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# EcoDriver Training: Results from the Cement Industry Pilot Field Trial

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# Presentation Outline

- **Introduction: Background on EcoDriver Training**
- **Cement Industry field trail**
- **Field trial results**
- **Issues**
- **Conclusions**



# Introduction

- **Eco-driving**

- > Shift up as soon as possible at between 1,500 & 2,000 RPM
- > Maintain steady speed in the optimal range (1200-3000 RPM)
- > Use the highest gear possible and drive with low engine RPM
- > Anticipate traffic flow
- > ‘Flow’ the vehicle: change speed smoothly

- **Evaluation results are limited. Most references provide little explanatory information behind the key results which are presented. Detail is often lacking.**

*“The claims regarding the Eco-drive benefits lack scientific backing.” (Walberg, 2007)*



# Introduction - Cont.

- **The average fuel consumption reduction via Eco-driving is reported to be between 4 and 25 % (depending on context)**
- **Homcin Ltd, a cement manufacturer in Switzerland, conducted an EcoDrive trial**
  - 69 drivers trained in a number of one day training sessions each involving 8 - 12 drivers
  - Fuel consumption measured before and after the training (on the same day)
    - The average fuel consumption reduction was about 8.5% and average speed increase is about 9%
  - Fuel consumption reduction still about 6 % after 7 months.

# Cement Industry field trail

- Field trial involved Blue Circle Southern Cement (drivers and vehicles), Strategix Training Group (training) and Monash University (evaluation)
- The field trial design segmented drivers into three groups:
  - > Group 1 participated in the complete training programme
  - > Group 2 participated only in the classroom training session
  - > Group 3 serve as a control



# Activities on the day of training

- **Before-course drive of 30 km test circuit**
  - fuel consumption
  - time to complete circuit (+GPS)
  - on-board assessor recording
    - > Gear changes
    - > Over revving the vehicle
    - > Brake applications
    - > Scanning ahead
    - > Following distance
- **Classroom training (about 1 hour)**
  - Group 1 drivers received feedback on the 'before' circuit drive
- **After-course drive of 30 km test circuit in same truck**
- **Compare 'before' and 'after' data**

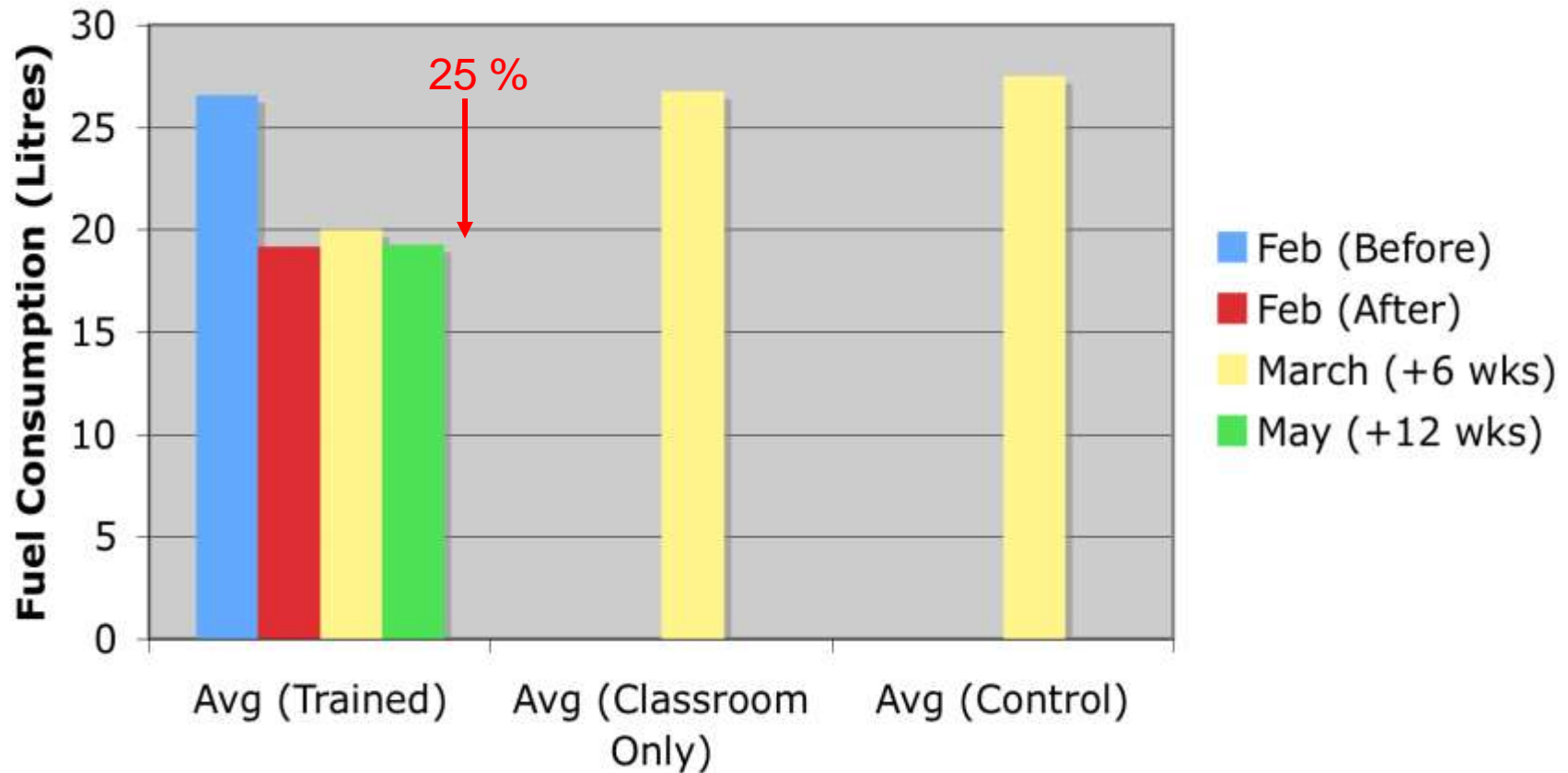


# 30 km test circuit in outer northern suburbs

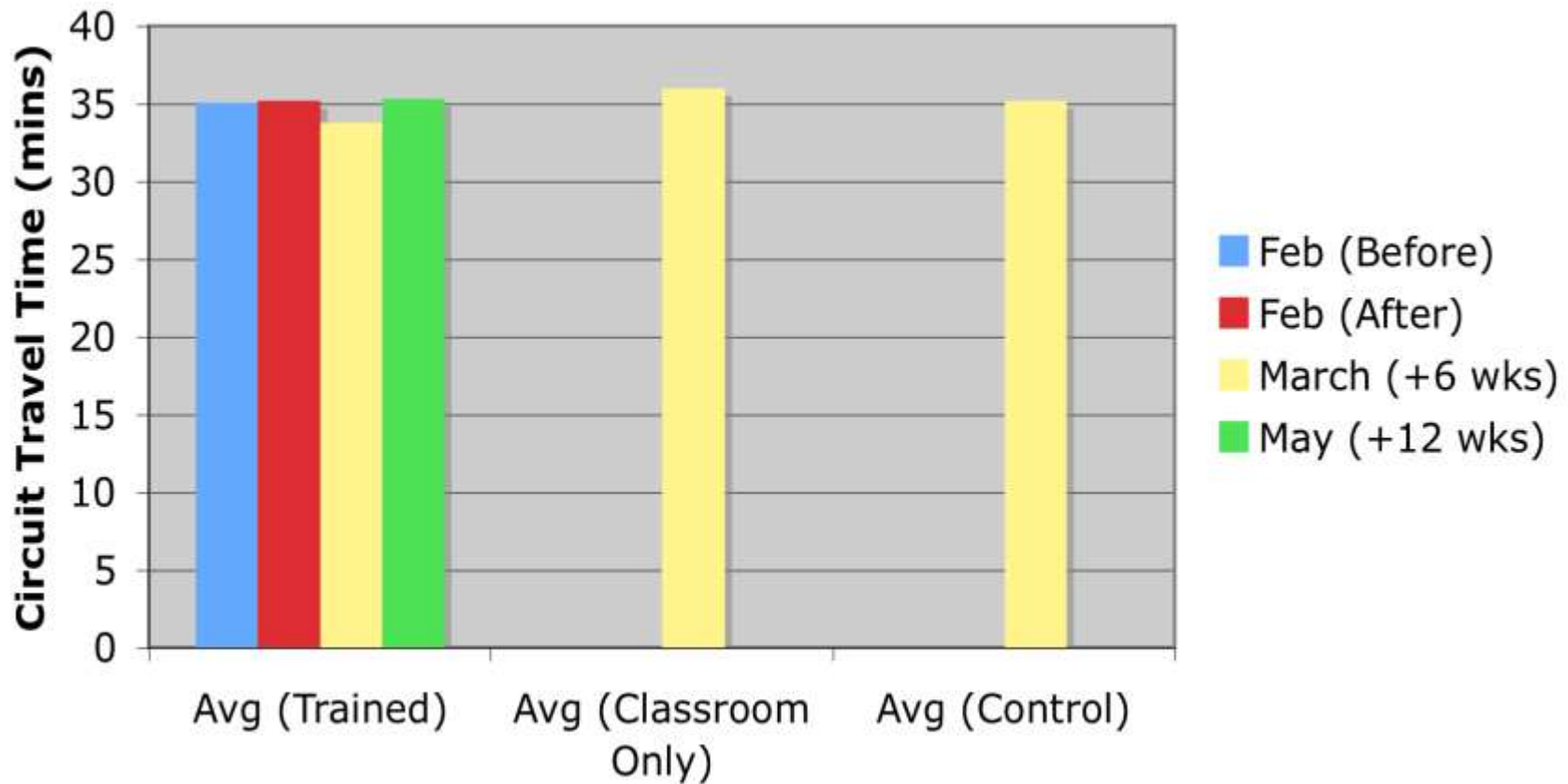


**51 kph average speed round the circuit**

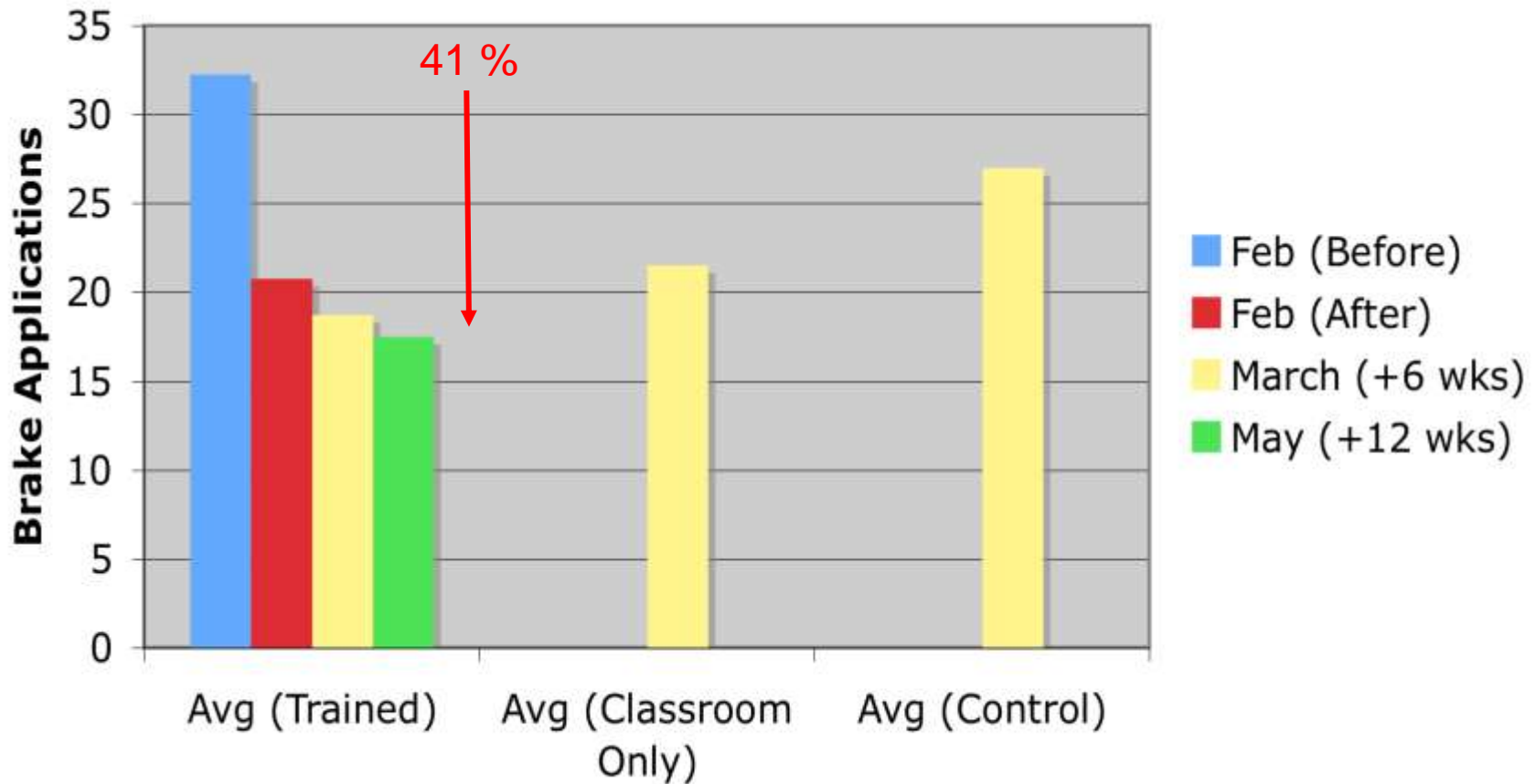
# Field Trial Results - Fuel Consumption



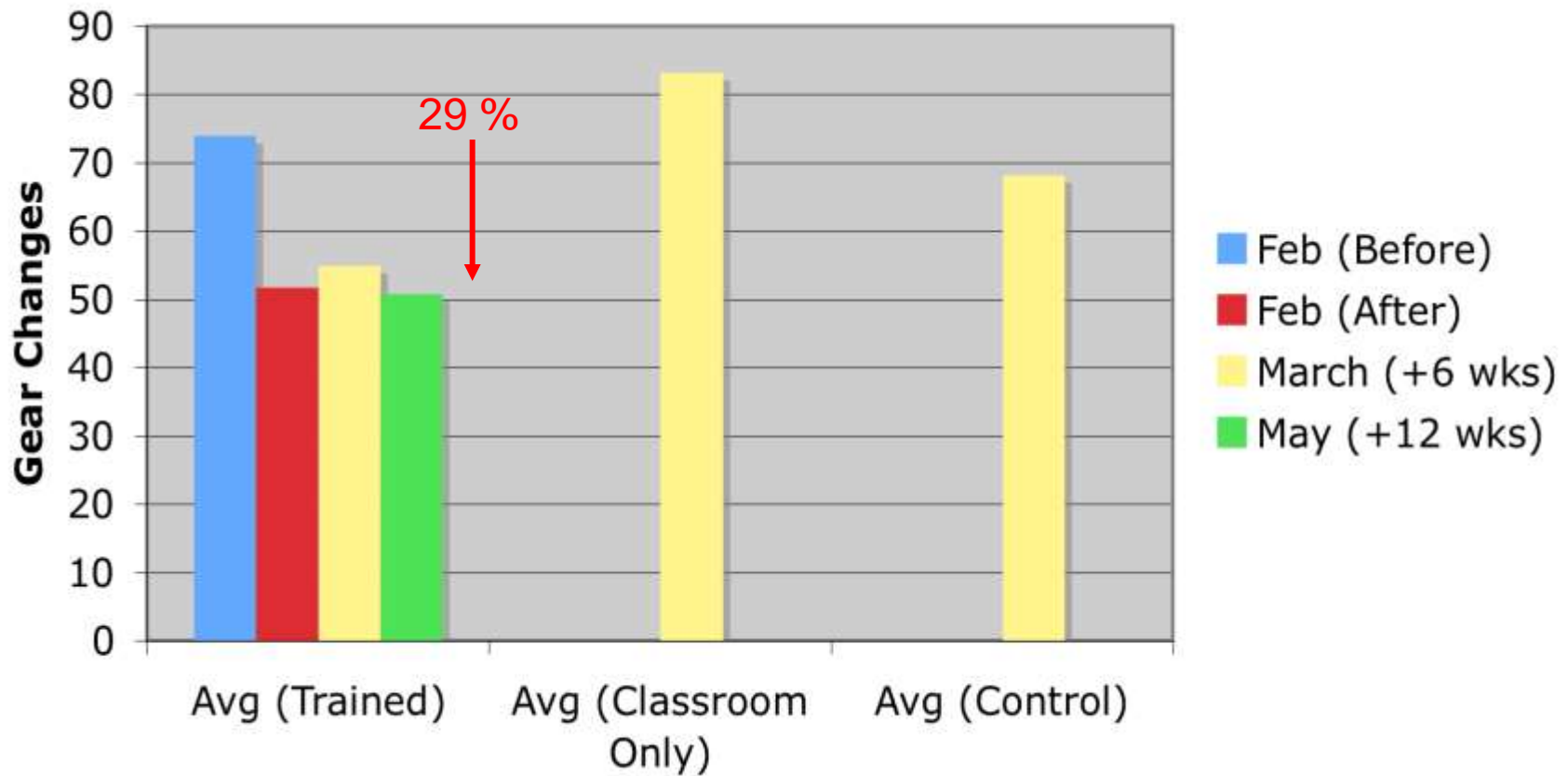
# Field Trial Results - Circuit Travel Time



# Field Trial Results - Brake Applications



# Field Trial Results - Gear Changes



# Statistically significant effects detected

- **Main effect of reduction in fuel consumption was not statistically significant for the trained drivers across all waves**
  - but the difference between the pre- (M=26.4 litres) and immediately post-course (M=19.2 litres) approached significance at 5 %
- **The classroom group did not differ significantly from the control group**
- **Main effects of brake applications and gear changes were statistically significant**



# Drivers views and attitudes

- **Qualitative small group interviews with trained drivers at the end of the trial**
- **All believed the new driving style was worthwhile and had enabled them to reduce fuel consumption**
  - Surprise to some who did not expect the course to deliver much difference in their driving style or fuel consumption



# Drivers views and attitudes (Cont.)

- **Noted it was physically easier to drive the vehicle but acknowledged they needed to think more about how they were driving. Typical statements included:**
  - “Instead of fighting the flow of traffic you are flowing with it”
  - “Less hectic behind the wheel”
  - “Seems smoother in the cab”
  - “I feel like I am keeping the vehicle flowing rather than a lot of stopping and starting”

# Drivers views and attitudes (Cont.)

- **Two drivers noted that as a result of the training they had also changed their behaviour when driving their private vehicles**
  - One driver, who drove a manual V8, was doing more skip shifting and trying to flow his car with the traffic
  - Another driver, with an automatic vehicle, noted that he was anticipating traffic conditions more
    - “I ease off the throttle rather than racing up behind cars at a red light and braking”*

# Issues and Interpretation

- **Results are clearly encouraging**
- **Already skilled and professional drivers**
- **Flowing the vehicle via fewer gear changes and brake applications appears linked to reduced fuel consumption**
- **Anticipatory driving style**
  - Safety implications
  - Reduced gear changes and brake applications: reduced maintenance costs plus less physical effort for drivers
  - Reduced brake applications: environmental benefits in terms of water and noise pollution



# Issues and Interpretation

- **Important to keep in mind key parameters of this pilot**
  - Large, heavy vehicles
  - Outer metropolitan operation
  - On-board assessor
  - Small number of drivers (4 drivers received full training)
- **Can't transfer these results to**
  - Other vehicle types
  - Other operating environments
  - Day to day operations



# Conclusions

- **This research is helping to provide insight into the potential for EcoDriver training in an Australian context**
- **Encouraging results achieved in the pilot**
  - Need to exercise caution in extrapolating the results
- **Need to establish how best to embed EcoDriver behaviour and quantify the in-service impact**