The Iowa Statewide Travel Demand Model
A Standard Model Development Process and Unique Approach
TRB Annual Meeting 2009
Washington, D.C.

Des Moines, Iowa

Purpose of Today’s Presentation
• View the evolution of the Iowa DOT statewide model
• Discuss the key purposes of the Iowa STM
• Outline the model architecture
• Review the model components
  Iowa TAZ, Iowa Network, Buffer (National) Zones, SE Data, FAF2 (Trucks)
• Look at Planned Uses of the Statewide Model
• Throughout, discuss the unique partnership between Iowa DOT and the Consultant Team

Phase I Work Flow
Three parts of Phase I:
Part 1 - Statewide Model Education (began Sept 15, 2006)
Part 2 - Needs Assessment (began November 22, 2006)
Part 3 - Model Architecture (began March 15, 2007)

Phases I and II Work Flow
• Phase I developed the Iowa Statewide Model Framework or “Architecture” for Phase II
  • Think “blueprint”
• Phase II is building the Iowa Statewide Model

Statewide Model Education
Model Education: Two Directions
First - the WSA Team familiarized stakeholders with statewide models & their capabilities.
Second - the stakeholders made the WSA Team aware of what each member needed from the statewide model.
Phase II Work Flow

Two parts of Phase II:

Part 1 – Construction of Iowa STM using the Architecture “blueprint” (began October 15, 2007)

Part 2 – Commodity Flow Model Component (TBD)

Why have a Statewide Model?

• Traffic forecasts affect every aspect of the Iowa DOT’s core business activities
  ➢ Planning & finance, programming, design, construction & maintenance
• A useful cost-effective tool
  ➢ System, corridor, project level data for evaluating needs & alternatives
  ➢ Reliable & timely forecasts
  ➢ Consistent methodology

Why have a Statewide Model? (cont.)

• To determine when and where existing and future capacity deficiencies will occur
• To aid in policy decisions
• To assist in making investment decisions (projects)
• Scenario Testing or “What If’s?”

Steering Committee

• Iowa DOT wanted MPO input and R & D Assistance throughout the STM development and deployment –
  Established a team of internal and external transportation specialists, – the EPSC – Executive Project Steering Committee, which includes MPO representatives
  The EPSC includes MPO and RPA leaders and modelers from all parts of Iowa
  The EPSC also relies on input from CTRE (Center for Transportation Research and Education) at Iowa State University

Phase II

• Iowa DOT wanted ownership of the STM throughout the entire process –
  No training session in the end!
• The Iowa DOT designed the “workshop” cooperative approach to address schedule, resources, and ownership issues.
• Set up a multitude of cooperative hands-on workshop programs for TAZ, network, and centroid creation with both DOT and consultant members

Iowa STM Design

• Simple and Successful
• No “Bling Bling”
Iowa STM Design

• Gain instant credibility
• Hit a “Home Run” with

Detailed Level Architecture Decisions

The STM will use TransCAD GISDK macro language in a Graphical User Interface (GUI)

Concept Level Architecture Decisions

• Three step model
• Trip generation – using typical cross classification methodology
• National + Iowa network and trips
• Trip distribution – gravity model
• Truck sub-model
• Pseudo Interface with MPO Models
• Phased Development of Freight Component

Detailed Level Architecture Decisions

• Iowa DOT wanted network congruence with the Iowa Road database - GIMS (Geographic Information Management System)
• The DOT has a newly defined LRS (linear referencing system) road coverage. However, no attributes yet.
• The Team was able to create a link to bring the GIMS data to the LRS network.
• The Team is reviewing the GIMS for connectivity, and assignability prior to formal network development
• Unique ID (“match field” will be retained in the GIMS and the Iowa STM highway network

Network Scenario Management – The STM uses a “Master Network” approach

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Detailed Level
Architecture Decisions

• EPSC wanted to develop a comprehensive statewide socioeconomic forecast –
  • The STM uses forecasts from REMI and Woods & Poole.
  • This data is allocated to the statewide TAZs
  • Consensus with all MPOs was achieved
  • “Off-the-Shelf” products help to minimize controversy with planned growth

Detailed Level
Architecture Decisions

• Iowa DOT now has 3,059+ Iowa STM TAZs
  • The STM went through a “TAZ-allocation” phase using 186,000 Census blocks to form the Iowa STM zones

Dane’s Red Zones

Detailed Level
Architecture Decisions

• A “telescoping” size buffer or national zone system was created outside Iowa
Example National Zone System

Detailed Level Architecture Decisions

- Truck Model
  - Needs the most recent national and state data –
  - The new Freight Analysis Framework (FAF2) freight data will be used for national truck flow information to/from and through Iowa.

Iowa Truck Flows

- Estimated Iowa Daily Truck Traffic
  - Source: FHWA

- Iowa Total Domestic Truck Flows
  - Source: FHWA

2030 Traffic Forecast

- Auto = 15.89M (+26%)
- Truck = 0.22M (+36%)
- Total = 16.11M (+26%)

Rural VMT

- 2000 = 37.05M
- 2030 = 52.38M
- Diff = +41%

Rural VHT

- 2000 = 709K
- 2030 = 989K
- Diff = +40%

FAF2 Districts

Planned Uses – Example from Louisiana STM

Existing Capacity Deficiencies

- Level of Service
  - Los A-C
  - Los D
  - Los E
  - Los F
  - 0 30 60 90
  - Miles
Planned Uses – Example from Louisiana STM

2030 Capacity Deficiencies

Level of Service
Los A-C
Los D
Los E
Los F
0 30 60 90 Miles

Planned Uses – Example from Louisiana STM

2030 Capacity Deficiencies with Committed Improvements

Level of Service
Los A-C
Los D
Los E
Los F
0 30 60 90 Miles

Questions?

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