
BAY OF PLENTY
KIWI
FRUIT
INDUSTRY
HEALTH & SAFETY FORUM

SYSTEM BUILDING

DR DAVE MOORE

CENTRE FOR OCCUPATIONAL HEALTH AND SAFETY RESEARCH

GROWING RESILIENCE

SAFER AND EFFECTIVE LIGHT VEHICLE SYSTEMS FOR KIWIFRUIT ORCHARD APPLICATIONS USING CONTINUAL IMPROVEMENT

Dave Moore I Hamish Mackie I Lily Hirsch

21 SEPTEMBER 2018

MACKIE RESEARCH
OPTIMISING HUMAN SYSTEMS

AUT



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PROCESS

1. Familiarisation

- Environments &Tasks
- Plant (tools, vehicles, materials,
- People

TASKS

1. Personal transport for inspection and supervision
2. Groups of people getting around the orchard
3. Light construction and maintenance work
4. Other tasks involving trailed implements
5. Spot spraying
6. Crop imaging
7. Dry pollen blowing


AUT


AUT


AUT


AUT


AUT


570 EFI
ADC


B5BNJ
Kawasaki
Kawasaki
KEA
www.keatrailers.co.nz
0800 TOW KEA

PROCESS

2. Focus Groups

- Strengths and weaknesses of the different vehicle options (including not using one at all)
- Different ways of doing the tasks
- Different approaches to system design (e.g. more investment in roading to increase vehicle options)

Appendix 9: TASK 7 - Dry pollen blowing

Notes and Risk Multipliers	Walking	Quad bike (and with trailer)	Side-by-sides
 **People** **Notes** • Pollen expensive so training essential; • Specialised task only done once a year. **General Risk Multipliers** • Looking up at the canopy while moving; • Distraction from hazards at ground or head level due to concentrating on task - not wasting pollen; • Inexperience using a trailer.	FOR • Commonly done so understood and predictable accuracy/productivity • Can vary rates and be more specific/targeted in application • Can use cheaper system • Necessary for applying wet pollen AGAINST • A lot of distance to cover so can get tired (but not a daily/weekly repeated task). Annual only, unless contractor • Slower • Risk of overuse injury – is hard work to hold a blower	FOR • Blower systems mostly designed for quad operators to use • Easy to get on and off vehicle AGAINST • Training essential as it is a specialised task and expensive product (but anyone can run the quad systems if trained) • Requires helmet • Needs to tow a trailer with a pump for larger blower systems (e.g. six nozzle), so some increased risk for operator when turning on headlands and transiting around property	FOR • Easier to operate than a quad – Active Riding skills not required AGAINST • Need to be careful of hitting head for higher models, especially if concentrating hard on pollen application
 **Environment** **Notes** • Single pass so negligible impact in comparison to tasks with cumulative impact potential such as spraying. **General Risk Multipliers** • Poorly maintained or weather-damaged canopy; • Sloping, rutted, or otherwise unpredictable headland surface characteristics.	FOR • None offered AGAINST • Uneven terrain and surface irregularity (e.g. rabbit holes) pose a risk of injury, falls • Risks of hitting head/face on beams, low hanging vines and broken wires	FOR • Most will fit under canopy AGAINST • Need to be careful of rabbit holes etc as bike could roll • Requires Active Riding and therefore predictable surface needed • Agreed lines of travel and No-Go areas required as quad	FOR • None offered AGAINST • Maintaining canopy clear height may be more crucial
 **Machine** **Notes** • Machines travel under canopy along rows and so have to be low enough to deliver the blower outlets to the right height in relation to the canopy;	N/A	FOR • Agile • Productive (but not as targeted as walking). With pollen blower on front vehicle moves at 6 km/h AGAINST • None offered	FOR • Easier to get from one orchard block to another • None offered AGAINST • Vehicle bought for general transport use may not fit under canopy

Inspection / Supervision - by a single operator

Notes and Risk Multipliers	Walki
People	FOR
Notes • Commonly the inspection involves two people as there may be a visitor or person being familiarised with the property accompanying them. Therefore, a vehicle suitable only for a sole operator not ideal • Ideally can get safely and comfortably under the canopy • Light loads and personal gear also commonly carried • Working with irrigation is a common subtask. May well involve operator getting wet and cold which can affect dexterity and riding performance. Also may be conducted during darkness where greater concentration and care needed. • Two wheelers were popular but are rarely used in orchards now as better options are available.	• Reduced ri • Reduced ir surfaces • Unlimited • Healthy • Able to spe time notici of orchard
General Risk Multipliers • The practice of inspecting while moving. Unlike animals machines don't have a vested interest in avoiding holes and rocks • Inexperience on the specific property • Failure to identify faults at early stage through the required vehicle checks	AGAINST • Time taker round the • Fatigue • No weathe • Risk of slip falls • Risk of musculosk • Risk of boi

People

Notes

- Commonly the inspection involves two people as there may be a visitor or person being familiarised with the property accompanying them. Therefore, a vehicle suitable only for a sole operator not ideal
- Ideally can get safely and comfortably under the canopy

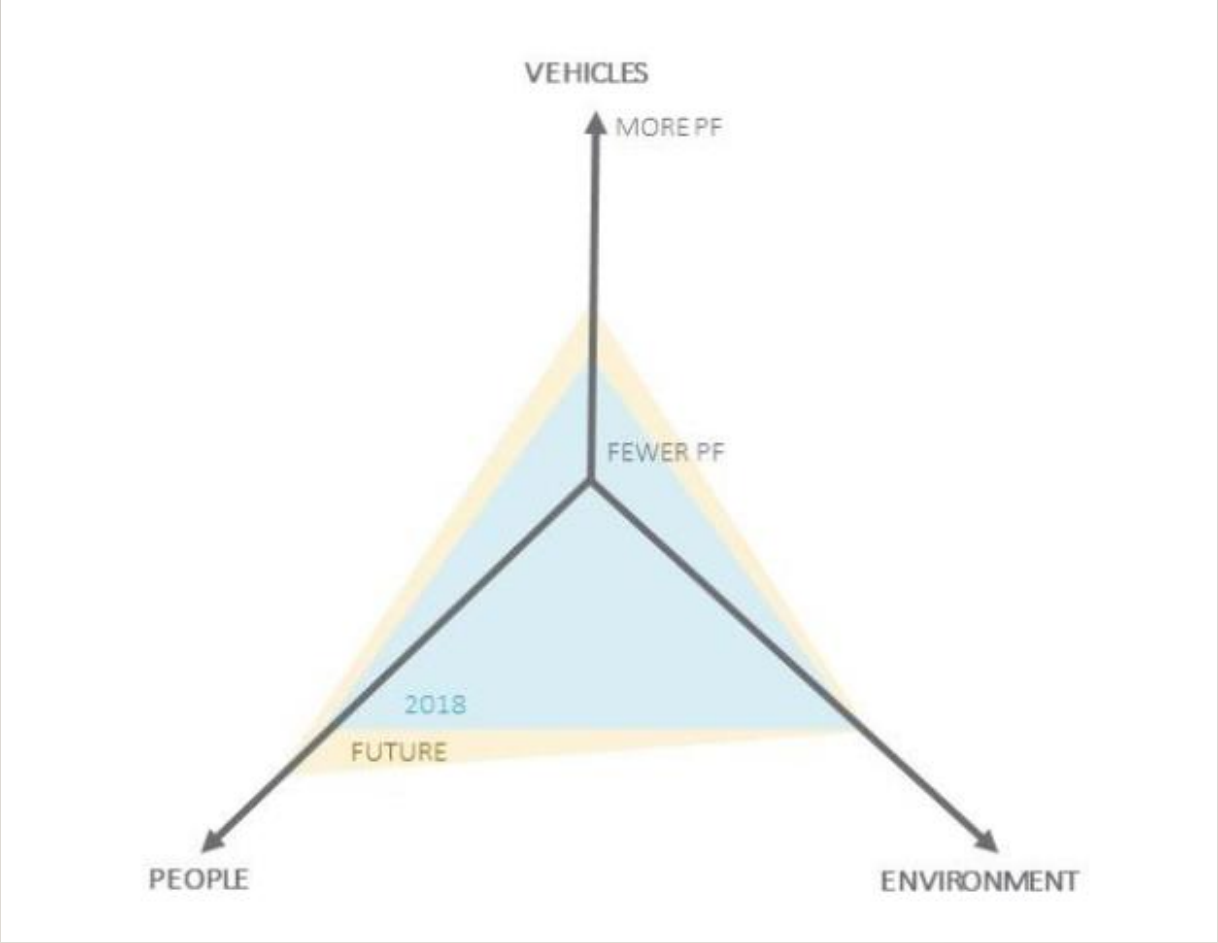
General Risk Multipliers

- The practice of inspecting while moving. Unlike animals machines don't have a vested interest in avoiding holes and rocks
- Inexperience on the specific property

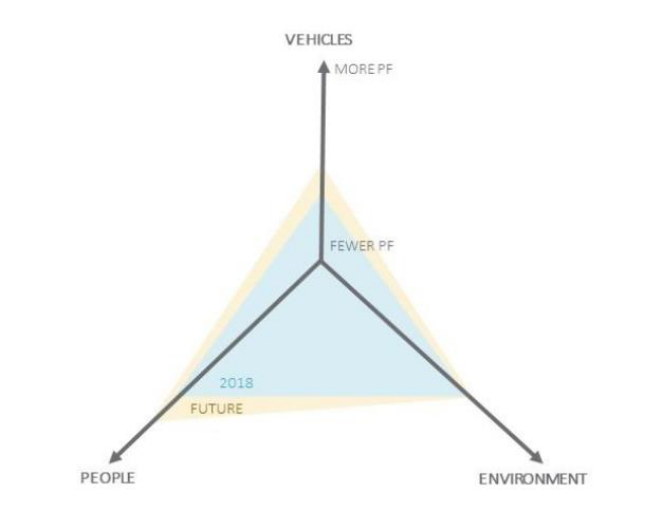
PROCESS

3. Case Studies

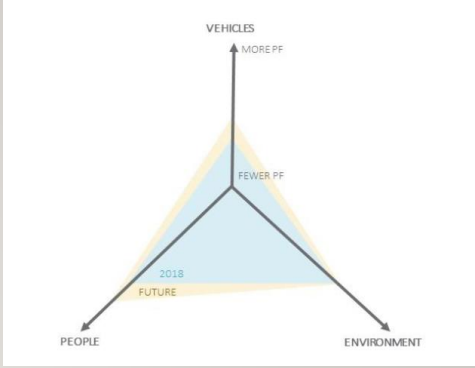
- Discussion on how to strengthen the systems involving vehicles using the ideas
- Building all forms of capital year by year


VEHICLES
MORE PF
FEWER PF
2018
FUTURE
PEOPLE
ENVIRONMENT

Protective Factors (PF) are positive actions that build a more resilient Safe System involving small vehicle use



Environment



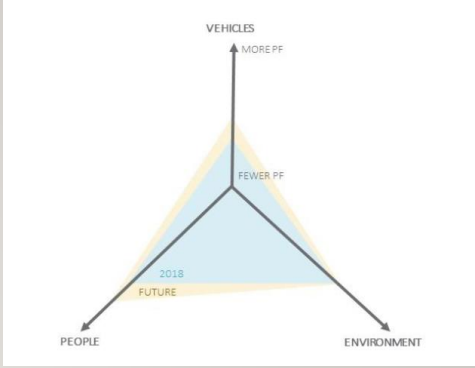
PFs we have introduced already

- Main routes metalled and maintained
- Face to face communications through the day as conditions change
- Blind corners redesigned

PFs we have planned

- Policy on public road use with alternatives reinforced

People



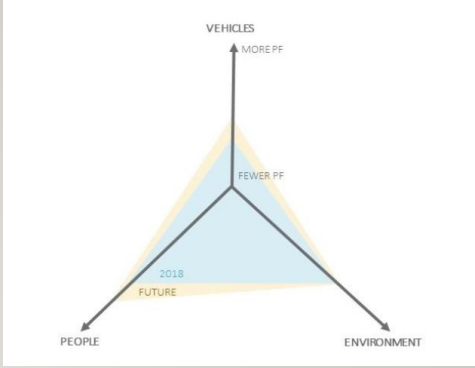
PFs we have introduced already

- Induction training includes site-specific recurrent scenario discussion
- Load limits set. Breaches lead to walking

PFs we have planned

- Comms upgrades linked to vehicle systems

Vehicles



PFs we have introduced already

- Maintenance for all vehicles (in or out of warranty) by qualified people
- Lower vehicles than previous quads

PFs we have planned

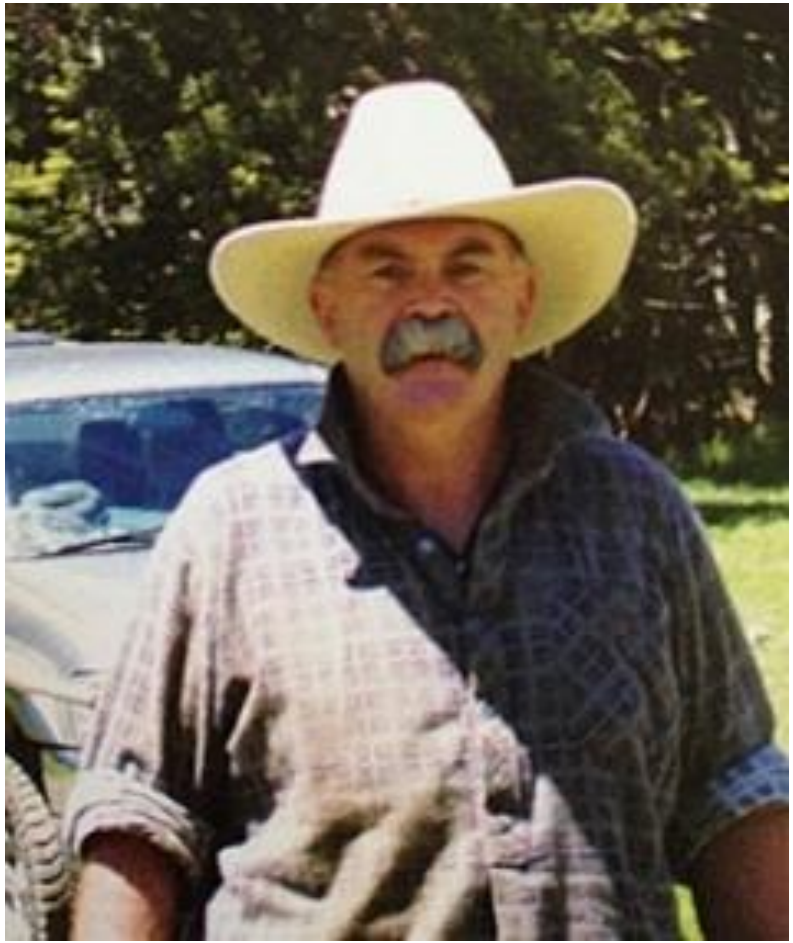
- Monitoring market for upgrades that have better head protection while still fitting under canopy


THANK YOU
MACKIE RESEARCH
OPTIMISING HUMAN SYSTEMS
AUT

Northburn Fire September 2014

Lessons learnt

General H&S lessons for Farmers



Peter Grayland


4.24pm


5.20pm

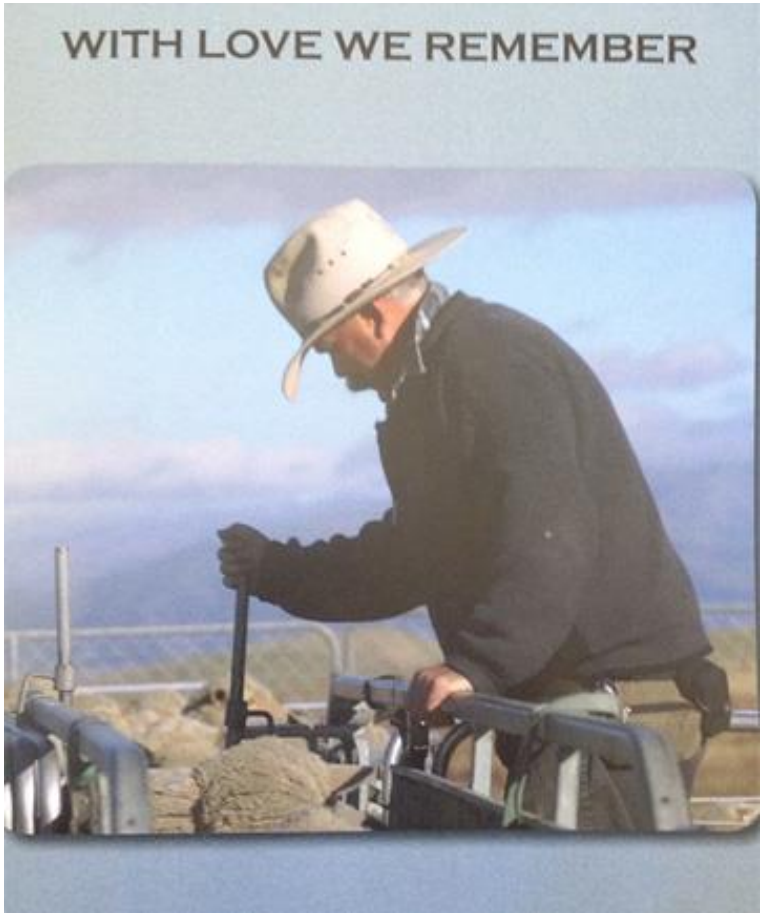

Lessons Learned

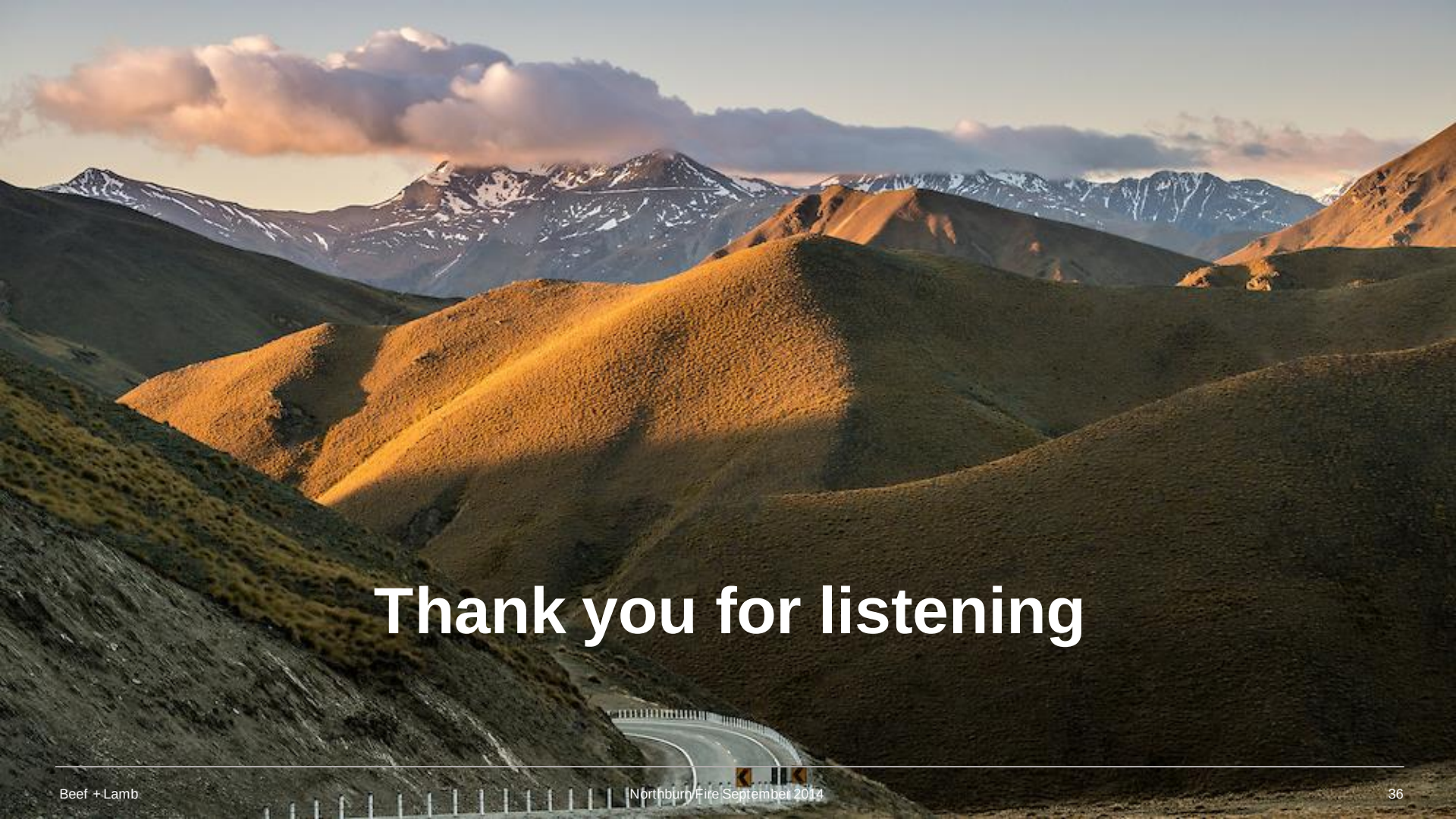

Lookout
Anchor point
Communication
Escape Route**S**


GNL968


JSA
TASK &
JOB
SAFETY
ANALYSIS
take5.nz
JOB SAFETY ANALYSIS
TAKE 5


RESERVE BANK OF NEW ZEALAND
100
THIS NOTE IS LEGAL TENDER FOR
ONE HUNDRED DOLLARS
LORD RUTHERFORD OF NELSON
NEW ZEALAND


WITH LOVE WE REMEMBER


Thank you for listening

Road Safety and the Kiwifruit Industry

Paul Graham, Principal Scientist, New Zealand Transport Agency

Kiwifruit Industry Health & Safety Forum, Tauranga, 14th October 2019

In 2018, on New Zealand roads

there were 11,658 fatal & injury crashes

378 people died

2,128 were seriously injured


POLICE
ACCIDENT


POLICE


FIRE

Crash reporting and analysis

- New Zealand's Crash Analysis System
- Owned by NZ Transport Agency
- All Police-attended crashes are entered into CAS
- Holds data since 1980
- Collects all data relating to what happened
  - location, vehicles, drivers, passengers, pedestrians, objects hit, road conditions, weather, contributing factors, …
- More comprehensive detail for Fatal & Serious crashes

TRAFFIC ACCIDENT REPORT

Send top pages to MOT Regional Office

MOT 4170

1 Local Body: City | Borough | County | District | Motorway

Locality or suburb:

Accident road:

At | Intsn with | OR | Metres | Km | N E S W | OF

Side road:

AND for State Hway: _____ R.P. _____

Fatal accident | Injury accident | Non-injury accident

2 Accident date:

Accident time: 24 Hour clock

Sun 1 | Mon 2 | Tue 3 | Wed 4 | Thu 5 | Fri 6 | Sat 7

Officer arrival time: Didn't attend

Police | M.O.T. | L. Body

Officer no.:

Officer name: _____

Officer station:

3 VEHICLE 1 Reg. No.

Car/Wagon | TaXi | Van/ute | Truck | Bus

School bus | Motor cycle | moPed | Other

Towing: Boat | Caravan | Trailer | Semi-trailer | A train | B Train | Other

Make & Model:

Year: 19 CC rating:

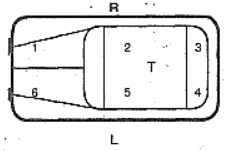
WOF or COF: Yes | No Expiry date : :

Speed before ax: km/hr | Parked | Reversing

No. of passengers: Front: Rear: Other:

Damage:

- Fire
- O/Turn
- Extensive
- Minor/Moderate
- Nil



4 DRIVER 1 Owns veh. | Not owned | Rental

Forenames Surname

Name:

Address:

Phone nos:

D.O.B.: : : Male | Female

Occupation:

Licence no.:

Licence status: Learner | Restricted | Full | Never lic'd | Disqualified | Overseas | unKnown

Injuries: *(in detail)*

Fatal | Serious | Minor | Nil

Hospitalised at:

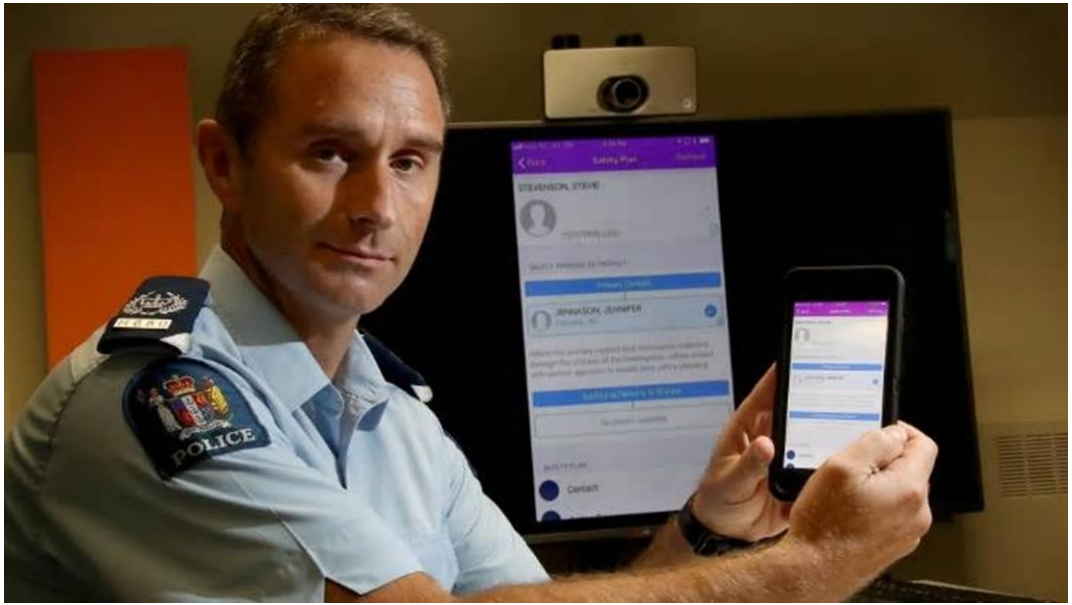
Alcohol: Not suspected | Suspected | Screen + – | Evidential | Blood

PREC/OFF CODE	Code 1	Code 2	Code 3	D.Loc	Rele	FAC 4	FAC5	FAC 6	CODER	DAY	MONTH

5 DRIVER INTERVIEW NOTES:

Driver 1 signature

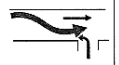
Traffic crash report (TCR)



VEHICLE MOVEMENT CODING SHEET

NZ TRANSPORT AGENCY
WAKA KOTAHI

For use with crash data from the crash system Version 3.0

	TYPE	A	B	C	D	E	F	G	H	J	O
A	OVERTAKING AND LANE CHANGE	 PULLING OUT OR CHANGING LANE TO RIGHT	 HEAD ON	 CUTTING IN OR CHANGING LANE TO LEFT	 LOST CONTROL (OVERTAKING VEHICLE)	 SIDE ROAD	 LOST CONTROL (OVERTAKEN VEHICLE)	 WEAVING IN HEAVY TRAFFIC			A OTHER
B	HEAD ON	 ON STRAIGHT	 CUTTING CORNER	 SWINGING WIDE	 BOTH OR UNKNOWN	 LOST CONTROL ON STRAIGHT	 LOST CONTROL ON CURVE				B OTHER
C	LOST CONTROL OR OFF ROAD (STRAIGHT ROADS)	 OUT OF CONTROL ON ROADWAY	 OFF ROADWAY TO LEFT	 OFF ROADWAY TO RIGHT							C OTHER
D	CORNERING	 LOST CONTROL TURNING RIGHT *REMAINED ON ROADWAY*	 LOST CONTROL TURNING RIGHT *OFF ROADWAY TO LEFT*	 LOST CONTROL TURNING RIGHT *OFF ROADWAY TO RIGHT*	 LOST CONTROL TURNING LEFT *REMAINED ON ROADWAY*	 LOST CONTROL TURNING LEFT *OFF ROADWAY TO LEFT*	 LOST CONTROL TURNING LEFT *OFF ROADWAY TO RIGHT*	 MISSED INTERSECTION OR END OF ROAD	 LOST CONTROL TURNING RIGHT (Old DA Code)	 LOST CONTROL TURNING LEFT (Old DB Code)	D OTHER
E	COLLISION WITH OBSTRUCTION	 PARKED VEHICLE	 CRASH OR BROKEN DOWN	 NON VEHICULAR OBSTRUCTIONS (INCLUDING ANIMALS)	 WORKMANS VEHICLE	 OPENING DOOR	 OPENING DOOR NON TRAFFIC SIDE				E OTHER

sed

cyclist

of

rty
size

135 Lost control – road conditions
136 Lost control – vehicle fault
137 Lost control avoiding another party
130 Other lost control

Appropriate signalling
141 Failed to signal in time
145 Incorrect signal
140 Other failed to signal

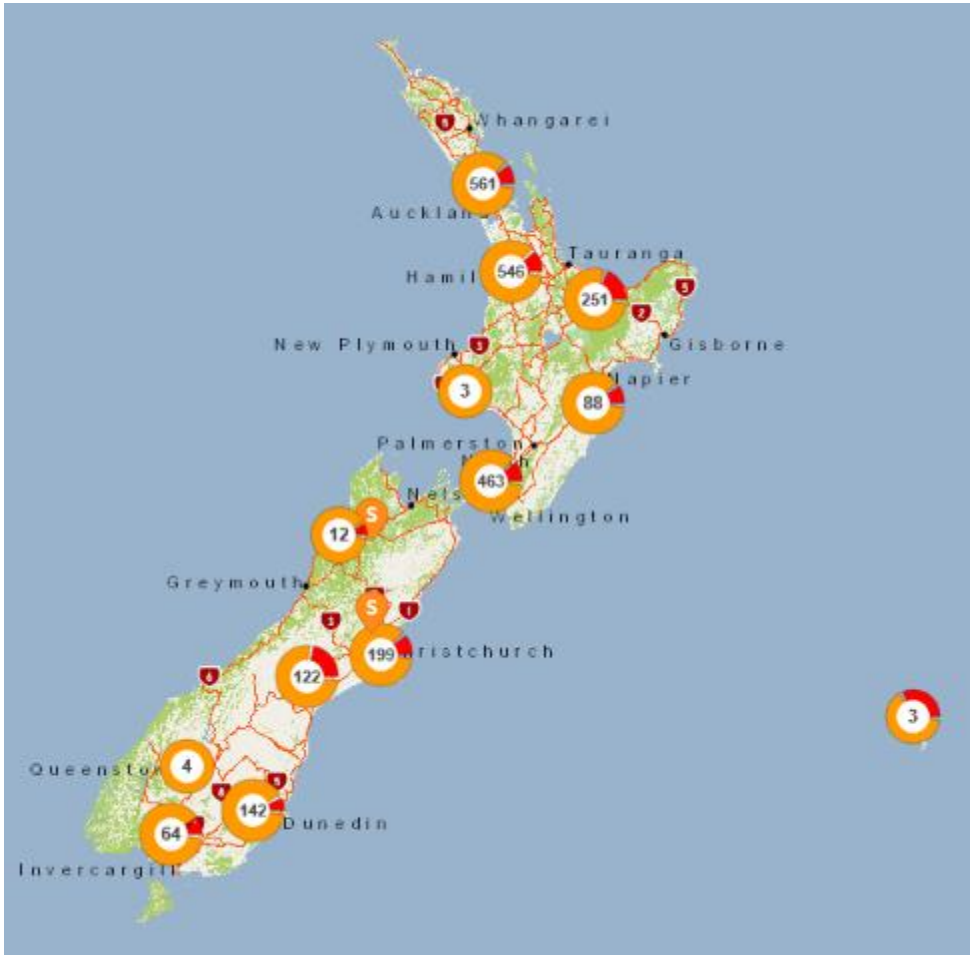
Overtaking
151 Overtaking line of traffic or queue
152 Overtaking in the face of oncoming traffic
156 With insufficient visibility
157 Overtaking at an intersection
158 On left without due care
159 Cut in after overtaking
160 Vehicle signalling turn
150 Other overtaking

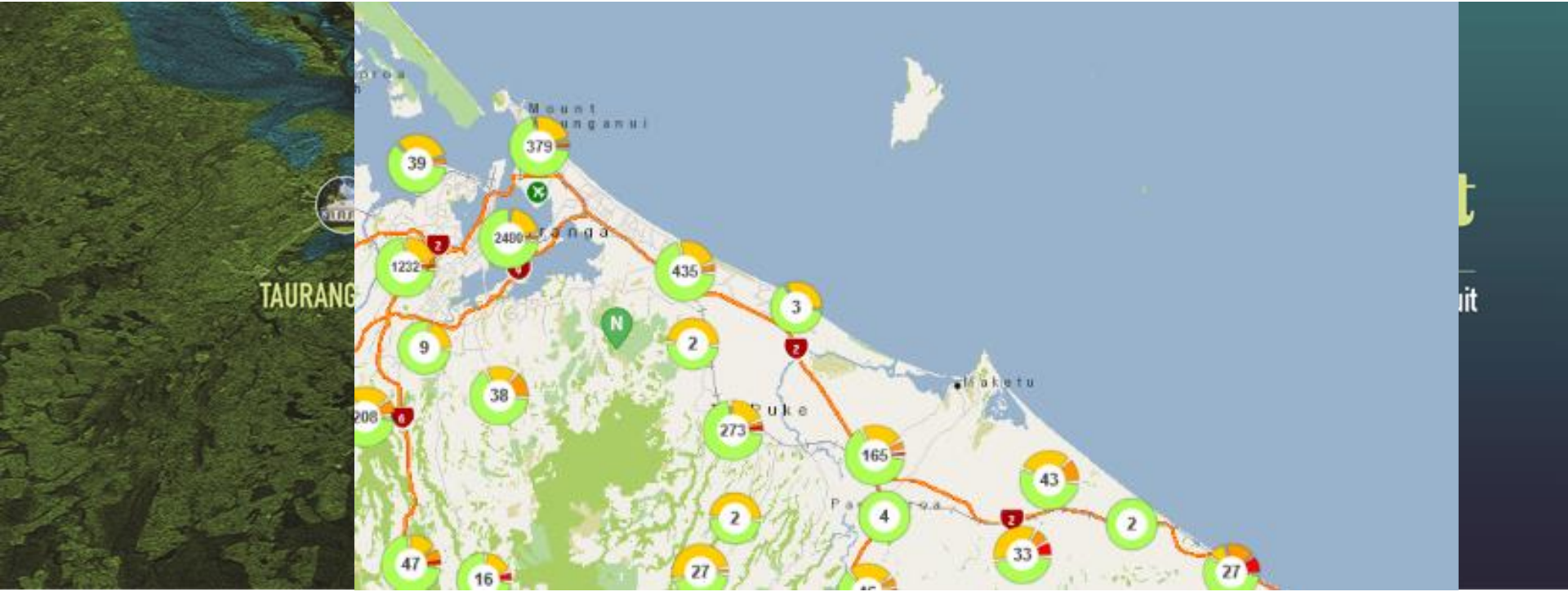
Wrong lane or turned from wrong position
171 Turned from incorrect lane
173 Travelled straight from turning lane or flush median
174 Turned from incorrect position on road
176 Turned into incorrect lane

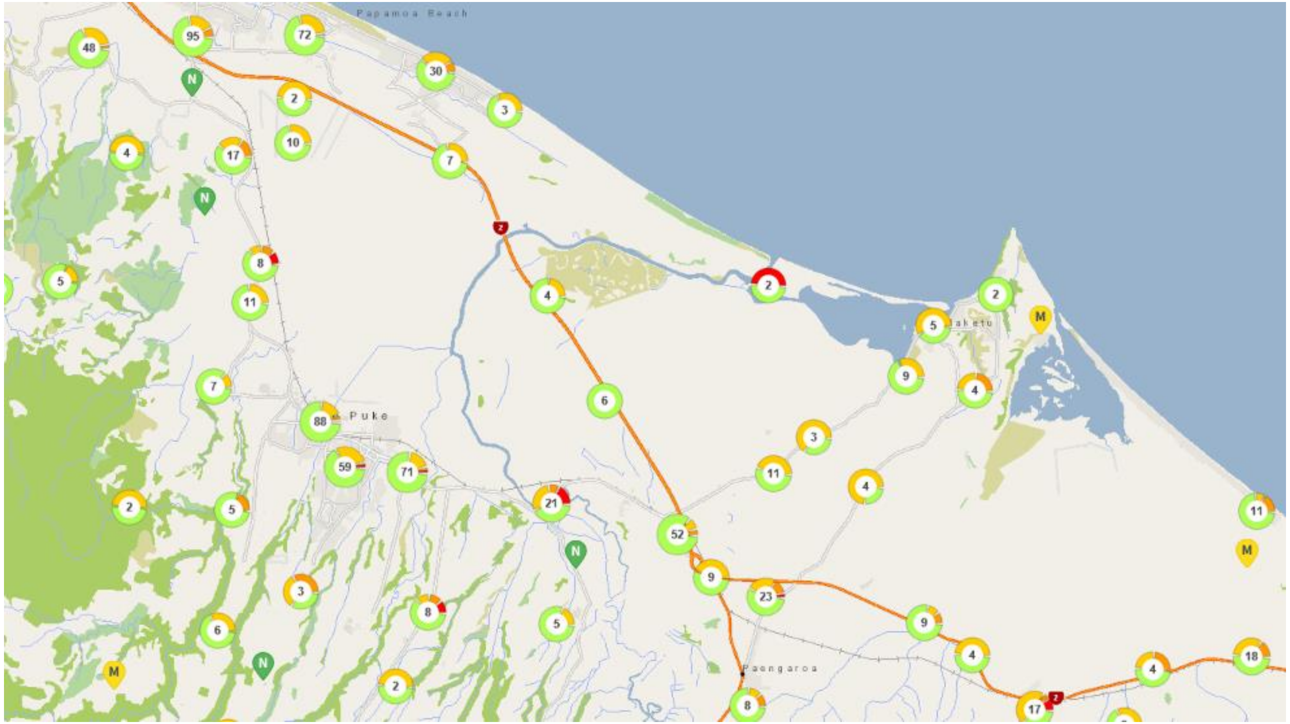
331 Passengers
354 Animal or insect in
357 Emotionally upset /
358 Food, cigarettes, be
359 Cell phone
361 Navigation device
362 Non cell communica
364 Vehicle console inbu heater, etc
365 Objects under drive
366 Food, cigarettes, be

Outside vehicle
352 Scenery or persons
353 Other traffic
355 Trying to find inters number, destinatior
356 Advertising or signs
363 Driver dazzled
350 Other attention dive

Failed to notice
331 Vehicle slowing, sto front
332 Bend in road
333 Indication of vehicle


Whangarei
561
Tauranga
546
251
New Plymouth
Gisborne
3
88
Palmerston
463
Wellington
12
Greymouth
199
122
3
4
142
64
Dunedin

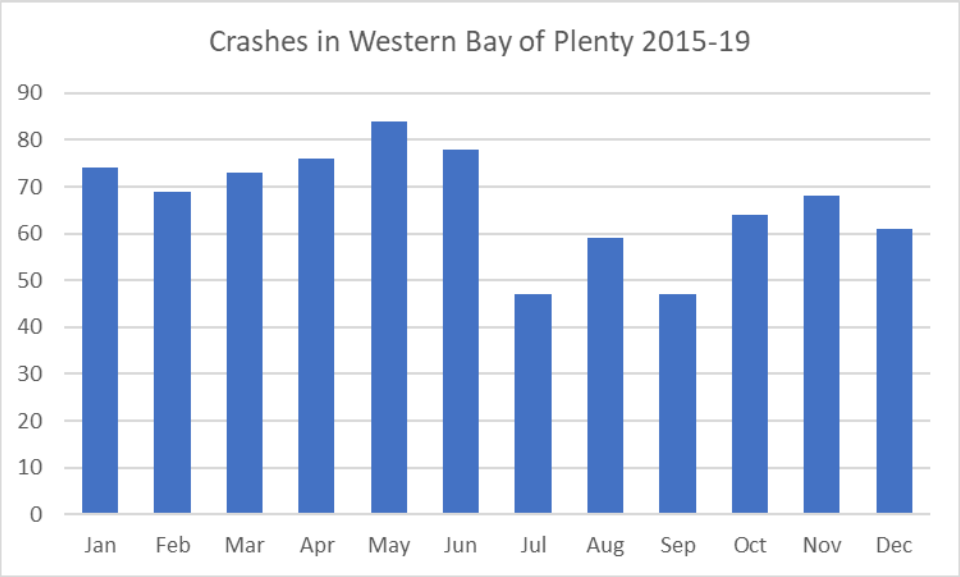

TAURANG
Mount
379
39
2480
1232
435
3
9
2
38
273
165
43
4
2
33
2
47
16
27
27



Papamoa Beach
Puke
Paengaroa

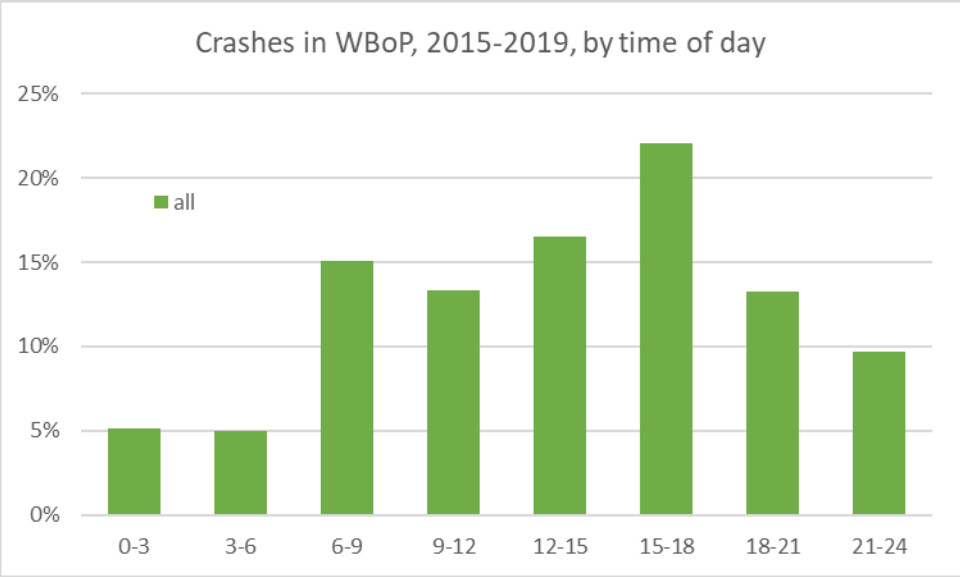
Bay of Plenty districts

	per yr
Kawerau	20
Opotiki	80
Rotorua	560
Tauranga	960
Western BoP	380
Whakatane	250

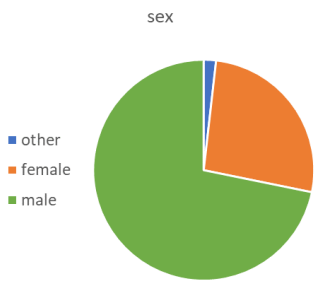


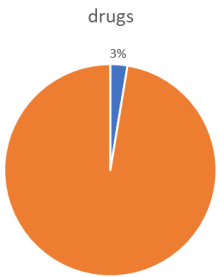
Western Bay of Plenty

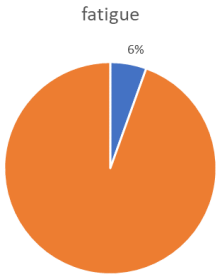
- around 370-380 crashes each year
- 40 result in fatal or serious injury each year

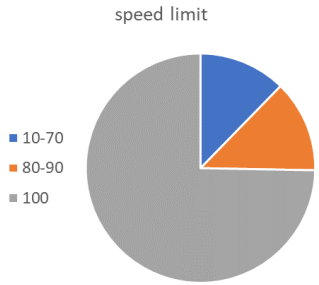


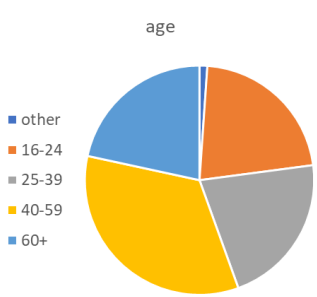
Contributing factors in fatal and serious injury crashes [WBoP]

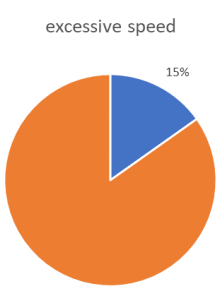


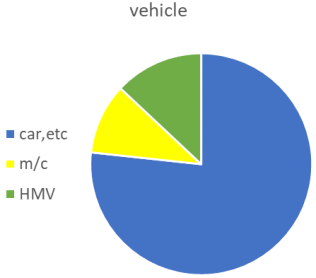


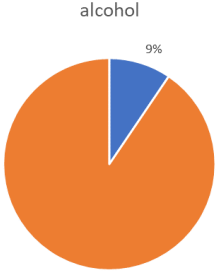




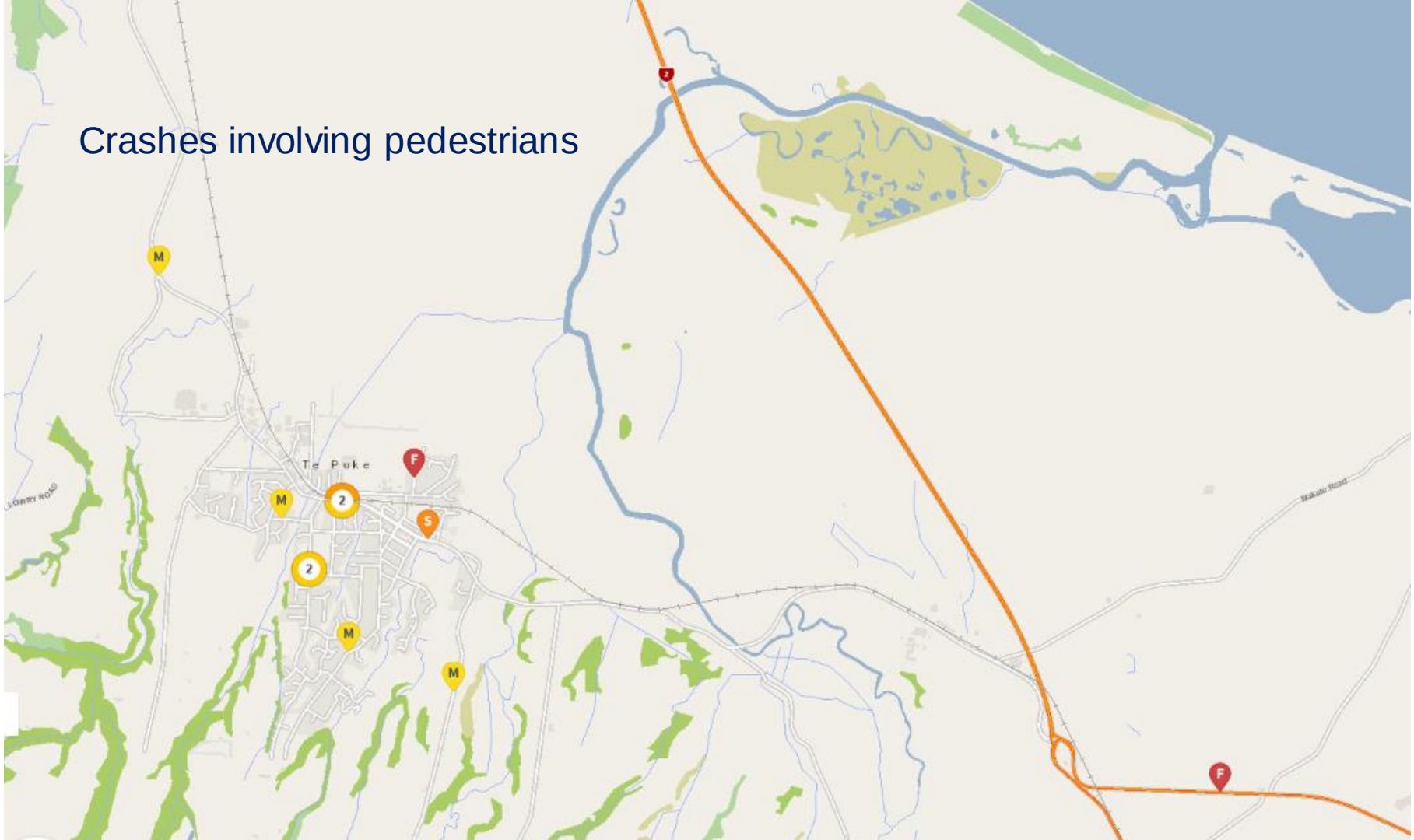






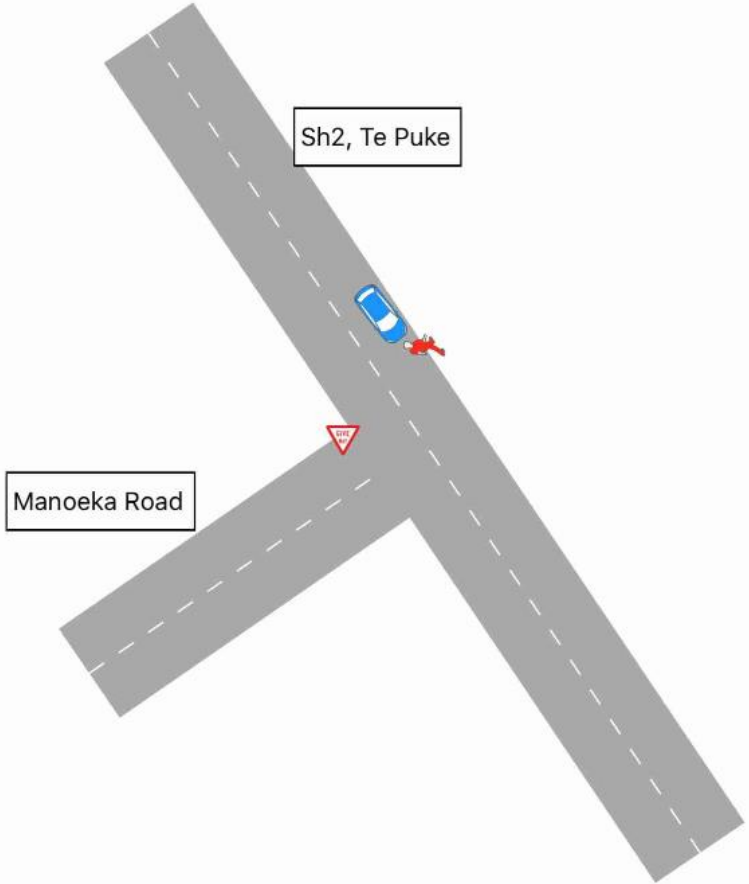


Crashes involving pedestrians



NOT TO SCALE

X was walking from Te Puke to Tauranga. A black vehicle with a loud exhaust has driven past with the occupants yelling out of the window. Shortly later the same vehicle has come past at about 15km per hour and clipped X. He was taken to hospital.



Fatigue

- a contributing factor in 33 fatal and 105 serious injury crashes (2017)
- majority were people who work shifts
  - shift workers 6x more likely to be in a fatigue related crash than other workers
  - 43% of workers say they work when they are overtired, from time to time or a lot
  - only 24% of employers agree

TOTALLED: Emergency services at the scene of yesterday's one-car crash at Pukepoto.

Woman's night shift work takes its toll

The driver and sole occupant of a vehicle that drifted to the left and crashed into a bank on Awaroa Road, Pukepoto, just before 7am yesterday emerged unscathed, but her car was tentatively assessed as a write-off.

A police spokesman said the woman had been on her way home after working a night shift in Kaitaia, and was believed to have fallen asleep.

Speed and alcohol were not believed

the intersection of Broadway and Mangakahia Road in Kaikohe on Saturday, to the surprise of no one. The intersection has long been the subject of complaints by truck drivers especially, with congestion as vehicles exit from the nearby service station and turn from Mangakahia Road on to Broadway.

Calls for the Far North District Council and/or the NZTA to install a

Shift working driver fatigue pilot programme

What employers think

- Interested in fatigue in the workplace, but drive to and from work often viewed as individual's responsibility
- Legislation does not clearly assist this situation (except in certain circumstances)

What employees think

- They can ‘push through’ tiredness
- If they speak up to management, will be viewed as lazy, not committed to job, etc
- No regular conversations about tiredness and driving **after** they leave work just what happens when at work

The challenge

- identify the level of fatigue in employer's direct workforce
- create a conversation between management and staff
- provide resources and tips to staff
  - raise the profile of fatigued driving as an issue
  - help with steps they can take to remain safe

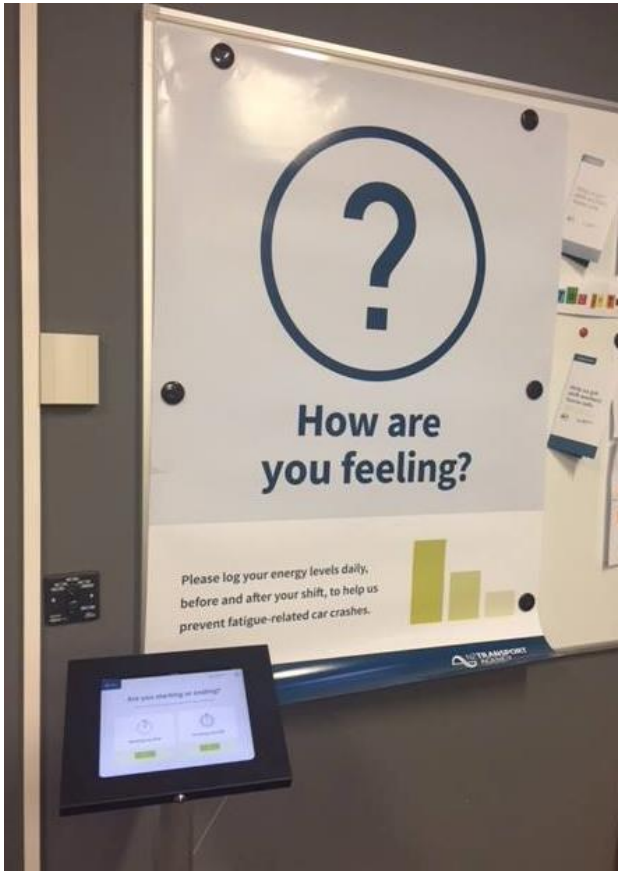
Inspiration…

The Shift Working Driver Fatigue Pilot Programme

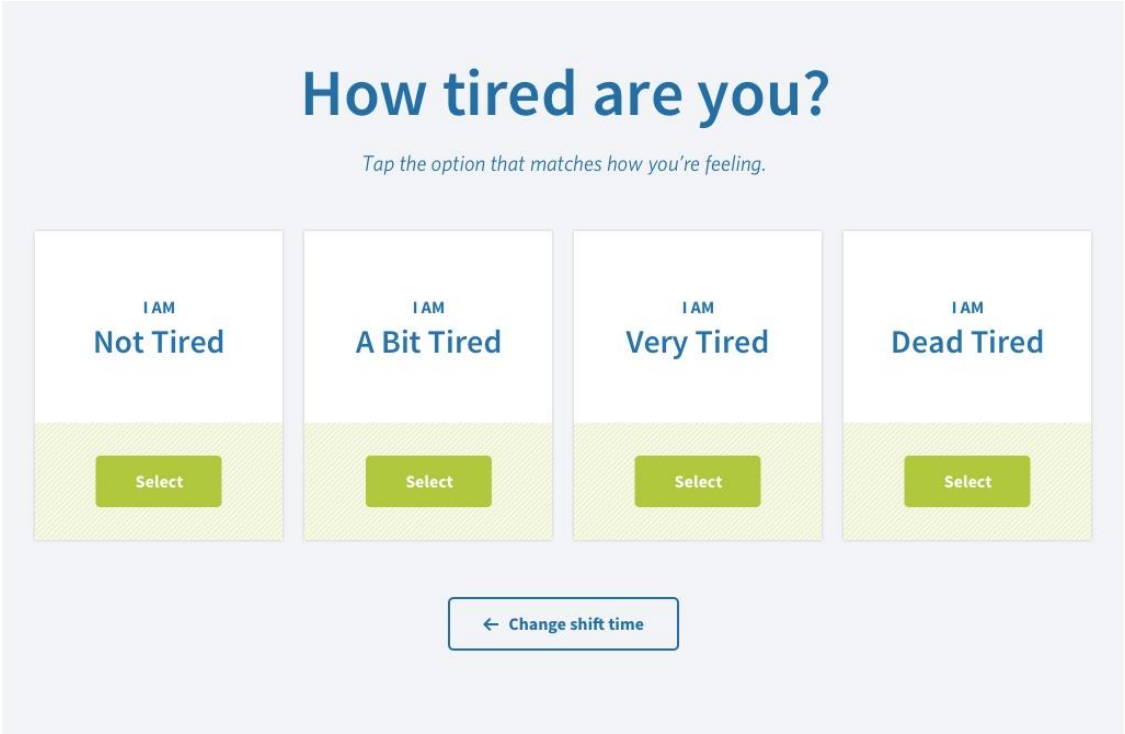
- Raise employer awareness
  shift working staff are at a higher crash risk on their commute to and from work
- Increase employer duty of care
  the commute to and from work as an important facet of workplace fatigue
- Start enabling changes to workplace processes and cultures
  help ensure the safety of fatigued shift workers
- Help employees recognise the signs and symptoms of fatigue
  'Take 15' before driving if required

Phase 1 – Data capture

- Kiosk set up in a communal area
- Staff encouraged to check in before/after shift
- Check-in is anonymous
- Data captured provides the ability to:
  - generate a baseline level
  - generate a view of how fatigued employees are before driving
  - provide vital fatigue information



Kiosk


How tired are you?
Tap the option that matches how you're feeling.
I AM
Not Tired
Select
I AM
A Bit Tired
Select
I AM
Very Tired
Select
I AM
Dead Tired
Select
← Change shift time

Phase 2 – Reporting

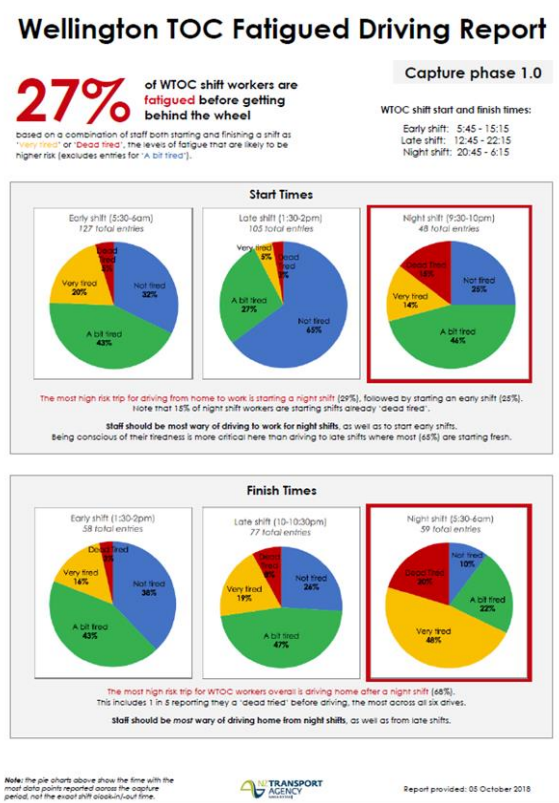
Report 1: Employers

For the management team on the level of fatigue, trends we've noticed and analysis of the data

Report 2: Employees

For staff so they can see the level of fatigue in the workplace and present recommendations on how to manage it

Note: Data captured and reported is completely anonymous and not assigned to any individual staff member



- Size of the road safety problem
- Data and information that's available
- Road crash picture in the Western Bay of Plenty
- Fatigue beyond the workplace