

LRT safety in France: how are pedestrians involved?

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- Review of the literature: why did we focus on pedestrians?
- Method and data
- Results in France

The complete report is on <http://www.territoires-ville.cerema.fr/etude-sur-la-securite-des-pietons-sur-les-axes-tc-a1776.html>

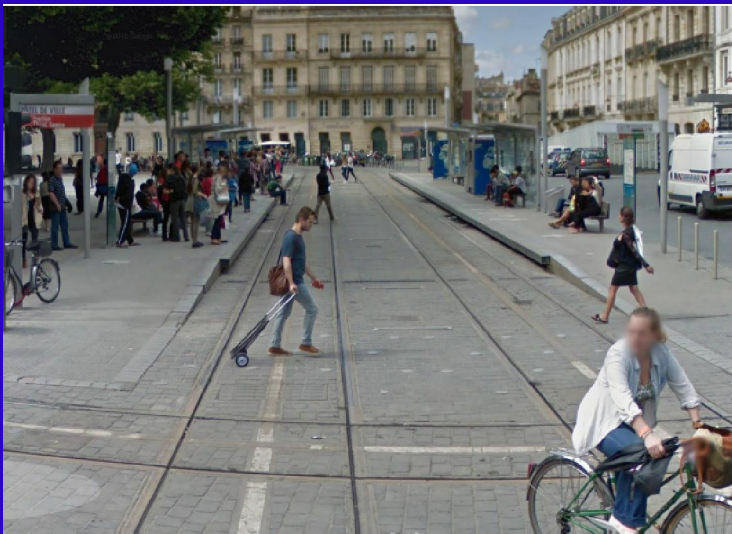
Specific accidents between streetcars and pedestrians

- Problems when pedestrians cross the streets with streetcars identified in literature:
 - Multiplication of the kind of lanes
 - Multiplication of traffic directions
 - The increase in distance of crossing



Specific accidents between streetcars and pedestrians

- Concentration of hazards in stations
 - Not only between pedestrians and streetcars
 - But also between pedestrians and road users



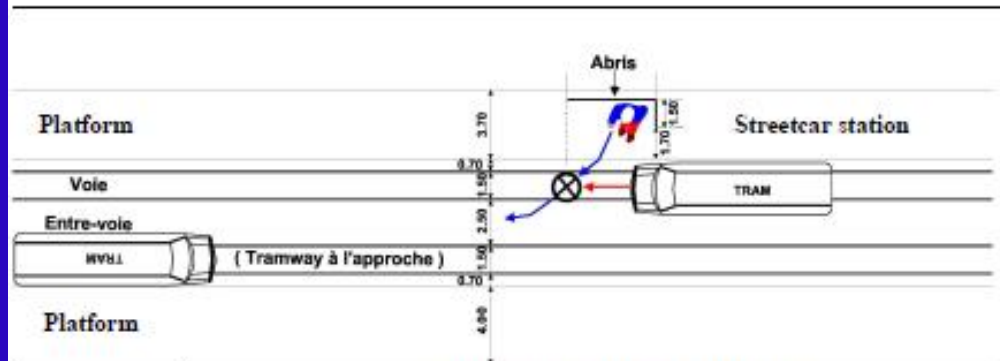
Specific accidents between streetcars and pedestrians

- Streetcars are involved directly in collisions
 - But they can also induce behaviors that lead to accidents
- The necessity to have an overall analysis of the pedestrians accidents

Data

- Police accidents reports
 - They concern all accidents:
 - occurring on a road open to public traffic
 - causing at least one victim
 - involving at least one vehicle
 - They contain:
 - A complete description of the protagonists, the vehicles, the location
 - A map representing the accident sequence
 - Testimony from the persons involved and from any witnesses

(A) direct involvement for collision between pedestrians and streetcars



DONNEES GENERALES RELATIVES AUX IMPLIQUES		
Involver	A	Y
Vehicle :	STREETCAR	
Age of vehicle	11 years old	
Age, sexe of user :	M - 45 years old	F - 21 years old

DEROULEMENT DE L'ACCIDENT		
Involver	A	Y
Travel situation	He drives streetcar for the society XX, on the line 1. He arrives at the station. He says to enter at 18 km/h. He sees a young lady sitting on a seat on the platform and waiting for the streetcar.	She was at a party with friends. She says to have drunk 4 or 5 glasses of wine. But she doesn't think to be drunk. She is waiting for the streetcar with a friend. So she is not on the good platform. She wants to go home on the opposite direction.
Accident situation	Y sees the streetcar that arrives on the opposite direction. She crosses the tracks quickly without checking that another streetcar is arriving in front of her.	
Emergency situation	A uses the emergency braking.	
Impact situation	A hits the pedestrian	

Method

Role played by streetcar:

- (A) Direct involvement
- (B) Indirect involvement
- (C) No involvement

Method and data

- Analysis:
 - 4 French networks: Bordeaux, Montpellier, Rouen, Strasbourg
 - 3 years (2009-2011)
 - 190 accidents with pedestrians on the streets where streetcar is implemented

Results in France

- More than half of pedestrian accidents are linked to streetcar

Streetcar involvements in pedestrian accidents	Number of cases
(A) Direct involvement	58
(B) Indirect involvement	47
(C) No streetcar involvement	73
(D) Undetermined (not enough information)	12
Total	190

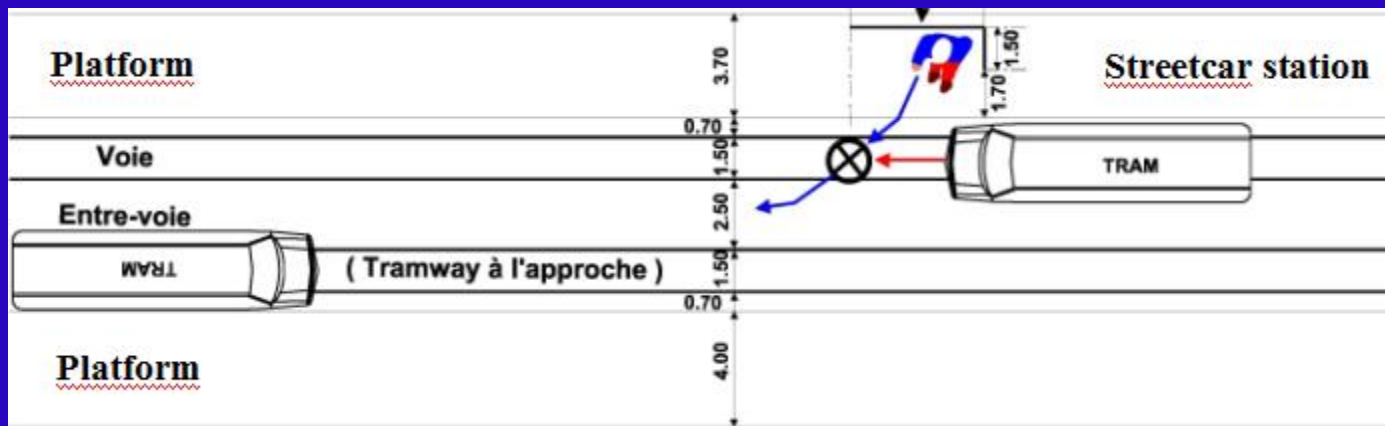
(A) Description of direct accidents

		Number of cases
In station	The pedestrian falls on the platform and is hit by a streetcar pulling into the station	9



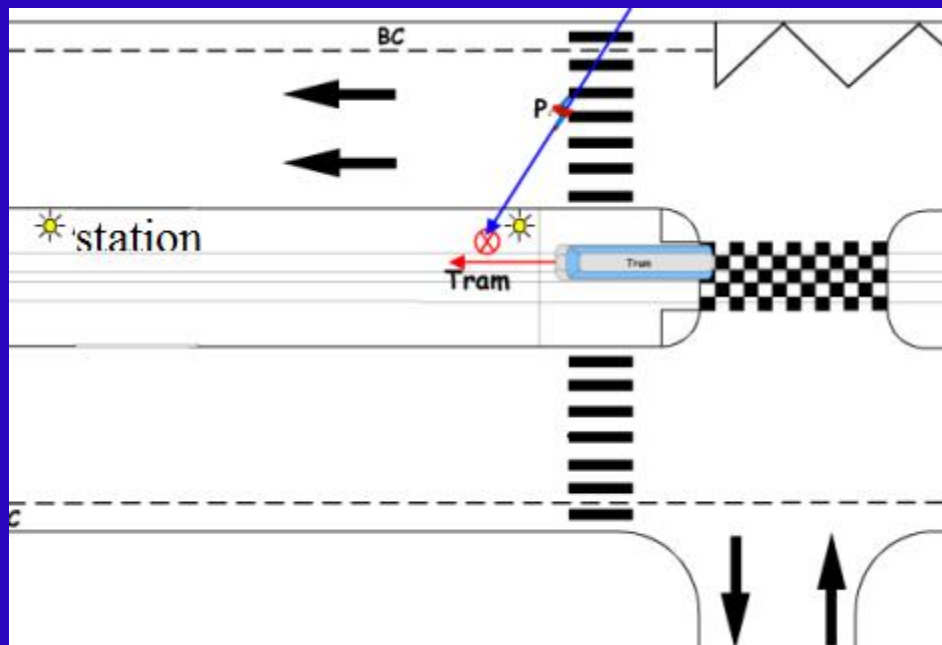
(A) Description of direct accidents

		Number of cases
In station	The pedestrian on the platform crosses the tracks directly, outside the pedestrian crosswalks	8
	The pedestrian on the platform crosses the tracks directly, outside the pedestrian crosswalks. Visibility masked by a streetcar stopped in the station	3



(A) Description of direct accidents

		Number of cases
In station	The pedestrian crosses the traffic lanes suddenly to reach the station and is hit on the first rails crossed	5



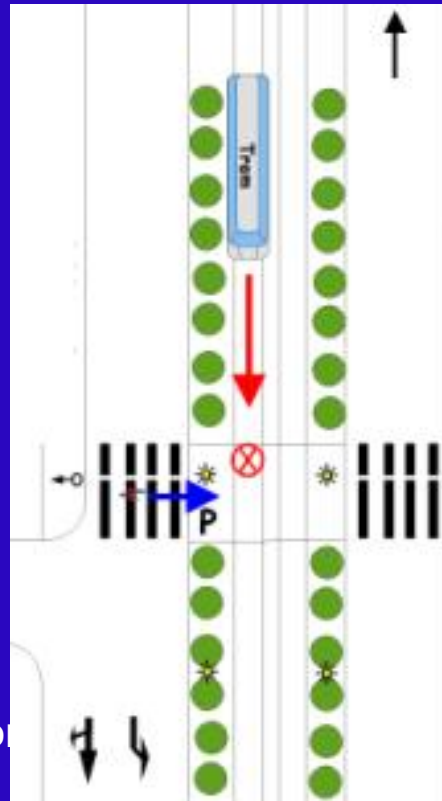
(A) Description of direct accidents

		Number of cases
Outside the station	The pedestrian walks along the streetcar and suddenly crosses when a streetcar is coming from behind	11



(A) Description of direct accidents

		Number of cases
Outside the station	The pedestrian crosses the traffic lanes and is hit on the first rails crossed	7

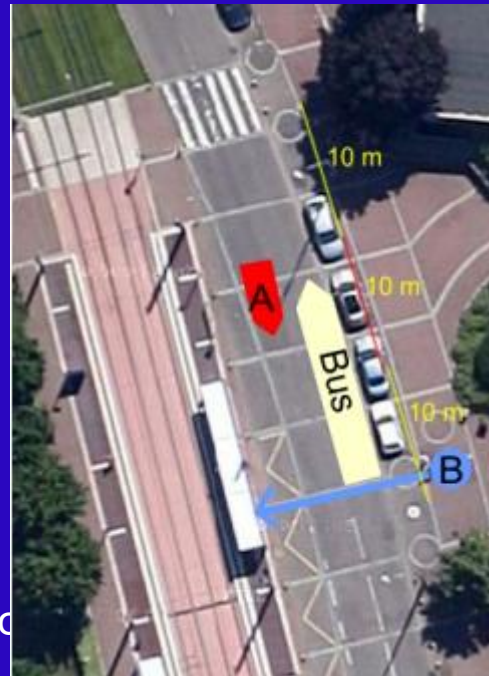


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	The pedestrian crosses the traffic lanes suddenly to reach the station and is hit on the first rails crossed	5
Outside the station	The pedestrian walks along the streetcar and suddenly crosses when a streetcar is coming from behind	11
	The pedestrian crosses the traffic lanes and is hit on the first rails crossed	7
Other cases		14
Total		58

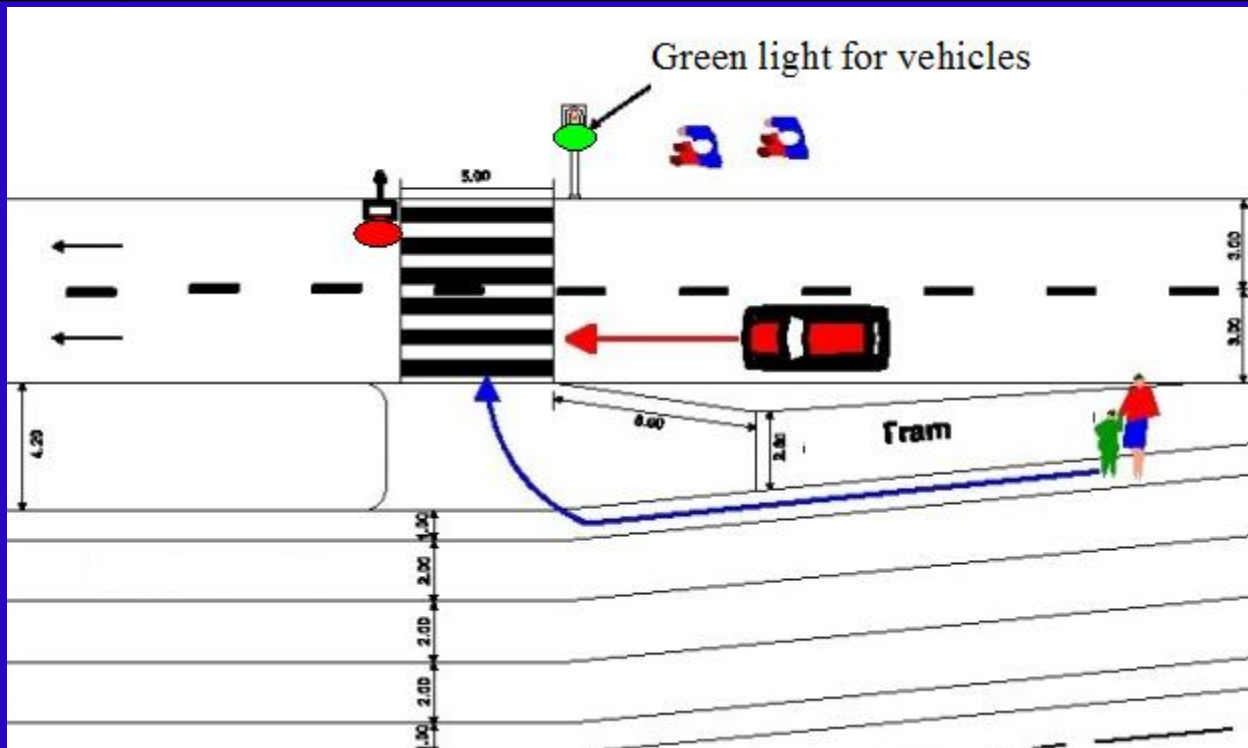
(B) Description of indirect accidents

		Number of cases
In station	The pedestrian suddenly crosses to reach the station, is hit on the street.	15
	The pedestrian suddenly crosses to reach the station, is hit on the street. Visibility masked by a vehicle stopped in general traffic.	9



(B) Description of indirect accidents

		Number of cases
In station	The pedestrian gets off the streetcar, crosses the street suddenly and is hit on the street	17



(B) Description of indirect accidents

		Number of cases
In station	The pedestrian suddenly crosses to reach the station, is hit on the street.	15
	The pedestrian suddenly crosses to reach the station, is hit on the street. Visibility masked by a vehicle stopped in general traffic.	9
	The pedestrian gets off the streetcar, crosses the street suddenly and is hit on the street	17
Outside station	Other cases	6
Total		47

Conclusion

- Analysing all the pedestrian accidents in relation with streetcars (55% directly and 45% indirectly)
- Regarding all these accidents:
 - Young pedestrians (11-25 years old) are highly involved (55%)
 - ➔ focus on distractor
 - The stations concentrate 67% of pedestrian accidents
 - ➔ guidance toward crosswalks
 - ➔ adjustments to traffic lights to make crosswalks safer
 - Outside station, problem of perception of streetcar space
 - ➔ raising awareness of the presence of tracks and streetcars

European COST project:

<http://www.tram-urban-safety.eu/spip.php?rubrique21>

Thank you for your attention

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