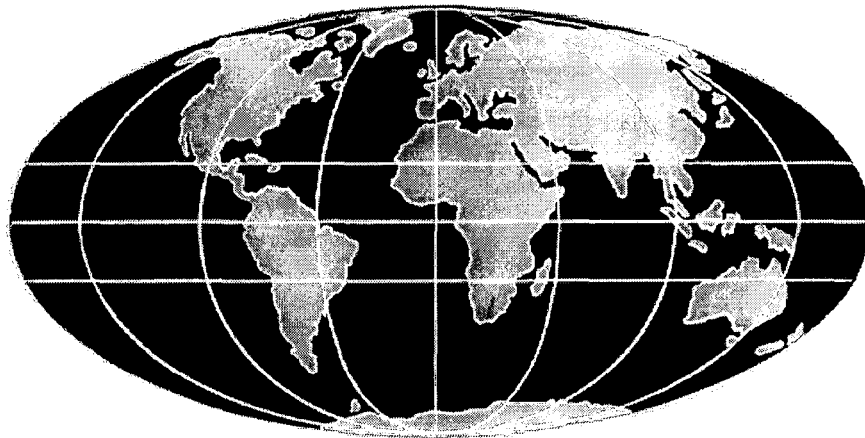


**TITLE:            Vehicle Roadworthiness  
                     Inspections – A Guide to  
                     Their Establishment and  
                     Maintenance**

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# Vehicle Roadworthiness Inspections - A Guide to Their Establishment and Maintenance

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## INTRODUCTION

Many countries have a requirement for vehicles to be maintained in a safe, roadworthy condition before use on their roads. A smaller number have an organisation that is required to inspect some or all vehicles at regular intervals and an even smaller number of countries ensure that the inspections are carried out in a fair, honest and effective manner.

This paper is designed to be of assistance to those countries that wish to improve their existing system of roadworthiness testing and to those who wish to introduce such a system. The paper examines the general requirements for legislation and for the organisation of the test; the procedures and requirements for carrying out a roadworthiness inspection. It is not intended to be a technical paper proposing methods of inspection or standards to be met or even the exact pieces of equipment required for the inspection. The actual items and the standards to which they should be tested will vary from country to country. They will depend on road and vehicle conditions, the resources available for inspection equipment and the maintenance and repair facilities available to enable owners to meet the inspection requirements.

## LEGISLATION REQUIREMENTS

In the United Kingdom (UK) there are, broadly, three sets of regulations, with amendments, which cover the use of vehicles on the roads. These are issued as Statutory Instruments (SI):

- SI No. 1078 Road Vehicles (Construction and Use) Regulations 1986

- SI No. 1796 The Road Vehicles Lighting Regulations 1989 and
- SI No. 1694 The Motor Vehicles (Test) Regulations 1981

There are other Acts and SIs which cover the full sphere of transport activities in the UK but, for the purpose of this guide, the three SIs above are the most relevant to the roadworthiness of vehicles. All these regulations are made under the powers of the UK Road Traffic Act 1972 or 1988 and are subject to amendment as necessary. In turn, these regulations may be subject to amendment by a variety of European Community [EC] Directives. The relevant Directive is 96/96/EC entitled "on the approximation of laws of the Member States relating to roadworthiness tests for motor vehicles and their trailers."

This section of the guide considers the need for each of these legislative tools and will also consider the relevance of the EC Directives to a wider sphere of use than originally envisaged by those composing them.

### Construction and Use and Lighting Regulations

The Construction and Use Regulations (C & U Regs) are designed to control the method and scope of vehicle construction in the UK insofar as they affect the way vehicles are built or adapted for their intended use. There are also conditions relating to the use to which a vehicle may be put including weights and dimensions, the use of trailers, control of noise and avoidance of danger.

The Lighting Regulations specify the type and number of lights, reflectors and reflective markings to be fitted to road vehicles, the

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reasons they are required and the occasions they must be used.

### **Roadworthiness Test Legislation**

This legislation covers the definition of vehicle classes required to have roadworthiness certificates, exemptions from requirements, authorised examiners, general administration of the vehicle examination procedure, appeals, fees, records and monitoring of premises. Separate annexes cover the items to be inspected, the manner and conditions for carrying out examinations and the equipment to be used.

The regulations do not cover the standard to which components should be inspected or particular failure modes - they are enabling regulations and will refer back to the relevant sections of the C & U Regs and the Lighting Regulations. Individual component or system standards are specified in the testers' manuals and in specific EC Directives such as 94/23/EC which specifies minimum braking standards or 92/55/EEC which specifies maximum limits for exhaust emissions. It should be noted that member states of the EC, such as the UK, are at liberty to impose stricter standards than those specified in these Directives.

### **Relevance to Countries Improving or Introducing Roadworthiness Testing**

Many countries already have legislation that is intended to govern the routine roadworthiness tests required of (or part of) their fleet. Particularly in countries that are ex-colonial countries (including ex-members of the USSR) this is based on legislation drawn up by the previous colonial administration and either not updated or revised by a piecemeal process. Requirements for roadworthiness testing may not be accompanied by C & U legislation and, frequently, only covers the components to be inspected and the standards to be met.

Countries with small fleets of vehicles and restricted wealth cannot afford to draw up their own C & U regulations to meet their own particular needs or requirements that do not

correspond with those from other countries or regions such as the EC. If such regulations are drawn up they will either be ignored or manufacturers/importers will no longer import vehicles. It will not be economically viable to tailor a vehicle for a market that may be worth, at best, only a few thousand units per annum. Consequently it is recommended that such legislation is adopted with only a few essential alterations to suit local driving conditions. It should be noted that, even though such legislation might be adopted, it would not be necessary for roadworthiness testing to be based on the same standards or even to the full extent of the base legislation.

The frequency of testing is one of aspect that could improve the standards considerably. Some countries require 6 monthly testing of some or all of the vehicles that are to be tested. By reducing the frequency to 12 monthly, the time available per vehicle is immediately doubled and the pressure on staff is drastically reduced. If testing is not being carried out correctly, twice a year, there is no sensible reason for keeping to such a test frequency.

The location of testing centres is important and it may well be better in both safety and administrative terms to locate initial testing in the capital or at most the major cities. Supervision and skilled labour will be easier to administer, traffic levels are normally significantly higher and enforcement is easier to undertake. Once a vehicle testing scheme is operating satisfactorily in the capital it can be expanded to the regions. The priorities for improvements noted in countries are quite similar with administrative and organisational problems being most often mentioned.

Import of vehicles from countries/regions with differing standards can cause problems. It is noted that many countries, especially in Eastern Africa, import second hand Japanese cars from the Middle East or directly from Japan without worrying about build standards or even the availability of spares or suitability to local conditions. In the short term these vehicles appear attractive but in the long term they have the potential to cause significant problems. Without being modified their life after

importation may be shorter than that of an "approved" African market car due to lack of spares and possible unsuitability to local conditions. It is, however, recognised that this is a difficult problem to solve. In the short term foreign exchange requirements are also reduced as the unit cost is perhaps half the new cost. Although these vehicles may be several years old and hence not incorporate the latest technology there is no suggestion that such vehicles are unsafe and in fact may be simpler to maintain. There may be no spares back up from the authorised importers, however, and the possible substitution of manufacturers' official spares with fake, possibly low standard, spares may prove a safety problem.

On a global scale, however, the idea of transporting vehicles from high income countries to those with a lower income can make sense. By importing vehicles from countries that have an exceptionally high roadworthiness requirement, e.g. Japan and/or a poor second hand market, e.g. Dubai, the lives of vehicles can be extended considerably and the global effect of car production can be reduced.

The detailed consideration of the import of second hand cars, although important, is nevertheless beyond the scope of this guide. The availability of cars designed for different conditions and markets should be taken into account when drawing up C & U regulations.

**TEST PROCEDURES AND REQUIREMENTS**

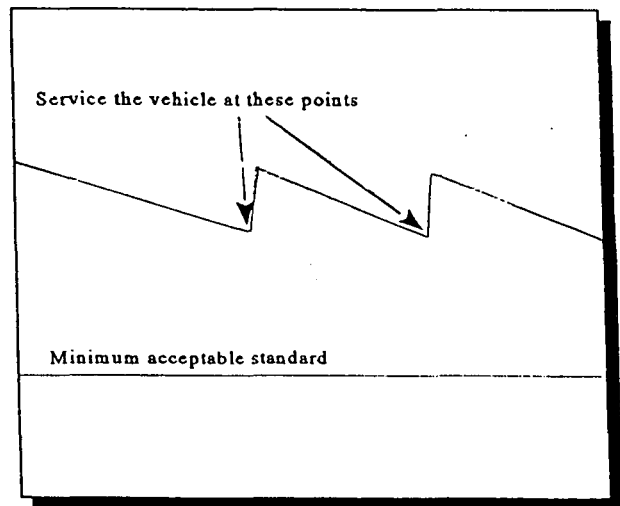
**Minimum Acceptable Standard**

This approach considers the condition of the vehicle on the day of inspection only and examines the performance of the various sub-systems as they can be evaluated without dismantling but purely by operating or inspecting. For example the performance of the brakes is examined using a roller brake tester. From this test a number of different parameters can be evaluated. The overall brake efficiency is the prime measurement the balance from left to right and front to rear, distortion in or binding of the brake drum or disc, and any lag in the braking system that prevents all the vehicle

brakes from being applied at the same time can be evaluated.

The author firmly believes the annual fitness test should ensure, on at least one day a year, that vehicles are at a minimum acceptable standard. The phrase "Minimum Acceptable Standard" has a very clear meaning and is one that should be appreciated by all vehicle operators. It means these are the lowest standards that vehicles should be allowed to fall into; vehicles that are maintained to "Minimum acceptable standards" will be unsafe and in an unroadworthy condition for most of their time on the roads. It follows that vehicles should be maintained to a higher standard to allow for any deterioration between servicing to ensure that they do not reach a condition in which they are unsafe to use. Responsible operators and owners will ensure that their vehicles are maintained at a level significantly above the minimum. Figure 1, below, illustrates this relationship graphically.

Figure 1 : Comparison of ideal standards of maintenance and examination



**Written Procedures for Vehicle Inspection with Failure Modes**

Procedures for inspecting vehicles must be clearly and unambiguously published. They should be available for members of the public who wish to prepare their own vehicles for the test, for garages involved in the repair and

maintenance of such vehicles and for the examiners themselves to ensure that they carry out the tests correctly.

The UK uses four types of manuals. The first is for light vehicles<sup>2</sup> the second for motorcycles<sup>3</sup> and the third and fourth for heavy goods vehicles (HGV)<sup>4</sup> and public service vehicles (PSV - buses and coaches)<sup>5</sup>. The light vehicle manual arranges the information in three columns: Information, Method of Inspection and Reason for Rejection. The column labelled "Information" relates to exceptions to the inspection, to particular definitions or to information that will assist in the performance of the test. The "Method of Inspection" defines how the inspection should be carried out and, in particular, what faults or defects the inspector is looking for. The "Reason for Rejection" is largely self explanatory and gives precise wording to define how a component or system will fail the test. Words used in this section will have precise meanings

that should be clearly understood by those using the manual. The motorcycle manual is similarly arranged in three columns but in a different order.

The HGV and PSV manuals contain much material that is common but, especially with respect to body type, are issued separately as they have separate audiences. Few operators run a mixed fleet of HGVs and PSVs.

### Equipment Requirements

Although equipment is essential for many of the tests used in the UK it is not totally indispensable and it may often be feasible to replace it with low cost alternatives or by simplified test procedures. Although precision and accuracy may suffer, similar tests may be carried out with such equipment. Table 1 below gives an indication of equipment requirements for different levels of roadworthiness testing.

**Table-1 : Equipment Requirements**

Level of testing	Equipment
<b>Basic</b> <ul style="list-style-type: none"> <li>• No previous effective testing</li> <li>• &lt;20 veh/1000 inhabitants</li> <li>• GDP per capita &lt;\$500</li> <li>• Widespread evasion of testing</li> </ul>	<b>Low cost equipment:</b> <ul style="list-style-type: none"> <li>• Headlamp pattern marked on wall</li> <li>• Black smoke visual inspection</li> <li>• Brake test on road using decelerometer</li> </ul>
<b>Medium</b> <ul style="list-style-type: none"> <li>• Testing carried out but has been restricted due to domestic situation or lack of resources</li> <li>• &lt;100 veh/1000 inhabitants</li> <li>• GDP per capita &gt;\$500</li> <li>• Evasion common</li> </ul>	<b>Mixture of equipment</b> <ul style="list-style-type: none"> <li>• Optical headlamp meter</li> <li>• Black smoke meter</li> <li>• Tyre tread depth gauge [low cost]</li> <li>• Roller brake tester for heavy vehicles</li> <li>• Road test using decelerometer for light vehicles</li> <li>• Steering free play meter</li> </ul>
<b>High</b> <ul style="list-style-type: none"> <li>• Routine testing to consistent international standards</li> <li>• &gt;100 veh/1000 inhabitants</li> <li>• GDP per capita &gt;\$3000</li> </ul>	<b>High quality, standardised equipment [Annex 4]</b> <ul style="list-style-type: none"> <li>• Optical headlamp meter</li> <li>• Black smoke meter</li> <li>• CO/HC meter</li> <li>• Tyre tread depth gauge</li> <li>• Roller brake tester for all vehicles</li> <li>• Steering free play and suspension checking equipment</li> </ul>
<b>State of the art</b> <ul style="list-style-type: none"> <li>• High motorisation with need for control of vehicle numbers</li> <li>• High income GDP per capita &gt;\$10,000</li> </ul>	<ul style="list-style-type: none"> <li>• Computer controlled equipment giving the minimum of operator subjectivity and the maximum throughput.</li> <li>• Possible full control by one organisation</li> <li>• High security documentation and control paramount</li> </ul>

It should be noted that computers are now relatively inexpensive so that even the lowest cost organisation should actively consider their introduction for all aspects of administration.

Equipment is often designed by a manufacturer for a particular market. When sold in a new market, the problem arises of lack of know-how, both in equipment operation and maintenance. The provision of equipment without maintenance contracts is frequent even if the inspectors have been given instruction in operation of the equipment. In several countries roller brake testers have been observed in an unserviceable condition because of a lack of maintenance and parts. In other countries this may be compounded by the donation of equipment without any training or maintenance backup at all.

The preparation of clear, written procedures, possibly in the local language but most definitely in the official language, is essential. These procedures should include elementary fault finding, routine calibration, cleaning and basic maintenance. Where the results from testing a system are dependent on the design of that system then amplification notes must be provided. More complex maintenance should be contracted to the local agent for the equipment or to a reputable local company with skills in the maintenance of electromechanical equipment. Training staff in-house is rarely cost effective and may just lead to the rapid departure of trained staff to a better paid job.

#### **Fee Levels for Different Vehicle Classes**

Vehicle roadworthiness testing is a road safety measure and the general public should be encouraged to view it as such. This emphasis on road safety should not be confused with a revenue raising exercise as the wrong message will be sent and evasion will become difficult to stop. The institution or company performing the tests should be able to recover its costs and, if a private company, to make a realistic but limited profit. The procedure in the UK is that charges are set at a maximum level. Garages may charge less [or nothing!] if they wish as long as they carry out a proper inspection. The

business may decide that it can make more money by using the roadworthiness inspection as a "loss leader", that is, in the hope that owners will have their vehicles repaired by the garage when/if they fail. Similarly, retest fees are set and a free retest may be permitted if a vehicle fails on certain items, or is returned within a certain period for retest or is repaired and retested by the inspecting garage. Strict monitoring is required if garages are not to fail vehicles deliberately but this would be an essential part of any test procedure.

#### **Qualified/Trained Staff**

The minimum qualifications for technical staff should be that of vehicle mechanic but this should not be seen as a licence to permit a mechanic to act as a vehicle inspector without further training. In the UK a five day course is required to train mechanics in the techniques of inspecting heavy vehicles although the training course for both HGVs and PSVs includes a considerable amount of duplication. A full course including the necessary administration requirements of the test would therefore take, for all vehicles, about twelve days for a test regime of medium to high standards with slightly less time required for a more abbreviated test regime. It is suggested that the syllabi for different classes of vehicles should be common although the standards to which inspectors will test vehicles will vary depending on the vehicle.

#### **Security**

The security aspects of vehicle roadworthiness testing result from the value that a vehicle gains once it has a roadworthiness certificate. Not only is there relative immunity from police attention but also the vehicle is worth more when it is sold. There are a number of aspects of the entire process that require attention and this section looks at the more common failings found in less advanced systems.

Inspection staff should not be permitted to hold or handle cash during the process of inspection and certification. The ideal method is to have a cash room with access for payment

only through a grill or window. Payment of the required fee would result in the vehicle owner being given a token that would [a] give him a guaranteed inspection and [b] give him a place in the queue of vehicles or [c] an assigned time and date if a booking scheme was in existence. The token could take the form of a flag or magnetic placard to be placed on the vehicle acting as a clear identification. No staff other than the cashier's staff would then be permitted access to the cash room and consequently all money could be properly accounted for.

Security of documents, especially pass certificates is essential. The ideal form of certificate will vary depending on level of sophistication involved but, at the very minimum, it is recommended that computer generated certificates should be used. Theft of these would be difficult as they physically would not exist until they were authorised and the use of special papers to make alteration or erasure impossible is quite practical at a modest cost.

More sophisticated systems in which all the vehicle data is held on computer should consider the use of 'Smart' cards. These are credit card sized and can contain sufficient information to identify the vehicle details, owner details, roadworthiness test information and whether annual taxes have been paid. The cost of these is about £2.00 (Rs120) each and the use of hand held scanners by the inspectors and the police to interrogate them is quite simple.

Such 'Smart' cards can also be incorporated into computer controlled inspection systems thus providing a fully identified up to date and secure record of vehicle performance during the life of the vehicle.

Setting up a through flow production line in which technical staff are only responsible for part of the examination is one way of cutting down the potential for corrupt practices. It is obviously much more difficult to bribe three or four inspectors than one. Naturally where the workload of a test station is low this may be difficult to organise. In larger test stations with a high throughput of vehicles this is an essential part of controlling the potential for corruption. When this method is linked to a random

allotment of staff to tasks it is very difficult for planned corruption to take place.

It may be possible to move inspectors around the country at intervals but this may prove difficult. Nevertheless it may be necessary to prohibit inspectors from working in their home town or region.

### **Pass rates and Other Measures of Performance**

Public acceptance and accountability of a more stringent test regime may be easier to achieve if not only the benefits but also the fairness of the new system can be demonstrated and proven. In addition, precise monitoring of pass (or fail) rates for vehicles, inspectors and components and of productivity will give the management a clear measure of the overall performance of the inspection system and of changes in demand.

The time required for an individual test will obviously depend on the number of items required for testing and the complexity of the inspection itself. The mean time for an inspection should be set as the result of careful trialing and will be different for different classes of vehicles. It is important the vehicle inspectors are not overloaded in terms of their work as the result will either be one of skimmed inspections or of unacceptably long waiting times for vehicle owners. Publication of these standards and the degree to which they are met is an important indicator of efficiency. It is unlikely that the average workload would exceed 3 inspections per man per hour.

Some of the pass rate monitoring should only be for the organisation's own quality assurance purposes but the overall pass rates for different classes of vehicles should be published together with the numbers of vehicles inspected. Monitoring of detailed pass rate statistics will identify inspectors who are not performing to standard or particular problems with vehicles presented for inspection. Pass rates that are too low are just as important a problem as those which are too high as they may indicate an unacceptably strict inspection standard set by one inspector or test station.



There may well be times when the system fails to deliver an acceptable standard of performance. If, for example, a vehicle is incorrectly failed then the owner should have some right of redress. This should take the form of an agreed appeals procedure that would be triggered when the aggrieved party completes an appeal form at the time of the inspection. This is especially valuable when testing is carried out by an independent, private organisation. The appeals procedure should then be handled by the regulating body which will normally be the department responsible for administering the test procedure. It is also important that the appeal is made at the time of inspection and that the regulating body responds within a very short time.

Clear lines of accountability within the organisation are essential. The test station manager is responsible for the quality of work performed by his staff and so on up the management chain to the Minister. In turn the test station staff must be made clearly accountable for the quality of work that they perform and should realise that it is a disciplinary offence to falsify test results. These procedures must also apply if the testing is carried out by a private company in which the ultimate sanction could be loss of contract plus a fine.

#### **Who Should Carry Out Inspections?**

Most countries use a state organisation to perform the inspections but the inspection system can be publicly or privately owned or a combination of both. However testing is performed, the organisation responsible should be subject to regulation by a government department. In the UK, testing of large commercial vehicles and buses is carried out by the state while light vehicle testing is carried out privately. The Vehicle Inspectorate (VI), which carries out the heavy vehicle testing, is also responsible for regulation of all testing in the UK.

#### **Private Ownership and Operation**

Full private ownership reduces the capital costs to the state to a minimum but necessitates

strong and independent supervision of testing standards, facilities and training of testing station staff. This system has been adopted by Singapore where contractors, all qualified to ISO 9002, have been licensed. In the UK, testing of light vehicles is similarly carried out by this system.

#### **Public Ownership/Private Operation**

Public ownership of the facility, but operated by a private enterprise, is one of three systems operated in Hong Kong. The right to carry out the business is frequently offered for contract. This has the advantage of lowering the immediate capital cost to small operators interested in tendering and, if the government maintains a presence in the testing station for booking and other functions, it is possible to closely monitor standards. It increases the government capital outlay but ensures that government keeps close control over property and land rights.

#### **Public Ownership and Operation**

Public ownership and operation of the facility is the system used in the UK for much of the testing of HGVs and PSVs. It ties up considerable government capital but can offer an unbiased and relatively corruption free service whose running costs may be completely funded from test fees. It is appreciated by most vehicle operators whose associations canvassed for its retention when privatisation of the testing system was proposed. This system is the most common around the world but, unless properly funded, organised and monitored, the possibilities of corruption may be higher in an inefficient government system.

#### **Private Ownership/Public Operation**

Private ownership of the facility with testing carried out by public sector inspectors is a system being encouraged in the UK by the Vehicle Inspectorate. The private operator installs equipment in his premises to the specification of the VI. Tests are booked through the parent VI Test Station by operators who wish to have their vehicles tested in the facility. A vehicle inspector visits the premises

to a regular programme and carries out the tests. This has the advantage of providing a more immediate service to the customer, reducing travelling and down time and decreasing capital investment by the state. The disadvantages may be lack of control over facilities and equipment standards and increased staff costs to the Inspectorate.

### Independence from the Police

The function of the police force in a country should be to enforce the law. It is important that the police are not directly involved in the testing or inspection of vehicles for two reasons. The first is that, in most countries, they will have very little technical knowledge and, secondly, that there may well be a conflict of interest between the police who have just carried out an inspection and the police who then stop a vehicle 100 m up the road.

The police certainly have a part to play in the enforcement of construction and use regulations via the medium of random roadside checks. However, the organisation of these should be that the police stop the vehicles, inspect documents and charge the driver, if necessary, while authorised vehicle inspectors carry out a technical inspection of the vehicle. Vehicle weight checking can also be incorporated in such inspections and such a combined task force can form a very useful enforcement tool for long or short periods.

### Vehicles to be Tested

There is no automatic choice of category for the testing of vehicles. The EC sets a minimum requirement but this may be (and in the UK is) altered to suit an individual country's requirements. Annex 1 of EC directive 96/96/EC defines these minimum requirements and this is reproduced in Table 2 below.

**Table-2 : EC Minimum Requirements**

Categories of vehicle	Frequency of tests
1 Motor vehicles used for the carriage of passengers and with more than eight seats, excluding the driver's seat	One year after the date on which the vehicle was first used and thereafter annually
2 Motor vehicles used for the carriage of goods and having a maximum permissible weight exceeding 3500 kg	One year after the date on which the vehicle was first used and thereafter annually
3 Trailers and semi-trailers with a maximum permissible weight exceeding 3500 kg	One year after the date on which the vehicle was first used and thereafter annually
4 Taxis, ambulances	One year after the date on which the vehicle was first used and thereafter annually
5 Motor vehicles with at least four wheels, normally used for the road carriage of goods and with a maximum permissible weight not exceeding 3500 kg, excluding agricultural tractors and machinery	Four years after the date on which the vehicle was first used and thereafter every two years
6 Motor vehicles used for the road carriage of passengers and with not more than eight seats, excluding the driver's seat	Four years after the date on which the vehicle was first used and thereafter every two years

The requirement for different classes of vehicles to be tested relies on two main points. One is the resources available in the country to perform the tests and the second is the potential for causing death and destruction when a fault causes or contributes to an accident. By these two factors it can be seen that trucks and buses (including all vehicles used for public transport) are given the highest priority.

Not only are the physical numbers of trucks and buses in most countries of a manageable size but when an accident occurs involving one of these vehicles it is not unusual for the death toll to enter double figures. The cost effectiveness of tackling these vehicles initially can therefore easily be established for a given country. Conversely, the testing of motorcycles is most likely to be of the lowest priority as accidents involving them may cause injury to the rider but rarely to other people and the large numbers of motorcycles in many countries would result in a disproportionate demand on available resources.

In conclusion, concentration on trucks and buses first, and then gradually expanding the system as resources and experience grows, is the best way of implementing an effective vehicle roadworthiness inspection system. Absolute vehicle numbers are kept to a manageable number while the vehicles with the potential for causing the most damage are targeted first.

### CONCLUSIONS

- A clear, unambiguous legal framework is essential before attempting to improve or introduce vehicle roadworthiness testing. The laws should be framed firstly to control how vehicles should be constructed and used and, secondly, as enabling legislation which permits the regular, in-service inspection of vehicles. This enabling legislation will be modified by specific regulations which will define standards required for testing, procedures for testing and reasons for rejection of different categories of vehicles and sub-systems.
- Test procedures and requirements will include the full sphere of management and administration of a vehicle inspection scheme. These written procedures should cover all aspects of testing and should include equipment operation and testing methodology. Clear written procedures are essential and their availability to the public is necessary to enable full acceptance of the vehicle inspection scheme. There can be no reason for making any aspect of these procedures confidential as the object of the whole exercise is to improve vehicle safety.
- The current EC Directives and Vehicle Inspectorate manuals form an excellent basis for the introduction and establishment of roadworthiness testing in a country.
- Fee levels should be set to ensure that the operation is not only self financing but will also generate sufficient income to invest for the future expansion and replacement of equipment and facilities when required.
- Training of staff to inspect vehicles should be viewed as a necessary supplement to basic mechanical engineering qualifications. The ability to inspect a vehicle needs to be taught in addition to the mechanical skills that should be possessed by all inspectors.
- Security of cash and accountable documents is required to maintain an honest and efficient organisation and to ensure public confidence in the scheme. The security should also consider the physical organisation of testing to reduce the occurrence of corrupt practises.
- The possibility of incorporating the private sector with the public sector in vehicle inspections needs to be carefully evaluated. In general, independence from the police will enable an objective measurement of effectiveness to be established via random roadside checks undertaken by the police.
- Choice of vehicle category required for testing should be made on the basis of damage potential and resources available within the country but it is likely in the first instance to be restricted to heavy commercial vehicle (trucks and buses) testing.

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- 5 Public Service Vehicle Inspection Manual. Published by HMSO, 1997, ISBN 0 11 551813 4

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