

ADB/RSI “PRACTICAL ROAD SAFETY ENGINEERING” ONLINE WORKSHOP - HOMEWORK

(A) INVESTIGATING “BLACKSPOTS”

Two hazardous locations are outlined below – please select one of them, investigate it and prepare a report with your recommendations and a BCR. Crash data (some of it is basic as some was gathered from locals, and not all came from Police crash data), a hand drawn collision diagram, a crash factor grid, photographs, and Google Earth photos for both of the two “blackspots” are attached.

Participants are invited to investigate one site only (it is your choice which one). Examine the crash data (look for patterns), and look at photos of the sites, and be a detective (or a doctor for a sick patient). The photographs will be your site inspection – not the best way to investigate blackspots but the only option for us at present.

Then prepare a one-page crash treatment report with clear recommended treatments, cost, estimated benefits and a BCR.

All participants are invited to email their one page reports (in English) with their main findings and recommendations by 5pm Tuesday 4th August Manila time to magas.consultant@adb.org with a copy to msayon.consultant@adb.org

Feedback will be given at the beginning of Session 6 on Thursday 6th August; all reports will be assessed, and results sent to participants as soon as possible after that and hopefully by the end of the workshop on August 13th.

SITE 1 A pedestrian blackspot on a wide arterial road in a capital city. (Driving on the right side)

A 200m section of urban arterial road has experienced 14 collisions (8 at night, and 3 or maybe 4 at dawn/dusk, and 2 in daytime) in the past three years. Eight of these involved a pedestrian. The road has six traffic lanes (plus a bus lane on each side); it is straight and flat, and speeds can be above the 60kmh speed limit, particularly at night. Intersection traffic signals are 600m away in both directions; they are fixed time signals and they have no pedestrian signals. There is a large pedestrian subway under this section of road (authorities are dismayed that so many pedestrian crashes happen while this facility is so close).

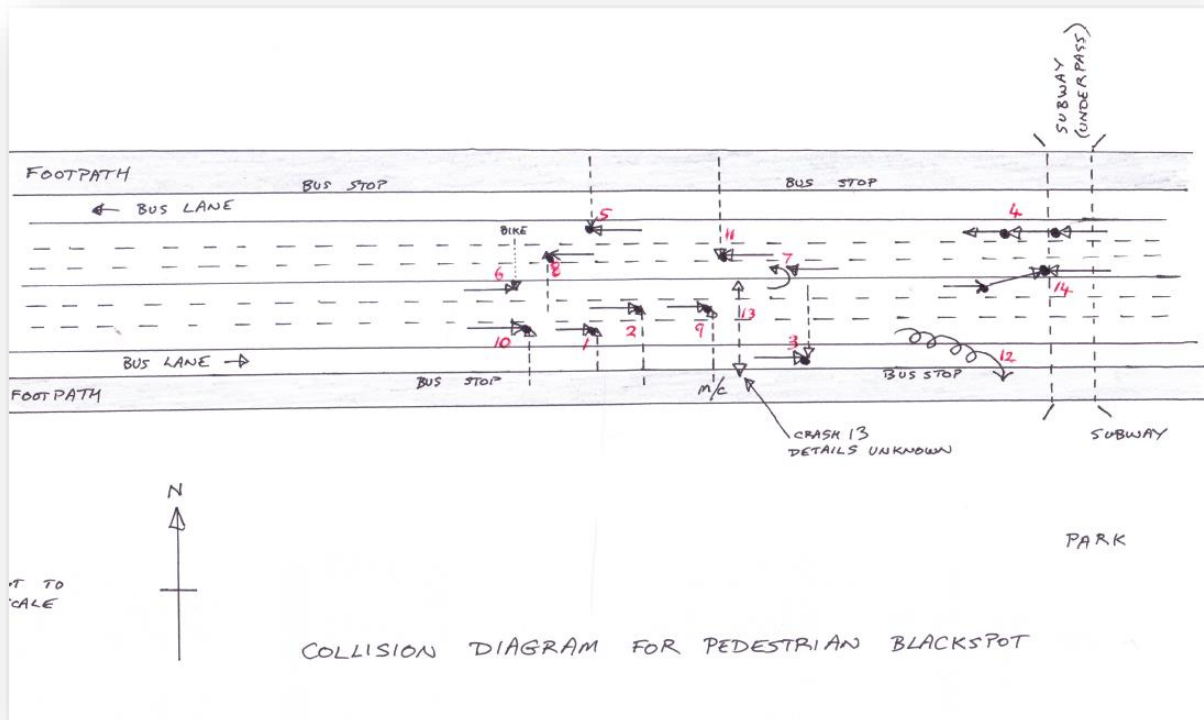
The surrounding area has several commercial multi-storey buildings, a University, and a large park. Most of the pedestrians who cross the road are young adults (students and office workers) who cross to bus stops. Some pedestrians wait on the centre line before crossing the second half of the road. More than 100 pedestrians per hour cross the road while less than 50 pedestrians per hour use the underpass. The underpass is wide, quite open, clean, and reasonably well maintained. There are no shops or attendants in it, and the lighting is poor. To access the underpass, pedestrians must use steps. The underpass serves the park well but is located east of where most pedestrians want to cross this busy road.

The community has been requesting action. Will renovating the underpass, and improving its attractiveness to pedestrians, address the pedestrian safety problem here? Will it be necessary to use fencing to restrict pedestrians from crossing at road level, and directing them into the underpass? Signals, refuges, kerb extensions? What other options may there be?

If necessary, make assumptions and state these in your report.

Assume a casualty crash (fatal and serious injury) costs average \$150,000USD in this country. Crash costs for this blackspot are therefore = 14 x \$150,000 = **\$2,100,000USD**

CRASH NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14
DATE	12/3	5/5	11/10	29/11	20/1	28/3	1/4	5/9	8/12	31/12	2/2	10/3	5/6	7/9
DAY OF WEEK	SUN	FRI	WED	WED	SAT	WED	SUN	WED	SAT	MON	MON	SUN	WED	SAT
TIME OF DAY	01.15	22.30	19.20	17.50	11.10	20.55	18.30	23.00	14.40	04.00	06.45	23.30	?	20.30
SEVERITY	1	2	2	3	3	3	2	1	3	1	3	1	2	2
LIGHT CONDITION													?	
ROAD CONDITION	WET	DRY	DRY	DRY	DRY	DRY	WET	DRY	WET	DRY	DRY	DRY	?	DRY
CRASH TYPE	003	003	001	303	001	102	207	002	102	004	001	502	?	301
VEHICLE 1	CAR	CAR	BUS	BUS	CAR	CAR	M/C	CAR	CAR	CAR	M/C	M/C	PED	CAR
VEHICLE 2	PED	PED	PED	TRUCK	PED	BIKE	CAR	PED	M/C	PED	PED		?	CAR
VEHICLE 3				CAR										CAR
DIRECTION VEH. 1	E	E	E	W	W	E	W	W	E	E	W	E	?	E
DIRECTION VEH. 2	N	N	S	W	S	S	W	N	NE	N	S	N	?	?
DIRECTION VEH. 3				W										W
OBSERVATIONS	ALC	ALC	SPEED					ALC & SPEED				SPEED		U TURN



Make any assumptions you need about costs, and use the attached Crash Reduction Factors to make a reasoned estimate for the benefits you will get from your treatments (use the largest CRF of any of the treatments you recommend – do not add CRF's together!!)



PHOTOGRAPHS OF PEDESTRIAN BLACKSPOT, URBAN ARTERIAL ROAD

SITE 2 A Y-junction of a national highway and a state highway (both are 2 lane, 2-way roads) in a rural area. (Driving on the left side).

In the past 3 years there have been 12 casualty crashes at this Y junction. 7 were “right-turn against through” crashes mainly at dusk and night, 3 were rear-end collisions, one was a run-off-road collision and one involved a pedestrian. The Police reports do not give many details of the crashes, but residents say that mostly the “right-turn-against” collisions occur at night as trucks/buses turn right from the north to the west – and are struck by vehicles heading north.

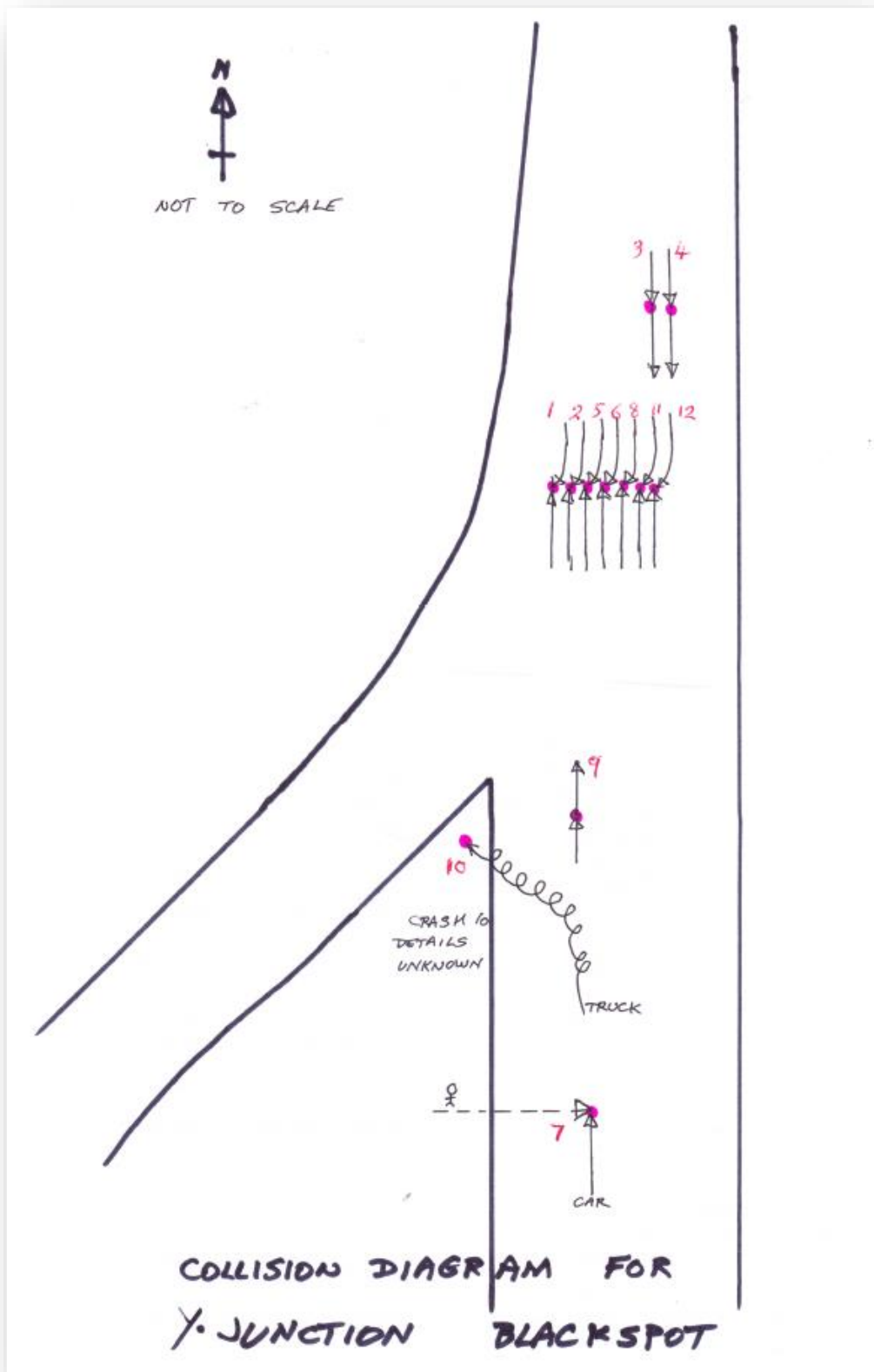
Two of the rear-end collisions are vehicles from the north striking vehicles on the national highway as they wait to turn right (from north to west). The other rear-end collision occurred on the southern approach (apparently when a northbound car braked hard to avoid a turning vehicle from the north). There is no information about the run-off-road crash except it occurred at night and it involved a truck. A pedestrian was struck while running across the national highway about 30-40m south of the junction, at about 10pm on a weeknight.

There is no information about the weather at the time of these crashes (fine, or wet etc.). If necessary, make assumptions and state these in your report.

Assume a casualty crash (fatal and serious injury) costs average \$75,000USD in this country. Crash costs for this blackspot are therefore = 12 x \$75,000 = **\$900,000USD**

CRASH NUMBER	1	2	3	4	5	6	7	8	9	10	11	12
DATE	12/3	?	11/7	29/1	28/3	1/4	5/9	8/2	31/4	?	10/8	7/9
DAY OF WEEK	SUN	FRI	WED	WED	WED	SUN	WED	SAT	MON		SUN	SAT
TIME OF DAY	01.00	?	19.30	17.50	?	18.30	22.00	14.40	04.00	?	23.30	20.30
SEVERITY	1	2	2	3	3	2	2	3	1	2	1	2
LIGHT CONDITION												
ROAD CONDITION	WET	DRY	DRY	DRY	DRY	WET	DRY	WET	DRY	DRY	DRY	DRY
CRASH TYPE	202	202	301	301	202	202	002	202	301	701	202	202
VEHICLE 1	TRUCK	CAR	BUS	BUS	CAR	M/C	PED	TRUCK	CAR	TRUCK	M/C	TRUCK
VEHICLE 2	BUS	TRUCK	TRUCK	TRUCK	M/C	BUS	CAR	M/C	CAR		TRUCK	CAR
VEHICLE 3												
DIRECTION VEH. 1	S	S	S	S	S	S	E	S	N	N	S	S
DIRECTION VEH.2	N	N	S	S	N	N	N	N	N		N	N
DIRECTION VEH.3												
OBSERVATIONS			SPEED	SPEED							SPEED	

NOTE: All of the right turn against and the two rear end collisions where Vehicle 1 is shown to be travelling S (south) involved a vehicle that was turning from the north to the west. It was travelling S (or stationary) at the point of impact and is coded that way. The drivers were intending to head west.



Make any assumptions you need about treatment costs, and use the attached Crash Reduction Factors to make a reasoned estimate for the benefits you will get from your treatments (use the largest CRF of any of the treatments you recommend – do not add CRF's together!!)



Y-JUNCTION



NORTH APPROACH



NORTH APPROACH



NORTH APPROACH



SOUTH APPROACH



WEST APPROACH

Figure 2.1: Standard accident-type codes for definitions for coding accidents (DCAs) in Australia

	00	10	20	30	40	50	60	70	80	90
	PEDESTRIAN on foot, in toypram	INTERSECTION vehicles from adjacent approaches	VEHICLES FROM OPPOSING DIRECTIONS	VEHICLES FROM ONE DIRECTION	MANOEUVRING	OVERTAKING	ON PATH	OFF PATH, ON STRAIGHT	OFF PATH, ON CURVE	PASSENGERS & MISCELLANEOUS
	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER
	00	10	20	30	40	50	60	70	80	90
1	NEAR SIDE 001	THRU-THRU 101	HEAD-ON 201	REAR-END 301	LEAVING PARKING 401	HEAD ON 501	PARKED 601	OFF CARRIAGEWAY TO LEFT 701	OFF CARRIAGEWAY RIGHT BEND 801	FELL IN/FROM VEHICLE 901
2	EMERGING 002	RIGHT-THRU 102	THRU-RIGHT 202	LEFT-REAR 302	PARKING 402	OUT OF CONTROL 502	DOUBLE PARKED 602	OFF CARRIAGEWAY TO RIGHT 702	OFF CARRIAGEWAY LEFT BEND 802	
3	FAR SIDE 003	LEFT-THRU 103	RIGHT-LEFT 203	RIGHT-REAR 303	PARKING VEHICLES ONLY 403	PULLING OUT 503	ACCIDENT OR BROKEN DOWN 603	LEFT OFF CARRIAGEWAY INTO OBJECT 703	OFF RIGHT BEND INTO OBJECT 803	HIT TRAIN 903
4	PLAYING, WORKING, LYING, STANDING ON CARRIAGEWAY 004	THRU-RIGHT 104	RIGHT-RIGHT 204	U-TURN 304	REVERSING IN TRAFFIC 404	CUTTING IN 504	CAR DOOR 604	RIGHT OFF CARRIAGEWAY INTO OBJECT 704	OFF LEFT BEND INTO OBJECT 804	HIT RAILWAY XING FURNITURE 904
5	WALKING WITH TRAFFIC 005	RIGHT-RIGHT 105	THRU-LEFT 205	LANE SIDE SWIPE 305	REVERSING INTO FIXED OBJECT 405	PULLING OUT REAR END 505	HIT PERMANENT OBSTRUCTION 605	OUT OF CONTROL ON CARRIAGEWAY 705	OUT OF CONTROL ON CARRIAGEWAY 805	HIT ANIMAL, OFF CARRIAGEWAY 905
6	FACING TRAFFIC 006	LEFT-RIGHT 106	LEFT-LEFT 206	LANE CHANGE - RIGHT 306	LEAVING DRIVEWAY 406	OVERTAKING- RIGHT TURN 506	HIT ROADWORKS 606	LEFT TURN 706		PARKED VEHICLE RAN AWAY 906
7	DRIVEWAY 007	THRU-LEFT 107	U-TURN 207	LANE CHANGE - LEFT 307	FROM LOADING BAY 407		HIT TEMPORARY OBJECT ON CARRIAGEWAY 607	RIGHT TURN 707		VEHICLE MOVEMENTS NOT KNOWN 907
8	ON FOOTWAY 008	RIGHT-LEFT 108		RIGHT TURN S/S 308	FROM FOOTWAY 408			MOUNTS TRAFFIC ISLAND 708	MOUNTS TRAFFIC ISLAND 808	
9	STRUCK WHILE BOARDING OR ALIGHTING 009	LEFT-LEFT 109		LEFT TURN S/S 309			HIT ANIMAL 609			
10				PULLING OUT 310			LOAD HITS VEHICLE 610			

DEFINITION FOR CLASSIFYING ACCIDENTS (DCA) CHART – FOR DRIVING ON LEFT SIDE OF THE ROAD.