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Evaluation of projects regarding routes to schools in the Municipality of Odense.

SUMMARY AND CONCLUSIONS

Background

Since the end of the 1970s, studies of routes to schools have been conducted within the Municipality of Odense. Local authorities in Denmark have a statutory duty to make dangerous routes to schools safe, and an obligation to provide suitable transport while measures to make these routes safe are implemented. In the Municipality of Odense, a systematic programme of studies of 45 schools has been conducted. Every year a sum is earmarked in the municipal investment budget to cover projects relating to school routes.

Such projects are also referred to as traffic calming projects, and encompass all manner of road constructions of diverse scope and nature. Between 1986 and 1999 the municipality undertook a total of 108 projects concerning routes to schools. These included low-speed roads, traffic calming, various types of tracks and paths for cyclists and pedestrians, various solutions at intersections, paving, traffic lights, roundabouts, raised surfaces and much more besides.

The Municipality of Odense wished to commission an evaluation of such projects carried out between 1986 and 1999. In particular, they required a statistical analysis of the overall effect of these projects regarding routes to school in terms of accidents and personal injuries, as well as a break down of personal injuries in regard to means of transport, age, and the school route project initiative.

The municipality provided essential data for the evaluation in the form of lists of the projects relating to journeys to school, accident statistics, road layout plans and maps etc.

The projects related to routes to school

All of these projects were carefully studied, and then divided into four main categories: intersections, road sections, paths and networks.

The intersection projects were set up either at a particular intersection, and in fact relate to a small physical area.

The projects for entire road sections involved projects for both long and short stretches of road. For the purposes of the evaluation, these have been defined as projects involving a minimum length of 200 metres of road. It has proved necessary to sub-divide these projects related to sections of road into three categories: normal stretches of road, stretches with initiatives at single points, and projects including intersections. A normal section of road would, for example, be a low-speed road. A project under the category of sections of road with initiatives at individual points could be a centre traffic island on a main road.

Stretches including intersections include one or more projects related to routes to school set up over an entire stretch and one or more projects implemented at intersections, where projects are included within the same specified physical area with a preceding and following overlap. Projects relating to paths include separate bicycle tracks, while network projects include those which are considered to affect a network of roads. In general, projects relating to routes to school which combine a physically limited area together with a preceding or subsequent area have been grouped together as an "object of study".

In the evaluation, a total of 104 projects related to routes to school have been aggregated into 80 "objects of study". This breaks down into 19 intersection projects (objects of study), 20 projects relating to routes to school, 60 projects on sections of roads (objects of study), giving a total of 83 projects relating to routes to school and one network project including one project relating to routes to school. No projects relating to paths were included in the evaluation. It should be mentioned, however, that despite this, the evaluation includes a couple of projects relating to routes to school which include separate bicycle tracks. The bicycle path projects are simply included as part of a project relating to a section of road.

Method

The traffic safety effect of the projects relating to routes to school has been calculated on the basis of an assessment of accidents before and after the projects, balanced against a control group to correct for the general accident trends. This control group consisted of accidents which occurred in municipalities comparable to Odense in terms of population development and level of urbanisation. On the basis of an analysis of population development in a number of towns, it was decided to establish a control group consisting of the municipalities of Esbjerg, Kolding, Randers, Vejle, Aalborg and Århus.

A comparison of the trends in accidents reported to the police in the towns of the control group and other roads in the Municipality of Odense not affected by the projects relating to routes to school demonstrated that the control group was well chosen and applicable. As mentioned, the evaluation was conducted in the period 1986 to 1999. A "before and after" period of equal length was used for each individual project, although the periods used for the various projects varied between one and three years.

The Municipality of Odense made hospital records available to study the accidents which were not reported to the police. Although a large number of these accidents could be identified as having taken place on particular roads, for many, it was not possible to identify whether the accidents had occurred within the physical confines of a project area. In addition, for the control group, only information regarding accidents reported to

the police were available. Thus, as the specifications for accidents recorded by the police and by the hospital were different, only accidents registered with the police were included in the statistical test of the traffic safety effect of the projects regarding routes to school. It should be noted, however, that for the projects studied, a report of the number of accidents only registered at hospitals has been provided.

As described above, the individual projects relating to routes to school were divided into four types, and each was given a definition concerning how the projects were physically demarcated. It was also necessary to be able to show whether an accident was specifically geographically linked to a particular project or not.

The effect of the school routes projects has been assessed under the categories of: all accidents; accidents involving material damage, and accidents involving personal injury. The effect on personal injuries has further been assessed in terms of minor, serious (fatal or serious injury) and all personal injuries. Personal injuries have been further categorised for 0-16 year-olds, 17 plus year-olds, pedestrians, cycles/mopeds and other means of transport. In addition the effect of the projects has been broken down by type of initiative.

Results

The school route projects have been aggregated as 56 objects of study using accidents registered with the police. For half of the objects of study, traffic safety has deteriorated, while for the other half it has improved. In 25 of the 104 projects studied there were no accidents either before or afterwards.

The school route projects have significantly reduced the number of accidents registered with the police, in fact by 18%, corresponding to 17.7 accidents a year. A falling trend in personal injuries was also identified, a fall of 20%, or 8.8 personal injuries a year. Using the financial model of the Road Directorate from 2000, this means that the projects have saved society DKK 15.7 million per year in the costs of accidents.

The school projects have especially reduced serious accidents. Traffic safety has been improved for pedestrians, motorists and motor bikers, whereas the traffic safety for cyclists and moped users has not been improved by the projects. Children and adults have benefited equally in terms of traffic safety as a result of the projects.

The categorisation of the projects relating to routes to school clearly shows that measures such as traffic-calming, low-speed roads, speed bumps, raised surfaces and signals have been most effective in improving traffic safety. The relatively few projects using these account for two-thirds of the effect.

The traffic safety effect of projects involving cycle paths, tracks and stripes show significant statistical differences, where some projects have made traffic safety considerably worse while others have produced a considerable improvement.

Recommendations

The evaluation shows that introducing low-speed roads, traffic calming systems, raised intersections and various types of signalling systems are the initiatives which have resulted in the most benefit in terms of traffic safety. Thus, the recommendation is to

focus on this type of speed reducing measure, as well as the system of regulation at intersections.

For the projects relating to routes to school to provide the best results in terms of traffic safety, the investigation of accidents should be accorded a higher priority, rather than just using the students' expressions of perceived danger.

For projects involving cycle paths to produce the best results, it is recommended that a comprehensive analysis of those already carried out be undertaken. Such an in-depth analysis will make it possible to identify the reasons why some of these projects have been very successful, while others have actually reduced the level of traffic safety.