Collisions between buses and vulnerable road users

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The victims of buses accidents in France

Bentama, A., Millot, M., Khatory, A. (2017) The victims of buses accidents in France: what exposure to risk? Rech. Transp. Secur. 33:31-39

- 2,338 accidents with buses on 2012-2014 => caused 1,382 victims amongst bus passengers and 2,081 victims amongst third parties (38% cars occupants, 38% pedestrians, 16% TMW)
- Serious accidents with buses involved 47% pedestrians, 30% cars occupants, 15% TWM
- Risk for road users regarding traveled time spent:
  - Highest for TWM => linked to this mean of transport
  - Higher for **pedestrians** than for cars occupants

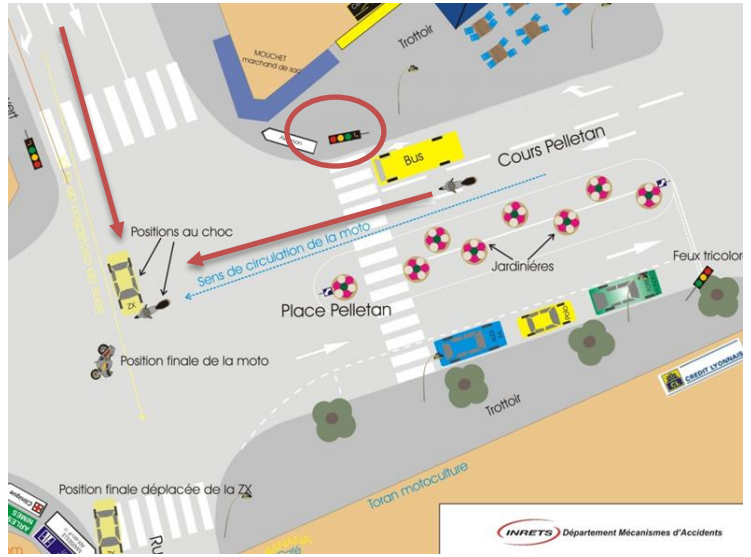
	Number of victims involved in bus accidents (BAAC 2012-2014)	Travel time (Billion of hours - ENTD)	Annual ratio (victims/ billion of hours)
Pedestrians	792	3,09	85,6 [79,7-91,7]
Two-wheelers motorised	325	0,27	401,3 [363,4-453,6]
Cars occupants	778	11,33	22,9 [21,3-24,5]

Indirect involvement of buses in accidents

Brenac, T., Clabaux, N. (2005) The indirect involvement of buses in traffic accident processes. Safer Science 43: 835-834

- Indirect involvement: a bus played a role in the process leading to a collision, even though the bus did not participate in the collision
- Accidents indirectly involving a bus are twice more than those with direct involvement
- Major indirect problems:
  - Bus constituting a sight obstruction (traffic light, other vehicles…)
  - Pedestrian hurried crossing the street to catch the bus

  Unger et al. (2002) Child pedestrian injuries at tram and bus stops. Injury International Journal of the Care of the Injured 33, 485-488

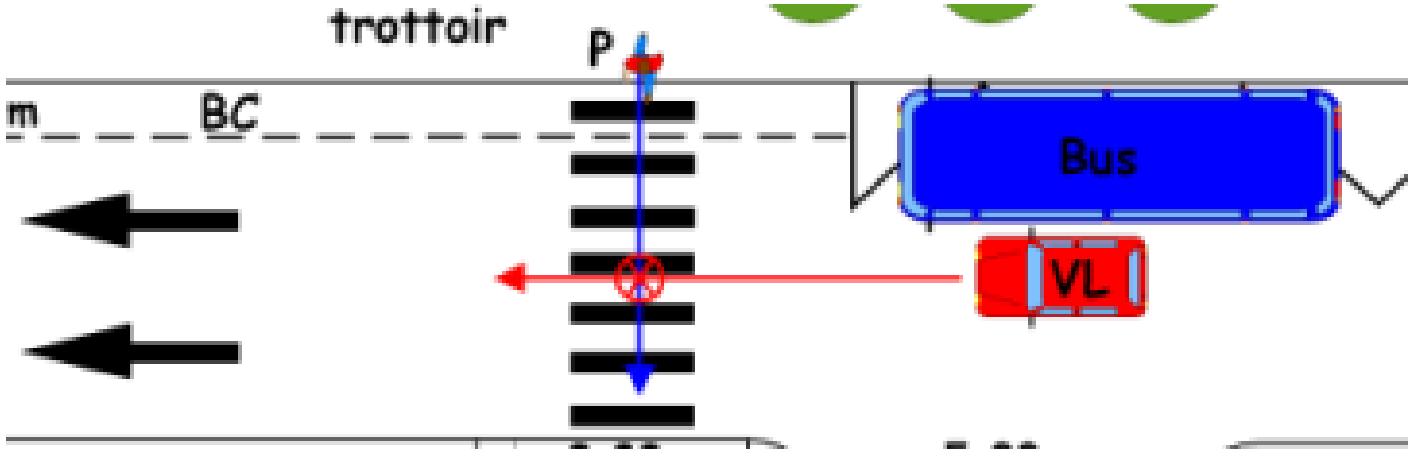


Safety for pedestrians

The pedestrian crossings to reach bus stops

Points to watch at the pedestrian crossings, especially near bus stops:

- Decrease the exposure of pedestrians (shorten crossing distances, islands of at least 2 meters wide ...)
- Avoid other vehicle overtakes the bus without the visibility



The pedestrian crossings to reach bus stops

— Check visibility for all: avoid masks fixed and mobile visibility, implement bus stop in area with good visibility

The pedestrian crossings to reach bus stops

- The waiting time "acceptable" for pedestrians before crossing is limited
  - In crossroads with traffic lights, research has shown that it's hard for pedestrians to comply with more than 30 seconds waiting time, except in heavy traffic

  (Highway Capacity Manual, 2000)
  - When a bus arrives, people hurry to cross

  ⇒ To guarantee safety crossing (green traffic light for pedestrians when a bus arrives, for instance)

  ⇒ To prevent pedestrians from crossing (comfortable waiting area, perception of the arrival of other vehicles…)

The pedestrian crossings with bus lanes

- Take care of the width of the pedestrian crossings and the pedestrian waiting area near the bus stop (if it's too crowded, people can wait on the road)
- In France, bus lanes in opposite direction involve more pedestrians accidents

Fournier, J-Y., Clabaux, N., Brenac, T. (2016) Sécurité dans les rues équipées de couloirs réservés aux bus, Rech. Transp. Secur.

- In France, in bus lanes, pedestrians have more accidents with taxis than with buses

Safety for cyclists

Cycle paths near bus stop

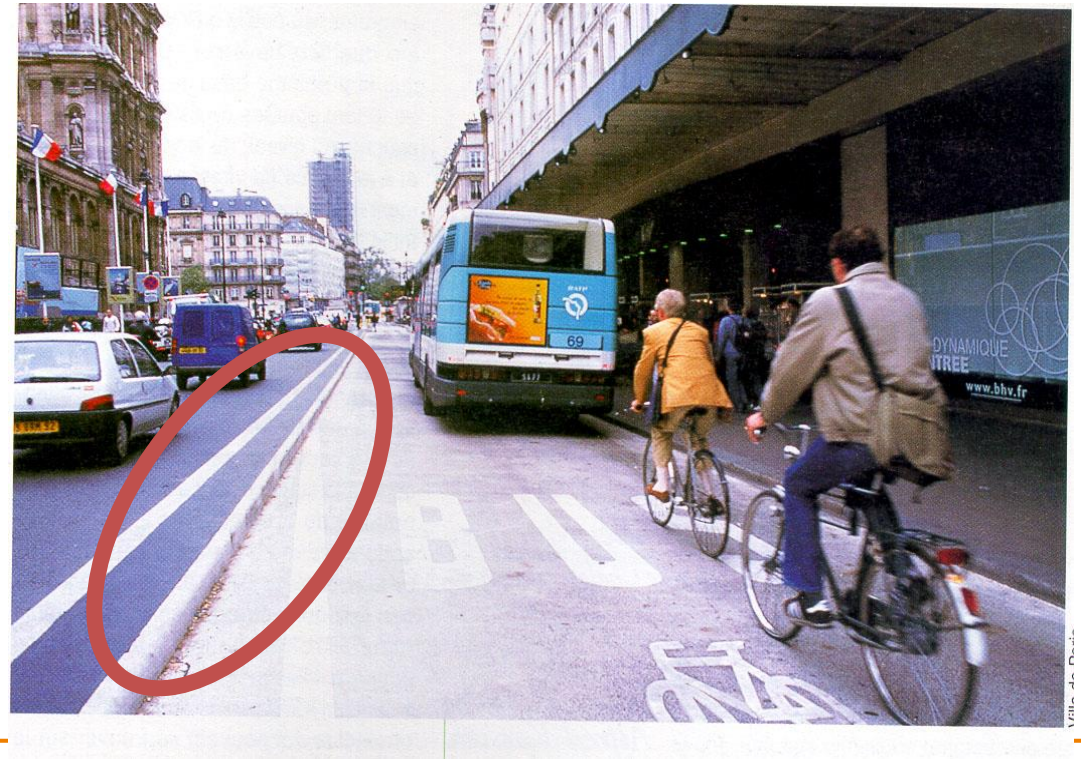
To assure the continuity of cycle path, in front of the bus stop:

⇒ To stop cycle path 10 m before the bus stop to let cyclist integrating traffic flow

⇒ To implement the cycle path behind the bus stop (if there is enough place for pedestrians)

Cyclists and buses

- To mark the route for each one and in particular for cyclists (in crossroad…)
- To adapt the width of the bus lane if it's shared with cyclists (4.5m if there is a separation with other vehicles)



Thank you for your attention

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