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FLAM

A database for the identification of causal factors in French fatal accidents

Sept. 27th 2022



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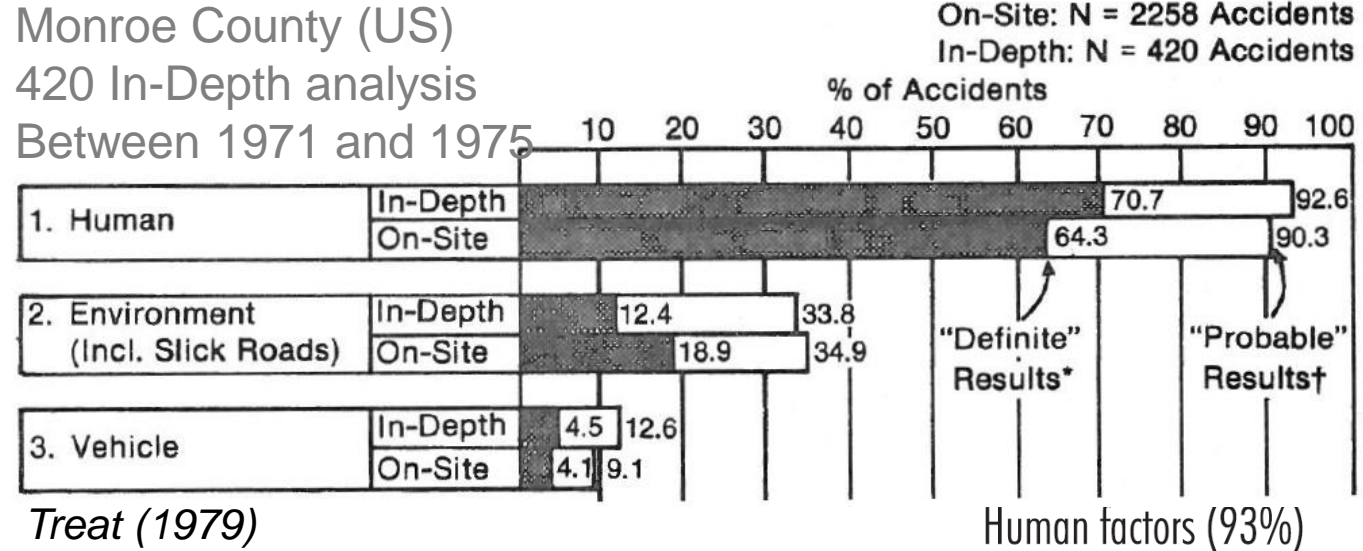
Objectives



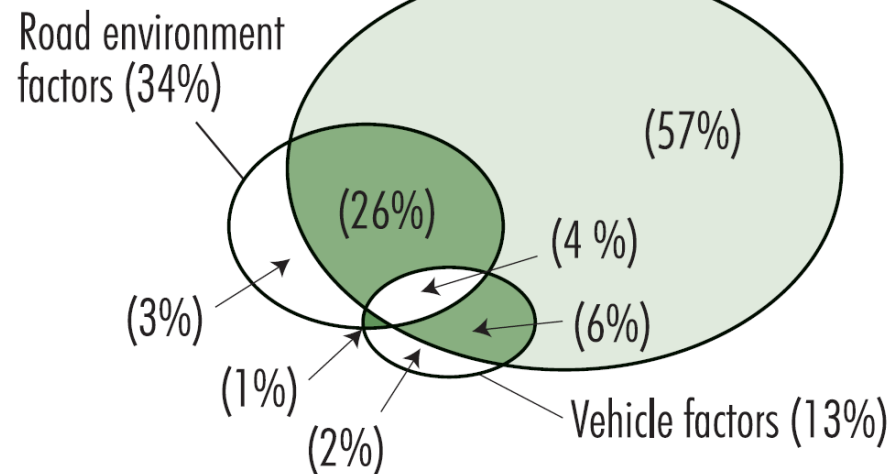
UPDATE KNOWLEDGE ON CRASH CAUSATIONS

Factor's origin

- Human
- Vehicule
- Infrastructure



Which factors ?



HOW ?



METHOD

Material

- All available police reports for fatal accidents in 2015
- 2878 accidents (85% of 2015 fatal accidents)

Database coding

- Coding in a dedicated database (FLAM)
 - “usual” accident’s information about location, road users, vehicle
 - information about accident sequence, causal and aggravating factors
- Coding book
- 36 qualified agents working in road safety from Cerema
- Specific training courses related to accident analysis and factor identification
- Check and corrections by a limited number of persons

CAUSAL FACTORS

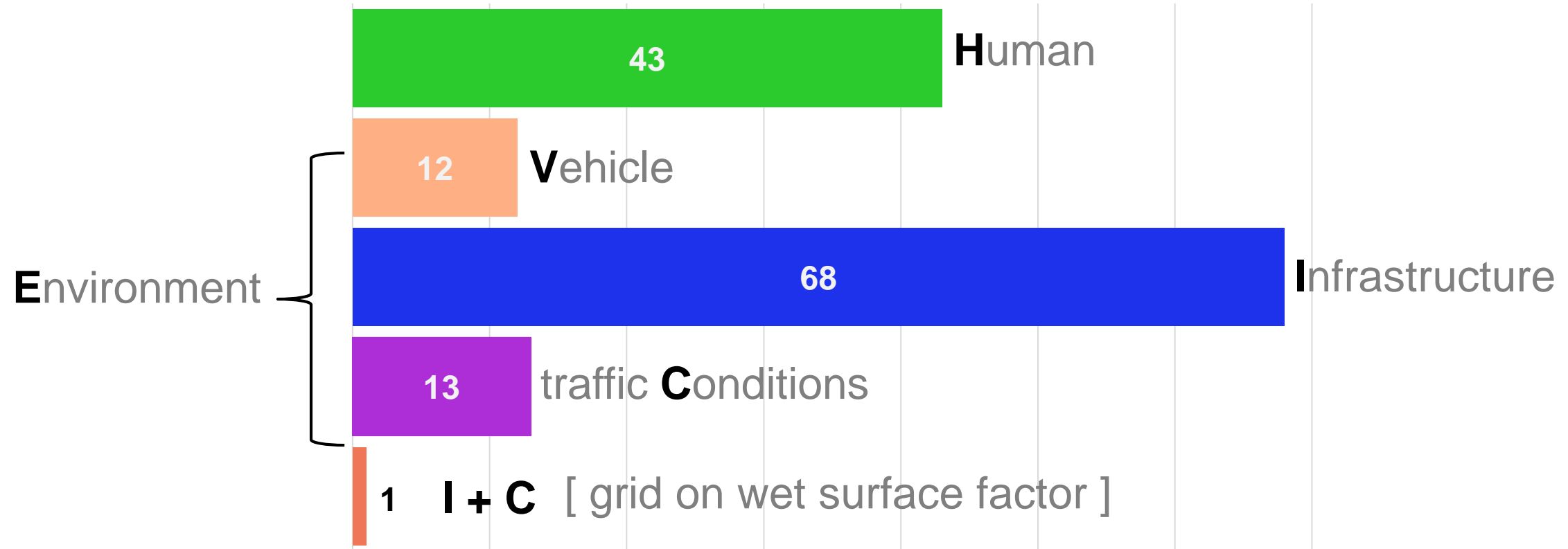
an element (presence or absence) or a specific state of one of the components in the human/vehicle/environment system that played a role in the accident's occurrence, without which the probability of the accident's occurrence would have been considerably reduced.

Factors are :

- qualified as quasi-certain (c) or probable (p) by analysts
- assigned to the road user (or its vehicle)

CAUSAL FACTORS

List of 137 causal/contributing factors



Results



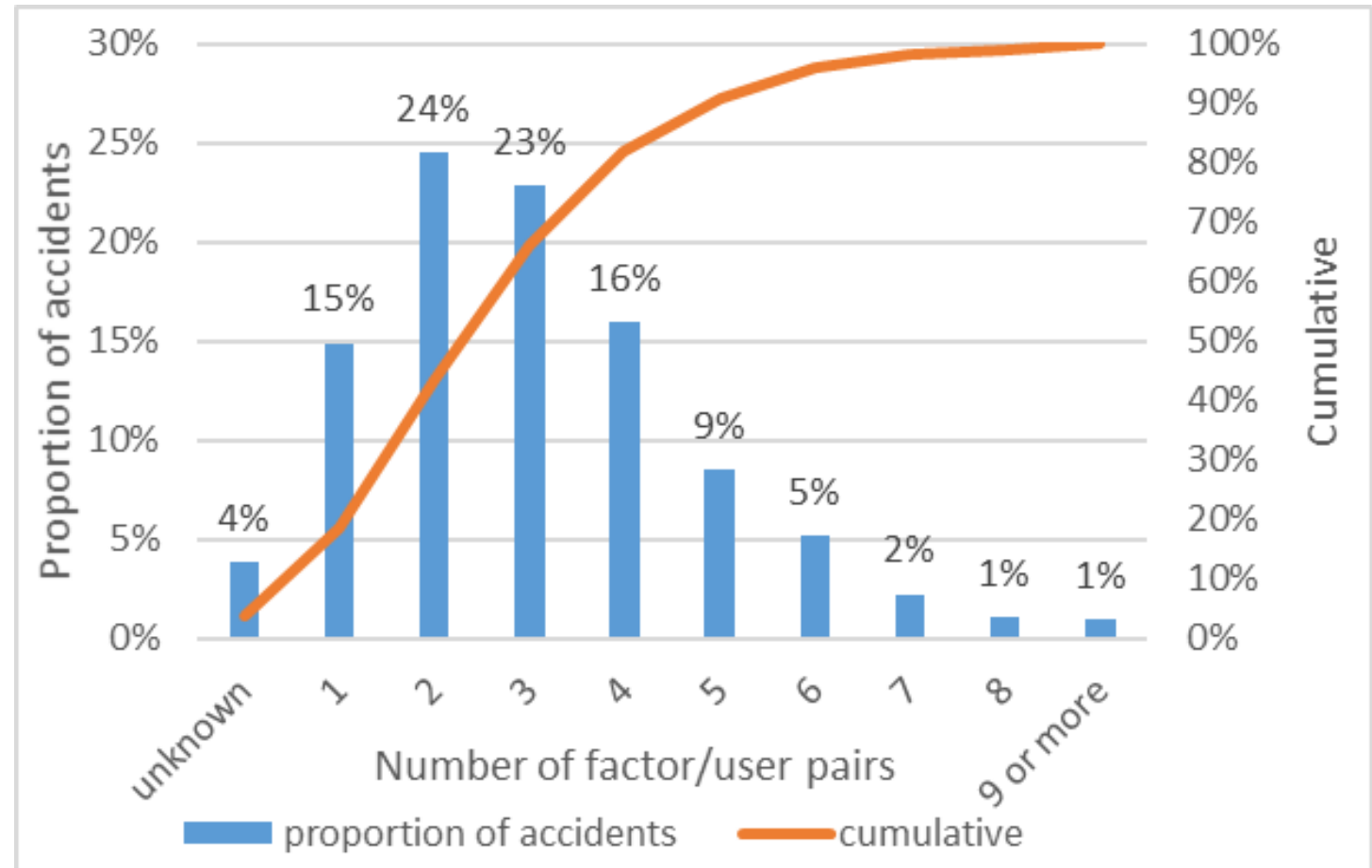
ACCIDENT CAUSES ARE MULTIFACTORIAL

Crash with one factor

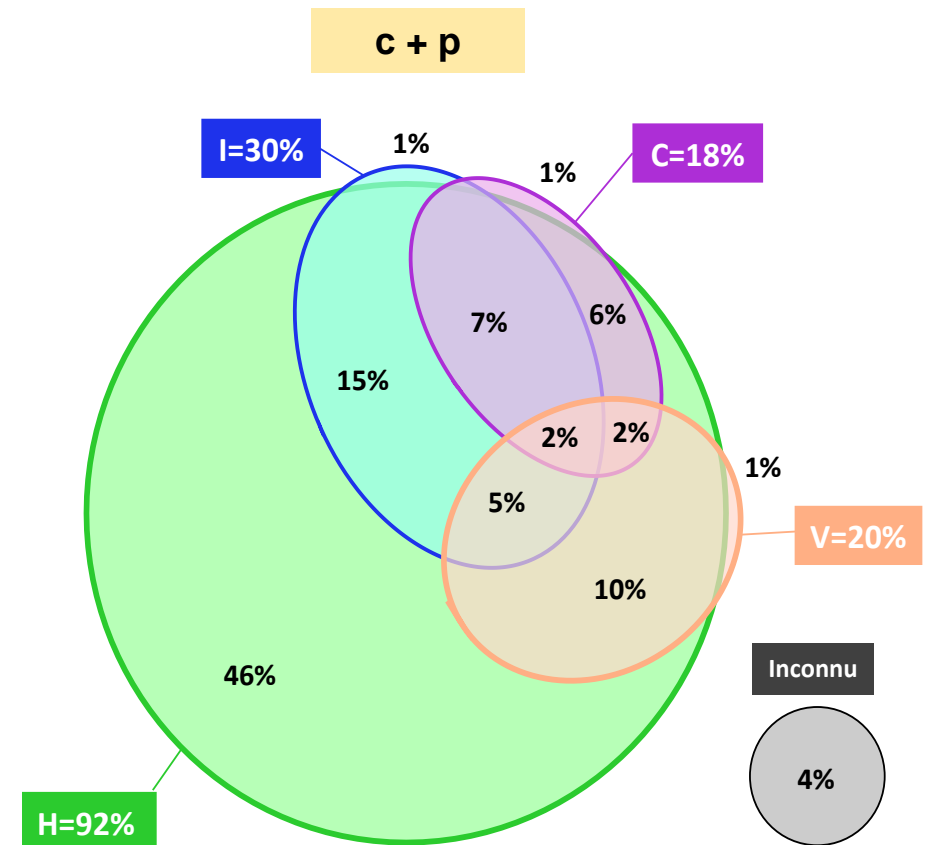
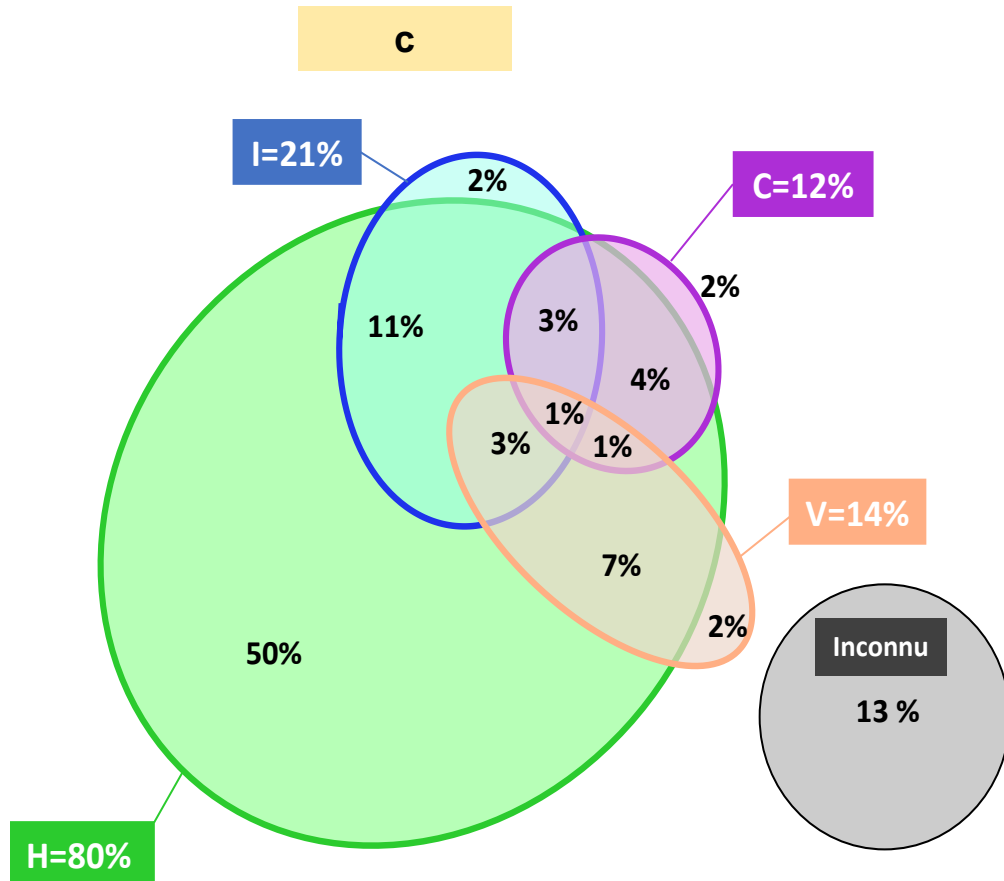
- Only 15% (c) to 25% (c+p)

Crash with 4 factors or more

- 19% (c+p) to 34% (c)

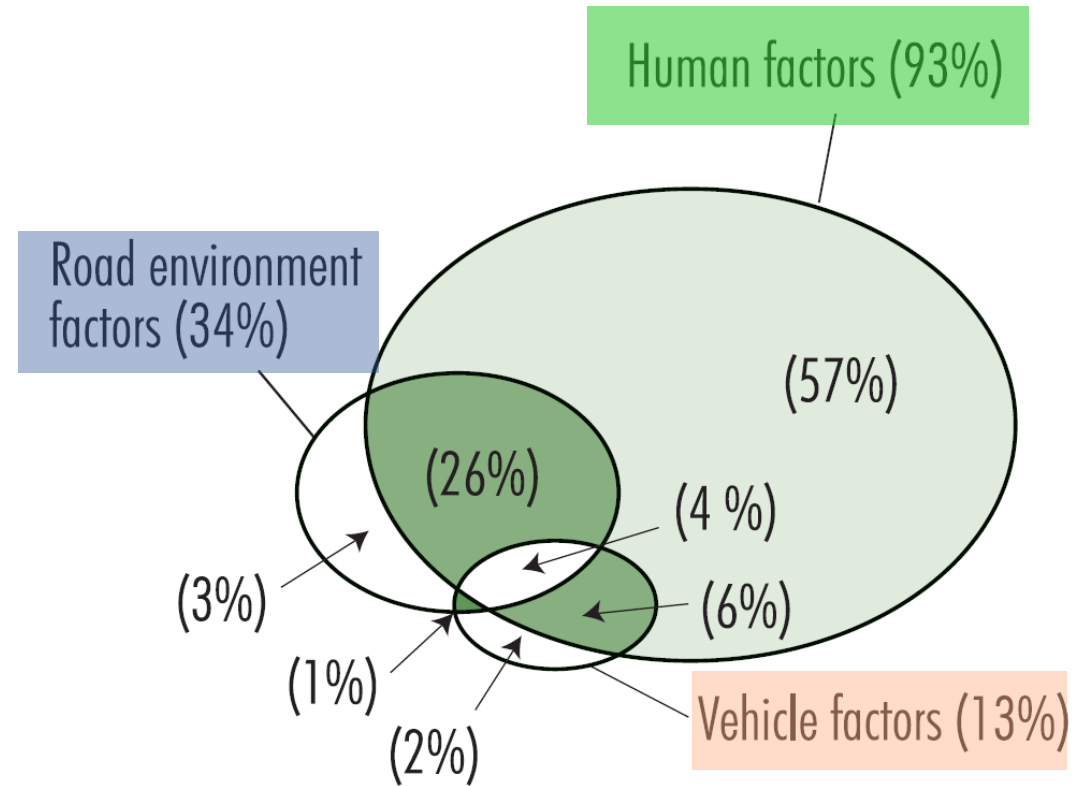
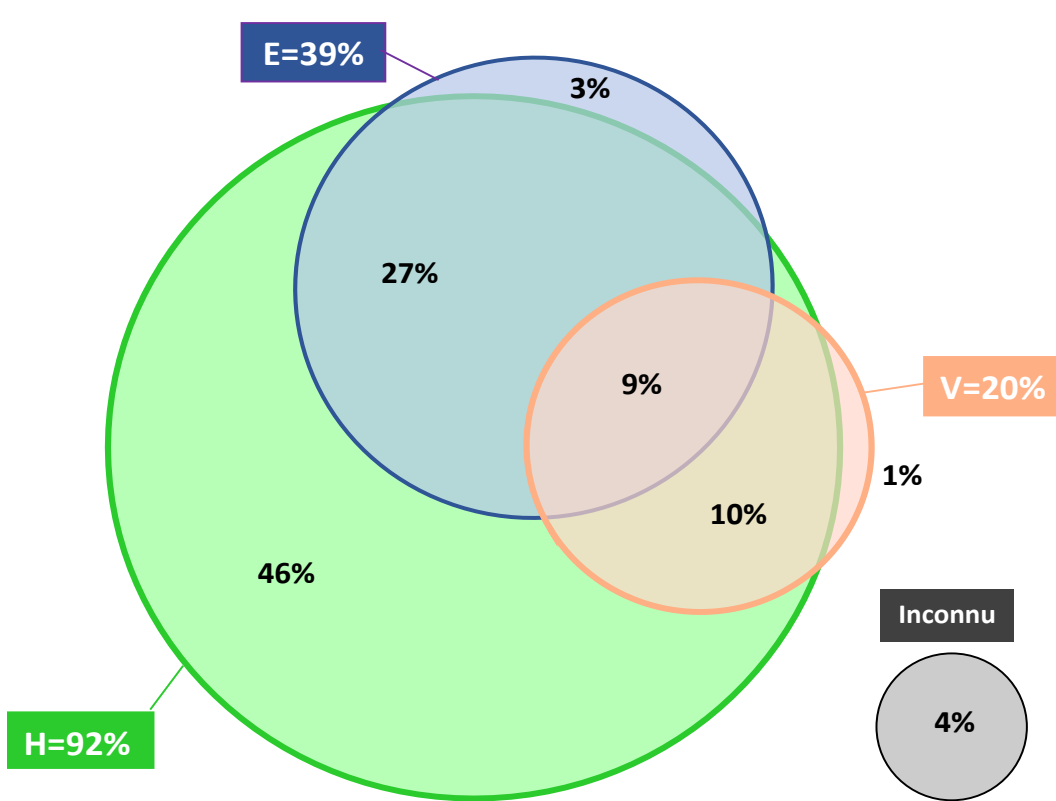


HUMAN FACTORS ARE PREDOMINANT



**H factors in 80 to 92% of accidents
but
only H factors in half of accidents**

SIMILARITY WITH PREVIOUS RESEARCH



HUMAN FACTORS

Level 1 group factor	c+p	c	Level 2 group factor	c+p	c	Level 3 group factor	c+p	c			
User state	67%	53%	ingestion of substances	39%	36%	alcohol	31%	30%			
						drugs	17%	15%			
						medicinal drugs	3%	2%			
			temporary state	34%	18%	chronic state	8%	5%	tiredness	12%	6%
									non-technological distraction	12%	6%
									malaise, health disorder	10%	4%
									stress, annoyance	3%	2%
									routine, monotony	2%	1%
									pre-existing handicap	4%	2%
			advanced age	5%	3%						
suicide, homicide	2%	1%									
Driving behaviour	58%	50%	driving rules	21%	20%	excessive or inappropriate speed	39%	30%			
						priority rules	16%	15%			
						traffic prohibited	3%	3%			
						safety distance	2%	1%			
						change of direction without indicating	1%	1%			
risk-taking	13%	12%									
Experience	14%	11%				inexperience, youth	11%	9%			
						poor knowledge of the vehicle	6%	4%			
Anticipation / Manoeuvre	8%	5%				inappropriate or untimely manoeuvre	6%	4%			
						poor evaluation of distances or speeds	3%	1%			
Perceptibility of pedestrians, cyclists	5%	4%				poor perceptibility of pedestrians	4%	4%			
						failure to wear high-visibility clothing	1%	1%			
Technological tools	4%	2%				technological distraction	4%	2%			

ENVIRONMENT FACTORS

Level 1 group factor	c+p	c	Level 2 group factor	c+p	c	Level 3 group factor	c+p	c
Visibility	10%	7%	visibility obstruction	8%	6%	fixed	6%	5%
						mobile	2%	1%
			street lighting				2%	1%
			other				1%	<1%
Legibility	7%	4%	at bends				3%	1%
			at intersections				2%	2%
			in specific areas (work site, traffic jam, etc.)				<1%	<1%
			signing (out of bends and intersections)				1%	1%
			other				2%	1%
Suitability to dynamic imperatives	10%	5%	design				1%	<1%
			state				9%	5%
			other				1%	1%
Ability to avoid and recover	9%	7%	width and/or nature of the surface				5%	4%
			obstacle				2%	2%
			other				1%	1%
Obstacle present on the carriageway	3%	2%	mobile obstacle				1%	1%
			fixed obstacle				1%	1%
Consistency with the environment	3%	2%						
Flow management	2%	1%						
Environmental conditions	7%	4%	deteriorated weather conditions				3%	2%
			glare (sun, headlights of other vehicles, etc.)				4%	2%

HUMAN FACTORS

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VEHICLE FACTORS

Level 1 group factor	c+p	c	Level 2 group factor	c+p	c
Design	11%	8%	poor perceptibility of two-wheelers	4%	3%
			powerful vehicle	4%	3%
			vehicle blind spot or field of view	3%	2%
			weight and configuration of HGVs	2%	1%
			high four-wheel drive type vehicle	<1%	<1%
			silent vehicle	<1%	0%
State	8%	6%	state of the vehicle	3%	2%
			state of the tyres	4%	3%
			state of the load	1%	1%
			defective driving assistance system	<1%	0%
Other	3%	2%			

CONCLUSIONS

Several limitations

- Police reports, interpretive identification of the factors, use of close factor list...

Strengths

- Size of the sample,
- Review by road safety experts counterbalancing human factor highlighted by police reports

Interest

- Relativate the weight of some factors (poor conditions of pavement...)
- Can be used to stressed out the importance of some factors impacting specifically some road users (visibility obstruction for pedestrian...)
- Remark : Cause may be associated with one traffic component while “solution” may belong to another

REFERENCES

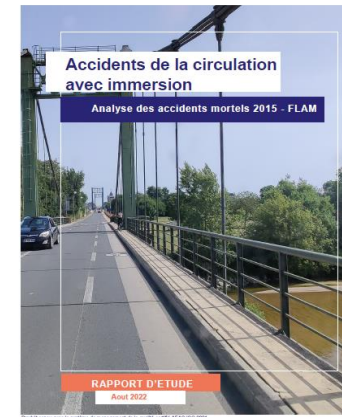


FLAM 2RM
Analyse des accidents mortels impliquant un deux-roues motorisé en 2015

Rapport d'étude, juillet 2020



FLAM piétons
Étude des accidents piétons mortels de 2015 : comprendre pour agir



<https://doc.cerema.fr/Default/doc/SYRACUSE/592045/factors-in-fatal-accidents-in-2015-utilization-of-the-flam-database>





**Thank you for your
attention**