IS MY COUNTRY SAFER THAN OTHERS?

A comparison of road safety data between different countries.

Paper presented to the PIARC XIXth World Road Congress, Marrakesh, Morocco, 22-28 September 1991.

R-91-57

S. Harris & F.C.M. Wegman

Leidschendam, 1991

SWOV Institute for Road Safety Research SWOV, the Netherlands

1. INTRODUCTION

Most countries have the need to compare their own state of affairs or achievements with other countries. The countries chosen for the comparison are usually those considered to be in the same 'league' as the comparing country, as far as the subject to be compared is concerned. Highly-developed, industrialized countries and so-called developing countries usually compare themselves with other such countries in the belief that differences will not be great.

Most countries go even further by concentrating on comparisons with similar neighbouring countries in the belief that, being geographically close, these countries will be even less different than such countries further away. Countries compare their populations, economies, health and welfare with each other as well as many other aspects of life. There are generally two aspects falling under the comparison: the present level and the historical development; often leading to the expected or planned future development. Countries are pleased if they appear to be doing better than other countries and disappointed if the reverse is the case. In the latter case questions are asked about one's own 'poor' performance and one looks to those countries performing better in the hope of learning from them. In road safety policy and research the situation is the same.

2. THE PURPOSE OF INTERNATIONAL ROAD SAFETY COMPARISONS

We are torn between two diverging ideas: on the one hand we see similarities with the countries in the same 'league' (a similar motorization and accompanying traffic rules and regulations); on the other hand we can all name differences between our own road traffic and road safety and that of other 'comparable' countries.

To name but a few: geographical differences such as climate and landscape; population differences such as distribution and density; road differences such as the proportion of hardened roads and motorways; vehicle differences such as the popularity of two-wheelers and carts and the size of trucks and cars, and, finally, differences in traffic and safety legislation. These differences and their development have led to differing data collections which have often been designed for the past or present specific needs of that country given the resources at its disposal. Each data collection has developed autonomously, generally without taking into account its compatibility with data collections in other countries.

In spite of this there is quite a lot of similarity between countries' accident report forms and the exposure data collected. The similarities and differences, and the reasons why, should be examined! An international community requires international information, and therefore comparable data.

It is a truism to say that if the road safety (or anything else for that matter) of countries is to be compared that the information used must be comparable. It must, however, be stated and repeated, because if the information is not so, even if its appears to be, then comparisons are pointless: even worse they can be dangerously misleading. This applies just as much to comparisons within a country as between countries.

Why should we want to compare countries' road safety? For the same reason we compare, nationally, one region with an other, one group of roads, vehicle or road users with an other, or this year with last year. By comparison we unearth special characteristics of the object of research where further, deeper research can lead to road safety improvements.
The comparison alone, whether it is international or (intra)national, is

of course only a first step. It is a signal or warning that a particular group (in comparison to other groups) may be a high-risk group requiring greater attention. International comparison is a starting point. It should not be regarded as a solution to road safety problems but as a guide to where one's own country may be falling behind other countries.

3. TOWARDS AN INTERNATIONAL ROAD SAFETY DATA BASE

3.1. General characteristics

Under the auspices of the OECD, the International Road Research Documentation (IRRD) exists as a permanent literature data base with many countries contributing to the input and even more countries have direct access to the output. At the moment, the OECD is setting up, along the same lines, the "International Road Traffic and Accident Database (IRTAD). Each participating OECD country sends its accident, population, vehicle, road-length, and exposure data (annually) to the host of the data base, the Bundesanstalt für Strassenwesen in Germany, giving that country the right of access to the same data of all the other contributing countries.

The choice of accident and exposure variables will not be limited to what all countries can contribute now, but to what is considered necessary for meaningful comparisons. Those countries, because of definition problems, non-collection of data, or not being able to supply certain data, will leave those variables blank in the hope that they, in later years, will be able to complete them. In the course of time the data base will grow as years are added, more countries contribute, and more detailed accident and exposure data concerning a greater proportion of accidents are added.

This data base will evolve into the central point for international road safety data, not only for the OECD, but also for other international bodies needing international statistics such as the ECMT, UN, ECE, WHO, and IRF etc. It would replace or at least reduce many of the separate surveys of countries' road safety data.

3.2. Accident data

The basis will be the accident data as recorded by the police in each country, possibly supplemented by hospital data. The accident data will be confined to fatal accidents, those resulting in hospital admission, and other serious injuries. These are the most serious accidents, causing the most suffering, and their recording is the most complete. So-called "Material Damage Only" accidents will not (yet) be included.

A list of accident and victim variables will have to be agreed upon as being necessary for making comparisons of sufficient depth. Such a list could, and probably will in time, contain the following variables: accident variables, vehicle variables, driver/pedestrian variables, victim variables. Not only will the variables have to be agreed upon, but also the coding of each variable, in order to attain uniformity.

3.3. Exposure data

The "exposure data" (to traffic dangers) to be included in the data base will depend on which accident data is included. Its purpose within such a database is not so much to be able to follow developments of mobility (although this is useful, also for calculating future trends) but for relating to accident data.

For vehicle/pedestrian kilometrage the most relevant method of data collection is by means of automatic traffic counts which can distinguish between the various types of vehicles (see accident data - vehicle variables) and also count pedestrians. A representative sample of all types of roads both inside and outside the built-up area is required.
If occupant kilometrage is required, or characteristics of drivers, passengers, and victims; or both; then a continuous National Travel Survey using Trip Diaries from a representative sample of the population is the most suitable method. The survey method can also collect data on travel times, vehicle ownership, and driving experience (of all types of vehicles) as well as population data. The preference for traffic counts, a National Travel Survey, or a combination of the two should be considered.

The exposure data base, depending on the choice of accident data, could contain the following variables: geographical variables, population variables, road variables, vehicle variables, kilometrage variables. As in the case of the accident data, the coding of each variable will have to be internationally uniform, and identical to the coding of the accident data variables.

3.4. Linkage of accident data to other data

Most countries nowadays have several (often computerized) databases, which although set up for other purposes, would be useful for road safety policy

and research and therefore international comparisons if they would be linked to accident data. The oldest traffic database of all, usually older than the accident data, is the vehicle registration which sometimes contains data on vehicle characteristics. Then there are databases on driver licence owners containing some personal characteristics; road networks containing road characteristics; hospital data containing injuries of road accident victims; and insurance company data on injuries and material damage and their costs. This we call a "Integrated Road Safety Registration System".

Linkage of these databases to the accident database requires a high degree of representativeness of the police accident data - which will present a problem for data on hospitalized road accident victims - and "common key variables" between the accident data base and the other data bases. The usefulness of such linkages in relation to the costs and effort required to attain then should be considered.

4. THE COMPARISON OF THE ROAD SAFETY OF A NUMBER OF COUNTRIES

4.1. Introduction

When comparing road safety in one country with another different indicators can be used. The choice depends on what one is trying to learn from other countries. At the most aggregated level one can compare indicators for traffic safety and for personal safety.

In Table 1 and 3 these two indicators or ratio's are presented. Traffic safety is a measure how safely the road transport function is performed and is commonly measured in terms of deaths per 10.000 registered motor vehicles or per 100 million vehicle kilometers travelled (see e.g. Trinca et al., 1988).

The degree to which traffic accidents affect the safety of the population can be considered as personal safety, indicated by the death rate per 100.000 population (mortality). This indicator is listed for different countries in Table 1 and 3 as well.

The relationship can be expressed as:
Personal safety = Traffic safety x Motorisation

For both lists of countries, the basis will be the (annual) number of Road Deaths. This is because road deaths are registered, in general, much better i.e. completer than the number of those wounded. The validity of the "weighed" data for Road Lengths, Numbers of Vehicles, and the Kilometrage ("mileage" in English-speaking countries) travelled by vehicles is much more dubious, and different from one country to another. This even applies, to a lesser extent, to the Population data.

4.2. Developing and developed countries

The data for this list (Table 1) has been kindly made available by the "Overseas Unit" of the (British) Transport and Road Research Laboratory (TRRL) in England. OECD plans to set up a Road Safety database for Developing Countries - a sort of simplified IRTAD.

The large range in the level of industrial development is clearly shown by the enormous difference between the "top ten" and the "bottom ten" as far as the number of "vehicles per 1,000 population" is concerned. The difference is about 50 to 1. Even within the top- and bottom tens there is a great difference.

4.3. OECD-International Road Traffic and Accident Database (IRTAD)

The IRTAD was established in 1984 by the Bundesanstalt für Strassenwesen (BASt) in W.Germany; primarily for their own use i.e. for comparing the road safety of W.Germany with other, comparable countries. This idea was adopted by the OECD Road Research Programme in 1987 and in 1989 to the installation of the system in its final form. As the name suggests, it is not just a road accident database. This can be seen in the "User Guide", which has already been produced by the BASt.
The contents are: Country, Year, Area, Population (by age-group), Network length of public roads (by type), Number of motor vehicles (by type) Kilometrage of motor vehicles (by type and road-type), Modal split (by cars, public transportation, railway, airplane), Injury accidents (by road-type), Killed and injured persons, Killed persons (by traffic participation, age-group, road-type) and Hospitalised victims (by traffic participation, age-group, road-type).

Table 2 contains "basic data" for each country. Furthermore, these variables can be combined, or "weighed", to calculate and compare (with other countries) various "rates" or "ratio's".

There is a great amount of variation between individual countries. The number of annual road deaths varied in 1989 by a factor 31 and the number of injury accidents (including fatal accidents) varies by a factor 113. This last difference, between 31 and 113, also shows that there is a wide range in the number recorded/registered accidents per death. This can either mean that the real number per death varies widely, or that the accident recording (fatal + non-fatal) and defintion of what constitutes "injury" varies greatly in completeness from one country to another! Looking at the individual countries, we can see that the range in accidents per death lies between 10 and 46 - a factor of c.5.

To increase the clarity, the absolute number of road deaths (for all three years) is added. Apart from the "absolute" numbers of road deaths, these numbers are related to the population, the numbers of motor vehicles, and the numbers of kilometres travelled by motor vehicles in each country.

As we saw in Table 2, the number of road deaths in 1989 varied a factor 31. In 1988 this was 29, and in 1987 this was 26. The range is, therefore, not completely stable in the course of time: it increased by 20% within just three years. In this case it was mainly due to an increase in the country - excluding the above-mentioned extremes - with the largest number (Japan) and stabilization in the country with the lowest number (Ireland).

To summarize: This paper illustrates clearly that the answer to the question: "Which is the safest country in the world?" cannot be given easily. It depends on which indicator is used and which indicator should be used best depends on what to compare. The presented results indicate remarkable differences between countries even when the motorisation is more or less the same. But: international comparison on an aggregated level can be considered as a signal and perhaps as a warning. International comparison is only a starting point. The next step is to explain why countries differ. This understanding will appear to be an important first step towards safer countries.

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Table 1. Personal Safety: Traffic Safety and Motorisation.

COUNTRY	PERSONAL SAFETY	TRAFFIC SAFETY	MOTORISATION	SOURCE AND DATA YEAR*
Listed in decending order of motorisation	Death per 100,000 population	Deaths per 10,000 Vehicles	Vehicles per 1,000 population	
	A HIGH NUMBER MEANS A LOW LEVEL OF SAFETY			
1. USA	19.1	2.6	747	1988
2. Canada	16.7	2.8	599	1987
3. New Zealand	24.0	4.0	595	1987\8
4. Australia	18.5	3.4	549	1985
5. F. Germany	13.2	2.6	510	1988\89
6. Norway	9.0	2.0	457	1989
7. Sweden	9.0	2.0	456	1989
8. Finland	14.8	3.4	432	1989
9. Netherlands	9.8	2.5	398	1989
10. U.K.	9.1	2.3	396	1989
11. Denmark	13.5	3.7	371	1989
12. Spain	18.4	5.2	351	1989
13. Greece	18.8	9.7	194	1989
14. Hungary	16.1	8.5	188	1988
15. S. Africa	36.0	23.1	156	1989
16. Singapore	11.4	8.3	138	1984\5**
17. Malaysia	22.6	16.7	135	1989
18. Costa Rica	7.4	9.2	81	1989
19. Jordan	13.7	17.7	77	1987
20. Chile	9.6	12.8	75	1987
21. R. Korea	27.5	56.8	48	1989
22. Colombia	2.9	6.6	43	1986
23. Turkey	12.9	32.0	40	1988
24. Thailand	3.6	9.2	39	1989
25. Egypt	11.4	59.7	19	1982**
26. Phillip-ines	1.6	9.5	17	1988
27. Kenya	7.6	68.0	11	1984
28. Papua New Guinea	7.2	95.0	8	1986\8****
29. Pakistan	4.9	122.2	4	1988
30. India	5.1	140.0	4	1986\7***
31. Ethiopia	2.2	184.0	1	1989

* All data are from the IRF book, 1990 edition, except:
** Data as given in original 'Table 1.
*** Population figures are from 'The World Bank Atlas 1989, deaths from 'Towards Road Safety in India' Indian Highways December 1988.
**** Population figures are from "The World Bank Atlas 1989, Deaths from @Road Accidents in PNG, Hills B. TRRL.

TRRL Jan 1991.

Table 2. The Basic Data of the IRTAD countries: 1989.

COUNTRY	AREA OF STATE sq.kms	rank	POPULATION millions	rank	NETWORK PUBLIC ROADS kilometres	rank	MOTOR VEHICLES 100,000	rank	MOTOR-VEHICLE kilometrage millions	rank	DEATH/ KILLED	rank	INJURY ACCIDENTS (incl.DEATH)	rank
Total	20858,975		732,233		10364,637		416,198		5121743		117602		1992364	
W. Germany	248,706	10	61,715	3	496,652	5	35,707	3	438500	3	7995	5	343604	2
Italy	301,260	8	57,505	4	*		*		*		6923	6	160828	5
Great Britain	229,883	11	55,653	6	356,517	6	23,302	5	402598	4	5373	7	260759	3
France	551,208	3	55,996	5	800,000	3	28,830	4	*		11476	3	170590	4
Spain	504,750	4	38,852	7	*		15,754	6	106140	5	9344	4	109804	6
Netherlands	41,574	17	14,848	9	101,986	9	6,547	8	95905	6	1456	13	44061	9
Portugal	92,631	13	9,809	11	*		3,583	13	*		3087	8	43499	10
Belgium	30,513	19	9,928	10	137,807	7	4,440	9	*		1993	10	62982	7
Greece	131,944	12	*		*		2,573	14	*		1954	11	28299	12
Sweden	449,750	5	8,459	12	*		4,332	10	*		904	14	17969	13
Austria	83,850	14	7,602	13	107,694	8	4,059	12	53353	8	1570	12	46565	8
Switserland	41,293	18	6,620	14	*		4,195	11	54500	7	897	15	24606	11
Denmark	43,069	16	5,130	15	70,774	12	2,169	17	35900	10	670	18	9922	15
Finland	338,107	7	4,954	16	*		2,204	16	38710	9	734	17	9682	16
Ireland	70,823	15	3,515	17	92,257	11	1,020	18	23684	11	460	19	5831	17
Luxembourg	2,586	20	*		*		*		*		*		*	
USA	9363,353	1	248,239	1	6202,402	1	191,694	1	3371264	1	45555	1	*	
Japan	377,719	6	123,255	2	1105,574	2	73,625	2	501189	2	14412	2	661363	1
Australia	7686,844	2	16,797	8	800,000	3	9,902	7	*		2799	9	*	
New Zealand	269,112	9	3,356	18	92,974	10	2,262	15	*		762	16	12004	14
Average	1042,949		40,680		863,720		23,122		465613		6190		117198	

* = not available

Table 3. Death Rates and other Death Ratio's of the IRTAD countries.

COUNTRY	DEATHS				DEATHS PER 100.000 POPULATION				DEATHS PER 10.000 MOTORVEHICLES				DEATHS PER 100 MILLION MOTOR VEHICLE KILOMETRES			
	1987	1988	1989	rank '89	1987	1988	1989	rank '89	1987	1988	1989	rank '89	1987	1988	1989	rank '89
Total	114195	118286	118364													
W. Germany	7967	8213	7995	5	13,03	13,41	12,95	13	2351	2359	2239	14	19,59	19,22	18,23	7
Italy	7327	7494	6923	6	12,79	13,06	12,04	14	2241	2223	*		*	*	*	
Great Britain	5125	5052	5373	7	9,26	9,10	9,65	18	2362	2281	2306	13	14,62	13,45	13,35	11
France	10742	11497	11476	3	19,35	20,62	20,49	5	3806	4025	3981	6	28,05	*	*	
Spain	7815	8252	9344	4	19,69	21,29	24,05	2	5426	5554	5931	3	81,94	83,22	88,04	1
Netherlands	1485	1366	1456	13	10,16	9,28	9,81	17	2368	2121	2224	15	16,83	14,60	15,18	9
Portugal	2985	3294	3087	8	30,63	33,69	31,48	1	9943	9991	8616	1	*	*	*	
Belgium	1922	1967	1993	10	19,48	19,92	20,07	6	4622	4583	4489	5	*	*	*	
Greece	1727	1738	1954	11	17,30	17,37	*		7555	7215	7594	2	*	*	*	
Sweden	787	813	904	14	9,39	9,66	10,69	16	1930	1937	2087	17	*	*	*	
Austria	1469	1620	1570	12	19,41	21,35	20,66	4	3792	4105	3868	7	29,72	32,48	29,43	2
Switserland	923	917	897	15	14,16	13,96	13,55	10	2305	2287	2138	16	18,50	17,64	16,46	8
Denmark	698	713	670	18	13,62	13,90	13,06	12	3233	3253	3089	10	20,71	20,37	18,66	6
Finland	581	653	734	17	11,79	13,22	14,82	9	2885	3107	3330	9	16,96	17,89	18,96	5
Ireland	462	463	460	19	13,04	13,09	13,09	11	4812	4720	4510	4	21,60	21,19	19,42	4
Luxembourg	68	84	*		18,38	22,58	*		3366	3962	*		*	*	*	
USA	46390	47087	45555	1	19,06	19,16	18,35	7	2523	2492	2376	12	15,09	14,53	13,51	10
Japan	12151	13447	14412	2	9,94	10,95	11,69	15	1752	1887	1957	18	26,54	28,12	28,76	3
Australia	2772	2888	2799	9	10,07	17,47	16,66	8	2940	2997	2827	11	*	18,96	*	
New Zealand	799	728	762	16	24,09	21.74	22,71	3	3830	3416	3369	8	*	*	*	
Average	5710	5914	6230		15,73	15,65	16,43		3702	3726	3718		25,85	25,14	25,45	

* = not available