TRANSPORT ACCIDENT AND INCIDENT INVESTIGATION IN THE EUROPEAN UNION

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European Transport Safety Council
Rue du Cornet 34
B-1040 Brussels

Tel: 00 32 2 230 4106
Fax: 00 32 2 230 4215
E-mail: info@etsc.be

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Acknowledgements

ETSC gratefully acknowledges the contributions of members of ETSC's Transport Crash Investigation Working Party to this briefing:

Mr. Sven-Erik SIGFRIDSSON (Chairman)	Swedish Board of Accident Investigation
Mr. Cees HEIJSTER	Heijster Transport Safety Consultancy BV, NL
Mr. John LANG	Marine Accident Investigation Branch, UK
Mr. Juan Antonio PLAZA RUBIO	Air Accidents Investigation Commission, Spain
Dr. John STOOP	Technical University Delft, NL
Mr. Frank TAYLOR	Cranfield Aviation Safety Centre, UK
Ms. Pirjo VALKAMA-JOUTSEN	Accident Investigation Board, Finland
Mr. Wilbert WALTA	Dutch Transport Safety Board

Also Mr. Pete THOMAS (Vehicle Safety Research Centre, Loughborough, UK) from ETSC Vehicle Safety Working Party.

ETSC Working Party Secretary: Mrs. Pam Lewis

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The European Transport Safety Council

The European Transport Safety Council (ETSC) is an international non-governmental organisation which was formed in 1993 in response to the persistent and unacceptably high European road casualty toll and public concern about individual transport tragedies. Cutting across national and sectoral interests, ETSC provides an impartial source of advice on transport safety matters to the European Commission, the European Parliament and, where appropriate, to national governments and organisations concerned with safety throughout Europe.

The Council brings together experts of international reputation on its Working Parties, and representatives of a wide range of national and international organisations with transport safety interests and Parliamentarians of all parties on its Main Council to exchange experience and knowledge and to identify and promote research-based contributions to transport safety.

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EXECUTIVE SUMMARY

Most serious, public transport accidents are investigated to a greater or lesser extent but, with some conspicuous exceptions, particularly with aviation, only a few are done with the aim of improving safety. Many have been investigated with the aim of apportioning blame or liability and although safety recommendations are often made, they frequently fail to identify some of the underlying causes of whatever went wrong.

An accident is rarely the result of a single event. More often, it is caused by a combination of unrelated events coming together. In many modes, the human element in this causal chain can be significant. When an accident occurs, it is normally the result of one or more shortcomings in the safety system. People rarely make mistakes deliberately, but will often do things that have serious consequences.

Today's accident and incident investigation must focus on improving the safety of the system and aim to answer five questions:

- What happened?
- How did it happen?
- Why did it happen?
- What can be done to prevent a reoccurrence?
- What can be done to minimise accident consequences?

This briefing looks at the current situation within the EU and presents the following conclusions and recommendations:

1. Effective accident and incident investigation makes a positive, and long lasting, contribution to the improvement of transport safety.
2. EU legislation needs to ensure that transport accident investigation bodies should be totally independent of the regulatory body, judiciary and operational regime.
3. All accident investigation reports should be published and made public without restriction.
4. The marine and rail sectors require binding, EU legislation for independent accident investigation along the lines already adopted in Council Directive (94/56/EC) for civil aviation.
5. Adequate resources should be made available to suitably experienced, accredited accident investigators to ensure they can carry out their work effectively.
6. The lessons learned from accident investigations and the safety recommendations that follow should be shared freely between Member States, through centralised European databases.
7. Procedures should be established by the EU and Member States to ensure a timely response to safety recommendations, to monitor the progress of the implementation of safety recommendations, including actions taken and, in due course, the effectiveness or otherwise of such actions.
8. In view of the large numbers of road deaths across the EU, the application of independent accident investigation techniques to representative samples of road crashes is particularly important. A co-ordinated independent European road accident investigation strategy should be developed with new systematic in-depth injury and accident causation data systems.
9. EU financial support for in-depth accident investigation studies should be conditional on those conducting and managing them not having a stake in the financial consequences of the study.
10. Event recorders should be fitted progressively to all vehicles transporting passengers and goods with procedures laid down to establish appropriate access to data.
11. If new European safety regulatory authorities are established for any of the modes, separate arrangements should be made for the establishment and maintenance of EU databases and for the monitoring of safety performance.
12. Further co-operation in accident investigation between different Member States should be encouraged.

1 INTRODUCTION

No matter what the transport mode, safety must have equal consideration with environmental and economic aspects. An accident leads to a reduction of confidence in the safety of the transport system. It can lead to death and injury. It can cause massive environmental damage. It is likely to have serious commercial and financial consequences. It can lead to civil litigation and criminal prosecutions and can ruin careers.

Socio-economic costs per fatality and total socio-economic costs of accidents for different transport modes in 1995

Mode	Total socio-economic costs per fatality (€ million)	Estimated number of fatalities in 1995	Total socio-economic costs (€ billion)
Road	3.6	45,000	162.00
Rail	2.1	1,300	2.74
Air	2.7	186	0.50
Water	9.8	180	1.78

Source: Transport accident costs and the value of safety, ETSC, Brussels, 1997

Accident prevention and mitigation of injury falls into two main categories:

- proactive whereby the risks are assessed beforehand and measures are introduced to prevent them happening; and
- reactive where they are investigated and analysed to find the causes to prevent a reoccurrence.

Notwithstanding the importance of proactive work or risk assessment, it is widely recognised that the thorough and independent investigation of accidents is essential to identify exactly what happened and why. This will ensure that the relevant, rather than the convenient, improvements can be made. Many states now recognise that this approach makes a major contribution to improving safety. Unfortunately, some others appear reluctant to introduce such a system in one or more transport modes.

2 GENERAL REMARKS

Most serious public transport accidents are investigated to a greater or lesser extent but, with some conspicuous exceptions, particularly with aviation, only a few are done with the aim of improving safety. Many have been investigated with the aim of apportioning blame or liability and although safety recommendations are often made, they frequently fail to identify some of the underlying causes of whatever went wrong.

An accident is rarely the result of a single event. More often, it is caused by a combination of unrelated events coming together. In many modes, the human element in this causal chain can be significant. People rarely make mistakes deliberately, but will often do things that have serious consequences. When an accident occurs, it is normally the result of one or more shortcomings in the existing transport system and new challenges to the man-machine interface are being introduced by new technologies in all transport modes.

Today's accident investigation must focus on improving the safety of the system and aim to answer five questions.

- What happened?
- How did it happen?
- Why did it happen?
- What can be done to prevent a reoccurrence?
- What can be done to minimise accident consequences?

There are great benefits to be had from the proper investigation of both accidents and near accidents, sometimes referred to as incidents. For the purposes of this paper, the word 'accident' embraces both.

An investigation will endeavour to establish not only the primary, or initiating, cause but also those that underlie the event. Some of these can be divorced from the event in both time and distance and extend back over many years. It is the desire to probe deeply into all the reasons for an accident that is the essence of a safety-oriented investigation. If mistakes have been made it is essential to find out why, to make recommendations to ensure they cannot be made again and to make public the lessons so that others may learn from them.

A key issue in any accident investigation is the status and impartiality of the body carrying out the inquiry. Any organisation with an actual, or perceived, vested interest in the result is rarely able to act with total impartiality. The European Union must insist that organisations undertaking transport accident investigation are totally independent of the regulatory authority, as is clearly stated in Council Directive (94/56/EC) establishing the fundamental principles governing the investigation of civil aviation accidents and incidents. Further, the investigating body should not have to submit its report to any higher authority for approval before it is published. Without these criteria, there will always be the suspicion of a ‘cover up’ or a failure to take a robust stand with the regulatory authority of the state concerned and thus a lack of public acceptability.

3 THE PRESENT SITUATION

Accident investigation is taking place in a rapidly changing transport environment. The liberalisation of transport markets means further borders to be crossed, the mergers of carriers, the development of Trans European Networks, new institutional arrangements following deregulation policies, new consumer demands for safer vehicles and travel, all necessitating new levels of co-operation at international level. Finally the community of independent transport accident investigation boards is rapidly developing. Throughout the world, new boards are being founded and their co-operation strengthened by organisations such as the International Transportation Safety Association.

3.1 Aviation

Although aviation is the youngest mode of transport, it has the longest tradition of safety investigations of accidents. Internationally it is regulated through Annex 13 to the Chicago Convention on Civil Aviation. The responsibility for implementation of the Convention rests with the International Civil Aviation Organisation (ICAO).

The annex was last reviewed at a meeting in September 1999. The Convention, through the Annex, puts an obligation on all member states to have an organisation for safety investigations and to institute investigations. The Annex explicitly states

that the purpose of the investigation should be solely to improve safety and not to apportion blame or liability. The investigation should be well separated from other investigations that may be conducted in parallel, for example criminal investigations or investigations for claims adjustment.

The main responsibility for instituting an investigation lies with the State of Occurrence. The States of Manufacture, Design, Operator, and Registry should be formally notified of the accident. They have each a right to appoint an accredited representative. This person has a right to follow the investigation in detail and has wide-reaching powers; such as those to question witnesses and examine objects. He also has a right to appoint advisors to assist him in his work. These advisors have, under the supervision of the accredited representative, the same rights as the representative. The representative also has a right to read a draft of the final report before publication and to comment on it. If the comments are not taken into account, the investigating state has an obligation to append the comments to the final report.

If the State of Occurrence does not institute an investigation, it is the responsibility of the State of Registry to do so. There are powers to delegate, by mutual consent, the whole investigation, or parts of it to another State.

The Council Directive (94/56/EC) mainly reflects the rules of the annex. However, there is one very important difference; the Directive makes it compulsory for EU Member States to make arrangements for air accidents investigation that are independent of the state regulatory body for aviation. However, it has yet to be fully implemented throughout the EU and court proceedings have been instituted by the European Commission against two Member States - Luxembourg and Greece.

3.2 Marine

The main legal basis for marine accident investigation lies in the United Nations' Convention on the Law of the Sea (UNCLOS). In Article 94, it states that it is the responsibility of the Flag State to institute an ‘inquiry’ (investigation) into accidents on the high seas. Accidents occurring elsewhere such as in territorial waters or inland waters are not covered by UNCLOS nor is any reference made on the investigation aims. In addition to UNCLOS, however, the conventions on Safety of Life At Sea (SOLAS) and Marine Pollution (MARPOL) touch on certain regulations connected with accident investigation.

In November 1997 the International Maritime Organisation (IMO), the United Nations' organisation responsible for international co-operation on maritime safety, and other matters, adopted a resolution (A.849 (20)) with a Code for the Investigation of Marine Casualties and Incidents. This ‘invites’ states to take certain actions and ‘invites’ co-operation between them but it is not a legally binding instrument. It merely "invites" member states to take measures to give effect to the Code and "requests" flag states to conduct investigations into all serious and very serious accidents. In practice, EU states have chosen to be selective with which sections they will comply. Although infinitely better than having no Code at all, it falls short of what the air transport industry enjoys with Annex 13 to the ICAO Convention on International Civil Aviation. It adopts, for instance, no position on which state should institute an investigation although it recognises that a number of states are "substantially interested". These states are ‘recommended’ to co-operate in the investigation and, by mutual consent, designate one as the "lead investigating state".

Within the European Union, Council Directive 1999/35/EC provides for a legal right for any substantially interested state to participate or co-operate in investigations of marine accidents.

Following a number of recent accidents at sea, some initiatives by the European Commission have prompted some Member States to discuss ways and means of co-operating more fully. So far, no conclusions have been made public. There is an emerging view that Member States should take positive action to comply with both the terms and the spirit of the IMO resolution and do more to insist that the marine accident investigators co-operate in their enquiries. It is also felt that there is a need for a maritime equivalent of Annex 13 to the Chicago convention on civil aviation. Also, to stress the importance of international co-operation with coastal states participating in any investigation where its interests are affected by the consequences of a marine casualty off its shores. The environmental damage to result from the effects of say oil pollution can be far-reaching.

Only a few Member States have independent organisations for the investigation of marine accidents: Finland, the Netherlands, Sweden and the United Kingdom.

3.3 Railway

Rail transport originated in the nineteenth century and is the oldest mode of fast public transport. In the beginning, it was often privately operated. However, developments led to a situation where the state was to become the main operator. It goes without saying that the state was also the regulator of rail transport. There is now a general trend, encouraged by the Commission, towards the separation of the former vertically integrated national railways into distinct train operators and infrastructure managers. While these changes may assist the economic health of the railways, unless they are handled carefully, they may not be helpful for safety. Safe railway operation requires very close co-operation between train control, train operation and station operation. The main problems are that there could be confusion about the location of safety responsibilities, and that some newcomers to the industry might be inexperienced in railway safety.

To date, rail operations have been largely national. Across borders, the operational rules differ very much from country to country. The signal systems as well as the automatic train protection systems are also different from one EU country to the next. This might seem odd since "international" rail traffic has existed for a long time. This is managed by changing engineers and locomotives at the borders. The introduction of high-speed trains has led to further changes. If high-speed trains are to be utilised fully, this border exchange will have to cease. With this in mind, the European Commission has lately taken steps to harmonise the rules in Member States.

Some international co-operation has traditionally taken place within the International Rail Union (UIC). This has mainly been of an operational character. More recently, an informal co-operation has been introduced between the various national rail inspectorates. However, to date there has been neither international co-operation in the investigation of rail accidents nor any sharing of findings. Investigation of rail accidents is, in most countries, a matter for the operators and the regulators. Within the European Union, only a few countries (Finland, the Netherlands and Sweden) have independent organisations for this purpose. Elsewhere, the issue of

independent accident investigation has been discussed recently because of major accidents.

3.4 Road

Annually there are over 42,000 fatalities and, when under-reporting is taken into consideration, several million non-fatal casualties in road accidents in the EU. Fatal crashes as well as non-fatal crashes are a daily event and the approach adopted towards accident investigation has evolved in a somewhat different way from other transport modes. Crash investigations are often conducted by local police forces to identify any illegal driving behaviour and normally this extends to the roadworthiness of the vehicle. Not every crash will be investigated however; particularly if there is no clear suggestion of blame, and this may have consequences for national accident statistics. Fatal crashes normally trigger a more detailed level of investigation, in some countries similar to that of a murder enquiry involving many types of specialists and using a science based objective approach. There is variation between countries and some may take a minimal approach, even in the case of fatal crashes. Otherwise, information concerning road crashes and injuries mainly comes from various safety studies carried out by research organisations at national level.

At the European level the fundamental requirement is for sufficiently accurate counts of crashes in order to assess the main priorities. The CARE system, with the CAREPLUS project, can now provide data on the fatal population for each EU Member State to a standard format. A similar normalisation activity is now needed to include data for serious injuries. A key restriction is a result of differences in the reporting rates to police and subsequent inclusion into the national accident database. Information on these rates is required in a systematic manner to further strengthen this database. Secondly, access to the CARE database is currently limited by the form of the agreement between the CARE partners, and this now needs to be opened up to the wider safety community to get maximum value from the database.

Although the CARE data are a prerequisite for an effective road safety strategy, other accident investigation activities are necessary to form a comprehensive understanding of EU accident and injury factors. In other transport modes, accidents are relatively rare events and are usually fully investigated to determine the factors precipitating the event as well as the injury consequences. Changes to operating practices, vehicle design, or a particular transport system may be made on the basis of a single crash investigation. Similarly detailed investigations may also be conducted into road accidents with regard to a criminal prosecution in fatal crashes but the large numbers occurring preclude investigations with the same level of detail in every case. In road accidents, the single crash investigation is not the normal method of reviewing procedures and developing countermeasures, as there is a difficulty in ensuring that any crash is sufficiently typical of the European crash population. Instead a statistical approach that involves large numbers of investigations is most commonly used with the major benefit that a variety of statistical methods becomes available to ensure that results are representative of EU crashes.

Research activities and safety strategy support

The systematic investigation into the causes of road accidents and the resulting injuries has mostly been a scientific research activity in Europe and usually undertaken either on a national basis or by industrial groups. Several countries have conducted studies into road accident causation in order to support national road safety policies. A smaller number have made similar investigations into injury causation and the role of the vehicle. Such research has been used to support the technical development of standards; for example the front and side impact Directives. However there has been continued debate over the relation between special crash samples within a single country and the wider European crash population. Analysis from this research is mostly distributed within the safety research community and less often forms part of safety policymaking. Real-world data resulting from in-depth accident investigation of representative samples of road crashes is not collected systematically to allow formal integration into new safety policy.

4 DISCUSSION

4.1 General remarks

Investigations into the causes of major accidents in the air, maritime and rail transportation industries are known by the flight numbers, names of vessels or places where they occur, such as TWA 800, Swissair 111, Herald of Free Enterprise, Estonia or Paddington Station. They are performed in different forms in various countries; by ad-hoc Public Inquiry, Parliamentary Hearing or by permanent Transportation Safety Boards. Such investigations can be discriminated from other types of accident analyses, such as statistical analysis of large amounts of aggregated data or scientific research into specific aspects. They are characterised by an on-the-scene and a post-scene fact-finding phase, focusing on single but major events and are performed in public. Their primary products are insights into the causes of accidents and the issuing of recommendations to prevent re-occurrence. Such accident investigations have a specific approach with inherent terminology and methodology. Despite differences throughout the transportation modes, their commonalities have been recognised for their potential to supply a unique contribution to the enhancement of transportation safety with regard to their design and operation.

Comprehensive investigation of transport accidents makes an invaluable contribution to improving safety and it is ETSC's view that a number of steps must be taken by the European Union to improve transport accident investigations so their full safety potential can be realised.

To be genuinely effective, the investigating organisation must be independent. It must have the authority to investigate whatever accident it sees fit, be independent of the regulator and be able to produce its findings, conclusions and recommendations without recourse to higher authority and without interference by any vested interest including the state. It should also be financially independent and not reliant on the regulator for the provision of both fiscal and resource allocations.

Secondly, accident investigation bodies must have public confidence. There must, within certain constraints of confidentiality, be total transparency in their work. All

reports, recommendations and the actions taken (or not taken) following the publication of a report should also be made public.

Thirdly, any investigation must be conducted with the minimum of delay and after anyone whose reputation might be damaged by its content has had the opportunity to study and comment on it. If reoccurrences are to be avoided, the reports should be published as soon as possible, but generally within 12 months of the accident. To achieve such a demanding target, each state must ensure that its accident investigation body has sufficient resources to enable it to investigate accidents in the necessary depth.

When analysing accidents, investigators should have access to databases where, for example, earlier investigations of similar occurrences and recommendations can prove helpful in drawing conclusions. Databases are also essential for the purpose of trend analysis. Such analysis is essential to enable investigators to give priority to kinds of accidents that tend to increase or to be more serious than before.

Finally, there should be the fullest possible co-operation between Member States when an accident with an international dimension is being investigated. An accident investigation will generally result in two types of output; the publication of safety recommendations and the promulgation of lessons to be learned. It is strongly recommended that the lessons learned are shared with other Member States so that all can benefit from them.

4.2 Aviation

In principle, the situation in the civil aviation field is reasonably satisfactory in the Member States of the European Union. However, it must be noted that a number of Member States do not fulfil the requirements of Directive 94/56/EC insofar as they do not have investigation organisations that are separate from the regulating administrations. This must be regarded as somewhat astonishing since the Directive fixed the timescale for implementation to two years.

The main safety problems in civil aviation are controlled flight into terrain and loss of separation. The factors behind each are of a different character. To a large extent, they have to do with problems in the man-machine interface. There are also — as recognised by ETSC — problems caused by fatigue. To some degree, this is caused by long-haul flights between time zones. It should be noted that the regulations on duty time for flight crews differ very much between countries and any EU requirement should be based primarily on safety needs.

As a result of the intense international co-operation in the field, the tools for investigators are — at least insofar as commercial operations are concerned — rather satisfactory. Heavy aircraft have flight data recorders (FDR) and cockpit voice recorders (CVR). The standard of the recorders is improving as well. The recommendations by the September 1999 meeting for review of annex 13 — presently being processed by ICAO — are aiming at further improvements. The meeting also discussed the possibilities of introducing video recorders for the benefit of investigations. There are also databases, managed by ICAO and others, where information on earlier investigations can be found. The September meeting recommended ICAO to improve this system by introducing a database on

recommendations made by investigators. In the meantime, the establishment of a database for EU countries would be helpful.

4.3 Marine

Marine accident investigation procedures within Europe are far less satisfactory than those in the civil air transport sector. Few states have independent investigation organisations, the international legal system is also much less developed than in aviation and individual national legislation often prevents effective co-operation. The dominant position of the flag state in accident investigation can create problems. While this can be defended for an accident occurring on the high seas, it is far less satisfactory in a situation where a major accident occurs just outside territorial waters and leads to environmental damage of a coastal state who can be denied the opportunity to establish the true causes.

Although marine transport has a relatively low death and injury rate, the consequences of a bad accident happening are very real and sometimes far reaching. The consequences of oil pollution on local flora and fauna, a holiday beach, or on a local fishing community, can be severe (Erica 1999). And if there is ever a large loss of life in a passenger carrying vessel, the repercussions can reverberate for many years and take their toll on businesses, small economies and even governments (Herald of Free Enterprise 1987, Estonia 1994, Express Samina 2000).

Shipping is international with ownership, management, manning, chartering and voyaging embracing interests from many different nations. No matter what the flag of a vessel going about its lawful business, it can trade in EU waters. Flag states around the world can be very protective and one of the driving forces that underpins the entire sector is the need to make a profit. There are too many ships afloat today where safety standards have been sacrificed for economic reasons. This manifests itself in the physical condition of some ships, the competence of some crews, the manning levels and the working conditions of those on board. Very often these factors ensure the ships involved have much lower operating costs than their more conscientious counterparts and ensure they can undercut the better run vessel. This in turn is a disincentive to invest in quality ships and well-trained crews. When such a sub standard vessel becomes involved in an accident, the effective accident investigator can expose all these flaws in a way that no one else can. Some states might be reluctant to have shortcomings in their ships revealed too conspicuously, but it is essential that all serious accidents are thoroughly investigated. This should include non-EU flagged vessels crossing the territorial waters of EU Member States or where environmental damage may result.

Unlike other modes of transport, the marine sector is extremely reluctant to embrace the tools necessary for effective accident investigation, often on economic grounds. Few ships are equipped with voyage data recorders (VDR) and progress within IMO to adopt a broad fitting policy has been painfully slow, although a revision to Chapter V of SOLAS was agreed in late 2000 to enable VDR to be fitted to passenger ships and ro-ro ferries from July 2002 for new ships and from first survey for existing ships. Many vessels are fitted with some form of limited recorders but these rarely record more than a few parameters, such as the course steered. ETSC recommends that the EU takes the lead in requiring the mandatory fitting of voyage data recorders in all new vessels (other than ro-ro ships and high-speed ferries that are covered by Directive 99/35/EC).

Only a few Member States have independent organisations for the investigation of marine accidents: Finland, the Netherlands, Sweden and the United Kingdom. There is, therefore, a strong case for the EU to require, as they have in aviation, that all Member States should be mandatorily required to establish arrangements for independent marine accident investigation and to report the results of accident investigations.

ETSC believes that greater emphasis should be given to investigating accidents in the fishing industry and fatal accidents involving leisure craft as part of the campaign to improve safety at sea.

Detailed investigations of accidents where the vessel has sunk are now possible and have been carried out with success. Flag or coast states should be encouraged to carry out such investigations calling on the expertise of other states as appropriate.

Many marine accidents have common features which, once accurately identified, can be used to underpin far-reaching safety improvements. There is, therefore, a need at EU level for detailed analysis of a selection of accidents as safety studies for the benefit of all States.

4.4 Railway

The situation regarding accident investigation in the railway sector is not satisfactory. There is at present virtually no international legal system concerning investigation of railway accidents. As stated earlier, the ongoing development in international rail traffic will make the harmonisation of the rules for railway traffic inevitable. This should of course also include the system for accident investigation.

In terms of passenger safety, railway systems have, in general, a good safety record, but since accidents do occur, there are safety problems. Although the relative lack of international co-operation in the field makes it difficult to assess the safety problems, two major ones exist, safety at at-grade-crossings and train collisions with other vehicles or with obstacles.

Since the railway systems traditionally have a very national character, the tools for investigators are also national and vary to a large extent from country to country. In some Member States there is some use of recorders for registering various information, such as on-board recorders that record parameters from the engine, recorders for the signal system and voice recorders for communication between engineers and the traffic control. There are at present no international databases, only national ones, and this limitation makes international comparisons difficult.

Some countries now have independent railway accident investigation bodies, whereas others do not. With so many new railway operators, independent bodies to conduct investigations will be even more necessary in future. ETSC recommends that the EU takes steps to ensure that all railway accidents are investigated by independent bodies.

4.5 Road

As indicated previously, insufficient independent road accident investigation is carried out at national level, whether by independent research institutes, university departments or national accident investigation boards, and should be increased.

In addition, the increasing responsibilities of the European Union resulting from the Maastricht Treaty together with its competency for vehicle design through Whole Vehicle Type Approval mean that a more systematic and common approach would add value.

There is now a clear range of areas where the EU has the responsibility for improvements in casualty reduction and a corresponding range of data sources is needed to support safety decision-making. Information on existing aspects of real-world safety problems is needed to direct new safety policy as well as to evaluate the effectiveness of recent safety countermeasures. New safety possibilities offered by technology improvements can be substantial under laboratory conditions but it is essential to ensure that they result in true safety improvements in real-world crashes.

Safety technologies may be heavily marketed to vehicle purchasers but there is a real expectation of improved protection when crashes occur. The responsibility of the EU to ensure improvements in vehicle safety standards for crash protection is accompanied by the responsibility to assess the long-term effects of safety regulation. This means that there is now a much greater need for systematic data about vehicle performance in crashes and the resulting injuries. Crash performance regulations are typically detailed and state precise requirements for the vehicle so the data needed to monitor vehicle performance need to be similarly detailed. To provide the most effective support to safety policy these data need to be co-ordinated to ensure that all of the information needs are met.

A co-ordinated independent European road accident investigation strategy

To fully support and evaluate the safety decision making a co-ordinated accident investigation strategy requires several key components.

- **Geographical coverage** - the data must cover the range of European crash conditions, analysis must give results that are as representative as possible;
- **Road user types** - The main casualty groups must be covered, in particular car occupants, cyclists, motorcyclists and pedestrians;
- **Level of detail** - The detail in the data must be sufficient to assess the effects of detailed regulation;
- **Accident and injury causation** - the main focus must be on those areas of safety for which the European Union has the main responsibility. This includes vehicle design and injury causation, but data on accident causation are also required, particularly for high risk or vulnerable road user protection;
- **Independence** - the data collection and analysis must be conducted by groups that do not have a stake in the financial consequences of the investigations.

These requirements will not be met by a single database so a co-ordinated strategy is needed. A group of databases that are linked qualitatively and statistically will

together provide the necessary building blocks. With the exception of CARE, existing studies have developed on an ad-hoc basis rather than fitting into a pre-determined framework and there is little scope to link the various data, either statistically or conceptually. While such studies may contribute to the development of new accident/injury countermeasures they do so in isolation and are not as effective as they could be.

The main gaps in current accident investigation studies concern injury causation regarding both car occupants and pedestrians and motorcyclists. The main competency of the Commission concerns vehicle type approval, yet there is no European injury causation study for car occupants nor for pedestrians together with motorcyclists the most commonly injured road users. Some in-depth accident causation data have been collected under the European Accident Causation Survey (EACS) and Motorcycle Accident In-Depth Study (MAIDS), but these studies are not independent, being partially funded by the car and motorcycle industry. The EACS is not representative of the EU accident population.

The EuroNCAP consumer information programme has led to a period of dramatic technical improvements to car design yet there is no overall accident research programme that is capable of fully evaluating the changes in injury patterns or injury risk. An in-depth study is needed that examines injuries and identifies the causes through analysis of the associated vehicle damage. When enhanced by detailed injury information linked to the vehicle registration or driver licensing information there will be a powerful tool to support further crashworthiness improvements. The completed STAIRS (Standardisation of Accident and Injury Registration Systems) project provides the basis for this in-depth programme with links to CARE to ensure the data are statistically representative of the EU situation.

While it would be possible to combine accident and injury causation studies, it is likely to be more effective to keep them separate as they have conceptual and often methodological differences.

Accident investigation studies will not give any benefit to road users unless the data are appropriately analysed and the results formally integrated with policymaking. New mandatory safety regulations will have the greatest benefit if the development includes a reliable estimate of the likely casualty reductions. Once in force a Directive should include the requirement to evaluate the longer-term effectiveness as both the frontal and side impact Directives did. In this way, real-world accident and injury data can form an integral part of European road casualty reduction strategies.

Special issues

Personal confidentiality restrictions

Regulation maintaining the privacy of the individual has been effective in strengthening individuals' rights but have made it more difficult to collect data for safety policy. The need to obtain an individual's permission makes data collection less efficient as partially completed cases may have to be abandoned when permission is not forthcoming. Analysis of multi-national datasets is more complicated. It is proposed that new personal data protection regulation should include exemptions for properly conducted public safety related studies with well-defined privacy rules so that the benefits to society should equal those of the individual.

Post-mortem investigations

The main priority of casualty reduction policies is to reduce severe injuries to road users. A necessary part of this involves the understanding of the patterns of injury and their causes yet many countries do not mandate automatic post-mortem investigations of traffic fatalities. A full identification of the injuries can give valuable information on causes of death and direct the most effective countermeasures. Information on alcohol levels or the presence of drugs in the bloodstream can be used to establish the frequency of fatal crashes involving alcohol and to monitor the effectiveness of public actions to influence driver behaviour. Any pan-European study to help develop safety improvements will be somewhat deficient if there are particular territories that provide no fatal injury information. Whilst this may be a sensitive issue for these countries, a wider debate on the value to the public of improved information for road safety will offer new opportunities in the understanding of injury causation.

4.6 Multi-modal investigation organisations

The assumption made in this briefing is that the organisation charged with investigating accidents in a particular mode is dedicated to that mode alone. Many Member States have single mode accident investigation bodies but others have adopted a multi-modal approach.

Some nations that have adopted the multi-modal approach to accident investigation have found it to be very successful. In the 1960s, the USA saw merit in a multi-modal approach and founded the National Transportation Safety Board. Other countries such as Australia, Canada, Finland, the Netherlands, New Zealand and Sweden have followed suit.

The main advantage with such an organisation is that the basic methodology used in an accident investigation is the same and that certain investigative tools can best be utilised across all modes. These include data recording facilities, forensic studies and psychological inputs to studying the human factor component. There are practical advantages in sharing the administrative load, investigator training, public relations and legal issues.

Multi-modal Boards differ somewhat in their composition. In Sweden and Finland, for example, the findings of the investigation team are not subjected to any further scrutiny. In the Netherlands and the USA, however, the findings of the senior investigator are then subjected to scrutiny to an appointed Board, who may be political appointees.

4.7 Factors common to all modes

Efficiency means that the investigators must have access to effective instruments for their work.

4.7.1 Event recorders

ETSC strongly advocates the use of event recorders in all modes of transport to assist in the accurate reconstruction of the events leading up to any accident. In some modes, particularly civil air transport, data and voice recorders are already widely fitted following international agreement and regulation, and have made a

significant contribution to understanding why accidents occur and have done much to improve safety. Data recorders are not so common in other modes, particularly shipping, and ETSC strongly recommends EU action to ensure the widespread fitting of such recorders in all modes of transport. Procedures would, of course, need to be established to protect against inappropriate access to data.

4.7.2 Post mortems

A necessary part of any accident investigation involving loss of life is to determine the precise cause of death. The only reliable means of achieving this is for automatic post-mortems to be mandated. In road, aviation and rail accidents a full identification of the injuries can provide valuable information on the cause of death so that effective countermeasures can be implemented to improve the chances of survival in the future. In marine accidents, there is a natural tendency to assume that any victim recovered from the sea has died from drowning. Such assumptions often overlook the possibility that some other cause of death may have occurred which may, in itself, have contributed to the accident.

4.7.3 Safety studies

Any one accident investigation will, if thoroughly investigated and analysed, produce safety recommendations and useful lessons to be learned. The study of a number of similar accidents can provide even more useful data. These may have the potential to influence the design, operating procedures or regulatory regime in a way that the one-off investigation is unlikely to achieve with conviction. ETSC strongly advocates the initiation and development of safety studies and trend analysis and the widespread publication of the findings.

4.7.4 Follow up of recommendations.

A key feature of any investigation is the recommendations resulting from the detailed analysis of the causes. They can be directed at anyone but are usually addressed to the regulatory body of the mode concerned. ETSC commends the importance of procedures to establish the response time to recommendations, to monitor their take-up and effectiveness.

4.7.5 International co-operation

With the possible exception of air accident investigations, international or cross border co-operation and the exchange of information between Member States is not as good as it should be. Good co-operation ensures the effective investigation of accidents where two or more States are involved, or where an accident occurs to one country’s vehicle/train/ship in another’s territory or territorial waters. The position is further aggravated in the marine world when ships of member flag states collide on the high seas, or where a vessel is involved in an accident outside territorial waters and the consequences inflict environmental damage on the coast line of an adjacent state. ETSC urges maximum co-operation between States in accident investigation and to routinely exchange such information that will assist in improving safety. Accident investigators of Member States are also recommended to meet their modal counterparts on a regular basis to discuss investigation techniques and to share experiences.

5 CONCLUSIONS AND RECOMMENDATIONS

1. Effective accident and incident investigation makes a positive, and long lasting, contribution to the improvement of transport safety.

2. EU legislation needs to ensure that transport accident investigation bodies should be totally independent of the regulatory body, judiciary and operational regime.

3. All accident investigation reports should be published and made public without restriction.

4. The marine and rail sectors require binding, EU legislation for independent accident investigation along the lines already adopted in Council Directive (94/56/EC) for civil aviation.

5. Adequate resources should be made available to suitably experienced, accredited accident investigators to ensure they can carry out their work effectively.

6. The lessons learned from accident investigations and the safety recommendations, which follow, should be shared freely between Member States, through centralised European databases.

7. Procedures should be established by the EU and Member States to ensure a timely response to safety recommendations, to monitor the progress of the implementation of safety recommendations, including actions taken and, in due course, the effectiveness or otherwise of such actions.

8. In view of the large numbers of road deaths across the EU, the application of independent accident investigation techniques to representative samples of road crashes is particularly important. A co-ordinated independent European road accident investigation strategy should be developed with new systematic in-depth injury and accident causation data systems.

9. EU financial support for in-depth accident investigation studies should be conditional on those conducting and managing them not having a stake in the financial consequences of the study.

10. Event recorders should be fitted progressively to all vehicles transporting passengers and goods with procedures laid down to establish appropriate access to data.

11. If new European safety regulatory authorities are established for any of the modes, separate arrangements should be made for the establishment and maintenance of EU databases and for the monitoring of safety performance.

12. Further co-operation in accident investigation between different Member States should be encouraged.