UNDER-REPORTING OF ROAD TRAFFIC CRASH DATA IN GHANA

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Abstract

Although completeness, in terms of reporting of road traffic crashes, is a crucial and desirable attribute of any crash database, nearly all such databases worldwide are subject to some shortfalls. It is imperative therefore to have reliable estimates of the shortfalls so that more realistic targets may be set for crash/casualty reduction programmes and for a better appreciation of the true socio-economic significance of road traffic crashes. This study undertook to establish realistic estimates of the overall shortfall (under-reporting) in the official crash statistics in Ghana over an eight year period (1997-2004). Surveys were conducted at hospitals and among drivers to generate relevant alternative data which were then matched against records in police crash data files and the official database. Overall shortfalls came from two sources, namely, “non-reporting” and “under-recording”. The results show that the level of non-reporting varied significantly with the severity of the crash from about 57% for property damage crashes through 8% for serious injury crashes to 0% for fatal crashes. Crashes involving cyclists and motorcyclists were also substantially non-reported. Under-recording on the other declined significantly over the period from an average of 37% in 1997-1998 to 27% in 2003-2004. It is clear from the results that official statistics of road traffic crashes in Ghana are subject to significant shortfalls that need to be accounted for. Based on these findings, correction factors have been suggested for use in adjusting the official data.

Update and improvement of the traffic accident data collection procedures in Spain: The METRAS method of sequencing accident events

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Summary

Current road safety research is characterized by broadly using traffic accident data systematically collected by different bodies with the main objective of producing official statistics and guiding road safety policies and interventions. However, the use of these records for research purposes shows serious limitations, of which prime cause lies in the used instruments and procedures. In this context, a redesigning and modernisation of the traffic accident collection systems - and more specifically of the traffic accident statistical form - is currently being carried out in Spain by the competent public administration. With that, it is pretended to reach a substantial improvement of the data quality for its subsequent study from a perspective of statistical research of the accident rate and road safety.

This work presents and justifies the METRAS method (**Me**asuring and Recording **Tr**affic **A**ccident **S**equence) as one of the key elements in this collection instrument. This method is an innovative system of collecting and coding the sequence of events that happened during the course of a traffic accident in an ordinate and detailed way, system that links each event with its corresponding traffic unit according to its order of appearance, and in a relatively simple, practical and accessible way in the context of the police statistical accident (with victims) form. Up until now, this information only appeared in the police reports and due to its characteristics, was only affordable for in-depth accident studies that fall into high costs and few accessible resources.

The METRAS method allows an improvement of the quality and reliability of the °∞accident typology°± information collected in the current statistical accident form. The carried out experiences highlight how it is easy to understand and to fill in and its compatibility with the European °∞CARE°± database as well as with the classic accident typology.

The possibilities of statistical analysis that this method offers are numerous, given that it allows studying the relationship of each event with the elements prior to the accident, the involved units and the most serious consequences. From another perspective, this method, at the police level, could be the basis for the report automation and the pictograms that positions the accident.

Key-words : Accident, Statistic, Road Safety, Report, Sequencing.

1. Introduction

The information relating to traffic accidents and victims represents an essential tool to control and detect safety problems in transport, to identify priority action areas and to evaluate the effectiveness of the measures used to improve safety. In this context, the study, the evaluation, the improvement and the optimization of the accident data collection systems represent a priority objective in the national and international road safety programs and policies (ETSC, 2000; COM, 2000; EC, 2001; DGT, 2006).

From an applied perspective, important actions in this direction are the ones that have been carried out for several years from the OECD's transport research programme (OECD-RTR, Organisation for Economic Cooperation and Development - Road Transport and Intermodal Linkages Research Programme), actions directed to strengthen traffic accident data collection systems, at the international level, as well as at the national, regional and local one. From these, it is important to point out because of its importance and continuous nature, the establishment and continuous update of an accident database that collects the main traffic accident aggregated data of the Member States: IRTAD (International Road Traffic Accident Database). Around IRTAD, a series of work and study expert groups have been set up, with one of the main objectives being the definition of evaluation criterions and strategies to improve the quality of the traffic accident data and, therefore, their obtaining and management procedures. The European Commission in the Road Safety Action Programme (RSAP) (2003) identifies that there exist important structural deficits in the traffic accident records at the EU level, and points out several action lines of improvement. In this context, the SafetyNet project, launched in the VI Framework Programme, in May 2004, represented a significant action of which wider objective has been to define the crucial elements necessary to build the European Road Safety Observatory (ERSO), emphasizing on the achievement of substantial improvements in the current accident information systems and favouring the establishment of information standards that allow a greater homogenisation of the future information on accident rate at the macro level in the EU. In the VII Framework Programme, the "DaCoTA" project (Road safety Data Collection, Transfer and Analysis) will raise as one of its objectives to go on with the efforts carried out in previous projects to collect, consolidate and standardize road safety data and information, through the exploitation of all the available sources.

Among the main data sources that give information on traffic accident, the police records contain in a organized and homogeneous way the greater quantity of information about the accident by using standardized procedures when planning, prioritizing and evaluating the different interventions or actions aimed at improving safety from a macro perspective, as well as from a micro perspective, like for example the specific actions on infrastructures, or any kind of actions at different levels. In spite of the great importance of these data, in connection with the traffic accident data collection procedure, it is important to mention that it represents a whole series of difficulties that affect the information self-importance and quality (Chisvert, 2000; Chisvert, Lopez de Cozar, Ballestar, 2007; Peden, Scur, Sleet, Mohan, Hyder, Jarawan, Mathers , (OMS) 2004), and that are directly linked with the complexity of the information that is required in the accident form, the inherent difficulties in the data collection task in an accident situation and the inadequacy of the current accident form, as well as of the corresponding data collection, codification and processing procedures. All this entails the need to develop new instruments that, on the one hand, guarantee minimum quality information for its use in the field of macro statistical studies and, on the other hand, optimize the current procedures of field collection, storage and management of the accident information.

In this line, in Spain, the METRAS research group (Measurement, Evaluation, Analysis and Data Processing of Traffic Accidents and Road Safety) took part in the development of proposal to improve the current traffic accident collection systems, that has already been successfully introduced in Catalonia and that is currently being redesigned at the state level in order to bring it into operation all over Spain shortly (Tormo, Lopez de Cozar, Ballestar, Martinez, Chisvert, Andreu, Sanmartin, 2007).

This traffic accident collection system redesigning and modernization, that includes the traffic accident police form redesigning, pursues the objective to achieve a substantial improvement in the contents and the categorization of the information related to accident rate and to enable carrying out studies with better quality, prioritizing the adjustment of the information to the needs of each involved user and reducing the time, the effort and the resources devoted to its collection. The development of this system counts on the participation of the users that develop this collection task and with the empiric evaluation of the instrument applicability.

2. Objectives and basis of the METRAS method

This work presents and justifies one of the fundamental concepts in which the work of a doctoral thesis is focussed on (Tormo, in process): the development of a method to improve, from the perspective of the traffic accident police statistical questionnaire (accident form), the procedure of collecting the information linked with the accident typology. This work has been presented and evaluated in the framework of the SAU project (Urban Accident Analysis Systems), as an example and outstanding development of best practices in the European field (Tormo, 2007).

The METRAS method offers a new information collection procedure about the accident typology that integrates a structured, detailed and standardized sequential description of the accident with the objective of overcoming some of the limitations of the traditional classification of the accident typology in the accident forms.

This method starts from the basis that an accident is a complex process with a dynamic nature, being hard to categorize in an easy way without loosing its sequential essence. From this point of view, the traffic accident is considered as being the final result of a process in which several events are triggered off from some previous actions, offences or errors made by the involved persons in it, from some environmental conditions, from the vehicle, the road itself or from the interaction between all the different elements present before and during the course of the accident. Each event is considered as a relevant and identifiable fact or event in a system of pre-established categories, which make up an accident. An event implies the existence of at lest one moving vehicle, which carries out an action that distorts the right trajectory of the vehicle, having negative consequences and creating instability in the traffic flow: running off the road, collisions, running over, overturning, vehicles on fire... The sequence of these events is what will be called traffic accident.

This method allows collecting each one of the events and assigning them to the involved traffic units, as well as knowing its relationship with the elements present before the development of the accident aiming at helping to explore both possible preventive measures and the ones directed towards an appropriate intervention on the road, the vehicle and the person. The concrete objective is to achieve a greater level of accuracy in the collected information, to reflect the development of the dynamic process of the accident, by defining the key aspects of its progress and all this in an easy way for the police in charge of the collection, far from the complex analysis that require the in-depth or accident reconstruction studies.

In the current accident forms, the accident type is a field in which a single event has to be chosen from a list of simple categories (running off, collision, running over...), event that has to inform or sum up as best as possible what happens in the accident. The completion norm announces to point out “the category that better describes the accident”. This entails, for the person in charge of filling in the form, some important selection difficulties, especially taking into account the dynamic nature of the accidents and their usual complexity. So, there is a great disparity of criterions that are usually applied when determining what prevails over in an accident, with the huge implications this entails on the reliability. Moreover, the criterion may vary according to the moment, the situation, the circumstances, the interests of the investigation and even the characteristics of the accident. Likewise, there are also disagreements depending on the observer that fills in the information. This makes an appropriate homogeneity in the analysed information difficult and, consequently, an important loss of accuracy as well as reliability.

The accident typologies present in most of the national collection systems do not offer a detailed picture of what happened during the course of the accident and do not allow identifying nor distinguishing the event that starts the accident from the one that causes the main injuries to the victims and from other events important as well that happened during the accident. It is normally not possible to make an analysis that links the backgrounds or the offences with certain types of accident, nor concrete subsequent events with the suffered injuries; making the accurate study of consistent accident patterns extremely difficult.

Because of these limitations, the researches based on the complex interrelations between the different elements and events that characterize each accident and its progress are usually dealt with from the perspective of the in-depth studies or studies based on accident reconstructions, which have more information. These researches start from sampled studies and represent a significant cost in human and economic resources (National Center for Statistics (NCSA) and Analysis National Highway Traffic Safety Administration U.S. Department of Transportation NHTSA, 1999); (Institut National de Recherche sur les transports et leur securite, INRETS Brenac, 1997); Brenac et Fleury (1999); Amans, Hermitte, Delamarre-Damier, Fuerxer, Martin and Moutreil (2005); Brace (2005); Reed and Morris (2008).

From another point of view, other models have been proposed to deal with the accidents that have a great impact in the field of work accidents and safety management. From this environment, different models that emphasize differentiated aspects have been posed: chain models of multiple events, epidemiological models, energy interchange models, behavioural models, system models, human factors... These models are mainly based on interviews made to the involved persons and analyse the accident as a process or a series of stages and not as a unique event. These models pose the accident stages from the presence of a danger, the risk detection, up to each answer of the subject, going through stages of recognition of the problem, analysis, development of solutions... being different according to the model that is used. An important characteristic is that the collected information is used to carry out particular studies of every accident, not for studies based on statistical analysis.

Nevertheless, in the occupational sphere, there is an approach that is similar to the one that pursues this work: The MAIM (Merseyside Accident Information Model), a powerful information recovery system. This model poses two levels of study: the accident sequencing and the underlying main factors. It is fundamentally focused on the importance of making the difference between the prior (immediate) cause of the accident and the cause of the injury and in the fact that an accident is not always made up of one single event; there might have many. In this model, several possible uses of the accident data were defined: to measure the results of the actions adopted in the safety field, to identify the causes, to identify the errors, to check the efficiency of the safety measures, to make the practical knowledge easier. Likewise, the information in the model was compared with the verbal descriptions and it was proved that no information was lost when transcribing the written descriptions to the model (Shannon and Davies, 2001; Davies and Manning (1994); Kjellen and Larsson, 1981; Kjellen and Hovden (1993)). So, even though the perspective, in the case of the traffic accident study, is different, it is true that the basis and the justification are the same.

3. Description of the METRAS method

The METRAS method proposes a generic structured protocol for the collection of the information relating to the sequence of events that happened in space and in time during the course of an accident, in the framework of the police accident (with victims) form aiming at being able to use this information in investigations based on statistical methodologies (Tormo, Sanmartin, Chisvert, Ballestar, Lopez de Cozar, Martinez, Andreu, 2007[1]).

The METRAS method raises two sections or stages:

1. The stage prior to the accident sequencing that includes data about the place, every involved unit (vehicles, pedestrians), actions prior to the accidents carried out by the involved drivers or pedestrians, the offences of each driver or pedestrian, failures of every vehicle, psychophysical conditions of the drivers or pedestrians (alcohol/drugs/disease), variables that are present in a greater or lower extent in the current police accident forms.
2. The conflict stage, that is the innovative part, in which the accident happens and that is composed by the succession of several events that make the accident, the order of appearance of these events, the order of involvement and of appearance of the vehicles that are involved in each event, including in addition to that, the indication of the most serious event.

[1] The METRAS method has received the MetraSeis Award to the most innovative contribution in the field of Survey methodology, in the framework of the IV International Congress of Survey Methodology, in the University of Navarra.

Hereafter a diagram that explains the METRAS method:

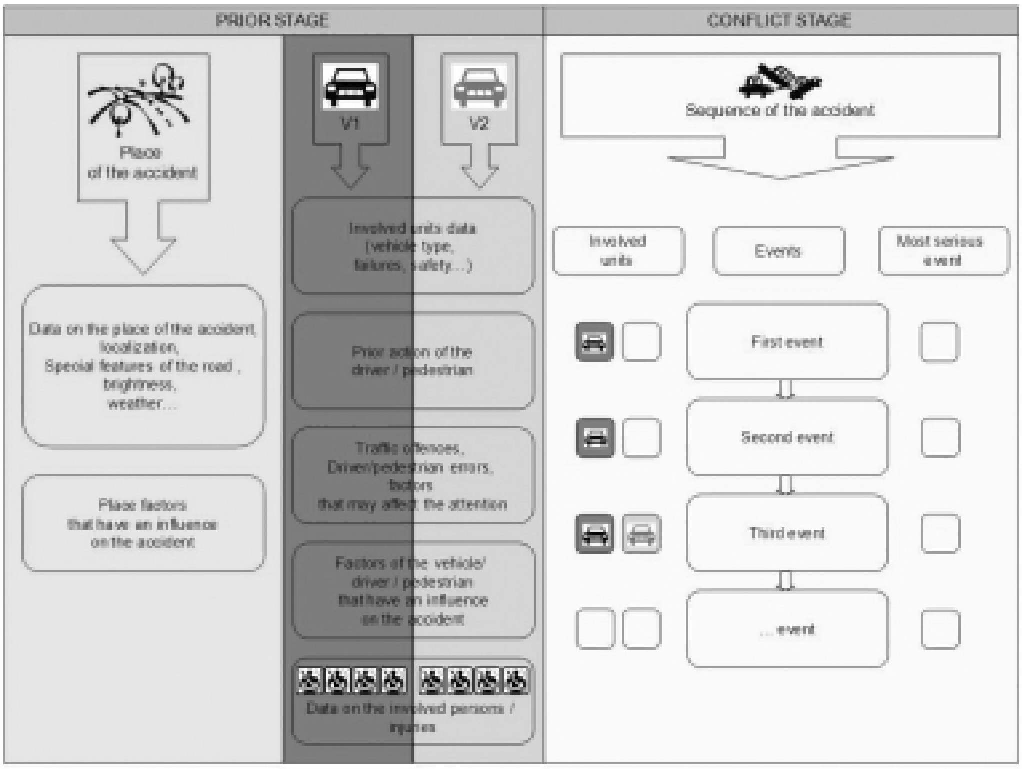


Fig 1 : METRAS method (Measuring and Recording Traffic Accident Sequence).

The procedure to fill in the METRAS method in the conflict stage is the following one:

Firstly, in the “involved units” part, the unit(s) involved in the first event has/have to be selected in the first and in the second cell.

Then, the type of event has to be selected from a wide list of categories of non-complex accident types, selecting the one that better reflects what happened. If the event has caused the most serious consequences on the persons involved in the accident, it has to be pointed out as the most serious event.

The next step is to go to the next row and to fill in all the information regarding the second event that happened and so on until the last event, being faithful with the order of appearance of the facts.

If there is only one vehicle involved in an event, it has to appear in the first cell of the involved units. If two vehicles are involved in the same event, the active vehicle (that is to say the one that started the action no matter if it the one responsible for the accident) is marked in the first cell. Each involved vehicle will have a code, each vehicle or unit that takes part in the accident will have his own code.

Comparative example between the completion methodology of the classic accident typology with the one that suggests the METRAS method.

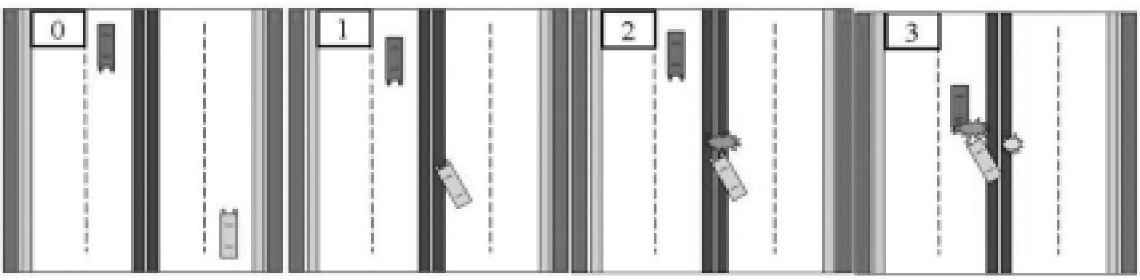
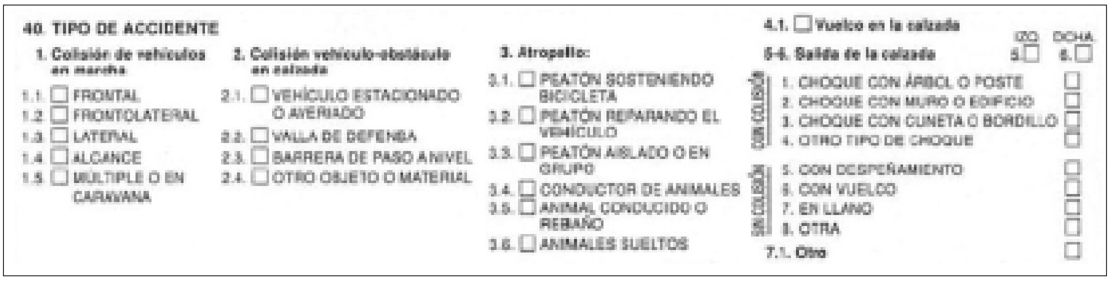


Fig 2 : Illustration of an example of traffic accident

In the Spanish police accident form with victims, the accident instructor has to identify the accident type that better specifies what happened by selecting one single category.



40. TIPO DE ACCIDENTE

1. Colisión de vehículos en marcha
1.1. ☐ FRONTAL
1.2. ☐ FRONTOLATERAL
1.3. ☐ LATERAL
1.4. ☐ ALCANCE
1.5. ☐ MÚLTIPLE O EN CARAVANA

2. Colisión vehículo-obstáculo en calzada
2.1. ☐ VEHÍCULO ESTACIONADO O AVERIADO
2.2. ☐ VALLA DE DEFENSA
2.3. ☐ BARRERA DE PASO A NIVEL
2.4. ☐ OTRO OBJETO O MATERIAL

3. Atropello:
3.1. ☐ PEATÓN SOSTENIENDO BICICLETA
3.2. ☐ PEATÓN REPARANDO EL VEHÍCULO
3.3. ☐ PEATÓN AISLADO O EN GRUPO
3.4. ☐ CONDUCTOR DE ANIMALES
3.5. ☐ ANIMAL CONDUCIDO O REBAÑO
3.6. ☐ ANIMALES SUELTOS

4.1. ☐ Vuelco en la calzada

5-6. Salida de la calzada — IZQ. 5. ☐ DCHA. 6. ☐

CON COLISIÓN
1. CHOQUE CON ÁRBOL O POSTE ☐
2. CHOQUE CON MURO O EDIFICIO ☐
3. CHOQUE CON CUNETA O BORDILLO ☐
4. OTRO TIPO DE CHOQUE ☐

SIN COLISIÓN
5. CON DESPEÑAMIENTO ☐
6. CON VUELCO ☐
7. EN LLANO ☐
8. OTRA ☐

7.1. Otro ☐

Fig 3 : “Accident type” classification of the DGT accident form with victims. (DGT, 1993).

However, it very usual to identify several selection criterions of the accident type according to which the category to be chosen could vary:

- The criterion of the first event of the accident: the category that shows the first event that happened is chosen.
- The criterion of seriousness of the injuries: the most serious event is taken down.
- The combinatorial criterion of elements: the alternative that considers more aspects of the accident is selected.
- The infrastructure criterion: the alternative that mainly damages the infrastructure is marked.
- Other criterions: sometimes, elements prior to the accident are chosen.

So, the accident of the example could be classified in several ways depending on the used criterion: 5.3 Running off the road by the left hitting the ditch or the kerb / 5.4 Running off the road by the left with another type of collision / Collision against defence mobile fence / 1.1 Frontal collision. As it may be observed in the example, furthermore the accident type is related with the involved unit.

With the METRAS method, the accident information will be codified exactly as it appears in the accident sequence in the following diagram:

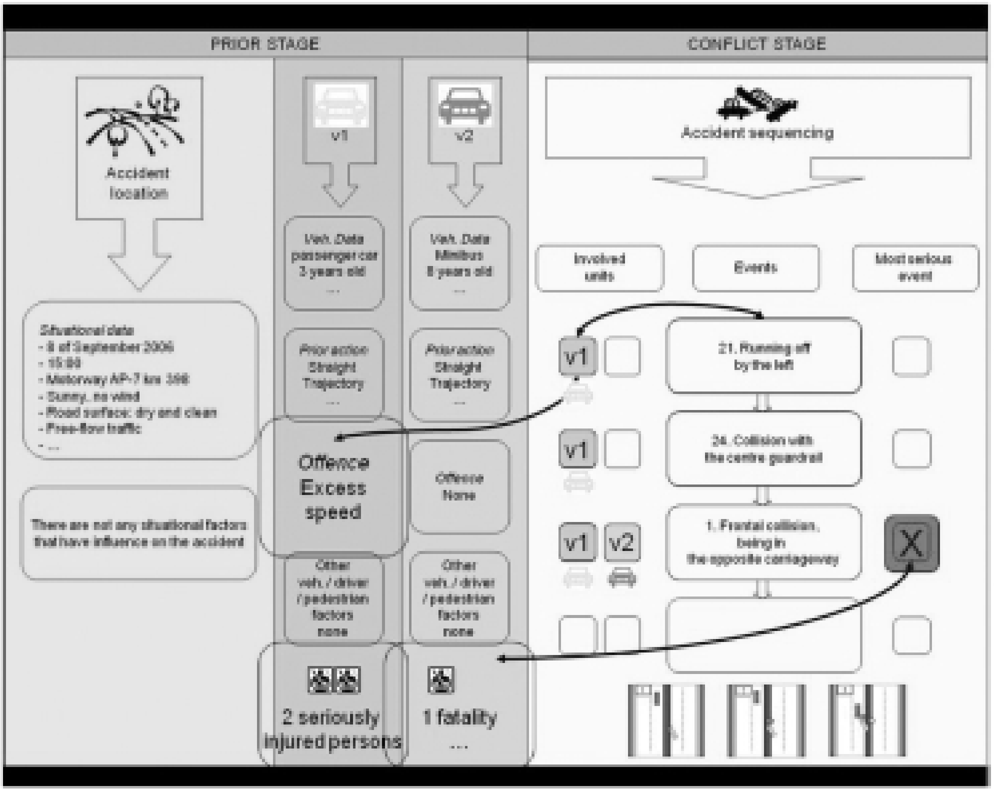


Fig 4 : An example of accident filled in with the METRAS method.

It may be observed as well how the METRAS method offers the possibility to link each unit with the corresponding event and with the most serious event, taking into account its order of appearance in the accident.

Oral Presentations

4. Empirical evaluation

Before its systematic application, the METRAS method has his first evaluation in the framework of the SIDAT project (Cardona, Cermeron, Chisvert, Dalmases, Fosch, Gasulla, Haro, Marselles, Martinez, Montoro, Roche, Sanmartin, Tormo, 2006), of which objective has been the redesigning of the accident collection system common to all the different police bodies of the autonomous region of Catalonia in Spain. An empirical evaluation was developed aiming at assessing the reliability and the viability: understanding of the process, homogeneity of its application, assessment of the errors, adequacy of the training needs, suggestions of improvement... From an analysis of the serious and fatal accident rate in Catalonia, a sample of reports (police reports) representative of this accident rate in urban and rural roads, by provinces and by involved units was selected aiming at getting a series of accidents with varied complexity and characteristics in addition to getting a representative sample. The task the policemen carried out entailed the application of the METRAS method from an accident form. For that, they were only given some basic written instructions about how the method worked and a paper template that is shown hereafter, without any other kind of specific training.

Accident sequence (to fill in for serious or fatal accidents)

The vehicles will be identified as V1, V2, V3, V...
The pedestrians will be identified as P1, P2, P3, P...

METRAS METHOD OF ACCIDENT SEQUENCING			
INVOLVED UNITS		EVENTS	MOST SERIOUS EVENT

TYPES OF EVENTS:

COLLISION BETWEEN VEHICLES
1. Frontal collision
2. Front-lateral collision affecting the right side
3. Front-lateral collision affecting the left side
4. Lateral collision
5. Positive scratch
6. Negative scratch
7. Rear collision, same direction or in platoon
8. Reverse rear collision
9. Rear lateral collision

RUNNING OVER
11. Running over a pedestrian
12. Running over an animal

FALL
13. Fall on the road
14. Fall of a passenger in a bus

COLLISION AGAINST OBSTACLES IN THE CARRIAGEWAY
15. Works elements
16. Cones or any other mobile elements of marker post
17. Mobile fence
18. Pieces of stone or vegetation
19. A stopped vehicle
20. A load or elements of other vehicles
21. Vehicles involved in a prior accident

RUNNING OFF THE ROAD
22. Running off the road by the right, no invasion of another road or carriageway
23. Running off the road by the right, invading another road or carriageway
24. Running off the road by the left, no invasion of another road or carriageway
25. Running off the road by the left, invading another road or carriageway
26. Running off a straight carriageway
27. Comeback on the road

COLLISION AGAINST FIXED ELEMENTS OF THE ROAD
28. Roundabout
29. Pedestrian refuge, traffic island
30. Kerb
31. Pylons
32. Traffic sign
33. Hedges, shrubs
34. Tree
35. Streetlight
36. Container
37. Fountain or statue
38. Bus stop
39. Barrera de contención de vehículos
40. Level crossing barrier
41. Crash cushions
42. Small bridges
43. Other elements of the road

COLLISION AGAINST ELEMENTS OUT OF THE ROAD
44. House, wall or building
45. Vegetation out of the road
46. Other elements placed out of the road: litter bins, benches, elements of children's park, advertising...)

OVERTURNING, FIRE, BLOW-OUT, OTHER
47. Spins
48. Roll-overs
49. Fall in a chasm
50. Overturning of the vehicle in its own carriageway
51. Overturning of the vehicle in the opposite carriageway
52. Overturning of the vehicle out of the road
53. Vehicle on fire
54. Other type of event

Fig 5 : Paper template of the METRAS method.

The procedure that was used was the completion of the same form by four different policemen. Each participating policeman filled in a sub-sample of accident with a different complexity (number of events / involved units). Finally, a sample of 73 accident forms was achieved, 55 policemen filled in the data for a final number of 305 accidents (sequence templates).

The second empirical evaluation emerges in the framework of the project carried out by the Traffic General Directorate, in the framework of the new Spanish accident collection system that is currently in the pipeline, more concretely in the redesigning of the traffic accident (with victims) police form (Tormo et al., 2007).

In this case, a working committee made up of the local polices having competencies in traffic accident had to evaluate the new proposed urban contents. In this experience, the METRAS method template was presented as a section of the accident form. This empirical evaluation was developed in two stages. The first one lied in the fact that the policemen in charge of the accident data collection filled in the sample form to be evaluated, from recent accident reports. Each police officer chose seven concrete serious or fatal accidents with the following characteristics: one involved vehicle, two involved vehicles, more than two involved vehicles, running over, accident with a cyclist, in a section, in an intersection. Each policeman was assigned a minimum of two accidents with these characteristics to fill in the new questionnaire. The second stage lied in filling in the form for all the accidents with victims that happened in the real environment during one week.

They had to fill in: for each accident, a document that allowed listing the different fields of information and for each participating policeman, a document of general evaluation in which they had to carry out an evaluation of the instrument contents (fields and categories) in relationship with the characteristics of the urban accident rate and to propose improvements. The METRAS method of accident sequencing was filled in for the serious or fatal accidents (338 forms). In the empirical evaluation, 163 policemen took part. From the collected data, a study of the queries done by the participants was carried out, an quantitative and qualitative analysis of the comments and difficulties expressed in the evaluation document, a study of the form evaluation and a quantitative analysis of the data collected in the accident form (analysis of the missing data, analysis of errors and inconsistencies of the information).

The results obtained in both experiences highlighted a high understanding of the process from the participants and a high percentage of coincidence among the policemen. The empirical evaluation allowed identifying the main doubts and improvement suggestions towards the system.

In the first experience, almost all the participants understood the process given that around 80% correctly answered the first event and the most serious one. The general coincidence among the policemen was of 90%.

As for the second evaluation, the METRAS method was properly filled in for 90% of the forms. It is worth mentioning that 60% of the collected accidents were composed of more than one event, which gives an idea of the percentage of traffic accidents in which the method means a step forward for the information it collects. In 80% of the forms, all the involved units were correctly filled in and in 75% of the forms; all the events were correctly filled in.

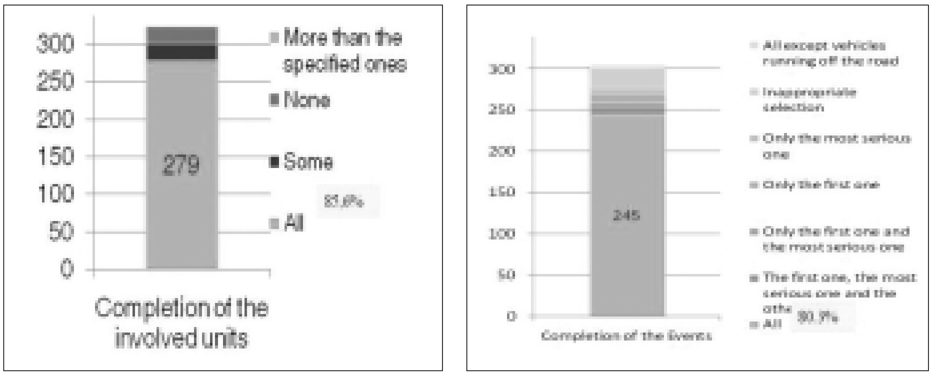


Fig 6 : Results of the accident sequencing in the empirical evaluation in Spain

5. Method compatibility

In order to be able to include this method in the accident form, it has been necessary to check the compatibility with the information collection methods regarding the accident type in the already existing official accident forms, like the DGT accident with victims accident form and the CARE database (DG TREN E3, 2003), as well as the CADaS proposal (Yannis, G.; Evgenikos, P.; Chaziris, A.; Broughton, J.; Lawton, B.; Walter, L.; Hoeglinger, S.; Leitner, T.; Angermann, A.; Bos, N.; Hemdorff, S.; Hollo, P.; Tecl, J.; Rackliff, L.; Sanmartin, J.; Pace, J.F., 2008) of which redesigning we took part.

By focussing our attention in the CADaS proposal for being the most advanced one, some limitations to carry out the conversion appeared. In the first place, it was necessary to take into account that one criterion has to be selected to determine the accident type. In the second place, it is necessary to prioritize certain information given that the “type of accident” variable in CADaS gathers very varied information that sometimes is not exclusive: action prior to the accident of the vehicles in some cases, position of the vehicles, intersection, traffic stream of the vehicles in some cases, road through which they drove, curves, route, element against which it collides, collision type. In the third place, the conversion may be difficult when there are several units given that it is a variable linked to the accident the sometimes shows actions of the units, which is not bearable when the action of each unit is different or when there are more than two involved units. In any case, these complications are the same ones as the ones that are transferred to the police when it has to fill in the form, things that do not happen with the METRAS method.

It is possible to see this process through a simple example: In a double carriageway road with double traffic flow, in a signpost curve, a passenger car runs into the load of a lorry that is scattered on the road. Then, the passenger car runs off the road by the right and overturns.

METRAS method of accident sequencing

INVOLVED UNITS		EVENT	MOST SERIOUS EVENT
V1		*20. Collision against a load or elements of other vehicles*	
V1		*22. Running off the road by the right, no invasion of another road or carriageway*	
V1		*52. Overturning of the vehicle out of the road*	*X*

Type of accident in CADaS (There are several categories that could cover this accident, among which one has to be selected).

- A-10.02 Single vehicle accidents with obstacles on or above the road
- A-10.06 Single vehicle accidents - Leaving straight road - either side of the road
- A-10.08 Single vehicle accidents on the road
- A-10.09 Single vehicle accidents including rollover

The limitation met in this case is the criterion to select to carry out the conversion: First event? Most serious one? road alignment in plant?... It can be decided as a general rule to select the first event that happened. In this case, the METRAS method would be translated to the CADaS 10.02 category. However, we have to take into account that the criterion of a policeman, as it has already been mentioned before may vary according to different conditions.

After having studied all the CADaS categories, it can be concluded that in order to carry out the conversion, it is perfectly possible by using the information of the following fields of the form: number of involved vehicles, position of the vehicles with regard to the road, to the carriageway, to the lane, traffic flow, driver/pedestrian manoeuvre prior to the accident, alleged offences of the driver/pedestrian, alleged speed offences, other offences and sequence of the accident (first event).

Finally, it can be checked that the whole set of possibilities of the method is translatable in a univocal and automatic way through the definition of prior algorithmic rules by using several fields of the form. It is advisable to bear in mind that the reverse translation could be impossible given that we could not go from a lower detailed system to a greater detailed one.

6. Conclusions

The METRAS method replaced the “type of accident” category in the new serious and fatal traffic accident data collection system in Catalonia, and the method is operational since the 1st of January 2006 (Cardona et al. 2006). For the information entry, the Servei Catala de Transit developed a web application that allows collecting the data of the form, including the accident sequencing with the possibility of getting a “flash” presentation of the accident once the data is entered, or to fill in the data through graphic elements in the context of a virtual scene.

Fig 7 : Web application of the SIDAT in Catalonia.

Likewise, the METRAS method has been accepted as an alternative to the accident typology in the new accident collection system in urban zones in Spain, which is currently being redesigned and that will be operational soon. At present, an empirical evaluation at the interurban level is foreseen in the whole state in order to finally accept its incorporation into the official form.

The relevant aspects that support the inclusion of this method in the framework of the police traffic accident form refer to the fact that the METRAS method approach allows improving the quality and accuracy of the current information and leads to a series of advantages compared with the classic classification of the accident typology. It entails a new perspective of the study of the accidents from the "macro" point of view with a much lower cost than the in-depth studies, among other advantages that are exposed hereafter.

From the point of view of the statistical analysis, the approach of an ordered and dynamic sequential description of the accident firstly allows the identification of the first event of the accident. Knowing what first happened allows studying the influence that the conditions prior to the accident (infrastructure, place factors, factors of the driver/pedestrian and of the vehicle...) have had on the event. It could be a key element in the study of active safety.

Going on with this type of analysis, the information on the most serious event allows knowing the event that caused the most serious consequences for the involved persons. It could be a key element to study passive safety elements. Likewise, identifying the involved units allows linking each unit with its corresponding event and consequently, with the previous actions, the offences or errors of the persons involved in the accident, the vehicle characteristic...

Studying the full accident could serve as a basis for the development of accident type-scenes and could allow designing patterns of accident rate typical for particular roads, vehicles or even drivers or pedestrians.

The possibilities of study and research that the method opens are important given that it is not usual to know the information about each unit for each involved event, the order of appearance and the conditions prior to the accident in the accident forms, in a way that the different aspects could be linked.

Form the point of view of the collection, the METRAS method, such as it has been mentioned in the results, allows the conversion to the classic accident typology as well as to the "accident type" field requested in the European "CARE" database and almost surely to possible redesignings as the ones based on CADaS.

At the police level, it also brings important advantages. Like this, it gives a greater usefulness and a more positive evaluation to the accident form given that it can be used as a support tool that complement the form. It could serve as a basis for the automation of reports and pictograms that position the accident and improve the limitations of the free textual descriptions that can lead to wrong interpretations and transcriptions of what happened.

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