REPORT ON NATIONAL ROAD ACCIDENT ANALYSES IN THE EU COUNTRIES

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Abstract

The objective of this research is the presentation of the national official use of accident data in the EU countries as well as the possibilities for pan-European comparison. The national reports of the official road accident statistics were analysed and compared. The comparison revealed that EU-level road accident analysis is limited by the data collected and the restrictions of the collection system used in each EU country. The road accident data collection - elaboration process is a national matter reflecting sometimes the way road safety is treated in each member state. The above processes present significant differences among the twelve EU countries and therefore convergence perspectives face important difficulties. This analysis identified the frequency of use of the various accident data categories in the various national publications, which is an interesting result showing which information can be compared at European Union level.

Key-words:
road safety, road accident analysis, international comparisons, road accident data bases

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State-of-the-art

The Maastricht treaty engaged the European Union to the construction of trans-European networks[1] with a special chapter dedicated to the road network. Design and planning of this trans-European road network makes general reference to the improvement of road safety without mentioning any concrete measures. It couldn't be different as today it is very difficult to define the safety level in the existing European road network and therefore it is extremely difficult to propose appropriate improvements in a rather unknown situation.

Today, it is not possible to make reliable international comparisons and answer how many accidents happen every year in the European road network, how many persons are killed and injured and which are the main reasons for these accidents[2]. It is very difficult to give answers to all these questions due to incompatibility of data collection and analysis systems in the European Union member states.

Existing national road accident data is an unexploited treasure due to a number of data quality problems[3]. The definitions of accident concepts used in each EU member state vary significantly. Even though several initiatives tried to collect and compare these national definitions the existing results are rather poor. In the framework of EC-CARE project, definitions of killed persons[4] as well as of several other accident terms[5] used throughout Europe were considered. Additional important research concerning definitions of accident concepts took place in the framework of OECD/IRTAD[6] and of ECMT. Finally, important efforts were also orientated towards the comparison of road accident data collection forms by NTUA[7] and by SOBEMAP[5].

Another data quality problem is the accident reporting inaccuracy which is of major importance for reliable comparison of road accident data. Important effort has been devoted over the last years in many European countries in proving that injury accident present high underreporting rates and only data for fatal accidents are close to the reality. Recently, important effort regarded the identification of reporting accuracy throughout Europe mainly by initiatives in the framework of IRTAD[8, 6].The creation by the European Commission of a road accident data base using national disaggregated data (the CARE data base)[9], to be used as the basic tool for the establishment of a European road safety policy[10], is an initiative in the correct direction. This new perspective is an important work, putting the base for reliable and useful road accident analysis in EU level. The appropriate exploitation of road accident data in EU level could lead to the right decisions, resulting thus to the reduction of the 1.200.000 road accidents and of the 45.000 persons killed per year in such accidents in Europe[11].

Apart from the European Commission's CARE data base with disaggregated data which is a promising project[12] but still in the construction phase[13], there exist a number of initiatives for European level road accident analysis which for the time being produced rather poor results as already mentioned. More specifically, the European Conference of Ministers of Transport (ECMT) produces an annual report[11] with the most reliable European level comparisons. But these comparisons refer to very few accident parameters. The Organisation for Economic Co-operation and Development (OECD) uses the IRTAD data base with aggregated data and interesting results but the system is only available to IRTAD members. Finally, the United Nations[14], the EC-Eurostat[15], the International Road Federation[16] and the World Health Organisation[17] produce annual road accident reports with general figures which in most of the cases are not comparable.

This work examines an aspect of the data collection-elaboration system which has not yet been examined in European Union level: the national official use of accident data through the national accident statistics reports. This research collected and compared the relevant work actually carried out and presented by the national administrations. Official analysis of road accident data carried out by the statistical service (or other specialised organisation) in each EU State reflects not only the requirements so far defined in the State but also the limits of data availability and reliability. The final objective of this work is the extraction of useful conclusions for the possibilities of pan-European road accident comparisons[18] as well as the opening of the discussion for a future European approach on road accident analysis.

Methodology

The publications (General Reports) for road accident statistics analysed and compared in the framework of this research are those officially published every year by the national administrations of twelve EU states (the three new member states were not considered as the research was carried out before their accession). It is noted that the United Kingdom issues two separate general reports, one for Great Britain (GB) and one for Northern Ireland (NI), and therefore the total number of general reports included in the following comparison is 13. It is also mentioned that in most of the states additional road accidents statistics general reports are published by various organisations (public and private) like the reports issued by regional administrations, by research institutes, by insurance companies, etc. This research overcame a number of difficulties such as the translation to a common language (English) of all road safety terms and concepts used in the various general reports as well as the lack of related bibliography for such an international level comparison of road accident analysis approaches.

The national general reports contain the output of road accident data collection-elaboration process. This process comprises data collection by specially designed national forms, processing in centralised national data bases and statistics presentation in the national general reports. The official reports vary from country to country in their contents, level of detail, etc. but they all provide at least a first analysis of the road accidents in the national road network. The information contained in these general reports provides a first idea on which data are:

- available via the road accident data collection - elaboration process,
- reliable after the errors elimination through suitable elaboration and
- interesting for the issuing authority.

The important variation of the contents, the structure and the format of the statistic Tables included in each national general report made necessary the use of three comparison parameters classifying the information in three distinct levels[19]: accident data categories, safety measurement units and last year and trends.

Accident data categories: Road accident data are included in various categories such as those concerning the road user type, the vehicle type, the age, the sex, the road class, etc. Comparison of the general reports identified 305 different accident data categories used in these reports. Accident data are combined to produce various categories that can be shown in multi-dimension Tables. For example the Table titled "*Accidents per road user type*" is

totally different from the Table titled "*accidents per road user type by age groups and by road class*" even though they both include information for road user type. The accident data categories have been divided into six groups concerning:

- general information (hour, day, month, etc.)
- road user (road user type, age, sex, seat belt use, alcohol influence, etc.)
- road environment (road type/class/surface/condition, intersection, etc.)
- vehicle (vehicle type/use/nationality, etc.)
- accident (accident type, collision type, etc.)
- cross-combinations of the above groups (road user type by road class, etc.)

Safety Measurement Units: Road safety data contained in the Tables can be given in several measurement units. All safety measurement units used in the seventeen general reports have been recorded and are presented in an exhaustive list in Table 3. This research identified 55 different measurement units which are used in the general reports. The safety and other related measurement units have been divided into six groups:

- absolute accident numbers (no of fatal, serious/slight injury accidents, etc.),
- absolute casualties numbers (no of killed, seriously/slightly injured, etc.),
- other accident related absolute numbers (no of drivers, vehicles, infringements, etc.),
- absolute numbers from other data bases (population, vehicles, vehicle-kilometres, etc.),
- accident rates (accidents/killed/injured per population/vehicles, etc.),
- severity indices (killed per accident/casualties, etc.),

All the above measurement units are found in the various national general reports not only as absolute numbers but also in the form of growth percentages, average values per year for a certain year, etc.

Last year available and trends: All national and international reports give road safety data either for the last year available or for a series of years for various road safety data. It is noted that 1991 has been selected as the reference year for the general reports comparison of this research and therefore most of the general reports analysed concern road accidents of 1991.

Results

General comments

The volume of road accidents statistics general report varies from 7 pages (L) to 380 pages (D) with an average volume amongst the thirteen reports of 121 pages. The number of Tables contained in the road accident statistics general report varies from 15 Tables (L) to 150 (D) with an average number of 53 Tables. This number of Tables included in each general report is in most of the cases, a quantitative criterion revealing the degree of detail covered by each report. The year of reference for twelve out of thirteen general reports is 1991. In most of the states the yearly official results of the road accident statistics are available a few months after the expiration of the reference year.

The issuing authority of the road accident statistics report is not the same in all countries. In seven countries (D, I, NL, B, GB, DK, GR) the report is published by the statistical office, in four countries (L, IRL, E, P) it is issued by a transport related service (Ministry, Directorate General or Section), in one case (NI) it is issued by the police and in one country (F) it is issued by an inter-ministry road safety authority. In each Member-State the responsibility of

information flow from data collection to data storage, elaboration and publication, is distributed amongst competent services in a different way. As a consequence, the way road accidents data are collected, elaborated and published reflects the approach of the administrative services involved.

Accident data categories comparison

The above described methodology led to the identification of a total of 305 different Tables in all general reports. Among these 305 Tables, 67 were one-dimension (only one accident data category) and 238 were multi-dimension Tables (cross combinations of accident data categories). Table 1 is an extract of the global Table with all 305 road accident categories used, containing time series of accident data categories included in each general report sorted by frequency of appearance in the general reports; only Tables for accident data categories found in five or more general reports are included in this Table.

Table 1. Tables for accident data categories - frequency and period covered

	Frequent Tables for accident data categories	D	F	I	NL	B	L	GB	NI	IRL	DK	GR	E	P	TOTAL 13
1	Day of the week	91	91	90-91	85-91	91	91	91	91	91	91	83	91	91	13
2	Road user type	61-91	90-91	75-91	85-91	91	91	26-91	91	82-91	91	83	82-91	91	13
3	Age group	61-91	90-91	75-91	85-91	91	91	91	91	91	91	83	91	91	13
4	Accident type	86-91	91	75-91	85-91	91	91	91	91	91	91	83	91	91	13
5	Hour	91	91	90-91	85-91	91		81-91	91	82-91	91	83	91	91	12
6	Month	53-91	90-91	90-91	85-91	87-91		91	91	82-91	91	83	91	91	12
7	Road user type - Age group	61-91	91		91	91	91	86-91	91	91	91	83	91	91	12
8	I/O built-up areas	53-91	90-91	91	70-91		91	91	82-91	91	91	83	66-91	91	12
9	Sex	61-91		75-91	85-91	91	91	91		91	91	83	91	91	11
10	Vehicle type	06-91	91	75-91	85-91			81-91	87-91	91	91	83	91	91	11
11	Region	53-91	90-91	75-91	88-91	91		91		87-91	91		91	91	10
12	Age group - Sex	61-91		75-91	91	91		91		91	91	83	91	91	10
13	Road surface conditions	91		91	91		91	91	91	91	91	83		91	10
14	Weather conditions			91	91	91		91	91	91	91	83	91	91	10
15	Hour - Day of the week	91		91	91	91		91	91		91		91	91	9
16	Road user type - Age group - Sex	61-91		91		91		91		91	91	83	91	91	9
17	Road class	91	90-91	88-91		91		86-91		91		83	91	91	9
18	Road layout		91	91		91		91		91	91	83	91	91	9
19	Lighting	91	91		91		91	91		91	91		91	91	9
20	Vehicle type - Accident type	91		91	91			91		91	91	83	91	91	9
21	Cities			75-91	91	91		91	91	91	91	83			8
22	Road user type - I/O built-up areas	91			91			85-91	89-91	91	91	83	91		8
23	I/O built-up areas - Vehicle type	61-91			91			91		91	91	83	70-91	91	8
24	Alcohol influence	91			85-91	91		91		91	91			91	7
25	Seat belt		90-91				91	91	91	91	91			91	7
26	Road user type - Sex	86-91				91				91	91	83	91	91	7
27	Road user type - Accident type	91		91		91			91		91	83	91		7
28	Age group - I/O built-up areas	91			91			91		91		83	69-91	91	7
29	Sex - Vehicle type	91		91	91					91	91		91	91	7
30	I/O built-up areas - Accident type	91		91						91	91	83	91	91	7
31	International comparisons	60-91	83-90	90				90		90	87-91				6
32	Road user type - Vehicle type	91		91	65-91			91			80-91			91	6
33	Road user type - Cities			91				91	91	91	91	83			6
34	Age group - Vehicle type	91		91	87-91						91		91	91	6
35	Road user type - Month	91		91	91			91			91				5
36	I/O built-up areas - Day of the week	91		91	91						91		91		5
37	I/O built-up areas - Region	91								91	91		80-91	91	5
38	Road class - Accident type	91		91		91		91		91					5

60-91: period covered from 1960 up to 1991 Blank cell: this table does not exist in the national general report

The total number of Tables used in only one national general report is 168 and the total number of Tables used in only two national general reports is 55. The number of Tables with the same type which are used in many national reports is very limited (38 Tables are used in at least 5 national general reports and only 14 Tables are used in at least 10 reports). The distribution of the Tables of the same type included in the national general reports is presented in Table 2.

Table 2. Number of Tables of the same type per number of general reports

Number of Tables of the same type	Number of general reports	Percentage of total number of Tables	Cummulative number of Tables
4	13	1%	4
4	12	1%	8
2	11	1%	10
4	10	1%	14
6	9	2%	20
3	8	1%	23
7	7	2%	30
4	6	1%	34
4	5	1%	38
21	4	7%	59
23	3	8%	82
55	2	18%	137
168	1	55%	305
305			

All thirteen national general reports include four Tables of the same type: a) Road user type, b) Age group, c) Accident type and d) Day of the week.

The contents of the accident data category concerning the *Road user type* do not present important lack of uniformity up to a certain level of detail. More specifically, the distribution of road users in drivers, passengers and pedestrians is common in all reports. Lack of uniformity is observed when these road users are distributed among the types of vehicles they use. The contents of the accident data category concerning the *Age group* present different classification of the age groups but this problem can easily be solved as in most of the cases the age is precisely mentioned in the data collection form. It is noted that in reality no comparison at all is possible between Tables with the accident data category concerning the *Accident type* because the contents of this category vary significantly from one national report to the other. The accident data category concerning the *Accident type* contains information included in the national reports under various titles such as accident cause, accident circumstance, type of manoeuvre which caused the accident, collision type, etc. and in various forms (short/long description, detailed or not distribution of the various values, sketch, etc.). The accident data category concerning the *Day of the week* is the one which has obviously no uniformity problems at all.

Four other Tables of the same type are included in twelve general reports:a) Road user type - Age group, b) Inside or outside built-up areas, c) Hour and d) Month.The use of the accident data category concerning the *Inside/outside built-up areas* is very frequent in most of the national general reports. The problem of this very useful category is the different definitions used in each Member-State for the concept of "built-up area". Even though the definitions

used are in most of the cases similar, the error in a EU common comparison is considered as significant. It is noted that this accident data category groups all categories used in the various national reports under the terms I/O agglomeration, urban area, etc. As far as *Month* and *Hour* are concerned those mentioned above for *Day of the week* apply (no uniformity problems).

Two Tables of the same type are used in 11 out of 13 national general reports:a) Sex and b) Vehicle type.The accident data category concerning the *Sex* is obviously one of the very few cases where there is no problem of lack of uniformity. Various approaches have been recorded among but also within the national general reports for the accident data category concerning the *Vehicle type*. It is certain that for some specific vehicle types such as the private car and the bike no uniformity problem exists. The problems appear in the classification of the two-wheel motor vehicles and of the goods vehicles. The lack of uniformity problems of this category can be solved either by the use of sub-totals of the classification (e.g. only private cars) or by the use of special correction coefficients.Four other Tables of the same type are used in 10 national general reports:a) Region, b) Age group - Sex, c) Road surface conditions and d) Weather conditions.The accident data category concerning the *Region* is also one of the few categories where no common comparison is valid as it refers anyway to different objects: the various regions of the European Union. The same applies to the category concerning the *Cities*. This is an important data category in the perspective of EU-level accidents comparison where a useful comparison of the road safety level could concern disaggregated geographic units: the regions, and not the countries where the aggregation makes the comparison much poorer. The accident data categories concerning the *Road surface conditions* and the *Weather conditions* refer to the road environment and present important problems in uniformity. The only way to avoid these problems is the use of a very simple (two, maximum three elements) classification. It is true that a very simple classification makes the accidents analysis poorer but in some cases it is the only way to face the lack of uniformity without changing the complete data collection process.

The six Tables of the same type which are used in 9 national reports are: a) Hour - Day of the week, b) Road user type - Age group - Sex, c) Road class, d) Road layout, e) Lighting and f) Vehicle type - Accident type.As far as *Road class* and *Lighting* are concerned remarks mentioned above for *Weather conditions* apply to them too (important problems in uniformity). The accident data category concerning the *Road layout* presents serious problems in uniformity. The problem is as serious as that for *Accident type* where many different approaches exist for its description. Therefore, it is not considered as a data category which could produce results comparable in EU-level.

Finally, the three Tables of the same type used in 8 national general reports are:a) Cities, b) Road user type - I/O built-up areas, c) I/O built-up areas - Vehicle typeThe above comparative presentation of the accident data categories indicates that a number of valid comparisons of some basic common elements in EU-level is possible. On the basis of the above analysis of the possibilities for a common approach, a number of one-dimension Tables of the same type which could be the first step of possible EU-level common comparison was selected and presented in the following list. The number of general reports using this accident data category is shown in brackets.

General Information:
1. Hour (12)
2. Day of the week (13)
3. Month (12)
4. Region (10)
5. Cities (8)

Road user:
6. Road user type (13)
7. Age group (13)
8. Sex (11)

Road environment:
9. Inside - outside built-up areas (12)
10. Road class (9)
11. Road surface conditions (10)
12. Lighting (9)
13. Weather conditions (10)

Vehicle:
14. Vehicle type (11)

This list is very interesting as it represents a solid and valid basis for the future definition of a reliable EU-level road accident analysis. It is true that this list can not cover all the accident analysis needs but it can be further elaborated with the addition or deduction of accident data categories, as the needs of EU-level accident analysis will be further defined. Important work is also needed for the appropriate selection and definition of the values to be contained in each one of these accident data categories.

Safety measurement units comparison

The 50 road safety and other related measurement units used in the thirteen general reports for road accident statistics are presented in Table 3. Very few of these measurement units are used in most of the Tables of the national reports (number of accidents, killed, injured and casualties). Most of the measurement units are used only in a few Tables. 20 out of 50 safety measurement units are used in only one or two general reports. It is noted that a safety measurement unit recorded to be used in several national reports, does not necessarily mean that it is the same in all reports. The definition of many absolute numbers differs from country to country even for basic concepts such as the number of killed, slightly or seriously injured, etc.

Table 3. Safety and other related measurement units used in each general report

	D	F	I	NL	B	L	GB	NI	IRL	DK	GR	E	P	TOTAL 13
ABSOLUTE ACCIDENT NUMBERS														
No of accidents*	●	●	●	●	●	●	●	●	●	●	●	●	●	***13***
No of fatal accidents	●		●	●	●	●	●	●	●		●	●	●	***11***
No of injury accidents	●			●	●	●	●	●	●		●	●	●	***10***
No of fatal injury accidents					●									***1***
No of serious injury accidents	●				●								●	***3***
No of slight injury accidents	●				●								●	***3***
No of accidents with only material damag	●	●							●	●			●	***5***
No of accidents with only serious material damage	●													***1***
No of accidents with only slight material damages	●													***1***
ABSOLUTE CASUALTIES NUMBERS														
No of killed	●	●	●	●	●	●	●	●	●	●	●	●	●	***13***
No of injured	●	●	●	●		●	●	●	●	●	●	●	●	***12***
No of fatally injured					●									***1***
No of seriously injured	●	●			●	●	●	●		●	●	●	●	***10***
No of slightly injured	●	●			●	●	●	●		●	●	●	●	***10***
No of casualties	●	●	●	●	●	●	●	●	●	●	●	●	●	***13***
OTHER ACCIDENT RELATED ABSOLUTE NUMBERS														
No of vehicles involved	●						●			●	●	●	●	***6***
No of drivers involved	●				●		●	●		●	●	●	●	***8***
No of road users involved	●							●		●		●		***4***
No of alcotests					●		●	●						***3***
No of infringements		●	●									●		***3***
ABSOLUTE NUMBERS FROM OTHER DATA BASES														
Population	●	●		●	●		●		●			●		***7***
All deaths							●							***1***
Vehicles	●	●	●	●	●		●	●	●			●		***9***
Vehicle-kilometers	●	●	●				●		●					***5***
Road network length	●		●	●	●		●		●					***6***
Driving licences (drivers)		●	●						●					***3***
Fuel use		●												***1***
Passenger-kms		●												***1***
ACCIDENT RATES														
Accidents per vehicle-kilometers	●						●		●					***3***
Fatal accidents per vehicle-kilometers									●					***1***
Killed per vehicle-kilometers	●			●			●		●					***4***
Injured per vehicle-kilometers	●													***1***
Accidents per population									●					***1***
Killed per population	●	●					●		●	●	●	●		***7***
Injured per population										●	●			***2***
Casualties (killed + injured) per population	●	●					●	●	●	●	●			***7***
Accidents per vehicle	●						●	●	●		●	●		***6***
Fatal accidents per vehicle											●			***1***
Non-fatal accidents per vehicle											●			***1***
Killed per vehicle	●	●					●	●				●		***5***
Injured per vehicle	●							●						***2***
Casualties (killed + injured) per vehicles	●	●												***2***
Accidents per km of road network	●													***1***
Accidents per day										●				***1***
Killed per deaths	●		●				●				●			***4***
Killed per passenger kilometers		●												***1***
1980 = 100			●					●						***2***
SEVERITY INDICES														
Killed per accidents	●	●	●									●	●	***5***
Injured per accidents	●		●									●		***3***
Casualties per accidents	●									●				***2***
Total number of safety measurement units use	**34**	**20**	**14**	**10**	**16**	**8**	**23**	**17**	**19**	**15**	**17**	**19**	**14**	***50***

** The term "accident" means accident with casualties unless stated otherwise*

Last year and trends comparison

As far as statistic trends are concerned, data concern in most of the cases 1991 and only a few Tables contain data for a series of years. These series of years concern mainly no-dimension Tables (aggregated data) or basic one-dimension Tables (road user type, month, I/O built-up areas, etc.). These series of years refer mainly to basic road safety measurement units such as the number of accidents, killed and injured.The range of year series used in these general reports varies not only from one report to the other but also within the same report. Three general reports show trends of up to six years (NL, L, P), five general reports show trends of up to ten years (GB, NI, IRL, DK, GR), three reports show trends of around twenty years (F, I, B), Spain shows trends of 25 years and Germany shows trends of 30 years. In very few cases longer periods are covered such as 1906-1991 (vehicle type in Germany), or 1926-1991 (numbers only, in Great Britain).

Conclusions and recommendations

Conclusions

The comparison of the twelve national general reports for road accident statistics revealed interesting aspects of the way official road accident analysis is carried out in the EU states. This comparison showed not only which information is considered as interesting for analysis and publication by each state but also the existing potential (which information is available) for such road accident analysis in every state. Thus, a first conclusion is that EU-level road accident analysis is limited by the data collected and the restrictions of the collection system used in each EU state. These data limits and restrictions have been recorded and presented in the previous chapters as useful basic information for every road safety researcher willing to make international comparisons.

A basic conclusion from the comparison of national road accident analyses is that the road accidents data collection - elaboration process is a national matter (or regional in some cases) reflecting sometimes the way road safety is treated in each member state. The new EU-level road safety culture has not yet shown any impact to national road accident analysis systems. The above processes present significant differences among them and therefore convergence perspectives face important difficulties. A basic problem is the lack of uniformity of the data used in each EU Member-State. The differences among the contents and the form of the road accident data collected and elaborated in each Member-State are numerous and consequently the data which are currently common in all twelve states are limited. The basic differences are summarised below.

- The definition of terms used by each Member-State administration varies considerably from one country to the other. This fact applies not only to the road accident terms such as the definition of the killed, slightly/seriously injured persons but also to more general terms such as the definition of the built-up area, of each road type, etc.

- The accident data categories used in each country present important differences and therefore the possibility for common elaboration at EU-level of these data is further limited. For example the description of a certain characteristic of the road environment is classified in many different ways in accident data categories such as: road type, road class,

road layout, road character, road speed limit, intersection type, etc. This problem is much more important for issues less standardised as the type of accident (accident cause, accident circumstance, collision type, obstacle hit, manoeuvre type, etc.).

- The contents of the accident data categories and the classification of these contents present also important differences even for quite standard issues as the road type or the vehicle type. Typical example is the different values used inside the accident data category *weather conditions*: normal, rain (light-heavy), snow, fog, wind (light-strong), storm, dry, wet, ice, and their combinations which do not exclude each other on one hand and describe sometimes the same conditions under different terms on the other hand.

- The road safety measurement units used present also lack of uniformity. All basic safety measurement units (e.g. definition of person injured) can be progressively uniform through the elaboration and use of appropriate conversion coefficients.

- The accuracy of the data collected varies considerably from one Member-State to the other. The degree of underreporting varies from one region to another and therefore EU-level comparisons should take into consideration the different underreporting realities of each region.

Recommendations

The above comparative analysis revealed a number of actions which are considered useful for the appropriate exploitation and EU-level comparison of the national road accident statistics[20]. The realisation of pan-european analysis reports and publications with information on road accidents is considered as a priority objective as it will further show the incompatibilities between the national systems and make more urgent the need for standardisation. The following five points summarise the necessary key actions for the realisation of the pan-european analysis reports as well as for the enhancement of the future road accident analysis in European Union level.

- Common definitions at European Union level for a number of the above mentioned road safety concepts (accident data categories, contents of accident data categories, safety measurement units) are considered necessary. In the short term, correction coefficients could be used while in the long term, an harmonisation at European Union level would be helpful.

- It is necessary that a minimum of common basic information (using common definitions) is collected in all member states of the European Union. Apart from this common basic information, every country can collect whichever information considers useful for its own needs.

- There is need for the adoption of a common basic process for the collection of road accidents information in all member states of the European Union ensuring equivalent level of reporting accuracy and data quality.

- The establishment of links with other additional data in order to allow the formation of accident rates is considered as a necessary action for meaningful road accident analysis at

European Union level. The additional data that could be used in combination with road accident data comprise population, drivers' population, vehicle fleet, road network, vehicle mileage, infringements, alcotest results, basic economy indices, etc.

- Care should be taken that the new culture of pan-european road accident analysis exploits the new technological tools available (powerful computers, software and networks) for fast and accurate processing of large amounts of data. Appropriate use of these technological tools will be beneficial for the technical realisation of many of the above proposals (massive use of correction coefficients, execution of numerous tests of pan-european comparisons and analyses, rapid distribution of the information etc.).

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