



STRMTG

SERVICE TECHNIQUE DES REMONTÉES MÉCANIQUES ET DES TRANSPORTS GUIDÉS

Accidentology of tramways implying bicycles

UTF meeting 11-09-2017

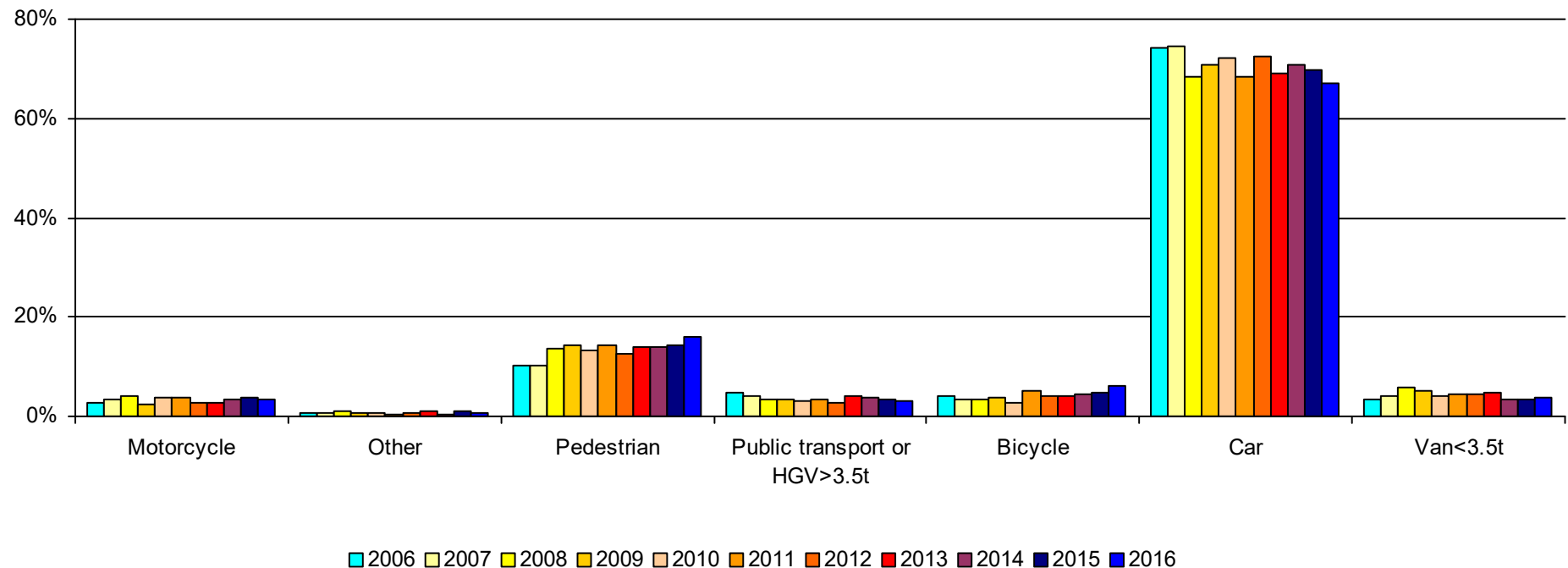
Distribution of collisions by third parties

Evolution 2006-2016

Third party	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Motorcycle	28	40	48	26	41	45	35	38	47	54	49
Other	7	8	12	9	8	6	7	15	5	14	10
Pedestrian	98	119	155	154	150	170	154	188	199	209	230
Public trspt or HGV>3,5t	45	46	41	36	35	40	35	55	55	48	43
Bicycle	40	40	41	39	31	64	50	56	63	72	87
Car	721	875	785	763	808	806	883	912	1004	1027	964
Van<3,5t	32	47	67	54	47	54	54	64	48	48	56
TOTAL	971	1175	1149	1081	1120	1185	1218	1328	1421	1472	1439

Distribution of collisions by third parties Evolution 2006-2016

Distribution of collisions ratio by third parties



- In 2016, collisions with tramways' figures are :
 - Bicycle 6%, behind car (67%) and pedestrian (16%), and ahead of motorcycle (3%), public transport or HGV>3.5 t (3%) and van<3,5t (4%)

Distribution of victims of collisions by third parties

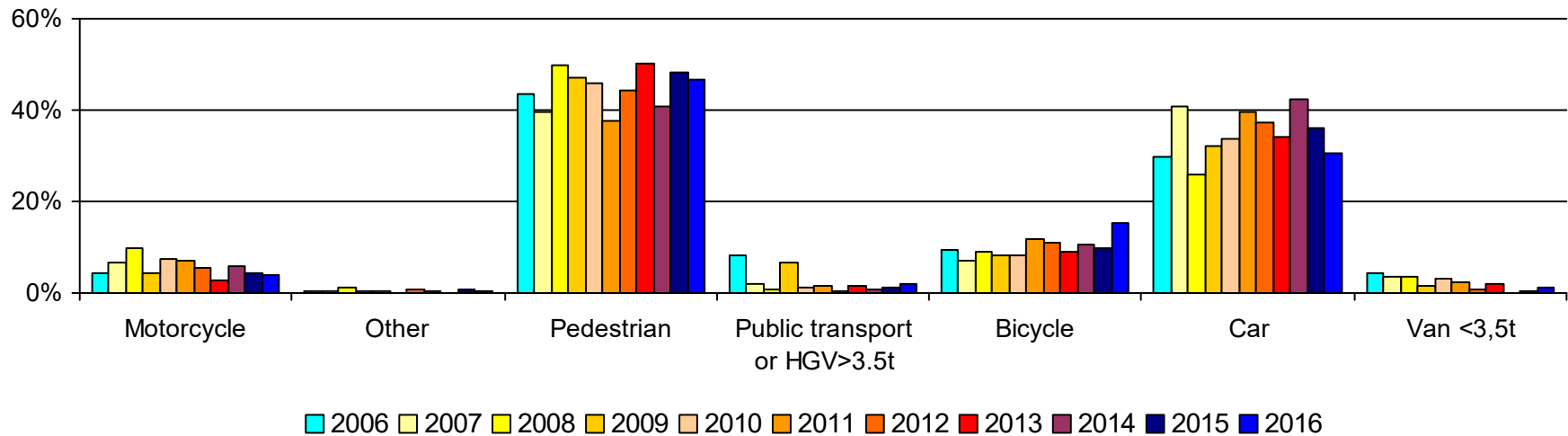
Evolution 2006-2016

Third party	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Motorcycle	8	17	27	12	19	24	14	7	19	12	13
Other	1	1	3	2	1	0	2	1	0	2	1
Pedestrian	83	104	136	137	122	126	116	143	134	139	154
Public trspt or HGV>3,5t	16	5	2	19	3	5	1	4	2	3	6
Bicycle	18	19	25	24	22	39	29	25	35	28	51
Car	57	107	71	94	88	132	97	94	139	103	101
Van<3,5t	8	9	10	4	8	8	2	5	0	1	4
TOTAL	191	262	274	292	263	334	261	279	329	288	330

Distribution of victims of collisions by third parties

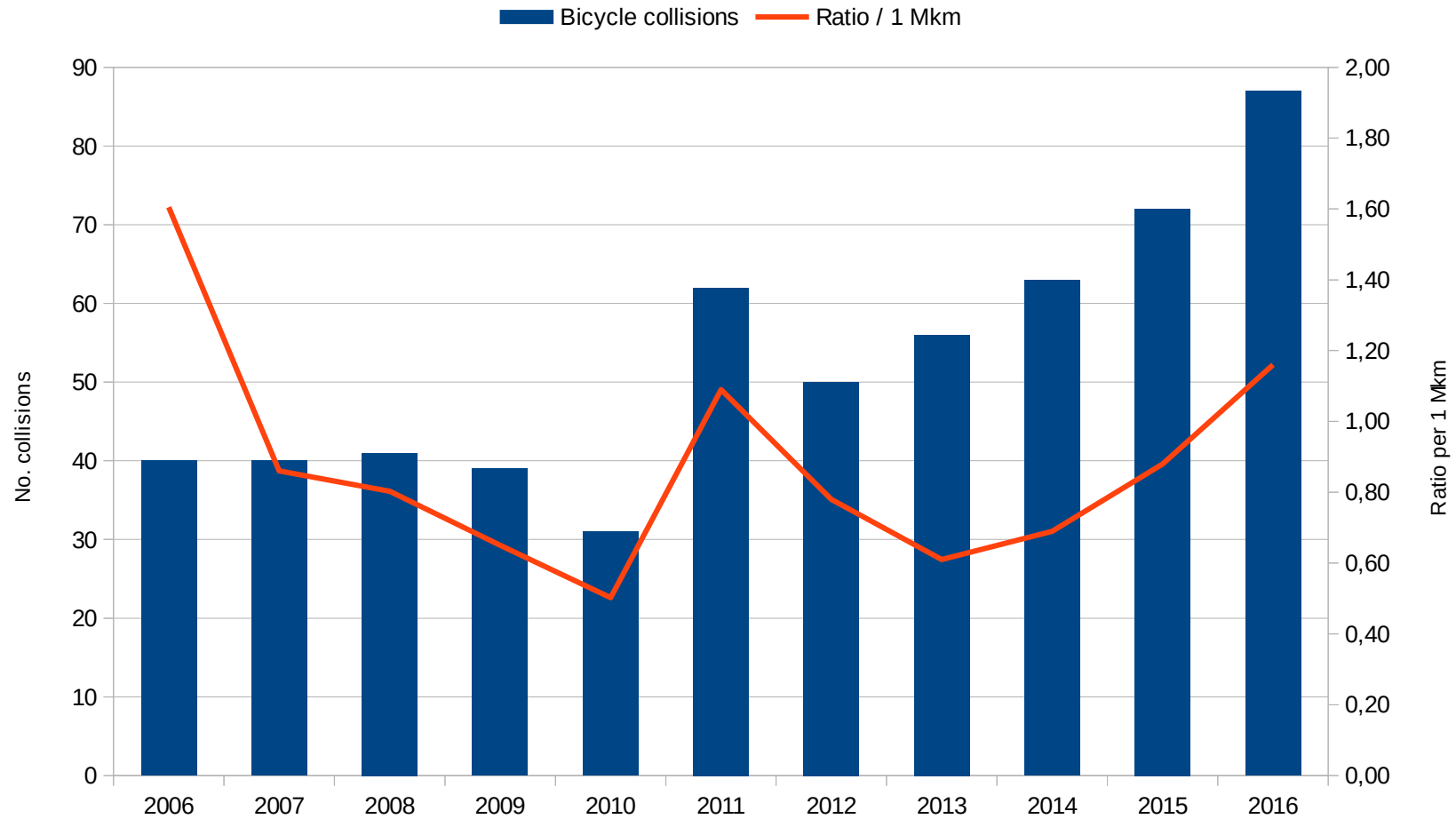
Evolution 2006-2016

Distribution of victims of collisions ratio by third parties



- In 2016, 47% victims from pedestrian collision, 31% from car collision and 15% from bicycle collision

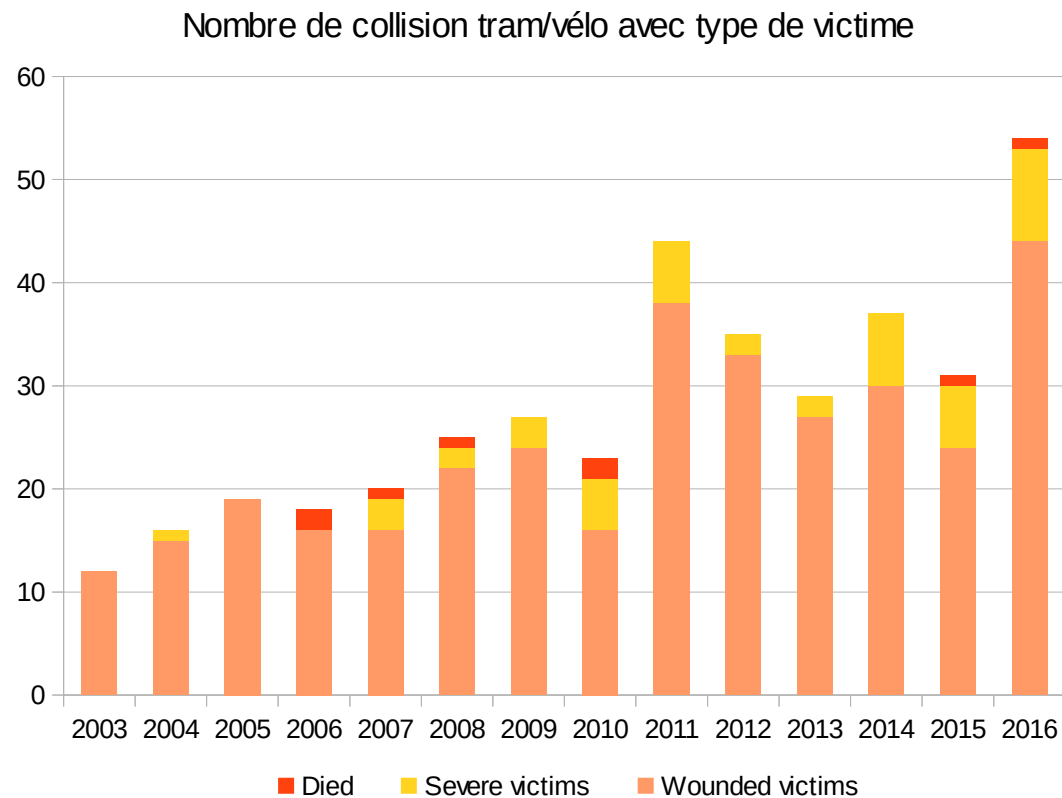
Monitoring indicator : ratio of tramway/bicycle collision per 1 Mkm produced Evolution 2006-2016



Distribution of bicycle collisions according to victims' gravity

Evolution 2003-2016

- Since 2003 : 655 collisions, 8 died victims, 46 severe victims, 336 wounded victims, 279 without injured person

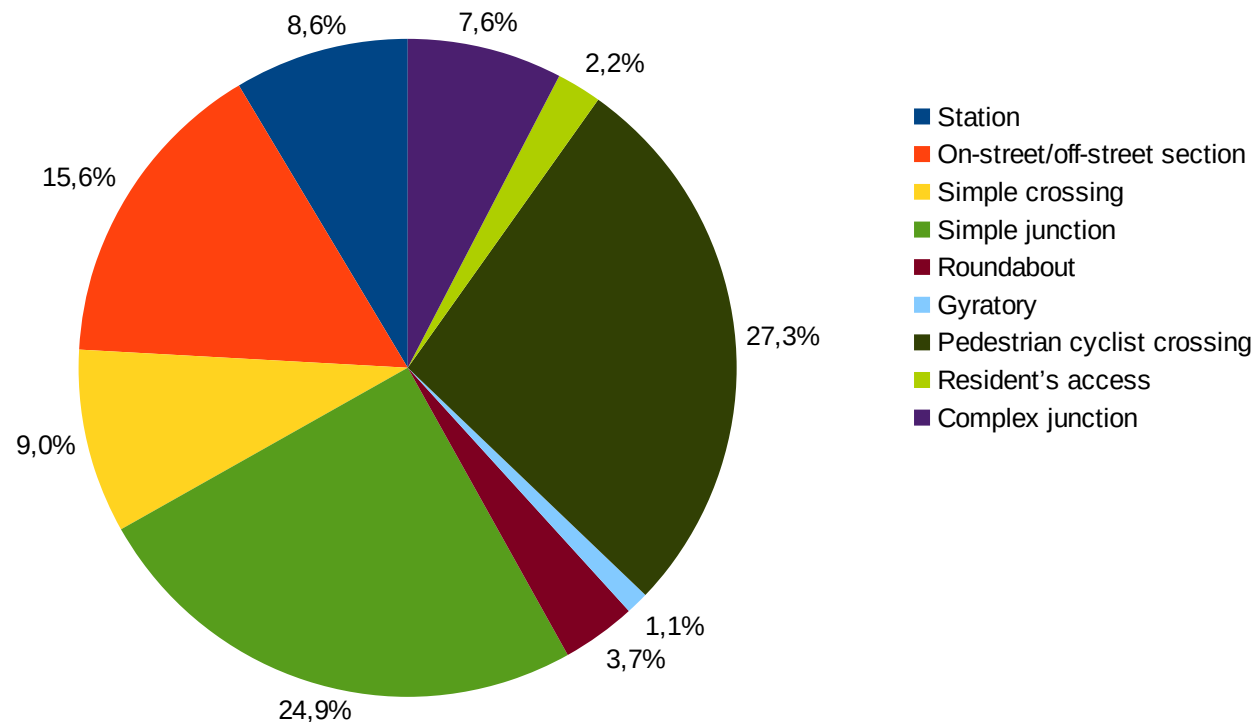


- Conclusion : 60% of collisions make victims

Configuration : Distribution of collisions tramway/bicycle by type of intersection Period 2004-2016

Ratio of collision with bicycles according to configuration

Total No. collision : 630

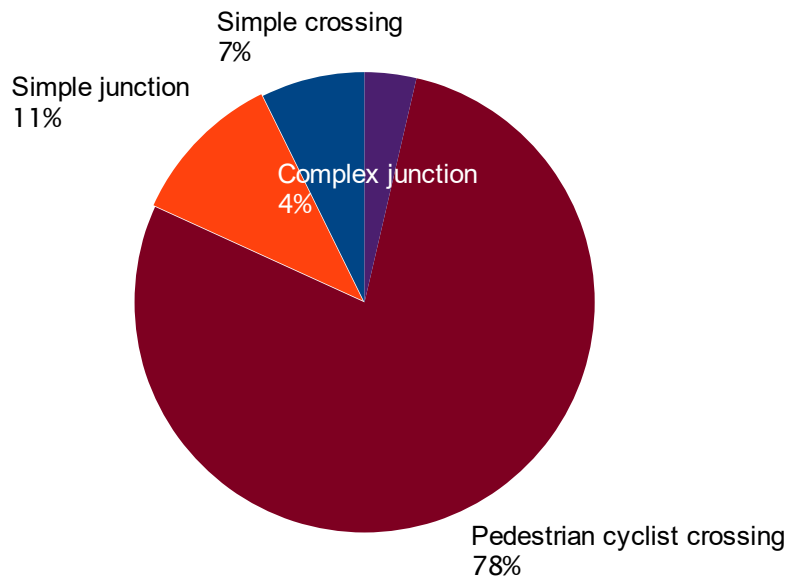


- 16 % on on-street/off-street section, 9 % on station and 75 % on intersection

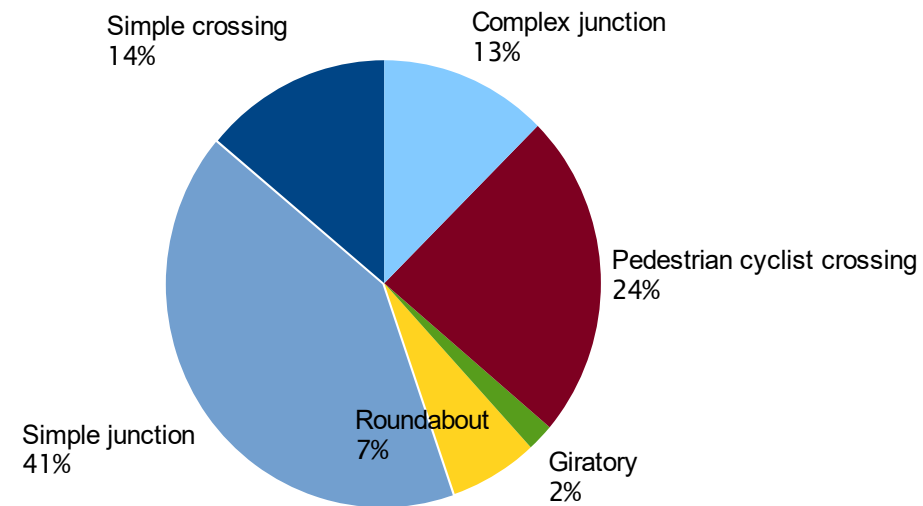
Configuration : ratio of tramway/bicycle collision per type of intersection according to traffic lights' presence Period 2004-2016

- Distribution of bicycle collisions with and without traffic lights :

Number of bicycle collisions without traffic lights



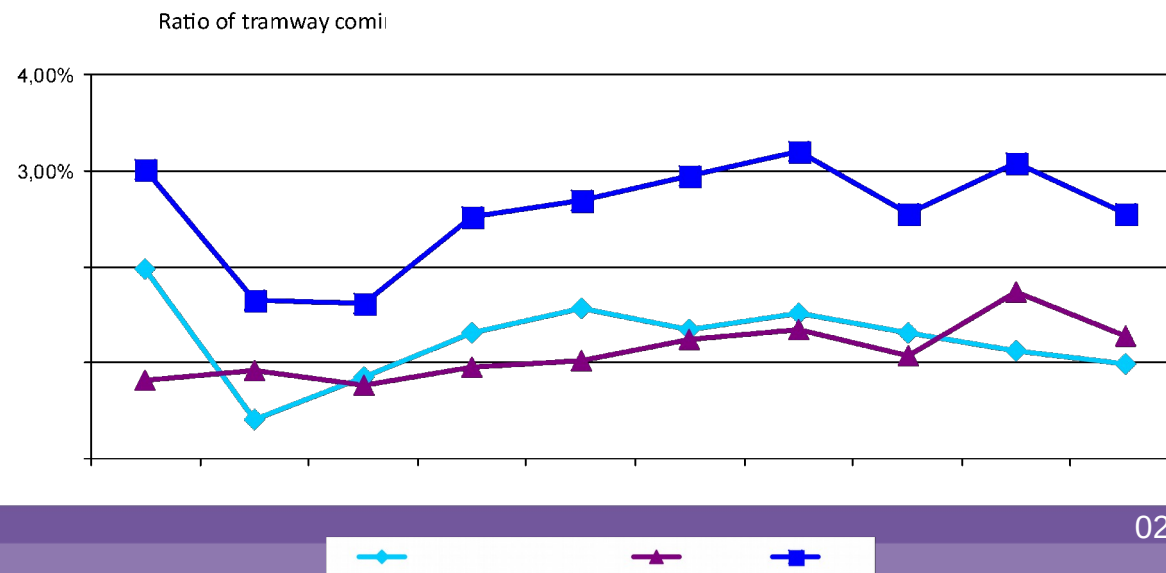
Number of bicycle collisions with traffic lights



Configuration : collision of bicycle with tramway coming from the opposite direction, partly hidden by the first tramway on intersection

Period 2004-2016

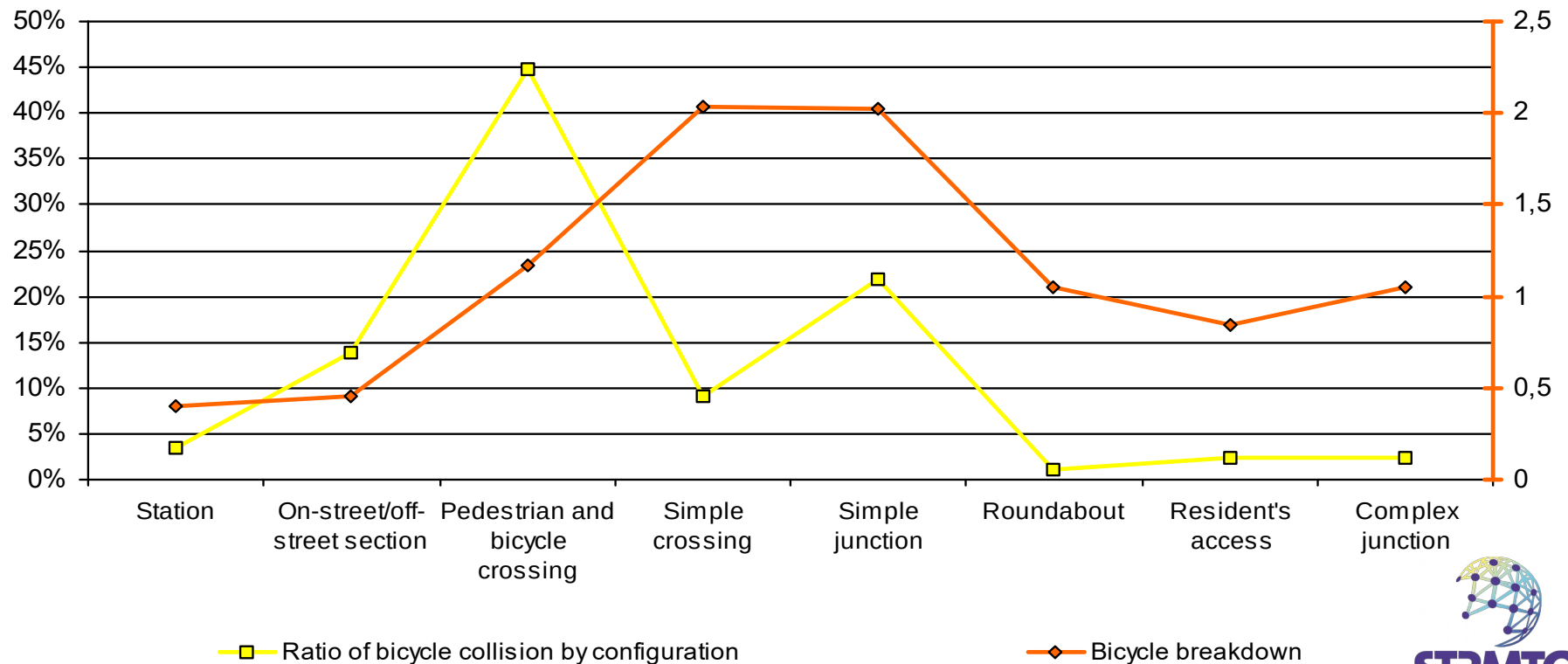
- Since 2004 : 461 collisions on intersection
 - 169 on pedestrian bicycle crossing, including 16 collisions with tramway coming from the opposite direction (representing 9.5%) :
 - 7 with traffic lights
 - 9 without traffic lights
 - 292 on intersection, including 48 collisions with tramway coming from the opposite direction (representing 16.4%) :
 - 47 with traffic lights
 - 1 without traffic lights



Focus on bicycle accidentology 2016

- 86 collisions, 43 wounded victims, 10 severe/dead victims
- Ratio of collisions : 45 % pedestrian bicycle, 22 % simple junction, 14 % on-street/off-street section
- Bicycle breakdown mostly on simple crossing and junction, and pedestrian/bicycle crossing

Relative breakdown of bicycle collision according to configuration



Analysis of severe victims accident reports

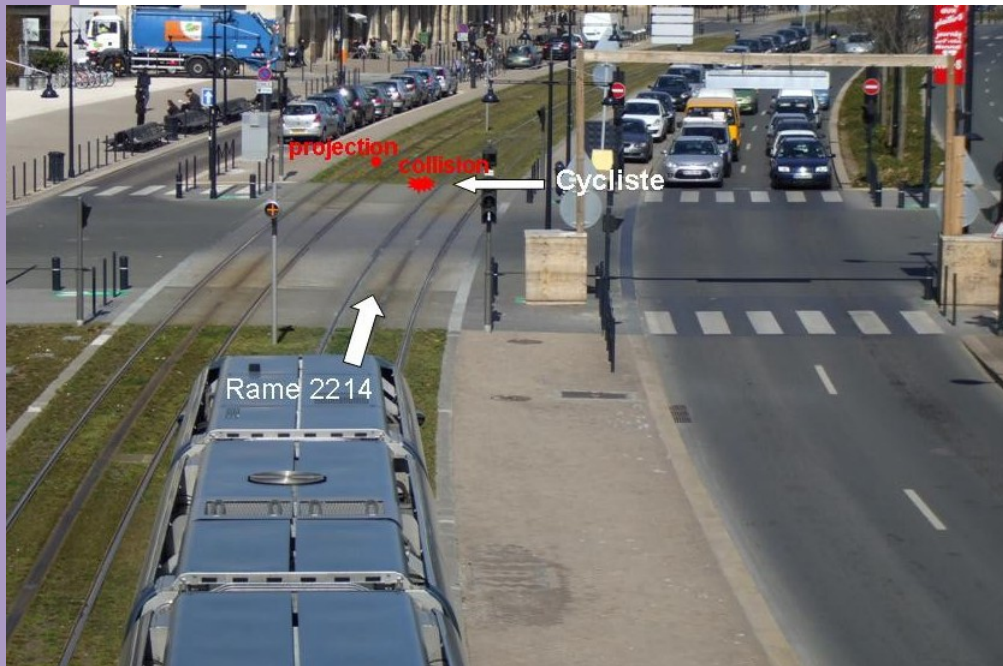
Bicycle crossing on on-street/off-street section



- No bicycle path
- Fixed sign C20c
- Deadly accident : Bicycle crosses tram track while tramway is coming
- Emergency brake at 50 km/h

Analysis of severe victims accident reports

Bicycle crossing on junction



- Bicycle path, crossing tram track
- Light signal : R25
- Deadly accident : tram driver caught sight of bicycle crossing road (R12) and then crossing tram track (R25)
- Gong and emergency brake at 28 km/h

Analysis of severe victims accident reports

Bicycle crossing on junction



- No bicycle path
- No sign for pedestrian
- Deadly accident : tram collides with bicycle coming from right and using pedestrian pavement
- Emergency brake at 30 km/h
- The wall represents a mask to driver's visibility

Analysis of severe victims accident reports

Bicycle crossing on junction – action set up



- No bicycle path
- No sign for pedestrian
- Deadly accident : tram collides with bicycle coming from right and using pedestrian pavement
- Emergency brake at 30 km/h
- The wall represents a mask to driver's visibility

Analysis of severe victims accident reports

Bicycle route along tram track



- Bicycle path, along tram track
- No sign
- Severe accident: bicycle drives along tram track on the same way, and crosses it without looking at behind her
- Gong et FU à 52 km/h

Analysis of severe victims accident reports

Bicycle route along tram track

- Bicycle path, along tram track
- R25 signal
- IB 19 T3 Lyon
- Severe accident : 2 cyclists going on the same way than tram, then 1 of them crosses tram track suddenly on his left
- Road gates put down, R24 and R25 on lights
- Gong and emergency brake at 47 km/h



Analysis of severe victims accident reports

Bicycle route along tram track



- Bicycle path along tram track
- No sign
- Deadly accident : bicycle along tram track, coming from left and turning right ahead of tram
- Brake at 30 km/h

Analysis of severe victims accident reports

Case of simple junction



- Bicycle path, but disrupted due to public works
- Road light signal
- Deadly accident : bicycle turns right and hit by tram coming from in front of
- Emergency brake at 40 km/h

Analysis of severe victims accident reports

Bicycle route crossing tram track



- Bicycle path, crossing tram track
- R11 for cyclists
- Severe accident : after letting a tram passed from his left, bicycle crosses tram track and is hit by a tram coming from the other direction
- Emergency brake at 25 km/h

FIN