



THE UNIVERSITY OF
MELBOURNE

Data collection for modelling urban freight transport

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Outline

Why collect data?

Model development process

Freight Movement Model (FMM) for Melbourne

Recent studies

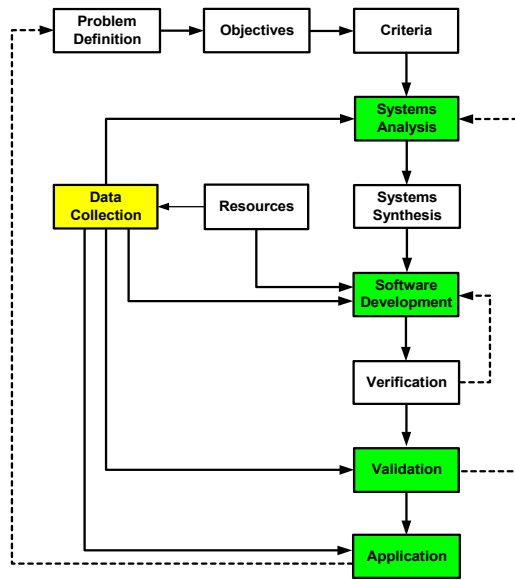
Knowledge management

Innovative methods

Why collect data?

Data is typically required for:

- Describing the physical system (transport networks & land use)
- Representing the population (business registers)
- Developing demand sub models (esp. production, distribution & vehicle loading)
- Overall model validation (controls: traffic surveys)
- Developing impact models (economic, social, environmental)



Model Development Process

City Logistics: Network Modelling and ITS, Taniguchi et al, 2001

Freight Movement Model (FMM) for Melbourne

Aim

To develop a practical & operational freight movement modelling and forecasting capacity to assist the strategic planning of freight movements as a component of the total metropolitan Melbourne travel task

Being developed for the Department of Infrastructure, Victorian Government by a team led by IMIS

FMM Applications

Predict road freight demand for changes in:

Economy

Locations & magnitude of freight generators & attractors
(e.g. ports & rail terminals)

Transport network

Demographics (population & employment)

Road freight & logistics sectors

Location & operation of intermodal terminals

Freight vehicle technology (e.g. B doubles)

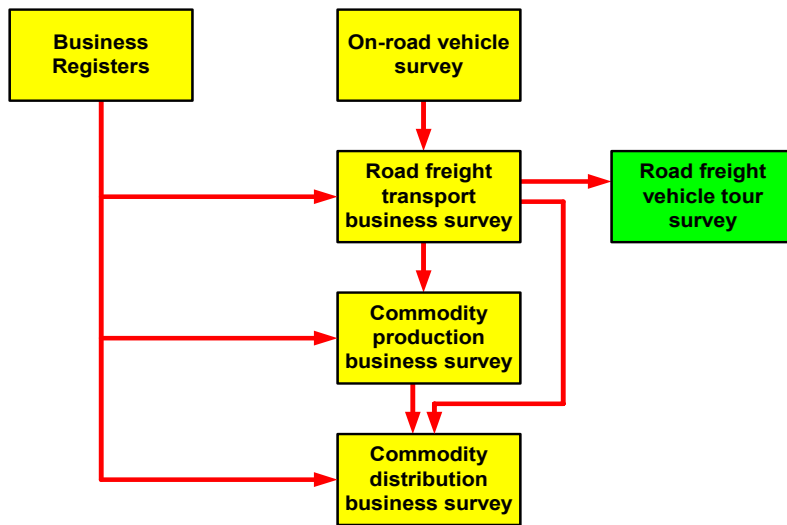
Infrastructure pricing policies

Industry cost structures

Integrated Commodity & Freight Database for Melbourne

The FMM project will effectively integrate existing and new data on commodity production and freight movement in Melbourne. The data will be used for:

- development of commodity production and freight movement models;
- development of freight vehicle 'loading' models and, in future, tour based vehicle models;
- statistical 'controls', to ensure that the FMM estimates match total commodity production in Melbourne and freight movements across screenlines



FMM Survey Components and Sequence

IMIS 2006

On-Road Vehicle Survey

Survey at locations on screen- lines between freight areas in Melbourne

Provides following data items, extracted from video images and automatic counters:

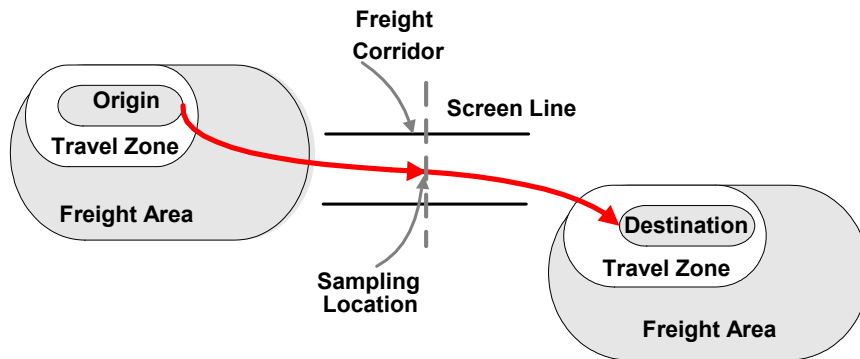
Freight vehicle classification (AUSTROADS)

Freight transportation type (eg. tanker & container carrier)

Freight shipment class/packaging (eg. dry bulk & palletised)

Commodity class (ANZSCC)

Vehicle registration plate details (contacts for business surveys)



On-road Freight Vehicle and Freight Type Survey

IMIS 2006

Matched Video Images



Matched images are recorded for each freight vehicle
Registration numbers are used to access road freight
transport businesses (number obscured for privacy)
Freight and/or shipment types are recorded, providing
'control' data on commodity/shipment volumes across
screen lines

Road Freight Business Survey

Interview of businesses sampled from the On road Survey, or identified through a Business Register

Provides following data items, obtained from emailed Excel based questionnaires:

Freight transport business type and size

Commodity types and quantities carried for the observed vehicle trip

Receipt and dispatch time windows

Locations and contacts for upstream and downstream businesses

Agreement to participate in the Freight Vehicle Tour survey

Commodity Production Business Survey

Interview of businesses engaged in commodity production, contacted through the Freight Transport Business Survey, or a Business Register

Provides following data items, obtained through emailed Excel based questionnaires and face face interviews:

Industry class(es) for the business (ANZIC)
Type and quantity of major commodities produced
Production resources – employees and plant capacity
Freight distribution to downstream supply nodes and external locations
Transport modes and time periods for freight movements

Commodity Distribution Business Survey

Interview of businesses engaged in commodity storage and/or transportation, contacted through the Freight Transport Business Survey, or a Business Register

Provides following data items, obtained through emailed Excel based questionnaires and face face interviews:

Same data items as for the commodity production businesses, but focusing on the freight distribution data items, to downstream supply nodes

Road Freight Vehicle Tour Survey

Tracking of freight vehicle tours, for a sample of vehicles identified through the Freight Transport Business Survey

Data items, obtained through simultaneous use of GPS units & vehicle run sheets:

GPS data

Origin, destination, chosen route, travel times between stops, travel distances & dwell times

Run sheet data

Commodity type(s), vehicle & transport type, time windows, commodity quantities & % laden

Recent Studies

AUSTROADS (www.austroads.com.au)

Best practice in road use data collection, analysis and reporting (AP ~~3~~4/04)

Review of Freight Data Collection and Generation Procedures and Opportunities (AP ~~2~~83/06)

National Transport Commission (NTC)

Twice the task (www.ntc.gov.au)

Victorian Government

Inquiry into Managing Transport Congestion
(www.vcec.vic.gov.au)

Review of Freight Data Collection & Generation Procedures & Opportunities

- Collecting freight data once & using many ways is cost effective
- Major issues: confidentiality, security, access & distribution
- Lack of consistency, transferability & standardisation of data collection procedures

AUSTROADS AP-R283/06

Review of Freight Data Collection & Generation Procedures & Opportunities

Need for:

- Data co-operation
- Meta data directories
- National Transport Data Framework: AusLink, a mechanism to better collect, manage & exchange data
 - Architecture & portal
- Determining a case for collaboration
 - Estimation of benefits & value
 - Identification of areas, desire & opportunities
 - Determine a business case for support

AUSTROADS AP-R283/06

Best Practice in Road Use Data Collection, Analysis and Reporting

Principles

- Accuracy
- Effectiveness
- Efficiency
- Reliability
- Accessibility
- Transparency
- Timeliness
- Relevance

AUSTROADS AP-G84/04

Road Use Data Planning & Management Process

1. Stakeholder consultation (register & needs)
2. Data planning (review, goals & evaluation)
3. Budget and programming (equipment & maintenance costs)
4. Data management (data collection, validation, processing & storage)
5. Data delivery (analysis, access & training)
6. Review & audit (stakeholder consultation surveys)

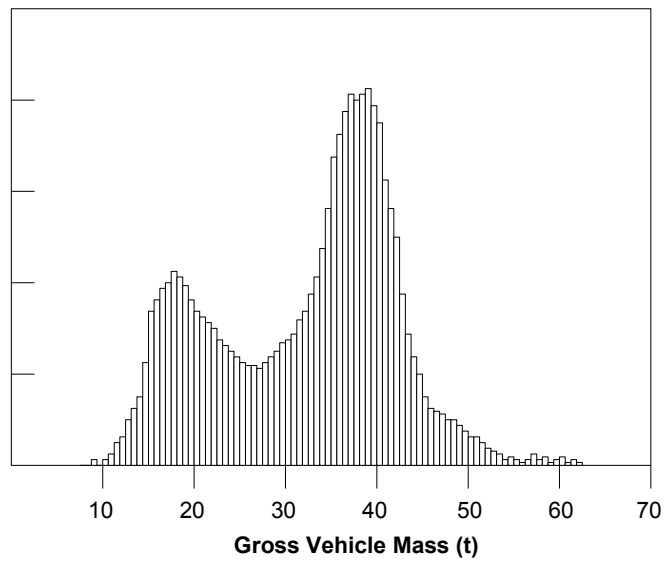
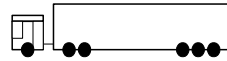
AUSTROADS AP-G84/04

CULWAY

- Unobtrusive, high speed Weigh-in Motion (WIM) system
- Based on strain gauge technology
- Two lanes of traffic
- Semi-permanent within pavement installed
- > 140 sites operating in Australia
- Accuracy GVM ($\pm 7\%$ at 95%)

ARRB: www.arrb.com.au

Load Distribution for "123" vehicles



CULWAY output

Data Mining

- Identify sources of available data
 - data access & use, updating, maintaining data's currency
- Identification of data sets in all necessary categories
- Data audit
 - availability
 - useability
 - cost
 - confidentiality
 - commercially sensitive

Meta Data

Database of data resources available

- Data holders
- Availability: access/acquisition conditions (incl. time)
- Costs,
- Scope & scale
- Data items & format
- Quality
- Limitations

Innovative Methods

- Information from track & trace systems
(eg. www.track-trace.com)
- Satellite images: identify the composition of the traffic stream & to count freight vehicles