

Sammendrag:

Evaluation of new arterial roads in Oslo - effects on accidents, accident severity and accident patterns

Four Oslo-projects have been evaluated

During the 1990's a number of new arterial roads were built in Oslo. In this report four of these are evaluated, with respect to effects on road safety. The project has been funded by The Public Roads Administration in Oslo.

The four projects that have been evaluated are:

- ?? Festningstunnelen (new tunnel, opened in 1990)
- ?? Granfosstunnelen (new tunnel, opened in 1992)
- ?? Sinsen and Storo (upgrading two major interchanges and widening the road, completed in 1994)
- ?? Ekebergstunnelen (new tunnel, opened in 1996).

New urban arterial roads primarily affect traffic that previously used the old main road, but in some cases it may also have an effect in a larger area. The study has attempted to assess this, by studying impacts in two areas of influence:

1. The main road link, which consists of the old main road and the new arterial road (both roads included in the after-period)
2. The area likely to be affected. The city precinct in which the new arterial road is located has been used as area of influence.

Method

The evaluation was designed as a before-and-after study, using the number of accidents in the city of Oslo as comparison. The study controlled for regression-to-the-mean, using the Empirical Bayes method. The before-and-after study covers different years for each project. For each project both the before- and after-periods comprised four years of data. The construction period was excluded from the before- and after-periods for all four projects.

Data on all accidents involving personal injury (police reported) and the amount of traffic on the different roads in Oslo was collected and analysed. Data on the number of persons involved and the severity of their injuries, and the type of accident was also collected.

Festningstunnelen

There has been an increase in the number of accidents on the arterial road of about 20 percent (not statistically significant at 5 percent level). At the same time the amount of traffic has increased. Despite the fact that the number of accidents has increased, accident rate (the number of injury accidents per million vehicle kilometres of travel) has been reduced. The number of severely injured road users has gone down, and accidents on the new arterial road are less severe than accidents in the rest of Oslo. Pedestrian accidents were most strongly reduced, but the number of rear-end collisions has increased.

In the precinct Sentrum (Central Business District of downtown Oslo), where Festningstunnelen is located, the number of accidents was reduced by almost 30 percent (statistically significant at the 5% level). The number of severely injured road accident victims was also reduced. The number of accidents involving pedestrians was reduced by 50 percent.

The results indicate that some of the traffic may have been transferred from the local roads in the precinct to the new arterial road. Regrettably, reliable traffic counts are available for the arterial roads only.

Granfosstunnelen

The number of accidents was reduced by nearly 15 percent (not statistically significant at the 5% level). Accident rate was also reduced. At the same time the number of severely injured accident victims increased (not statistically significant at the 5% level). The reduction of the number of accidents (in absolute terms) was greatest for pedestrian accidents and rear-end collisions, and the increase was greatest for head-on accidents and single-vehicle ran-off-the-road accidents.

In the precinct of Ullern (a mainly residential area in the western outskirts of Oslo) the number of accidents increased by 10 percent (not statistically significant at the 5% level). The number of severely injured accident victims also increased, and accidents are more severe than in the rest of Oslo (not statistically significant at the 5% level).

Table S.1: Summary of results of evaluation of road safety effects of new urban arterial roads in Oslo. Percentage changes

Effect on:	Percentage changes – main road link			
	Festningstunnelen	Granfosslinjen	Sinsen/Storo	Ekebergtunnelen
Vehicle kilometres	+40	+6	+20	+15
Accident rate ¹	-15	-17	-59	-19
Regression-to-the-mean	+1	+1	+0	+2
Number of injury accidents	+18	-13	-51	-9
Number of victims per accident	+28	+5	-13	+2
Accident severity ²	-14	+60	-40	-75
Cost per injury accident	+18	+58	-41	-54

¹ Number of injury accidents per million vehicle kilometres.

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² Number of fatalities, very serious injuries or serious injuries per injury accident.

Sinsen – Storo

On the Rv150 from Sinsen to Storo (a section of Ring 3 around Oslo, an arterial road serving roughly the same function as the London Orbital, the Capital Beltway in Washington DC or the Boulevard Périphérique in Paris), the number of accidents was reduced by 50 percent (95 percent confidence interval: -68%, -27%). Accident rate was also reduced, and in the after period accident rate was lower than in the rest of Oslo.

There has also been a reduction of road accidents in the precinct of Sagene/Torshov (a mainly residential area close to the centre of Oslo). Pedestrian accidents had the greatest reduction in absolute terms.

Ekebergtunnelen

The number of accidents in Ekebergtunnelen (and the old arterial roads) was almost the same in the before- and after period. But because of the increase in traffic volume, accident rate was reduced. In both the before and after period the accident rate was lower than in the rest of Oslo.

In Gamle Oslo (residential area in the eastern part of Oslo), the precinct where Ekebergtunnelen is situated, the numbers of accidents was reduced. All types of accidents were reduced.

Small changes in the number of accidents – but accident rate was reduced

Three of the four projects in Oslo did not lead to statistically significant changes in the number of accidents. The fourth project, which consisted of a major upgrading of an existing arterial road, led to a 50% reduction of the number of accidents. Table S.1 summarises results for the four projects that were evaluated in Oslo. The table shows that the number of injury accidents did not change very much in the three cases that involved constructing new arterial roads. The accident rate was, however, reduced for all projects. In three of the four cases, accident severity was reduced.

Results of other evaluation studies

Results for Oslo were compared to the results obtained in five other evaluation studies. It was found that the results were highly consistent with those found for Oslo: Upgrading an existing urban arterial road improves safety, whereas building a new urban arterial road does not result in a reduction of the number of accidents. Table S 2 summarises the results.

Table S.2: Effects on road safety of new urban arterial roads. Percentage changes

Project	Percentage change of the number of accidents on the main road link, best estimate	Percentage change of accident rate on main road link, best estimate
<u>New urban arterial roads</u>		
Southern arterial, Christchurch	-4	-15
Motorway south of Odense	+6	-6
Eastern arterial, Trondheim	+16	+23
Western arterial, Bergen	-22	-45
Festningstunnelen, Oslo	+18	-15
Granfosslinjen, Oslo	-13	-17
Ekebergstunnelen, Oslo	-9	-19
<u>Upgrading of existing arterial roads</u>		
Bypass road, Trondheim	-51*	-48
Sinsen-Storo, Oslo	-51*	-59

* Statistically significant change at 5% level.

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