ITEANZ Seminar - On Your Bike
Cities 'safe enough' for travel by bicycle?
Inner Melbourne, Amsterdam and Copenhagen

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Embargo: Not to be quoted, this research is still in progress

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Comparative case study
Are Amsterdam & Copenhagen safer than Inner Melbourne?

Amsterdam

Copenhagen

Melbourne

- Three inner city areas: originally *'walking' cities, i.e.* developed pre-car
- Adults - who have transport choices and are or could-be bicyclists
- Primary 'Safety' - crash avoidance, objective risk and perceived danger

**Inner Melbourne
Five municipalities**
15 km diagonal
Area: 135 km²

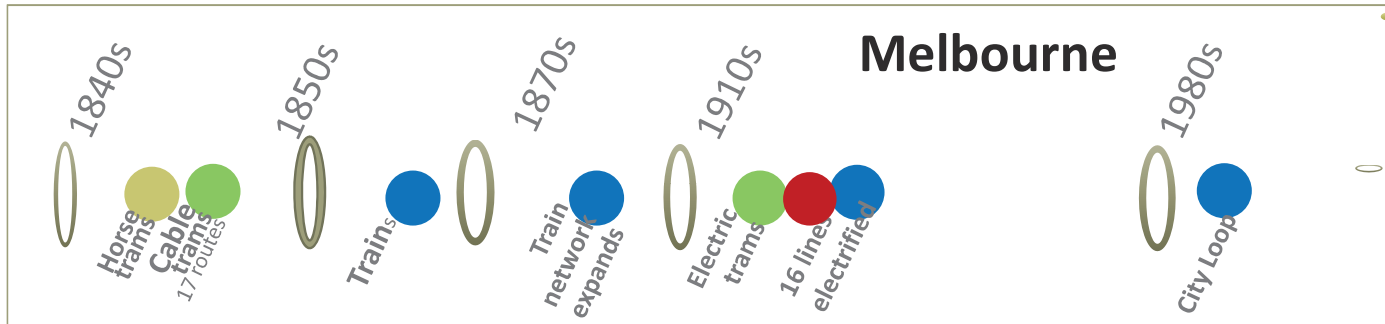**19th C** walking
then extensive
trains & trams

Amsterdam
21 km diagonal

Copenhagen
14 km diagonal

18th & 19th C
walking & canals
19th C some trams
Single municipality
Area 79 km²

17th – 19th C
walking & canals
19th C some trams
Single municipality
Area 219 km²

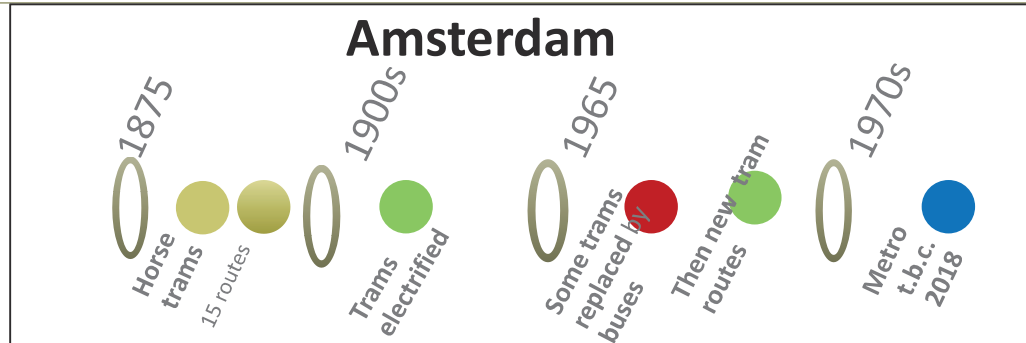# Context is important: 19C Melbourne had Trains before and more Trams than Amsterdam or Copenhagen

Melbourne

1840s — Horse trams, Cable trams 17 routes
1850s — Trains
1870s — Train network expands
1910s — Electric trams, 16 lines electrified
1980s — City Loop

Trams
26 routes – 487 trams
250 dble track kms

Trains 16 lines
372 kms

Amsterdam

1875 — Horse trams 15 routes
1900s — Trams electrified
1965 — Some trams replaced by buses, Then new tram routes
1970s — Metro t.b.c. 2018

Trams
16 routes - 216 trams
80 track kms

Trains
4 lines
52 track kms

Copenhagen

1863 — Horse Trams, Mech. trams
1930s — S-trains 6 routes
1960s — All trams replaced by buses
2000s — Metro t.b.c 2018
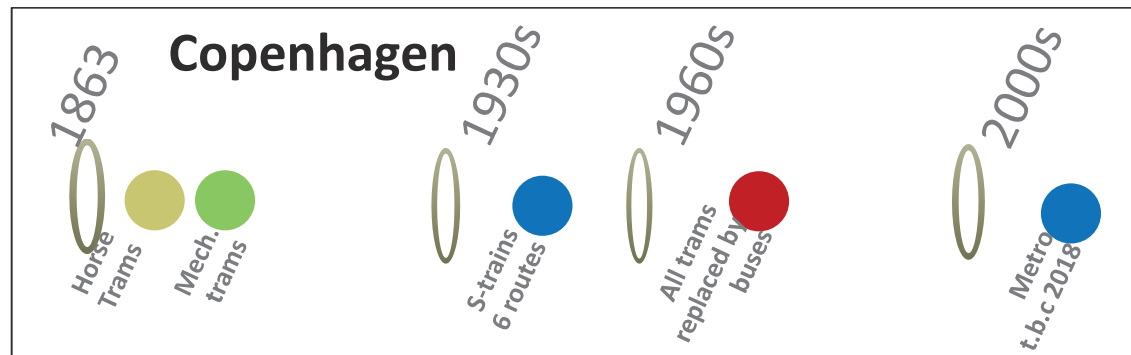
Trains
7 lines
170 track kms

Trams
Trains
Buses

4

Melbourne c. 1910

Copenhagen c. 1940

Flinders Street Station - c1900-1914
Cnr Flinders & Swanston Streets

What we know

- More injuries than reported in CrashStats (Sikic et al, 2009, Garrat et al, 2015)

- Single vehicle – 'bike only' crashes are numerous but under reported
  (Schepers et al 2011, 2012, 2014), Biegler et al 2012)

- Threatening experiences very common
  (Johnson et al 2010, Garrard, 2011)

- 'Safe System' approach not well developed in Victoria (or Australia)
  (Mooren et al 2011, 2013)

- 'Safety in numbers' works when **motor traffic speeds and volumes are moderated** (Jacobsen et al 2003, 2009, 2012,2015)

Understanding travel safety
adults have choices – safety is relative

Objective safety ('risk') **–** for *government and institutional actors*
Measurable risk: number of injuries related to a measure of travel
Risk reduction is an ethical criteria for governments and corporations (eg. vehicle manufacturers)

Perceived safety ('danger') **-** for *individuals,* shapes behaviour
Belief about danger is a threshold factor for mode choice.
Can my trip be safely made by bicycle?
Decision is based on beliefs:
(a)'system safety' (environmental danger),
(b) individual ability to cope, reduce danger

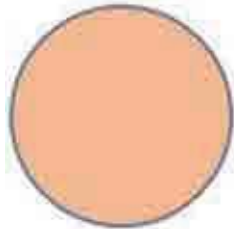# Safety: Injury Risk for Trips by Mode (IMAP)

$$R_m = KSI_m / P / T_m$$

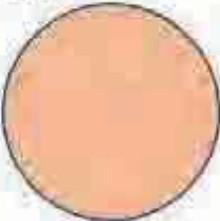(KSI = killed & seriously injured) (P = population) (T = share of trips)

•*Trips in cars and on foot are low risk*

•*R= 1.2 to 1.3*

Trips by bicycle have six times the risk of serious injury

•*R = 7.8*

IMAP (Population 446,000)	Motor vehicle occupants	Pedestrians	Bicyclists
KSI	251	163	156
KSI/100,000 population	56.3	36.5	35
Mode share	47%	27%	4.7%
Risk exposure index *Area of each circle is proportional to the risk*	1.2	1.3	7.8

City Safety: Injury risk for riders trips compared

Risk in **Inner Melbourne** is:

    1.7 X Metro Melb

    14. X Amsterdam

    12. X Copenhagen

Why the difference?

Study Area	Metro Melb	Inner Melb	Ams	Cph
Population (100,000)	40.87	4.46	8.20	5.59
Bicycling share of trips	<2%	4.7%	28 - 39%	30%
Bicyclists KSI	363	163	130	111*
K.S I per 100,000	8.8	36.5	15.8	19.9
Risk exposure index (KSI/100,000/mode share) Area of each circle is proportional to the risk	4.5	7.8	0.56	0.66

*probably under reported

Framework for Change

Recognise CONTEXT
- **Morphology**
- **Culture**
- **Policy**

Comprehensive 'safe system' CONTENT
- Infrastructure
- People/Behaviour
- Vehicles

PROCESS
- Institutions
- Decision Making
- Co-production

Cultural Context   place of bicycling in city life

Inner Melbourne

– *Car is 'king' of the road*

– *Bicyclists to keep out of the way of motorists*

– *Cycling only for the fit and fearless*

– *But people would like to bicycle*

Amsterdam
– *Bicyclists are 'kings of the road'*
– *Bikes are just how they get around*
– *Bicycling is for everyone*

Copenhagen
– *Road users are equal - and look out for each other*
– *Bicycling is sensible city transport*
– *Bicycling is for everyone*

Amsterdam (and Copenhagen) from Wegman et al 2006, and Furth 2017
Cities Designed for **people** using **Sustainable Safety Principles**

'*mono-functionality*' road classes	Three road types defined by the functions for people: - Local Access - Connection and Distribution - Through Movement (high volumes at speed)
'*homogeneity*' amongst users	Group users by mass, direction and speed to limit potential for injurious conflict between users
'*predictability*' for road users	Road users know what types of traffic to expect and at what speed, and only need to make one decision at a time
'*forgivingness*' of errors	People make mistakes; road design and road use culture to reduce and forgive errors with no serious outcomes
'*awareness*' by users	Road users to know their responsibilities and be aware of their individual limitations

Infrastructure: Recognisable functions

Amsterdam

Local street ('Fietsstraat' - cars are 'guests')
intersects with Distributor Road

Copenhagen

Roadway Elements: Traffic lanes, Parking, Bike Path, Footpath

Safer Vehicles: eg City Trucks Local problem available **solution** - Vehicle Design Rules

Melbourne (Aus.)

E U

Process – forward looking, co-operative
(Copenhagen incremental reduction in car parking)

Car parking reduced from 1960s

And more pedestrian space

15

Co-production Copenhagen

Drivers stop for bicyclists - because they were asked to

Respect between uses: walking, riding and bike parking – no signs

Amsterdam and Copenhagen - they changed !

Amsterdam

Copenhagen

Change for Inner Melbourne - Key Ideas

►**Adaptive failure: a socio-technical problem (Context)**

not adapted to the sustainability and liveability challenges created by excessive car dependence.

► **'Good enough' safety ? (Content)** environment needs to be very good, pursued with best intentions across all three safe system pillars: infrastructure, vehicles and behaviour

►**Safety (Process)** is 'valued'

   can be co-produced by stakeholders

Context Opportunities

1) Major Construction projects - use disruption

2) Proposed **major road projects -** re-scope

3) Roads with **trams -** redesign

4) Re-focus TAC

5) Growing number of professionals who have experienced safety in Northern European cities

Seize opportunities: Major Project Disruption
Drivers are disrupted not people on bicycles

Melbourne

Copenhagen

Process (Decision) Opportunities

1) Stakeholders: Build momentum for change on **shared values**
   - Engage with motorists interests
   - Support pedestrian interests

2) Consider the **NACTO** model
   (**N**ational **A**ssociation of **C**ity **T**ransportation **O**fficials, USA)
   - *a cooperative response to the challenges faced by cities*
   'to build cities as places for people, with safe, sustainable, accessible and equitable transportation choices, a strong economy and vibrant quality of life'.
   - *exchange ideas, insights, and document best practices*
   - ***make joint approaches on national transportation issues.***

Content (Action) Opportunities

1) re-think intersection designs, road rules, priorities and enforcement
2) lower speeds (eg 30 km/h) on local streets,
   and at all intersections and crossings
3) rethink on-road car parking and 'loading/standing' provision
   centre-of-street parking on wide local streets ?
4) narrow streets, one-way cars with two-way bikes?
5) consistent detail of road design elements like widths, surfaces and planting
   to communicate expected behaviour, speed limits, priorities
6) phase out shared paths - separate walkers and bicyclists
7) advocate for best international practice in Australian vehicle design
   regulations (ADR's) for autonomous vehicles, bikes & trucks

Thank you

- Questions

- Discussion

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