The Impacts of Carrying People in Single Occupancy Vehicles and Buses on Roading Costs

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Introduction

• Various transport modes
  • Buses
  • Single Occupancy Vehicles (SOVs)
  • Other

• Costs associated with different modes...
Components of Roading Costs

- Land Purchase
- Construction
- Maintenance
- Fuel Consumption
- Noise
- Congestion
- Accidents
- Vehicle Emissions
Cost Components Investigated

Impact of buses on pavement deterioration

• Comparison with SOVs
• Impact of positioning buses on the kerbside lane

The effect of buses on congestion

• Impact of shifting between modes (SOV and bus)
Pavement Deterioration

- Due to accumulated damage from vehicles
- Empty bus is the equivalent of 3000 SOVs
- Buses on average have a greater impact than SOVs per person
- Not considering the impact of freight vehicles
The Impact of Kerbside Bus Lanes

What is the impact of kerbside bus lanes on pavement deterioration?

- High failure rates close to kerb
- Catch pits located on kerbside
- Narrowing of traffic lanes
- Retrospective kerbside bus lanes
Road Space

What is the impact of kerbside bus lanes on pavement deterioration?

- Average vehicle occupancy 1.3-1.5 passengers
- A bus at full occupancy equals
  - 40 vehicles
  - 6% of road space

What is the impact on congestion?
Road Space and Intersection Capacity

Investigating the impact increased mode share has on capacity

• Varying mode share
• Varying bus occupancy
• Impact on delay
• Impact on speed
Impact of buses on intersection capacity
Impact of buses on intersection capacity
Impact of buses on intersection capacity
Results

Average Delay for Different Mode Shares

- 0% Bus Mode Share
- 10% Bus Mode Share
- 20% Bus Occupancy

Average Delay (s)

Bus Occupancy
## Results

<table>
<thead>
<tr>
<th>Vehicle Mode Share</th>
<th>Bus Mode Share</th>
<th>Bus Occupancy</th>
<th>Average Delay</th>
<th>Average Speed</th>
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</tbody>
</table>
Results

• As mode share increases
  • average intersection delay decreases
  • average intersection speed increases
• Correlates with increased bus usage resulting in decreased congestion
Conclusions and Recommendations

• Buses have a higher cost per passenger in terms of pavement damage

• Further investigation on the impact of buses on kerbside lanes is recommended

• Increased bus occupancy and mode share of buses results in reduced congestion

• Site specific investigations and all aspects which contribute to roading costs must be considered.
Questions??