

WOONERFS AND OTHER EXPERIMENTS IN THE NETHERLANDS

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INTRODUCTION

The woonerf - literally, living yard - has been the most celebrated Dutch contribution to urban environmental traffic management in the last decade. Originating in a 1975 report from the Netherlands Association of Local Authorities (VNG, 1975), the idea has been widely applied in Dutch towns and cities and has been the subject of intense interest to professional visitors from other countries. But the woonerf is only part of a whole package of measures - including the design of the urban traffic environment, legislation and law enforcement, tuition, information and training - to influence driver behaviour and thus improve both road safety and the quality of life, which have been under study in the Netherlands in recent years.

Central to this concern, of course, is the problem of traffic hazards: the complex of incidents, conflicts and accidents with adverse effect on road users, sometimes long-lasting. But the countermeasures are concerned also with wider questions of the quality of life - as officially recognized for the first time in a report from the interdepartmental Working party on Road safety in residential areas, Living with Traffic in Towns and Villages (VRO, 1974). Nevertheless, this article will concern itself centrally with the question of traffic safety.

THE WOONERF

In 1975 the Netherlands Association of Local Authorities VNG set up a Woonerf work group, to report on the following questions:

- What infrastructural and/or traffic engineering minimum requirements must be present in a public residential area for it to qualify as a woonerf?
- What traffic regulations, not then applicable, are desirable for traffic and parking in these residential areas?

The Woonerf work group completed its report at the end of 1975 (VNG, 1975) and the results were presented to the Minister of Transport. In the meantime experimental woonerven had already been set up in the cities of Delft and Emmen.

In 1976 the woonerf obtained legal status. It differs from a normally structured residential street, because the paved area can be (partly) used for traffic as well as for playing, walking and parking. The woonerf has, first and foremost, the functions of a residence, meeting place, playground and walking area (the yard function). Obviously this public area has the additional function of carrying traffic. But it has no function for through traffic.

The woonerf can be characterized as follows:

- it is an area open to public traffic, to which the traffic regulations apply;
- it is mainly paved;
- it is in an area mainly meant for residence;
- sometimes it is a single street or a single square, or a connected area of streets and squares;
- walking and playing are allowed everywhere (that is to say not prohibited);
- the area is also accessible to motorists and cyclists or mopeds;
- it is not however the intention that motorized through traffic should use the area;
- there is an intermingling of traffic categories;
- there are no conventional, straight pavements with (raised) kerbs;
- to protect pedestrians and playing children, physical and visual facilities (narrow passages, trees, bollards, varied pavings) are used which induce motorized traffic, especially car drivers, to enter the area at a low speed and continue to drive slowly.

There is therefore a firm link between:

- the functions of area and street
- the presence of speed restrictions
- special driver behaviour, and
- special rules for driver behaviour.

The principle is that the proper speed of wheeled traffic should result from the design of the residential area. The introduction of special rules for behaviour, and placing traffic signs to point out these rules, crown the work of the town planners and traffic engineers.

It is correct that emphasis has been put on structuring the area so that road users - especially car drivers - are induced or compelled to drive slowly. It is obvious that this cannot be achieved and never will be by merely placing one or more traffic signs (Kraay et al., 1984).

Much has been said and written in the past ten years about the woonerf, a street for people. Problems concerning the recognition of entries and exits, the lack of adequate facilities for handicapped people, the high cost, etc. cause great concern. Besides this, there is the problem that residential areas with a serious lack of parking space, high housing density, very narrow streets, streets for through traffic, and other aspects which attract traffic are on the whole unsuitable for reconstruction as woonerven. This may explain why such woonerven have only been designed on a limited scale in older areas. Furthermore it is notable that the woonerven are on a small scale. They average two streets with an overall length of less than 200 metres.

EFFECTS OF RESEARCH

The great popularity of woonerven among the Dutch people is revealed by interviews covering evaluation of a number of features of the residential environment. These interviews (Kraay et al., 1982, p. 39), with a nationally representative population sample, gave the following results: 70 per cent considered woonerven desirable or very desirable, 16 per cent had no opinion, and 14 per cent were against.

The Road Safety Directorate (DVV) of the Ministry of Transport has examined to what extent woonerven complied minimum legislation standards (DVV, 1979). The number satisfying these standards was found to be low.

It is not very easy to draw any conclusions from this, since it is not clear whether woonerven which not do completely meet the requirements are necessarily unsafe. Major departures from the requirements, however, may cause confusion among users, and hazardous situations may arise. Another problem is that of streets and districts which are structured like woonerven without having their formal status. This may cause uncertain situations, especially for slow moving traffic whose drivers are under the impression of being in a woonerf.

BEHAVIOURAL STUDIES

Some behavioural studies have been undertaken. A project in Gouda (Güttinger, 1979), for instance, showed that the pattern of activities in a woonerf-type neighbourhood was more varied than in traditional neighbourhoods.

It is not yet clear to what extent the woonerf structure encourages residents' activities in the public spaces (which is one of the woonerf's purposes). Interviews with residents indicate that few of them find that woonerven encourage them to go out more.

Although elderly people and parents of young children believe speeds are still too high, the speed of motorized traffic in woonerven is lower than in traditional streets. Most research projects give average speeds of 13 to 25 km an hour. It was found that speed is determined not by the type of reconstruction (changes in alignment, humps etc.), but far more by the closeness of the features.

INQUIRY STUDIES OF WOONERVEN IN USE

Inquiry studies (Kraay et al., 1982, p. 39) carried out on a fairly large scale showed that overall evaluation of woonerven by their users (children, elderly people and mothers whose children often play out of doors) is more positive than for traditional residential areas. The assessment of motorists is not much more positive than of traditional neighbourhoods. It was also clear that a different knowledge regarding woonerven, as between residents and non-residents, corresponds to attitudes towards them; resistance to woonerven is based mainly on lack of knowledge. Driving at walking pace means little to residents, and measurements show that hardly anyone does so. It is in fact doubtful whether there is any need to drive at walking pace in woonerfs. A number of writers advocate a limit of 15-20 km (10-15 miles) per hour. It is not clear whether a higher limit will merely reduce the number of offenders or lead to lower speeds as well. A special problem is speeding by moped riders. This is not only felt by residents but is also shown by measurements. Low traffic densities and the partial or total lack of through traffic are assessed positively. Most residents agree with cars being forced to slow down.

Positive reaction to woonerven is rarely based on considerations of safety, but mainly on the bigger play areas, the quiet and cosy environment, greenery, and so on. But this does not mean residents consider woonerven unsafe. Research shows, for example, that two-thirds of the children consider woonerven safer than ordinary streets with pavements (Neeskens & Kropman, 1984).

Feelings about road safety in village and shopping woonerven have been the subject of before-and-after studies (Neeskens, 1982). The interview results show that residents consider their village or shopping woonerven safer than the former conditions. They express a pronounced preference for the new facilities.

PUBLIC PARTICIPATION

Most woonerf residents are not very enthusiastic about the influence they have had on the decision to create a woonerf. This is rather different in the case of government experiments because there consultation is required. Such examples of experiments with infrastructural facilities, initiated and partly financed by the government, are:

- reclassification and reconstruction of urban roads in the cities of Eindhoven and Rijswijk;
- reconstruction of residential streets and of streets to form woonerven;
- 30 km per hour regulations in fifteen residential areas;
- facilities for crossing busy traffic arteries by pedestrians in city centre areas at about one hundred locations;
- improved safety facilities on routes for school children at about one hundred locations;
- a cycle path network in the city of Delft;
- facilities on through routes in small centres in ten situations;
- countermeasures in streets with mixed functions for through traffic, shopping and residential functions, in ten streets.

In the demonstration project on Reclassification and reconstruction of urban areas in Eindhoven and Rijswijk, consultation was likewise evaluated (Pouwels & Katteler, 1985).

Some of the conclusions are important. Success in carrying out the

plans apparently depends partly on how consultation and differences in viewpoints are handled. A clear procedure, with explicit scope for consultation (as in Rijswijk) prior to decision-making, is more successful than where this was not the case (as in Eindhoven); the legitimacy of the plans, and public support for them, gained considerably from this.

Experience shows that adequate representation of residents in a consultation process is more difficult to achieve; they drop out or move elsewhere. It is very important to be clear and frank with people. A number of problems would have been less intracable if it had been made clear: what consultation is possible and what not; what the status is of the various documents (e.g. for information only, as a proposal, as data) and of the evening meetings with residents (e.g. guidance or information only, as against consultation with the possibility of filing objections).

RECENT RESEARCH RESULTS

Besides woonerven regulated by law, a number of shopping, village and city woonerven were created at the end of the 1970s. Streets and residential areas were also reconstructed without the intention of turning them into woonerven.

The research of the Institute for Road Safety Research SWOV (Kraay & Bakker, 1984; Kraay, 1985) into the effects of 69 countermeasures (56 woonerven, 3 village woonerven, 4 shopping woonerven and 6 other infrastructural countermeasures) showed with statistical tests that:

- in the experimental area of woonerven the decrease in accidents was greater than in the experimental area of the other experimental countermeasures; the decline just failed to be significant at the 5 per cent level;
- in all types of experiments the reduction in accidents was greatest for pedestrians and moped riders;
- accidents between fast-moving vehicles are reduced, no difference being found between woonerven and other experimental facilities (here again the decrease fell just short of significance at the 5 per cent level).

Further analyses of the effects of the countermeasures, classified according to road and area characteristics, show inter alia that:

- there is a big reduction in accidents in residential areas between city centres and fringe areas of the cities; these areas mainly resemble a ring around the city centre;
- there is a greater reduction in accidents if the facilities are provided in the form of woonerven; the reduction is least in shopping woonerven; pavements should be retained as much as possible and the details should be intensive, with obstacles, changes in alignment, humps and plateaus; decorative paving is recommended. Further:
- the reduction in accidents is greater the more cars are parked in parking bays;
- the number of accidents increases with an increase in the number of connections to suburban roads and in the number of intersections within the experimental area.

Decrease in accidents in the after period was partly due to keeping out through traffic and short-cut drivers and partly to a reduction in motorized vehicle speeds.

Another recent project relates to reclassification and reconstruction of two urban areas, 100 hectares each, in Eindhoven and Rijswijk (Janssen & Kraay, 1984; Mathijssen, 1985). As an experiment, rigorous countermeasures were taken to keep short-cut drivers out of residential areas so as to increase safety and habitability. To start with, the road system was divided into traffic arteries, access roads and residential streets. Next, each type of road was (re)constructed according to function.

In the case of residential streets, three different options were decided upon. The appropriate sets of measures vary from fairly simple ones (one-way traffic and a single hump), to rather more complicated (one-way traffic combined with a variety of speed-retarding facilities) and to very drastic ones (woonerf or simular structure).

The purpose of these measures is to give slow moving traffic a more or less equivalent position to fast moving traffic.

The initial results of accident research indicate that such a structural approach may have a positive effect on road safety in urban neighbourhoods. In residential streets in the experimental area the number of accidents involving injury per vehicle kilometre was halved. On traffic arteries and access roads, the reduction was about 15 per cent. The aggregate reduction for all types of road and street in the experimental area was about 20 per cent.

This research also showed that the measures taken in the experimental area had no adverse effect on road safety in the wider area around. Residential streets in this area seem in fact to have become even safer. The measures taken in the experimental area did not therefore shift the problem to other parts of the city. Improved safety in the residential streets in the experimental area certainly did not apply to moped riders: there was a proportionate worsening in their safety.

During interviews after reconstruction of the area the residents in the various types of residential streets were asked whether they thought safety in their streets and neighbourhoods had improved. On the whole, they were fairly positive, but this was not the case in the woonerf streets. The most positive views were expressed by residents in streets where many speed-reducing measures had been taken.

Behaviour studies and interviews were held to ascertain whether the measures in the experimental area had met their primary objective. Traffic counts showed that excluding short-cut traffic from residential streets was at least a partial success. Car traffic decreased by 12 per cent in the residential streets in the experimental area, while in fact it rose slightly in those in the control area. The interviews (Kraay, 1984) also revealed that there was less short-cut traffic after the reconstruction. In the woonerf streets the residents said such traffic had almost entirely disappeared. But in the other streets many people thought there was still too much. Reducing traffic speeds was a major objective of the measures. Some two-thirds of the residents believed cars were indeed driving more slowly. Speed measurements showed that motorists drove most slowly in woonerf streets. But they also showed that moped-rider speeds in residential streets were difficult to curb; in woonerf streets they are often faster even than motorists. Perhaps this is why their safety was not improved after reconstruction.

A woonerf is created not only to keep out short-cut traffic and to limit the speed of other traffic, but also to create an attractive environment for the residents. Hence, residents were asked before and after the reconstruction whether they liked strolling in the neighbourhood. Remarkably enough, far fewer people liked this after reconstruction than before. Perhaps their reply to this question - like their negative views on safety - is partly due to problems that occurred with consultation. But besides this, observations also disclosed several deficiencies. For instance, pedestrians in woonerven are more or less compelled to zigzag across the street by obstacles built on one side or the other. This makes them cross through moving traffic at points with poor visibility. Observations also disclosed several deficiencies that caused problems mainly for cars at places where woonerven emerge into traffic roads. The exits often have a raised construction from which cars can easily roll off. This may bring them into conflict with cars coming from the right, especially on narrow traffic roads. In addition, the exits are often so narrow that incoming and outgoing cars can hardly pass each other.

The question - what range of countermeasures in residential streets has the most positive effect on safety - cannot yet be answered. Behavioural and opinion polls provide too little to go by. Research might provide an answer if accident statistics are available for a longer after period.

Apart from this, it is already clear that 80 to 90 per cent of accidents involving injuries in urban neighbourhoods take place on traffic roads. From the road safety aspect, therefore, this is where the greatest benefit from action is to be expected. In the case of residential streets, comparatively simple measures to keep out short-cut traffic and restrict the speed of other traffic may be more appropriate than complex, expensive facilities such as woonerven. Moreover, it has recently become possible for municipal authorities to prescribe 30 km per hour zones inside built-up areas, subject to certain conditions. This is a major addition to the weaponry available to compel drivers to drive properly in residential streets.

CONCLUSION

In order to make traffic easier to live with in residential areas there are at present two statutory measures (the woonerf and the 30 km per hour regulation) which can yield good results if judiciously applied. Positive results are also obtainable with reconstructed areas as in Eindhoven and Rijswijk, where traffic circulation is influenced and combinations of speed-retarding measures have been applied. The woonerf rules are to be extended in the very near future to include shopping and village woonerven (DVV, 1985). It is hoped that this statutory possibility will be put into practice more widely under new woonerf regulations, because research results to date already indicate that the above measures have distinct positive effects on driver behaviour and the occurrence of traffic accidents.

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