

UPDATE AND IMPROVEMENT OF THE TRAFFIC ACCIDENT DATA COLLECTION PROCEDURES IN SPAIN. THE METRAS METHOD OF SEQUENCING ACCIDENT EVENTS

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4th IRTAD CONFERENCE Road safety data: collection and analysis for target setting and monitoring performances and progress

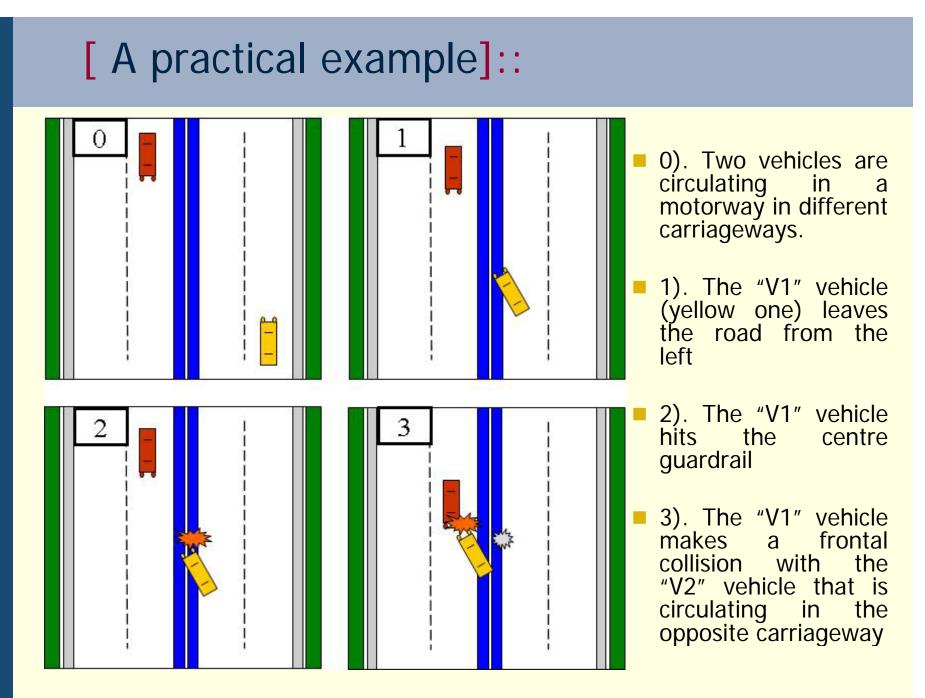
Seoul, 16-17 September 2009

[Recording information from accidents]::

CUESTIONARIO ESTADÍSTICO DE ACCIDENTES DE CIRCULACIÓN CON VÍCTIMAS DE CONFORNIDAD CON LO DISPUESTO EN LOS ARTÍCULOS 10, 11 Y 13 DE LA LEY DE LA FUN CIÓN ESTADÍSTICA PÚBLICA, LAS PERSONAI 2. NUMERO DE ACCIDENTE A relienar por la Jefarula Provincial la Tráficol DIRECCIÓN GENERAL DE TRÁFIC GADAS A CCLABORAR EN L JEFATURA DE TRÁFICO MINISTERIO ISLA DELINTERIOR YOS DATOS PERSONALES SE HALLAN AM 3. PROVINCIA PARADOS POR EL SECRETO ESTADÍSTICO. B. TIPO DIA 9, TOTAL L A F P VICTIMAS 11 HERIDOS 12. HERIDOS 13. VENICULOS 18. HABITANTES 19. ZONA GRAVES LEVES IMPLICADOS (ce miles) 5. DIA 6. HORA 7. DIA SEMANA - do 100 . Garnete z. 🗆 de 50 a 100 2. 🗌 Urbana . ce 5 a 50 8. C Traveti NÚMERO NUNCIPO 16. SENTIDO Ce1a5 Entre calle CARRETERA 4. Variante y calle . 20. TIPO DE VÍA 21. ANCHURA DE LA CALZADA 23. MARCAS VIALES 25. ARCÉN PAVIMENTADO 1. AJTOPISTA
 1. ■AJTOPISTA
 2. ■AJTOVIA
 2. ■AJTOVIA
 3. VIA RÁNDA
 4. ■VIA CONVENCIONAL GON GARRIL LENTO
 22. ANCHURA DEL CARRIL INEXISTENTES O BCRRADAS - NO ☐ INEXISTENTES O BCHRADAS SÓLO SEPARACIÓN CARFILES GEPARACIÓN CARRILES Y BORD SÓLO SEPARACIÓN DE BORDES 26. ELEMENTOS DE SEGURIDAD DE LA VIA VIA CONVENCIONAL 24. ARCEN 1. DE MÁS DE 3,75 m. 2. DE 3,25 & 3,75 m. 3. MENOS DE 3,35 m. MEDIANA ENTRE CALZADAG CAMINO VECINAL INEXISTENTE O IMPRACTICABLE 2. BARRERA DE SEGURIDAD VIA DE SERVICIO MENOR DE 1.50 m. DE 1.50 A 2.49 m. DE 2.50 m. EN ADELANTE 3. PANELES DIFECCIONALES 4. HITOS DE ARISTA 9. OTRO TIPO 5. CAPTAFAROS Número de carriles calzada 27. FUERA DE INTERSECCIÓN INTERSECCIÓN 30. PRICRIDAD REGULADA POR 1. SUPERFICIE RECTA LAGENTE SECA Y LIMPIA 29. Acondicionamiento Con carle Con calle 28. Tipo UNBRIA NARA ERRECTAL SERAL DE "STOP" MOJADA CURVA FUERTE SIN SÓLC ISLETAS O PASO PARA PEATONES EN VIA SECUNDA SERAL DE "CEDA EL PASO 4. CURVA FUERTE CON SENAL Y SIN VELOCIDAD SENALIZADA BARRILLO PAGO PARA PEATONES O ISLETA EN CENTRO VIA PRINCIPAL OLC MARCAS VIALES PASC PARA PEATONES OTRA SEÑAL N NGUNA (Sélo norma) CNLAGE DE BALIDA
 GIRATORIA
 OTROS ATTUS ATTUS 5. CURVA FUERTE CON OCRAL Y VELOCIDAD SENALIZADA CARRIL CENTRAL DE ESPERA 8. ACEITE OLETA DE GIRO (ZQUIERD VISIBIL DAD RESTRINGIDA 33. FACTORES ATMOSFÉRICOS 35. OTRA CIRCUNSTANCIA 36. SEÑALIZACIÓN DE PELIGRO EXISTENTE INEXISTENTE INNECESARIA (no hay peligro) PASO A NIVEL D BUEN TIEMPO 1. TI PLENO DÍA T EDIFICIOS NIEBLA INTENSA CANEIO DE RASANTE CREPÚSCULO CONFIGURAC ST. ACERAS NIEBLA LIGERA UERTE DESCENSO 3. ILUMINACIÓN 3. VEGETACIÓN DS DNO FIRME DESLIZANTE SUFICIENTE LLOVIZNANDO FACTORES ATMOSFÉRICOS SEÑALIZADO 38. ARBOLES LLUVIA FUERT BACÉN ESCALÓN OBRAS BACHES 4. ILLUMINACIÓN DESLUMBRAMIENTO SIN FILA FILAA a. DEL ECRDE DE LA CALZADA INSUFICIENTE GRANIZANDO POLVC O HUNC 5. SIN ILUNINACIÓ NEVANDO CTRA CALICA 8. VIENTO FUERTE SIN RESTRICCIÓ 30. VISIBILIDAD DE LA SENALIZACIÓN VERTICAL (SI existe) INUNDACIÓN PERALTE INVERTIDA DOTAC FIN CARFIL LENTO BUENA 2. DEFICIENTE OTRA 40 TIPO DE ACCIDENTE 4.1. 🗍 Vuelco en la calzada 41. CIRCULACIÓN LUÍDA sión de vehicales 2. Co 5-6. Salida de la calzada DENSA 3.1. PERIOR SUSTEMENDO CHOCLE CON ARBOL O POSTE 2.1. ELVERICULO ESTACIONADO CONGESTIONADA CHOQUE CON MUTIO O EDIFICIO rena. 42. CIRCULACIÓN BAJO MEDIDAS ESPECIALES CHOICE CON CUNETA O BORDS 22. TVALLA DE DEFENSA 23. DEARPERA DE PARO A NIVEL 24. DOTRO OBJETO O MATERIAL OTRO TIPO DE CHOQUE 33 (TOR ARELADD O EN CON DESPENAMIENTO MUTPLEOF CARRIL REVERSIBLE NEUCTOR DE ANIMALES MAL CONDUCIDO O APULITACIÓN ARCÓS OTRA MEDIDA MALES SUFLICS POSIBLES FACTO 4. MARCA Y MODEL (Opinión cel agente VEHICULO A Distracción Dos Unimas cifras del año innels dal e Alcohol o drogas Cansancio, sueño e enfermedad VEHICULO B DESCRIPCIONES felocidad in Intraccion a norma de Estada a condición de SÍMBOLOS A LITILIZAE de 4 či más rueclas de 2 či 3 ruodas de tracción atrimal Dosta



- The accident is one of the most unfortunate incidents that can happen in traffic.
- Collecting the key information on the TA characteristics and consequences is important in order to monitor how it evolves and to evaluate the preventive measures.
- collection. The the record the and of such information management is complex requires and appropriate instruments that make this task entrusted to the traffic police easier.



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Classic classification of the accident type::

- 1). The "V1" vehicle (yellow one) leaves the road from the left
- 2). The "V1" vehicle hits the centre guardrail
- 3). The "V1" vehicle makes a frontal collision with the "V2" vehicle that is circulating in the opposite carriageway

SELECT ONE OPTION ONLY

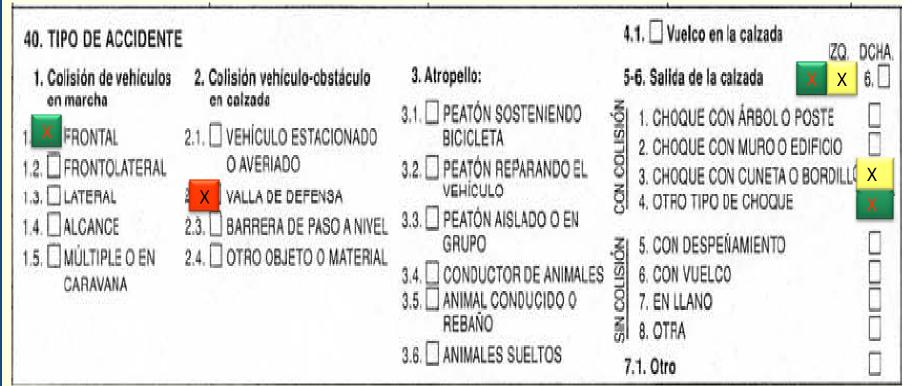


Image: A practical Example Im

ONE SINGLE CATEGORY TO DEFINE THE ACCIDENT TYPE

According to the classic classification of the accident type, the previous example could be classified in several ways:

- 5.3 Running off by the left hitting the ditch
- 5.4 Running off by the left with another type of impact
- 2.2 Collision against bumper fence
- 3.1 Frontal collision

SEVERAL CRITERIONS TO SELECT THE ACCIDENT TYPE

Criterion of the first event of the accident
Criterion of severity of the injuries
Combinatorial criterion of elements
Infrastructure criterion
Other criterions

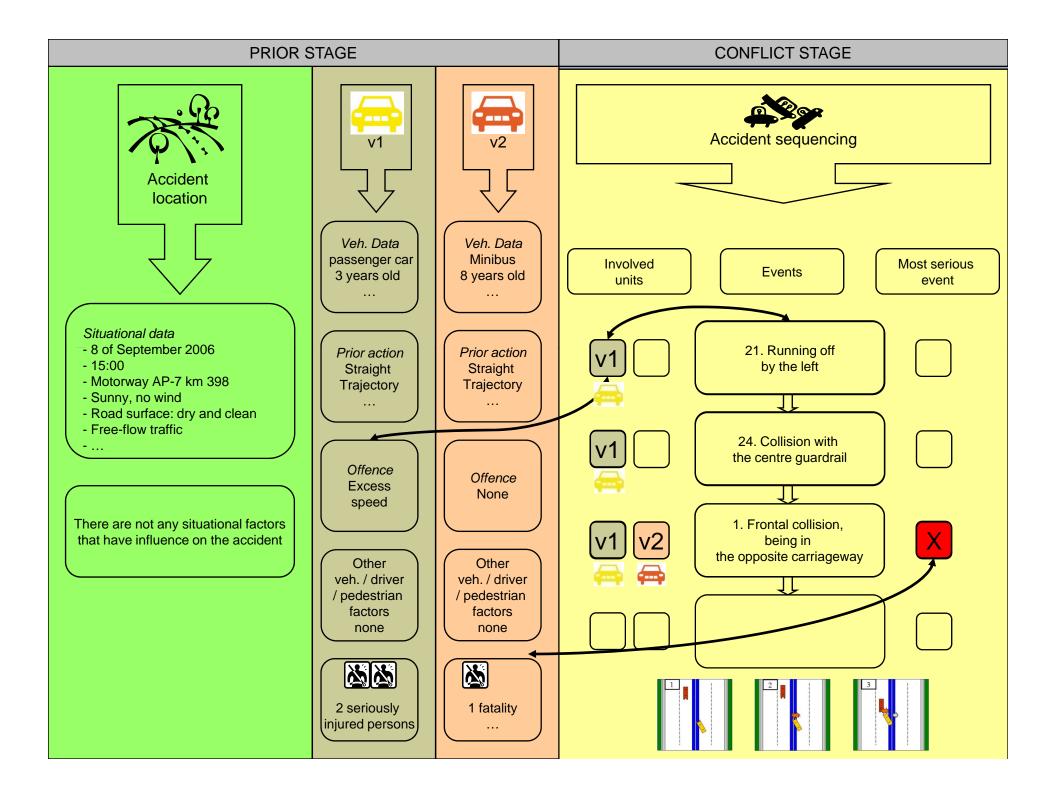
The accident type information is not associated with any of the involved unit (driver/pedestrian).

[Limitations of the classic classification of the accident type]::

- The classical accident typology only allows to identify <u>one event</u> in only one category.
- The <u>selection criterion</u> of a category may change according to the moment, the location, the circumstance, the research interests and even the accident characteristics.
- It may also change depending on the observer and is consequently <u>subjective</u> and not much defined.
- Difficult identification given the <u>dynamic nature</u> of the accident. It does not allow a realistic knowledge of what happened during the course of the accident.
- It does not differentiate the <u>first</u> event from the <u>most serious</u> one.
- It does not allow to <u>link</u> the type of accident or severity of the injury with fields or characteristics of the <u>involved units</u>, the drivers or the pedestrians.

[The METRAS (Measuring and Recording Traffic Accident Sequence) alternative] ::

- It integrates a structured, detailed and standardized <u>sequential</u> <u>description of the accident</u> to avoid the limitation of the classic category of accident type in the statistical questionnaires.
- It considers that an accident is a <u>complex process</u> having a <u>dynamic</u> <u>nature</u> and that one single category does not allow its description.
- It considers the <u>accident as a final result of a process</u> in which several events are caused because of previous actions, offences or errors from the persons involved in the accident, environmental conditions, the road, or the interaction between several elements present just before the start of the accident.
- It implies a generic structured protocol in order to collect the information related to the <u>sequence of the events</u> that take place in the space and in the time during the course of an accident, from a statistical perspective.
- Each event is considered to be an important and identifiable incident in a system of pre-established categories, that make an accident.



[Empirical evaluation. The experience with the METRAS method] In Catalonia:: The SIDAT Project

PROCEDURE

- Each report is filled in by up to four different police agents.
- Each participating agent fills in accident sequences from different level of complexity (number of events / units involved).
- A sample of 73 traffic accident reports, 55 agents that filled in the data and a total number of 305 accident sequences is achieved.

RESULTS OF THE PILOT TEST

- UNDERSTANDING: Practically all the agents do understand the procedure.
- Around 80% correctly answer to the first event and the most serious one.
- The reports sometimes do not have enough information, and may be interpreted differently.
- This pilot test showed very positive results as for the understanding of the method, easiness of completion, objectivity, both for motorway and urban area accidents.

The questionnaire on one sheet of paper

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 SERI- OUS EVENT		

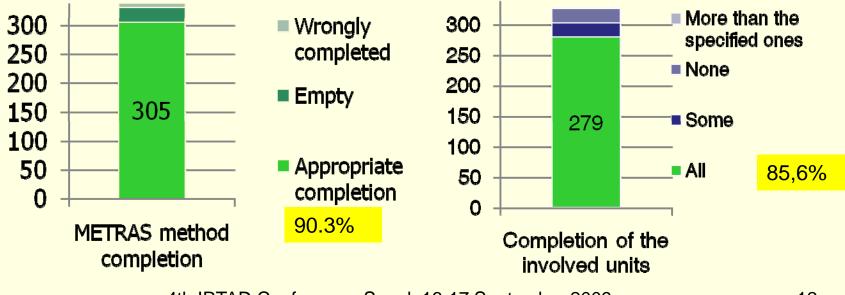
TYPES OF EVENTS: COLLISIÓN BETWEEN VEHÍCLES 1. Frontal collision 2. Front-lateral collision affecting the right side 3. Front-lateral collision affecting the left side 4. Lateral collision 5. Positive scratch 6. Negative scratch 7. Rear collision, same direction or in platoon 8. Reverse rear collision 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 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 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 23. Running off the road by the right, invading another road or 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

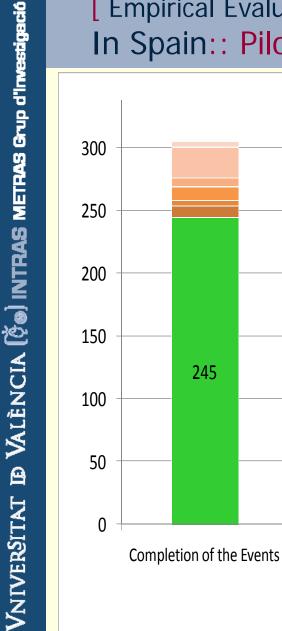
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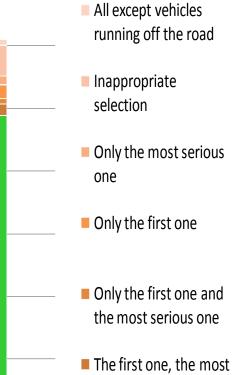
[Empirical evaluation. The experience with the METRAS method] In Spain:: Pilot National Statistical Questionnaire of DGT

- The first stage: the police agents fill in the serious or fatal questionnaires to evaluate from the <u>archived accident reports</u> with specific characteristics that have taken place in their municipality lately
- The second stage: the completion of the statistical questionnaires for the accidents that happen during the <u>pilot test week</u> together with documents of evaluation of the difficulties and contents
- Sample: 163 agents and 456 questionnaires. The sequencing accident METRAS method was filled in for serious or fatal accidents. (338 questionnaires).

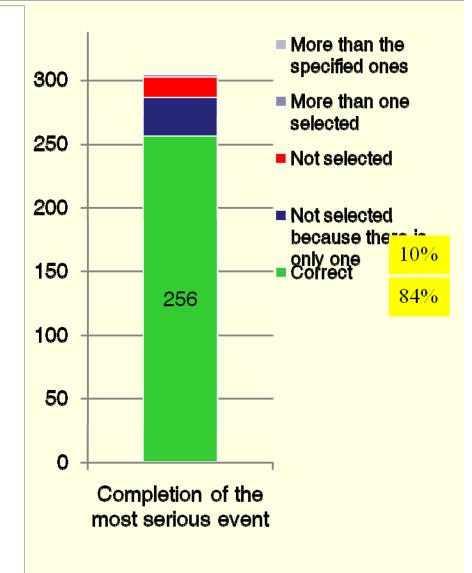


[Empirical Evaluation. The experience with the METRAS method] In Spain:: Pilot National Statistical Questionnaire of DGT





The first one, the most serious one and the other ones
 All 80.3%



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[Method compatibility::]

Example: In a double carriageway road with double traffic flow, in a signposted 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 MOST **INVOLVED EVENTS SERIOUS UNITS EVENT** *V1* 20. Collision against a load or elements of other vehicles 22. Running off the road by the right, no *V1* invasion of another road or carriageway *V1* 52. Overturning of the vehicle out of the Х road

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/overturning

[The METRAS method in a very complex accident::]



V2: White minivan V5: Last white lorry

V3: Ambulance

ACCIDENT SEQUENCE					
UNITS		EVENTS	MOST SERIOUS EVENT		
V1	V2	7 (Rear-end collision, same direction)	X		
V2	V3	7 (Rear-end collision, same direction)			
V2		(Running off the road by the left, no invasion of another road or carriageway)			
V1	V4	7 (Rear-end collision, same direction)			
V1		(Running off the road by the 26 left, invading another road or carriageway)			
V1		51 (Overturning of the vehicle in the opposite carriageway)			
V1	V2	7 (Rear-end collision, same direction)			
V5	V3	7 (Rear-end collision, same direction)			
V5	V4	7 (Rear-end collision, same direction)			

[Results of this codification] What does the METRAS method allow from the point of view of the statistical analysis ::

- The information about the first event allows to identify what first happened and then study the influence of the infrastructure conditions, the situational factors, the factors of the driver / pedestrian and of the vehicle to prevent the accidents. It could be a key element for the study of the active safety.
- The information about the most serious event allows to know the event that has caused the most serious consequences for the involved persons. This could be a key element for the study of the elements of passive safety.
- Accident sequencing may allow to draw patterns of accident rate for particular roads, vehicles and even drivers or pedestrians.



[Results and Conclusions::]

What does the METRAS method allow from the point of view of the Record::

- It is integrated in the traffic accident statistical questionnaire of the police.
- It allows the improvement of the quality and reliability of the information on the accident typology.
- It respects the dynamic nature of the accident. It implies a better knowledge of the accident reality that was only present in the reports up until now.
- At the police level, it gives a better utility and a more positive assessment to the statistician. For serious and complex accidents, it could be a tool to manage to describe the accident. It could be used as a basis for the automation of reports and pictograms that position the accident.
- At the urban police level, it allows getting information for interventions.
- It implies a new perspective of the accident study from the macroscopic point of view with a much lower cost that the in-depth studies.
- It is compatible and it allows the conversion to the classic accident typology as well as to the "accident type" field requested in the European "CARE" database and to the new "CADaS" proposal.

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Thank you !!!!!

NOTES:

- The Metraseis Award for the most innovative contribution in the field of the survey methodology was given to the "METRAS method of event sequencing in the field of traffic accident statistical questionnaire." in the "IV Conference of Survey Methodology", organized by the Public University of Navarre in Pamplona on the 20-22 of September 2006.
- The complete study of this method is currently being finished as the doctoral thesis of M^a Teresa Tormo and will be presented and defended soon.

More information...

www.uv.es/metras