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EVALUATION OF INLAND TRANSPORT INFRASTRUCTURE PROJECTS

**PHASED APPROACH TO TRANSPORT INFRASTRUCTURE
DEVELOPMENTS**

Transmitted by the Governments of Finland and Norway

Note: Following the request by the Working Party on Transport Trends and Economics, at its fifteenth session (TRANS/WP.5/32, para. 28), the secretariat approached a number of member countries as well as international organizations in order to collect the available methodologies on a phased approach to transport infrastructure developments. Replies received by member Governments are reproduced below.

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FINLAND

The improvement of main roads in stages in Finland (A summary of Finnra's report 34/2002)

A study was carried out in order to compare various implementation models for the improvement of ordinary two-lane roads in stages. The objective was to compare the cost-effectiveness of the implementation models with regard to implementation and maintenance cost on the one hand and benefits like traffic safety, traffic flow, business competitiveness and transport economy on the other. The calculation period was 40 years.

The following road types were compared:

- An ordinary two-way lane;
- An ordinary two-way lane with single sections for overtaking;
- A wide lane road;
- A wide shoulder road;
- An overtaking lane road;
- A narrow four-lane road;
- An ordinary motorway.

Implementation models consisted of the improvement of the present road in 1-2 implementation stages or the building of a new road. The implementation paths were chosen so that the selected road types could be upgraded in a way that the investments made in the previous stages did not need to be dismantled.

The results indicated that in Finland it is worthwhile to develop the long two-lane sections in the long term partly as ordinary two-lane road types and partly utilizing new road types. Of the undivided new road types, an overtaking lane road equipped with a median barrier, a wide two-lane road, and an ordinary two-lane road with overtaking lane sections and a median barrier particularly were considered. The cost-effectiveness of these types differs in respect of different maintenance objectives and depends mainly on the width, geometry and traffic volume of the presently existing road.

Overtaking lane roads equipped with a median barrier or single overtaking lane sections equipped with median barriers are feasible improvements especially for roads, which presently are narrow, busy and have poor geometry. Significant benefits can be achieved, especially in traffic safety, because serious head-on collisions can be avoided. The smoothness of traffic flow improves also by way of improved overtaking opportunities. No major differences were found regarding the positioning of the single overtaking lanes (in parallel or consecutively). Implementation in parallel is slightly cheaper but the safety impacts are not quite as good as in the consecutive implementation model. Positioning in parallel can, however, be justified, for example, for environmental reasons or if the road section will later be upgraded to a full four-lane cross section.

A wide shoulder road is a feasible improvement in cases where the existing road is wide, has a good geometry and is at least satisfactory regarding its safety record. In such cases the implementation costs are moderate when compared to new road types and the impacts are

positive. However, if the traffic volume is high (the daily volume is 8,000 vehicles or more) it can be stated that the wide lane road is clearly a better solution.

When busy ordinary two-lane roads are improved into dual-carriageway standards, it is feasible to consider narrow four-lane roads as well as ordinary motorways, which are clearly cheaper solutions than high standard motorways and still have almost as good safety impacts.

It can be concluded that, from the overall cost-efficiency point of view, in most cases it is reasonable to head directly for the final target stage, although in some cases, for example, due to insufficient financing, it may be reasonable to choose an intermediate solution to avoid serious safety or level of service problems. In these cases, the feasibility of the implementation path must be considered from the construction-engineering point of view as well.

If the improvement need is purely safety driven, it should always be checked if significant safety improvements could be achieved by smaller safety improvements. These improvements are usually much cheaper and typically they involve actions like:

- Grade separated pedestrian and bicycle crossings;
Improvements at intersections (channelling, staggering, give-way spaces, view area improvements, etc.);
- Road lighting with yielding poles.

The study concludes that alternative implementation models can be assessed with regard to different road maintenance objectives and they proved to be cost effective. The cost-effectiveness, however, is not the only or even the best indicator for such improvements; therefore, the final decisions for the staged implementation procedure must be based on general transport policy objectives.

Railways

In Finland the same kind of principle as described above has also been used in railway investment. In Finland most track sections are single tracks (only the main railway lines are two-track sections). If the volumes are insufficient to back up two track solutions, additional capacity can be achieved in a much cheaper way by constructing overtaking and passing track sections.

In the surrounding Helsinki Metropolitan area, commuter train traffic has increased significantly, which lead to insufficient track capacity on the existing main tracks. This capacity problem has been solved recently by introducing the city track concept, which means that additional tracks dedicated only for commuter trains have been constructed next to the main railway line. This has allowed a significant increase in commuter train supply as well as freeing capacity in long distance traffic.

NORWAY

Phased approach to transport infrastructure development in Norway

1. Process

The Norwegian approach to transport infrastructure planning and other more policy related transport issues are based on the development of the National Transport Plan (NTP). The current plan covers the years 2002 to 2011, with emphasis on the first four years (i.e. 2002-2005). The development of NTP is an ongoing process and the next document will be forwarded to the Norwegian Parliament early in 2003. This document will cover the years 2006 -2015, with a similar emphasis on the years 2006-2009.

The National Transport Plan covers the modes road, rail, air and sea, and both infrastructure planning and policy measures. The Ministry of Transport and Communications and the Ministry of Fisheries are responsible for developing the plan. The process starts with guidelines to the National administrations (i.e. Norwegian Public Roads Administration, Norwegian National Rail Administration, Avinor AS, The National Coastal Administration) which make their joint proposal to an infrastructure plan to the Ministries. The National administrations do not need to agree on every measure, but must make their disagreement visible in the proposal. The counties and larger cities are involved in this public process, both by making “strategic analysis” as input to the process and through formal comments to the final proposal from the Administrations. The infrastructure plan is based on economic frames for planning purpose (i.e. not binding, but with governmental approval). Based on this process and further deliberations in Ministries and Cabinet, a report is forwarded to the Parliament. The emphasis in the report is on multimodal corridors, terminals and cities. Based on the Parliament decisions, the National administrations make their more detailed action plans.

The important considerations in the National Transport Plan are the need for an effective, secure and environmental-friendly transport system. To do so, there is an obvious need for a well-balanced policy. An important measure is “to get the prices right”, i.e. internalization of external effects.

A multimodal medium/long term plan such as NTP gives the opportunity to investigate the possibilities and measures for creating a modal shift, i.e. reducing the share of road traffic. Other considerations are the number of small local airports in sparsely populated regions. Investments in road infrastructure may be an alternative to keeping some airports in operation. Both the timeframe of the plan, the multimodal character of the plan and the dual objective of policy development and investment plan makes this possible.

2. Methodology

Local and regional land-use and transport planning are a responsibility for regional authorities and municipalities, and not an important aspect in NTP. However, such planning forms parts of the basis for the National plan.

On the regional level, regional transport models are being used. Important tools on the national level are the multimodal national transport models (persons and goods). These are used to make traffic forecasts and to evaluate the effect on transport flows of changes in cost and infrastructure. The output of the transport models are also used as input to other models, for instance to calculate environmental impact and as input to cost-benefit analysis. The transport models can be used to calculate both the effects of infrastructure developments and policy measures. In addition, the transport models help to secure consistency in the plan.

Investment projects presented in the plan are analysed through a well-developed system of social cost-benefit analysis.

The proposal from the National administrations must (according to the guidelines from the Ministries), in addition to the investment plan, show the effect on transport cost (both user cost and social cost), safety (changes in numbers of fatalities and injuries), environmental (parameters including different types of pollution and noise).

An important part of national transport planning is the continued evaluation of the process, as seen from the different participants, including the Parliament. The results of the evaluation are part of the basis for the next revision of the National Transport Plan.
