Challenging Barriers to Activity Hastings: Model Community

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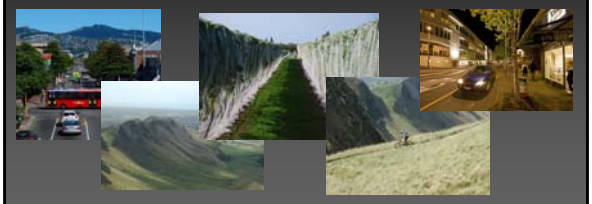


Access ≠ utilisation?

Example: If you make my walk to school easier I will walk to school more often?

No, not necessarily because this is an ASSUMED CAUSATION

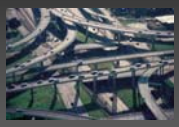
Don't take my word for it…

- Stepping towards causation: Do built environments or neighborhood and travel preferences explain physical activity, driving, and obesity? Lawrence Douglas Frank, Brian E. Saelens, Ken E. Powell, James E. Chapman (2007)
- Built Environments INFLUENCE Travel Behaviour
- How do we measure causation for active mode barriers?
- "THE SELECTION PROBLEM"

- Do prisoners who reoffend do so because they are influenced by their neighbourhoods? Or do they return to their neighbourhood specifically to commit more crime?
- What do you measure to answer this?... Selection Problem?

As Engineers we:

- See this:
- Build this:
- And Get This:


- Causation is a simpler problem to solve

- Do people walk and cycle more because the infrastructure encourages it? Or do people who like to walk and cycle move to areas which offer better infrastructure?...
- The prisoner reoffending problem?... Hurricane Katrina showed that a prisoner was nearly twice as likely to recommit crime if released back into the same neighbourhood.
- Epidemiologists are looking at the Christchurch Earthquake to determine the relationship between activity and infrastructure

Model Communities?

- We don't understand causation relationships of walking and cycling
- To achieve change we have to understand the real barriers and constraints to travel options
- Represent existing (model), predict future (model) and assess perception and opinion

NZTA Model Community

- NZTA announced $7m funding available to become New Zealand's first walking and cycling model community
- 22 Councils submitted expressions of interest
- Hastings and New Plymouth selected as model communities

NZTA Model Community Funding

- Funding to be provided over financial years 2010/11 and 2011/12
- New Plymouth: $3.71m
- Hastings: $3.57m

> "The purpose of this investment is to help create an environment that will make walking and cycling easy transport choices."
>
> Ms Jenny Chetwynd, Central Regional Director, NZTA
> 25 June 2010

HDC Vision

HDC Vision:
Making Walking and Cycling Irresistible

Four target user groups:

- Walk and Cycle to Work
- Walk and Cycle for Fun
- Walk and Cycle to Shop
- Walk and Cycle to School

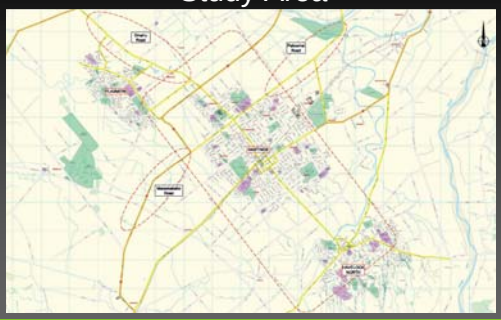
Hastings Area Transportation (HAT) Model

- Commissioned by HDC in May 2009
- Stakeholder Group led by HDC and included NZTA & HBRC
- Multi modal model – Cars, heavy vehicles, buses, cycles and pedestrians
- AM & PM Peak Period Models

HDC Model Communities Application: Utilisation of HAT (traffic) Model

- Select link analysis at several key locations
- Trip length distribution by land use
- Determine proportion of trips along key routes within target distance for mode shift to walking or cycling

Study Area



Hastings Area Transportation (HAT) Model

Three parts to model:

- Microsimulation model for cars, HGV and PT

- GIS interface used to analyse cycle network

- Pedestrian activity at key crossing points

Model Network

HAT Model: Pedestrians

- 15 unsignalised pedestrian crossings modelled (Zebra)
- Replicate random arrival of pedestrians
- Frequency and duration of pedestrian calls based on survey information from HDC

HAT Bicycle Model

- Theoretical model – no physical interaction with vehicles
- Shows most likely route choice by cyclists based on distance, prevailing traffic conditions and cycle network infrastructure
- Used to assist with strategic planning of cycling infrastructure

Bicycle Compatibility Index (BCI[1])

- The form of the BCI model is given below:
- BCI = C + a1*BL + a2*BLW + a3*CLW + a4*CLV + a5*OLV + a6*SPD + a7*PKG + a8*AREA + AF

Where:

BL **= Presence of a Bicycle Lane or Paved Shoulder**
BLW **= Bicycle Lane or Paved Shoulder Width**
CLW **= Curb Lane Width**
CLV **= Curb Lane Volume**
OLV **= Other Lane Volume**
SPD **= 85th Percentile Speed of Traffic**
C **= Constant**
PKG **= Presence of a Parking Lane With More Than 30% Occupancy**
AREA **= Presence of Residential Roadside Development**
AF **= ft+fp+fn**
ft **= Adjustment Factor for Truck Volumes**
fp **= Adjustment Factor for Parking Turnover**
fn **= Adjustment Factor for Right Turn Volumes**

And:

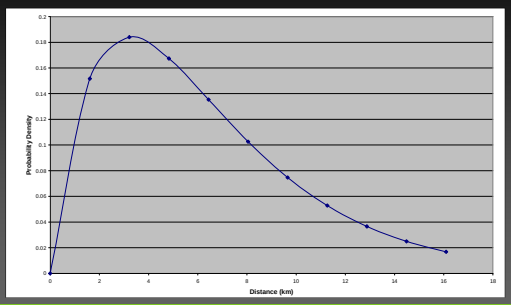
C = 3.67
a1 =-0.966
a2 = -0.125
a3 = -0.152
a4 = 0.002
a5 = 0.0004
a6 = 0.035
a7 = 0.506
a8 = -0.264

[1] Federal Highway Administration by the Highway Safety Research Center at the University of North Carolina (Harkey et al., 1998).

HAT Bicycle Model

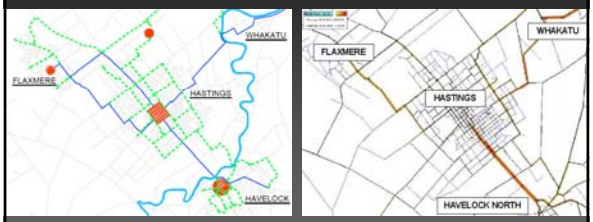
- Calculated BCI for each link is applied as a link cost factor in Paramics Bicycle Model
- Bicycle trip length distribution follows probability density function (gamma function) described in BCI paper.
- All link speeds set to 20kph

BCI Bicycle Trip Length Distribution



Bicycle Count Locations
23 Two-Way Counts

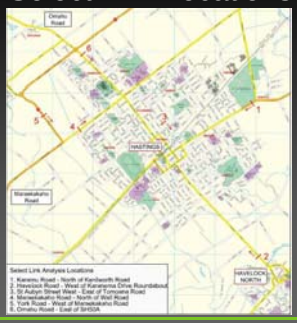
Linking Model Outputs with the Model Community Network



Option Test: Upgrade of St. Aubyn Street

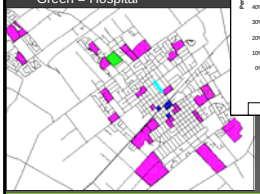
PM Peak Option Test Bicycle Flows

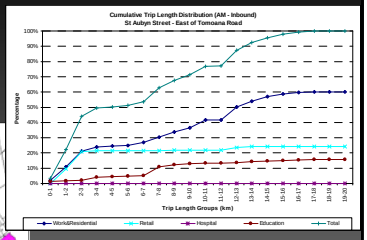
Select Link Locations



St. Aubyn Street – East of Tomoana Rd

- Pink = Schools
- Blue = Retail
- Green = Hospital





HAT Model Purpose

- Enable HDC to plan for the sustainable growth of Hastings in the immediate and long term future
- Build a multi-modal modelling platform
- Determine the functionality of existing Hastings urban roading network

How are we challenging activity and behaviour in Hastings

- Represent real world constraints… through regional land-use model (vehicle ownership, income levels, household compositions etc)
- Determine detailed distribution and assignment (microsimulation model)
- Assess who travels less than 8km and what their trip purpose is
- Levy organisations with specific targets for activity
- Analyse where $ is best put for optimal cycle routing

Conclusion: Encouraging Activity

(Until our health professionals tell us otherwise)

- Identify Who To Target
- Engage Them in Process

Many thanks to Hastings District Council

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Traffic Design Group