

SAFETY IN RESIDENTIAL AREAS; THE EUROPEAN VIEWPOINT

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SUMMARY

Traffic-safety studies into the effects of engineering countermeasures in residential areas have been carried out in several countries.

The results of implementation of area-wide road engineering schemes on traffic accidents can be summarized as follows:

- Strict differentiation of streets according to their traffic function leads to safer residential areas;
- Full segregation of vehicle from pedestrian and cycle movement is accompanied by very low accident rates;
- Space-sharing approaches (e.g. woonerf) decrease accident rates by half and have favourable effects for children;
- Most accident surveys have shown that the measures taken in the experimental areas have not led to negative effects on road safety in the areas of influence.

But there are some drawbacks to these approaches.

Area-wide road engineering schemes are in most cases restricted to residential areas. It may be noted that about 80 percent of accidents involving injury in urban districts occur on main roads. Purely from the point of view of road safety, it is here that measures can be expected to have the greatest effect.

Area-wide road engineering schemes are only one element in the solutions of the safety problem in urban areas. It implies a physical condition whereby a number of negative consequences of the traffic system can not take place. Long-term controlling strategies, which are independent of the location and are obtained from information and education, are not considered in the approaches.

It becomes more and more obvious that road-safety work needs new impulses and has to go new ways. In addition to traffic regulations, engineering measures, campaigns, traffic-education programmes, etc. it should be noted that there is a move in the approach from area-wide road engineering schemes for residential areas to more integrated urban traffic-safety planning and management.

On the other hand, the engagement of and co-operation with local groups becomes important.

Two recommendations are made:

1. Countermeasures for improving traffic safety in urban areas have also effects on other aspects of the environmental system such as: town and country planning and the economic and socio-cultural system. Therefore, traffic-safety issues should be implemented in these plans. A new OECD-group has made a proposal for such an approach.

2. Better explanations of the existing safety problems to the residents and closer association of the population to countermeasure design are a greater guarantee for a successful outcome.

For this communication task, researchers can provide added value, by providing knowledge on the needs and motivations of local road users: how they perceive their urban environment and how they would wish it to be, what their movements are and the difficulties they encounter in their daily trips, whether they feel safe or unsafe, etc.

Researchers ought to make the results of their work applicable for effective use by different consumers at the local level; by giving the local researchers, decision makers, and the residents the relevant tools so that for them will also apply that "knowledge is power".

INTRODUCTION

In most of the countries of Western Europe about 60 percent of accidents involving injuries take place in built-up urban areas, and most of the casualties are unprotected road users. Although the rate has fallen during the last decade in most European countries, the decline has not been so great, unfortunately, in built-up areas.

It is difficult, however, to identify precisely the risks to which children are exposed. Most studies indicate only the extent of the road safety problem for children: there are no data on exposure. We are unable, therefore, to state what risks children actually face on the roads.

I should point out here that children, quite simply, have not yet had the time to learn the skills they need if they are to participate fully and safely in traffic. Consequently they must be given support in the form of information and education. Parents also have a part to play: they bear direct responsibility for their offspring.

The safety problems of young road users in the Netherlands relate mainly to cyclists between the ages of 6 and 20, and pedestrians under 12, coming into conflict with cars.

International estimates indicate that some 30 percent of road accidents involving children take place on the way to and from school. About 60 percent of children aged 9 to 12 involved in accidents on their way to and from school in the Netherlands are cyclists - while no more than 25 percent of schoolchildren in this age group use bicycles!

One measure which has been tried in Germany entailed shifting part of the exposure period by changing children's school hours (with them starting later, staying at school during the lunch break and finishing earlier). There was great opposition from both teachers and parents (especially working mothers). Nor did the intended side-effect (the improvement and streamlining of public transport) materialize. Some moves in this direction in the Netherlands got no further than the drawing board because of the number of objections. As an isolated measure it would not seem very likely to have any major positive effect.

Ideas of a more area-wide nature have been put forward at various times in various countries with the aim of improving living conditions as a whole as well as improving road safety.

For many years after World War II town and transport planning concentrated particularly on the town centres and urban development areas. A great deal of energy and money was spent on the town centres with a view to reducing the fast-growing traffic problems, with the emphasis on continually adjusting the increasing traffic flows. New traffic solutions were sought for urban development areas to accommodate the increasing number of motor vehicles. The existing districts round the town centre did not receive much attention for many years, but there too increasing motor traffic made ever greater demands on public space. Pedestrian pavements were narrowed. The increasing area given over to parking reduced the amount of space available for other purposes.

AREA-WIDE APPROACHES: AN OVERVIEW

The very first example of an area-wide approach in a residential area was Radburn, New Jersey in the USA in 1928. The street system was differentiated into streets for through traffic, local distributors and residential access streets. Motor vehicles were separated from pedestrians and bicycles. The access streets were designed as culs-de-sac. There were underpasses for pedestrians and bicycles crossing the local distributors. In the first twenty years only one serious accident occurred. The approach was not widely imitated at the time (OECD, 1979).

The situation in Great Britain is in some ways different from that on the Continent. Fifteen New Towns were built, starting in 1946, to reduce the industrial and population pressures on the conurbations of London and Glasgow. Each New Town was carefully designed to include good, fast communications between living and working areas, commercial districts, shopping centres, schools and the town centre. Sports facilities, social and cultural amenities and recreation occupied an important position in the structure of the New Towns. The various modes of transport were carefully considered when planning their traffic systems:

- (a) Pedestrians and motor traffic were highly segregated.
- (b) Social amenities had to be easily accessible: in Cumbernauld, for example, the aim was to keep all housing within three-quarters of a mile of the town centre.
- (c) A good public transport system was provided, segregated from the other modes of transport. In many New Towns residents were to be no more than five minutes walk from a bus stop.
- (d) The road system was designed to cope with rush-hour traffic.

In the rest of Europe traffic safety became a serious problem in the 1950s and in some countries planners sought more or less radical solutions. In Sweden, for example, the Radburn idea was applied in many residential areas during the 1950s and later evolved into the SCAFT Guidelines (SCAFT, 1968).

The degree to which pedestrians and motor vehicles are segregated depends upon economic considerations. The examples of Mannheim-Vogelstang in Germany and Bijlmermeer in the Netherlands show different degrees of segregation. Whereas in Mannheim pedestrians mix to a large extent with motor vehicles in the same streets, in Bijlmermeer the two types of traffic are completely segregated, on two levels.

Towns and residential districts where traffic has been strictly segregated in this way have subsequently been subjected to severe criticism. The main point was that the principle of segregation was based solely on road safety considerations and produced a dull environment for people to live in - indeed, some said they could not live there. Another point was that such districts cannot easily be served by public transport.

In the sixties the "woonerf" principle was devised in the Netherlands. A "woonerf" is a group of residential streets designed in such a way as to mix and integrate the various types of traffic rather than segregate them. The government laid down standards for "woonerf" design in 1976. Since motor vehicles use the same part of the street as pedestrians and cyclists, they must reduce their speed to walking pace.

This planning approach provided many examples of possible alternative treatments of urban roads and was thus quite fruitful. Some of the concepts developed were subsequently taken up by traffic planners given the job of

improving traffic conditions in old town centres with narrow streets ill-adapted to heavy car flows. In addition to measures to segregate or integrate traffic, some measures designed to restrict car usage and promote public transport were applied for the first time (e.g. in Nottingham in England and Göteborg in Sweden, around 1973-74).

Recommendations for traffic planning in residential areas have also been issued in the Federal Republic of Germany, the United Kingdom and the United States. In Germany, Recommendations for the Design of Urban Streets were published in 1971 (Forschungsgesellschaft für das Strassenwesen). In the United Kingdom, layout considerations were given in "Roads in Urban Areas" in 1966 (Ministry of Transport) and "Residential Roads and Footpaths" in 1971 (Department of the Environment and Department of Transport). In the United States, "Recommended Practices for Sub-division Streets" were published in 1967 (Institute of Traffic Engineers). The SCAFT Guidelines were revised in 1973 (Chalmers Tekniska Högskola).

In France, the planning approach had very little influence until the early seventies, save for the design of some new towns (e.g. Cergy-Pontoise, Le Vaudreuil). Road safety research and practice only started focussing on urban areas around 1972-73. Black spot treatment was the first type of action undertaken, in direct line with the practice in rural areas, and quickly showed its limitations when applied to the overall safety problem. The first traffic plans for city centres were also designed at that time, but although safety was stressed as one of their aims, they were essentially concerned with rationalizing car traffic and improving traffic flow: road safety was then clearly not a priority for local decision-makers or pressure groups. It was only later that pedestrian precincts and provisions for two-wheeled traffic and public transport were introduced in city centres, and the overall effect of traffic plans on accidents was never properly evaluated.

Until the early eighties there were no signs of any really general safety programmes at local level in France. The situation changed with the process of decentralization initiated in 1982 and two incentive packages launched by the French government to encourage local authorities to tackle their safety problems and help them to do so both technically and financially ("Minus 10 Percent" and "Safer Cities with Accident-free Neighbourhoods").

Local road safety action is now developing rapidly, using the whole range of safety measures available from planning to education, tackling the most difficult problems, e.g. improving areas with both residential activities and heavy traffic, and road safety objectives are increasingly considered as the trigger of urban life improvement (better environmental amenities, economic renewal). This is not an easy process, and research is a necessary part of it.

Research is currently taking place into area-wide road engineering schemes in three towns in Denmark (Vinderup, Skaerbaek and Ugerlore), in five towns in the United Kingdom (TRRL Urban Safety Project) and in West Germany.

The Federal Republic of Germany is currently conducting a major experiment and associated research project on area-wide traffic restraint in six model cities: West Berlin, Mainz, Ingolstadt, Esslingen, Buxtehude and Borgentreich. The aim is to reduce the impact of vehicle traffic in large areas of cities. During the 1970s promising results were achieved with traffic restraint measures in residential areas. The question now is how to transfer these measures to larger areas, including roads with heavy traffic and business premises.

Current research is paying a great deal of attention to through roads. There is no attempt to provide strict segregation of different types of traffic; wherever possible, they are integrated. The plans take account of environmental quality (smell, noise, vibration).

In recent years "shared surfaces" have also been proposed in the planning guides of many local authorities in the United Kingdom. According to these proposals, shared surfaces may be used primarily in culs-de-sac and short loops. The "woonerf" model has been introduced in Sweden, and laws have been amended in Belgium and Denmark to enable it to be introduced there.

Despite the fact that area-wide schemes have been put into practice successfully in several countries including Denmark, Finland and Japan, the overall number of schemes has remained fairly small.

In many existing residential districts the principle of segregation or mixing of different types of traffic on a district basis cannot be applied fully because the cost is too high, the road system is unsuitable or there is quite simply not enough room. In this case the main measures left for improving road safety and environment quality in urban areas are influencing traffic circulation, reducing speeds, regulating parking, providing special facilities for pedestrians and cyclists, and converting a street or two into a "woonerf".

EFFECTS OF MEASURES

Road safety studies of residential areas have been carried out in several countries, mostly based on accident statistics and of a general nature. In view of the relatively small numbers of road accidents it is often not possible to relate the effects to particular types of road user, age or type of manoeuvre. The main road safety findings can be summarized as follows:

- (a) strict differentiation of streets according to their traffic function leads to safer residential areas;
- (b) full segregation of vehicle and pedestrian and cycle movement is accompanied by very low accident rates;
- (c) the space-sharing approach (the "woonerf" principle) approximately halves the accident rate, including that for children.

CONCLUSIONS

1. Area-wide road engineering schemes are demonstrably able to produce a considerable improvement in road safety, including that of children.
2. They have so far been confined almost entirely to residential areas. Current examples of large parts of a town or even an entire municipality being tackled are to be found only in Germany, England and Denmark.
3. Area-wide schemes are merely one element in the solution. The physical conditions are such as to exclude, or virtually exclude, certain adverse

effects of the traffic system. Long-term control strategies, independent of location, implemented by way of information and education are not involved.

4. Although not a logical consequence of the above, a fundamental question should be asked: how are young people to be taught to participate in our traffic system, how can they be helped to overcome or compensate for their lack of understanding and experience of traffic?

5. It is becoming more and more obvious that road safety work needs new impulses and has to go new ways. The importance of involving and cooperating with local groups, in addition to traffic regulations, engineering measures, campaigns, road safety education programmes etc. is becoming increasingly clear. The following suggestions are based on the philosophy of increasing private initiative in many areas of everyday life. We should try to find ways of:

- (a) transferring or extending moves to change attitudes in society to the area of road safety;
- (b) addressing local groups so that solutions to specific local problems can be adapted to the local conditions;
- (c) addressing individual road users to make them aware that their behaviour can not only contribute to improving road safety but also help to compensate for deficiencies in the traffic system (Michalik, 1987).

RECOMMENDATIONS

Given recent developments, the favourable effects they have had on road safety and the rather low political priority attached to road safety on its own, I would suggest two ways of improving road safety still further.

1. Municipal road safety policy

Measures to improve road safety in urban areas often affect other aspects of topographical, economic and socio-cultural systems. Municipal road safety policy should therefore be made an integral part of development plans and urban renewal plans. The mere fact that the expected effects on road safety are explicitly stated in these plans will enable the interests

of road safety to be balanced against all the other interests; also, it will enable a coherent view of road safety in the town as a whole to be obtained, reducing the risk of merely shifting the problems elsewhere.

Cooperation on road safety within and between different levels of government has increased considerably in recent years in a number of countries in Western Europe: take for example the "Minus 10 percent" campaign in Austria, "Réagir" in France, "Minus 25 percent" in the Netherlands and various schemes whereby national governments delegate powers to regional authorities (as in England and the Netherlands) and municipalities. The systematic approach to road safety at municipal level is still in its infancy, however. An integrated approach is rare. New policies are developed only with great difficulty.

It is essential for the road safety of our children that a coherent policy be developed in which road safety education is given high priority. We also need to provide them with safe routes to and from school, a safe residential environment, safe means of transport and effective information.

We find, however, that those concerned are moving away from area-wide schemes for residential areas towards integrated urban area traffic safety planning and management, as initiated by the OECD. A Scientific Expert Group on Integrated Urban Area Traffic Safety Planning and Management has formulated the following principles in its background paper (OECD, 1987).

To improve safety, local authorities should preferably develop integrated programmes* because:

* By "integrated programme" we mean a set of coordinated activities to be carried out by a variety of agents of different nature (governmental or private organizations, acting at different levels) with the aim of solving a number of well-defined problems, including safety problems. In such a programme the various measures are adjusted to each other so that the total effect of the package of measures is larger than the aggregated effects of separate measures. Also, possible contradictions between measures corresponding to different objectives are clarified and resolved through negotiation before reaching the implementation stage.

- The majority of accidents are distributed over the whole urban area; accident data are subject to statistical fluctuations, therefore it would be misleading to design countermeasures for individual accident sites.
- In urban areas, a multiplicity of safety problems, related for instance to the complexity of the traffic mix, the friction between through traffic and local activities, are concentrated in time and distance while coming under different competences; these problems should not - and cannot - be treated separately.
- Traffic safety may not be (and often is not) a leading priority for local policy-makers or citizens; therefore there is often a need either to embed safety measures in other policies or to take advantage of other measures to include some safety action.
- Safety measures of different kinds must be part of a comprehensive safety policy: to ensure maximum impact, the complementary measures likely to enhance each other should be identified and coordinated, as regards both design and implementation.
- Integrated safety programmes are the best way to ensure that local authorities will get a complete picture of their problems before selecting their priorities for action.

If the municipal authorities are not yet able to apply this integrated approach, I believe that it is incumbent on national governments (e.g. the appropriate departments of the Ministry of Transport) to promote it and even enforce it to some extent using suitable organizational and financial tools.

I am convinced that an integrated approach of this kind at municipal level could and would make a substantial contribution to solving the overall urban traffic problems - including safety, quality of life and traffic - and would ultimately be cost-effective. There would be particular benefit to the most vulnerable sections of the population, children and old people.

2. The role of research

Unless they have participated in the decisions, local residents and pressure groups will not readily accept measures in their neighbourhoods, and this can be harmful to road safety. They must therefore be given the opportunity - not just in theory but also in practice - to express their opinions and influence the decision and how it is implemented. Better explanations of the existing safety problems and more public participation in countermeasure design should make a successful outcome more likely.

Research can help in the communication task, first providing information on the needs and motivations of local road users: how they perceive their urban environment and how they would wish it to be, what journeys they make and the difficulties they encounter in their daily trips, whether they feel safe or unsafe, why, and the importance they attach to these feelings among their other preoccupations, etc. Research has only just begun in this field, and the criteria for subjective safety, for instance, or road users satisfaction with their environment, are still very tentative.

Final decisions need not be made immediately: temporary, experimental measures can often be evaluated simply, e.g. by means of censuses of traffic intensity or speed monitoring. The question that must be asked is whether the objectives have been achieved and the means used were effective. We must also be on the lookout for side-effects, and the opinions of residents and other users should be canvassed. The measures must be adjusted in accordance with the results of the evaluation.

Those involved in research in this field have a clear responsibility here, in my opinion. Looking back, one can say that a lot of information has been gathered during the last decade on the effects of infrastructural measures in urban areas. We do not yet know everything, but we know a lot. The information from research carried out over the years with public money must now be made available to the man in the street, as it were. Researchers should assemble the information from their research in manuals, leaflets etc. so that local road safety problems can be tackled in a practical way.

On the other hand, local government is assuming increasing responsibility for road safety. Local authorities are involved more and more in decisions, actions and follow-ups. It is important, therefore, to review the current means of highlighting promising examples and emphasizing the needs that should guide future research.

To sum up, researchers should present their work in a form suitable for effective application at local level by different "consumers", and give local researchers, decision-makers and residents the tools they need, so that the maxim "knowledge is power" also applies to them.

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