dangerous situation arose at one point on the short cut, where vehicles driving along a road with a maximum speed of 80 km/h have to give way to cyclists on a parallel route.

This did not arise on the correct route, where the maximum speed falls to 50 km/h and an intersection has been adapted. All but one of the navigators failed.

Test 4, on traffic leaving motorways to take a short cut.

On motorways, says SON, vehicles should stick to routes indicated by overhead road signs, and avoid using alternative connectors. Taking such diversions demands a greater degree of manoeuvring to cope with regional traffic.

The test took place on a route leading from Vaassen, just south of Epe, along the A50 motorway towards the A1 in the direction of Deventer. On its way, it passes



From the top:

● The Hattem test 1 site; did guidance between A and B avoid the designated low-traffic Elskamp (shown in red)?

● The Hattem test 2 site; did guidance avoid sending through traffic via built-up residential roads (A>D>B) and instead direct it via the preferable route A>C>B?

● En route for the Golden Tulip; did guidance direct conference-goers leaving the A50 motorway onto forest lanes (A>C) rather than via the preferable route A>B>C?

● On the A50; did guidance encourage motorway traffic to stay on the network (A>C>B) or take a short cut.

Putting navigators to test

through a major intersection at Beekbagen.

This time, only three navigators failed to offer a route via Beekbergen. These suggested, instead, leaving the A50 motorway and taking an often-congested regional connecting road in order to shorten the journey.

Instructions

SON also stresses that navigators should give drivers instructions - eg 'turn left', 'turn right', 'go straight on' - that are in good time as well as recommending correct routes.

Navigation instructions, it says, must all be primarily in spoken form so that drivers can keep their eyes on the road.

If on-screen support is offered, this should only use clear symbols that are legible from 1.5m and can be scanned at a glance. It is undesirable for there to be anything more on the screen than is strictly necessary for navigation instruction.

Not giving lane instructions in good time results in 'searching' behaviour, hesitation and even panic reactions, which can lead in turn at best to traffic queues, and, as worst, RTAs. High driving speeds mean that mistakes almost always lead to potentially dangerous situations for the driver and other road users.

When it comes to congestion-avoiding advice, says SON, it is essential that the navigation software can distinguish between different types of roads - eg to avoid traffic that is trying to escape from a main-road queue being sent along residential access roads and town and village centres. SON is currently taking a close look at the issues of queue information and automatic route recalculation.

The correct route to drive from A to B is, of course, determined partly by the structure of the road network. In The Netherlands, this is based on extensive scientific research, with the aim of making the road network conform to the country's Sustainable Safety policy, versions of which also exist in other European countries. (See panel).

Where next?

Following its research, SON has come out with tough recommendations for official, industry and consumer action. It has urged the Dutch government to ban the sale



Mappers from Tele Atlas on the road. The SON report says that its data is 'sufficient for finding the correct route'

and use of navigation systems with errors of the kind that it has identified, on the grounds of road safety, protection of residential environments, and lack of conformity with the Government's Sustainable Safety policy. The Government, it says, should certify navigation systems.

Manufacturers and suppliers, it continues, should be prepared to warn customers about software errors and issue product recalls. Consumers who have bought a system they suspect to be faulty should return it to the shop where they bought it.

So far, says SON's Gerard Dijkstra, members of the Netherlands Council for Traffic Safety, an advisory board to the Government, agree with its recommendations and are considering next steps. Industry has acknowledged the problem and is working on solving it.



Above: historic Hattem, location of two of the SON
Below: The Golden Tulip, a well-used conference centre.



www.stichtingonderzoek-navigatiesystemen.nl
www.crow.nl
www.navteq.com
www.teleatlas.com
www.nav4all.com

Sustainable safety

Sustainable safety has been a key policy issue within The Netherlands' road transport sector since 1992. The 1997 Start-up programme: Sustainable Safety covenant involved agreements between the Association of Netherlands Municipalities, the Association of the Provinces of the Netherlands, the Ministry of Transport, and the Association of Water Boards.

It contained 24 road safety measures, infrastructural and behavioural, designed for relatively fast implementation, and for paving the way for further initiatives. Key elements included making clear distinctions between major roads and traffic calming areas; and action plans for the definition of urban and rural speed restriction zones (with an emphasis on increasing the numbers of 30km/h ones). In support of lower-speed zones, road authorities were encouraged to use 'sober layouts'.

The Start-up programme aimed to ensure that each road authority categorised its road network according to requirements laid down by CROW, the Dutch national information and technology platform for the infrastructure, traffic, transport and public space.

A second phase led to a number of specific agreements between the covenanting organisations, developed to have the automatic status of planning core decisions.