OPUS

Mobile Marked and Unmarked Speed Cameras: Their time and distance halos and relative effectiveness in reducing speeds

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Acknowledgements

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- Fergus Tate who was the NZTA project owner

Method

Mobile speed cameras were deployed at:

- A flat 1.7 kilometre section with a speed limit of 70 km/hr.
- A flat 1.8 kilometre section with a speed limit of 50 km/hr.
- A flat 4.2 kilometre stretch of rural state highway with a speed limit of 100 km/h

The 70km/hr and 50km/hr sites were adjacent to each other

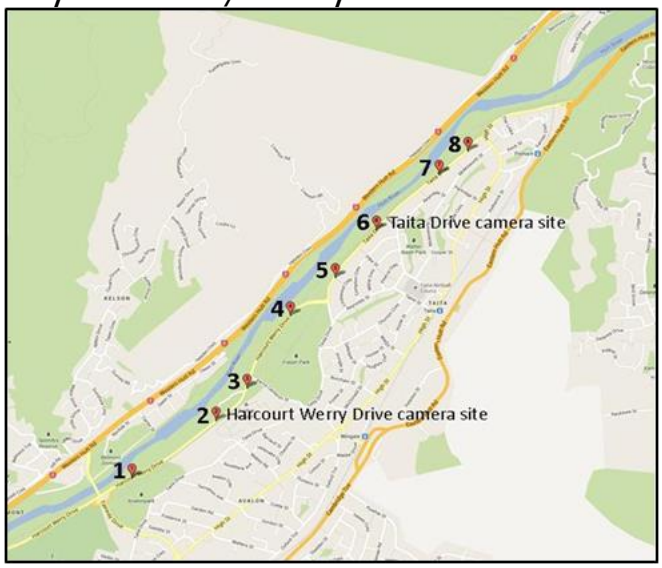
Both unmarked and marked camera vehicles were used

- Speeds were measured in the vicinity of the sites with and without the presence of camera vans.
- The extent of time and distance halo effects was investigated as was the effectiveness of marked and unmarked camera vans in reducing speeds.

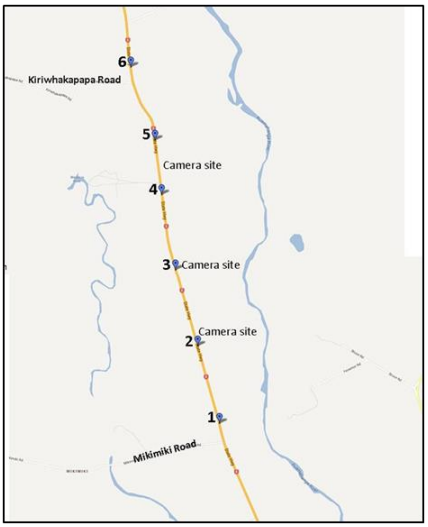
Method continued

- Speeds were measured using rubber tubes attached to a Metrocounter to measure speeds and count traffic
- One camera deployment position was used at each of the urban sites and three camera deployment positions at the rural site.
- Marked and unmarked camera vans were deployed for various shifts at each site over two, three day periods; one three day period for each type of camera van.
- There were also days on which speed was measured with no cameras operating, in order to provide a baseline comparison.
- There were no occasions when cameras were simultaneously deployed at both the urban sites as the same camera vehicle covered both sites.

50km/hr and 70km/hr sites



100km/hr site



Analysis

Analyses were performed using speed data from 'unimpeded" vehicles with headway of at least 4 seconds from the nearest vehicle in front.

The main speed-related variables used were:

- the median speed (a measure relating to the centre of the speed distribution) and
- the 85th percentile speed (a measure relating to the upper end of the speed distribution).

The median was used instead of the mean to minimise the impact of outliers (possibly due to equipment malfunction) on the analysis.

Analysis continued

- The analysis for time halos uses CUSUM charts
- These charts plot the cumulative sum of deviations of a variable from a steady state reference value.
- An increase from the steady state is signalled by an increase in slope of the CUSUM chart
- A decrease from the steady state is signalled by a decrease in the slope of the CUSUM chart

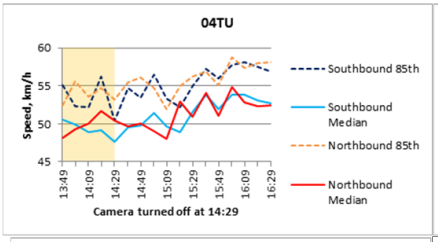
Results

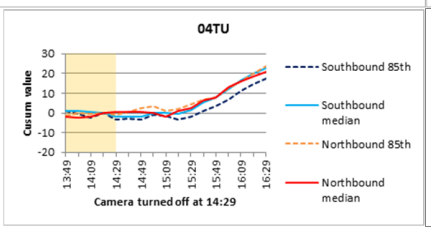
Time halos and distance halos

- Mobile speed cameras impact motorists' speeds at the time and place of deployment
- They also impact them at distance away from the site of deployment (distance halo) and at a time away from the time of deployment (time halo)
- Time and distance halos depend on the specific circumstances in which the enforcement is being carried out.

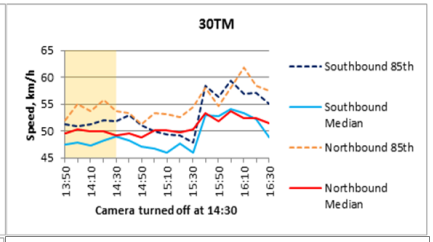
Time halos at 50 km/hr site ~ 45 min for unmarked; 1 hr for marked vehicle

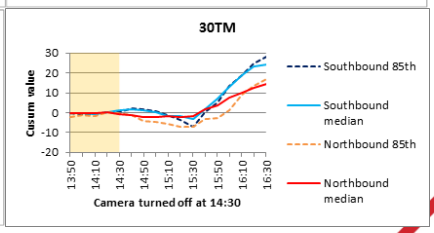
Unmarked vehicle





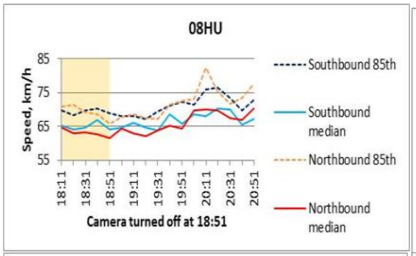
Marked vehicle

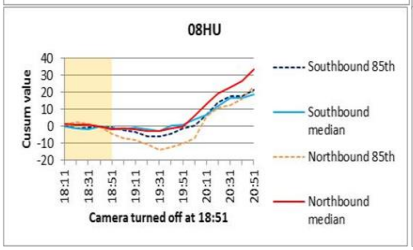




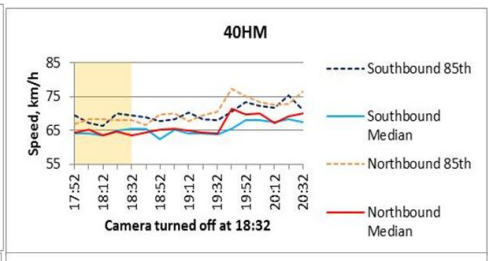
Time halos at 70 km/hr site ~ 1 hr for both types of vehicle

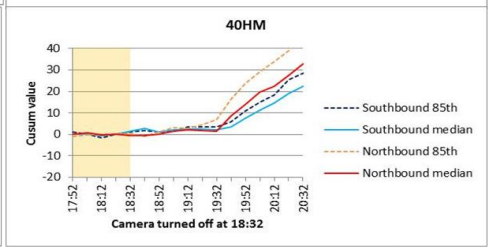
Unmarked vehicle





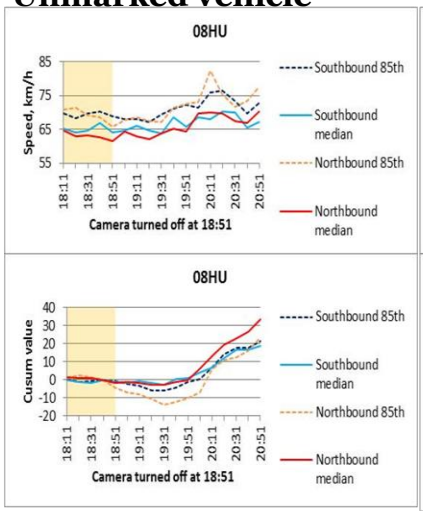
Marked vehicle



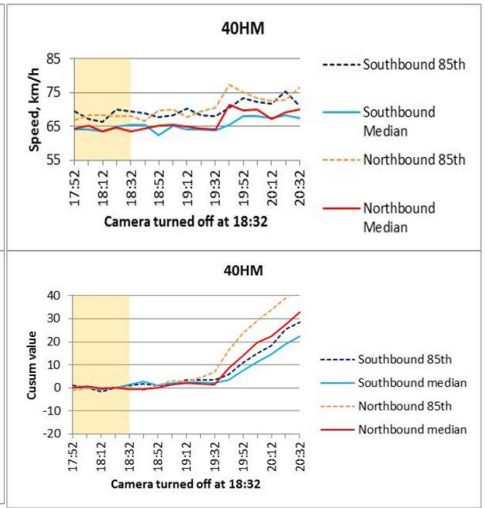


Time halos at 70 km/hr site ~ 1 hr for both types of vehicle

Unmarked vehicle

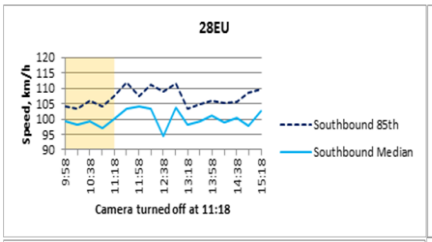


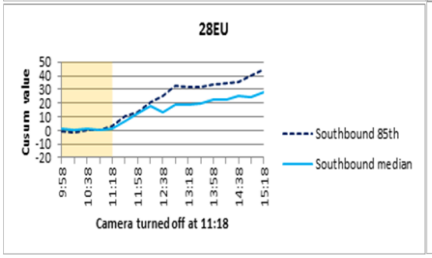
Marked vehicle



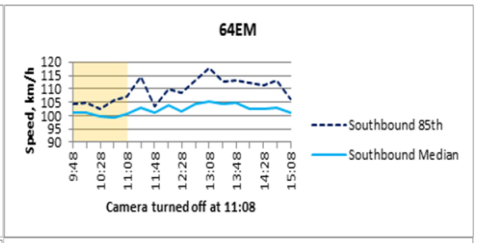
Time halos at 100km/hr site. For both deployment types speeds rose immediately deployment ceased

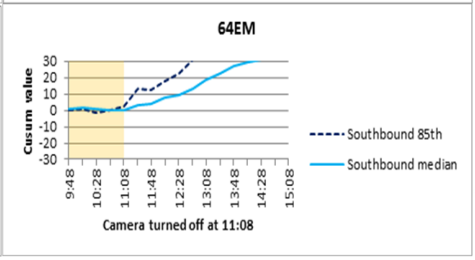
Unmarked vehicle





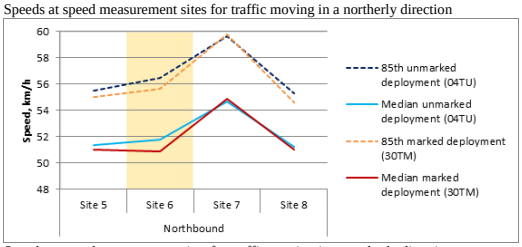
Marked vehicle



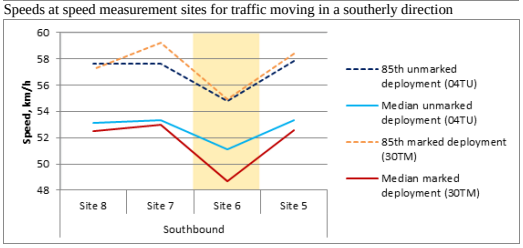


Distance halos at 50km/hr site~ 500 metres

Speeds at speed measurement sites for traffic moving in a northerly direction

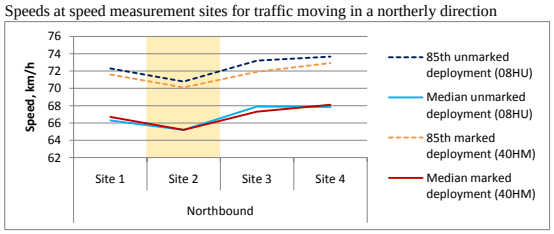


Speeds at speed measurement sites for traffic moving in a southerly direction

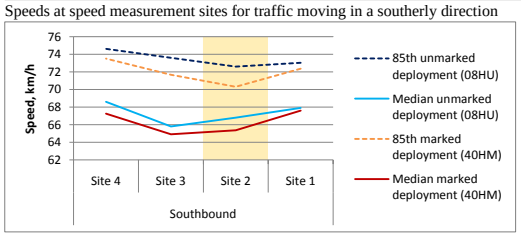


Distance halos at 70km/hr site ~ 500 metres

Speeds at speed measurement sites for traffic moving in a northerly direction

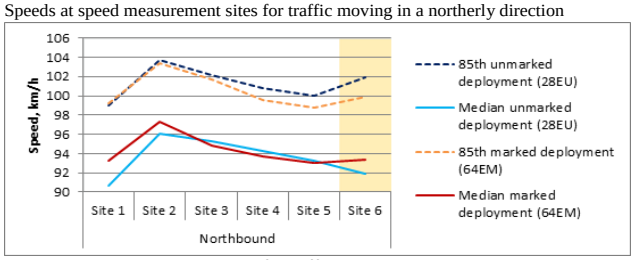


Speeds at speed measurement sites for traffic moving in a southerly direction

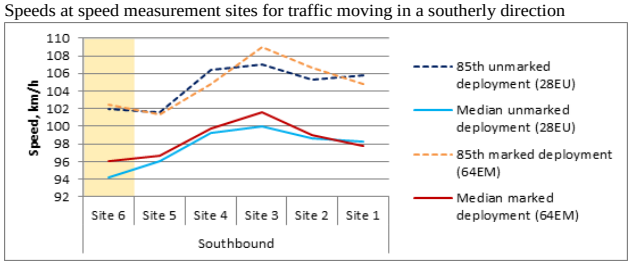


Distance halos at 100 km/hr site ~ 1 km

Speeds at speed measurement sites for traffic moving in a northerly direction



Speeds at speed measurement sites for traffic moving in a southerly direction



Length of time before motorists sped up

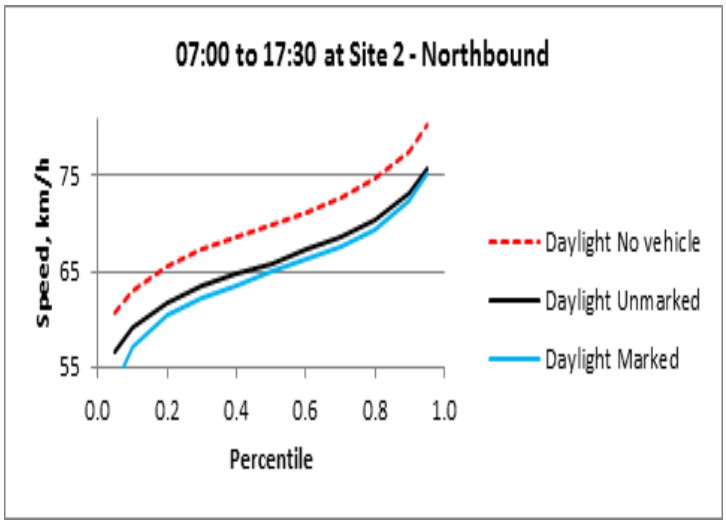
Whatever the speed limit or the camera vehicle, motorists tended to speed up again a little over half a minute after they passed the camera vehicles.

Overall speeds

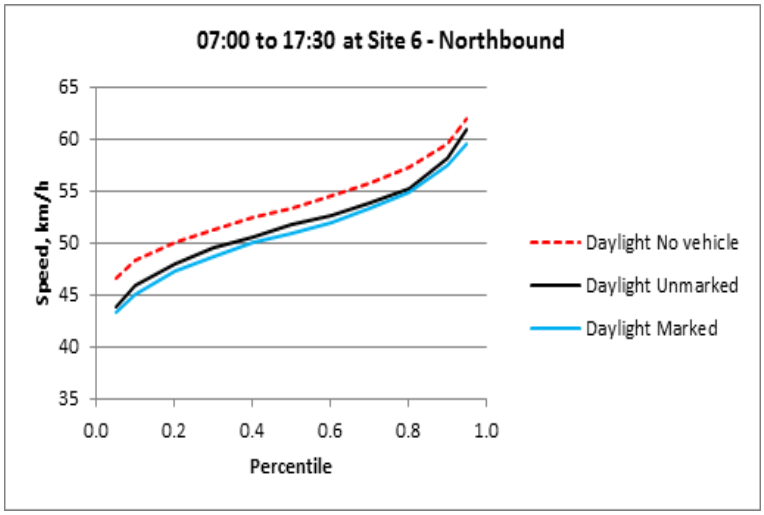
Will look at the cumulative distributions of speeds at the camera sites during daytime hours with:

- Marked camera vehicle present
- Unmarked camera vehicle present
- No camera vehicle present

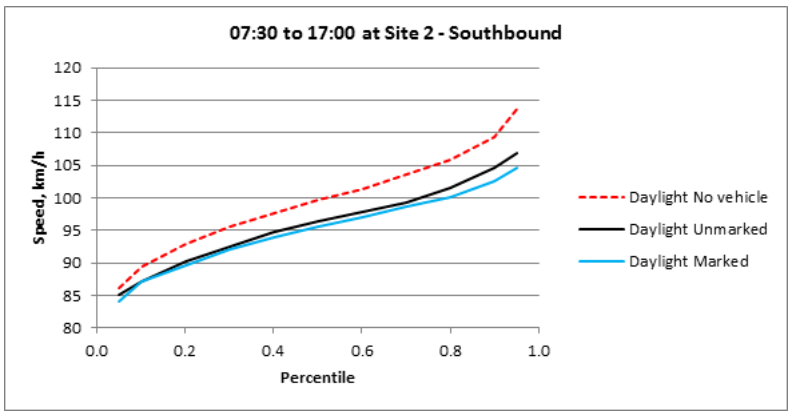
70km/hr site



50 km/hr site



100 km/hr site



Summary of overall speed distributions

- In all cases the speeds were lower in the presence of cameras than without cameras,
- The marked cameras were the more effective cameras at reducing speeds at the 50 km/hr and 70 km/hr sites
- The marked camera vehicles performed only slightly better than the unmarked camera vehicles

Conclusions

- Both marked and unmarked cameras reducing speeds in their immediate vicinities
- Marked cameras were more effective but the difference was small
- A time halo of around an hour at the 50 and 70 km/hr sites
- No evidence of a time halo at the 100 km/hr location.
- A distance halo of around 500 metres for the 50 km/hr and 70 km/hr sites and 1 kilometre for the 100 km/hr site.
- Both distances would be a little over half a minute of travel at the speed limit.
- These halo effects applied for both marked and unmarked vehicles
- The distance halos are consistent with the small number of mobile cameras in New Zealand