TERNZ TRANSPORT RESEARCH

NZ TRANSPORT AGENCY WAKA KOTAHI

DO 'SAFE-HIT' POST MEDIANS HAVE A PLACE IN NEW ZEALAND'S SAFE ROADS SYSTEM?

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PekaPeka Passing lane project

Rationale for 'safe hit' post median treatment

Hopefully an improved level of safety compared with double yellow audio tactile lines

Cheaper road safety option that might be installed in advance of wire or solid barriers

Median safety continuum?

Less safe	**Painted yellow lines:** Standard median configuration traditionally used in New Zealand.
	ATP on (or next to) painted yellow lines: ATP helps to prevent inadvertent lane departures when driver is in control of vehicle but not deliberate departures, or those where the driver is not in control of their vehicle.
	Flush median (of varying width) with ATP on right-hand edge lines: In addition to above, the separation provided by the flush median (along with two distinguishable ATP lines) gives added safety via recovery space for deliberate or 'loss of control' departures.
	Flush median with ATP on right-hand edge lines plus safe-hit posts (i.e. Peka Peka): In addition to above, the safe-hit posts prevent deliberate central median crossing via a perception of damaged property when hit. The perceptual effects of the safe-hit posts alone are unknown.
More safe	**Wire rope / solid barrier:** In addition to above, the barrier physically prevents central median crossing, providing an inherently safe system for head on/cross centreline crashes.

Purpose of the study

*Will take time to get actual safety effects, **so**…*

Understand driver behaviour and perceptions

Maintenance issues

Long-term understanding of benefits and costs

Method

- No pre/post evaluation possible
- 4 treatment plus 5 untreated sites, matched as much as possible with geometry, curve direction etc
- Measures of effectiveness (MOEs):
  - Baseline crash history for future analysis
  - Maintenance issues and costs
  - Speed
  - Lane position
  - Merging
  - Turning
  - Motorist perceptions
  - Other matters of interest (e.g. ATP noise)

Treated site

Untreated site

Results - Crashes

Crash Date	Crash ID	Dist from side road	Nth/Sth	Side Road	Mvmt Code	Mvmt description	F	S	M
2000	2010056	750	N	Greenhill Rd	CB	loss cntrl left strght	1	3	0
2000	2012763	400	S	Peka Peka Rd	DB	loss cntrl left curve	0	0	1
2001	2110011	300	N	Greenhill Rd	BA	Head on straight	1	2	1
2002	2211278	900	S	Peka Peka Rd	PA	Pedestrian	0	1	0
2004	2412023	2000	N	Hemi St	JA	Veh turning	0	1	0
2004	2412981	1500	S	Peka Peka Rd	CB	loss cntrl left strght	0	0	1
2005	2512116	1100	N	Greenhill Rd	BF	loss cntrl on curve	0	0	1
2005	2512936	1360	S	Peka Peka Rd	DA	loss cntrl turn rght	0	0	1
2007	2711090	1500	S	Peka Peka Rd	AA	pull out to rght	0	1	2
2007	2711708	1170	S	Peka Peka Rd	CA	strght out of cntrl	0	0	1
2007	2712703	300	N	Greenhill Rd	FD	Queue	0	0	1
2007	2712827	2000	S	Peka Peka Rd	CB	loss cntrl left strght	0	1	3
2008	2812201	820	N	Greenhill Rd	CC	loss cntrl rght strght	0	0	1
2008	2812552	1380	S	Peka Peka Rd	DB	loss cntrl left curve	0	0	1
2008	2812915	3000	N	Ngaio Rd	FD	Queue	0	0	1
2008	2813598	450	N	Greenhill Rd	QF	Fell inside veh	0	0	1
2008	2813889	1280	S	Peka Peka Rd	CB	loss cntrl left strght	0	0	1
2009	2913339	400	N	Greenhill Rd	CB	loss cntrl left strght	0	0	1

Key Point: This site has a significant crash history

Results - Maintenance

Reported maintenance issues for six months following installation

Month	Location	Description
April	0	
May	0	
June	Sthbnd, North end of barrier on straight	Damage identified during routine inspection. Two duraposts knocked down. Posts and sockets OK. Duraposts bolted back in
July	0	
August	0	
September	Sthbnd, North end of barrier on straight	Damage identified on routine inspection. Two duraposts damaged. Duraposts will need to be replaced as too damaged to re-install. RG17 at this location also replaced

Key Point: Overall relatively modest maintenance issues, but need to check in a bit more detail

Results - Speed

Summary of speed measurements for different conditions

Lane type	treatment	Mean Speed (km/hr)	85% Speed (km/hr)
Slow and single lanes	Treated	94	101
	Untreated	95	102
Fast lanes	Treated	103	110
	Untreated	105	113

Note *all differences between treated and untreated sites statistically significant (unpaired t-test, p<0.01)*

Key Point: Definitely no higher speed at treated site, possibly slightly lower. Need to consider other route factors at each location though

Results – Lane position

Summary of lane position at treated vs untreated sites

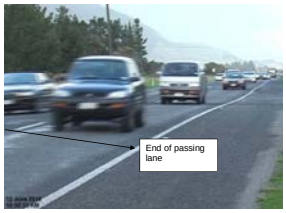
Lane type	Treatment	Count	Dist to Centreline /RH edge line (m)
Straight single lanes	Treated	359	1.11
	Untreated	371	0.84
Straight Fast lanes (no passing only)	Treated	66	0.78
	Untreated	81	0.72

Note *all differences between treated and untreated sites statistically significant (unpaired t-test, p<0.01)*

Key Point: Vehicles travelled further from RH line at treated sites. Lane departures rare at all sites possibly due to ATP

Results – Merging

Treated site



untreated site

Results – Merging

Merging behaviour at treated and untreated locations

Site	No. Merging interactions	No. Level 1 interactions	No. Level 2 interactions	No. Level 3 interactions
Treated	47 (within 49 mins)	35 (74%)	12 (26%)	0
untreated	36 (within 45 mins)	23 (64%)	13 (36%)	0

Level 1 = merging between at least two vehicles occurring but no action taken by the vehicles
Level 2 = some avoiding action taken by either or both vehicles (evidenced by brake lights, lane deviation slowing or acceleration)
Level 3 = severe action taken by at least one vehicle (hard braking, obvious crash avoidance behaviour)

Key Point: Possibly better merging behaviour (certainly no worse) at treated merge compared with untreated areas

Results – Motorist Perceptions

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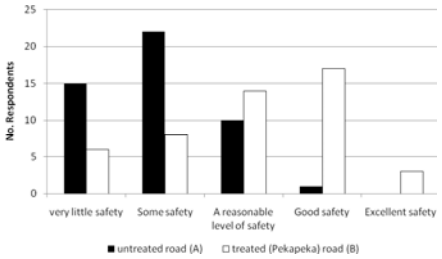
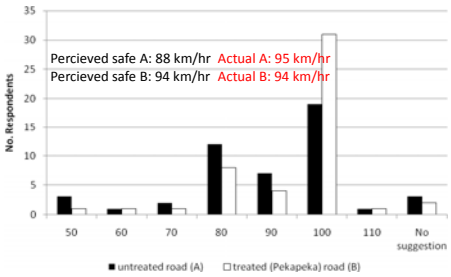


Responses to survey question 2: "Please circle the number that most closely represents the level of safety you feel is provided by the double yellow centrelines (A) / central median (B)?"

Results – Motorist Perceptions



Responses to survey question 3. "What do you think is a safe speed (km/hr) to travel along road (A&B)?"

Results – Motorist Perceptions

Other themes from respondent's open comments were:

- No physical barrier (9 respondents)
- Generally positive statement (7)
- Turning issues (6), this seemed to be related to merging issues (3) as they are at similar locations.
- Noisy rumble strips (6). This theme seems to be related to respondents who live near the merge (southbound) and left-hand curve (northbound) areas.

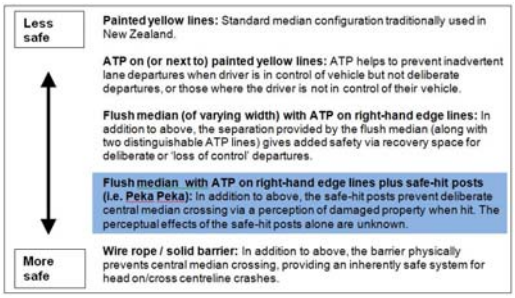
Key Point: Generally positive feedback from perceptions survey

Discussion

Key points:

- Overall, safe hit post median treatment performed well within the constraints of this trial
- Still need to understand more about safety and maintenance
- **DO 'SAFE-HIT' POST MEDIANS HAVE A PLACE IN NEW ZEALAND'S SAFE ROADS SYSTEM? → *Depends on strategic approach***

Too many median treatment categories? Potentially not very 'self explaining'



Discussion

Possible NZTA approach:

Vehicles per day	Median Treatment
Less than 8000 vehicles per day (VPD) → rumble lines	
8-15,000 VPD → wide central medians (with ATP)	
Greater than 15,000 VPD →median wire rope barrier	

Thank

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