

Do our aspirations match our abilities?

Systematic challenges facing the traffic and transport profession



Stuart Donovan, Tuesday 24 March 2015

IPENZ Transportation Group Annual Conference

Christchurch, New Zealand

Outline

- Four systematic and inter-related challenges:
 - Scientific rigour
 - Economic value
 - Completeness
 - Values versus practices
- Finish with a case-study
- Range of solutions, but change is needed

#1 Scientific rigour



Engineering is too important to wait for science.

(Benoit Mandelbrot)

#1 Perception versus reality?

- *Perception*: Professional practices have a strong scientific/empirical basis.
- *Reality*: Many of our quantitative techniques lack scientific rigour.

#1 Demand estimates

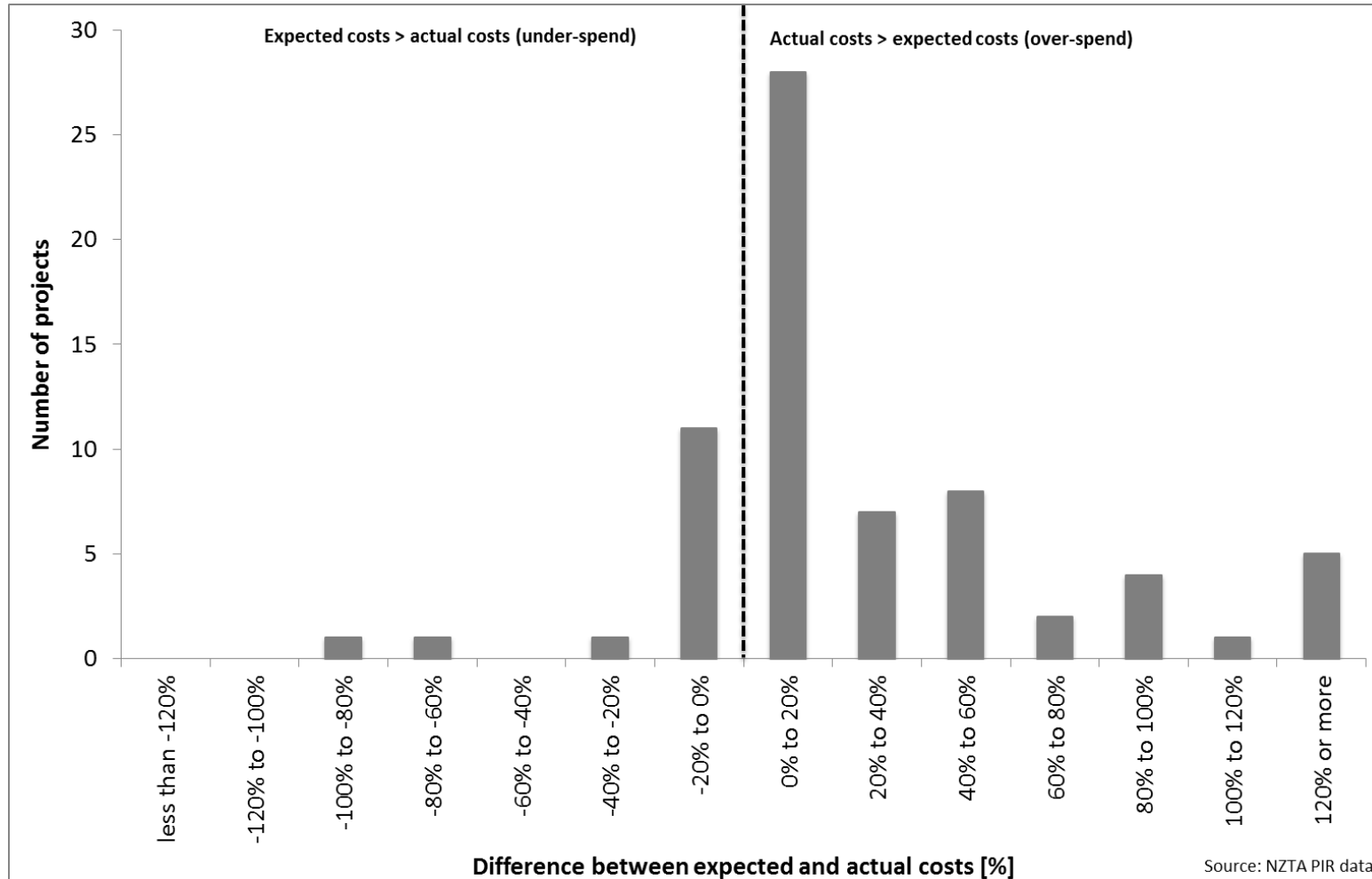
- Trip generation and parking rates suffer from:
 1. Omitted causal variables,
 2. Simultaneous causality,
 3. Sample selection bias, and
 4. Inadequate treatment of statistical dispersion.
- Over-estimate vehicle demands by ~100%.

#1 Trip generation rates

“The commonly used household vehicle trip rates from the Institute of Transportation Engineers' Informational Report, Trip Generation, are nearly twice as large as equivalent data from survey-based sources ... Considering these factors ITE data are claimed to lead to excessive local road capacity decisions. Survey-based rates are more consistent with other national accounts and observations of travel.”

(Reid, 1982)

#1 Costs under-estimated



#1 Conclusions

- Demand estimates positively biased
- Cost estimates negatively biased
- *Potential solutions?*
 - Address scientific deficiencies; but
 - What's the incentive? Systematically record demand and cost estimates; and
 - Make these estimates publicly available

#2 Economic value



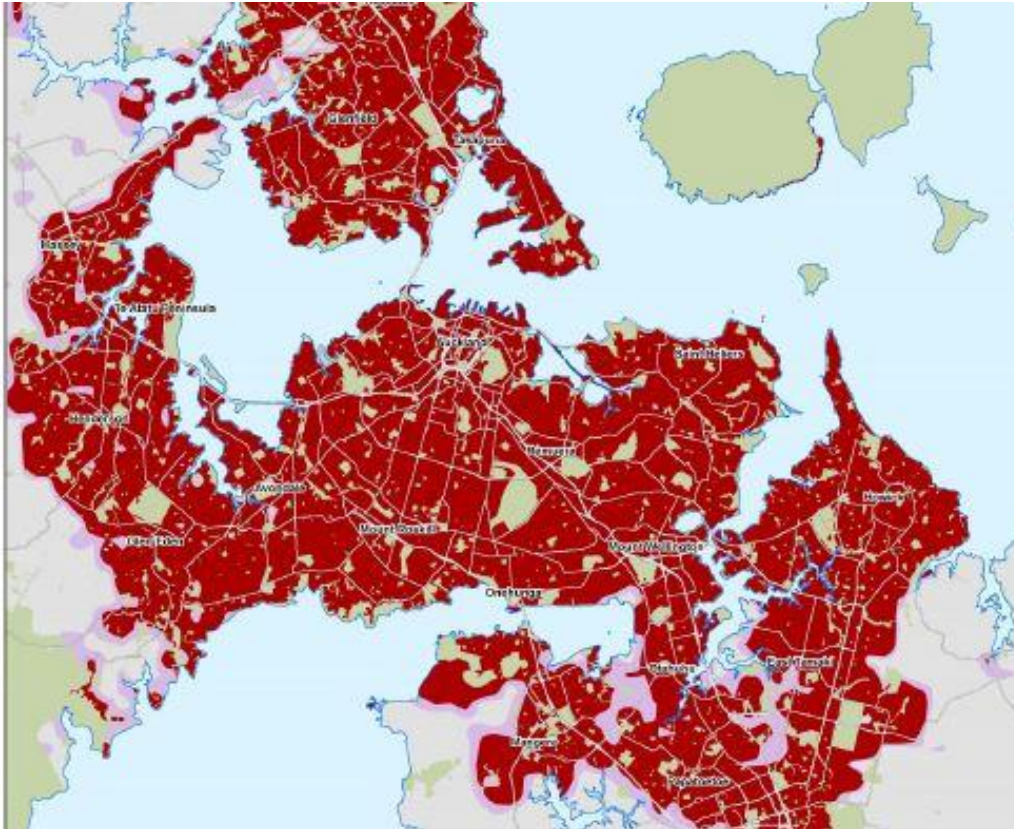
#2 Perception versus reality?

- *Perception*: Professional practices contribute to people's economic welfare.
- *Reality*: Professional practices have developed with little to no supporting economic analysis.

#2 Parking requirements

- ***No*** credible research supporting minimum parking requirements (MPRs).
- ***Universal finding*** that MPRs tend to have negative land use and transport impacts.
- By prescribing MPRs, is the profession giving tacit support to a technical practice that appears to be undermining economic well-being?

#2 Parking requirements



Red areas indicate where benefits of removing MPRs were found to exceed the costs of doing so. Strong economic evidence supporting the removal of MPRs from Auckland's metropolitan areas, due largely to the land and floor space taken up by low-value parking.

#2 Design vehicles

- Choice of design vehicle has a major influence on the size of the road network
- Accommodating a semi-trailer, rather than a car, increases the footprint of intersections by 30-40%.
- Incremental cost in Auckland estimated at approximately \$2 *per semi-trailer per intersection*.
- Is society willing-to-pay this cost?

#2 Conclusions

- *Potential solution?* Professional practices should be subject to rigorous economic analysis, as per most other areas of public policy.

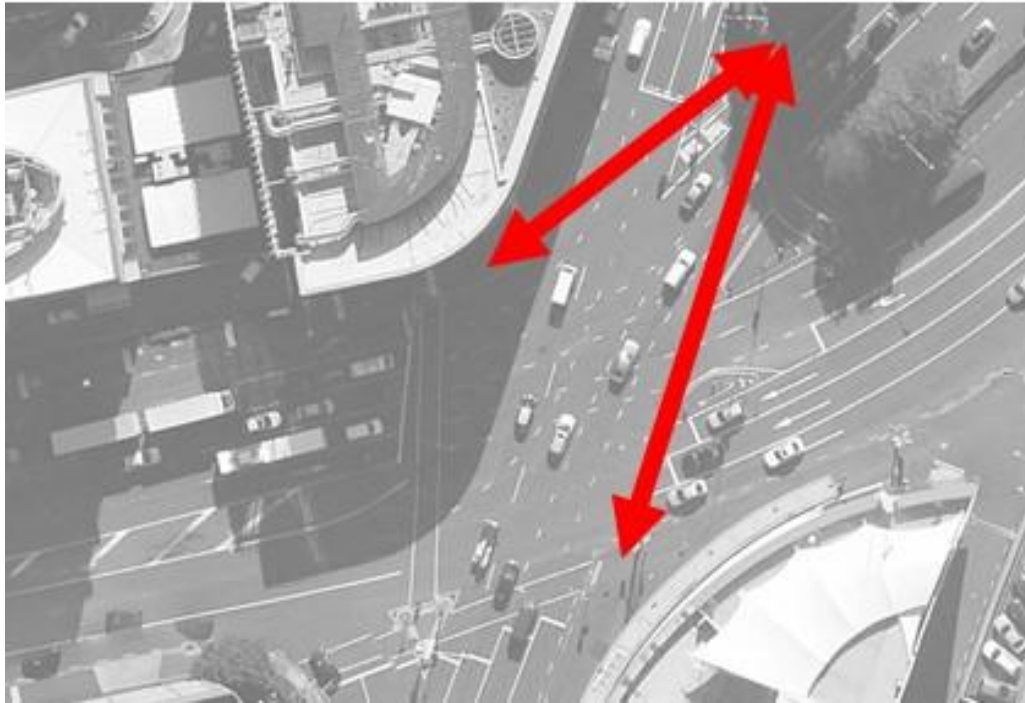
#3 Completeness



#3 Issues

- KPIs focus on measuring vehicle outcomes
- Design standards informed primarily by vehicle-centric KPIs, e.g. DoS, LoS
- Limited guidance on what constitutes acceptable delays to non-car users

#3 Outcomes



Pedestrian crossings removed from ***two*** legs of the intersection, making it impossible for people to safely cross. This intersection is located ~200m from Queen Street in Auckland's city centre, on the way to the Viaduct and Wynyard.

#3 Outcomes



Pedestrian wearing a toga must divert 150m and navigate three signalised crossings.

#3 Conclusions

- KPIs and guidelines are still incomplete
- *Potential solutions?*
 - Develop KPIs that measure productivity (i.e. output and input), not simply vehicle output; and
 - Street design guidelines, such as NACTO, given precedence ahead of road design guidelines.

#4 Values versus actions

- *Perception:* Professional practices generally align with our professional values.
- *Reality:* Aforementioned issues creates risk of disconnect between practices and values.

#5 The proposal

- Auckland Transport and NZTA proposed to widen an intersection in Auckland
- Cost of \$5.5 million; required cutting down six 80 year old pohutukawa trees
- Proposal unanimously voted down by the AT Board after considerable community opposition
- Useful case study of aforementioned issues

#5 Meet Jolisa



#5 Here's what she said

“... these are not just any old pohutukawa ... these trees were planted in 1934 by the Council to line Great North Road and complete a public park built by Depression-era relief workers.

They were planted with an eye toward the centenary of the city and the nation, in full expectation they would be cared for by the community.”

#5 “Most painfully ...”

“... the proposed design:

- *does not improve things for cyclists*
- *makes things worse for people who walk*
- *does not meaningfully improve public transit*

***Most painfully of all** ... it offers no better vehicular traffic outcome than other options that preserve the trees. In other words, purely on traffic measures alone, leaving aside the value of place, the proposed outcome isn't especially great.”*

#5 Campaign material



Daniel Newcombe

Josh Arbury



Recommendations

- *Scientific rigour*: Address lack of rigour in our quantitative predictions, and make data public.
- *Economic value*: Ensure professional practices are supported by robust economic analyses.
- *Completeness*: Develop new KPIs and adopt urban street design guidelines. Consider all users.
- *Values*: Avoid subjective value-judgments, instead present real trade-offs to decision-makers.

Thank you

Stuart Donovan

sdonovan@mrcagney.com

EXHIBITORS



Alan Nicholson

Vote on the Transportation Group's highest priorities for research topics to be conveyed to NZ Transport Agency



SUPPORTING SPONSORS



Pravin Dayaram

Closing session

