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Investigating and Modelling the Effects of Traffic Calming Devices

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Summary

This research investigated the effects on traffic volumes, speeds and crashes of traffic calming devices on urban local streets. Eleven sites in Christchurch with street calming devices were evaluated using field surveys and network modeling using TrafikPlan, and compared with findings from a literature review.

The main findings of the studies were:

- At seven sites that used vertical devices for treatment, five of them had reduced traffic volumes and speeds.
- At ten sites that used horizontal devices, eight of them had experienced reductions in volumes and speeds.
- From the crash history, it was found that road safety has been noticeably improved after installation of the traffic calming devices, with average crash reductions of 15-20%.
- In terms of network performance, TrafikPlan modelling seems promising for estimating traffic volume and speed changes on treated local streets and adjacent arterial roads.

This paper discusses these findings and speculate on how the devices investigated affect traffic behaviour. It is recommended that further research be conducted at more sites and for longer time periods to build up a comprehensive local database of traffic calming treatments. Future studies should also investigate the effectiveness of environment impacts of the devices, i.e. noise and air pollution.

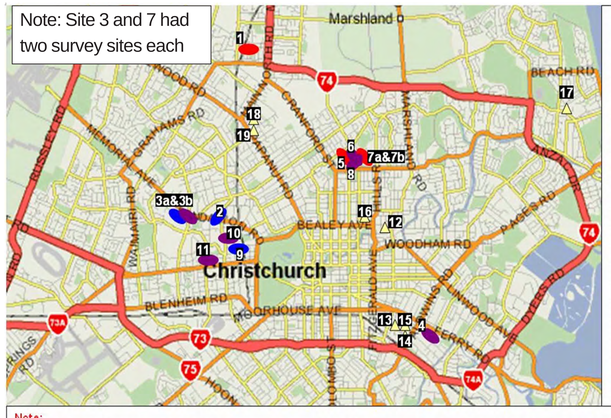
Study Aims

The objectives of this research project were:

1. To investigate the effectiveness of traffic calming devices on urban local roads in Christchurch. The effects of traffic calming devices on the following three aspects were analysed:
   - Vehicle's operating speed
   - Traffic volume and types
   - Severity and number of crashes
2. To analyse the reliability of transport modeling software regarding prediction of the effects

Study Location: Christchurch, New Zealand

Note: Site 3 and 7 had two survey sites each



1	Tuckers Road
2	Snowdon Road
3a	Hamilton Avenue
3b	Hamilton Avenue
4	Wildberry Street
5	Francis Avenue
6	Flockton Street
7a	Aylesford Street
7b	Aylesford Street
8	Carrick Street
9	Matai Street West
10	Rochdale Street
11	Rata Street
12	Alexandra Street
13	Grafton Street
14	Laurence Street
15	Grenville Street
16	Geraldine Street
17	Saltaire Street
18	Mary Street
19	Grants Road

Note:
- The sites have been selected to investigate the effects of the devices on traffic speed, volume and safety.
  - The investigated sites are with Vertical Devices
  - The investigated sites are with Horizontal Devices
  - The investigated sites are with Vertical Devices and Horizontal Devices (Both)
- △ The sites have only been selected to investigate the effects on safety.

Types of Devices Investigated

- Horizontal Devices
  - (1) Roundabout
  - (2) Chicane
  - (3) Pinch Point


Example - Site 8


Example - Site 11

- Vertical Devices
  - (1) Intersection Platform
  - (2) Raised Tables


Example - Site 5


Example - Site 9

Investigation Method

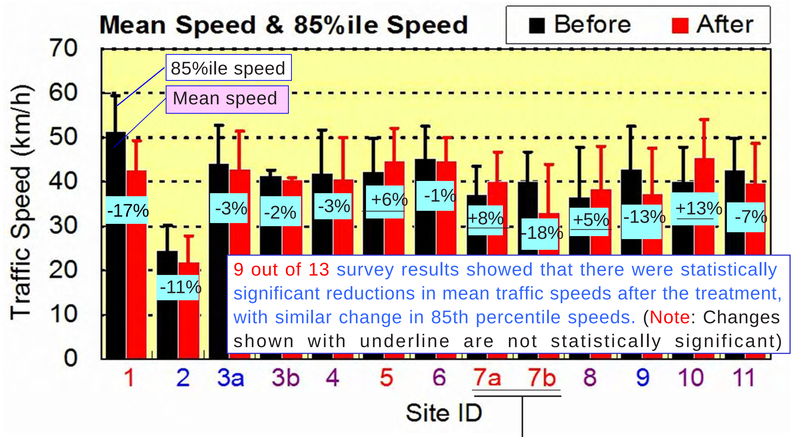
(1) Sites Selection

(2) Data Collection
- Traffic Data
- Accident Data

(3) Data Analysis
- Determine AADT
- Estimate traffic volume growth rate
- Establish growth rate of traffic crashes
- Set up networks in TrafikPlan


Example of Traffic Survey

Results: Effects on Traffic Speed

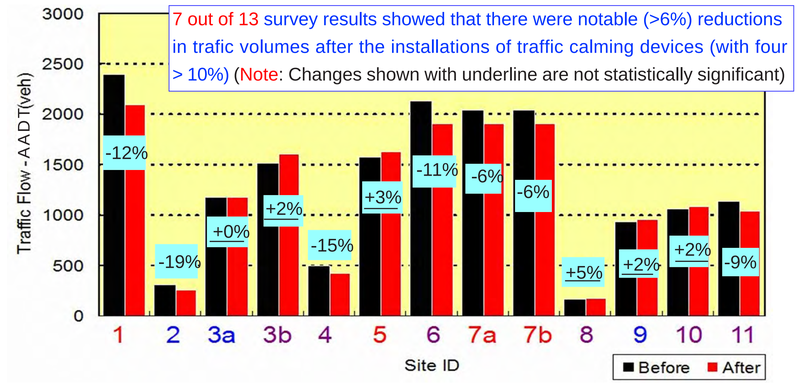


9 out of 13 survey results showed that there were statistically significant reductions in mean traffic speeds after the treatment, with similar change in 85th percentile speeds. (Note: Changes shown with underline are not statistically significant)

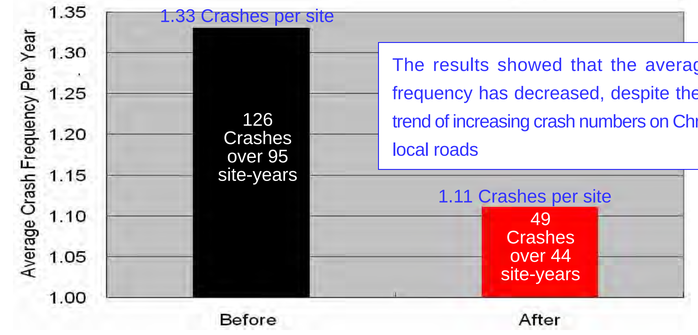
The test results showed that the traffic speeds decreased at the devices themselves but increased in between the devices. This suggests that driver behaviour is a factor. Drivers may be trying to speed up after slowing down for the device in order to catch up on lost time due to deceleration.

Results: Effects on Traffic Flow

7 out of 13 survey results showed that there were notable (>6%) reductions in trafic volumes after the installations of traffic calming devices (with four > 10%) (Note: Changes shown with underline are not statistically significant)



Results: Effects on Road Safety (19 Sites)



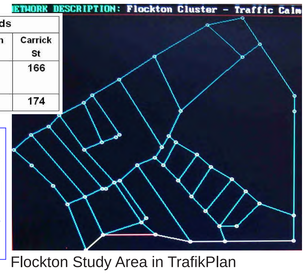
The results showed that the average crash frequency has decreased, despite the general trend of increasing crash numbers on Christchurch local roads

Results: TrafikPlan Modelling Study

Observed Results - Changes in Traffic Flow

Traffic Volume in 2009	Surrounding Arterial Roads				Treated Local Roads			
	Innes Rd	Cranford St	Warrington St	Hills Rd	Francis Ave	Aylesford St	Flockton St	Carrick St
Without the Devices	13024	21444	10535	22633	1572	2039	2133	166
With the Devices	12702	20451	10197	20648	1626	1908	1907	174

TrafikPlan modelling seems promising for estimating traffic volume and speed changes on treated local streets and adjacent arterial roads, but more factors need to be considered after getting the



Flockton Study Area in TrafikPlan

Key Recommendations

- More research should be conducted to determine why some traffic calming devices failed to achieve reductions in traffic volumes and/or speeds.
- More research should be done to evaluate the effects of each kind of treatment on road safety. This should include what types of crashes have reduced after installing traffic calming devices.
- Future research should be undertaken on the environmental impacts of the devices

Research Report for Details:
Mao, J. (2009). Investigating and Modeling the Effects of Traffic Calming Devices. MET Research Project, Department of Civil & Natural Resources Engineering, University of Canterbury, New Zealand.

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