Release Notes for the IHSDM 2009 CPM Beta Release

Summary of Changes

Significant improvements/changes were made to the IHSDM software (from the 2008 Public Release to the 2009 CPM Beta Release) in the following areas:

- Evaluation Modules
- Graphical User Interface (GUI)
- Data
- Output/Reporting
- Help/Documentation
- System Administration Tool (AdminTool)
Evaluation Modules

Crash Prediction Module

The Crash Prediction Module was updated and extended to implement Part C of the Highway Safety Manual (HSM) (Draft 3.1; April 2009):

- The crash prediction methodology for rural two-lane highways (which has been implemented since 2003 in IHSDM) was updated to faithfully implement the predictive method documented in HSM Part C, Chapter 10, to the extent possible.

- A crash prediction methodology for evaluating rural multilane highways was added, to faithfully implement the predictive method documented in HSM Part C, Chapter 11, to the extent possible.

- A crash prediction methodology for evaluating urban and suburban arterials was added, to faithfully implement the predictive method documented in HSM Part C, Chapter 12, to the extent possible.

NOTE:

- The HSM Part C chapters contain most, but not all details needed for the IHSDM software development team to fully implement the crash prediction models in IHSDM. Discussions were held with the HSM model developers to clarify some items. Where necessary (i.e., where the HSM Part C did not address an area in sufficient detail for software implementation), the IHSDM software development team made assumptions and interpretations in order to implement the models.

Other IHSDM Evaluation Modules

The 2008 Public Release contains six evaluation modules: Policy Review (PRM), Crash Prediction (CPM), Design Consistency (DCM), Traffic Analysis (TAM), Intersection Review (IRM) and Driver/Vehicle (D/VM). Crash Prediction is the only active evaluation module in the 2009 CPM Beta Release. However, the IHSDM Documentation (accessible via the IHSDM Help Browser) still contains documentation relevant to all 6 modules. The section of the IHSDM Tutorial relating to the Crash Prediction Module (Lesson 4) was updated to reflect the current software. Tutorial sections related to the non-CPM modules are unchanged from the 2008 Public Release.

NOTE:

- IHSDM users interested in using the other IHSDM modules should continue to use the 2008 Public Release.
Graphical User Interface (GUI)

Changes to the GUI include:

Project Operations

New Highway

- The interface (Wizard) for creating a new highway was modified to reflect the expansion of the highway data model to include multilane rural and urban/suburban arterial highways. A “Section Zones” panel was added to the “Add a new highway” screen, which includes attributes for Area Type (rural, suburban, urban), Alignment Type (undivided two-lane, undivided multilane, divided multilane) and Functional Classification (arterial, collector, local). These three highway data attributes are then used to divide the highway data into “Sections” (i.e., evaluation regions).

Highway Operations

NOTE:

- The "View Highway" operation does not currently render multi-lane alignments correctly, e.g., in some cases, no median is shown and only two lanes are shown.

Evaluation Operations

The following enhancements were made to the Evaluation Operations:

- The “Show Spreadsheet” operation was extended to the Crash Prediction Module. After running an evaluation, the user can now access a spreadsheet which shows calculation details (e.g., safety performance functions (SPF) and accident modification factors (AMF)) for homogeneous roadway segments and intersections.

- A “Show Raw Results” option was added, which allows users to view the raw results without creating an Evaluation Report. These results can be viewed via an Evaluation Results (navigation tree and table) interface, or via a spreadsheet or XML file (accessed from the File menu in the Evaluation Results interface).
Data

Changes related to highway and intersection data include:

Highway Editor

- The Crash Prediction Data View was updated to reflect the existence of the three crash prediction methodologies (rural two-lane highways, rural multilane highways and urban/suburban arterials). The data elements for the rural two-lane highway model were revised to match HSM Part C, Chapter 10, and data elements for rural multilane highways and urban/suburban arterials were added based on HSM Part C, Chapters 11 and 12, respectively. For a given highway section, only the elements used by the relevant crash prediction model are shown. For example, “On-Street Parking” and “Speed Category” are two elements used only by the urban/suburban arterials model. Therefore, these elements are shown in the Highway Editor only for urban/suburban arterials.

NOTE:
- If LandXML data are imported without lane width data elements, IHSDM will indicate that the highway cannot be evaluated. However, once the user adds lane width via the Highway Editor, the highway may be evaluated using the CPM.

Intersection Editor

- Intersection Attributes were modified to add several elements used in the new crash prediction methods: Red Light Camera, School Nearby, Lighted at Night, Percent of Night Crashes, Number of Bus Stops, Number of Alcohol Sales Establishments, and Replaced with Roundabout.

- For Intersection Legs, elements for Left-Turn Signal Phasing, Pedestrian Volume and Max. Pedestrian Crossing Lanes elements were added. The Intersection Sight Distance element was removed, since this is no longer a factor in the rural two-lane model.

Sample Highway Files

- The “highways” folder contains eight sample highway files (the 2008 Public Release contained two), which may be used as a starting point for IHSDM CPM testing and evaluation:
  - ihsdm.network.example.xml – a highway data file for “IHSDM Pike,” an existing 2.7 mile highway section. The file includes data for an intersecting highway (“Route 1”) and the intersection of IHSDM Pike and Route 1
- `ihsdm.network.irm_example.xml` – provides data for six highway sections and four intersections, including four-leg intersections with all-way STOP-control, yield-control and no control, and a five-leg intersection with yield-control.

- `Two-lane Rural Highway.xml` – a 20,000 ft long two-lane rural highway, with data for four intersecting highways and their intersections

- `Two-lane Rural Highway Alt1.xml` – an alternative design to “Two-lane Rural Highway.xml” (TWLTL and climbing lanes added, and shoulder, driveway density and roadside hazard rating modified)

- `Multilane Rural Highway.xml` – a 20,000 ft long multilane rural highway, with data for four intersecting highways and their intersections

- `Multilane Rural Highway Alt1.xml` -- an alternative design to “Multilane Rural Highway.xml” (thru lane width and shoulders modified)

- `Urban Arterial.xml` -- a 20,000 ft long urban arterial, with data for four intersecting highways and their intersections

- `Urban Arterial Alt1.xml` -- an alternative design to “Urban Arterial.xml” (thru lane width, shoulder, lighting, automated speed enforcement modified)
Output/Reporting

Improvements to output/reporting include:

- The Report Template Editor interface was modified (e.g., arrow buttons are now used to add, remove or move report data items, rather than text buttons).

NOTE:
- Evaluation Reports generated using the 2008 Public Release cannot be opened with the 2009 CPM Beta Release. Use the 2008 Release to view such reports.
Help/Documentation

Improvements to Help/Documentation include:

- Documentation was updated to reflect the 2009 CPM Beta Release, focusing on the update and extension of the Crash Prediction Module (CPM).
  - The Crash Prediction Module Engineer’s Manual was replaced by three Engineer’s Manuals: Crash Prediction on Two-Lane Rural Highways, Crash Prediction on Multi-Lane Rural Highways, and Crash Prediction on Urban/Suburban Arterials.
  - All documentation sections were updated to reflect the new CPM workflow, interface, etc.

- Tutorial:
  - The section of the IHSDM Tutorial relating to the Crash Prediction Module (Lesson 4) was updated to reflect the current release. Tutorial sections related to the non-CPM modules are unchanged from the 2008 Public Release.
System Administration Tool (AdminTool)

Changes to the Administration Tool include:

**Crash Prediction**

- Updated the Crash Prediction calibration/distribution data sets interface:
  - A navigation tree structure replaced the old tab-based interface.
  - The rural two-lane calibration/distribution data sets were updated based on Highway Safety Manual (HSM) Part C, Chapter 10 (Draft 3.1; April 2009).
  - Rural multilane and urban/suburban arterial data sets were added, based on HSM Part C, Chapters 11 and 12, respectively.

- Deleted the Calibration Spreadsheets section:
  - The calibration procedure that was used in the IHSDM CPM has been updated in the HSM Appendix to Part C. Since the old spreadsheets no longer are applicable, they were removed.

- Added the ability for users to view, copy and edit Model Data Sets:
  - This capability will allow agencies to modify safety performance functions (base models) and accident modification factors, if they have developed their own.

**NOTE:**

- As noted in the Highway Safety Manual (HSM), though satisfactory results can be obtained with the CPM models, as they stand, when the predictive model for each facility type is calibrated with the procedure detailed in the HSM Appendix to Part C, more reliable results may be obtained by updating selected data elements with locally-derived values. Users should refer to HSM Part C for guidance on using locally-derived values.

As noted in the HSM, Appendix to Part C (Section A.1.3): “To preserve the integrity of the Part C predictive method, the quantitative values in the predictive models, (other than those listed in Exhibit A-3 and those discussed in Sections A.1.1 and A.2.2), should not be modified. Any replacement values derived with the procedures presented in this section should be incorporated in the predictive models before the calibration described in Section A.1.1 is performed.”