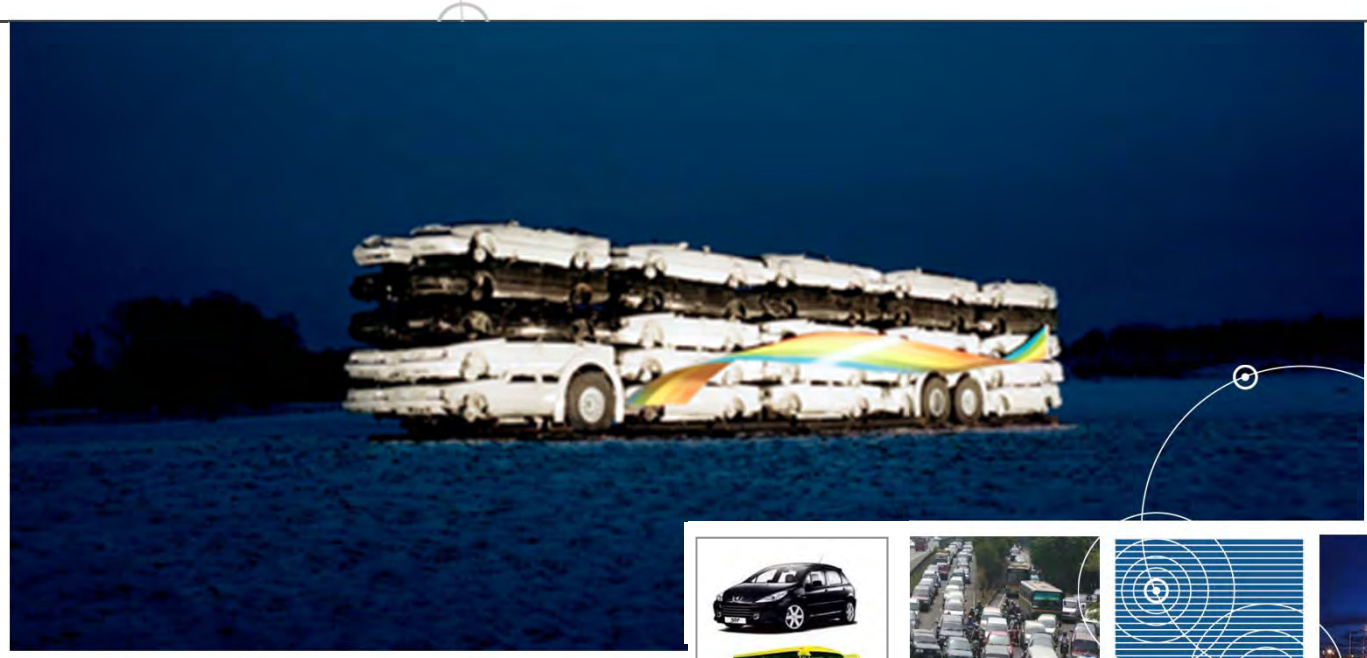

The Impacts of Carrying People in Single Occupancy Vehicles and Buses on Roading Costs

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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

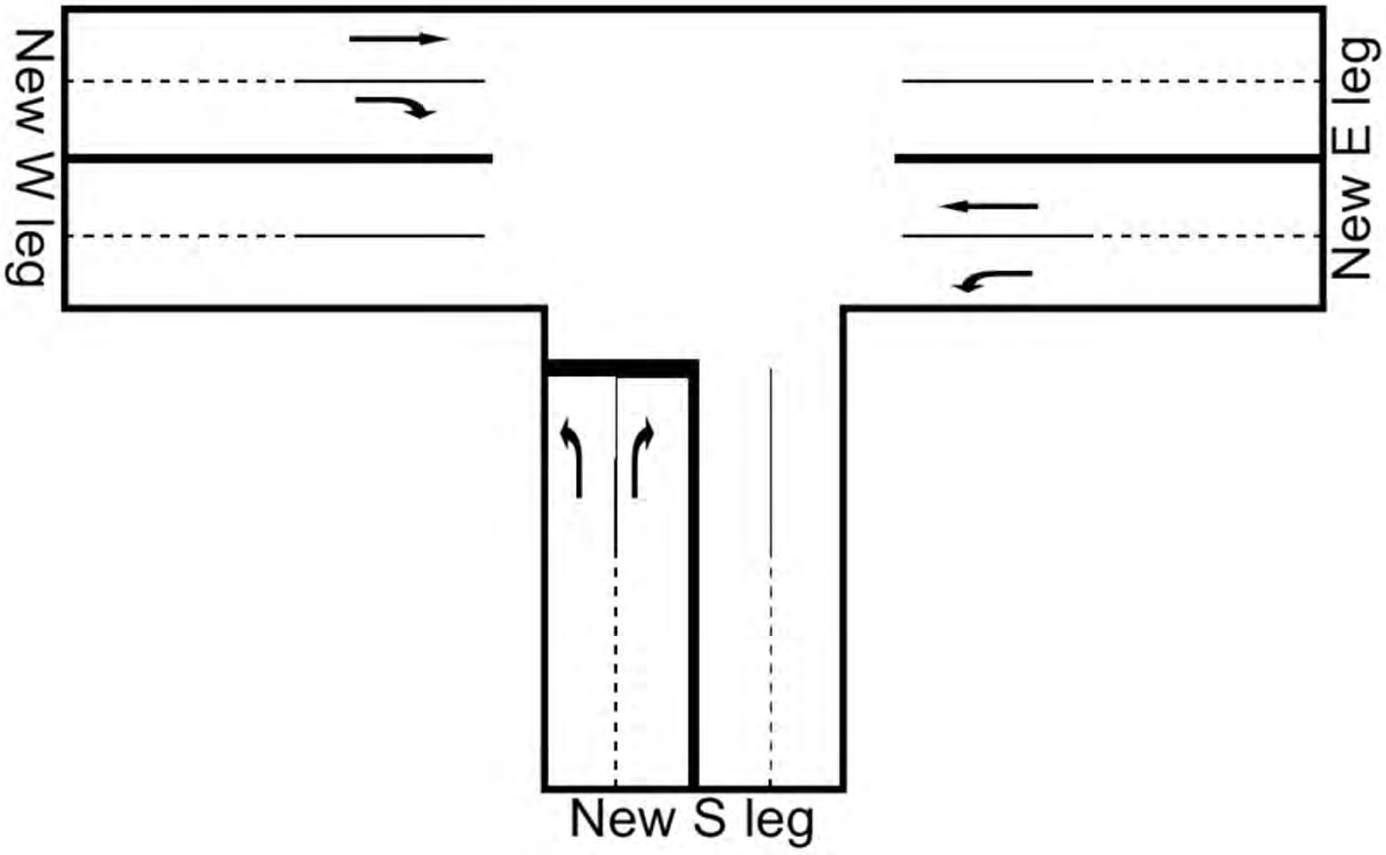
What is the impact on congestion?

Road Space and Intersection Capacity

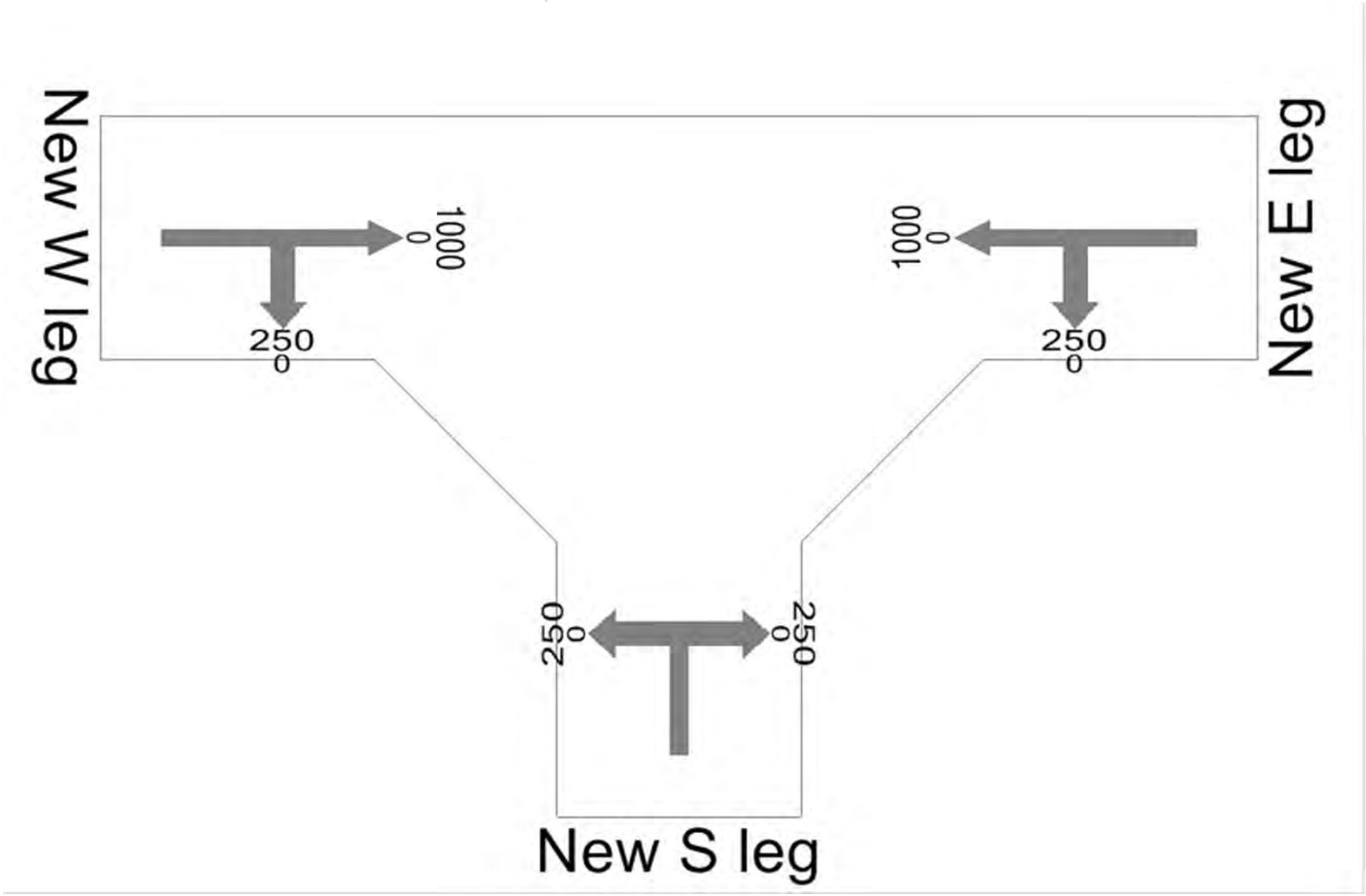
Investigating the impact increased mode share has on capacity

- Varying mode share
- Varying bus occupancy
- Impact on delay
- Impact on speed

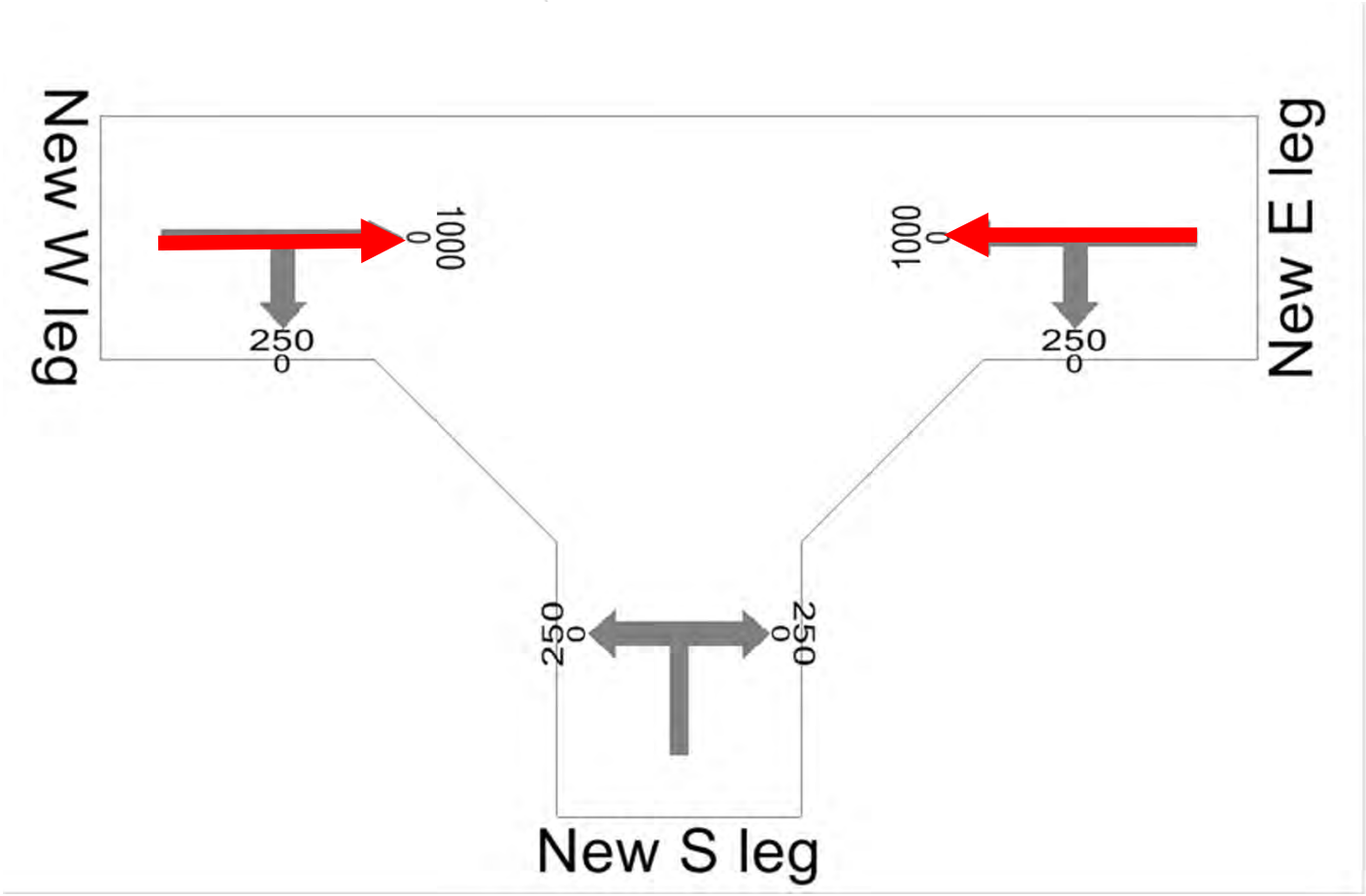
Impact of buses on intersection capacity



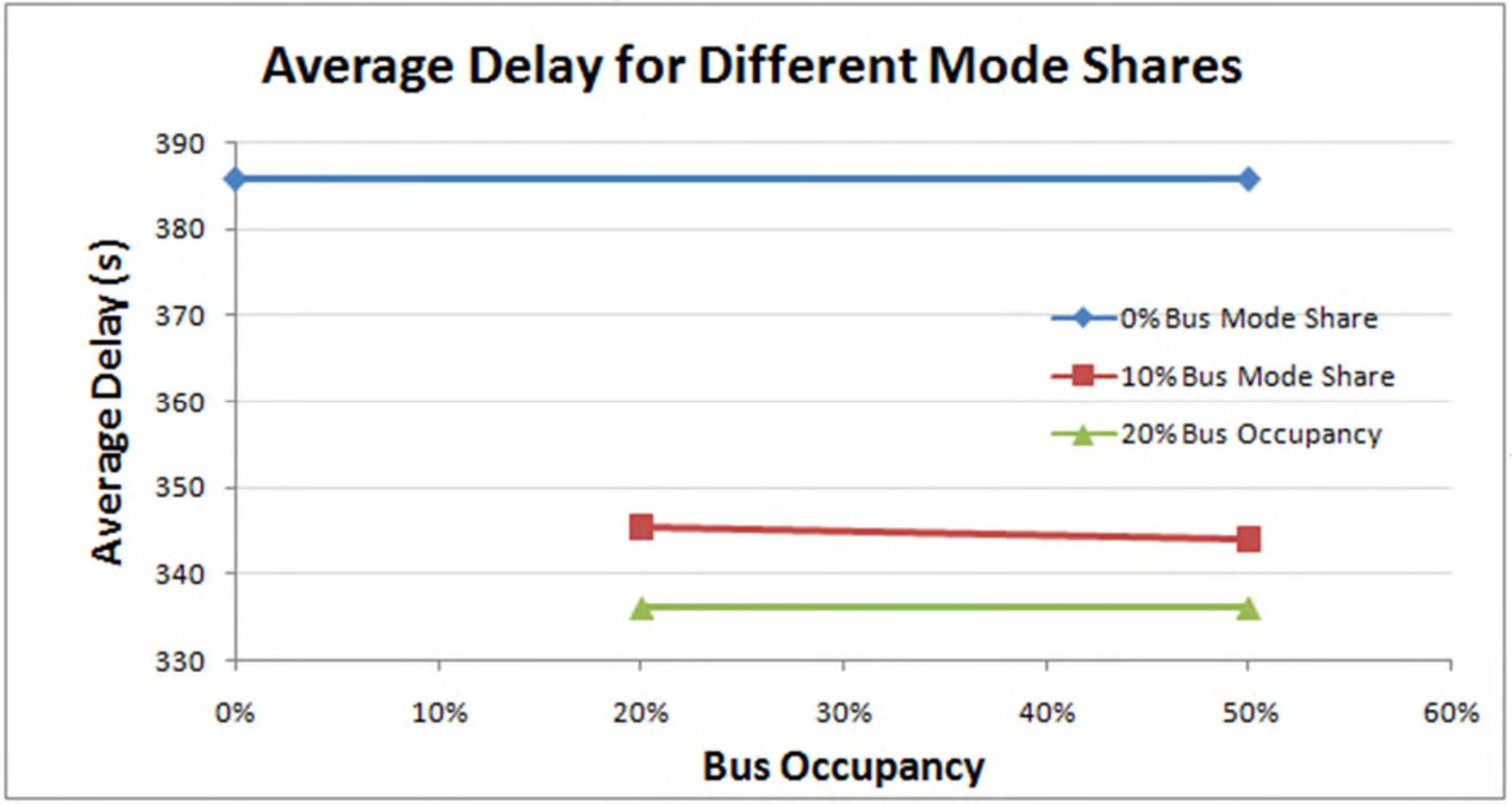
Impact of buses on intersection capacity



Impact of buses on intersection capacity



Results


Average Delay for Different Mode Shares
390
380
370
360
350
340
330
Average Delay (s)
0% Bus Mode Share
10% Bus Mode Share
20% Bus Occupancy
0%
10%
20%
30%
40%
50%
60%
Bus Occupancy

Results

Vehicle Mode Share	Bus Mode Share	Bus Occupancy	Average Delay	Average Speed
100%	0%	0%	385.8	4.8
90%	10%	20%	345.5	5.4
90%	10%	50%	344.0	5.4
80%	20%	20%	336.0	5.5
80%	20%	50%	336.0	5.5

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??