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THE CONTROL OF LORRY NOISE

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IN 1980 the OECD Conference on Noise Abatement Policies concluded that '...road traffic constitutes by far the major source of noise,...' and that '...heavy lorries and buses constitute a major source of deterioration in the noise environment, and sustained action should be taken as priority to deal with them.' The problem has long been recognised in London and was a topic which received considerable attention during 1982, first because of the independent inquiry set up by the Greater London Council into the potential effects of bans on heavy lorries within London, whose Report is expected shortly, and secondly because of the Government announcement in November 1982 that the permitted weight of lorries would be increased from 32.5 tonnes to 38 tonnes. In both cases the aspects which probably caused most concern were noise and vibration.

A social survey published in 1978 found that 12% of those interviewed were very much, or quite a lot, bothered by lorry noise, and 22% bothered to some extent. Of those who actually mentioned hearing lorry noise, 33% were bothered by it. In both cases, slightly higher percentages were bothered by motor cycle noise. On the other hand when asked what sort of vehicles made the worst noise, 39% mentioned lorries, 19% motor cycles and mopeds, 5% mentioned buses and coaches and 4% mentioned cars. The reaction of people to commercial vehicles is also shown from a table in a study carried out by the Building Research Establishment which indicates that while 68% of people hearing unspecified road traffic noise are bothered by it, in the case of trucks and buses this rises to 83%. This study in fact suggested that under non-freely flowing traffic conditions, the most useful prediction of noise nuisance is related to the logarithm of the percentage of heavy vehicles in the traffic stream rather than to any measurement of traffic noise using existing noise units.

At low speeds it is the composition of the traffic which is the dominating factor and recent German calculations indicate that a hundred trucks per hour travelling at or below 55km/h give an equivalent noise level at a distance of 25m

of 66 dB(A). In order to produce a similar noise level from traffic consisting only of cars, more than 2,500 cars per hour would be required.

Actual measurements carried out by the GLC at 140 locations in central London also bear out the importance of heavy vehicles in determining noise levels under urban traffic conditions. For example, at 1200 vehicles per hour there is a difference of 9 dB(A) between 16% heavy and 50% heavy, all other conditions remaining equal. A doubling of total traffic volume on the other hand would only give an increase of 3 dB(A). Although this data is now rather old (1965), there is no reason to suppose that it would be markedly different today. At higher speeds the importance of the proportion of heavy vehicles in the traffic streams decreases.

Reduction at Source

In many cases the most effective way of reducing noise is at source, and on the 'polluter pays' principle this also appears to be the most equitable. From a purely technical point of view much has already been achieved in this respect by work at the Institute of Sound and Vibration Research at Southampton University, the Motor Industries Research Association and the Transport and Road Research Labortories, and there are now few problems in achieving substantial reductions. In Britain, the Quiet Heavy Lorry Project showed in 1979 that a 10 dB(A) reduction, i.e., a halving of preceived loudness, was achievable on a 38 tonne heavy goods vehicle. The vehicle used for this was a Foden truck with a Rolls Royce Eagle turbo-charged diesel engine. In drive-by tests under BS 3425 conditions the Quiet Heavy Vehicle registered 81 dB(A) compared to 90 to 92 dB(A) prior to modification.

Recent work in Germany has been even more impressive and Magirus Deutz have modified 7.5 tonne lorries, reducing their noise levels from 90 to 74 dB(A). This however added approximately 7.6% to the capital cost of the trucks. These vehicles are now in service with the German post office and work is in progress on reducing the noise of substantially larger trucks.

In the United States the Department of Transport has also sponsored research on a Quiet Truck Programme, with the objective of producing vehicles emitting not more than 81 dB(A) under ISO test conditions. It was estimated that the capital cost for an 81 dB(A) truck would be about 5% greater than for a similar unmodified truck rating 94 dB(A). Fuel costs were considered likely to decrease slightly due to increased efficiency, but maintenance costs would increase due to more difficult access to the engine.

From these and other data it seems clear that quieter heavy vehicles are feasible, if both the motor industry and the operators are willing to pay for it and if investment in quieter vehicles is encouraged by realistic legislation on vehicle noise emission.

Vehicle Noise Standards

Noise emission from motor vehicles in the United Kingdom is controlled by the Motor Vehicles (Construction and Use) Regulations 1978, updated by Statutory Instrument 1166 (1980). The maximum permitted level for lorries under these regulations is 89 dB(A). In accordance with the European Commission Directive, 77/212/EEC lorries manufactured on or after 1 April 1983 and coming into use on or after 1 October 1983 will be subject to the following limits:

(a) vehicles intended for the carriage of goods and having a permissible maximum weight not exceeding 3.5 tonnes -81 dB(A);

(b) vehicles intended for the carriage of goods and having a permissible maximum weight exceeding 3.5 tonnes -86 dB(A);

(c) vehicles intended for the carriage of goods or materials, having an engine power equal to or exceeding 200 hp DIN and a permissible maximum weight exceeding 12 tonnes -88 dB(A).

The European Commission stated in 1977 that by 1985, noise limits should again be reduced with the aim of having an 80 dB(A) limit for all new vehicles under the Construction Regulations, but in a written reply in August 1981 it was stated that 'the Commission is not at present in a position to give a binding commitment as to a date on which a proposal on this matter will be placed before the Council or in respect of the limit value such a proposal may contain'. The British Government has recently stated that new lorries coming onto the road in the 1990s should be no noisier than most 1981 new model cars. This implies a target of 80 dB(A) and the halving of present noise levels.

The effects of reducing noise at source

The gradual reductions in permissible noise levels from motor vehicles cannot be expected to have any immediate or even early effect, as legislation usually only applies to vehicles coming into service after a given date (e.g. October 1983 for the next reductions in the U.K.), and the useful life of commercial vehicles is understood to be 10 to 15 years. Thus it is unlikely to be before 1990 that the majority of commercial vehicles on the road will meet the noise limits in the latest EC Directive and it seems equally unlikely that all vehicles would meet the suggested 80 dB(A) standard before the end of the century. The proportion of new and quieter vehicles in the general traffic will no doubt increase, but the extent of this will be dependent on, among other factors, the economic situation and the degree of encouragement given for quieter vehicles by the government. Recent estimates in the United Kingdom have suggested, that if all lorries were quietened by 10 dB(A) in a traffic stream with 1500 vehicles per hour including 10% heavy commercial vehicles, the noise level would be reduced by 2.0 dB(A), and if it included 40% heavies, the level would be reduced by 6.3 dB(A). This estimate assumes freely flowing traffic and the effect of reducing the noise of

lorries is probably under-estimated as far as urban traffic conditions are concerned, as for slowly moving traffic the importance of lorry noise, and consequently also of reductions in lorry noise, become greater. Although it is well worthwhile and indeed essential to reduce the noise at source of those vehicles making the greatest contribution to urban traffic noise, this by itself cannot provide a complete solution even in the long term. Other methods such as traffic restraint or bans also need to be considered, and are particularly important during the period before the proposed lowering of noise limits can be expected to have a noticeable effect.

Traffic restraint

There are two levels of traffic restraint which can be used to mitigate the effect of noise from heavy commercial vehicles. One is to ban all vehicles over a certain size or weight from a particular road or area at all times, and the other is to apply the restriction only during certain hours, usually at night. If lorries are banned from using specific roads, they will need to use alternative routes, and if they are banned from an area they are in practice likely to concentrate on a particular route on the periphery of that area which then effectively becomes a lorry route even though it may not be described as such. Taking an area as a whole, there is generally a net environmental benefit if lorry traffic is restricted to specific roads, particularly if these are main roads. The noise increase on an already busy road is likely to be slight or negligible, while the noise decrease in the minor roads is likely to be clearly noticeable. Nevertheless, however small the increase in noise on a major road, it is still an increase, and likely to lead to resentment which would probably not be allayed by references to improvements for the area as whole. This could perhaps be overcome if it were possible to offer compensation to those people affected. Unfortunately under present legislation in the United Kingdom, ther is no provision for such action, as the Land Compensation Act 1973 only applies where there is a new road, or a physical alteration to an existing one.

Noise at night, particularly from individual vehicles on lightly trafficked roads, is a widespread problem which cannot easily be quantified because of the lack of statistics on traffic flows and of adequate descriptors of noise levels in minor roads. A specific problem related to lorries, is that they are sometimes parked overnight in residential roads, and started up in the very early hours of the morning. Night time restrictions on the passage of heavy commercial vehicles through residential areas, and a ban on overnight parking can be an effective way of reducing this particular problem, providing of course that adequate and carefully located lorry parks for overnight parking can be provided, and that access to these does not itself cause new problems.

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