



FIA Foundation
for the Automobile and Society

Seat belt campaign toolkit



In association with:



Researched and compiled by:





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Foreword

Many people are alive today only because they were protected by their seat belt in a crash. In highly motorised countries more than 300,000 deaths have been prevented by seat belts over the past 25 years, according to estimates.

Yet seat belt compliance is worryingly low in those countries where car use is now rising most rapidly. In parts of Asia, Eastern Europe and former CIS states, in Latin America and in some African countries motorisation is increasing dramatically. Thousands of entirely preventable deaths and serious injuries are occurring because the message about seat belts is not getting through to motorists. More needs to be done to convince political leaders, police authorities and individual motorists and passengers that seat belts are essential for safe driving.

This seat belt campaign toolkit has been researched and compiled on behalf of the FIA Foundation by the highly experienced international team at the UK Transport Research Laboratory (TRL). The toolkit sets out the arguments and the facts for seat belts. For those countries that already have legislation on the fitting and wearing of seat belts, advice is provided on raising compliance by a range of techniques including enforcement, publicity, education and incentive schemes. For countries seeking to introduce or update seat belt laws, the toolkit advises on legislation and technical regulation governing the design, manufacture and use of seat belts, and how to create a suitable environment for their introduction.

The CD ROM which accompanies the toolkit contains artwork and animations developed by the FIA Foundation for a seat belt awareness campaign. This is a free resource and we hope you find it useful.

Strategies that work in one country may not necessarily transfer effectively to another. The toolkit attempts to reflect a range of experiences from around the world, but does not offer prescriptive solutions. Rather, it is hoped that the toolkit can act as a catalyst for local initiatives and actions to improve road safety. It provides a base of information from which you can raise your own questions and solutions and develop advocacy tools for seat belt use that will work with the audiences you are trying to reach.

Who is the toolkit for?

- The toolkit is intended to provide relevant information and give guidance to those countries that have poor vehicle occupant wearing rates and/or do not, at present, have national legislation covering the fitment and wearing of seat belts. Advice is given on how to introduce appropriate legislation covering all key issues.
- Ultimately, the toolkit targets all key stakeholders. These include:
 - Policy makers,
 - Safety professionals,
 - Safety organisations,
 - Motoring and transport associations,
 - The private sector especially vehicle and component (including seat belt) manufacturers,
 - Importers,
 - Dealers,
 - Garages,
 - Insurance and,
 - Transport operators.
- The toolkit gives practical guidance on which type and design of seat belt should be considered for front and rear seat occupants in cars, vans and mini-buses, and also for commercial coaches. Guidance is also provided for appropriate child restraint systems.
- For those countries that already have seat belt legislation but where wearing rates are low, advice is given on how rates can be improved by the use of enforcement techniques, education programmes, publicity campaigns and incentive schemes, and also on how these various measures can be funded.
- Advice is given on monitoring and evaluation of new legislation and also on methods used to increase wearing rates.
- The toolkit has been produced (initially) in English and is available from the FIA Foundation.
- If required, TRL Ltd would be pleased to provide any additional advice and guidance and also to deal with queries concerning the toolkit. The resources highlighted through this toolkit offer examples of good practice. However, these are not exhaustive. TRL Ltd would welcome any opportunity to assist in the development and evaluation of future practices. If further advice is needed, readers should contact Darren Divall, TRL Ltd, email: ddivall@trl.co.uk.

How to use the toolkit

- The toolkit is divided into six sections:

1. Introduction

Containing current information relating to road death and injury worldwide. This section highlights the role of the seat belt, providing explanations of the benefits of use and how an increase in wearing rates can reduce the number of deaths and injuries taking place.

2. Raising Compliance

Practical guidance is offered in this section covering enforcement, publicity, education and incentive campaigns. This section also provides advice on potential funding of road safety campaigns and highlights the importance of the insurance industry, and private and public organisations to ensure increases in national wearing rates.

3. Monitoring and Evaluation

This section outlines the campaigners' responsibility to monitor and evaluate all campaigns in order to develop for the future and maintain compliance with legislation.

4. Manufacturing and Fitting of Seat Belts

This section provides key stakeholders with a checklist of actions to ensure, through legislation, that vehicles manufactured or sold within any country are fitted with seat belts that have been tested and approved by an independent Approval Authority based on United Nations Regulations. A recommendation is given on the most suitable standard. Section 4 also offers advice on testing, child restraints, vehicle owner maintenance and opportunities open to the private sector to increase seat belt availability and use.

5. Introducing Seat Belt Wearing Legislation

Before seat belt wearing legislation is introduced, it is important to have evaluated current wearing rates, and knowledge and awareness levels. This section provides a selection of tools to obtain the necessary information and create an environment that accepts the benefits of seat belts and subsequently the introduction of seat belt legislation. Recommendations of key points for legislation are given. Sub-section 5.3 also makes note of institutional constraints that may be encountered, and exemptions to the law that may need to be considered.

6. References and Appendices

Appendices include useful websites, a wearing rate sample survey form, a sample lesson plan and a guide for inspecting seat belts and their components.

- Many countries and states have yet to address the possibility of reducing road death and injury through the use of seat belts and child restraints. Some have only attempted to deal with the problem on a very basic level. For these countries, it is recommended that they systematically work through this toolkit to ensure a comprehensive approach that will increase vehicle occupant safety.
- Many countries and states, particularly in heavily motorised parts of the world have existing legislation for both the manufacturing and wearing/usage of seat belts and child restraints. Stakeholders should use the information in sections 2, 3, 4 and 5 to assess how current practice might be improved. There is little point in having legislation if it is not being enforced and supported by an interdisciplinary campaign. Therefore, key stakeholders should use the monitoring and evaluation tools highlighted in section 3 to identify if improvements can be made. Funding options and external support available to increase interdisciplinary campaigns can be found in sub-sections 2.7, 2.8 and 2.9.
- Countries and states that have simply legislated to ensure that seat belts are installed within vehicles as standard may find it beneficial to use the checklist provided in sub-section 4.11 to assess the validity of section 4 (Manufacturing and Fitting) to their country/state. All legislation and practices should be regularly monitored and evaluated and as such, the recommendations given in section 4 may prompt a more thorough review in order to adopt current practice particularly with the impending developments for child restraints.
- For those countries and states who believe that their current legislation and approach to seat belts and child restraints is adequate, it is recommended that key stakeholders review the practices and recommendations outlined within this toolkit. This should be seen as part of a comprehensive assessment of national initiatives to increase and monitor seat belt wearing rates.

Section 1: Introduction



Section 1: Introduction

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1.1 Introduction

Of the million or so people killed each year in road accidents worldwide and 30-40 million people injured, over 80 per cent take place in the developing and emerging nations of Africa, Latin America/Caribbean and Eastern Europe.

In the developed countries of North America, Western Europe and Japan, road deaths fell by approximately 10 per cent between 1990 and 2000. Unfortunately, over the same period road deaths increased in developing countries by between 30 to 100 per cent. In other words, in these countries the problem continues to worsen.

The wearing of seat belts could prevent many of these deaths and serious injuries taking place. **Thus, over the last 25 years, it is conservatively estimated that in highly motorised countries about 310,000 fatalities and more than 9 million moderate to critical injuries have been prevented through wearing of seat belts.**

Even in a safety conscious country such as the **United States of America**, it is thought that in the year 2000 **more than 10,000 lives were lost and over 140,000 people injured unnecessarily because they failed to wear their seat belts.**

Seat belts, of course, do not prevent an accident taking place. They do, however, play a crucial role in reducing the severity of injury to vehicle occupants involved in an accident.

It has been calculated that road accidents cost all developing and emerging countries combined approximately US\$85 billion per annum (with about 40 per cent of economic costs being injury related). Thus with a saving of 15 per cent of those killed and injured by greater use of seat belts, about US\$5 billion could be saved each year.

This toolkit provides essential information on how to introduce seat belt legislation nationally and how to increase wearing rates with improved enforcement techniques, education and publicity campaigns, and incentives schemes in countries where wearing rates are low.

The information provided within this toolkit has been collated after consultation with over 50 countries covering parts of Africa, the Americas, Asia, Europe, the Middle East and Oceania. Other sources of information include published literature, the Internet and detailed discussions with acknowledged experts.

1.2 Key facts

- Seat belts save lives: the simple act of buckling a safety belt can improve an occupant's chance of surviving a potentially fatal crash by 45 to 73 per cent.
- Between 1975 and 2000, the United States saved US\$588 billion in casualty costs due to seat belt use. The annual savings have increased significantly as seat belt wearing has increased amongst vehicle occupants.
- Airbags act as a supplementary measure to the performance of a seat belt. If an occupant is unrestrained, or the vehicle has an airbag installed but no seat belt, it is possible that the occupant may come into contact with the airbag before it has fully inflated. There is then a real risk of the vehicle occupant sustaining serious injury.
- As a result of its size and weight, a child may not be restrained properly by an adult seat belt. An appropriately designed and manufactured child restraint should always be used giving careful consideration to manufacturers fitting instructions.
- Seat belts should be checked regularly for fluffing and fraying, holes, cuts or nicks, damaged buckles, weak connections, and poor retracting or locking. Replacement seat belts should be installed if faults are found.
- Vehicle owners should consult a seat belt manufacturer before replacing any seat belts. Replacing webbing by other than the seat belt manufacturer concerned is not recommended.
- Second hand seat belts should never be used as replacements. The consequences of this could be catastrophic.
- Seat belt webbing should be completely replaced after a vehicle has been involved in an accident, even a minor accident.
- Education and publicity are important tools for increasing wearing rates, but usage will remain low without legislation and enforcement.
- Seat belts are not designed for comfort, they are there for safety – **Vehicle Users' Safety.**

1.3 Role of seat belts

Vehicle safety features are distinguished by two categories; 'Primary Safety' and 'Secondary Safety'. Primary safety features aim to prevent an accident taking place, e.g. good brakes, tyres. Secondary safety features aim to prevent/minimise injury to a vehicle occupant once the accident has occurred, e.g. side impact protection systems, airbags.

Seat belts are a secondary safety device with a number of objectives. These include:

Preventing ejection from the vehicle in an impact;



reducing the risk of contact with the interior of the vehicle or reducing the speed of such impacts;



providing a distributed force to the wearer to give the necessary support in an accident, restraining the vehicle occupant before guiding them back into their seat.



Note: There are two collisions to every accident. Firstly, the collision involving the vehicle and another object, e.g. another vehicle, barrier, form of street furniture or pedestrian. Secondly, the collision between the occupant and the seat belt, air bag or vehicle interior. Although there are many factors to consider, the first collision will affect the severity of any injuries sustained by the occupant. However, the use, or non-use of a safety device such as a seat belt in the second collision, will have possibly the greatest influence on the resulting injury to the vehicle occupant.

Seat belts do not prevent accidents from taking place; rather, they play a major role in reducing the severity of injury to vehicle occupants involved in a collision.

1.4 Effectiveness of seat belts

Studies conducted throughout the world since the 1950s have shown conclusively that seat belts, when worn and fitted correctly, save lives. The following results from research dating back to 1960 qualify this statement and outline the importance of such safety devices in vehicles.

Tourin and Garrett (1960) conducted a major study comparing 9,717 road crash victims (933 belt wearers and 8784 non-belt wearers). They concluded that **'users of safety belts sustained approximately 35 per cent less 'major-fatal' grade injuries than did non-users'**.

A study by the Nordisk Trafiksikkerhedsrad (1984) calculated that head injuries make up some 60% of all injuries to vehicle occupants. The study concluded that **'Drivers and front seat passengers who do not use seat belts suffer almost the same percentage of head injuries as non-users in rear seats'**. Therefore, **use of seat belts by rear seat passengers could not only reduce the likelihood and severity of injury to themselves, but also to drivers and/or front seat passengers.**

A review of the impact of legislation in the United Kingdom by Mackay (1985) showed a stable wearing rate of around 30% before the introduction of legislation. Within the first year of legislation and enforcement, wearing rates had risen to 90%. **This rise in seat belt use brought about a reduction in mortality and morbidity figures of approximately 25%.**

Reinfurt, et al. (1988) calculated that seat belt wearing, as a result of **legislation has reduced the percentage of fatalities by 6-21% in Australia, 10-12% in Sweden, 15-21% in the United Kingdom, 7-10% in the United States, and 25-30% in Germany.**

Blinco, et al. (2000) found that **'the simple act of buckling a safety belt can improve an occupant's chance of surviving a potentially fatal crash by 45 to 73 per cent'**.

Between 1975 and 2000, the United States saved US\$588 billion in casualty costs due to seat belt use. The annual savings have increased significantly as seat belt wearing has increased amongst vehicle occupants. For example, the annual economic saving due to seat belt use in 1975 was US\$1.5 million. By 2000, that figure had risen to US\$49.9 million. However, **road death and injury from non-use of seat belts still costs the American society 'an estimated US\$26 billion annually in medical care, lost productivity and other injury related costs'** (Blinco, et al. 2000).

The American College of Emergency Physicians (ACEP, 2002a) suggest that seat belts are the most effective means of reducing deaths and serious

injuries in traffic accidents. They also calculate that 75% of all vehicle occupants ejected from a vehicle in an accident die as a result. **'Seat belts provide the greatest protection against ejection in a crash'**.

The actions of rear seat passengers can have a sizeable impact firstly, on the number of casualties in an accident, but also on the severity of injuries, not only to themselves, but to the driver or front seat passenger. As Broughton (2002) states, 'it has long been recognised that in an accident **'an unrestrained rear seat passenger poses a serious threat to any restrained person seated directly ahead of them'**.

There have been a number of calculations made to determine the exact nature of the risk. Ichikawa, et al. (2002) believe that the risk of death to the restrained driver as a result of an unrestrained rear passenger is five times greater than if the passenger was wearing a seat belt Broughton (2002) questions the magnitude of this calculation, but does conclude that there is an increased risk to the driver. However, **'although the failure of the rear seat passenger to use a restraint does put the driver at risk, the risk is less than the risk to their own safety'**.

ACEP (2002b) also state that nearly all the people who have died from air bag related injuries in the United States, were either unrestrained or improperly restrained. Airbags are an active, high-energy device commonly designed to act as a supplementary measure to the performance of a seat belt. If an occupant is unrestrained, or the vehicle has an airbag installed but no seat belt, it is possible that the occupant may come into contact with the airbag before it has fully inflated. This is also the case for people who need to sit closer to the steering wheel as a result of their size. **Airbags deploy at approximately 300km/h. If the vehicle occupant comes into contact with the airbag before it is fully inflated, there is a real risk of the vehicle occupant sustaining serious injuries (mainly eye injuries)**. Therefore, vehicle occupants should ensure that they are restrained regardless of whether or not a vehicle has an air bag installed. Manufacturers should be aware of the potential implications of installing an airbag without also fitting a seat belt.

The ACEP (2002c) also provide advice on the relationship between speed and the use of seat belts. Speeding was a contributory factor in 30% of all fatal road accidents in the United States during 2000. 'The economic cost of this is almost US\$27.4 billion per year'. Although statistics show that speeding drivers are less likely to be wearing seat belts, **the use of a seat belt in an accident significantly improves the survival chances of the vehicle occupants**.

The pictures on the following page show the resulting position of four car occupants in a simulated side swipe accident with a bus.

**Position of occupants before impact.
Front passenger only wearing seat belt.**



**Position of occupants after impact. The
3 unbelted occupants would have at
least sustained serious injury.**



**Final position of occupants if seat belts
had been worn resulting in minor
injuries.**



**Side view of furthest forward position
with occupants wearing seat belts.**



(Pictures courtesy of RACC Club, Barcelona, Ajuntament de Barcelona and IDIADA Automotive Technology)

Note: Independent crash tests, such as Euro NCAP, Australian NCAP and the US Insurance Institute for Highway Safety, have resulted in significant improvements to the safety of vehicle occupants by highlighting to vehicle manufacturers areas where improvements in safety can be made. However, the testing also outlines to consumers, through the use of star ratings, how vehicles compare with respect to specific safety criteria. As a result, a myth can quickly develop that due to the safety rating of the vehicle through crash testing, some vehicles are safe enough that occupants do not have to wear features such as seat belts to further increase safety.

Stakeholders should endeavour to dispel this myth. Crash test ratings are based on all occupants being restrained by a seat belt and appropriate airbags deploying.

Methods should include:

- Information at the point of sale;
- information provided through the vehicle toolkit;
- visual display in the vehicle, e.g. stickers.

Child restraints

Child restraints work in the same way as adult seat belts. Rearward facing seats have been shown to be particularly effective (see below). When travelling rearwards, the forces will be distributed over the back and the head in an optimal way which markedly increases effectiveness.

Injury reduction benefits of child restraints

Type of restraint	All injuries	Severe injuries
Rearward facing	76%	92%
Forward facing	34%	60%

Table source: ETSC, 1996).

Good protection requires that the type of restraint used is appropriate for the age and weight of children and a range of restraint types are covered by international standards. Rearward-facing baby seats are available for babies up to 10 kgs and appropriate from birth to 6-9 months or for babies up to 13kg and from birth to 12-15 months. There are forward-facing child seats for children weighing 9-18 kgs roughly from 9 months - 4 years. Booster seats are available for children weighing 15 - 25 kgs about 4 to 6 years and booster cushions for children weighing 22 - 36 kgs roughly from 6 - 11 years (RoSPA, 2003).

Infant deaths in cars have been shown to be reduced by approx 71% when child seats are correctly used, while toddler deaths are reduced by 54% (NHTSA, 2002). However the use of child safety seats and the restraint of children in cars generally varies within and between countries.

1.5 Essential steps

Assess current seat belt usage levels and mechanisms in place to increase wearing rates:

Essential to the effectiveness of any road safety improvement programme is a detailed analysis of related accident and casualty statistics. In relation to a campaign designed to increase seat belt usage, it is important to determine current wearing rates and to examine existing mechanisms in place that promote the use of the safety device.

This data provides stakeholders with a clear understanding of the current situation with useful baseline figures against which the effectiveness of future actions can be evaluated.

By determining the mechanisms currently in place to increase seat belt usage, stakeholders can identify any shortfalls in legislation or implemented campaigns, e.g. it may reveal that no enforcement of existing legislation is undertaken.

Market research:

Before drafting legislation or designing new campaigns, it is important to complement the previous collection of data with a market research exercise that will assess road users current knowledge and awareness of seat belts and their associated benefits. This will also act as a baseline for future monitoring and evaluation of the success of legislation with associated campaigns.

It is recommended that the market research exercise aims to identify road users current level of acceptance of the benefits of seat belt use, and particularly if legislation has not been implemented, their opinion of the introduction of such legislation. Stakeholders should work towards gaining a high level of support for seat belt legislation before the preparation of a draft legal document.

Once the data has been collected and analysed, stakeholders will be able to identify a clear starting point. This will highlight if there is a need to design, evaluate and implement a campaign. All campaigns should be multi-disciplinary. As described in Section 2, to ensure that a much higher level of seat belt wearing is achieved, a combined campaign of legislation, enforcement, publicity, incentives, and/or encouragement is required. However, before implementation, stakeholders are advised to evaluate the campaign using focus groups. These focus groups, which comprise a small number of the target audience, should aim to consult and assess the appropriateness of the material/processes to be used in the campaign. The material must then be finalised from the results of these groups before implementation.

Has seat belt manufacturing and wearing legislation been introduced?

Although seat belt manufacturing and wearing legislation should be designed separately by a technical/expert working party, it should be incorporated into any campaign, along with appropriate enforcement. Consultation of the draft document, using road safety lobby/pressure groups as well as civil liberty groups, is essential. As well as providing stakeholders with an indication of any potential opposition, this process can also bring about seat belt legislation that is acceptable to the majority of road users. Consulting such groups will help to bring about more acceptable legislation for all parties and therefore, increase its acceptability when introduced.

Implement sustained multi-disciplinary campaign:

As stated in Section 2, campaigns designed to increase seat belt usage must be sustained in order to maintain any success in increasing wearing rates.

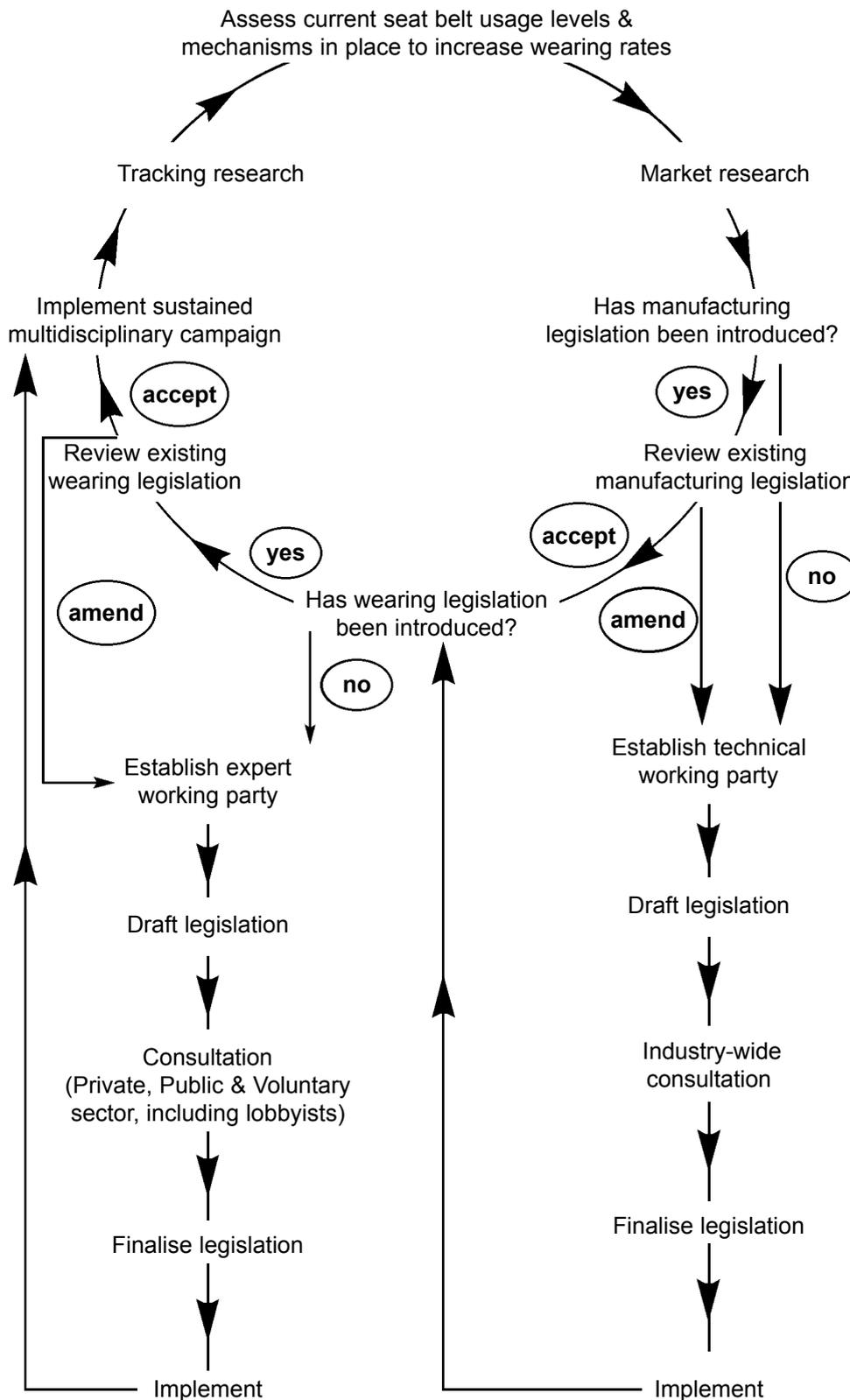
Monitoring:

The effects of a campaign on vehicle occupants, including legislation, should be monitored through observational wearing rate studies, seat belt sales, market research and other methods. Performance indicators can be found in sub-section 3.1.

Once research which tracks the performance of a campaign is complete, stakeholders should return to the initial activity of assessing the current national situation and continue the process in order to update present campaigns and develop innovative approaches to achieving the aim of increasing seat belt wearing rates.

The flow chart on the following page provides additional explanation of the processes.

Figure1: Flow chart to increase seat belt wearing rates



1.6 Further assistance

Stakeholders may require additional assistance towards developing strategies that are designed to increase seat belt wearing at a national or state level. The following organisations may provide additional information or support:

FIA Foundation

60 Trafalgar Square
London WC2N 5DS
United Kingdom
+44 (0)207 930 3882 (t) +44 (0)207 930 3883 (f)
www.fiafoundation.com

TRL Limited

Old Wokingham Road
Crowthorne
Berkshire RG45 6AU
United Kingdom
+44 (0)1344 773131 (t) +44 (0)1344 770356 (f)
www.trl.co.uk

Global Road Safety Partnership

P.O. Box 372 - 17, chemin des Crêts
1211 Genève 19
Switzerland
+41 22 730 42 49 (t) +41 22 733 03 95 (f)
www.grsproadsafety.org

United Nations - Economic Commission for Europe

Transport Division - Technology Section
Palais des Nations
1211 Geneva 10
Switzerland
+41 22 917 0039 (t)
www.unece.org/trans/main/welcwp29.htm

Organisation for Economic Co-operation and Development (OECD)

2, rue André Pascal
75775 Paris Cedex 16
France
www.oecd.org

European Conference for Ministers for Transport

2 rue André Pascal
75775 Paris Cedex 16
France
ecmt.contact@oecd.org



Section 2: Raising compliance



Section 2: Raising compliance

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2.1 Introduction

Countries with the best seat belt compliance records have achieved their position by strong enforcement of legislation, backed up by sustained publicity campaigns. This combination of legislation, enforcement and awareness raising is essential for increasing and maintaining seat belt compliance.

Using publicity in isolation is unlikely to be wholly effective. Publicity campaigns in the UK between 1970 and 1982, for example, raised seat belt wearing rates to 40%, a significant increase on pre-publicity rates (Broughton, 1990). But it took the introduction of seat belt legislation (in 1983) combined with enforcement of the law by the police and supporting publicity and education campaigns to raise compliance to the current rate of 91%.

However, raising public awareness of the arguments for using seat belts can be an important precursor to a political debate on introducing legislation, or to the practical implementation of a seat belt law. Educating people on the road safety benefits of seat belt use is never a waste of time.

If campaigns are to achieve their goal of raising seat belt usage, stakeholders should ensure that goals are clearly defined and a specific strategy is in place. The Global Road Safety Partnership (GRSP, 2002) have produced a 9-point plan and it is recommended that this should be followed when implementing any campaign.

In Hungary, seat belt wearing legislation was introduced in 1976 for front seat vehicle occupants, and rear seat passengers travelling in urban areas since 1993 (CDC, 1993). Non-compliant drivers are subject to fines and potential suspension of driving privileges which has helped to bring about a 61% compliance rate by the mid 1990s.

Road traffic accidents were the leading cause of death for people between 1 and 44 years of age in Spain (CDC, 1995). Spain introduced seat belt wearing law for front seat passengers travelling 'outside city limits' in 1975. In 1992, this was expanded to include all front seat passengers travelling within city limits, and also rear seat passengers travelling in vehicles with 'manufacturer-installed safety belts'. A sustained enforcement campaign achieved an increase in wearing rates from 25% to 86% in 2002.

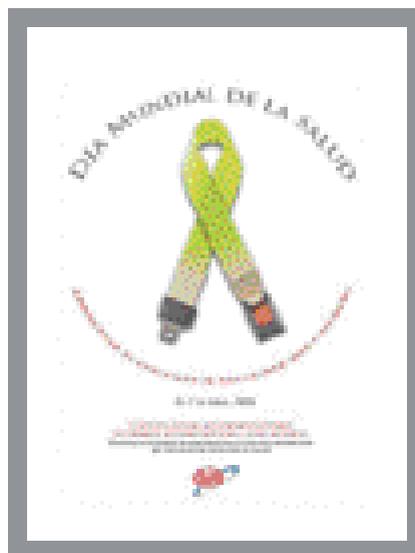
The Centre for Disease Control (USA) conducted a study that made recommendations to increase the use of appropriate child restraints by comparing interventions across different states in America (CDC, 2001). Of the five interventions assessed, they strongly recommended two. The study illustrated that by implementing child safety seat legislation, promotion using enforcement strategies, providing cheap or free access to appropriate child

seats, and providing rewards/incentives to parents and children using child seats, significant gains can be made that increase the safety of children travelling in a vehicle. A summary of their findings and recommendations can be found in Appendix 1.

Health promotion officers have the opportunity to play a direct role in the encouragement of safer travel. Countries within the Eastern Mediterranean Region have recognised the impact of road traffic injuries on society and are currently devising a database that will contain accident information (WHO, 2000). Injury control is now a crucial element of Egypt's long-term 'Healthy Egyptians' programme. As a result, the recently introduced seat belt wearing law (1st January 2001) is being accompanied by a long-term enforcement campaign, which will be reviewed at the end of the programme in 2005.

This section highlights a practical approach to raising wearing levels and thus improving national road safety. Section 5 provides advice on issues such as legislation, institutional constraints and exemptions, which affect seat belt wearing rates.

'Buckle up today and every day' the simple and very effective message of the American Automobile Association's seat belt safety campaign for World Health Day 2004. This poster is targeted at the US Hispanic population.'



2.2 Implementing a campaign

Before arriving at the implementation stage of a campaign, consideration must be given to a number of factors. These factors aim to ensure that the campaign is effective in both reaching the target audience and delivering a clear message. The Global Road Safety Partnership (GRSP) and the European Conference of Ministers of Transport (ECMT, 1997) have identified a number of tasks to be completed before implementation, as well as an equally important task to undertake during and after delivery.

Table 1: GRSP's 9-point action plan for implementing a campaign

Point	Task	Description
1	Define the problem	Base the campaign on information. Determine the behavioural factors involved in the type of crash or injury under investigation. Define the key features of the behaviour to be addressed. Identify the target group. Assess the social context for the campaign. Consider relevant research and analyse what has worked before and elsewhere. Identify the complementary government and/or community interventions required to support the desired change in behaviour.
2	Determine objectives	The campaign objectives should be specific. They should always be linked to a measurable behaviour change. The objectives can be about shifting community understanding and support for government policies - such as wearing a seat belt or helmet or - about what to do to improve safety, such as driving more slowly.
3	Agree supporting activities	Identify the key interventions required to support the desired change in behaviour and the organisations responsible. The police are generally the most important. They are essential partners for campaigns targeting anti-drink drive, anti-speeding and seat belt and helmet wearing, especially when laws are in place that provide effective sanctions for non-compliance. High profile policing can send a powerful deterrent message.
4	Select lead agency	Successful campaigns are normally managed by a lead agency in consultation with other stakeholders. The lead agency is usually the responsible government department, a National Road Safety Council, or a road safety NGO. Credibility is crucial. Those conducting and designing the campaign must be seen to be both knowledgeable and impartial.

Point	Task	Description
5	Use the right skills	Road safety publicity campaigns require a combination of skills. Specialists with behavioural and social science skills could be consulted on the content of the campaign and help to identify the target audience and messages. Delivering the message requires marketing, social advocacy and advertising skills. Project management skills are needed to deliver the campaign on time and within budget.
6	Communications brief	The campaign objectives should be specific. They should always be linked to a measurable behaviour change. The objectives can be about shifting community understanding and support for government policies - such as wearing a seat belt or helmet or - about what to do to improve safety, such as driving more slowly.
7	Develop the campaign	Seek creative ideas on how to convey the messages - keep them simple, clear and few. Test creative concepts on a pilot sample of the main target audience and use the feedback to finalise the campaign. Other government, community and police supporting actions should be planned in conjunction with the campaign.
8	Deliver the campaign	Launch the campaign at a high profile media event, complemented by extensive advertising. Keep stakeholders informed of progress so that they can reinforce the key message when opportunities arise.
9	Evaluate the impact	All major campaigns should be evaluated. This is often done through a pre- and post-campaign survey. Measure behavioural changes, such as improved seat belt or helmet wearing, or reduced speeds. However, sustainable behavioural changes take time to achieve. Short-term changes should be treated cautiously and surveys should also be done well down stream. These inform decisions about the time intervals between campaigns, for example how frequently to run adverts on TV.

Following a seminar on Communication in Road Safety in 1997 ECMT divided the campaign process into five phases:

Table 2: ECMT 5-phase approach to implementing a campaign

Phase	Tasks	Stages
Preliminary	<ul style="list-style-type: none"> - Check that the type of communication is the appropriate tool for reducing the number of accidents in question - Define objectives 	<ul style="list-style-type: none"> - Check that it is possible to reach the target group - Check that a behavioural change is possible - Analyse the cost-effectiveness compared with other measures
Design	<ul style="list-style-type: none"> - Choose the theme - Define the motivational approach - Define the content of the message - Choose the medium - Create the tools 	<ul style="list-style-type: none"> - Decide on the subject /create the slogan - Evaluate the 'novelty' effect - Analyse the target group - Conduct an opinion survey - Draw up the budget
Testing	Conduct surveys to measure the impact	<ul style="list-style-type: none"> - Preliminary tests - Laboratory tests - Field tests
Implementation	Implement the measures	<ul style="list-style-type: none"> - Timetable - Determine/modify the intensity
Control	Evaluate the effectiveness	<ul style="list-style-type: none"> - Data recording - Observation - Measurement - Opinion surveys - Statistics

Points 1, 2, 3, and 5 of the GRSP plan are covered within the Preliminary stage of the ECMT table. They provide simple advice that should be considered prior to any design stage:

- **Is a campaign required?**
The answer to this is normally yes. It is vital that road users are made aware of the safety benefits of seat belt use. The humanitarian and

financial savings to be made are proven and significant, and stakeholders have a duty to bring about a reduction in the additional cost and severity of injury to vehicle occupants who do not wear a seat belt.

- **Define the issues:**
What is the issue the campaign is seeking to address? Are front seat occupants to be targeted, rear seat occupants, or both? Will child restraints be a specific issue in the campaign?
- **What can be achieved?**
Surveys should be conducted that identify the target audience, the potential for behavioural change, and the cost-effectiveness of any campaign. Targets should be “SMART”. For example:
 - S = Specific: to increase wearing rates for front seat occupants by X% within 3 months.
 - M = Measurable: What performance indicators are in place to assess the effect of the campaign?
 - A = Achievable: Are there adequate resources to carry out all tasks adequately?
 - R = Relevant: Are the messages clear and supportive of the objectives?
 - T = Time based: Establish time limits for the campaign allowing time to review its effectiveness.
- **Partnerships:**
Stakeholders should also consider who has a role to play in delivering the campaign and the benefits of a partnership approach in order to maximise the skills of the wide ranging road safety knowledge base, e.g. National Road Safety Council, non-government organisations, scientists, marketing/advertising agencies, project managers.
- **What are the objectives?**
To raise knowledge and awareness amongst vehicle occupants of the benefits of seat belt use, and therefore, increase the wearing of seat belts. To reduce the cost to society of dealing with road casualties and death. To reduce the severity of injury to vehicle occupants involved in a road accident, and in turn minimise the suffering of vehicle occupants and their family and friends due to death, disability, or loss of income.

Points 6 and 7 of the GRSP plan work towards the ‘Design’ and ‘Testing’ stages of the ECMT table with the aim of getting the communication right.

These key points assist stakeholders in ensuring production of the most effective campaign:

- **Choose the theme:**
Although it is obvious that the campaign will aim to increase seat belt wearing rates, what does it aim to achieve? Who are the target audience? Conduct surveys (opinion and observational) that help to define the market. Stakeholders may wish to create a simple slogan for the campaign, e.g. 'There are 101 reasons not to wear a seat belt. Every one is a killer!'
- **Define the approach:**
What do the behavioural studies suggest is the best way to deliver the message? Does the campaign have a message which is a strong motivator? Seek creative ideas when designing material. What is the budget? Choose the most effective medium.
- **Design the campaign materials:**
Campaign messages should be designed with both the audience and the delivery medium in mind. In part, the medium used is dictated by the budget available to campaigners and is dependent on media availability, which will vary according to the territory in which the campaign is taking place.
- **Test the material:**
Usually conducted using a sample of the target audience, providing feedback that will finalise the design and content of material.

A review of worldwide publicity campaigns has identified a number of common denominators running through each, which can act as a guide for devising creative treatments for seat belt messages. Table 4 highlights these commonly used themes for improving creativity in road safety publicity campaigns.

Point 8 of the GRSP plan and phase 4 of the ECMT table deal with implementation:

- **Timetable:**
The campaign may use a variety of media. Due to the level of budget, each may be divided into separate elements with different time allowances. How long will the campaign continue under the initial intensity before levelling out for sustainability?
- **Determine the intensity:**
Due to budgetary constraints, the intensity of the campaign may differ depending on the type of media used. Stakeholders may wish to select periods of the year where campaign intensity is high, reducing to a sustainable level in between. With each new level of intensity, a new snippet of information may be released. For

example, in the launch the focus could be on injuries sustained by non-wearers. The next session of intensity may concentrate on the law. The next level of intensity may look at wearing rates and the savings to be made if there was an increase in seat belt use.

- **Launch:**

Key ingredients for a successful campaign launch can include:

- Involving a local politician, sports star or celebrity who can raise the profile of the issue and attract media attention;
- using a driving simulator or seat belt sled to get across the message;
- providing press releases and fact sheets with essential information about potential casualty savings;

Key ingredients for a successful awareness campaign can include;

- regional and local launches and activities to maintain momentum;
- highly visible enforcement activities by police;
- human interest stories: e.g. 'how a seat belt saved my life';
- organising surveys of local drivers to assess seat belt compliance can provide good media stories.

It is important to ensure that the necessary logistical work has been done in advance of the campaign launch. If the campaign involves a number of partners, make sure that they have all received relevant timetables, leaflets and other material in good time.

The final GRSP point and ECMT phase are vital if the campaign is to develop and increase its effectiveness for the future. The 'Control' or 'Evaluation' task assesses the success or failure of the campaign and allows stakeholders to begin the process of designing new approaches to increasing seat belt wearing rates:

- **Data collection:**

Information should be collected and recorded to determine the outcome of the campaign (see sub-section 3.1 – Performance Indicators). This information should be compared to the baseline figures created through pre-campaign surveys.

- **Evaluation:**

All major campaigns should be evaluated. This is often done through a pre- and post-campaign survey. Establish a baseline wearing rate and then measure behavioural changes e.g. improved seat belt wearing rates. However, bear in mind that sustainable behavioural changes take time to achieve. Short-term changes should be treated cautiously and surveys should also be done well downstream. These inform decisions about the time intervals between campaigns, for example how frequently to run adverts on TV.

2.3 Raising awareness

Awareness raising and education have an important role to play in encouraging compliance. To be most effective, publicity and education campaigns should be run in conjunction with enforcement strategies, so that the messages people read in their newspapers or see on the television are visibly reinforced by the authorities on the roads.

Publicity and education are very similar disciplines; however, there are subtle differences that also set them apart from each other. The role of publicity is to raise awareness amongst the target audience with short, sharp bursts of information through a variety of media that reinforce the aims of the campaign. Whether educational resources are pitched at adults or children, their role is to provide the detailed information to supplement campaign messages to increase the knowledge of road users. In short:

- **Publicity:** raises awareness
- **Education:** increases knowledge

Education within schools may require road safety professionals presenting/demonstrating during lessons or assemblies. Additional resources such as leaflets, flyers and postcards can be produced and distributed amongst the target audience to further reinforce the spoken word. Seat belt sleds are effective tools to attract the attention of both adults and children at community events to deliver educational presentations and distribute resources.

Knowledge and awareness campaigns can be used both to lay the foundations for new seat belt laws, by informing and educating the public of the reasons for proposed legislation, and for consolidating seat belt laws. Countries with the best seatbelt compliance records have achieved their position by maintaining awareness campaigning and education over a number of years, in support of legislation and enforcement. When successful, awareness campaigns can also be a relatively cheap way to reinforce road safety messages – to maintain the salience of an issue in the minds of the public.

In this section, we examine examples of best practice in advertising and in educational materials: the key tools for any awareness campaign.

2.3.1 Examples of publicity

Publicity has proven to be a very effective tool for raising awareness, increasing knowledge and in turn raising wearing rates, particularly prior to the introduction of legislation. **The target audience is primarily that sector of the population who do not wear seat belts when travelling in a vehicle. However, to ensure that seat belt wearers continue to do so, reinforcement messages are also recommended.**

This advertisement was part of Spain's Plan Nacional de Seguridad Vial 1980 (National Road Safety Programme 1980), and helped to raise wearing rates to 25%.



(Plan Nacional De Seguridad Vial 1980)

The United Kingdom's 'Clunk! Click!' campaign (a series of television commercials filmed in the 1970s) ran for 11 years prior to legislation being introduced in 1983. This helped to increase seat belt wearing rates from minimal levels up to 30% by the mid-1970s and 40% by 1983 just before the introduction of front seat legislation.

For a campaign to be successful, it is important to employ social marketing tools. Van Rooyen (1994) stated that 'social marketing is an effort to impact on the culture of a community in order to persuade to accept, modify or abandon ideas, attitudes, practices and behaviour'.

In this application, attempts are being made to persuade vehicle occupants to wear a seat belt, and modify their behaviour through acceptance of the proven humanitarian and socio-economic benefits.

Principles of Social Marketing

- it must focus on a single minded proposition;
- its execution must be distinctive;
- its target audience must be clearly defined.

Publicity is a long-term process that requires constant monitoring and evaluation. Refer to section 3 for information on assessing the effectiveness of publicity campaigns.

The importance of creativity within an advertising campaign is all too often over-looked. The result of this is devaluation of media investment, misunderstanding of the message by the targeted audience, incorrect targeting, and a dilution of awareness. There are many reasons why this is so, for example lack of understanding, budgetary constraints, or simply that the creativity has been influenced by people who have insufficient knowledge.

This campaign by JAF (Japanese Automobile Federation) is very clear. It is aimed at children and informs the reader that even at 7 kilometres per hour, unrestrained occupants can be seriously injured.

(Japan Automobile Federation)



This Brazilian advertisement is less clear with the slogan masked by the graphics (a broken windscreen). The message simply states that ‘in some situations it is better not to use your head first’.

(Ministry of Transport, Brazil)



A review of worldwide publicity campaigns has highlighted a number of common denominators running through each, which can help to form a foundation for future creative concepts:

Table 4: Common themes for improved creativity in road safety publicity campaigns

Common themes	Desired outcome
Shock tactics (e.g. visuals of crash dummies; real-life representations)	Emotional response to stimulus
Law enforcement	Moral decision. Fear factor; the desire not to be banned from driving, wanting to retain independence and status.
Inconvenience: e.g. on the spot fines	Lifestyle decision, not wanting a reduction in income
Awareness, education, ability to relate to ones-self	Educational decision based on level of knowledge
Peer endorsement	Creating social awareness and acceptability
Memory/recall	Subconscious, almost automatic decision
Frequency of message/call to action	Instant decision/compliance

Creativity is not just about the concept but also about the planning and choice of media. Choice will be dependent on media availability, which varies from nation to nation. Market research should aim to indicate the type of media that affects specific demographic groups. For example, early morning radio for drivers on their way to work, and reminders through advertising boards at petrol stations and car parks.

A Jordanian awareness raising campaign chose to blanket the whole country through television, radio, newspapers, mosques and churches. This was particularly effective, increasing wearing rates by 47% (Tarawneh, et al. 2001).

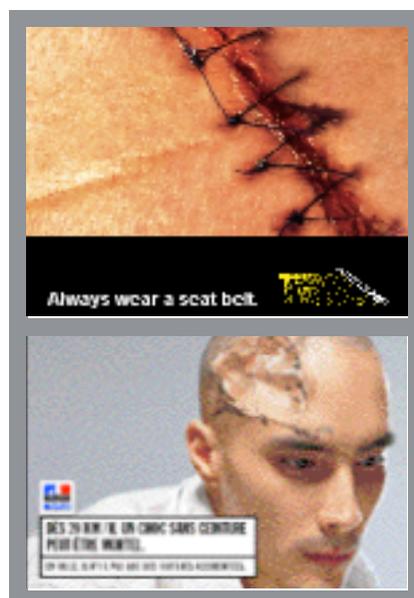
The use of shock tactics has been very widely utilised. It is believed that high impact images will make us emotionally relate to our responsibilities on the road. However, what is most likely to ensure the effectiveness of any road safety campaign is clear understanding and credibility of message for the specified target audience.

By simply using shock tactics to deliver a message, the target audience becomes accustomed to the shock and therefore, each subsequent advertisement has to be more extreme in order to have the same effect.

Rather than attract the target audience's attention, images that shock can make them avoid such advertisements or literature.

The benefits of using attention grabbing images of the consequences of not wearing a seat belt must be weighed against the negative ways in which people might react. For high impact advertisements to work, an effective balance has to be found.

UK Department for Transport campaign to increase seat belt use.



(Department for Transport, United Kingdom)

French advert highlighting that at just 20km/h an accident can be lethal.

(Ministry of Transport, France)

Research has shown that publicity has greater impact as a **'primary message'**, than as a **'secondary message'**.

Primary Message	The core (initial) message aimed at the identified target audience affected by a multidisciplinary campaign to change attitudes and behaviour. For example, to increase seat belt wearing rates amongst front seat occupants, particularly drivers such as the successful UK Clunk-Click campaign of the 1970s/80s.
Secondary Message	A supplementary message aimed at a wider target audience than the original core message. This is almost an addition to the core message and therefore may not have quite the same impact.

Experienced campaigners suggest that it would be preferable, where possible, to introduce seat belt legislation for both front and rear seat occupants at the same time so that the importance of rear seat belts is not seen as less of a priority and therefore diminished. Evidence for this is shown by research into front and rear seat belt wearing rates in countries that have introduced legislation using a 'tiered' approach:

Table 5: Wearing rates within example countries that have used a staggered/tiered approach to the introduction of seat belt legislation

Country	Front seat wearing rates (%)	Rear seat wearing rates (%)
Canada	90.6	79.6
Finland	87	74
Japan	83.9	67.4
New Zealand	92	70
South Africa	81	48
Sweden	90	75

When using a tiered approach, whilst **'primary messages'** help to increase seat belt usage for front seat occupants to above 80%, **'secondary messages'** result in much lower wearing rates for rear seat occupants.

It must still be noted that although publicity can achieve significant results, enforcement will bring about the greatest achievements when aiming to increase seat belt wearing levels.

Cost can play a major role when considering using media. Research by Donovan, Jalleh and Henley (1996) suggested that low-cost publicity can be just as effective as high-cost campaigns, provided that the target audience understands the message. However, more widespread dissemination of road safety messages can be achieved through a large budget, although Government and corporate assistance can reduce advertising costs significantly.

Television advertising can prove costly. In Jordan both television and some radio stations are Government owned. Therefore, cost-effectiveness was increased as air time did not need to be included in the overall costs of the campaign. Three 1-hour televised meetings were held, discussing the benefits of seat belts, plus fifty 30-second adverts. The most popular radio station was chosen to deliver road safety messages through programmes of general interest. These adverts lasted longer than those on television. (Tarawneh et al., 2001)

2.3.2 Education

Education is at the heart of any awareness raising campaign. These campaigns will aim to educate drivers on the benefits of wearing a seat belt, on the reasons why their passengers should wear a seat belt and on the importance of ensuring children are appropriately restrained.

Educating the public as to the need to increase safety through the use of seat belts is imperative at the outset. The public will then require constant reinforcement of the issues covered within the initial campaign. Further education is necessary for future generations and should aim to develop a 'safety culture' amongst the target audience. In order to achieve this 'safety culture' there are a number of barriers that may need to be overcome:

Barriers that campaigns must overcome to achieve goals:

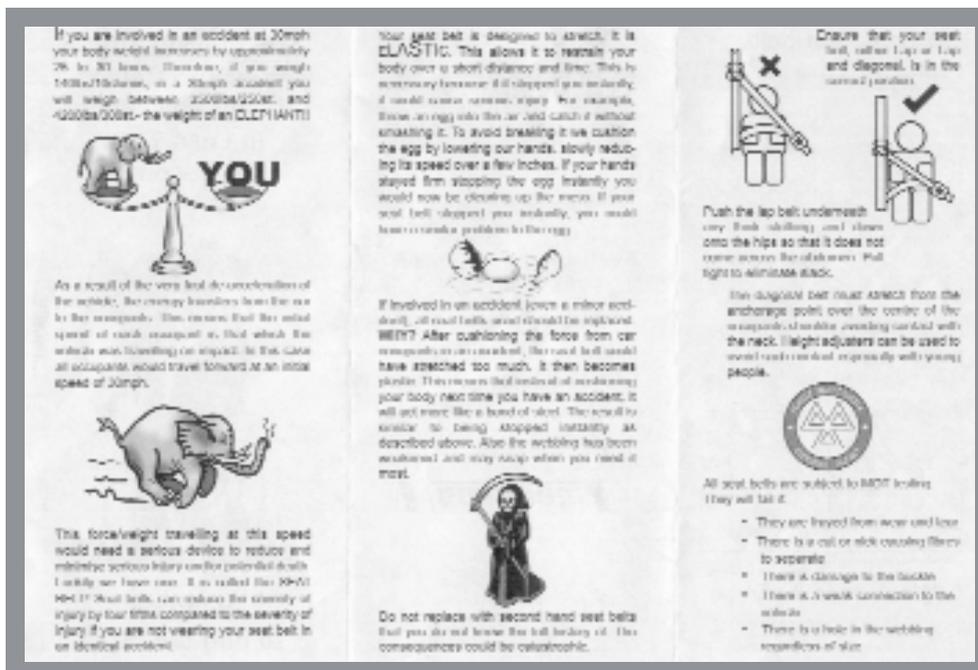
- gender
- cultural issues
- economy: local/national;
- access to information via media;
- resources to deliver education;
- lower standard of education, i.e. literacy
- social awareness;
- socio-demographics;
- standard of driving, and attitude on the road and towards other road users;
- understanding the importance of safety;
- standard of vehicles on the road;
- average journey times or length of journey;
- average journey type i.e. urban/rural.

As is the case with much of the advice contained in this toolkit, local knowledge is essential for identifying those barriers that will effect the way a campaign should be designed, delivered and received.

Table 6: Options for educating vehicle occupants on safer use of vehicles and the highway

Methods of education	Description
Press releases	Publicity agencies and/or campaign organisers can issue press releases that explain the need/reasons for legislation and highlight national and local campaigns.
Literature and advice	<p>Health personnel and officials can provide literature and advice for patients who have been involved in a road traffic accident, or through health promotion presentations or exhibitions.</p> <p>Manufacturers should also provide relevant guidance on the use of features within a vehicle, e.g. information within the vehicle toolkit informing the vehicle owner how to identify damage or faults to a seat belt that indicate replacement is required.</p>
School Curriculum	Road safety is often not a popular choice of subject for inclusion in school lessons. The most common approach to delivering road safety is through projects relating to personal, social or health education modules.
Road Safety Personnel (i.e. Technicians/Road Safety Officers, Road Traffic Police)	<p>Road Safety personnel should have the expertise to increase the knowledge of the whole community, using a wide range of methods.</p> <p>They should also consider providing resources and holding special events educating vehicle occupants about how to identify faults and maintain seat belts.</p> <p>They also have a key role to play in school education.</p>
Partnerships	Publicity personnel, health officers, teachers and road safety personnel should combine their efforts to ensure a consistent approach to raising awareness and knowledge.

Example of an educational leaflet being used in the United Kingdom and India

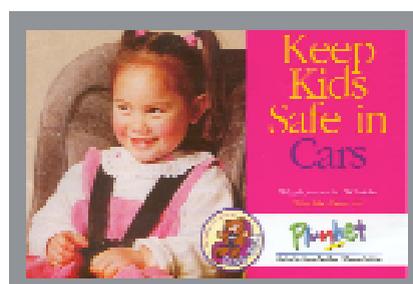


The above information leaflet concentrates on educating vehicle occupants about the importance of wearing a seat belt. Many leaflets highlight the law regarding wearing, however, it is just as important to explain why one should wear a seat belt.

In this example leaflet, the vehicle occupant is informed of the substantial forces involved in a 30mph/50kmh accident due to severe deceleration of the vehicle. It explains how a seat belt can minimise the injury sustained by a vehicle occupant if they are wearing a seat belt.

It also explains how to fit a seat belt using pictures (top right) to demonstrate this. Vehicle occupants should push the lap part of the seat belt down onto their hips so that it does not ride onto the abdomen. They should then pull the diagonal section up to minimise slack. 'The diagonal section must stretch from the anchorage point over the centre of the occupants shoulder avoiding contact with the neck.'

Stakeholders should also ensure that adequate information is provided to parents on the dangers of using an inappropriate restraint for children.



Information for parents on child safety. New Zealand

(Land Transport Safety Authority, New Zealand)

Educational information provided on the reverse of a Self Reporting Parking Badge used in Switzerland.

This ‘10 Seconds to Save A Life’ campaign has been promoted strongly worldwide automobile clubs using a variety of methods.



With the possible exception of some poorer countries, the Internet is also a very useful tool for educating vehicle occupants on the use of seat belts.

Getting messages across about the benefits of seat belt wearing early in life is obviously desirable, through parents/guardians and teachers via the media and school curriculum. This can be particularly beneficial as often a feedback effect can exist of an informed child on a parent. Once children have increased their knowledge and adopted good safe practice, they may well criticise parents/guardians when they exhibit poor safety behaviour themselves on the road (e.g. not fastening their belts before driving off).

As with publicity campaigns, the educational process should never be viewed as short term. Constant reinforcement, and targeting of an ever-evolving audience is required in order to continually improve the trend in seatbelt wearing. During periods of non-activity attitudes and behaviour will regress.

Organising and managing road safety education in schools

Stakeholders, and in particular Government, should give consideration to the following factors in order to effectively manage regular road safety education lessons for school aged children. Stakeholders should:

- Establish a coherent policy, which covers the provision of information, and the development of the skills necessary for the effective use of acquired knowledge.
- Identify the location of road safety education already being taught within the curriculum, and the method of teaching. This should ensure the removal of repetition and the inclusion of appropriate work.
- Build upon the best of current practices and employ a variety of approaches to emphasise the importance of cross-curricular work and effective co-ordination.

It is widely accepted that effective learning will take place when the subject is taught in relevant contexts. For learning to be successful road safety can be taught:

- As an integral part of the school's personal and social education programme and/or as part of the tutorial or pastoral programme.
- As an essential component of health education.
- By inclusion in compulsory short modular courses on life skills.
- As separately timetabled lessons.
- Through extended curricular events, beyond the confines of timetabled lessons, such as themes of current media interest.
- Through planned permeation through part, or all, of the whole curriculum.

(DfT, 1998)

2.4 Enforcement

Publicity, education and incentive campaigns have all been proven to raise seat belt wearing rates to a point. However, the most effective tool for increasing compliance is ENFORCEMENT. Campaigns that have been supported by enforcement have tended to achieve the most significant increases in wearing rates.

An essential ingredient of successful seat belt legislation requires there to be a commitment to enforce the law, which includes working in parallel with public education and publicity campaigners.

The greatest benefits from seat belt use are obtained when wearing rates are 90% or above. This can be achieved when a sustained enforcement campaign is employed alongside other seat belt wearing interventions such as publicity, education and incentives.

Enforcement must be intelligence led if it is to gain credibility. Detailed performance indicators should highlight specific demographic groups/trends where non-compliance is high. Casualty statistics will also provide information that identifies those groups/occupants most at risk of injury.

The police may wish to take a phased approach, increasing in severity over time, particularly for persistent offenders. The emphasis should always be on the aim to reduce death and injury severity:

- Intense educational campaign used to advise occupants of the dangers of not wearing a seat belt,
- Intervention – further advice provided with official warnings,
- Hard enforcement – using penalties (penalty points, fines) to highlight the need for compliance. Where death and/or injury has occurred and fault can be attributed, the police may wish to establish awareness training/driver rehabilitation courses as an option for the courts.

The police, or other body under the authority/accountability of the police, should undertake enforcement campaigns aimed at achieving national seat belt wearing targets. The use of enforcement ‘tools’ will be very dependent on the current nature of the host country’s law enforcement regime. However, options are noted in the table on the following page.

Table 7: Tools for enforcing seat belt legislation

Warning notices	Documented warnings issued to vehicle occupants with the intention of advising and educating before a stiffer penalty is applied.
Fixed penalty	A written ticket issued at the scene of the offence (and documented in a database) requiring the occupant to pay a fine, receive endorsements, or challenge the enforcement in a court of law.
On the spot fines	Immediate fines for non-compliance paid directly to the Government or road safety fund through the enforcement officer at the scene.
Technology	The increasing capability to use remote enforcement methods may enable the operation of such systems to be undertaken by a body/agency other than the police. It would be difficult to use this method if 'Secondary' legislation were introduced.
Intelligence led campaigns	Identifying and targeting consistent offenders through observation of vehicles, types of user, and at specific locations.

Although an 'On the Spot' fine system may be the norm in many countries, it is generally not recommended as it allows for possible corruption by individual enforcement officers. Such practice would undermine the level of understanding and acceptance of the law.

Ultimately, there should be a penalty for non-compliance. This is usually a fine. It is recommended that a maximum limit of fine be established, at a level that will serve as a suitable deterrent for all vehicle occupants.

Enforcement authorities may find it difficult in some circumstances to enforce seat belt wearing legislation. For example, where drivers appear to be complying with the law, but use 'dummy' seat belts that are drawn over the shoulder such as in the picture opposite. There may also be problems viewing seat belt compliance if the vehicle windows are tinted.



(Pontificia Universidad Católica del Perú)

To overcome such situations it is recommended that stationary vehicle checks are conducted at appropriate and convenient sites (e.g. a lay-by, purpose designed temporary road blocks/checking stations). Although the

long-term purpose of stationary vehicle checks will be to enforce the law, enforcement officers should issue warnings and provide relevant advice to vehicle occupants in the early stages of any campaign. This eliminates any likelihood of discrimination and helps to raise awareness of the benefits of seat belt use.

To avoid confusing messages, it is vital that enforcement officers set a good example to other road users by wearing a seat belt throughout every journey.

'Secondary' enforcement, as discussed in sub-section 5.5 (where a citation can only be issued in conjunction with a 'primary' offence), can undermine the effectiveness of a law. If vehicle occupants believe that they are committing no 'primary' offence, this may allow them to believe they do not need to wear a seat belt.

2.5 Incentives

Hagenzeiker (1999) states that incentive schemes achieve their greatest results in small-scale settings (localised) and are extremely effective in reaching short-term goals.

Incentives used have included:

- Work-related privileges (such as days off)
- Immediate valuables (such as pens or flowers)
- Promotional Items (such as stickers)
- Exchangeable tokens (cash)
- Chance to win contests (lottery tickets)
- Social attention (this is used as a threat rather than a benefit as names of occupants not using seat belts are published in local press)

An example of free campaign merchandise that could be used as an incentive to increase seat belt wearing rates. The material shown not only serves as a gift, but also supports the FIA's campaign highlighting the fact that 'taking 10 seconds to put a seat belt on could save your life'.



(Touring Y Automovil Club
Del Peru)

As with all campaigns, the greatest results are achieved through a co-ordination of combined countermeasures. A study by Mortimer, et al. (1990) in the United States concluded that although there were significant increases in wearing rates using incentives alone, 'maximum increase in safety belt use occurred with a program that combined both incentive and enforcement strategies'.

Note: There can be no doubting the immediate effectiveness of incentives. Stakeholders should consider carefully, however, the use of incentives. Bandura (1986) believed that the use of incentives to increase seat belt usage 'invites unnecessary difficulties when the time comes to phase them out'.

2.6 How to fund compliance raising activities

There will be an inevitable need for initial and sustained investment in order to ensure a co-ordinated approach to increasing seat belt usage. Costs will be incurred throughout the design of legislation, including the consultation process. External agencies may be employed to conduct pre, during and post-publicity campaigns and ideally to evaluate such campaigns with regard to wearing rates. Internal ancillary costs will also be incurred by agencies such as the police and local authority when they are required to implement seat belt legislation through a variety of campaigns.

Central Government must recognise that there are likely to be financial savings made on their expenditure in other areas. As outlined within the Introduction of Section 1, the financial benefit of a 15% reduction in fatalities and serious injuries worldwide could produce an annual saving of US\$5 billion. Financial investment, therefore, must come from Central Government. This in turn raises the question of national responsibility for road safety. It is essential that one Government department, or even a National Road Safety Council has prime responsibility for road safety matters, and that it has full-time staff and is adequately funded.

There are a number of additional avenues to pursue that may assist in the funding of campaigns aimed at increasing of seat belt usage:

Table 8: Funding options for road safety campaigns and initiatives

Funding options	Description
Hypothecation (re-investment)	The ability to apply revenue from fines. A percentage of the fine paid by the vehicle occupants could be allocated into a central 'collision prevention fund' that may be used to increase road safety personnel, increase enforcement resources (including the development and implementation of technology), fund enforcement, education, training and publicity campaigns.
Road Safety Levy (Government funding) (refer also to 2.7.2)	This approach allows stakeholders to incorporate a road safety levy into insurance premiums that will also be allocated to the central 'collision prevention fund'. If used, the World Bank recommend a tariff equivalent to 8 per cent of premiums.
Sponsorship (Private sector investment)	A major international company, or locally recognised company, could benefit from being actively associated with a 'belt up' campaign.
Commercialisation (Stakeholder funding)	Stakeholders should explore whether there could be any legitimate tie with vehicle/seat belt manufacturers. This may produce further sponsorship for related campaigns, but may also allow the opportunity for discounts for owners of older vehicles which have not been fitted with seat belts to afford to do so, particularly among less affluent social groups.

2.7 Insurance

The motor insurance industry has the opportunity to play a key role in increasing road safety within a country. Motor insurance compliance, however, is low in many low-income countries. Therefore, stakeholders would need to ensure a high level of compliance in this area before being able to introduce the recommendations outlined within this section.

One possible way of improving compliance would be to adopt a checking procedure during the initial registration of a vehicle, or during a regular (annual) vehicle inspection. If the vehicle owner displays a valid pass sticker/disk in their vehicle windscreen, enforcement agencies will be sure (or able to check) that their insurance is valid.

South Africa employs a system whereby third party injury insurance is collected through a fuel levy. Therefore, each time a vehicle owner/driver purchases fuel/uses their vehicle, they also purchase third party injury insurance. As a result, non-compliance is virtually non-existent.

(Aeron-Thomas, 2002)

2.7.1 Pricing incentives for safe driving

It is possible for motor insurance companies to encourage drivers to adopt a safe approach when driving by offering discounts on the cost of insuring a vehicle based on the number of claims that an individual has during the specified period of insurance (usually one year). Should a driver have no accidents, and therefore, no claim on their insurance, they can be given a discount on the following years premium. This can also increase with the number of consecutive years of no claims. Table 9 shows the level of discount offered by insurance companies in selected countries:

Table 9: No claim discount offered in selected countries

Country	Value of No Claim Discount
Costa Rica	10% - 1 Year
Karnataka, India	15-65%
BC, Canada	10-45%
United Kingdom	10-65%

(Aeron-Thomas, 2002)

Although many drivers enjoy the benefits of this system, it can encourage under reporting, particularly in damage-only accidents, where the police may not be required to attend the scene of the accident and settlement occurs

without any insurance company involvement. Therefore, safe driving is not necessarily increased.

Nevertheless, some incentive is probably provided if it becomes clear to the vehicle users that accident compensation can be reduced significantly if it is established that a vehicle occupant was not wearing a seat belt at the time of an accident.

In the United Kingdom, the level of personal injury claims has reduced since the recognition by the courts of 'contributory negligence' by the injured party's failure to wear a seat belt. Froom v Butcher (1975) proved that the claimants injuries would have been reduced by 25% had they been wearing a seat belt, and as such had their compensation reduced by 15%. Hitchens v Berkshire CC (2000) set a precedent by reducing the claimants compensation by 50% after it was found that they were not wearing a seat belt.

2.7.2 Road safety levy

Countries should consider a 'Road Safety Levy' placed on the normal cost of a motor insurance premium. If this system is used, the World Bank recommend the introduction of a tariff equivalent to 8 per cent of third party premiums. This money is then allocated to a 'Collision Prevention Fund' and used to raise awareness and knowledge of road safety issues.

Road Safety Levies can be mandatory or voluntary. There has been much support for voluntary levies around the world. Both have proven effective in increasing the funding source for road safety campaigns.

Voluntary financial donations are given every quarter by the motor insurance industry in Fiji. These amount to approximately 10% of third party premiums and are dependent on the number of new policies. This provides the National Road Safety Council with 60% of its funding.

The Transport Accident Commission (Victoria, Australia) provides funding for road safety through both a mandatory levy and as a voluntary levy. Donations started at 3% but have risen to 10%. This funding for road accident reduction and rehabilitation programmes reduced road deaths by 50% in less than 4 years.

(Aeron-Thomas, 2002)

2.8 Private sector support

Private companies/organisations have the opportunity to influence the driving behaviour of their employees. Programmes using some of the incentives suggested in sub-section 2.5 enable the employer to encourage safer use of vehicles.

1. Work-related privileges (such as days off)
2. Immediate valuables (such as pens or flowers)
3. Promotional Items (such as stickers)
4. Exchangeable tokens (cash)
5. Chance to win contests (lottery tickets)
6. Social attention (name in newspaper)

Such incentives can be allocated/distributed to employees at security gates on entrance to the organisation where seat belt usage can be clearly seen.

Note: Organisations should consider funding implications when using incentives. Wearing rates are likely to decrease if and when the budget for incentives can no longer be maintained.

2.8.1 Company policy on road safety

Companies and organisations should consider designing and adopting a policy that issues guidance to all employees who may at some time during their employment, be required to use a vehicle. This should establish clear rules relating to adherence of Road Traffic Law, but also be specific on issues such as the use of seat belts and mobile phones, and also on the consumption of alcohol.

Many non-government organisations (NGOs) already provide advice to motorists through a variety of media sources. One of the most common is the use of the world-wide web.

2.9 Campaign effectiveness

Campaigns that have introduced manufacturing and/or wearing legislation, and delivered a degree of enforcement, publicity and education to raise awareness and increase compliance have proven to be successful in raising wearing rates. The following table highlights the achievements of selected countries:

Table 11: Increases in seat belt wearing rates in selected countries after the implementation of legislation and campaigns.

Country	Wearing rates (%) prior to legislation and campaign	Wearing rates (%) after legislation and campaign
Austria	30	70
Australia	25	95*
Croatia	50	80
Czech Republic	30	60
Denmark	5	94
Finland	40	93
India	0.5	50*
Japan	37	84
Netherlands	15	86
Norway	10	94
South Africa	33	81*
Spain	25	86
Sweden	20	90
United Kingdom	25	91

*Differs between states

All percentages were correct at time of consultation.

2.10 Case studies

Many lessons can be learned from highlighting good practice. Below are two case studies (United Kingdom and Australia) that show the level of commitment and effort required to increase seat belt wearing rates, and importantly, to maintain the results of such efforts. These studies should provide stakeholders with an idea not only of the possible interventions needed to raise seat belt usage, but also the potential timescale for improvement.

2.10.1 United Kingdom

Seat belts were progressively introduced in European vehicles from the late 1950s and tendered to be adapted from aircraft seat belts. Initially, a range of seat belt configurations was in use. These were full harness (two shoulder straps and a lap strap), lap/shoulder or three-point seat belts comprising a lap belt and a diagonal shoulder belt, lap belts and single diagonal belts over one shoulder, across the chest and down to an anchorage below the opposite hip. Initially, the seat belts were all hand adjusted for fit (static seat belts). Various tests were conducted using each of the different types of belt and it soon became acknowledged that the 3-point lap and diagonal seat belt was the best compromise of all options.

British Standard BS3254 was introduced in 1960. Manufacturing legislation, making it mandatory for cars to have seat belts fitted in the front was implemented in 1965. Despite the new legislation, wearing rates were low and in the early 1970s a series of commercials were filmed using a well known celebrity highlighting the dangers of being thrown through a car windscreen. This advertising campaign lasted for over a decade increasing awareness of the benefits of seat belt use, but also preparing the ground for wearing legislation in 1983.

Legislation, making it compulsory to wear seat belts in the front seat was introduced in 1983. In 1989 it became compulsory to wear seat belts in the rear of a car, and extended in 1991 to include all children under the age of 14 who are required to be restrained in an appropriate child seat. These were primary laws and have been constantly enforced. Part 2 of BS3254, relating to child restraints was also introduced in 1991.

Enforcement, education and publicity formed the basis of future campaigns to increase wearing rates. In 1993 the 'Elephant' campaign was launched costing £1million. A black and white television commercial was shot demonstrating the danger of travelling unrestrained in the back seat of a car in the event of an accident. It aimed to show that even at relatively low speeds, an adult passenger could be thrown through the windscreen causing serious injury. This was in response to statistics outlining that

although wearing rates had increased for front seat occupants (up to 95%), wearing rates for rear seat passengers were significantly lower (less than 50%). This was supported by enforcement and community education mainly by local authority Road Safety Officers. Evaluation of the impact it had on passengers showed a marginal increase, with wearing rates rising approximately 5%.

Further analysis of wearing rates identified that compliance was high amongst young children, but dropped off dramatically in the teenage years. Therefore in 1996 'Peter Pan' and 'Doctor', two radio commercials were launched. Supported by leaflets providing advice on seat belt law, enforcement and further local authority work, this national and local campaign with an advertising budget of £300,000 was aimed at parents and adult rear seat passengers, with a secondary target of 7-10 and 11-14 year old children respectively. The campaign had a marked effect on parents who now claimed to make sure that their children were in an appropriate restraint. The campaign achieved 21% prompted awareness among parent drivers who listen regularly to commercial radio.

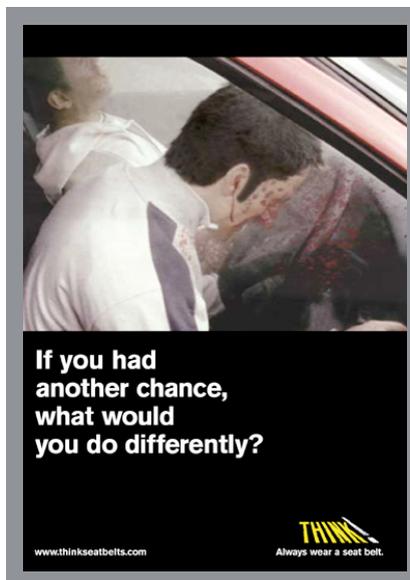
The emphasis on parents continued in 1998 with the production of 'Julie', a TV and radio campaign with a budget of £750,000. 'Julie', the parent driver allows her teenage son to sit directly behind her without fitting his seat belt. When the parent makes an emergency stop, colliding with a stationary vehicle, her son crushes her against her seat belt whilst delivering a fatal blow to the head as they come into contact. This hard hitting graphic campaign finished with the line, "**Belt up in the Back, for everyone's sake**". Posters, leaflets, local authorities and the police supported the campaign, which continued to be re-run at designated times until early 2003.

In 2003, the Department for Transport's THINK! campaign launched a new seatbelts TV ad which was supported by posters, on-line advertising and an interactive website.

The aim of the campaign was to tell drivers and passengers of the importance of wearing a seatbelt in the front and back of a vehicle and to change people's attitudes and behaviour towards wearing a seatbelt. This was based on the insight that the real crash happens inside the car. The strategy sought to target short trips at low speeds in urban areas, as it is often on these types of journeys that drivers don't belt up. Though the work was accessible to everyone it specifically targeted 18-24 year old males.

The TV ad called 'Backwards' showed the horrific effects of a car accident when you don't wear a seatbelt and aimed to raise awareness of the importance of always belting up in the front and back of your car. The ad began by showing the aftermath of a crash, before rewinding - the creative device of playing the crash backwards allowed the viewer to go back to the point where the journey started. From this point he/she can focus on the split second decision of whether or not to put on a seatbelt.

When the crash was then played forwards, the occupants were wearing their seatbelts, and the horrific effects of the crash were avoided. The viewers were left with a lasting reminder of the huge difference a simple click can make.



DfT © August 03
T/INF/863P

2.10.2 Case study: Australia

In 1959, the Senate of the Commonwealth Parliament in Australia, established a Select Committee whose primary aim was to investigate the most effective ways of promoting road safety in the country. The Senate Select Committee (1960) recommended that 'the motor trade should install seat belts of an approved standard in all motor vehicles. Road safety authorities should give publicity to the advantages of wearing seat belts'.

Australian Standard E35 was introduced in 1961 (Safety Belts) and was very similar to that used in the United Kingdom (BS3254). A standard with specifications for anchorages (D11) was produced in 1967. To ensure that seat belts conformed to this, the Standards Association of Australia (SAA) registered a certification mark, which would be used by manufacturers who were approved by the SAA. Therefore, consumers would be able to identify seat belts that were manufactured to the national standard.

Starting in 1962, the Australian Road Safety Council produced a monthly journal attempting to generate awareness of seat belts and their benefits, and reported on work undertaken to try and achieve this. The journal, 'Report', continued for over a decade.

After a recommendation by the Victorian Joint Select Committee for Road Safety (1969), legislation was introduced (1970) making it mandatory for vehicle occupants to wear seat belts. Soon after, similar legislation was introduced in New South Wales (1971). By 1972, seat belt wearing legislation applied to the whole of the country.

Enforcement played a key role in raising the number of vehicle occupants wearing a seat belt. Milne (1985) highlights the results of a campaign during 1976 whereby '6000 drivers were reported for failing to wear their seat belt'. Since this campaign, wearing rates have been high.

Developments continued to be made in the design and manufacturing of seat belts in Australia. Application of Design Rules (ADRs) relating to seat belts have been introduced for cars, larger passenger vehicles, multi-purpose vehicles, light and heavy goods vehicles as well as child restraints.

Milne (1985) believes that the Design Rule program and the seat belt wearing legislation implemented in Victoria had a significant effect on further Australian law, but also 'in many overseas countries'. Milne also estimates that 'between 1971 and 1977 some 4200 more people would have been killed had the trend in fatalities from 1960 to 1970 continued'. Much of this is down to the success of improvements made in seat belt design and manufacturing, and also wearing legislation.

2.11 Checklist

Enforcement - a sustainable campaign delivered by enforcement agencies to ensure that legislation is taken seriously by vehicle occupants

Publicity - pre, during and post legislation, designed and piloted with the assistance of focus groups

Education - pre, during and post legislation, designed to raise awareness and knowledge of the benefits of seat belt use

Incentives - short-term bursts with short-term goals. Beware that financial constraints of a sustained incentive campaign may have a detrimental effect when funding is reduced or deleted

Explore potential funding - refer to sub-sub-section 4.6

Encourage insurance companies to play an active role in increasing usage. Explore the viability of a road safety levy to assist in the funding of road safety campaigns

Encourage the private sector to play an active role within the working environment of employees who use a road vehicle as part or all of their employment

Establish achievable and measurable casualty reduction targets through a National Road Safety Strategy

Ensure campaigns are co-ordinated at a national level, providing resources and assistance for local practitioners

Section 3: Monitoring and evaluation



Section 3: Monitoring and evaluation

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Monitoring and evaluation is a process that stakeholders should begin before the design of the very first publicity/education campaign and should relate to all campaigns, including enforcement and incentives.

BUCKLE UP TO LIVE

(A seat belt campaign used in Argentina by Luchemos por la Vida – ‘Let’s fight for life’)

Before starting the seat belt campaign, a "systematic observation" of the reality of seat belt use among drivers and front seat occupants in Buenos Aires was undertaken. Use was only 1.3% among drivers and 1% among occupants.

In March 1992, after a first and very simple campaign on radio and TV, percentages went up to 3.1% and 2.2% respectively. After decree law 692/2 was passed and the first long term campaign ("Eggs") was over, the percentage was 38%.

In 1999 the percentage was 39%, though it had reached a peak of 80% in summer 1995/96, according to statistics for controls made at specific checkpoints along route No. 2 of Buenos Aires province.

In Argentina, over 7579 traffic accident fatalities occurred in 1998, it is estimated that approximately 1,100 people died because they were not wearing a seat belt.

(Luchemos por la Vida,
1999)

Simple monitoring techniques undertaken in this example by Luchemos por la Vida have enabled them to establish the effect of their seat belt campaign. Wearing rates were very low before the campaign began, and had peaked at 80%. Although wearing rates have subsequently fallen to 39% this is still a significant improvement on the baseline figure. The information provided by monitoring and evaluation methods will allow the organisation to develop more effective future advertising material by understanding what works and what does not.

Table 12: Systematic process of monitoring and evaluating seat belt campaigns

Processes of monitoring and evaluation	Description
Evaluation of pre-campaign knowledge and wearing levels	Research of the target audience, and their awareness through specific questionnaires. This should provide an assessment of current understanding of road safety in relation to seat belts (the same questions should be asked in all surveys to ensure consistency throughout evaluation). Also, observational studies of vehicle occupants at specific sites (which will be used for pre, during and post-campaign observations). This will give a direct indication of the current wearing rate (see sub-section 5.2 for guidelines).
Focus group evaluation	Establish focus groups and discuss current level of awareness and wearing rates. Show participants various proposed first-stage creative strategies and discuss. It is important that people do identify personally with proposed messages and treatments. It is common to identify one specific creative angle on which to concentrate, regardless of focus group size.
Post-educational campaign	Evaluation of levels of knowledge after educational awareness programmes usually conducted by road safety personnel, health education personnel and local Government educationalists.
Media research	Research target audience and identify popular forms of media used by these groups. Conduct research into different creative messages within targeted focus groups to identify an appropriate level to pitch the campaign.
Short-term research	Tracking research throughout early stages of a seat belt campaign or legislation to identify increases (or decreases) in wearing rates and awareness/knowledge.
Long-term research	Tracking wearing rates on a regular basis, and also knowledge, evidential and accident data to be collected to provide a long-term indication of campaign effectiveness.
Micro-research	Specific research into advertising mediums, and their effectiveness.

As outlined in sub-section 5.5, achievable and measurable targets for casualty reduction must be established. Monitoring and evaluation should seek to identify the effectiveness, or ineffectiveness of all campaigns against clear baseline figures.

Research is needed to investigate many different areas in order to assess the effectiveness of a campaign in terms of both changes in behaviour and ultimately in casualties. For example:

White, et al. (2000) evaluated an Australian drink drive campaign. They identified that the enforcement and advertising campaign employed had achieved its aim, as monthly casualty crash figures had reduced. However, interestingly it was also discovered that there had been a reduction in alcohol sales too, a possible direct result of drivers attempting to comply with the message.

An assessment of seat belt sales would indicate compliance with new legislation, or increased knowledge and awareness of the benefits of seat belt usage gained through an education/publicity campaign.

One important issue to consider when evaluating the effectiveness of publicity is that the public are unlikely to be specific or correct in their analysis of which media discipline made them react. Quite often, a person who views a television commercial, is then reminded of the message in the press, or on the radio, and finally 'jolted' into action at the sight of an advertising poster/billboard.

To provide added value to a publicity campaign, it should aim to work in conjunction with a defined educational message relative to the target market. This can be delivered through press releases or by educationalists/road safety personnel. However, it is important that account is taken of this when evaluating the effectiveness of road safety publicity.

3.1 Performance indicators

Evaluating the effectiveness of a seat belt wearing campaign will provide stakeholders with an indication of its success, or failure. Pre-campaign assessments should have provided baseline figures that the following performance indicators can be compared to. The results of this comparison will reflect the achievements of a campaign.

Casualty severity

Accident data analysis, reviewing the severity of vehicle occupant casualties.
Review of hospital casualty data.

Wearing rates

Rates of usage indicated through observational surveys.

Knowledge and awareness

Results of market research indicating current knowledge and awareness.
Comparisons made with previous surveys.

Sales

Sales of vehicles with seat belts installed. Sales of seat belts for the after market, i.e. old vehicles having seat belts installed for the first time, and seat belts being renewed.

Viewing/listening figures

Audience figures for identified media choices.

Opinion

Reported opinion of focus groups used to trial/pilot new publicity/educational ideas.

3.2 Maintaining compliance

Once enforcement, publicity, education or incentives have been removed, the initial results are likely to deteriorate unless the campaign has been effective enough to develop a consistent 'safety culture'.

Another example of the need for a campaign to be sustained over a long period of time can be seen through Thyer and Gellar's (1987) study of the "Buckle Up" sticker campaign. A sticker, reminding the front seat occupants to wear a seat belt was placed on the dashboard for a two-week period. This simple reminder increased seat belt use from 34% to 70%. They were then taken away for another two-week period. When taken away, wearing rates dropped back to 41%. For a further two-week period, the stickers were reintroduced. When placed in front of the driver and passengers, usage increased again, this time to 78%.

Unless a campaign is maintained over a long period of time, or indeed constantly, wearing rates will drop as drivers and passengers either realise that there is less chance of the law being enforced, or forget the reasons for needing to wear a seat belt.

What is vital, is that all campaigns are monitored and evaluated, allowing for a review of their effectiveness and subsequent change or adjustment to ensure correct targeting of an ever-evolving audience.

3.3 Checklist

Determine what it is you want to achieve

Monitor and evaluate the effect of all compliance raising campaigns using methods set out in section 3

Ensure that campaigns are sustainable establishing long-term objectives

Implement regular monitoring processes in order to identify the need for reinforcing the message and maintaining compliance

Section 4: Manufacturing and fitting of seat belts



Section 4: Manufacturing and fitting of seat belts

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It is clear that there needs to be a strategy in place to ensure that all power driven vehicles having at least 4 wheels (or 3 if the maximum weight exceeds 1 tonne) have safe seat belts installed as a standard feature. Section 4 recommends appropriate types of seat belt for different vehicles also highlighting why other options may not be as effective.

It identifies other key considerations such as buckles, retractor types, and anchorage points, and outlines the need for technical standards to ensure both safe manufacture and installation of the restraint systems. Even the highest quality seat belt will fail if installed badly.

This section is aimed at all stakeholders who have a concern or responsibility for setting standards for seat belts and their fitting and maintenance in vehicles. It targets government organisations involved in setting these standards, harmonisation of vehicle standards and those involved in monitoring the standards. It provides useful information for non-government organisations representing vehicle owners and the concerned agencies in the private sector. It can also be used directly by fleet operators and vehicle owners although it is recommended that local leaflets are produced based on the information in the toolkit.

Ideally, it would benefit all vehicle occupants if seat belts complied with the same standard worldwide. Thus, regardless of which country one was resident in or visiting, occupants could rely on the same proven and reliable safety features offered to them when travelling on the highway. Therefore, this toolkit recommends harmonisation with one set of regulations for seat belts, anchorages and child restraints.

This section outlines what the vehicle owner can do to identify wear and tear and/or faults in their seat belt. It also provides guidance on what the private sector can do to encourage seat belt wearing.

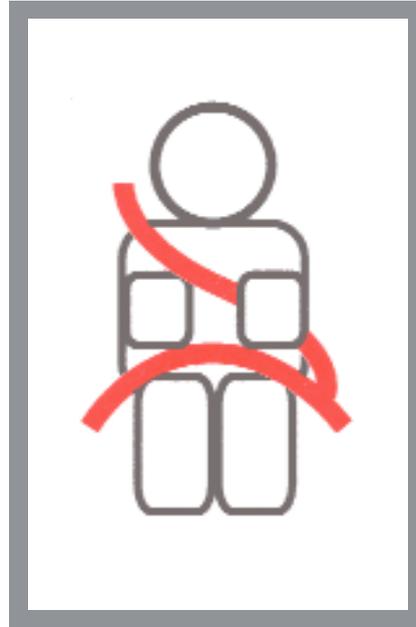
Key points for drafting legislation are provided underlining the importance of regulation of manufacturing in order to eliminate malpractice. A checklist of recommended practice is included along with a practical summary of recommendations within this section of the toolkit.

4.1 Recommended types of seat belts

Cars, vans and minibuses

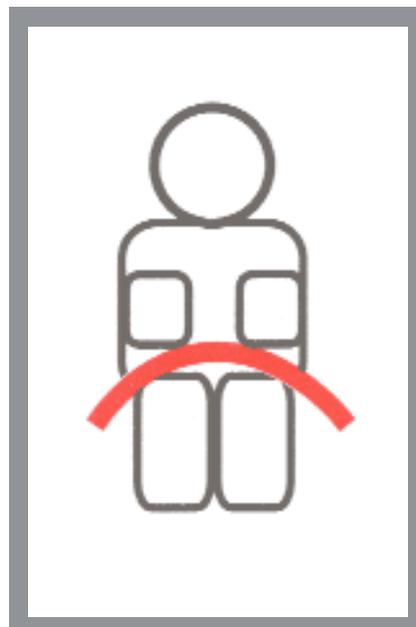
Rated for effectiveness and ease of use, the three-point lap and diagonal seat belt is the most commonly used in cars/vans. The seat belt tongue clips into the buckle, which in the front seats of cars is usually placed on the end of a stiff stalk or directly attached to the seat. A retractor device is included as part of the belt system as this ensures unnecessary slack is taken up automatically (see 4.2). This system allows the occupant to connect the tongue and buckle using one hand, preventing ejection after maintaining the seating position of the occupant.

Ensuring ease of use will increase wearing rates.



Coaches

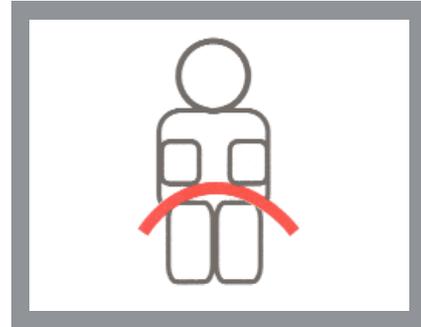
A prominent cause of death and injury from accidents involving coaches is ejection from the seat or vehicle. Owing to the size and mass of coaches, the severity of damage when involved in a collision with another vehicle is often minor compared to that of other vehicles if it is a car and van. It is the effect of being thrown around in a roll over accident that results in more serious injury for passengers. Therefore, a two-point lap belt using a retractor device (see 4.2) is sufficient, with the aim of maintaining the seating position of the occupant.



4.1.1 Types of seat belt not recommended in cars, vans and minibuses

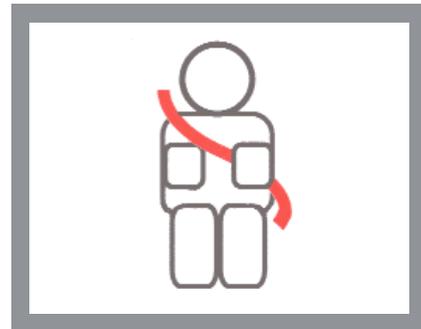
Lap belt

Accident studies have shown that although the lap belt does fulfil the task of reducing ejection, it fails to prevent the occupant's head and upper body moving forward and hitting the vehicle interior. For the driver, this could result in serious head injuries from contact with the steering wheel.



Single diagonal belt

The single diagonal design does provide better restraint for the upper body of the wearer than the single lap belt, but they have been shown to be poorer at preventing ejection and submarining.



Full harness

(Double shoulder, lap and thigh straps with central buckle device)

The full harness gives very good protection both from ejection and from interior contact. However, they are somewhat cumbersome to put on (e.g. no one-hand operation – see 4.1). This is an important factor in achieving a high wearing rate, and thus the harness only tends to be used in vehicles used for motorsport where drivers and co-drivers perceive high risk.



The three-point lap and diagonal seat belt gives a satisfactory compromise between good protection and easy use.

4.2 Key components

The following components are highlighted to inform stakeholders of significant developments in the improvement of seat belt systems. Each device has played a major role in increasing either ease of use or effectiveness.

It is important that the first person to arrive at the scene of an accident, who may be unfamiliar with seat belts, can immediately identify the means of releasing the buckle.

Specifying one type of release mechanism (i.e. a red coloured push button) has helped to facilitate release. In setting standards for buckles, it has proved desirable to establish both minimum and maximum loads to activate the 'Red Push Button'. The minimum force to reduce the likelihood of inadvertent release and a maximum to help with release after the event of an accident.

(Refer to 6.2.2 of UNECE Regulation 16)



The belt must be easy to adjust for the vehicle occupant. This can be achieved by providing a device that allows the occupant to toolkitly adjust the belt, or a device that automatically tightens the belt (retractor). Retractor seat belts avoid the need to adjust the belt for each occupant or when different thickness of clothes are worn due to different weather conditions. For example, shirts worn in hot weather compares to thick jackets in a colder environment.

Minimised adjustment increases wearing rates.

(Refer to 6.2.5 of UNECE Regulation 16)

A major cause of an ineffective seat belt is slack in the webbing. Slack can be caused by the vehicle occupant moving around or adjusting the seat belt for comfort, and from the occupant wearing thick clothing. A seat belt pre-loading device (pre-tensioner) is designed to reduce the amount of slack in the seat belt webbing around a vehicle occupant during the early moments of an accident and therefore, increase the effectiveness of the seat belt.

(Refer to 6.2.6 of UNECE Regulation 16)

4.3 Anchorages

A seat belt is only as effective as its weakest link!

The 'comfort and protection' of a seat belt will only be as good as the 'location and strength' of the belt anchorage points.

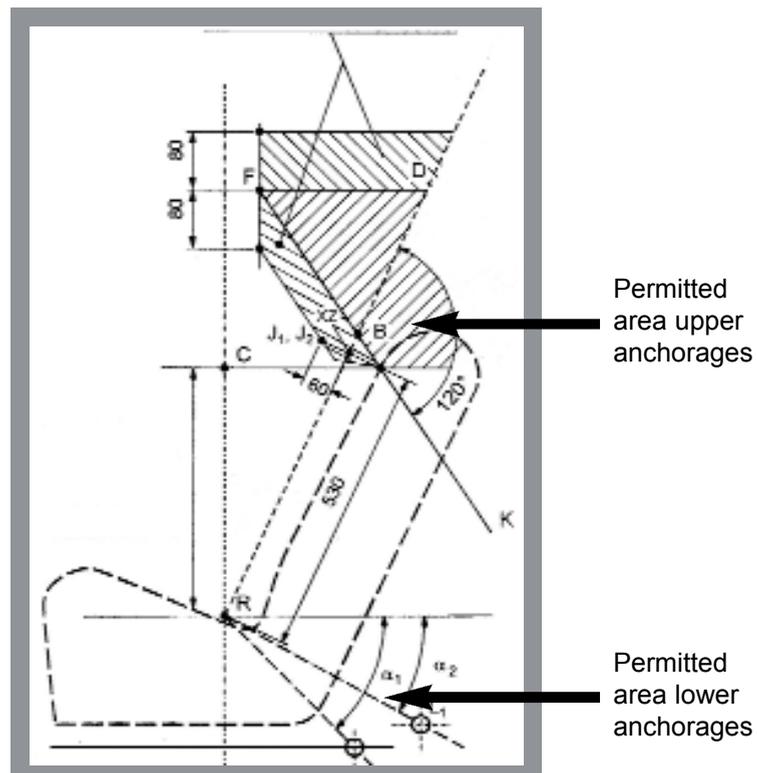
Separate standards for the seat belt anchorage points and for the seat belt components themselves provide a mechanism for controlling both the location and lie of the seat belts.

The seat belt anchorage standard adopted by a country/state should include a definition of the standard interface. Conventionally, this is the provision of a captive nut at the appropriate structural positions on the vehicle. To connect the seat belt anchors to vehicle attachments, the accepted norm globally has been the use of 7/16" UNF threaded bolts/set screws.

Positioning of lap strap anchorages is critical to ensure the lap strap does not ride up into the abdomen or in fact allow the wearer to slip under it (submarining). The shoulder anchorage should be above the shoulder so as not to apply a compression load on the spine in an accident. Correct positioning and thereby comfort also affects wearing rates.

Figure 2: Simplified location of effective belt anchorages diagram

See Annex 3 of
UNECE
Regulation 14
for full diagram
and explanation



4.4 Child restraints

Specially manufactured child restraints should be used for children. Their weight and size may make it difficult for the adult seat belt to prevent ejection and injury. Therefore, children require additional protection to that of an adult.

Note: The determining factor for choice of a child restraint is weight.

Table 13: The weight categories of child restraints

Category	Description
0	For children of a mass less than 10kg
0+	For children of a mass less than 13kg
I	For children of a mass from 9kg to 18kg
II	For children of a mass from 15kg to 25kg
III	For children of a mass from 22kg to 36kg

(UN, 1981 – several amendments since this date)

Note: There is no single model of child restraint that fits all models of vehicle. Vehicle owners should ensure that the child restraint used is appropriate for the vehicle in which it is to be used.

Safety Tips for Using Child Restraints

1. Remember that child weight is the primary determining factor in car seat choice.
2. Don't, under any circumstances, use any child car seat on a passenger seat fitted with an airbag.
3. It is strongly advised that you do not buy or use a second hand car seat. You can never be certain how it has been used, or whether it has been involved in an accident. If you were to have an accident the seat may not protect your child.
4. Always use appropriate child restraints and adjust harnesses correctly for every child for every trip.
5. Regularly check the fit of your car seat and replace seats or harnesses showing wear and tear.
6. Never modify the seat, its fitting, the harness or buckle; it may not protect your child in an accident.
7. Remember the driver is responsible for other passengers and luggage towage.
8. No car seat is child proof, encourage your child not to play with the buckle.

Britax Childcare

Children should be individually restrained. Due to the forces experienced during an accident, even a minor accident, it is unlikely that an adult will be able to prevent injury to the child if inappropriately restrained.

Also, the child will suffer serious injuries or death if placed in between the adult and the adult seat belt whilst travelling.

The picture opposite is a French advertisement highlighting that in a collision of just 50km/h, the child's weight will effectively increase by 20 times. Therefore, a 5kg baby will appear to weigh 100kg within a split second making it physically impossible for any occupant to securely hold on to the child.



(Ministry of Transport,
France)

It is anticipated that UNECE Regulations 14, 16 and 44 will soon be amended to include a child restraint system known as ISOFix (international standards for fitting child restraints in vehicles).

At present, child restraints are fitted in the vehicle by the vehicle owner using a lap (2-point) or lap and diagonal (3-point) seat belt. However, correct fitting and use depends on the skill of the vehicle owner to ensure firstly, that the restraint is appropriate for the vehicle it is to be used in, and secondly, that the seat belt is sufficiently adjusted to provide adequate support in the event of an accident.

The main purpose of ISOFix is to improve the overall safety performance of child restraints, particularly by improving the convenience of installation and reducing the risk of misuse.

The ISOFix system can be clearly seen in the picture opposite. These connections consist of two metal clips at the rear of the restraint, which attach to two anchorage points (manufactured and designed to specific regulations) by pushing the child restraint back until the clips and anchorages are securely fastened. Easy release of the seat is achieved by means of the red push button shown.



Stakeholders should keep abreast of all amendments to UNECE Regulations 14, 16 and 44 relating to ISOFix by using the web address below:

<http://www.unece.org/trans/main/wp29/wp29wgs/wp29grsp/grspage.html>

4.5 Standards

There are a number of variations in the standards for seat belts adopted by different countries. Each country claims good reasons for these variations. However, ideally stakeholders should harmonise with one specific standard to ensure consistency at a global level. To develop a strategy for harmonisation, the Government should establish a Working Party consisting of all key players such as manufacturers, safety bodies and the Vehicle Inspections Agency.

It is recommended that countries should base internal standards on United Nations (UNECE) Regulations. The World Forum for Harmonisation of Vehicle Regulations (WP29) is now seen as the appropriate centre for harmonising world standards on vehicles. Therefore, stakeholders should ensure that legislative steps are taken to ensure that manufacturers retailing in their country comply with UNECE Regulation 14 (seat belt anchorages), UNECE Regulation 16 (seat belts and restraint systems), and UNECE Regulation 44 (restraining devices for child occupants).

India has begun the harmonisation process for four wheeled (or three if the weight exceeds 1 tonne) passenger vehicles. Regulations AIS016 (seat belts) and AIS015 (anchorages) have been designed to harmonise with UNECE Regulations. As such, India has legislated to ensure that vehicles sold within the country meet the requirements of these standards using a three-tiered (phased) approach with targets set for 2003, 2005 and completion in 2010.

All United Nation Vehicle Standards can be found at:
<http://www.unece.org/trans/main/wp29/wp29regs.html>

UNECE Regulation 14	<p>UNECE Regulation 14 applies to the anchorages for seat belts for adult occupants of forward-facing seats in power-driven vehicles having four or more wheels (or three if the weight of the vehicle exceeds 1 tonne), and used for the carriage of passengers or goods where the weight does not exceed 12 tonnes.</p> <p>(UN,1970a - several amendments since this date)</p>
UNECE Regulation 16	<p>UNECE Regulation 16 applies to seat belts and restraint systems for installation in power-driven vehicles having four or more wheels (or three if the weight of the vehicle exceeds 1 tonne), and used for the carriage of passengers or goods where the weight does not exceed 12 tonnes.</p> <p>(UN, 1970b - several amendments since this date)</p>

UNECE Regulation 44	UNECE Regulation 44 applies to the approval of restraining devices for child occupants of power-driven vehicles. (UN, 1981 - several amendments since this date)
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See Table 14 for contents of UNECE Regulations.

Note: When adopting standards, stakeholders should assess the effects of their natural environment on the seat belt components. For instance, prolonged periods of Ultra-Violet (UV) light from the sun can reduce the life span of a seat belt unless treated. The heat from the sun can also distort some types of materials. Australia has adopted the above Regulations, but added to them to ensure suitability within their environment.

Refer to sub-sub-section 4.5.1 also

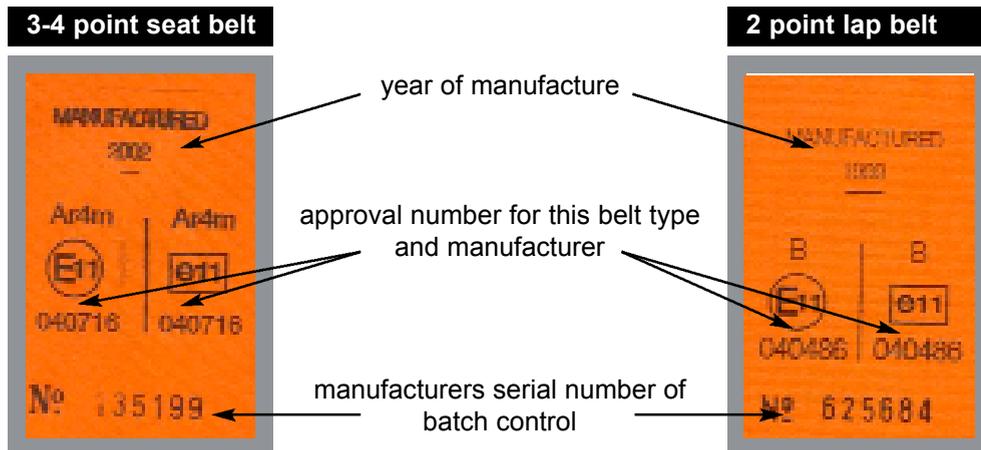
For technical specification, stakeholders should refer to the standards using the website address above. However, this toolkit provides additional information relating to standards on buckles and retractors (4.2), anchorages (4.3), child restraints (4.4) and testing (4.5.1). Recommendations for legislation that incorporates the above standards are outlined in sub-section 4.7.

A summary of the standards used or adopted in countries who responded to the consultation exercise used to collate information for this toolkit can be found in Appendix 4.

Table 14: Contents of UNECE regulations 14, 16 and 44

Reg 44	Reg 44	Reg 44	Reg 44
Application for approval: The technical details required within an application by the manufacturer, also highlighting measures to control conformity.	✓	✓	✓
Approval: Labels stating approval, granted by a specified authority.	✓	✓	✓
Markings: Indicates the obligation on the manufacturer to provide details about the product.		✓	✓
Specifications: Specified requirements of the product.	✓	✓	✓
Testing: Highlights the type of tests required to be undertaken for individual components and products, specifying the minimum and maximum results of conformity.	✓	✓	✓
Inspection after testing: Evaluation and documentation of testing results.	✓	✓	✓
Modifications: Manufacturers obligation to inform the approval authority and document any modifications to a product which has been approved.	✓	✓	✓
Installation: Outlining the requirements of installation dependent on the seat type.		✓	
Conformity of production: Identifies the obligation on the manufacturer to implement control measures to ensure conformity.	✓	✓	✓
Penalties for non-conformity: Outlines the penalties enforced for non-compliance.	✓	✓	✓
Operating instructions: Standard instructions to be provided by the manufacturer to the product user.	✓	✓	✓
Production discontinued: The obligations on the manufacturer to inform the approval authority that a product has ceased to be manufactured.	✓	✓	✓
Transitional provisions: Periods of notice given to manufacturers to comply with amendments to regulations.	✓	✓	✓

Each seat belt should be marked with a label identifying a number of features. These highlight to the consumer or vehicle inspector whether or not the product has been manufactured to the required standards:



(Securon Ltd)

Key to seat belt labels	
A	3 or 4 point seat belt (lap and diagonal or full harness)
B	2 point seat belt (lap belt)
e	load limiter
r	with retractor
3	automatic locking retractor (ALR)
4	emergency locking retractor (ELR)
m	multi-sensitive
N	sensitive for special applications
p	pre-tensioner
z	seat belt designed in combination with air bag
E	denotes UNECE Regulation approval
e	denotes EEC Directive approval
11	denotes country where approval was issued (e.g. 11 = United Kingdom, 25 = Croatia, 45 = Australia, 47 = South Africa)

4.5.1 Testing

To ensure credibility of any approval granted to a product, it is recommended that the 'type approval' approach is taken. Self certification, whereby the manufacturer of a product certifies that it meets the requirements set out in a specific standard by performing their own testing, allows for potential malpractice by unscrupulous manufacturers.

Using the 'type approval' method, a product is submitted to the Approval Authority who then issue certification based on results from independent testing (see 4.7.1).

The standard adopted for seat belts should include a dynamic strength test using a test dummy on a sled, restrained by the seat belt under test attached to standard anchorages or those prescribed for use.

(Refer to section 7.7 of UNECE Regulation 16)

The dynamic test may be performed after multiple operations of the mechanisms (e.g. buckles, adjusters, retractors) to provide a control on the durability of the system.

(Refer to section 7.5 of UNECE Regulation 16)

The seat belt webbing should be subject to an abrasion test and, if thought appropriate, a sunlight degradation test.

(Refer to section 6.4.2.1 of UNECE Regulation 16)

Other mechanical parts of the seat belt should be subject to durability testing, appropriate for the conditions under which they are expected to operate. This could include, for example, high or low temperatures or a sandy environment or high humidity environment, as these factors are known to affect seat belt performance.

(Refer to section 7 of UNECE Regulation 16)

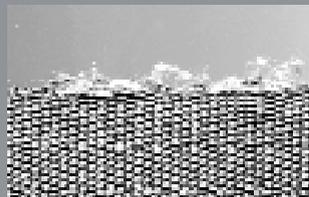
Note: One of the difficulties with purchasing used vehicles or replacing old/damaged webbing, is that the seat belt webbing may be new, however, the retractor reel may have been used with a previous set of webbing in the same vehicle. Therefore, new webbing could hide a faulty or pre-stressed retractor.

4.6 Vehicle owner maintenance (voluntary action)

Minor damage to the seat belt webbing or components can reduce the effectiveness of the seat belt significantly. A small 2mm-3mm cut in the webbing reduces the effectiveness of a seat belt by up to 40% in a static test. Effectiveness reduces even further in a dynamic (more realistic) test due to increased friction and heat.

Vehicle owners should regularly inspect their seat belts and replace them if any of the following faults are found:

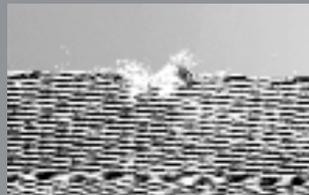
Fluffing and fraying



Holes



Cuts and nicks



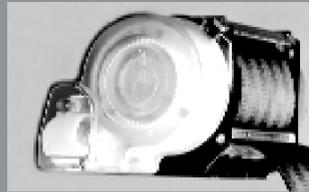
Damaged buckles



Weak connections



Poor retracting and locking

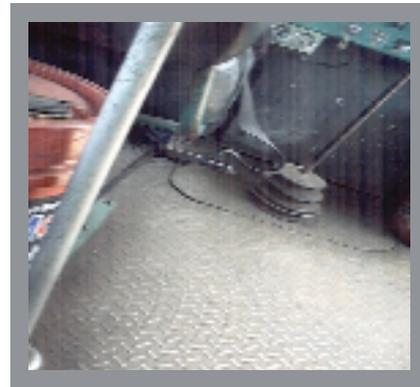


(Securon Ltd)

4.7 Recommended legislation for the manufacturing and fitting of seat belts

Legislation that is accepted by those it affects, and that it is enforceable are the most important aspects to consider when introducing a new law. Legislation that is not enforced allows unscrupulous manufacturers to produce and sell faulty or sub-standard goods, which in turn could cost lives.

The fitting of seat belts can become sub-standard if the legislation is not enforced. In this picture, the webbing has been wrapped around a metal leg of the seat and is very unlikely to act as an effective anchorage. Lower anchorages attached to the seat are common place, however, when this is the case the whole unit (including seat anchorages should be subject to testing as specified in section 6 of UNECE Regulation 14.



This plastic buckle and tongue (broken or not), may not provide sufficient protection to withstand the force of a vehicle occupant projected forward even a minor accident.



Examples from Pontificia
Universidad Católica del
Perú

The following points are recommendations for inclusion within legislation that effects the manufacturing and fitting of seat belts:

Table 15: Recommendations for legislation affecting manufacturing of seat belts

Recommendation	Details
Manufacturing	<p>Manufacturing and fitting of seat belts and anchorages has to be governed by unambiguous legislation. Including UNECE Regulations for anchorages (14), seat belts (16) and child restraints (44) will identify clear manufacturing technical specifications that manufacturers have to work to.</p> <p>A Type Approval mechanism should be established, which will liaise closely with manufacturers and ensure independent testing of products before sale.</p>
Consumer Information	<p>Any legislation should look to assist the consumer in identifying correctly approved products. See identifying labels highlighted in sub-section 4.5.</p>
Road Worthiness Testing	<p><i>Legislation</i> should include road worthiness testing for cars, vans, minibuses and coaches travelling on the public highway. Within this, it should be mandatory for seat belts, retractors and anchorage points to be checked for corrosion, damage, and excessive wear and tear that may reduce the capability of the whole system.</p> <p>When drafting legislation, stakeholders should examine the cost implications and establish consumer fees accordingly. Legislation should cover authorised examiners, administration, examination procedure, appeals, fees, records and monitoring of test centres.</p> <p>Appendix 5 contains an example from a vehicle testing toolkit on inspecting seat belts and their components.</p>
Retrospective Installation	<p><i>Retrospective</i> installation has not been widely adopted unless approved anchorages have been included at the manufacturing stage. There are no current regulations regarding retrospective anchorages. Therefore, it may be dangerous to legislate that vehicles with no mounting points should have seat belts installed after manufacture.</p> <p>It is recommended that legislation is introduced ensuring that vehicles manufactured with approved anchorage points that have not had seat belts fitted, should have seat belts installed by an approved fitting centre (can be the same as the test centres).</p> <p>A period of grace stating the deadline for compliance is recommended.</p> <p>All components and anchorages must meet the same manufacturing standards as new vehicles.</p>

4.7.1 Compliance with regulations

There are two common types of checking mechanisms used to ensure that manufacturers conform to design and installation standards:

Table 16: Common Checking Mechanisms for Conforming to Standards

Checking Mechanism	Description
Self Certification	Here the manufacturer certifies that the entire production meets the minimum requirements set into the standard. Manufacturers are not required to undertake performance testing only to the methods included in the standard.
Type Approval	<p>With this approach, products that are subject to safety standards (seat belts, anchorages, retractors) are submitted to an independent Approval Authority for type approval evaluation and testing. Unless they meet the requirements of the standard at this stage, they will not be approved for sale or use.</p> <p>Where retrospective fitting occurs (see Table 15), all seat belt components must meet the standards of testing. Installation must then take place at an approved installation centre.</p>

Especially for those countries who have yet to introduce satisfactory standards for anchorages, seat belts and child restraints, it is recommended that systems are checked by a Government accepted Approval Authority who will conduct independent testing. Weak or non-existent regulation can result in the sale of unsafe seat belts.



(Pontificia Universidad Católica del Perú)

Section 9 of UNECE Regulations 14 and 16, and section 11 of UNECE Regulation 44 provides the Approval Authority with the power to perform spot checks to test the conformity of a manufacturers products 'at any time', but only on two occasions in one year.

If testing identifies non-compliance, in the most serious of cases (e.g. one that would result in the serious injury or death of an occupant if involved in a collision), that product should be removed from sale and production until

such time as it has been modified to comply with the requirements outlined within the Regulations. This will subsequently result in a recall of that product if sales have been made. Refer to section 10 of UNECE Regulations 14 and 16, and section 12 of UNECE Regulation 44.

Regular vehicle inspections help to ensure that a vehicle is maintained to a standard that makes it safe for road use. Some countries make vehicle inspections a mandatory requirement; however, in many countries the responsibility lies with the vehicle owner. Inspections can be conducted in a variety of ways:

Table 17: Options to encourage/legislate that vehicles are roadworthy

Checking Mechanism	Description
Mandatory regular vehicle inspections at an approved testing centre	<p>Six monthly or yearly inspections conducted by trained vehicle inspectorate employees (mechanics). Vehicle owners would be issued with a certificate to state that at the point of inspection, a vehicle was deemed roadworthy.</p> <p>Mandatory inspections allow a country or state to maintain a minimum standard of vehicle quality ensuring that its condition would not pose a hazard to its occupants or other road users.</p> <p>This is the recommended requirement.</p>
Spot checks	<p>Checks performed on an ad hoc basis by an enforcement officer, issuing a demand for the vehicle to be inspected by a trained mechanic/inspection centre if deemed to be unroadworthy.</p>
Consumer checks	<p>A service offered to vehicle owners by inspection centres or dealerships advising the vehicle owner of maintenance required to ensure roadworthiness.</p>

4.8 Training of inspectors

In most countries vehicles (after a certain age) must obtain a certificate of road worthiness. Stakeholders must ensure that vehicle inspectors appointed to carry out this work are trained adequately enough to ensure that even minor faults can be identified during testing. This should be conducted by an authoritative agency established to conduct such training and approve specific test centres.

Inspectors will have achieved a high academic status or extensive experience within their field before training to become a vehicle inspector.

Mandatory inspections are usually conducted at commercial garages and at local authorities, but these should always be approved by the authoritative agency who will conduct regular spot checks to ensure consistency and quality.

In the UK, the Vehicle Inspection Agency approve all test centres and conduct the training of inspectors. Mechanics are required to hold a suitable qualification or sit an exam with a 75% pass rate before undertaking training. The current 2-day course (soon to be extended to 3 days) contains practical and theoretical elements. Approved inspectors are then required to attend refresher training every 3 years.

A system is also in place whereby penalty points are applied to test centres and examiners who have not achieved the required standards. Although complex, warnings can be given to those not performing to the letter of the toolkit. Additionally, approval can be taken from both centres and examiners for serious breaches of testing specifications. Credits for high quality work can also be obtained.

Vehicle testing is also available through some commercial organisations who will visit the residence of the vehicle owner; however, this type of test is never mandatory.

4.9 Employer opportunities

The private sector has a significant role to play in increasing seat belt usage. Companies have a number of options available to them to assist in achieving the national goals.

During a number of awareness raising campaigns in Australia during the 1960s, some private sector organisations voluntarily equipped their fleet vehicles with seat belts. This helped raise wearing levels from almost zero to 25% (Milne 1985). This level of achievement is further enhanced when taking into account the fact that installation of seat belts in road vehicles was not common practice at that time.

Employers in most countries have a responsibility under Health and Safety Law to ensure, as far as is reasonably practicable, the safety of their employees. Risk assessments should be conducted that identifies real and potential dangers, and outlines control measures to minimise the risk of injury to their employees. Therefore, employers should look to design or adopt policies and measures that minimise the risk of injury to their employees who travel in a vehicle as all or part of the duties.

Tesco, a supermarket chain, have installed red seat belts in their distribution trucks. Due to the function and the type of vehicle, seat belts are not mandatory. In order to minimise the risk of ejection from the vehicle in an accident, and also to reduce the likelihood of injury, it is company policy that drivers of Tesco trucks wear a seat belt during a journey. The reason that the seat belts have been dyed red is so that compliance with the company policy is visible to a person standing near the vehicle.

Policies should not be limited to seat belts. There are many road safety issues that can be covered within such a policy, for instance adherence to Road Traffic Law, consumption of alcohol and drugs, use of mobile phone whilst driving. Any sanction used as a result of non-compliance should be comparable with other such internal failings.

4.10 Summary

The information provided in this section of the toolkit refers to the manufacturing and fitting of seat belts. It aims to give guidance and recommendations on the use of legislation and standards to increase the safety of vehicle occupants.

The key to achieving success is consultation and partnership with vehicle manufacturers. If countries can ensure that vehicles sold in their country have seat belts installed as standard, manufactured to the specified regulations set out within legislation, then stakeholders can start to work towards increasing wearing rates.

Stakeholders should note that ease of use will inevitably affect wearing levels. Therefore, recommendations are based on types that have proven to be effective to provide satisfactory support in an accident and minimised inconvenience to the vehicle occupant when fastening and wearing.

The fact remains that any standard(s) adopted to increase the safety of vehicle occupants is better than none. However, in order to provide consistency and a co-ordinated approach to increasing the standard of seat belts, it is recommended that countries adopt the 'uniform technical prescriptions' outlined by the World Forum for Harmonisation of Vehicle Regulations.

Stakeholders should employ a mechanism that ensures compliance with relevant legislation and standards/regulations. This is vital if legislation is to be taken seriously.

A system should also be implemented that ensures regular independent testing, assessing wear and damage of seat belts and their components with a pass and fail criteria. As such, guidance should be provided to both vehicle owners and vehicle inspectors on assessing wear and damage of seat belts.

To aid the process of encouraging vehicle occupants to wear seat belts, organisations should be convinced of the need to play a proactive role in the installation of seat belts in fleet vehicles. This will result in an improvement in road safety overall whilst achieving health and safety objectives (see sub-section 4.9).

4.11 Checklist

- | | |
|---|--------------------------|
| Examine current seat belt manufacturing and fitment standards/guidance | <input type="checkbox"/> |
| Determine current levels of vehicles fitted with seat belts | <input type="checkbox"/> |
| Determine current levels of vehicles fitted with anchorage points only | <input type="checkbox"/> |
| Calculate the cost of retrospective installation for vehicles with anchorages only and establish realistic consumer costs | <input type="checkbox"/> |
| Analyse current road casualty data relating to vehicle occupants and potential injury savings with better seat belt compliance | <input type="checkbox"/> |
| Lobby Government and increase support to establish a Working Party to address the need for the introduction of technical standards for the manufacturing of seat belts and child restraints | <input type="checkbox"/> |
| Establish a Working Party (which should include manufacturers and consumer groups) to identify the country's/state's ability to conduct regular vehicle inspections, outlining improvements to be made | <input type="checkbox"/> |
| Agree standards and lobby for legislation to be introduced that incorporates the appropriate changes | <input type="checkbox"/> |
| Establish a procedure for vehicle inspections incorporating the checking of seat belts (inclusive of webbing, anchorages, buckles, retractors etc.) | <input type="checkbox"/> |
| The Working Party should advise on the introduction/harmonisation with agreed standards | <input type="checkbox"/> |
| Identify timescale for compliance of agreed standards and inspection facilities | <input type="checkbox"/> |
| Identify and administer the training of vehicle inspectorate employees on the checking of seat belts | <input type="checkbox"/> |
| Produce seat belt inspection guidance for vehicle inspectors | <input type="checkbox"/> |
| Produce seat belt inspection guidance for vehicle owners | <input type="checkbox"/> |
| Encourage private and public sector organisations (including the insurance industry) to play a proactive role in increasing vehicle safety for employees and promote through health and safety law and insurance system | <input type="checkbox"/> |
| Monitor and evaluate the effectiveness of legislation | <input type="checkbox"/> |

Section 5: Introducing seat belt wearing legislation



ALWAYS USE YOUR SEATBELT

Section 5: Introducing seat belt wearing legislation

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This section of the toolkit aims to provide stakeholders with key information relating to raising seat belt wearing rates through legislation. **Enforcement of legislation is the most effective tool available to stakeholders to increase seat belt usage.**

Before the introduction of legislation, there is a need to create an environment whereby the benefits of seat belt use are known and accepted by vehicle occupants. This process involves an assessment of current knowledge and awareness followed by the introduction of appropriate practices aimed at raising the knowledge of vehicle occupants of all ages. These practices are discussed in more detail in Section 2.

Section 5 identifies a number of barriers that are likely to be encountered by stakeholders, and outlines a number of ways to overcome these difficulties such as a comprehensive consultation programme involving companies and organisations, and particularly vehicle occupants.

Once complete, recommendations are provided for drafting seat belt wearing legislation, outlining options for its introduction covering front seat occupants, rear seat occupants, and child restraints.

Finally, this section offers a selection of considerations for potential exemptions from the seat belt law.

5.1 Creating the right environment

Educating the public is imperative at the outset of any new promotion, service or product, and seat belts are no exception. Vehicle occupants need informing, and then re-educating to generate acceptance of the benefits of wearing a seat belt. Continuous education is also necessary for future generations.

The pictures opposite show devices that have been used to educate all vehicle occupants of the benefits of wearing a seat belt by allowing participants to experience a simulated minor crash (5km/h). The top picture (Seat Belt Convincer) is used by the Japan Automobile Federation. This has helped to raise seat belt use from 62% to 84% in Japan during the last decade.



(Japan Automobile Federation)

The bottom picture is a Seat Belt Sled. These are more common than the device used in Japan. Such devices can be used to convince vehicle occupants of the need to wear a seat belt before the introduction of legislation and are an ideal publicity tool for the involvement of celebrities.



(FIA Foundation)

In the Netherlands, seat belts had been fitted in cars (front and rear) since 1973. After an awareness raising campaign leading up to rear seat belt legislation in 1992, the use of seat belts in rear seats increased from 28% to 55%.

The following are examples of publicity that have been used to encourage seat belt wearing rates prior to the introduction of legislation:

Moroccan seat belt campaign



(Comité National de Prévention des Accidents de la Circulation)

(URRENO, Uganda)

Advertisement used in Uganda



Due to the wide-ranging target markets between countries, in-depth analysis of the audience and socio-conditions of each nation should precede all advertising campaigns. The campaigns should also work in conjunction with a defined educational message relative to the target market.

The publicity campaigns of the 1960s in Australia played a key role in changing vehicle occupant behaviour towards seat belts. A study conducted by Freedman, et al. (1971) in New South Wales found that '75 per cent of respondents rated belts as "very important" or "important" including almost two-thirds of those who never wore seat belts'.

Campaigns should be based around the results of market research of road users and relate to their seat belt knowledge and awareness (refer to Appendix 6).

Consideration must be given to road users in those socio-economic groups that will find it difficult to afford to install seat belts in their vehicle, or purchase a new vehicle with seat belts installed as standard.

An overriding consideration will need to be the impact that legitimate Human Rights entitlement could have on the effectiveness of any seat belt legislation. It is important for legislators to demonstrate a balanced argument allowing people their civil rights, yet exhibiting the responsibility of state, which protects those who fail to show proper regard for their own or other peoples' safety. See Section 5.3 for more information.

The most effective way to overcome resistance to seat belt wearing legislation is to deliver a successful publicity and education campaign that uses a sound and balanced argument for and against the use of seat belts. The campaign should highlight the benefits of seat belt use (reduced death and injury as well as savings to the local economy) and use this to increase the awareness and knowledge of all road users, ensuring that the majority accept new legislation increasing their safety whilst travelling in a vehicle. See 5.3 and 5.4.

Case study: changing attitudes and legislation in Costa Rica

At the time of going to print the FIA Foundation is supporting an awareness campaign in Costa Rica to promote seat belt use. Costa Rica's seat belt law was overturned by the Constitutional Court in 1997 following a campaign by the Libertarian Movement, which argued that compulsory seat belt laws were an infringement of civil liberties and unconstitutional (similar arguments are made by anti-seat belt campaigners in many countries).

The Costa Rican government was determined to reintroduce a seat belt law, not least because of the high number of road casualties involving un-belted car occupants. A campaign organised by the government, the Costa Rican automobile club and the national Road Safety Council was launched in September 2003 to promote seat belt use. A high profile campaign image (a seat belted heart) on leaflets and roadside signs, a TV and radio advertising campaign and a touring seat belt slide were used to raise awareness. Police officers handed out advisory leaflets to drivers.

In December 2003 the Costa Rican parliament voted to reintroduce the seat belt law. The new legislation is, at time of printing, being considered by the Constitutional Court.

The campaign's distinctive logo was displayed via a range of media, including road side signs



The Costa Rica campaign saw the first use of the FIA Foundation's crash test dummy seat belt campaign character



5.2 Assessment of current situation

An accurate assessment of the current situation with regard to seat belt use will provide any country or state with a number of baseline figures that future legislation and campaigns will aim to improve. Therefore, all subsequent assessments become indicators of success. These results are identified through a number of different surveys. Actions for assessing the current trend in seat belt usage are illustrated in Appendix 6.

5.2.1 Observers

Accurate observations are demanding on even the best of observers. To help save time and funding, employed staff should be local to the site where the observations are being conducted. However, as such, the quality of data produced by survey staff is difficult to control. It has been proven in the UK that to conduct seat belt surveys, staff of 'proven experience and motivation' are required.

5.2.2 Site selection

The sites selected for observation can depend to some extent on the survey staff. Compromises can be made on the data being nationally representative to ensure quality of data over quantity of data. Therefore, it is better to accept surveys conducted in one or two smaller locations where the researcher can rely on quality of data, than try to blanket large parts of the country/state and receive inaccurate data from unreliable survey staff.

Sites should be selected such that all road types are represented so that correlation may be made between urban and rural roads, between motorways and unclassified roads, built up areas and non-built up areas, and so on. Sites should be assessed for the ease of which they allow the survey staff to observe and record the use of seat belts and child restraints by vehicle occupants. For example, sites where traffic lights are installed allow survey staff time to view vehicle occupants clearly. This helps to ensure that results can be generalised to represent different vehicles and different journeys.

To ensure consistency in data, researchers should try to use the same sites for every subsequent observation.

A risk assessment should always be carried out at every site before observations are conducted to ensure that it is safe for the survey staff to undertake their tasks.

Appendix 7 provides stakeholders with a sample observational survey form.

A clear sampling strategy is required. For example, at a traffic signal location:

1. When the signal turns red, observe the first car that stops,
2. As time permits, observe in strict order any stationary vehicles queueing behind the first,
3. When the lights change, suspend observation until the next red period.

(Broughton, 1990)

Observers should work in small teams. The team should include one person to count the vehicles observed, whilst at least one person should observe and record the relevant data. Duties may be rotated.

Although it is important that observers are inconspicuous so as not to affect results (e.g. drivers may realise they are being monitored and quickly apply the seat belt), it is equally important for employers to ensure that any potential dangers for observers by working alongside the road are minimised.

5.3 Institutional constraints

There will undoubtedly be a number of issues that will need to be considered when introducing seat belt legislation. These will have a direct influence on the detail within any legislation aimed at increasing seat belt usage.

Physiological issues need be examined, for instance:

- Age:** Provisions for children, elderly;
- Gender:** Nature and type of stipulated belt, provisions, if any, for pregnant women; and
- Medical:** Conditions, which might preclude wearing of a safety belt, i.e. major surgery.

Also, the distribution and demography of the various groups should be appreciated before formulating legislation. Legislation may discriminate against those at the lower end of the socio-economic bands who may not be able to afford the additional cost of either installing seat belts into their current vehicle, or the price of a new vehicle.

The introduction of seat belt legislation will be seen by some to have many dis-benefits. Representative bodies, as well as informed individuals, need to be given a chance to influence the final legislation by being involved in a comprehensive consultation programme, which is undertaken before any legislation is formally presented for enactment. These include:

Enforcement Agencies		
Political	Legal	Safety Bodies
Educational		Health
Ethnic/Religious	Industrial	Social

To smooth the passage for the introduction of seat belt wearing legislation, and therefore look to overcome objections from lobbyists and civil liberty groups, stakeholders need to adopt a clear strategy. The timescale of this strategy can vary depending on the impact and effectiveness of implemented measures.

The aim of introducing seat belt legislation is to reduce the number of vehicle occupant deaths and reduce the severity of injury. The only way to determine the scale of the problem, as well as assess the effect of any intervention, is to have clear performance indicators based on an analysis of the number of casualties, casualty severity, casualty costs, sales of seat

belts, public awareness/opinion, and wearing rates pre-legislation/campaign. Stakeholders should also assess the vehicle occupants' ability to adhere to any new legislation. If all occupants were required by law to wear seat belts, but only 50% of vehicles were fitted with the device, then it is likely many road users will be committing an offence. Therefore, manufacturing has to be one of the first interventions (see Section 4). New vehicles must be fitted with seat belts as standard, and where possible and safe, retrospective fitting should take place. Stakeholders may wish to offer incentives for vehicle owners who retrospectively have seat belts fitted to their vehicle.

An education and publicity campaign should then be adopted. As stated above, it is very difficult to identify a timescale of how long this should continue before legislation would be suitably accepted. Where wearing rates are low and casualty figures are high, countries/states should employ a sustained/high impact publicity and education campaign. The use of a high profile figure/celebrity within the campaign has proven to enhance the effectiveness of the intervention.

Analysis of wearing rates and casualty savings will show improvement with the use of an effective campaign, however, experience shows that this improvement will plateau. It is at this point that a further intervention is required. This may be the introduction of legislation, or may require a new approach to educating and raising awareness. Table 11 in section 2.9 indicates the percentage wearing levels achieved before the introduction of legislation in a selection of countries.

The police play an important role in smoothing the way for wearing legislation. Without legislation in place it is impossible for them to enforce the wearing of a seat belt. However, through good community policing and soft enforcement, safety messages can be delivered to raise awareness of the benefits of seat belt use. Options open to the police include:

- Teaching in schools;
- educating at community groups;
- stopping vehicles and providing advice to unrestrained occupants.

This should not be conducted in a threatening way, but should be highlighted as a positive way to reduce the death and injury rate within a given area. It should be recognised that road safety is a community programme, and the key points/benefits of seat belts should be tied into a more holistic approach to road safety.

Once legislation is introduced, enforcement should be considered and included into all multi-disciplinary campaigns. The enforcement agency should liaise with other stakeholders to ensure a consistent approach to increasing seat belt wearing rates. The campaign must target the demographic groups statistically least likely to wear a seat belt, and therefore most at risk from increased severity of injury.

There are a number of approaches that enforcement agencies may wish to adopt. These may utilise strong enforcement tactics or may increase in severity over time or for persistent offenders. It is recommended that a staggered approach be undertaken (see sub-section 2.4). For a short period of time, unrestrained occupants would receive additional education and advice by the police as part of a continued education/awareness raising campaign. Over time, non-compliance would be met with an official warning before the introduction of fines or penalty points. Resistance to seat belt wearing legislation may be increased if a strong enforcement tactic was used immediately.

Finally, before legislation is introduced, a country/state-wide consultation exercise must be conducted. Through consultation not only are important points raised that will increase acceptance of a new law, but stakeholders can identify the level of acceptance amongst lobbyists and civil liberty groups. Once identified, it becomes easier to adopt a strategy that aims to overcome any outstanding issues, although it should be said that there is likely to be sustained resistance by some individuals.

5.4 Legislation to change behaviour

As with all legislation, it is vital that a continuous and consistent campaign of enforcement compliments any new law, in order to educate and encourage vehicle occupants to adhere to it.

The first formal enforcement campaign (primary law) in the United States was conducted in Elmira, New York in the 1980s. The approach used in this county was later used as a model for other campaigns across the country. Williams, et al (2000) highlighted the success of this campaign with front seat wearing rates increasing from 49% to 80%. However, the enforcement programme was not maintained, and wearing rates fell to 69%. As a result, the campaign had to be revived in 1999.

Table 18 contains recommendations for inclusion within legislation that affects the wearing of seat belts:

Recommendation	Details
Promotion of Road Safety	Stakeholders may find it beneficial to state through legislation that local authorities/government should promote safe use of the roads and vehicles. This may be through engineering, enforcement, education and encouragement. This will establish teams specifically designed to deal with the road safety of an area targeting residents, employees of local businesses and those driving through an area.
Target	<p>Legislation must identify who it is aimed at. Sub-sub-section 5.5.1 provides information relating to a 3-phase approach. Stakeholders should make note of the potential problems associated with this highlighted when discussing 'Primary' and 'Secondary' messages in 2.3.1.</p> <p>The alternative option is to introduce legislation that blankets vehicle occupants of all categories (front seat, rear seat and children). Although this is the preferred option of campaign planners, stakeholders should ensure that their country/state has the resource capability to enforce such legislation.</p> <p>Although covering all vehicle occupants in one piece of legislation is the recommended option, it is clear from Table 19 that many countries have taken the phased route. Stakeholders should ensure that enforcement resources are available before introducing any new law, but particularly legislation that covers all vehicle occupants.</p>

Recommendation	Details
Exemptions	Stakeholders should consider justifications for exemptions to the law and clearly state who and under what circumstances vehicle occupants may be exempt from wearing a seat belt. Refer to sub-sub-section 5.5.2.
Occupant responsibility	<p>Clear responsibilities should be established through the introduction of new legislation. It is strongly recommended that the adult driver is made responsible for the appropriate restraining of all children within the vehicle. However, stakeholders will need to determine at what age children move into the adult category and become responsible for wearing a seat belt.</p> <p>Once included within the adult category it should become an individuals responsibility to wear a seat belt.</p> <p>Stakeholders will need to establish clear penalties for non-compliance. Fines and/or licence endorsements are the most popular option aimed at deterring further non-compliance.</p>

In the UK, the Secretary of State for Transport may make regulations requiring, subject to such exceptions as may be prescribed, persons who are driving or riding in motor vehicles on a road to wear seat belts.

Except as provided by regulations, where a child under the age of fourteen years is in the front of a motor vehicle, a person must not without reasonable excuse drive the vehicle on a road unless the child is wearing a seat belt in conformity with regulations.

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The above examples have been taken from United Kingdom law. There have since been a number of Statutory Instruments introduced in addition to this that update the seat belt wearing law; for example to make child restraints mandatory in 1991.

Such legislation enables enforcement authorities to administer a penalty for vehicle occupants who do not comply with this law (refer to sub-section 2.4).

Seat belt legislation within Europe as well as within many other regions is 'Primary law'. This allows the enforcement officers to stop and prosecute a driver/vehicle at any time if they believe that the driver and/or its passengers are not properly restrained.

Some American states have introduced legislation, but as a 'Secondary law'. The difference here is that the enforcement officers can only prosecute for

this offence, if the driver/vehicle has been stopped for a primary road traffic offence, such having as failed to stop at red traffic lights. The Police cannot stop and prosecute the occupant(s) if no primary offence has been committed.

Legislation in South Dakota states that 'Every driver and front seat passenger must wear a properly adjusted and fastened seat belt'. (AAA Government Relations, 2002) However, this is a secondary offence and as such the driver must commit a primary offence before they can be prosecuted for non-compliance of the seat belt law.

Evans and Graham (1991) stated that 'average increases in belt use are greater in states with primary as opposed to secondary enforcement laws'. On this evaluation, states or countries wishing to increase seat belt use will find it more effective to introduce primary legislation.

Government should establish a Working Party represented by all stakeholders in the road safety industry:

Garages	Motoring and transport associations	Dealers
Insurance		Importers
Safety organisations		Transport operators
Policy makers	Safety professionals	Manufacturers

This working party should use its expertise to draft seat belt wearing legislation. A comprehensive consultation exercise should then be undertaken (this is likely to require more than one draft being produced). Once the draft has been agreed, an all-embracing education and publicity campaign should be embarked upon that will aim to assist in acceptance of the new legislation (refer to sub-section 5.1, 5.3 and Section 2).

Note: Stakeholders must aim to establish achievable wearing rate targets through a National Road Safety Strategy, that will be supported by a multi-disciplinary campaign that includes legislation and enforcement, i.e. specific targets for increasing wearing rates must be defined. These must then be monitored to determine the success of the campaign and, in particular, the legislation.

5.4.1 Optional phasing

For reasons explained in sub-section 2.3.1, campaign planners believe that the best approach is to see full vehicle occupant legislation (covering front,

rear and child vehicle occupants) introduced in a single phase. However, historically many governments have considered this too much to ask of the driving public immediately and have adopted a staggered approach. They have dealt with front seat occupants first, before moving on to rear seat occupants, and finally child occupants.

Table 19: Introduction of seat belt legislation by year (examples)

Country	Front seatbelt legislation (Year)	Rear Seat legislation (Year)	Other
Canada – Ontario	1976	1976	1982 child seats
Cyprus	1987	2002	
Czech Republic	1967	1976	
Germany	1984	1986	1983 for under 12s
Great Britain	1983	1991	1989 for under 14s
Ireland	1979	1993	
Japan	1971	1985	
Sweden	1975	1986	1988 for children
Switzerland	1981	2002	
South Africa	1977 and 1998*	1998	

* Introduction time differed between provinces

5.4.2 Exemptions

This area of legislation is complex and widespread exemptions under the law could undermine the effectiveness of a belt use programme. However, it may be desirable to allow certain, well-defined exemptions, such as:

Emergency services:

on emergency response, or for other specialist reasons; this should not be a routine exemption, i.e. for every journey.

Types of vehicle:

stakeholders may wish to consider exemptions for drivers of commercial passenger carrying vehicles, such as taxis, if this is considered justifiable.

Health reasons:

persons holding a valid certificate signed by a medical practitioner to the effect that it is inadvisable on medical grounds for them to wear a seat belt, e.g. following major heart surgery.

Ethnic/religious:

though not to be overstated, in deciding on the type and fitting of seat belts, ethnic and religious characteristics should be considered.

Note: It should not be forgotten that, with the exception of a medical condition whereby the use of a seat belt may further endanger the life of an individual, seat belts do save lives. When making exemptions, legislation should ensure that they are clear with minimal ambiguity.

5.4.3. UNECE Special Work Group on Seat Belts

Further advice and information on introducing and operating seat belt legislation may be obtained in the future from the UN-ECE Special Work Group on Increasing Seatbelt Usage. This is a working group set up by the UN-ECE Working Party on Road Traffic Safety (WP1) which is developing best practice advice on seat belt usage. A questionnaire produced by the group can be found at Appendix 8.

5.5 Checklist for increasing awareness of the benefits of seat belt use and smoothing the path for the introduction of seat belt legislation

- | | |
|--|--------------------------|
| Establish a Working Party, consisting of members from the road safety industry (see 5.5) to draft seat belt wearing legislation taking into account the details in Table 18 in 5.5 | <input type="checkbox"/> |
| Assess current wearing rates, opinion, knowledge and awareness, creating baseline figures that will indicate success or failure in future assessments | <input type="checkbox"/> |
| Consider socio-economic implications | <input type="checkbox"/> |
| Consider Human Rights implications | <input type="checkbox"/> |
| Design an education and publicity campaign specific to the target audience identified through the assessment process, aimed at addressing the myths highlighted in 5.4 | <input type="checkbox"/> |
| Outline partnerships to increasing seat belt wearing and assign relevant tasks, e.g. police, road safety personnel, professional organisations, health professionals etc. | <input type="checkbox"/> |
| Use focus groups to assess validity of campaign | <input type="checkbox"/> |
| Implement education and publicity campaign and monitor | <input type="checkbox"/> |
| Distribute draft legislation to professional organisations and lobbyists for consultation. This may require more than one draft being written | <input type="checkbox"/> |
| Assess impact of education and publicity campaign, comparing new figures with those determined as baseline figures | <input type="checkbox"/> |
| Determine timescale for education and publicity campaign before considering the introduction of legislation | <input type="checkbox"/> |
| Design and implement further education and publicity campaigns if necessary | <input type="checkbox"/> |
| Produce final legislation | <input type="checkbox"/> |
| Consider the capacity for full implementation and/or phasing | <input type="checkbox"/> |
| Implement legislation | <input type="checkbox"/> |
| Introduce a new campaign, which includes enforcement, encouragement, education, publicity and possibly incentives | <input type="checkbox"/> |



Section 6:
Appendices



Section 6: Appendices

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Glossary of terms

Anchorage/mountings

The part of the seat structure to which the seat belt assemblies are secured.

Attachments

Part of the belt assembly including the necessary securing components, which enable it to be attached to the belt anchorages.

Belt adjusting device

A device enabling the belt to be adjusted according to the requirements of the individual wearer and to the position of the seat. The adjusting device may be part of the buckle, or a retractor, or any other part of the safety-belt.

Buckle

A quick-release device enabling the wearer to be held by the belt, i.e. securing the open end of the belt to the floor mounting by means of a tongue.

Child restraint

A device (usually a seat of some kind) used to restrain a child of a specified weight. To be used when the seat belt alone is not appropriate, for example if the child is so small it would slip under/over the seat belt in an accident.

Diagonal belt

A belt which passes diagonally across the front of the chest from the hip to the opposite shoulder.

Full harness belt

A belt assembly comprising a lap, thigh and shoulder straps with a central locking device.

ISOFIX

An international standard attachment that child restraints can be connected to, reducing the likelihood of incorrect fitting.

Lap belt

A belt which passes across the front of the wearer's pelvic region.

Pre-tensioner

An additional or integrated device which tightens the seat belt webbing in order to reduce the slack of the belt during a crash sequence.

Release mechanism

A red coloured push button device that when pressed, releases the tongue from the buckle.

Retractor

Device to accommodate part or the whole of the strap of a seat belt.

Seat belt (safety belt)

An arrangement of straps with a securing buckle, adjusting devices and attachments which is capable of being anchored to the interior of a power-driven vehicle and is designed to diminish the risk of injury to its wearer in the event of accident or of abrupt deceleration of the vehicle, by limiting the mobility of the wearer's body and absorbing the forces generated by such deceleration.

Seat belt sled

A device used to convince road users of the need to wear a seat belt. Demonstrates the forces involved in a low speed impact. Refer to pictures on page 44 of the toolkit.

Submarining

Too much slack in a seat belt assembly may cause the occupant to slip under the diagonal and/or lap belt into the foot well compartment during a collision; submarining.

Three-point belt

Any belt which is essentially a combination of a lap strap and a diagonal strap.

Tongue

A metal insert connected to the belt and fastening into the buckle. Only disconnected by pressing the release mechanism.

Webbing

The strap section of the seat belt system used to counteract the momentum of the vehicle occupant in the rapid deceleration experienced in an accident.

Appendix 1: Recommendations from the Centre for Disease Control (CDC) task force regarding the use of selected interventions to increase the use of child seats

(CDC, 2001)

Intervention (No. of qualifying studies)	Task Force recommendation for use	Intervention description	Key findings* Median (range), number of studies
Interventions to increase child safety seat use			
Child safety seat law (n=9)	Strongly recommended	Requires infants and young children traveling in motor vehicles to be restrained in federally approved child safety seats appropriate for the child's age and size. State laws vary regarding the children to whom the laws apply (e.g., according to age, height, weight, seating position, or a combination of factors).	Child safety seat use: +13% (+5% to +35%), 3 studies. Fatal injuries: -35% (-57.3% to -25%), 3 studies. All fatal and nonfatal injuries: -17.3% (-35.9% to -10.5%), 5 studies.
Communitywide information and enforcement campaigns (n=4)	Recommended	Use media support and child safety seat displays in public stations to promote use. Use special enforcement strategies (e.g., checkpoints, dedicated law enforcement officials, or alternative penalties) to enforce existing child safety seat laws.	Child safety seat use: +12.3% (+3.8% to +20.8%), 5 studies.
Distribution and education programs (n=10)	Strongly recommended	Provide approved child safety seats to parents through loans, low-cost rentals, or giveaways. Include educational components of varying intensity.	Child safety seat use: +22.6% (+4% to 62.3%), 11 studies (range of follow-up times: immediate to 2 years).
Incentives and education programs (n=4)	Recommended	Provide rewards to children and parents for purchasing and correctly using child safety seats. Include educational components of varying intensity.	Child safety seat use: +9.9% (+4.8% to +36%), 6 studies (within first 5 months of program operation). Insufficient evidence to assess effectiveness in changing correct use or other outcomes.
Education-only programs (n=6)	Insufficient evidence [†]	Provide information and teach skills to parents, children, or professional groups regarding the use of child safety seats.	Three studies of perinatal education programs for parents regarding correct use of child safety seats.

Appendix 2: Sample lesson plan for teaching seat belt safety in secondary schools

IN-CAR SAFETY

Lesson Plan

Topic of Lesson:

In-car safety (use of safety devices, such as seat belts and air bags).

Length of lesson:

45 minutes (5 minutes of video).

Target audience:

12 to 15 year olds.

Curriculum subject:

Personal, social and/or health education. Citizenship.

Equipment required:

Television and video player.

Resources required:

Crash test video. Seat belt sample (a belt can be used if a seat belt sample is unobtainable). Relevant leaflets such as that highlighted in Section 2 of the manual. Other leaflets outlining the current legal situation for seat belt wearing. 7/10ths of a second text sheet (included at end of lesson plan. National and local publicity material, such as posters, key rings etc.

Note: Some educational resources may contain project work or teaching ideas that can be incorporated into the lesson.

Aims and objectives of the lesson:

- To raise pupils awareness of the dangers of irresponsible occupant behaviour.
- Highlight the consequences of non-use of in-car safety devices.
- Encourage the use of in-car safety devices.
- Highlight the benefits of using in-car safety devices.

Introduction:

What is the role of a safety device in a vehicle?

Vehicle safety features are distinguished by two categories; 'Primary Safety' and 'Secondary Safety'. Primary safety features aim to prevent an accident

taking place, e.g. good brakes, tyres. Secondary safety features aim to prevent/minimise injury to a vehicle occupant once the accident has occurred, e.g. side impact protection systems, airbags.

Seat belts are a **secondary** safety device with a number of objectives. These include:

- **Preventing ejection from the vehicle in an impact**
- **Reducing the risk of contact with the interior of the vehicle or reducing the speed of such impacts**
- **Providing a distributed force to the wearer to give the necessary support in an accident, restraining the vehicle occupant before guiding them back into their seat**

The American College of Emergency Physicians (ACEP, 2002a) suggest that seat belts are the most effective means of reducing deaths and serious injuries in traffic accidents. They also calculate that 75% of all vehicle occupants ejected from a vehicle in an accident die as a result. **'Seat belts provide the greatest protection against ejection in a crash'**.

Airbags are an active, high-energy device commonly designed to act as a supplementary measure to the performance of a seat belt. If an occupant is unrestrained, or the vehicle has an airbag installed but no seat belt, it is possible that the occupant may come into contact with the airbag before it has fully inflated. This is also the case for people who need to sit closer to the steering wheel as a result of their size. **Airbags deploy at approximately 300km/h. If the vehicle occupant comes into contact with the airbag before it is fully inflated, there is a real risk of the vehicle occupant sustaining serious injuries.**

Note: There are two collisions to every accident. Firstly, the collision involving the vehicle and another object, e.g. car, barrier, form of street furniture. Secondly, the collision between the occupant and the seat belt, air bag or vehicle interior. Although there are many factors to consider, the first collision will affect the severity of any injuries sustained by the occupant. However, the use, or non-use of a safety device such as a seat belt in the second collision, will have the greatest influence on the resulting injury to the vehicle occupant.

In an accident travelling at 50km/h, a vehicle occupant's body weight increases significantly (approximately 30 times). This would increase the weight of the occupant similar to that of an elephant. A seat belt is designed to withstand such a force.

Body of Lesson:

- Use leaflet containing current seat belt wearing legislation to outline the audiences legal responsibility. If no legislation exists continue to next point.
- Discuss the effects of non-seat belt use in a collision to outline the audiences moral responsibility:

Bring two volunteers to the front of the room and seat them one directly behind the other (about 1 metre). Enact the scenario of the driver travelling at 50km/h wearing a seat belt, and the back seat passenger in the same vehicle not wearing a seat belt. Demonstrate that there are 3 movements for seat belt wearers in an accident; one is forward, they are then restrained by the seat belt. They then move back into their seat. They then ride down into the seat.

For occupants not wearing a seat belt, there is one movement; that is forward until they come into contact with the vehicle interior, other occupants or are thrown from the vehicle.

Reinforce that it is calculated that 75% of all vehicle occupants ejected from a vehicle in an accident die as a result. **'Seat belts provide the greatest protection against ejection in a crash'**.

Demonstrate the movements of the two occupants:

- **Driver/front occupant:** Moves forward, restrained brought back into seat.
- **Rear occupant:** Moves forward, hits the back of the driver's seat, the two heads collide, rear occupant crushes the driver between their seat and their seat belt.
- **Likelihood:** Driver/front occupant is dead!

Discuss the moral responsibility of the rear occupant to wear their seat belt.

Show video of sample crash tests that clearly demonstrate the use of seat belts and airbags.

Talk audience through the test. Explain that research has shown that **'the simple act of buckling a seat belt can improve an occupant's chance of surviving a potentially fatal crash by 45 to 73 per cent'**.

Reinforce the point that although airbags can be an effective restraint, reducing the severity of injury to occupants involved in an accident, they are designed to act as a supplementary measure to the performance of a seat belt, and should not be used individually.

Demonstrate correct fitting of seat belt with the use of a seat belt sample (a trouser belt or similar length and thickness piece of material can be used if a seat belt sample is not available).

- It is recommended that cars are fitted with a 3-point lap and diagonal belt.
- The diagonal section should fit from the buckle, up through the centre of the chest, and over the shoulder on the opposite side.
- The lap section should sit across the lap (hip bones).
- For added safety, pull upwards on the diagonal strap to minimise all slack, particularly in the lap section.
- Do not allow the lap section to position itself over the waist. In the event of an accident, rather than use the strength of the hip bones, this could cause internal injuries to the occupant as their body surges forward increasing its weight to that of an elephant.
- It takes 10 seconds to fit a seat belt. But it's 10 seconds that could save your life.

Conclusion:

The forces generated in a 50km/h accident can increase a vehicle occupant's body weight to that of an elephant. This can be fatal for those who choose not to wear a seat belt. It can also prove fatal for those front seat occupants who have occupants directly behind them that also do not wear a seat belt.

There may be a legal responsibility on occupants to be appropriately restrained, but more importantly, there is a moral responsibility on all passengers to ensure that they do not kill their friends and family because of their actions. Although an occupant may die as a result of their actions, it is their family and friends who will be left suffering because of their loss.

Read **'7/10ths of a Second'** (following page).

Conclude by stating that **'there are 101 reasons not to wear a seat belt. Every one is a killer'**.

Distribute relevant promotional and educational material reinforcing the objectives of the lesson.

For the next 7/10's of a second, we are going to take you through

Death in Slow Motion

It's night, you're tired, and you're late getting home, so you're driving 55 miles per hour on a road not designed for that speed. Your car reaches a curve in the road, but you make a mistake, too late, the car goes out of control and you hit a solid immovable object, **CRASH!!!**

1/10th of a second:

the front bumper and chrome frosting of the grill work collapse. Slivers of steel puncture the wall to a depth of one and a half inches.

2/10ths of a second:

the hood rises, crumples, smashes into the windshield. Spinning rear wheels leave the ground. The fenders come into contact with the wall forcing the rear parts out over the front doors. Your body continues to move forward at 55 miles per hour - twenty times the normal force of gravity. You now weigh more than three thousand pounds. Your legs ramrod straight, snap at the knee joints.

3/10ths of a second:

your body is now off the seat, torso upright, broken knees pressed against the dashboard. The plastic and steel frame of the steering wheel begins to bend beneath your death grip. Your head is now near the sun-visor, your chest above the steering column.

4/10ths of a second:

the cars front twenty-four inches have been demolished, but the rear end is still travelling at about thirty-five miles per hour. The half ton motor block crunches into the fire wall.

5/10ths of a second:

your fear frozen hands send the steering column into almost vertical position. The force of gravity impales you on the steering shaft. Jagged steel punctures your lungs and intercostal arteries. Blood spurts into your lungs.

6/10ths of a second:

your feet are ripped from your tightly laced sneakers. The brake pedal shears off the floor boards. The chassis bends in the middle. The car begins its downfall, spinning wheels digging into the ground.

7/10ths of a second:

the entire body of the car is forced out of shape. Hinges tear, doors spring open. In one last convulsion, the seat rams forward, pinning you against the cruel steel of the steering shaft. Blood leaps from your mouth, shock has frozen your heart, **YOU ARE DEAD.**

Total time elapsed: **seven tenths of a second!**

(www.huntersville.org/police/traffic-death.html)

Appendix 3: Websites containing useful information relating to seat belts

1. <http://www.acep.org/1,12,0.html>

The American College of Emergency Physicians. Health information relating to road safety features such as seat belts and airbags.

2. http://www.autoroutes.fr/securite/campagne_04.php?lng=2

Provides information relating to campaigns including seat belt wearing campaigns.

3. <http://bmj.com/content/vol324/issue7346/>

The British Medical Journal. Issues relating to health with a special publication on the 11th May 2002 (Volume 324, Issue 7346) relating to road injuries.

4. <http://www.buckleupamerica.org/>

A national campaign in America to increase the proper use of seat belts and child safety seats.

5. <http://www.gohs.state.ga.us/>

Georgia Governors Office of Highway Safety offering information on road safety topics including occupant safety

6. <http://www.luchemos.org.ar/>

'Let's Fight for Life' campaign website. Spanish and English translations.

7. <http://www.mto.gov.on.ca/english/safety/kseatb.htm>

Ontario Ministry of Transportation website.

8. http://www.motorists.com/info/seat_belts.html

The National Motorists Association advocating, protecting and representing the interests of North American motorists.

9. <http://www.nace.com.mx/>

Mexican road safety site concentrating on alcohol and driving.

10. <http://www.nace.com.mx/archivos/cinturon.pps>

Mexican site providing powerpoint presentation on the need to wear seat belts due to the speed and severity of road accidents.

11. <http://www.nhtsa.dot.gov/kids/research/seatbelt/>

National Highway Traffic Safety Administration website containing fun, but informative information about the benefits of seat belts.

12. <http://motoring.ivillage.co.uk/>

A guide for parents about child seats, road safety and the law.

13. http://www.rac.co.uk/carcare/advice/safety_security/motorists_at_risk

Easy to follow advice on motorist safety including occupant protection. Hyperlink to child car seat leaflet.

14. <http://www.roads.dft.gov.uk/roadsafety/index.htm>

United Kingdom Department for Transport website covering all road safety issues.

15. <http://www.securiteroutiere.equipement.gouv.fr/>

French transport website containing information about campaigns, casualties, and accident and vehicle technology.

16. <http://www.securon.co.uk>

Seat belt manufacturer for the after market.

17. <http://www.transportes.gov.br/pare/CAMP9.htm>

Brazilian Ministry of Transport Road Safety information.

Appendix 4: Summary of standards used in responding countries

Country	Standards Used
Australia	ADR 4/03
Austria	UNECE Regulations
Argentina	IRAM 3641 and IRAM-AITA 1k15
Belgium	UNECE Regulations
Canada	CMVSS 209 and CMVSS 210
Croatia	UNECE Regulations
Cyprus	UNECE Regulations
Czech Republic	UNECE Regulations
Germany	UNECE Regulations
Greece	UNECE Regulations
Denmark	UNECE Regulations
Finland	UNECE Regulations
France	UNECE Regulations
Netherlands	UNECE Regulations
Hungary	UNECE Regulations
Iceland	UNECE Regulations
India	UNECE Regulations
Ireland	UNECE Regulations
Israel	UNECE Regulations and National standard 543
Italy	UNECE Regulations
Japan	(JIS) D 4605 and (JIS) D 4609
Luxembourg	Determined by National Technical Control Organisation
New Zealand	UNECE Regulations
Norway	UNECE Regulations
Panama	Determined by manufacturer
Peru	UNECE Regulations
Singapore	BS AU 160a and BS AU 80
Slovenia	UNECE Regulations
Spain	UNECE Regulations
Sweden	UNECE Regulations
Switzerland	UNECE Regulations
United Kingdom	UNECE Regulations
South Africa	SABS 1080 and SABS 1430

Appendix 5: Inspecting seat belts and their components. Taken from UK vehicle inspectorate inspection manual

5.1 Seat Belts

Information	Method of Inspection	Reason for Rejection
<p>This inspection applies to: Only those seat belts which are required to be fitted. The vehicle manufacturer should be advised of a defect noticed on any additional seat belt fitted.</p>	<ol style="list-style-type: none"> 1. Check that each seat which requires a seat belt is fitted with one of the appropriate types (see table on page 1 to 3) 2. Pull each seat belt webbing apart to stretch it to see that it is properly secured to the vehicle structure. Note: For seats with integral seat belts, it might not be possible to examine the fixing of the seat belt to the seat. 3. Examine the condition of all seat belt webbing for cuts or other damage of any description. Pay particular attention to webbing around anchorages, buckles and loops. 4. Examine the condition of the vehicle seat tilting and reclining fittings on each belt. 5. Examine flexible buckle shells for: <ol style="list-style-type: none"> a. signs of corrosion or wear/tear. Pull the shell to the side, if this can be done without damage; b. 'cracks' flexible buckle shells and holes for a locking mechanism and between strands of fibre. 	<ol style="list-style-type: none"> 1. A seat belt missing or of the wrong type. 2. <ol style="list-style-type: none"> a. A seat belt not securely fixed to the seat or to the structure of the vehicle. For example, a looped belt not secure; b. For seats with integral seat belts, any insecure attachment of the seat to the vehicle structure. 3. <ol style="list-style-type: none"> a. A cut which causes the fibres to separate; b. Pulling or laying out fibres to obstruct correct operation of the belt or which has nearly weakened the webbing; c. Stretching badly frayed, not secure, incomplete or repaired. 4. An attachment fitting or adjusting fitting of a seat belt fractured or badly distorted. 5. <ol style="list-style-type: none"> a. corrosion or distortion of a flexible shell likely to lead to failure under load; b. missing strands of a flexible webbing cable.
	<p>Method of Inspection</p> <ol style="list-style-type: none"> 6. Test each belt locking mechanism and try to pull the locked sections apart. On retracting seat belts, check that with the mechanism engaged and the seat unoccupied, excess webbing is wound into the retractor unit. Never force types of retracting belt which have a 'no pull' feature. They retract. Operate the release mechanism while pulling on the belt to check that the mechanism releases when required. 7. As far as is practicable without dismantling, check the condition of the vehicle structure around the seat belt anchorage points (ie within the 'prescribed area' see Appendix 6). The non-anchored anchorage points might need to be inspected from inside the vehicle. 	<p>Reason for Rejection</p> <ol style="list-style-type: none"> 6. <ol style="list-style-type: none"> a. the locking mechanism of a seat belt does not secure or release the belt as intended; b. a retracting mechanism does not retract the webbing sufficiently to remove all the slack from the belt with the locking mechanism engaged and the seat unoccupied. Note 1: In the case of seats, this should be checked with the seat back set in its rearmost position. Note 2: The vehicle structure should be checked to and given the opportunity to show any (temporarily fixed device) likely to cause failure under this reason for rejection before modification or repair is carried out. 7. Distortion or modification which significantly reduces the original strength, causes corrosion, severe distortion, a fracture or an inadequate type of a load bearing member or its supporting structure or protruding within 20cm of a seat belt anchorage. Note: The integral seat belt anchorage, this reason for Rejection applies to any part of the seat frame between the anchorage point and the normal rearward seat mounting to the vehicle structure. The 20cm rule applies to the vehicle structure near the seat mounting.

(Vehicle Inspectorate, 1996)

Seat belt requirements for vehicles first used before 1 April 1987

Vehicle Description	Seat Position		
	Driver's and 'Specified front passenger' Seat (See Note 1 below)	Centre Front Seat	Forward Facing Rear Seats
<p>1. Passenger and dual purpose vehicles</p> <ul style="list-style-type: none"> with 4 or more wheels with up to 12 passenger seats first used on or after 1 January 1985 <p>2. 3-wheeled vehicles</p> <ul style="list-style-type: none"> with an unladen weight over 450kg first used on or after 1 January 1985, or with an unladen weight over 270kg if first used on or after 1 September 1970 <p><i>except vehicles:</i></p> <ul style="list-style-type: none"> less than 110kg unladen, equipped with a driving seat of a type requiring the driver to sit astride it, and controlled or operated by a person not continuously engaged in the business of manufacturing vehicles of this type <p>3. Goods vehicles, motor caravans and motorhomes</p> <ul style="list-style-type: none"> with a design gross weight not exceeding 4000kg first used on or after 1 April 1987 <p>4. Goods vehicles, motor caravans and motorhomes</p> <ul style="list-style-type: none"> with a design gross weight not exceeding 4000kg first used on or after 1 April 1980 <p><i>except those first used before 1 April 1982, if they are not a model number listed in Part 3 of Schedule 1979 with an unladen weight exceeding 1100kg</i></p>	<p>A. Vehicles first used before 1 April 1981:</p> <p>A belt which retains the upper part of the body (but need not include a leg rest) for each seat</p> <p>B. Vehicles first used after 31 March 1981:</p> <p>A 4 point (lap/shoulder) belt (see Note 2 below)</p>	<p>No requirement</p>	<p>No requirement</p>
	<p>Note 1: The "specified front passenger seat" requires a seat belt in the seat which is:</p> <ul style="list-style-type: none"> present in the vehicle, and unfixed from the driver's seat <p>unless there is a fixed partition separating the passenger seat from a space in front of it which is designed to serve the driver's seat, or certain types of taxi, bus or van</p> <p>Note 2: A 4 point belt means a seat belt which:</p> <ol style="list-style-type: none"> retains the upper and lower parts of the torso includes a leg belt is anchored at not less than three points, and is designed for use by an adult <p>Note 3: An adult means an individual wearing a leg belt and shoulder straps bearing a British Standard marking in an acceptable alternative to any of the seat belt types listed.</p>		

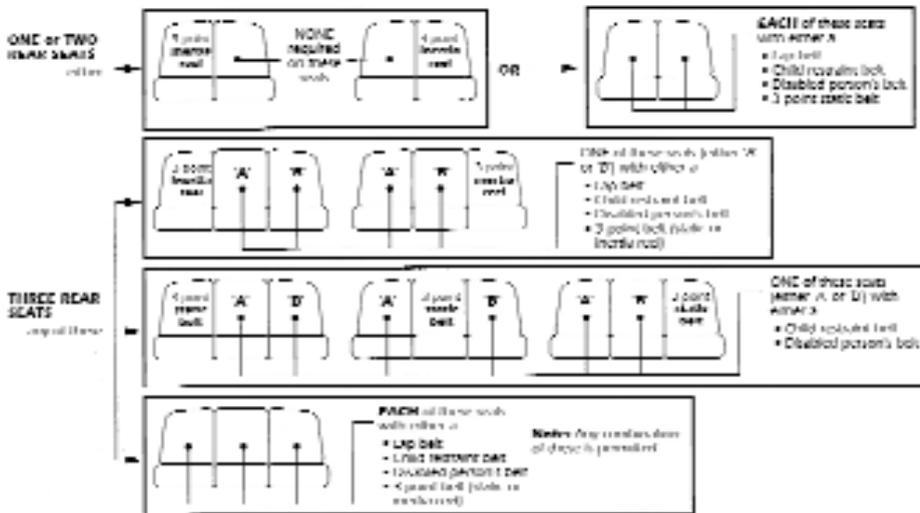
Seat belt requirements for vehicles first used after 31 March 1987

Vehicle Description	Seat Position		
	Driver's and 'Specified front passenger' Seat (See Note 1, page 4)	Centre Front Seat	Forward Facing Rear Seats
<p>1. Passenger vehicles and dual purpose vehicles with not more than 8 passenger seats, except 2-wheeled vehicles:</p> <ul style="list-style-type: none"> with an unladen weight of 2000kg or less with an unladen weight over 450kg but not over 1100kg <p><i>except vehicles:</i></p> <ul style="list-style-type: none"> requiring the driver to sit astride it, and controlled or operated by a person not continuously engaged in the business of manufacturing vehicles of this type <p>2. Goods vehicles, motor caravans and motorhomes:</p> <ul style="list-style-type: none"> with a design gross weight not exceeding 4000kg first used after 31 September 1984 	<p>2 point belts for each seat (see Note 2 in page 4)</p>	<p>2 point belt, lap belt or 4-point (lap/shoulder) belt</p>	<p>A. Vehicles with not more than 2 rows seats:</p> <p><i>where:</i></p> <ol style="list-style-type: none"> A 4 point shoulder belt for at least one seat, or A 2 point belt, lap belt, disabled person's belt or child restraint for each seat <p>B. Vehicles with more than 2 rows seats:</p> <p><i>where:</i></p> <ol style="list-style-type: none"> A 4 point shoulder belt for at least one seat and one 2 point (lap, or lap/shoulder) person's belt, leg belt, disabled person's belt or child restraint for at least one other seat; or A 2 point belt, lap belt, disabled person's belt or child restraint for at least one other seat; or A 2 point, belt, lap belt, disabled person's belt or child restraint for each seat <p>For additional information see page 6 & 7.</p>
<p>3. Goods vehicles</p>	<p>No requirement</p>	<p>No requirement</p>	<p>No requirement (see Notes 2 & 3, page 4)</p>
<p>4. Vehicles first used before 31 October 1986 which are:</p> <ul style="list-style-type: none"> minibuses with up to 12 passenger seats motor caravans, motorhomes, vans or design gross weight not exceeding 4000kg <p>5. Motorbikes, motor cycles and mopeds:</p> <ul style="list-style-type: none"> with a design gross weight not exceeding 1000kg first used after 31 September 1984 	<p>No requirement</p>	<p>No requirement</p>	<p>No requirement</p>

(Vehicle Inspectorate, 1996)

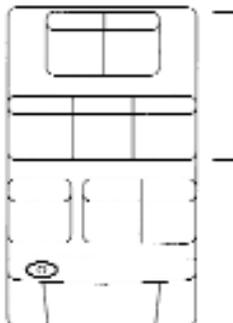
Seat Belts (Additional information: Forward facing rear seats)

Vehicles that meet Table 41 March 1997 – Forward facing rear seats must have at least the type AND NUMBER of SEAT BELT shown below.



Seat Belts (Additional information: Forward facing rear seats)

MORE THAN THREE REAR SEATS



A If one outward seat has a 3-point inertia reel type belt, then at least one other seat in the row must have an **ACCEPTABLE BELT**

W If any one seat has a 4-point safety belt, then at least one other seat in the row must have either a child restraint or doubled person's belt.

D If the vehicle does not comply with A or W above, then **each seat in the rear must have an acceptable belt.**

Acceptable belts are:

- Lap belts
- Doubled person's belts
- Child restraint
- 4-point belt (buckle or inertia reel)

Note 1: Outboard seats are seats closest to the vehicle sides.

Note 2: Row seats (also are not required for vehicles with more than 6 passenger seats in any configuration).

Note 3: Rear-facing or side-facing seats are not required to be fitted with seat belts.

Note 4: On unusual seats that do not otherwise use, fitted in the rear of extended limousines, are not required to be fitted with seat belts.

Note 5: Seats fitted to the rear of the driver's compartment in a goods vehicle do not require to be fitted with seat belts (unless the seat is the specified passenger seat, see Note 1, page 4).

Note 6: A goods vehicle (eg. a car driver's seat) which has been converted to a passenger vehicle/specialist use (ie. fitted with rear seats and side windows etc.) is required to comply with the 'passenger vehicle' requirements.

(Vehicle Inspectorate, 1996)

Structural Integrity and Corrosion

Appendix C

1. Introduction

The effect of corrosion on the safety of a vehicle depends on:

- Its extent
- The function of the section on which it has occurred

A small amount of corrosion on an important part of a vehicle structure can make a vehicle unsafe when it destroys the continuity of the load bearing structure.

On the other hand, heavy corrosion of unimportant sections may have no effect on the vehicle's safety.

Corrosion of a particular part, such as a body sill, may be very important in one type of construction, but of less importance on another. This is shown in figures A to D where the shaded portions indicate the important load bearing parts of different types of vehicle construction.

2. Proscribed Areas

To assist with the assessment of corrosion, Sections 2, J and K of the Manual identify the parts of the vehicle structure which are particularly important and to which particular attention must be paid during an inspection.

These are:

- The load bearing parts of the vehicle to which current loadable items (as specified in Section 2, J and K) are mounted

- Any structure or parting which is susceptible to either the component mounting or the load bearing assembly within 150mm of the mounting location (e.g. in the combination of a seat belt mounting on an inner sill, corrosion must be given in the outer sill, door pillar, floor panel, wheel arch or any other supportive structure within 150mm of the component mounting points)

Section 6 of the Manual deals with structural checks, including damage or corrosion not within the 'proscribed areas'.

2. Assessment

Having identified the important load bearing members and 'proscribed areas' on a vehicle, the assessor should determine whether they are adequately corroded, firstly by visual inspection and then by finger/thumb pressure.

If necessary careful scraping or light sanding of the affected areas with the Corrosion Assessment Tool is permitted. Secondly corroded metal, or metal coated with oil, grease or other material than those mentioned above, is it not necessary to apply heavy impact blows or to use a sharp instrument to 'dig' at the structure.

4. Failure Criteria

Any part of a load bearing member, or load bearing parting within a 'proscribed area', should be rejected if it is weakened by corrosion to the extent that:

- It is finger/thumb pressure it does not 'dig' right, or

- It is unable to locate a hole, or

- The Corrosion Assessment Tool penetrates, or

causes the metal component to crumble or flake off.

(See Section A 4 for the vehicle structure not within a 'proscribed area')

Severe corrosion makes corrosion considered to reduce the strength of a component mounting, supporting structure, parting or load bearing member negligible.

5. Highly stressed components

The severity of general or local corrosion in highly stressed bearing and suspension components (eg. arms, rods, lower etc.) cannot be assessed by light tapping or scraping with the Corrosion Assessment Tool.

A small screwdriver may be used in such and probe, but only in places inaccessible to the Corrosion Assessment Tool.

A highly stressed component should be rejected if it has been:

- Severely distorted or cracked by corrosion, or
- If local corrosion has occurred in such a small hole or split

C Appendix

Structural Integrity and Corrosion

6. Corrosion Assessment Tool

The Corrosion Assessment Tool must be used carefully to avoid unnecessary damage. The tool comprises:

- A durable engineering plastic head for light tapping, and
- An aluminium alloy shaft with a curved 'spade end' for light scraping. The alloy shaft can also be used as a small lever.

WARNING

The curved spade end must only be used for light scraping and not to prod and poke the vehicle structure.

7. Safety Precautions

Eye protection is recommended when scraping corrosion in vehicle structures and components. Any sharp edges on the Corrosion Assessment Tool should be removed.

8. General Guidance

Corrosion which has not reduced the metal thickness sufficiently to weaken it will likely not weaken a system. However, the assessor should inform the vehicle purchaser that corrosion has occurred.

On the other hand, where there is severe corrosion, it may be necessary to advise to carry out a brake test if this could cause danger or further damage.

9. Thin gauge steel pressings

In some vehicles, comparatively thin gauge steel pressings are used for chassis steering and suspension components, mounting, sub-frames and cross members. Many of these parts have hollow sections or splining areas in which road dirt, oil/grease will collect or other dirt may collect, causing serious but often very localized corrosion.

In some cases where large quantities of salt are used on roads, corrosion has caused the failure of steering and suspension components within three years. Some components have been known to fail completely at one end and still be undamaged at the other.

10. Platform or underframe

Some vehicle types (such as VW 'beetle') may have a platform or underframe which is the main load bearing structure. Hollow body panels considered to be part of a load bearing structure should only be rejected if they:

- play an active part in directly supporting the steering, suspension, braking components or seat belt anchorages, or
- are likely to adversely affect the correct functioning of the braking system or steering gear (eg. by loading a wheel)

11. Corrosion around drainage holes

Corrosion can be more prevalent in areas around drainage holes due to the ingress of mud, oil, dirt, road salt etc. Therefore, special attention should be paid to these areas of the important structural and loadable components.

12. Method of Repair

It is essential that repairs to corroded areas are properly carried out. Light working is acceptable for repairs to 'proscribed areas'. Suitable meshwork of appropriate gauge or thickness should be used for repairs in this.

- Any plating or welding extends to a sound part of a load bearing component, and
- The repair must be virtually as strong as the original structure.

So only a continuous seam weld is acceptable for patch repairs, all rough spot welded joints are acceptable unless they are fully welded.

Welded repairs to highly stressed components such as steering/suspension arms, rods, lower etc. are not normally acceptable.

Structural Integrity and Corrosion

Appendix C

14. Bonding, sandblasting, glass fibres and body filler

These are bonding processes and are not regarded as strong enough for repairs to load bearing members although they are usually required for other repair work.

Waxing, linings and sealings are only accepted if used as used by the vehicle manufacturer and the standard of any such repair must be comparable to the original.

14. Identifying types of repair

If it is necessary to fill in the gap between welding and laying after the repair has been covered in paint or undercoat, a solvent, grinding may be selected by the inspector first of all or a split in the skin of the vehicle at a joint.

Other items likely to be damaged or may often be identified by a difference:

- in appearance, or
- in sound when tapped, or
- by the use of a magnet.

Non-metallic vehicle structures

15. Plastic and Fibreglass

Plastics are becoming more common in vehicle structures. Glass reinforced plastic (GRP) and fibreglass, depending on the resin content, and various resins, such as epoxy and urethane, are used in various applications and plastic reinforcement (fibreglass) construction.

16. Fixable items mounted to plastic structures

Exhaust pipes, such as steering rods, subframes and coil bolts, are sometimes mounted directly to plastic structures which do not have metal reinforcement.

Although usually designed to support these components, some are not, particularly coil bolts.

Manufacturers should be consulted on such matters. Look for evidence of weakness. Check suspension or dimension within a 'practical area' or a component bearing on its mounting to the vehicle. It is also vital to check to work hard or break, especially on coil bolts.

17. Repairs to plastics

- Which is 'permanent', or
- Which affects the load bearing structure should be as strong as the original part.

18. Structural integrity and the removal or substitution of metal panels

On a vehicle of integral construction the strength and stiffness of the vehicle structure may be seriously affected by any panel being removed or replaced by a panel of different material.

In considering whether the original strength and stiffness has been significantly reduced following a modification, the repair must consider whether the vehicle is required to carry that component.

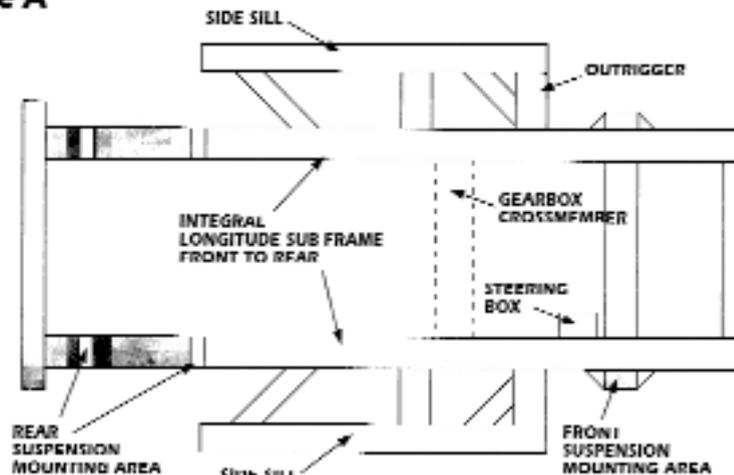
If the repair involves that the vehicle does not carry the vehicle structure, the first issue is 'Notification of Refusal' within inspection Manual item 6.5 Section for Appendix 1.

If it is not possible for plastics to replace or substitute a metal panel, the vehicle must be repaired to meet the original 'practical area' or load bearing members or components.

Appendix

Structural Integrity and Corrosion

Figure A

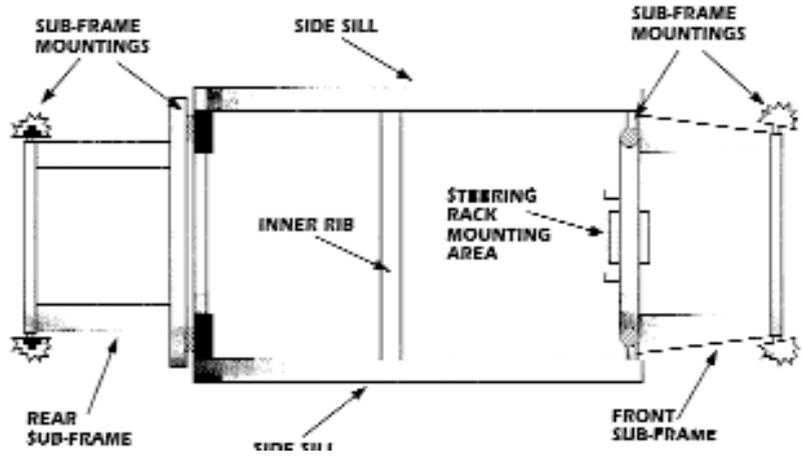


(Vehicle Inspectorate, 1996)

Structural Integrity and Corrosion

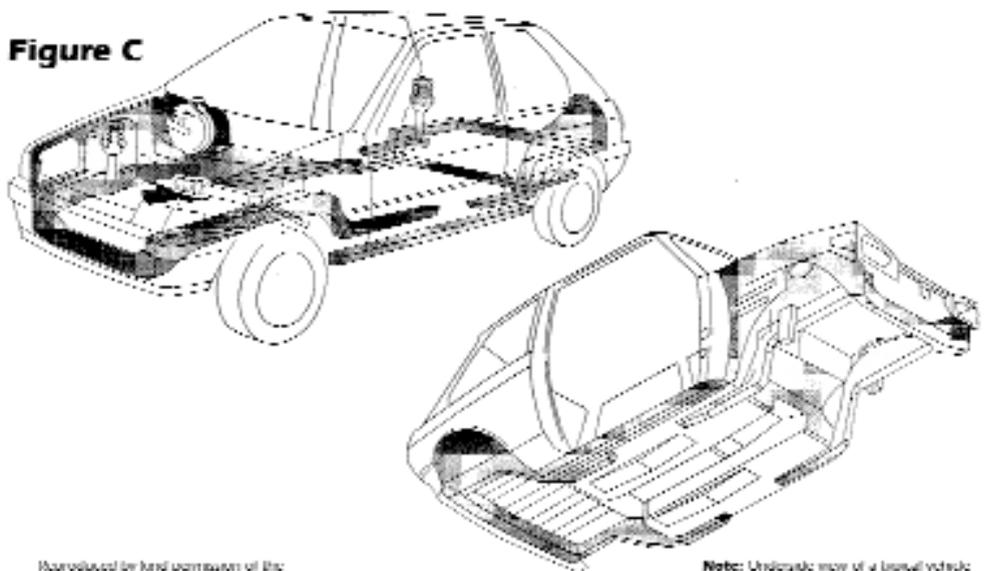
Appendix C

Figure B



C Appendix Structural Integrity and Corrosion

Figure C



(Vehicle Inspectorate, 1996)

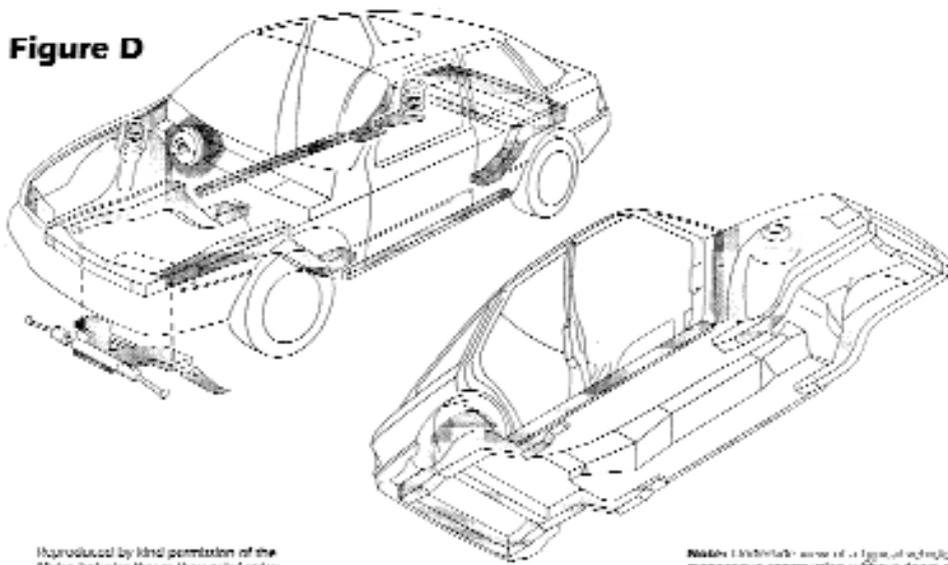
Reproduced by kind permission of the Motor Industry Research Council (M.I.R.C.)

Note: Underside view of a typical vehicle on major corrosion areas will not show if front wings fitted

Structural Integrity and Corrosion

Appendix C

Figure D



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Motor Industry Research Council
(M.I.R.C.)

Note: Illustrate use of a type of vehicle
monocoque construction without doors or
front wings fitted.

(Vehicle Inspectorate,
1996)

Appendix 6: Actions for assessing the current trend in seat belt usage

Common themes	Desired outcome
<p>Observed Wearing Rates:</p> <p>To highlight the percentage of vehicle occupants wearing seat belts at a national/state level.</p>	<p>A visual assessment of wearing rates representing all types of road.</p> <p>Conducted at regular intervals - recommended every 6 months.</p>
<p>A sample survey form can be found in Appendix 7</p>	<p>Using the same sites in selected areas of the country/state for each assessment.</p> <p>Weekend and weekday assessments.</p> <p>Observers need to indicate gender, seating position, approximate age, type of vehicle, if head restraints and seat belts are installed, and if they are being worn.</p>
<p>Stakeholder Analysis/Market Research:</p>	<p>Surveys indicating road vehicle occupants' level of awareness and knowledge of seat belts and their benefits.</p> <p>Assessment of casualty statistics.</p>
<p>Seat Belt Sales:</p> <p>To indicate any increase in the purchase of seat belts.</p>	<p>Number of seat belt sales for manufacturers of vehicles.</p> <p>Number of seat belt sales for manufacturers in the after market (manufacturing and retailing for replacement and late installation).</p>
<p>Vehicles sales:</p> <p>Establishing the percentage of vehicles in use that have seat belts installed.</p>	<p>Number of vehicles imported with or without seat belts installed.</p> <p>Sales of new vehicles with seat belts installed - may be affected by legislation.</p>
<p>Convictions:</p> <p>To be used post-legislation, to indicate levels of effective enforcement.</p>	<p>Analysis of criminal statistics relating to vehicle occupants in court for non-compliance of seat belt legislation.</p>

Appendix 7: Sample seat belt wearing observation form

TRUCK CAR OCCUPANT RESTRAINT USAGE SURVEY
Ref. No. _____

FRONT SEAT PASSENGER	CENTRE PASSENGERS	DRIVER
<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> 14y + <input type="checkbox"/> Large child (10-13) <input type="checkbox"/> Medium child (5-9) <input type="checkbox"/> Small child (1-4) <input type="checkbox"/> Baby (0-1) <input type="checkbox"/> Un-restrained <input type="checkbox"/> Seat belt <input type="checkbox"/> Child seat <input type="checkbox"/> Rear facing seat <input type="checkbox"/> Carrycot strapped <input type="checkbox"/> Carrycot-unstrapped <input type="checkbox"/> Occupant on lap	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> 14y + <input type="checkbox"/> Large child (10-13) <input type="checkbox"/> Medium child (5-9) <input type="checkbox"/> Small child (1-4) <input type="checkbox"/> Baby (0-1) <input type="checkbox"/> Un-restrained <input type="checkbox"/> Seat belt <input type="checkbox"/> Child seat <input type="checkbox"/> Rear facing seat <input type="checkbox"/> Carrycot strapped <input type="checkbox"/> Carrycot-unstrapped <input type="checkbox"/> Occupant on lap	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> 17-29 <input type="checkbox"/> 30-59 <input type="checkbox"/> 60+ <input type="checkbox"/> Un-restrained <input type="checkbox"/> Seat belt <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> 14 + <input type="checkbox"/> Large Child(10-13) <input type="checkbox"/> Medium child(5-9) <input type="checkbox"/> Small child (1-4) <input type="checkbox"/> Baby (0-1) <input type="checkbox"/> Un restrained <input type="checkbox"/> Seat belt <input type="checkbox"/> Child seat <input type="checkbox"/> Rear facing seat <input type="checkbox"/> Carrycot-strapped <input type="checkbox"/> Carrycot-unstrapped <input type="checkbox"/> Occupant on lap

Note any odd details of rear seat passengers or any occupants behind rear seats:

Comments _____

VEHICLE DETAILS C/F _____ Taxi _____

Registration letter B _____

(1st letter) D _____

 C _____

 Older _____

 Other _____ (Personal, Forces etc.)

(Broughton, 1990)

Appendix 8: A seat belt questionnaire

**UNITED
NATIONS****E****Economic and Social
Council**Distr.
GENERALTRANS/WP.1/2004/7
3 February 2004

Original: English

ECONOMIC COMMISSION FOR EUROPE**INLAND TRANSPORT COMMITTEE**Working Party on Road Traffic Safety(Forty-fourth session, 6-8 April 2004,
agenda item 5 (e))**REVISION OF THE CONSOLIDATED RESOLUTIONS R.E.1 AND R.E.2**Increasing seatbelt usage**QUESTIONNAIRE ON
SEATBELTS AND CHILD RESTRAINTS
POLICIES AND PROGRAMMES****A. Introduction**

Motor vehicle crashes represent a major cause of fatality and injury, both in highly motorized, as well as developing countries. This is an issue that is a major public health problem, predicted to become even more of a global challenge over the next several decades. The use of safety belts and child restraint systems are the most effective means of reducing fatalities and serious injuries to vehicle occupants. Increasing the use of safety belts is also seen as the most effective defensive step individuals can take to reduce serious injury from the reckless behaviour of, for example, impaired drunk and drugged motorists and drivers displaying aggressive behaviour on the roads.

This questionnaire was developed by the Special Work Group on Increasing Seatbelt Usage set up during the 43rd Session of the Working Party on Road Traffic Safety. Please refer to document **TRANS/WP.1/2003/15, Use of Seat Belts**, for a further description of the purpose and mandate of this group.

B. Explanation

- The most appropriate person to fill out this survey would be a senior government official who has ongoing responsibility for managing and directing your country’s policies, programmes and practices related to seat belt and child restraint use.
- Child restraints refer to a separate seat or device, used in concert with the vehicle, that secures the child, generally using the vehicle’s seat belt devices, e.g., infant seats, booster seats, etc.
- Please attach, on a separate continuation sheet, to this questionnaire any further explanations to any of the questions that you feel is necessary.

C. Overview

1. Does your Government promote the use of seatbelts and child restraints?

	Seatbelts	Child restraints
Yes		
No		

2. How would you describe your Government’s support for increasing seatbelt and child restraint use?

	Child restraints	Seatbelts
Very high priority		
High priority		
Medium priority		
Low priority		
Not a priority		

D. Data/Statistics

3. Does your Government routinely collect detailed information about road traffic crashes that result in death or injury?

- Yes
- No

4. Does that data include information about whether seatbelts/child restraints were in use at the time of the crash?

- Yes
- No

5. Do you routinely collect data on seatbelt/child restraint wearing? If yes, what was the most recent usage percentage?

	Yes	No	Percent usage/ Date collected
a) Seating positions -- front			
b) Seating positions –back			
c) Child restraints			

6. How do you collect information about seatbelt and child restraint wearing?

- Observation
- Crash data
- Self-reported by occupants
- Opinion/telephone surveys
- Other, please state:
-
-
-

E. Legislation

7. In your country, are vehicles legally required to have seatbelts fitted/installed?

	Front Y/N	Rear Y/N	Centre Rear Y/N	Year introduced?
Cars				
Commercial vehicles (trucks, goods carriers)				
Bus/coach				

8. Do you have a domestic technical standard for seatbelt installation/performance?

- Yes
 No

If yes, please specify:

.....

.....

.....

9. Do you have legislation making seatbelt use by adults mandatory?

	National/Federal Law	State/Provincial Law	Front	Rear	Date law enacted
Yes					
No					

10. Do you have legislation making child restraints use mandatory?

	National/Federal Law	State/Provincial Law	Front	Rear	Date law enacted
Yes					
No					

F. Enforcement

Please provide a breakdown of legal requirements by age bands and specific child restraint type:

Age band (e.g. 0-2)	Type of restraint	Seating position (if specified)

11. How strictly does your Government enforce the seatbelt/child restraint laws?

	Seatbelts	Child restraints
Very strictly		
Strictly		
Moderately		
Rarely		
Not at all		

12. What are the sanctions for violations of seatbelt/child restraint laws?

	Seatbelts	Child restraints
Monetary fines (How much?)		
Penalty points against driver's license (How much?)		
Other		
Please state:		

13. Do the police have special seatbelt/child restraint enforcement campaigns in any of their areas of jurisdiction?

- Yes
- No

If yes, briefly describe:

.....

TRANS/WP.1/2004/7

14. Do you have a road safety education programme in schools?

- Yes
- No

15. At what age does the education programme start?

.....

16. Does the education programme include information about child restraints/seatbelts?

.....

17. Does the wider national education programme for the rest of the population include information for parents/carers, e.g. grandparents, about correct child restraint use?

- Yes
- No

18. In the last 12 months, has your Government advertised seat-belt messages using the following media ? Please tick all that apply:

- TV campaigns
- Radio campaigns
- Cinema advertising
- Outdoor/posters/billboards
- Leaflets
- Print e.g. newspapers, magazines
- Internet, new media
- Public relations
- Other, please describe:

19. Do you use shock tactics in advertising?

- Yes
- No

If yes, how does the impact compare with more subtle tactics?

.....

20. Do you routinely measure the effectiveness of your seatbelt programme?

- Yes
 No

** If yes, how do you determine the impact of:

- a) individual interventions (e.g. a new law enacted, a new TV advertisement)
- b) the entire seatbelt strategy (e.g. seatbelt wearing rates, reduction of casualty rates, awareness of seatbelt messages, publicity, etc.)

.....

21. Have you carried out research into the characteristics of people who don't use safety restraints?

- Yes
 No

** If yes, how did you use the information?

.....

22. Does your seatbelt programme offer your stakeholders incentives to help (e.g., grants, additional police equipment, etc.) increase seatbelt/child restraint use to:

- enforcement bodies
 other governmental bodies
 vehicle users
 other, please state:

** If yes, please give examples:

.....

23. To what extent do you engage non-governmental bodies in promoting road safety activities, particularly seatbelt usage and child restraints?

	Seatbelts	Child restraints
Very often		
Often		
Moderately		
Rarely		
Never		

24. Do you enlist the support of third parties to help focus on and improve seatbelt use among some low use groups e.g., young men 16-24?

- Yes
- No

** If yes, please give examples:

.....

25. In priority order, name the three most significant factors that are responsible for increasing seatbelt / child restraint use in your country.

.....

.....

.....

26. In priority order, name the three biggest obstacles your Government faces to increasing seatbelt use in your country (e.g. exemptions for certain drivers or occupants).

.....

.....

.....

27. In priority order, what are the three actions you would take to increase safety belt/child restraints use if you were solely responsible for your Government's seatbelt programme?

.....
.....
.....

Is there anything else that you might want us to know about your country's seatbelt and child restraint programmes?

.....
.....
.....

Name of person responding to this survey:
Title:
Nation:
May we contact you if we have questions about any of your answers?
<input type="checkbox"/> Yes <input type="checkbox"/> No
Telephone Number:.....
Mobile Phone Number:.....
Fax Number:.....
E mail:.....





ALWAYS USE YOUR SEATBELT



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