mainroads WESTERN AUSTRALIA working with Fulton Hogan

# FULTON HOGAN SERVICES


Mainroads WA approved Trial March/April 2016

# Introduction

Rumble strips are a road safety feature used to alert inattentive drivers by causing a tactile vibration and audible rumbling transmitted through the wheels into the vehicles interior. This Trial focusses on the use of a transverse (across the lane) temporary Rumble strip by the name of Road Quake (supplied by Saferoads Australia).

# Objective

- Increase driver awareness.
- Both a visual and an audio prompt.
- Reduce drivers speed prior to Traffic Controllers which will.

I. Reduce end of queue collisions.

II. Reduce “runners” at the Stop Slow bat.

III. Ensure greater motorist compliance.

# Background

- Rumble strips take a number of different forms and are generally grouped into three different categories- Longitudinal rumble strips, centre rumble strips and permanent transverse rumble strips. For this trial, we are focussing on a particular type of Temporary transverse strips. (Roadquake 2 and 2F)


**Fig 1**. Types of temporary transverse Rumble Strips.

# The Product/s

- Trialled Two versions of Roadquake 2 (2F and 2)
- Overall length 3.3m (2F hinged foldout 1.65 unit, RQ2 3 piece (1.1m each) unit.
- Weight RQ2 13kg per modular unit, RQ2F 40kg.
- Colour: Black base and high Viz yellow trafficable surface.
- Lifespan: Approx. 3-5 years under normative conditions
- Weather: Suitable for  use in rain and temperatures from -18°C to 85°C
- Array: 3 units used at 3m apart.
- Price: $2,560 per full strip + GST. For a full set of 6 strips (min recommend for a work zone) it works out at $15,360 + GST.

**Fig 2A**. RQ2F: Hinged unit

**Fig 2B**: RQ2: 3 piece modular

# Installation

- No equipment needed.
- 3 units at 3.3m spacing
- Two people can install the strips (one spotter, one person deploying)
- Associated signs need to be utilised to provide advance warning,


**Fig 3**. Multi message sign configuration

# Test Methodologies

- Both Quantitative and qualitative data collected.
- Quantitative data came speed was obtained using a. speed detection radar device. Background data was obtained from traffic counters and speed assessment trailer speed data.
- Qualitative data from motorists, traffic controllers and workers onsite


**Fig 4**: Decatur Genesis 2 Incar radar.

# Findings

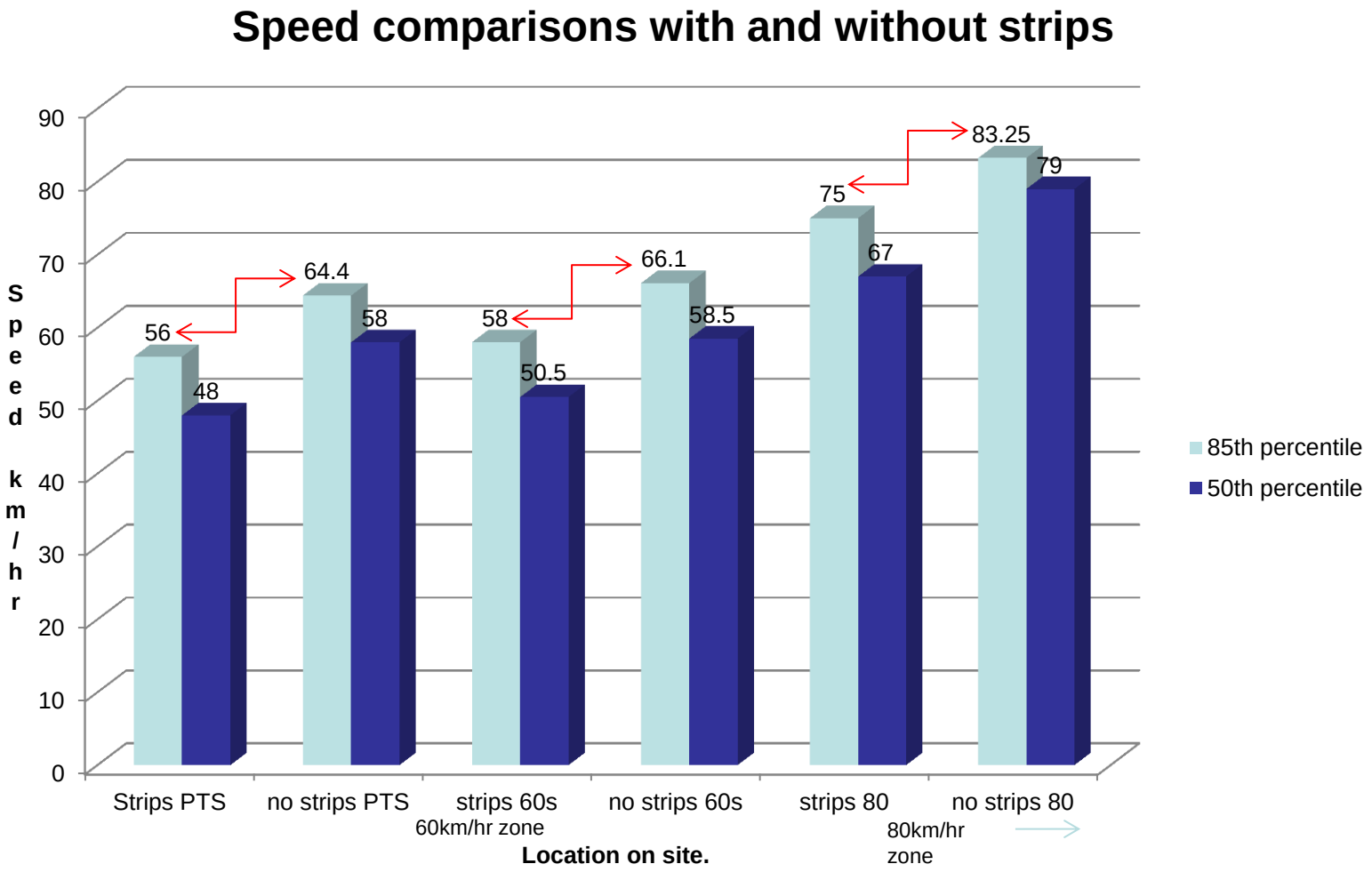
- Positives
- The primary benefit of temporary rumble strips is their effectiveness in alerting drivers to other traffic control devices and upcoming circumstances such as lane changes, detours, or other hazardous conditions.
- Vehicle speed reductions were observed with an 8km/hr speed reduction observed at all locations
- Quick and easy to install.
- Easy to store on vehicles

**Fig 4**: Both strips are easy to transport/store.

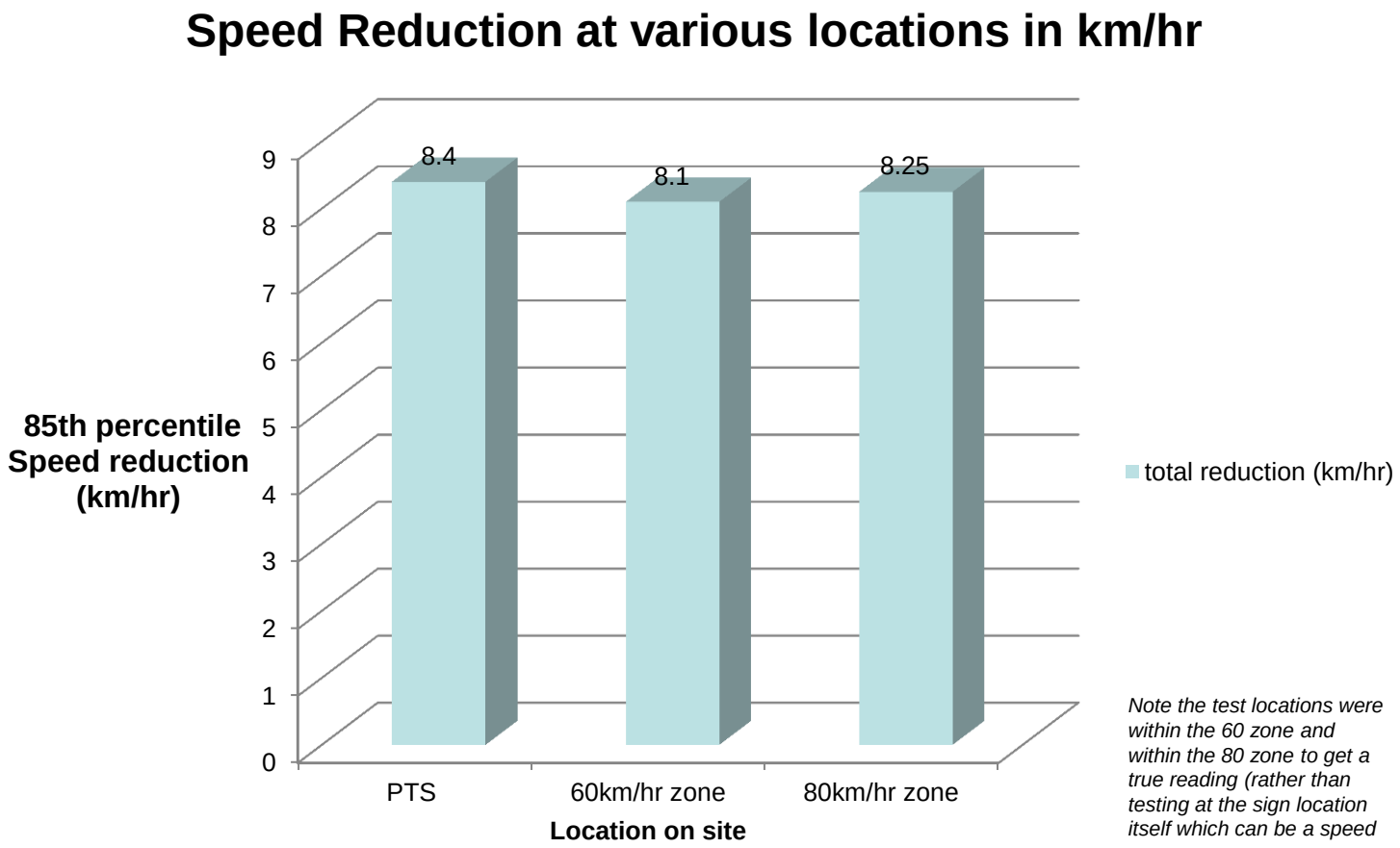
# Use of the 85th and 50th percentiles.

- “This percentile is used for  evaluating/recommending posted speed limits based on the assumption that 85% of the drivers are traveling at a speed they perceive to be safe. In other words, the 85th percentile of speed is normally assumed to be the highest safe speed for a roadway section.
- The 50th percentile roughly translates to the “average” speed past a point.

# Graphs


Speed comparisons with and without strips
Speed km/hr
90
80
70
60
50
40
30
20
10
0
56
48
64.4
58
58
50.5
66.1
58.5
75
67
83.25
79
Strips PTS
no strips PTS
strips 60s
60km/hr zone
no strips 60s
strips 80
no strips 80
80km/hr zone
Location on site.
85th percentile
50th percentile

# Graphs




*Note the test locations were within the 60 zone and within the 80 zone to get a true reading (rather than testing at the sign location itself which can be a speed*

# Findings

**Other findings**

- Avoidance Manoeuvres.
- Sudden Braking
- Weight (RQ2 unit)
- Movement of the units throughout the day (pic).
- RQ2F quite heavy at 40kg (2 person lift)

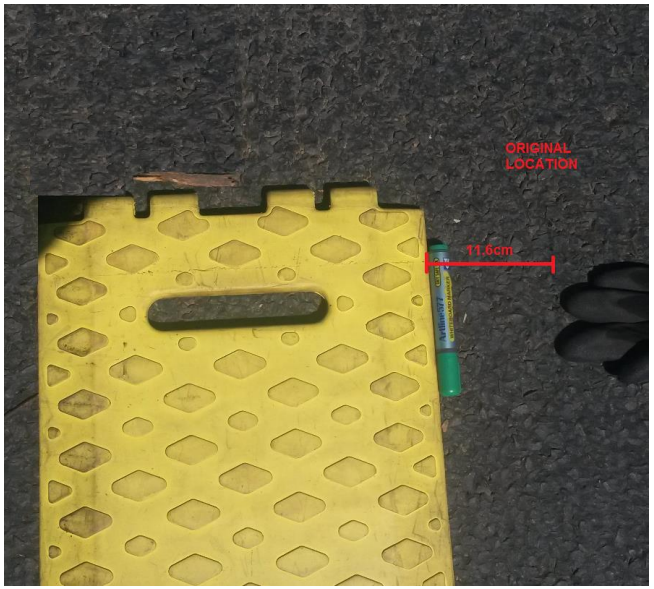



**Fig 5A &B**: Movement of strips

# Recommendations

- Useful to have available if issues regarding vehicle compliance arise onsite.
- 1 full set might be able to be utilised among a department for example and be used as needed.
- Other devices which yield similar results such as Speed assessment trailers (which are widely available) can potentially be used as a level 1 option and the strips can possibly be implemented as either a level 2 standalone option of complement the SAT.
- More research needed  separating the strips and using individual strips adjacent to the worksite.
- Future research into other methods to reduce avoidance techniques i.e. use of narrow collapsible delineator (pictured in Fig 6).

**Fig 6**. 300mm wide Collapsible delineator.

# Recommendations cont'd

- Consider (factory) transportation device if considering purchasing the RQ 2F (40kg) unit as lifting this unit onto trucks can be cumbersome (due to height of trucks and the weight of these units).


**Fig 7**: Transportation device for the strips.

# Summary

- The results of this field evaluation revealed that if the Rumble strips were set up properly, they could create a speed reduction of approximately 8km/hr per hour.
- Overall, about one percent of drivers swerved around the Rumble strips, indicating that additional driver information may be needed to assure the public that these devices are intended to be traversed).
- The Hinged unit was heavy and quite cumbersome to lift onto trucks, the RQ2 modular units are easier to store and present less of a manual handling hazard.
- These devices are monitored devices and must be included in the 2 hourly (max) Traffic management inspections as per other TM devices due to slight movement of the devices and other factors.
- Good result at PTS signage but one sample was skewed due to vehicles slowing as they could see the TC queue ahead suggest between 80 and 60 signage or between 60 and PTS, not between PTS and TC.