

THE TRAFFIC ZONE SYSTEM IN THE CITY CORE OF GOTHENBURG, SWEDEN

Sven Lindqvist, Gothenburg Parking Company, Sweden

To achieve quick environmental improvement and better transportation without heavy expenditure, the Gothenburg City Council divided the city into five districts. Through traffic was transferred from the heavily loaded streets to the tangential streets by closing the borders to traffic other than pedestrians and public transport. No streets were closed to traffic, and transportation took place as usual though it was necessary to get into circulation routes located around the city core to reach the next zone. The public was informed of the new system by pamphlet distribution and advertising. Zone symbols helped motorists choose the shortest route. The traffic volume in the main streets has been reduced by 70 percent, there is more freedom of movement for the pedestrians, and air pollution and traffic accidents have been reduced. Private motorists have accepted the system well, but there has been protest from the taxicab organization, which asks to be treated as public transportation. Retail trade increased considerably in the residential areas and to a lesser extent in the city core. The need for increased parking facilities is being met.

•GOTHENBURG is Sweden's second largest city with approximately 500,000 inhabitants and approximately 150,000 cars. The city is 350 years old, and the oldest part, now forming the city core, was built as a fortress. Most streets are narrow, but some have been widened to serve as main arterials.

The number of cars rapidly increased after the second World War, and during the 1960's serious traffic and parking problems developed. In the 1960's, environmental problems, caused by heavy traffic, arose in the city core. Pedestrians had difficulty crossing streets, the carbon monoxide exhaust levels increased dangerously, and public means of transportation were impeded by automobile traffic. Traffic accidents and noise increased in the city core, built for pedestrians and horses 350 years ago.

During the 1960's, the Traffic Planning Department of Gothenburg studied various possibilities to solve the problem. In 1968, the City Council ordered that measures be taken to solve the most severe environment problems. In the 1959 master plan for Gothenburg, it has already been decided that the old city core plan and the scale of the buildings were of such a historical value that they could not be changed (Fig. 1).

The attempts made in the West German city of Bremen in the early 1960's to clear up the traffic conditions in the central areas of the city were of great interest for us in Gothenburg. Bremen is approximately the same size as Gothenburg and is situated at a river in the same way as Gothenburg. These attempts were studied and analyzed, and several visits were made to Bremen for first-hand observation.

The decision of the City Council in 1968 was to make necessary investigations aiming at a quick and economical improvement of the traffic situation with special attention to the Saturday traffic. The research was made with the following objectives: to improve the environment for pedestrians and those working in the city core, to increase traffic-ability for public transport, to ensure that proposed measures would be quickly carried out, and to realize the plan without heavy expense.

In this proposal, there was no suggestion for solving parking problems. However, this matter had been studied in other connections. The traffic count was used to determine which streets had the greatest pedestrian traffic. Certain shopping streets,

which since the 1950's had been reserved for pedestrians, did not have intensive pedestrian traffic. Important through-traffic streets invariably had pedestrian congestion.

On a normal weekday prior to implementation of the plan, approximately 100,000 cars passed into the small city core at Gothenburg, a core that has a diameter of 1 km. Half of these cars were just through traffic. For example, 45 percent of the traffic over the Kungsparksbron Bridge was through traffic. The traffic in the Östra Hamngatar south of Brunnsparken could be reduced by 60 to 70 percent through use of a zone system. Streetcars and buses shared the roads with the general traffic in the streets of the city core. On Saturdays, the speed of transit vehicles was reduced to approximately 5 km/hour.

Based on the decision of the City Council and the examinations that had been made, the Traffic Planning Department suggested a division of the city core into five zones: NE, NW, SW, S, and SE (NO, NV, SV, S, and SO) (Fig. 2). The border between two zones was to be crossed only by pedestrians and public transport vehicles. This eliminated through traffic from the heavily loaded streets and transferred it to tangential streets. The tangential traffic routes and their crossings could, through some small alterations of the crossings, serve the increasing load without exceeding their theoretical capacity.

None of the streets in the city core was intended to be closed to traffic. No extra limitation was imposed on traffic or parking within the zones. Goods transportation and deliveries could, therefore, take place as previously although it would be necessary to use new routes and to drive longer distances for deliveries in different zones. The principle is that, after a visit in one zone, the vehicle must return to the circulation routes around the city core to reach the next zone.

Buses and streetcars follow the same routes as earlier but now have their own reserved public transport lanes. Buses and streetcars run through the city core in common lanes and share the stops.

The date for introduction was August 18, 1970, when most residents had returned from their summer vacations, but the schools had not yet opened. One month before implementation, literature was distributed giving all the details about the zone system. Suitable traffic routes to various destinations in the city core were given to all offices, department stores, shops, and so forth. One week before the change, a pamphlet was distributed to all households in Gothenburg and the surrounding area. Immediately before and during the introduction, the inhabitants were also informed through advertising. The total cost of this campaign was approximately \$30,000 and proved to be well-spent money.

In order to make it easier for the motorists to choose the shortest route to their destinations in the city core, all signs to the city core (CENTRUM) were completed with zone symbols (Fig. 3). The borderlines between the zones were painted as an unbroken double white line or were provided with a low barrier, 5 in. high. These arrangements have cost approximately \$50,000.

The traffic volume in the main streets has, as expected, been reduced by 70 percent. There has been an increase of about 30 percent on the circulation routes, which has resulted in the planned adjustments in some crossings (Figs. 4, 5, and 6).

Motorists seem to have accepted the system rather well. The expressed criticism refers to the difficulty of finding the right way to the desired sector and the way around from one sector to another. Both of these problems are the result of the shape of the circulation routes in old European towns.

Concerning public transport, no extensive changes in the traveling times can be reported. However, it can be established that the deviations from the time schedule are much less than before. The reduction of vehicle traffic within the zones has given pedestrians more freedom of movement in the city core.

A positive factor for all those who visit and work in the city core is that the air pollution has been considerably reduced. Health authorities have determined that the carbon monoxide content in the air along several streets has been reduced from 65 to 5 ppm. Furthermore, the noise level has been reduced from 74 to 67 dBA. Some sets of traffic lights have been switched off, which has also increased the comfort for pedestrians.

Figure 3. Route signs.



Figure 4. Percentage of change in vehicle flow after introduction of zone system.

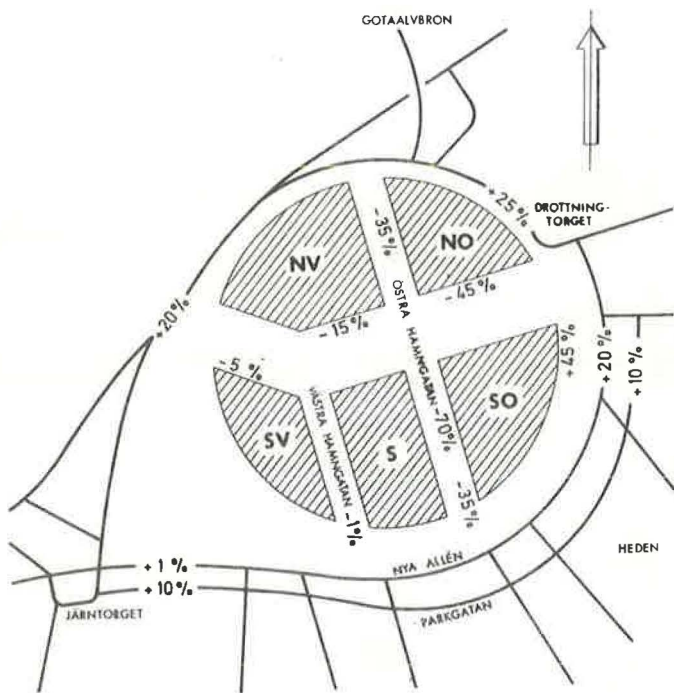


Figure 5. Vehicle flow in city core before introduction of zone system.

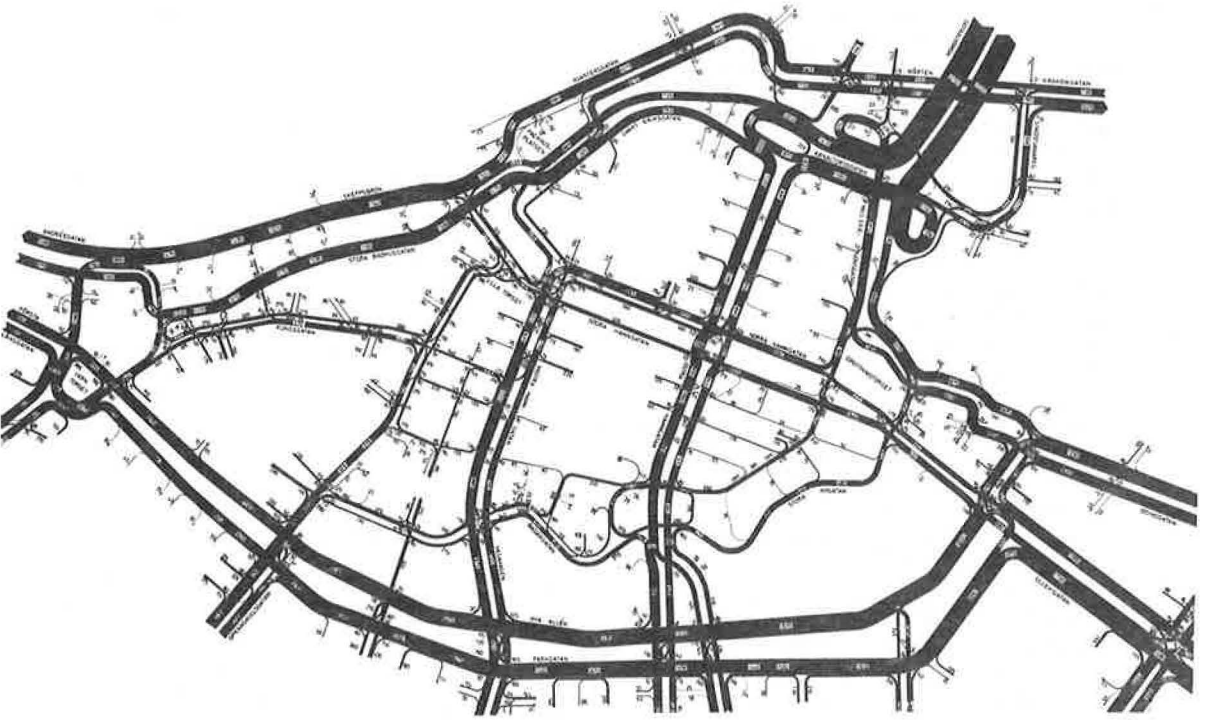
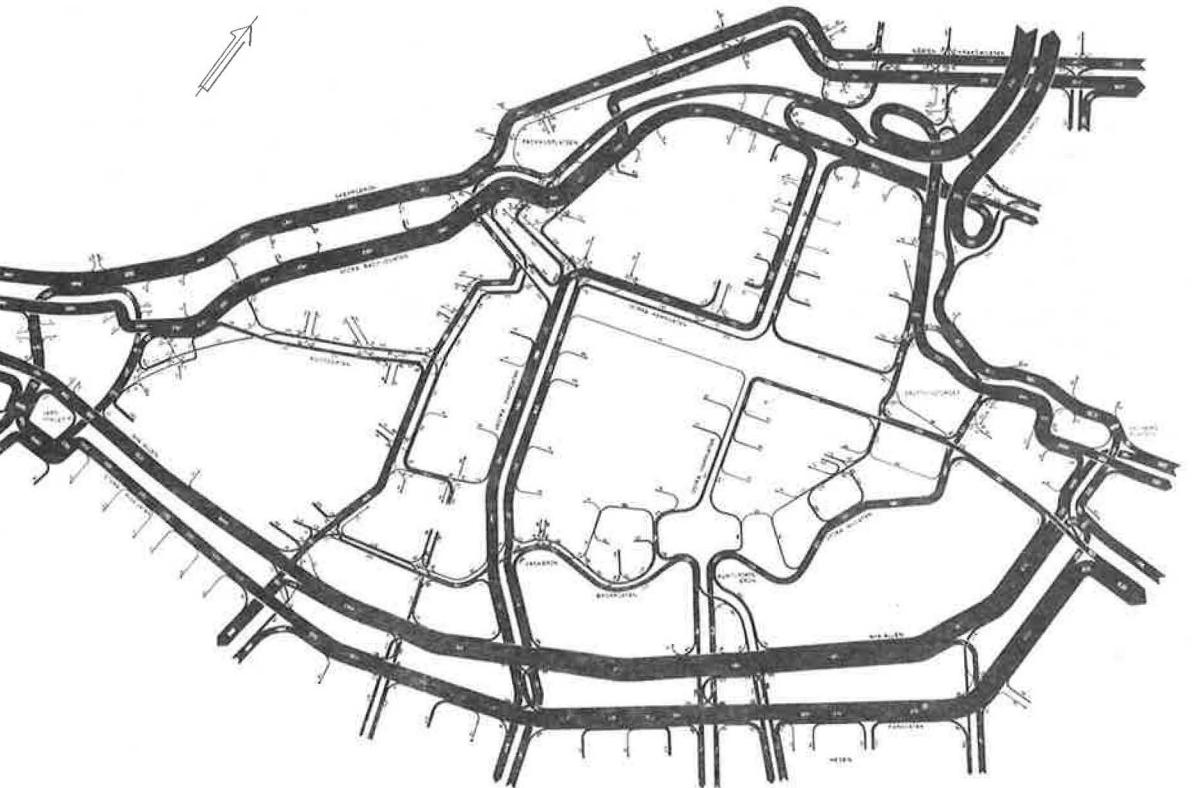


Figure 6. Vehicle flow in city core after introduction of zone system.



The traffic accidents in the city core have been reduced by 20 percent, whereas the increase on the circulation routes is very small.

The strongest protests against the system have come from the taxicab organization. It claimed that the taxicab should be regarded as a form of public transport and should be allowed to use the public transport lanes and cross the zone limits. Taxicabs are now allowed to cross the zone limits at the points where public transport crosses, but for the rest they have to follow the same lanes as the private cars. The risk of traffic accidents is too great at the streetcar and bus stops to allow taxicabs to use the lanes that are reserved for public transport.

Retail trade problems in the city core (A-center) were already great before 1970. Whereas the turnover increased by 1 to 5 percent a year in the shops of the city core, the turnover increased by 10 to 15 percent in the B-centers (that is, shopping centers for the big residential areas) and by 20 to 30 percent per year for special supermarkets. The merchants in the city core desire such measures so that a more considerable increase in the turnover can be obtained. The zone system has resulted in only a small decrease in turnover. As a complement to the zone system, the merchants demand a considerable increase in the number of central parking places. At present, there are approximately 4,500 spaces for shopping customers in the city core, of which about 2,000 spaces are on parking lots.

Outside the circulation routes, at a walking distance of 5 to 10 min from the city core, there are approximately 6,000 spaces, most often located in open areas, for shopping customers.

The old plans for parking in the city core included 10,000 spaces for visitors, 3,000 to 4,000 spaces for people who work in the city core and need their cars for work, and 1,000 to 2,000 spaces on the streets for short stops (5 to 10 min).

Since the old plan for the city core was presented in 1959, we have carried out a study of the capacity during peak hour of the accesses to the central part of the city. The central part of the city is about 4 square miles and includes the city core. The access streets have a capacity corresponding to approximately 50,000 car spaces. In this area, we now have 35,000 spaces.

Of these 50,000 spaces, about 11,000 will be allowed in the city core. The CBD will be served by 15 spaces per 10,000 ft² of shop area or 800 to 2,000 spaces in each zone. About 7,000 spaces will be used for short visits (1 to 2 hours), 3,000 will be used by people working in the city core, and 1,000 will be used for short stays (5 to 10 min). Shoppers and employees will have spaces in parking garages. The parking garages in the city core are built with (or are planned to have) direct connections with the circulation routes, so that the zone streets will not be loaded by this traffic. For the zones NE and SE, this matter is solved. For zones S and SW, the construction of parking garages will start this year and the next. Furthermore, approximately 7,000 spaces at a lower rate will be available in connection to outside of the circulation routes only.

Our objective is to create a city core that functions well in all respects. The zone system is the first step to reach this goal. A well functioning road system outside the city core and adequate parking availability are a second step, and a better public transportation system is a third step.