Low-cost measures: an overview of organisational and procedural aspects

Contribution to the ETSC International Symposium 'Low-cost/high return engineering measures for safer roads' in Brussels, November 5, 1996

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Summary

The implementation of effective and cost-efficient programmes such as low-cost road and traffic engineering measures (LCM) cannot be viewed as an activity with a 'high political profile'. LCMs are taken almost invisibly. However, if these measures are shown to be highly effective, then the interest of politicians and bureaucracy could be stimulated, the more when significant results are feasible at a low cost. This observation has important implications for the organisation and procedures used to implement LCM.

In this context, the following points deserve special attention. Firstly, the problem that while regional and local road authorities might have the capacity to apply LCM, they do not have enough expertise to investigate and design LCM schemes. In many countries, central government has adopted some level of responsibility for the support of regional and local government; the roles of the various parties must be defined. A related topic deals with the question of which in-house expertise is appropriate for all road authorities and how and where to cooperate with other road authorities or with private consultants.

Another key element in this approach would be how to finance the investigation, design and implementation of LCM schemes and related questions about the allocation of funding within the budget of road authorities.

A final important item to be dealt with is the collection and dissemination of reliable information on the effects and costs of LCM schemes (in terms of accident reduction and in terms of understanding these effects).
An evaluation system should form part of the LCM programmes, whilst the learning capacity of the design community will certainly be improved by cooperation at local, regional, national and international level.

Contents

1. Introduction

A road safety measure can be assessed on the basis of various criteria. Firstly, an assessment should examine what (types of) accidents could be prevented: the scope of a measure. Given that scope, the effectiveness of a measure will be investigated: what percentage reduction in terms of accidents or road accident casualties is achieved by the measure.
A combination of scope and effect leads to a result in terms of the number of accidents or road accident casualties averted.

A further assessment can be based on a policy perspective. For example, if it has been stated that road safety measures should be taken particularly in order to minimise accidents involving 'vulnerable road users', then it is important to evaluate the effect of a measure on this category of road users. Furthermore, realising a public base of support and evaluating the practical feasibility of the measures are important criteria.

A subsequent approach is to compare savings (in terms of a reduction in road accident casualties) against the costs associated with the measure (cost-effectiveness analysis), and to determine who should bear responsibility for these costs. Certainly in a situation where funding is limited, it is important that those measures that lead to the greatest saving at the lowest costs are selected. Initially, it is feasible to express the reduction in the number of road accident casualties in terms of monetary units and to compare these to the costs incurred (cost-benefit analysis).

Speaking of 'low-cost engineering measures', it is therefore useful to first consider the scope of these measures. It can be argued that low-cost measures are particularly effective when taken at locations where many accidents have occurred or can be anticipated: black spots. Without entering into the black spot approach in detail, it is nevertheless useful to consider the potential influence of this measure.

If we take the definition of a black spot as being five injury accidents per year, or ten injury accidents per three years, then we are speaking of 250 black spots in the Netherlands, involving about 150 intersections and hundred road sections. If we take the locations as a whole, then 1.1% of the total number of accident fatalities, 3.4% of the number of hospital admissions and 4.1% of the remaining number of injured parties are registered here. In other words: of the 50,000 road accident casualties annually registered in the Netherlands, 32,000 occurred at locations where only one injury accident occurred that year, while 16,000 occurred at locations where two, three or four injury accidents occurred that year; 2,000 road accidents occurred at locations where five or more injury accidents were registered that year. In the past ten years, the number of locations where more than five injury accidents occur per year has not declined, for that matter; the number has remained constant. With this definition of black spots, the impact of a potential road safety measure is therefore fairly modest. If effective measures are feasible, these will first have to be assured of a broader range of impact.

A study carried out in the Netherlands into the effectiveness of infrastructural measures shows a considerable level of effect: measures that were taken at 143 black spot locations led to a reduction of 32% in the number of accidents and 45% in the number of injury accidents. It should be noted in this regard that there is question of an average value in this case: at some locations, the reduction was 90%, while at others, the number of injury accidents rose by several percentage points. The associated conclusion should be that effects are not achieved automatically but that a thorough analysis and an expert choice of measures could lead to considerable effects.

If we combine the range of measures applied (250 locations) and assume an effectiveness of about 45%, then some 1,000 injuries could be avoided. If we compare these numbers to the total number of road accident casualties that should be registered in the Netherlands in accordance with the target set in the field of road safety (a 25% reduction, namely from 50,000 injured to 37,500), then this means that, given these assumptions, this approach could realise about 8% of the target set. An important conclusion can be drawn from these facts: a black spot programme, whether or not carried out using low-cost measures, will have to be conducted on a considerable scale if it is to offer a 'substantial' contribution to the promotion of road safety.

It should be noted that the low-cost measures as described in the ETSC report are not the same as the black spot approach described here. The black spot approach can certainly be expanded with routes and regions, for example. But it is certainly useful to estimate range and effectiveness and deduce the required policy effects before making policy statements about such measures.

For that matter, the costs of the measures in the Netherlands black spot programme (where an available effect of 45% is realised, therefore) should not really be regarded as 'low-cost': the measures cost an average of ECU 70,000 per location. The fundamental question to be asked in this regard is whether a relationship exists between the effectiveness of measures and the associated costs, in particular if measures are carried out in a sober manner. This is an interesting subject to examine, based on the monitoring of measures and evaluation studies. It is not too presumptuous to assume that there is some danger in adopting a 'penny wise - pound foolish' attitude.

2. LCM cooperation

Various parties should cooperate in order to enable an effective and efficient approach towards LCM. In principle, a road authority bears responsibility for solving safety problems on their o wnroad network.
But, if a road authority wishes to realise this responsibility, it is in the first place dependent on the availability of accident data (usually via the police) and the quality of these data. Improving the volume and quality of the data available would enhance the possibilities for an effective approach!
It is widely known that by no means all accidents are registered by the police and this is more often the case as the outcome of an accident becomes less serious. Agreements should be made between representatives of road authorities and the police (if possible long term) about the availability and sustainable quality of accident data.

A second form of cooperation concerns that between local and regional road authorities and central government. It is certainly inefficient if all road authorities developed the methodology of the LCM approach individually or have all the expertise for this approach at their disposal. Depending on the scope of the problems and their significance to policy, a road authority will take certain decisions. But a role is certainly open to central government to make agreements in cooperation with representatives from local and regional road authorities.

Another form of cooperation concerns the role of central government to stimulate other partners, such as local and regional road authorities, to promote road safety. Given the dilution of the road safety problem (in the Netherlands, for example, 50,000 injured distributed over 100,000 km of road) it is quite feasible that central government wishes and can play a role in this regard, or is even obliged to if this approach is to become reality. Although this can differ from one EU member state to another, the contextual and financial role of central government in terms of stimulation is certainly feasible.

Finally, one could consider cooperation in the field of knowledge acquisition and dissemination. It was already indicated that a large variance was found in the results of a Dutch black spot programme. A comparable result was also found with the safety effects of the implementation of 30 km/h zones in the Netherlands. In the field of monitoring and evaluating LCM programmes and the distribution of research results, cooperation is needed between local and regional road authorities and research institutes. In many countries, it is up to central government to finance this form of knowledge acquisition and dissemination. Perhaps, the European Union can play a role in this field as well in addition to the role of EU Member States.

3. LCM information

In the field of required information to enable successful implementation of an LCM programme, one could consider the following:

- efficient and reliable information about road accidents;
- information about the physical location characteristics and traffic flow and behaviour in traffic;
- per location, information about the results of a road accident analysis, a description of the possible causes and information about measures to remove these causes. It is recommended in this regard to describe the envisaged behaviour in traffic following introduction of the measures as explicitly as possible, and also to consider whether that which was envisaged has in fact become reality some time following implementation of the measure.
- to perform an evaluation study per location.

In order to be able to learn from the various experiences, it is recommended to perform a type of 'meta-analysis': In this approach, research results from various studies are not simply added to each other, but it is attempted to arrive at more accurate and correct statements by relating results to each other. Finally, it is then important that these results and findings are made available to people in practice, in order to improve the quality of their analyses and designs. In this regard, international cooperation can certainly prove useful.

4. LCM staffing

Although the work which is being considered here may seem 'simple', practice has shown quite the opposite. A high level of expertise and experience is needed to take the correct steps on this uncertain path. The problem is often that there are relatively few data available to perform complete analyses, and that the causes of accidents are not always so simple, let alone that the most optimal (and low-cost) remedy is that easy to design. Finally, in many cases the causal relationship between measures and their effect proves to be weak in practice. In view of this situation, the quality of the staff and their motivation in performing these activities is of great importance.

Firstly, the training programmes provided in a country should be such that others can learn these techniques. It is also important that practical experience in this field is stored and does not disappear too rapidly to 'management' or leave the organisation in other ways. It is also recommended that cooperation is promoted between the specialists from various road authorities, where it should be remembered to what extent the scope and nature of the problem justifies each road authority to employ its own expert. Cooperation between road authorities could be the solution; another possibility is to house the expertise with commercial consultancies.

The motivation of the staff is a second important factor within the whole. It would go too far to indicate how staff can be trained in general. However, it can be indicated that a manifest political will at this point is of major importance, coupled to a structural financing of the analyses and the implementation of measures, sustained over a period of several years. In addition, one could consider the establishment of so-called 'quality circles', as already applied in the business community. And last but not least, positive results have a very motivating effect!

5. LCM funding

Much can be said in favour of structuring the organisation of these activities and to also base the financing on this approach. It is useful to realise that an LCM programme should be seen as one whole: analysis, road design, the implementation of measures and their evaluation should be considered as a single unit, and be financed as such. In order to ensure that the available funding is actually extended, it could be considered to earmark budgets for this purpose.

Experience has shown that the activities as described in the above are hardly, if ever initiated or developed by individual road authorities. There are two agents which might act as initiator in this regard: firstly, an 'association of professionals' and secondly, central government, sometimes also with mutual cooperation. This type of development would only be feasible if central government at least assumes the role of 'initiator'. For example, methodology development, the organisation of training programmes, the assessment of LCM activities and the dissemination of knowledge gained from the projects performed. In many countries, such activities are also given financial support by central government.

6. Conclusions and recommendations

It should be noted that LCM programmes fulfil a modest role in the field of road safety policy in many countries. This is also due to the unassuming 'administrative and political profile' that these activities tend to have. It is an often invisible activity with no support provided by policy or government. It is certainly recommended to try to enhance this profile.

Furthermore, rough estimates have shown that low-cost programmes need to be conducted on a massive scale if they are to contribute to the sustainable improvement of road safety in an area. The organisation of these programmes should preferably be such that there is some continuity in their implementation: this benefits both the quality of the programmes and their effectiveness in terms of a reduction in the number of road accident casualties.

Potentially, LCM programmes offer interesting possibilities as a contributor to the improvement of road safety. To do so, it is however necessary to increase the 'learning capacity' in the field by setting up training programmes, monitoring and evaluating systematically implemented measures and bundling and exchanging the knowledge acquired, also at a European level.