Modelling for High Productivity Vehicles in Metropolitan Areas
13 February 2018
Today’s moderator

Eliz Esteban
Communications Officer
Austroads

P: +61 2 8265 3302
E: eesteban@austroads.com.au
About Austroads

The peak organisation of Australasian road transport and traffic agencies

- Roads and Maritime Services New South Wales
- Roads Corporation Victoria
- Department of Transport and Main Roads Queensland
- Main Roads Western Australia
- Department of Planning, Transport and Infrastructure South Australia
- Department of State Growth Tasmania
- Department of Transport Northern Territory
- Transport Canberra and City Services Directorate, Australian Capital Territory
- The Department of Infrastructure, Regional Development and Cities
- Australian Local Government Association
- New Zealand Transport Agency
Our structure

Austroads Board

Austroads National Office

Assets Program
- Assets Task Force
- Bridge Task Force
- Pavements Task Force
- Road Tunnels Task Force
- Project Delivery Task Force

Network Program
- Network Task Force
- Freight Task Force

Safety Program
- Road Safety Task Force
- Road Design Task Force
- Registration and Licensing Task Force
- Austroads Safety Barrier Assessment Panel

Connected and Automated Vehicles
- CAV Steering Committee
- Industry Reference Group

NEVDIS
- Vehicle governance
- Licensing governance
Housekeeping

Presentation = 35 mins
Question time = 15 mins

GoToWebinar

Please type your questions here

Let us know the slide number your question relates to
Austroads report

Download from Austroads Website:

Today’s presenter

Dr Ian Espada
Team Leader, Network Operations
Congestion, Freight and Productivity
Australian Road Research Board (ARRB)

P: +61 3 9881 1685
E: ian.espada@arrb.com.au
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<td>Project Background and Introduction</td>
<td>Dr Ian Espada</td>
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<tr>
<td>Literature Review</td>
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<tr>
<td>Stakeholder Consultation</td>
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<td>Modelling</td>
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<td>Conclusions</td>
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<tr>
<td>Q&amp;A</td>
<td></td>
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Project Background and Introduction
Introduction to team

Project Team

Austroads Project Manager
Thang Nguyen

Project Leader, ARRB
Ian Espada

Team Member, ARRB
Kevin Wu

Team Member, ARRB
Andrej Bucko

Review Team

Austroads Project Working Group

Stakeholders-Road and Traffic Authorities

Austroads Freight Task Force

Austroads Board
The Project Team

Austroads Project Working Group

- Jeff Norton (DPL NT)
- John Calomiris (TMR QLD)
- Phil Bullock (TfNSW)
- Justinieta Balberona (TCCS ACT)
- Thang Nguyen (TfNSW)
- Kuga Kugathas (TCCS ACT)
- Kuga Kugathas (TCCS ACT)
- Jeff Potter (NTC)
- Marinus La Rooij (NZTA)
- Fiona Allan (MR WA)
- Carmelo Roistano (DPTI - SA)
- Eric Henderson (VicRoads)
- Andrew Poole (DSG Tas)
- Andrew Poole (DSG Tas)
- John Calomiris (TMR QLD)
- Jeff Norton (DPL NT)
High productivity freight vehicle (HPFV) access in metropolitan areas

PBS 2B access

Late 2016

Early 2018
Research objective

Performance Based Standard (PBS) 2B access → road operation

See Section 1.1
Project overview

Background  Literature Review  Stakeholder Consultation  Modelling
Literature Review
### Impact and Findings

<table>
<thead>
<tr>
<th>Impact</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestion delay</td>
<td>• Significant change in truck fleet mix</td>
</tr>
<tr>
<td></td>
<td>• Reduction in truck trips</td>
</tr>
<tr>
<td></td>
<td>• Congestion delay in saturated networks</td>
</tr>
<tr>
<td>Vehicle-to-vehicle crashes</td>
<td>• HPFV have lower historical crash rates</td>
</tr>
<tr>
<td></td>
<td>• HPFV appear safer or just as safe</td>
</tr>
<tr>
<td>Crashes with vulnerable road users</td>
<td>• Trucks are overrepresented</td>
</tr>
<tr>
<td></td>
<td>• No specific analysis on different truck types</td>
</tr>
<tr>
<td></td>
<td>• Factors related to crash heightened with larger trucks</td>
</tr>
</tbody>
</table>
### Environmental, amenity and cost

#### Impact Findings

<table>
<thead>
<tr>
<th>Impact</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>• Reduction in emissions</td>
</tr>
<tr>
<td>Amenity</td>
<td>• Reduction in trucks could improve amenity</td>
</tr>
<tr>
<td></td>
<td>• Impact of different truck types is not well understood</td>
</tr>
<tr>
<td>Transport cost</td>
<td>• Significant savings</td>
</tr>
</tbody>
</table>

See Section 2
Stakeholder Consultation
Key considerations

• Safety, amenity and community acceptance
• Congestion delay is a risk
  - but not considered critical
• Transport cost savings is primary driver
• Cost of infrastructure upgrade and maintenance
• Highly desirable to convert to PBS 2B
  - Line haul/truck routes with no constraints: >50% take-up rate
  - Otherwise: 15% to 50%

See Section 3
Please type your questions here

Let us know the slide number your question relates to
Modelling
Modelling Framework

- Proposed route
- Safety, amenity, ...
- PBS 2B Route
- Microsimulation
- Performance impacts
- Decision

Parameters
- Car to PBS 2B vehicles
- Vehicle dimensions
- Acceleration and deceleration
  - Load conditions
  - Driving mode
  - Grade
- Vehicle power-to-weight ratio

See Section 4

Cost
PBS 2B Parameters

- Powertrain specs (past assessments)
- Mass
- Driving mode
- Grade

DriveSIM

- Acceleration
- Speed limitations

See Section 4
## King Georges Road

### Demand
- **Actual**: Peak (2016 to 2036), Off-peak (2016)
- **Hypothetical**: Peak and off-peak (2016)

### Mix
- **Actual**: <1% Articulated trucks
- **Hypothetical**: <1% to 8% Articulated trucks

### Network
- **Actual**: As existing
- **Hypothetical**: As existing

See Section 5
King Georges Road

Off-peak

Negligible impact up to 8% articulated

Take-up (0% → 70%)

Change in transport cost

Peak

Change in transport cost

Take-up (0% → 70%)

+15%

8%

6%

4%

1%

Lower freight transport cost in both cases

See Section 5
<table>
<thead>
<tr>
<th>Access type</th>
<th>Vehicle type</th>
<th>Change in transport cost</th>
<th>&lt;1% Articulated</th>
<th>8% Articulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-peak only</td>
<td>All types</td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
</tr>
<tr>
<td></td>
<td>Articulated</td>
<td>Benefit</td>
<td>Benefit</td>
<td>Benefit</td>
</tr>
<tr>
<td>All-day</td>
<td>All types</td>
<td>No change</td>
<td>Dis-benefit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Articulated</td>
<td>Benefit</td>
<td>Benefit</td>
<td></td>
</tr>
</tbody>
</table>

See Section 5
Motorway

<table>
<thead>
<tr>
<th>Item</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td>Off-peak → Peak</td>
</tr>
<tr>
<td>Mix</td>
<td>3% → 16% articulated</td>
</tr>
<tr>
<td>Network</td>
<td>On-ramp</td>
</tr>
</tbody>
</table>

See Section 5
Motorway

Off-peak

Take-up (0% → 70%)

Change in transport cost

-5% 3% 9% 16%

% articulated

-2% 9% 3% 16%

Peak

Take-up (0% → 70%)

Change in transport cost

+1% 16% 9% 3%

% articulated

✓ Neutral impact to delay
✓ Lower operation and emission cost

✓ Higher delays
✓ Lower operation cost
## Motorway

<table>
<thead>
<tr>
<th>Access type</th>
<th>Vehicle type</th>
<th>Change in transport cost</th>
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</thead>
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<tr>
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<td>All types</td>
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</tr>
<tr>
<td></td>
<td>Articulated</td>
<td>Benefit</td>
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</table>

See Section 5
Conclusions
## Conclusions

### Issue | Findings
--- | ---
Congestion delay | Risk… if high truck shares and saturated in arterials
Not a concern on… motorways, low truck shares, and under-saturated roads

Vehicle-to-vehicle crashes | Likely to be neutral or could potentially result in less crashes

Crashes with vulnerable road users | Risk… apply countermeasures

Environmental | Benefits expected

See Section 6
## Conclusions

<table>
<thead>
<tr>
<th>Issue</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Amenity</td>
<td>Possible benefits, but not well-understood</td>
</tr>
<tr>
<td>Modelling framework</td>
<td>Key assumptions were developed for accurate and consistent analysis</td>
</tr>
<tr>
<td>King Georges Road access</td>
<td>Recommend to apply… based on network performance impacts</td>
</tr>
<tr>
<td>Arterial road access</td>
<td>All-day access can be considered when under-saturated or low truck share</td>
</tr>
<tr>
<td></td>
<td>Off-peak access only can be considered, otherwise</td>
</tr>
<tr>
<td>Motorway access</td>
<td>All-day can be generally considered</td>
</tr>
</tbody>
</table>

See Section 6
Questions?

Dr Ian Espada
Team Leader, Network Operations
Congestion, Freight and Productivity
Australian Road Research Board (ARRB)

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E: ian.espada@arrb.com.au
Upcoming Austroads webinars

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<td>National Performance-based Asphalt Specification Framework</td>
<td>27 February</td>
</tr>
<tr>
<td>Pavement Design: Guide to Pavement Technology Parts 2 and 4C</td>
<td>9 March</td>
</tr>
<tr>
<td>Local Road Access for High Productivity Freight Vehicles</td>
<td>27 March</td>
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Thank you for participating