

Cyclists prefer
asphalt

Safe traffic
without
studded tyres

Electronic signs affect drivers
– but do they affect traffic safety?

Contents

Editorial notes

Nordic Road & Transport Research is a joint publication of six public road and transport research organisations in the Nordic countries, Denmark, Finland, Iceland, Norway, and Sweden. The main objective of the publication is to disseminate research results and news from the institutions, especially to researchers and decision makers. Each institution is responsible for the selection and presentation of the material from its own scope of activities.

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Excitement in Iceland June 2012 | 3

National Geographic team at VTI | 3

Visit the new-look vti.se | 3

EPAM's call for abstract successful | 4

Norway launches quick-chargers for electric vehicles | 4

Still safe without studded tyres | 5

Studded tyres reduce the risk of oversteering | 5

ERS do not affect road safety | 6

Variable message signs reduce travel time but may increase crashes | 6

Ophthal – An ERA-NET road project | 7

Road sweepers can reduce PM₁₀ concentrations | 7

Online maritime risk indication | 8

Improve cycle paths by listening to the cyclists | 8

Fatal accidents in Norway involving young road users | 9

Project overview route 39 coastal highway | 10

Reduction of noise annoyance from M3 around Copenhagen | 10

Measures to reduce GHG emissions and improve air quality | 11



Excitement in Iceland June 2012

The Via Nordica 2012 conference in Iceland 11-13 June next year is shaping up. Apart from 20 parallel sessions arranged by the Nordic Road Association's (NVF) 16 Technical committees there will be five Plenum sessions with many interesting speakers. To name a few.

In the opening session the Swedish historian Gunnar Wetterberg will start with a tale about roads in the Nordic Golden Age and how roads and transport can lead to a new Nordic Golden Age. In the session the focus will be on politics and road authorities, how decisions are made.



There will be a session about how road traffic is going greener and in all likelihood the newly appointed Secretary-General of the International Transport Forum (ITF) Carole Coune will talk about transport's contribution to green growth. Claes Tingvall, the father of Vision Zero will describe the new challenges for public investments and the need for collaboration with NGO and the industry in the Plenum session: Vision Zero goes Global. Mobility management will be Elizabeth Deakin's topic. She is a UC Berkley professor of City and Regional Planning and has, apart from many other things, on several occasions testified for committees of the US Congress and for the California Legislature. "In the future it will be forbidden for safety reasons for people to drive cars," predicts a speaker in Plenum 5: Beyond the Crossroads, is the Future Ours to See? Raul Rojas, is a professor at Berlin's Free University (FU) and he also says: "The cars of today are the horses of yesterday." Be welcome to the 21st Nordic Road Congress in Reykjavik next year. Registration will open in November at www.vianordica2012.is.

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www.nvfnorden.org/

National Geographic team at VTI

Last spring, National Geographic visited VTI's crash track to film a moose crash test. The purpose of the film is to help prevent collisions with animals.

– In the film, we go through what you can do to avoid colliding with wildlife, said the staff from National Geographic.

National Geographic does a lot of research in preparation for stories and films and when they were looking for ideas about animals and collisions they found VTI.

– It's amazing to see that there is someone out there carrying out research on this subject and trying to make life safer in this regard.

The film was screened in the U.S. in August and is coming to Europe this autumn. Information



Scott Lakey, Tomas Karlsson (VTI) and Scott Gog after the crash test had been done.

about broadcast dates will be available on VTI's website www.vti.se once they have been set.

More information: www.vti.se

Visit the new-look vti.se

In September, VTI launched a new website. The new-look vti.se has been designed for improved accessibility and offers more comprehensive information than previously, among others, in VTI's areas of research and offers. It boasts an improved search engine, and it is easy to share information via Facebook, Twitter and e-mail. The website can be found at its usual address: www.vti.se.

Did you know that VTI also has its own YouTube channel? Visit us at www.youtube.com/vtisweden.

EPAM's call for abstracts successful

After a call for abstracts the 4th EPAM conference has been gaining great attention. The scientific committee received more than 120 abstracts from 32 countries on five continents. Most of these proposals will result in papers to the conference.

The effects of increasing traffic, climate change and need of safety as well as the need of well-being have to be met by even more effective road management. A holistic approach covering a lifetime view of road keeping (e.g. LCA) and preserving the assets is essential. The challenge Europe is facing is to use environmentally friendly materials and technologies providing a sustainable and safe road infrastructure system.

Under these requirements the 4th EPAM, European pavement and asset management conference, is to be held in Malmö, Sweden 5-7 September 2012. The objective of the conference will be "Meet the challenges of road infrastructure asset management".

A comprehensive program will be developed including plenary sessions, technical sessions in parallel, technical tour and social events. The technical program includes keynote lectures on selected subjects of relevance for the conference objectives and sessions on different themes covering the main concerns on asset management and pavement engineering.

An indoor exhibition and an outdoor space will also be available for commercial displays and exhibits of equipment. This will provide an opportunity to display and demonstrate new products and equipment to an international audience of experts.

EPAM will be organized by VTI. The conference is the follow up of the previous EPAM conferences in Budapest, Hungary in 2000, Berlin, Germany in 2004 and Coimbra, Portugal 2008.

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Norway launches quick-chargers for electric vehicles



Tom Eirik Nørbech,
NPRA, Norway

In order to make electric vehicles an attractive choice for transport the issues of range and range anxiety have to be dealt with. The establishment of quick chargers can be effective in dealing with these obstacles to increase the number of EV's on the road.

Transnova, a Norwegian governmental program established to curb greenhouse gas emissions from transport, will this year co-fund approximately 40 quick charging stations. Quick charging is defined as the ability to charge up to 80 per cent of battery capacity within 30 minutes. Until now, 19 quick-charging stations have been granted funding, and an equal additional number will be funded within the current calendar year. Transnova contributes up to 45 per cent of the investment costs for the quick charging points. The ceiling for the

contribution is NOK 200 000.

The programme is mainly directed towards private businesses which can demonstrate sound business concepts by investing in quick charging stations with public access. Petrol and service stations, shopping centres, roadside eateries, centrally located car parks and terminal areas will be given priority. Exemptions might be made for large fleet operators in the taxi business or delivery services who commit to making investments in EVs. Exemptions might also be made for municipalities or other public sector institutions who want to offer quick charging stations at well suited spots (concerning both location and number of EVs able to use quick charging in the area). A strategy of distributing quick chargers in clusters or corridors is being chosen, or in clusters which can grow into corridors. The areas given priority are the largest cities (Oslo, Bergen, Trondheim and Stavanger) and the corridors from Oslo and Trondheim towards the Swedish border, as well as corridors from Oslo to some of the smaller cities in the surrounding region.

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Still safe without studded tyres



Rune Elvik, TØI, Norway

Reduced use of studded tyres in five Norwegian cities from 2002 to 2009 has not had a major impact on the number of road accidents. The five cities are Oslo, Drammen, Stavanger, Bergen and Trondheim.

Changes in the use of studded tyres and changes in the number of accidents have been studied in these five cities for the period from January 1, 2002 until August 31, 2009.

The use of studded tyres was reduced in all cities except Stavanger. For all five cities as a group, the number of police reported injury accidents increased by 2 per cent during the winter season as a result of reduced use of studded tyres.



Photo: Harald Aas

The number of insurance reported accidents (of which more than 90 per cent are property damage only accidents) was almost unchanged. The results of the study are highly consistent with the results of a similar study reported by the Institute of Transport Economics in 2000.

In the study, the use of studded tyres was reduced in four of the five cities.

More information: TØI report 1145/2011, www.toi.no
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VTI study:

Studded tyres reduce the risk of oversteering



Mattias Hjort, VTI, Sweden

64 per cent of the fatal accidents that occur on winter roads are caused by the vehicle skidding. Of these, 82 per cent are so called oversteering accidents, i.e., accidents where the vehicle has started to rotate.

VTI has carried out a study in order to test how different types of tyres affect stability in slippery conditions. For this study the institute developed a test method based on NHTSA's sine with dwell manoeuvre. The test method uses a steering controller where a steering manoeuvre causes severe oversteering even on slippery surfaces such as ice and snow.

The study shows that studded tyres have a clear advantage on black ice. Even considerably worn tyres, with only a few studs left, do well compared to non-studded tyres. A worn studded tyre is

comparable to a new non-studded Nordic tyre and clearly better than a new Central European tyre. Central European tyres stand out on this surface by generating the greatest amount of oversteering. On surfaces with higher friction, such as uneven ice and snow, it is tyres with the least traction which generate the lowest amount of oversteering.

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Full report: www.nordicroads.com

ERS do not affect road safety



Tania Dukic, VTI, Sweden

Electronic regulatory signs, ERS, do not affect road safety when it comes to accidents, speed and traffic flow. VTI still recommends, however, that the effects of visual distraction be considered and further examined before any decision is taken on whether ERS are to become a reality on Swedish roads.

Commissioned by the Swedish Transport Administration, VTI has drawn up a document to be used in deciding whether ERS are to be permitted on Swedish roads. Animated images as well as the placing of the signs greatly influence driver behaviour on passing ERS. In darkness and in adverse weather conditions, such as rain and fog, the light can be experienced as blinding, which makes driving more difficult, especially for older drivers.

VTI's studies show that ERS primarily burden a driver's vision modality. The factors which have the most negative effect on road safety are animated images, the placing of the signs, weather conditions and darkness.

A comparison of traffic before and after the installation of ERS does not show anything that indicates road accidents being caused by ERS. However, surveys of visual behaviour as well as



Photo: VTI/Tania Dukic

driving behaviour show several cases of visual distraction on passing ERS. Effects on speed, braking or lateral position were not presented. The majority of drivers who completed a questionnaire after driving test were negative to the use of ERS on the side of motorways.

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Variable message signs reduce travel time but may increase crashes



Michael W. J. Sørensen, TØI, Norway

Travel times are likely to be reduced and crashes to increase when incident information is shown on variable message signs (VMS) in the Norwegian town Trondheim. The reduction in travel times is not sufficient to outweigh the increased costs of crashes.

The effects of six variable message signs (VMS) in the Norwegian town Trondheim (on travel times, road safety and the environment) were investigated using simulations, user surveys and analyses of speed data.

According to the results from traffic simulations, travel times are likely to be reduced and crashes to increase when incident information is shown on VMS.



Photo: Michael Wehik Jøger Sørensen

Variable message sign outside Trondheim.

However, the reduction in travel times is not sufficient to outweigh the increased costs of crashes.

No positive safety effects were found of congestion warnings, possibly because the VMS were not working as intended.

Most road users regard VMS as useful, even though only a few change route as a result of the information given to them. Some will change route in case of incident, but not necessarily when travel times or information on congestion are given.

Using VMS to provide information about alternative routes and driving conditions would improve their usefulness.

The report presents the results from a project in the programme "ITS on the road towards 2020".

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More information: TØI Report 1153/2011, www.toi.no

Ophthal – An ERA-NET road project



Jørgen Kragh, DRI/DRD,
Denmark

The European ERA-NET road consortium initiated a research project "Optimization of Thin Asphalt Layers, (TAL)" which was carried out by the Danish Road Directorate/Danish Road Institute, the Belgian Road Research Centre and VTI, the Swedish national road and transport research institute.

The final report evaluates TAL properties, comparing with conventional surfacings such as DAC 11 or SMA 16, and gives guidance on where to use TAL and where not to. TAL in general



come out somewhat better; for example concerning costs, use of nature resources, rolling resistance, and traffic noise emission. However, there may also be problems, for example concerning durability. If studded tyres are used the wear of TAL is usually significantly greater than the wear of surface layers with larger maximum aggregate sizes.

The main conclusions are that the application of TAL is certainly worthwhile, in particular as a renewable "skin" on a stable road construction having sufficient bearing capacity. The skin can

be optimised to serve road users' need for sufficient skidding resistance and other important functions and it can be replaced quickly and at a low cost when the exposure to weather and traffic makes it necessary. The use of TAL seems to be increasing due to the needs of road administrations for cost-effective road infrastructure maintenance, coinciding with needs for lower traffic noise levels in residential areas.

The life cycle cost of TAL compared with the cost of thicker overlays such as DAC 11 or SMA 16 cannot yet be assessed accurately. Optimization of TAL may be attempted by varying the mix design and the construction techniques applied. The effects of such development should be investigated extensively. The report gives recommendations for further experiments.

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Road sweepers can reduce PM₁₀ concentrations



Mats Gustafsson, VTI,
Sweden

Road dust is at times a source of high concentrations of inhalable particles (PM₁₀) in road and street environments, causing environmental quality standards for these particles to be exceeded. New sweeping techniques are currently displaying good potential to remove PM₁₀ in laboratory conditions.

In order to reduce PM₁₀ concentrations, various methods have been used – reducing the use of studded tyres, reducing traffic speeds and introducing the use of

dust binding agents such as hygroscopic solutions. Street sweeping has long been described as a possible measure, but discouraging results from both Swedish and international studies have shown that the sweeping technique and strategy of today seldom give any positive effect on PM₁₀ concentrations. Despite this, however, a recent study conducted by VTI shows that sweepers can help to reduce concentrations of PM₁₀ in environments where resuspension is a significant source of particles. Sweeping, however, can only have an effect on the PM₁₀ that has been resuspended from the road, while PM₁₀ consists of particles both from direct emissions and from resuspension.

Even though the effect of sweepers on PM₁₀ concentrations was difficult to trace, the results of the present study are cautiously optimistic. Further improvements of sweeping technique and strategy should be able to help solve problems of efficiency that have arisen. VTI research-

ers suggest the following examples of areas which should be improved:

- methods used in humid conditions or to avoid sweeping in such conditions
- the time sweeping is carried out, for example by sweeping more frequently and also earlier in the spring
- coordination and collaboration with other road operations and maintenance
- parking policy and the enforcement of parking prohibitions. This would increase the chances of effective sweeping
- techniques for the uptake of PM₁₀
- techniques which avoid dust depots being placed out on the road.

In addition to the PM₁₀ efficiency of sweepers, noise, emissions, flexibility, speed and energy consumption are important parameters that must be considered for the choice of sweeper.

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Full report: www.nordicroads.com

Online maritime risk indication



Markus Porthin, VTT, Finland

VTT is developing an online risk indication system which aims to support the work of Vessel Traffic Service (VTS) operators by pinpointing potential risk situations.

The surveillance of vessel traffic offered by VTS centres is heavily dependent on the skills and experience of the operator. Although the operators are properly trained, human error is always possible, as shown e.g. by the Propontis accident in 2007 in the Gulf of Finland, where the operator failed to notice a fatal route mistake by a tanker.



The Intelligent Water-borne Risk Indication System (IWRIS) uses positional data on ships from the Automatic Identification System (AIS) to learn their normal routes and behaviour. Using this information, the system can predict the future routes of the



The coloured squares indicate potential collision risk between the vessels.

ships e.g. for the next 15 minutes. The system alerts the user whenever the probability of two or more ships coming too close to each other exceeds a given threshold. An alert is also given when the behaviour of a ship deviates from the norm.

The IWRIS system has been tested at Helsinki VTS centre. According to the tests, although the system requires further development, it was seen to have potential in aiding the work of the operators.

The research is funded by the Finnish Transport Agency as part of the EU Baltic Sea Region Programme project EfficienSea.

More information: www.efficiensea.org

Improve cycle paths by listening to the cyclists



Anna Niska, VTI, Sweden

More than 40 per cent of single-cycle accidents can be related to operation and maintenance, and single-cycle accidents account for more than 70 per cent of all bicycle accidents. In order to improve cyclist safety, reducing road slipperiness is the most important factor.

If the bicycle is to compete with the car in terms of travel time, the travel time ratio for bicycle and car, including parking and running time for the motorist, should not exceed 1.5. An uneven surface, as well as other operation and maintenance factors, such as broken

glass, gravel, slipperiness and inadequate snow removal, extend the travel time for cyclists.

If cyclists are free to choose, they prefer asphalt over concrete, paving stones and gravel. Asphalt provides a hard, smooth and waterproof surface with good friction and low rolling resistance. It is also the surface which is easiest to maintain and shows the best results for snow removal.

Greater awareness increases efficiency

In addition to listening to cyclists' needs, operation and maintenance measures can be made more efficient through better knowledge of the cycle path network and planning. If the measures are adapted, problems with specific routes can be reduced as well.

Some problems can be avoided by taking operation and maintenance into account already in the planning and construction stage. Knowledge of the cycle path network, where the largest bicycle flows are found, where many accidents

occur and where road conditions are often poor, will make it possible to streamline operation and maintenance measures. It is simply a question of planning measures to be implemented when and where they are needed most.

Correct dimensioning a prerequisite

In order for cycle paths to be maintained in an efficient manner, it is essential that they have been dimensioned in accordance with current regulations, are of good quality and are not used by heavier vehicles than they are dimensioned for. Due to inadequate dimensioning, only a few crossings of a heavy vehicle can destroy a cycle path.

In addition to exceeded weight, the most common causes of cycle path degradation are frost, root damage and infrastructural operations.

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Fatal accidents in Norway involving young road users

Non-use of safety belt, speeding, drink driving, reckless driving, and lack of experience and driving skills are some of the main reasons why young male drivers in particular have a very high fatality risk. The biggest problems related to motorcycle and moped accidents are non-use of helmet, speeding, drink driving, excessive belief in own skills, and lack of experience.

Young men have a very high accident risk.



Michael W. J. Sørensen,
TØI, Norway

Since 2005, the Norwegian Public Roads Administration's (NPRA) five regional accident analysis groups (UAG) have studied all fatal accidents in depth. 1,058 fatal accidents have been studied in 2005–2009. In recent years these UAG reports have been used in several research studies.

In 2010, the Institute of Transport Economics (TØI) has analysed 260 fatal accidents where a young driver (16–24 years) of a car, motorcycle or moped precipitated the accident. This group, especially young men, have a very high accident risk. The project was funded by NPRA.

Of the 1,058 fatal accidents in 2005–2009, 361 are fatal accidents involving a young road user. These accidents resulted in 415 fatalities of which 283 were 16–24 years old. There were 225 men and 58 women.

In the analysis we zoomed in on the 260 fatal accidents in which a young driver of a car, motorcycle or moped most likely precipitated the accident. There were 215 car accidents, 37 motorcycle accidents and 8 moped accidents.

For the 215 car accidents with young drivers the following factors seem to be the most important safety problems:

- non-use of safety belt
- speeding
- drink driving
- reckless driving
- too much faith in own skills
- partying in the car
- lack of experience and driving skills
- non familiarity with the vehicle.

If accidents involving car drivers aged 18–19 and 20–24, respectively, are compared, a positive trend emerges regarding lack of experience and driving skills, not being familiar with the car, and lack of information gathering, while a negative trend applies to drink driving, partying in the car, no safety belt, reckless driving, and too much faith in own skills.

For the 37 fatal accidents involving young motorcycle drivers the biggest driver-

related road safety problems seem to be the following:

- speeding
- non-use of helmet
- drink driving
- having no driving licence
- lack of experience
- too much faith in own skills.

Comparing the three age groups of young motorcyclists (16–17, 18–19 and 20–24 years), one notes that certain safety problems increase with age: too much faith in own skills, drink driving, non-use of helmet, and having no driving licence. For motorcyclists aged 20–24, drink driving and non-use of helmet are particularly important risk factors.

The biggest road safety problems related to the eight moped accidents are non-use of helmet, speeding, drink driving, and too much faith in own skills.

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More information: TØI Report 1117/2010. www.toi.no

Project Overview Route 39 Coastal Highway



Olav Ellevset, NPRA,
Norway

The E39 Coastal Highway in Norway is a part of the European Trunk road system. The route runs along the western coast of Norway from Kristiansand in the south to Trondheim in central Norway, and is about 1,100 km long.

Today there are still eight ferry connections along the route, and most of them are wide and deep fjord crossings requiring very high investments and development of new technologies for crossing them. The newly initiated E39 Coastal Highway project has been established to explore the benefits for industries and the society at large, and to define the technical challenges and possibilities related to developing the route into a more efficient corridor with no ferry connections. The current project design will reduce the travel

time along the coast from Kristiansand in the south to Trondheim with 7–9 hours to about 12–13 hours.

The project has currently four components:

- 1 **The Society Component** will substantiate the national, regional and local impacts that are likely to come from major reductions in travel time. Included are short term impacts from reduced transport costs, and wider impacts due to long term structural changes of the society.
- 2 **The Fjord Crossings Component** will explore the technical feasibility of bridge crossings of the remaining fjords. Whereas some crossings may be up to about 7 km long, typical depths would be around 500–600m. However, Norway's longest fjord Sognefjorden has been used as a technical pilot site for considering extreme structural requirements, and at the study point the fjord is 3.7 km wide and 1,250 m deep. Technical options are suspension bridges, floating bridges, submerged floating tunnels, and combinations of those three main concepts.
- 3 **The Energy Component** will explore the feasibility of combining bridges with electrical power generation from



Photo: NPRA

renewable sources like wind, waves, currents and solar.

- 4 **Implementation Strategies and Contracting Options Component** will look into various implementation options for such a mega project, and will particularly consider to which extent experiences of project sizes and contracting modes in the oil and marine sectors would be relevant and beneficial also for the transport sector.

The project is commissioned by the Ministry of Transport and Communications, and is managed by the Norwegian Public Roads Administration. The project intends to come up with its recommendations to the Government in September 2012.

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Reduction of noise annoyance from M3 around Copenhagen



Hans Bendtsen, DRI/DRD,
Denmark

Due to the increase of traffic, Motorway M3 around Copenhagen has been widened from four to six lanes on a 17 km long section. Before the widening of M3, there were 1.5–2.0 metres high noise barriers and as part of the rebuilding project, four metres high noise barriers were constructed and noise reducing road pavements were laid. An investigation on noise annoyance from road traffic noise was carried out by the Danish Road Directorate before and after the rebuilding project. The percentage

of very and extremely annoyed respondents decreases from thirty seven per cent in the pre-survey to sixteen per cent in the post-



Photo: DRI/DRD

survey. The percentage of moderately annoyed is nearly constant with thirty per cent and twenty seven per cent, respectively.

Finally, the percentage of slightly or not annoyed respondents increases from thirty three to fifty seven per cent from the pre to the post-survey. As a total, this is a remarkable reduction of the perceived noise annoyance in the survey areas around Motorway M3 for the new situation after the widening of M3.

Hans Bendtsen, hbe@vd.dk
Full article and report: www.nordicroads.com



Photo: NPRA

Measures to reduce GHG emissions and improve air quality

The Norwegian Public Roads Administration's Eastern Region is committed to reducing CO₂-emissions from road transport. At the same time, air quality in urban areas of the region is poor. Measures that can improve air quality locally, and at the same time reduce GHG emissions globally, so called synergy-measures, are examined in the report "Measures with synergy-effects for air-quality and climate".



Ingeborg Olsvik, NPRA, Norway

The report was developed by Helena Axelsson and Mats Larsen in the NPRA, Eastern Region.

The report focuses on areas under the NPRA's responsibility and authority; driving pattern, the number of vehicles on the road and the number of driven kilometres. The Eastern region includes five of Norway's 19 counties, and the largest proportion of driven kilometres in the country. The report focuses on the urban areas Lillehammer, Oslo, Bærum and Fredrikstad.

Synergy-measures to improve air quality locally and lower emissions globally

The measures examined in the report are divided into four types: 1) coordinated area- and transport planning, 2) queue-pricing, 3) low-emission zones and 4)

lowering of speed limits. The study found that not all synergy-measures are equally suited for all locations. Finding appropriate measures that are tailored to the locations in which they are implemented is essential

The measures under "coordinated area- and transport planning" include accommodating for more energy efficient transport forms like cycling, public transport and walking. These measures will be the most fundamental and efficient synergy measures in the long run.

Experiences from several countries show a predominantly positive attitude among road users to measures involving traffic management. However, the measures will only be observed if they are compulsory and if they are followed through.

Lower speed improves air quality and reduces accidents

Previous studies have shown that speeds between 50-70 kmph give the lowest emission rates per kilometre. Reducing speed limits in Oslo during the winter, from 80 to 60 kmph, has not only resulted in improved air quality by reducing particle-matter

concentrations; it has also reduced the number of injury accidents on the affected stretches of road dramatically.

On average, a 20 kmph speed limit reduction will induce drivers to reduce their speed with 5–10 kmph. This has reduced the amount of airborne particles. The effect on GHG emissions was evaluated as positive, but marginal. The reduction of traffic related injury accidents, however, was significant. The Ring 3 ringroad around Oslo had a reduction of injury accidents of 30 per cent, while the Riksveg 4 stem road saw reductions of 50 per cent in the period between November and March.

Thus, measures that were implemented to reduce local pollution have had positive effects on other national transport political objectives. These results are significant, and give grounds to examine measures of synergy effects for environment and traffic safety more closely.

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NORDIC

ROAD AND TRANSPORT RESEARCH 



A joint publication with the latest research findings of six public research organisations in Denmark, Finland, Iceland, Norway and Sweden.

FINLAND

TECHNICAL RESEARCH CENTRE OF FINLAND (VTT)

VTT Technical Research Centre of Finland is a contract research organisation with a staff of 2,800. In this joint publication, the VTT expertise areas cover research and development of transportation, logistics and road structures. The work is carried out in five research groups employing a staff of 60.

DENMARK

DANISH ROAD DIRECTORATE (DRD) DANISH ROAD INSTITUTE (DRI)

The Road Directorate, which is a part of The Ministry of Transport, Denmark, is responsible for development and management of the national highways and for servicing and facilitating traffic on the network. As part of this responsibility, the Directorate conducts R&D, the aim of which is to contribute to efficient road management and to the safe use of the network. The materials research component is carried out by the Danish Road Institute.

SWEDEN

SWEDISH NATIONAL ROAD AND TRANSPORT RESEARCH INSTITUTE (VTI)

VTI is an independent and internationally prominent research institute in the transport sector. Its principal task is to conduct research and development relating to infrastructure, traffic and transport and its operations include all modes of transport. VTI has a total of some 200 employees. VTI's head office is in Linköping, with branch offices in Stockholm, Gothenburg and Borlänge.

ICELAND

ICELANDIC ROAD ADMINISTRATION (ICERA)

The ICERA's mission is to provide the Icelandic society with a road system in accordance with its needs and to provide a service with the aim of smooth and safe traffic. The number of employees is about 290. Applied research and development and to some extent also basic research concerning road construction, maintenance, traffic and safety is performed or directed by the ICERA. Development division is responsible for road research in Iceland.

NORWAY

NORWEGIAN PUBLIC ROADS ADMINISTRATION (NPRA)

The Norwegian Public Roads Administration is one of the administrative agencies under the Ministry of Transport and Communications in Norway. NPRA is responsible for the development and management of public roads and road traffic, as well as the Vehicle Department. This responsibility includes research and development of all areas related to road transport and the implementation of R&D results.

NORWAY

INSTITUTE OF TRANSPORT ECONOMICS (TØI)

The Institute of Transport Economics is the national institution for transport research and development in Norway. The main objectives of the Institute are to carry out applied research and promote the application and use of results through consultative assistance to public authorities, the transport industry and others. TØI is an independent research foundation employing about one hundred persons.

Contact

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