Release Notes for 2017 Public Release Update

Summary of Changes

Significant improvements/changes were made to the IHSDM software from the 2017 Release (Version 13.0.0; September 2017) to the 2017 Release Update (Version 13.1.0; March 2018) in the following areas:

- Data Entry by Mileposts
- IHSDM Economic Analyses Tool (EA Tool)
- Data
- Graphical User Interface (GUI)
- Output / Reporting
- Help/Documentation
- System Administration Tool (AdminTool)
Data Entry by Mileposts

“Station-based” data entry options were expanded to include mileposts (MP) / kilometer-posts (KP). Specific changes include the following:

- Edit (IHSDM main menu): The Edit > Preferences > Reporting/Data Display tab now includes options for “Mi/Km: X.ZZZZZZ” and “MP/KP: X.ZZ” for Data Display (see figure below).

The “MP/KP: X.ZZ” setting is recommended when location data are available in milepost/kilometer post with 2 decimal precision (e.g., MP 234.98).

The “Mi/KM: X.ZZZZZZ” setting provides 6 decimal precision; this setting is recommended when location data are in MP/KP with more than 2 decimal precision (e.g., Mile 234.976541).

If the user changes the Station/Location Notation and selects the OK button at the bottom of the Review/Edit GUI Preferences window, the change is immediately propagated throughout all existing IHSDM Projects. In this way, the user can easily switch between stations and mileposts (or kilometer-posts) without changing the underlying data. Note that the data display is set globally, rather than on a Project-to-Project basis.

New IHSDM Projects created by the user will display the “Location” in whatever data display notation is currently selected. So, for example, if data are available in mileposts, and the user sets the Station/Location Notation to “MP/KP: X.ZZ” or “Mi/Km: X.ZZZZZZ,” then all input and output will be in mileposts.

- In the Highway Editor and in Evaluation Reports, all previous references to “Stations” (e.g., Start Station, End Station, Station) have been changed to “Location” (e.g., Start Location (Start Loc.), End Location (End Loc.), Location). The user-selected units are
appended (e.g., “Start Location (MP)” for the start location in mileposts; “Start Location (Sta. ft)” for start location in stations (feet)). See figure below, showing MP.

Evaluation results (e.g., in Evaluation Reports) are also shown in MP or stations, depending on the Data Display > Station/Location Notation setting (see the figures below, showing MP in an Evaluation Report table and in the Raw Results, respectively).

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<th>Segment Number/Intersection Name/Cross Road</th>
<th>Start Location (MP)</th>
<th>End Location (MP)</th>
<th>Length (mi)</th>
<th>Expected No. Crashes for Evaluation Period</th>
<th>Crash Rate (crashes/mi/yr)</th>
<th>Travel Crash Rate (crashes/million veh-mi)</th>
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IHSDM Economic Analyses Tool (EA Tool)

The purpose of the IHSDM Economic Analyses Tool is to allow IHSDM users to do economic analyses within IHSDM, using Crash Prediction Module (CPM) evaluation results (crash frequencies and severities). The EA Tool was enhanced and expanded for the 2017 Release Update.

Expansion of Scope
The initial version of the IHSDM EA Tool (IHSDM version 13.0.0; September 2017) applied only to freeway segments and interchange components which were evaluated using station-based data input and analysis. The EA Tool is expanded in the IHSDM 2017 Release Update, and now applies to all facility types (including intersections) currently covered by the CPM:

- Rural 2-Lane Highways
- Rural Multilane Highways
- Urban/Suburban Arterials (including arterials with 5 or fewer lanes, 6+ lanes and 1-way arterials)
- Freeway Segments and Interchange components (ramps, C-D roads, and ramp terminals)

Comprehensive Crash Unit Costs
Default comprehensive crash unit costs were updated in the Economic Analyses Model Data Sets section of the System Administration Tool (AdminTool) to reflect revised values in FHWA’s draft final "Crash Costs for Highway Safety Analysis" and "Highway Safety Benefit-Cost Analysis Guide" documents. The new values (in 2016 dollars per crash) for the "KABCO" crash severity scale are:

- K: $11,428,100
- A: $662,200
- B: $200,500
- C: $126,700
- O: $11,900

NOTE: Since the default Crash Unit Costs have changed, Economic Analyses that were previously run with default values should be re-run.

See the System Administration Tool (AdminTool) section for more details.

FI to KABC Proportions
The Highway Safety Manual crash prediction models for certain facility types (freeway segments, freeway interchange components, and urban/suburban 6+ lanes and 1-way arterials) directly estimate crashes by the KABCO severity scale, and the K, A, B, C, and O crash breakdowns are used in the EA Tool.
However, the crash prediction models for other facility types (rural two-lane highways, rural multilane highways, urban/suburban arterials with 5 or fewer lanes) estimate fatal and injury (FI) crashes without a breakdown by the KABCO levels. FI to KABC proportions for those facility types were added to IHSDM through the AdminTool. In the Economic Analysis process, the appropriate proportions are applied to convert predicted or expected FI crashes to K, A, B, and C crashes. The default FI to KABC proportions stored in the AdminTool can be modified by the user. (See the Economic Analyses Tool “book” in the Help Browser for more details, including a listing of the default FI to KABC proportions by facility type.)

**Fixes**

- A bug was fixed in which the EA Tool provided incorrect results for freeways with an unequal number of lanes for the two directions of travel (e.g., for a 7-lane section with 3-lanes in one direction and 4-lanes in the other direction).
- A bug was fixed in which property damage only (PDO) crashes at intersections on urban/suburban arterials were not being considered properly.

See the System Administration Tool section for more details.

For guidance in using the EA Tool, see IHSDM Economic Analyses Tool Help in the IHSDM Help Browser.

See the IHSDM Economic Analyses Tool Tutorial lesson for a sample exercise in using the EA Tool.
Data

Changes related to data include:

- For Station-based data input: All previous references to Station have been changed to Location, to reflect the new capability of data entry by mileposts. (See Data Entry by Mileposts section for details).

- High Volume Section data element (freeways): A bug was fixed in which the program was only accepting data for a single year. Now, the data are processed correctly when the user enters data for multiple years.

- Ramp Connection data element: A bug was fixed in which the Add, Edit, Delete, and Validate buttons were not operational after the first operation performed on the data. For example, the user could add, delete or edit the ramp connection data only once (using the Add, Delete, or Edit buttons); after that, the buttons were not operational until the Highway Editor was closed and re-opened.

- Import of LandXML data: If vertical alignment data or lane data are not included in an imported LandXML file, the Highway Viewer does not work correctly. A message is now provided to inform users that they must correct the errors (i.e., add the vertical alignment and/or lane data), and that the Highway Viewer will not open until valid data are entered.

- For highways with multiple sections, in which one section is a freeway and one is an arterial, the Median data element for the freeway section was not showing under the Crash Prediction view in the Highway Editor. This bug has been fixed.

- Lane Offset was added as a data element for all one-way roads (e.g., ramps, C-D roads).

- A bug was fixed in which the Highway Editor did not display properly for certain multi-section rural multilane highways.

- Ramps / Ramp Connection: It is possible to create two ramps with the same name within the same Project (for example, the name “Ramp A” could be assigned to two separate ramps under two different Interchanges). This caused a problem in the previous version of IHSDM when establishing ramp connections. Now, in the Ramp Connection data element, the Ramp Name attribute carries the Interchange Name and the Ramp Name (e.g., “Interchange I-95 / SR 1: Ramp A”). For Ramps created independent of an Interchange, the Ramp Name attribute will show the Ramp Name only (e.g., Ramp A).

- Highways: The Functional Classification data element previously had “Freeway Ramp” and “Freeway C-D Road” as options. These were changed to “Freeway Service Ramp” and “Freeway C-D Road and System Ramp,” respectively. This change was to reflect the HSM Chapter 19 guidance that system ramps (i.e., ramps at system interchanges) are to be evaluated using the crash prediction models for C-D roads. Ramps at service interchanges are to be evaluated using the crash prediction models for ramps.

- Ramp Connections: fixed a bug that occurred when Ramp Connections are present with highway Sections (ramp connections did not show up correctly when the highway had multiple Sections).
NOTE: If the IHSDM 2017 Release Update is installed over an older version, existing projects will not be updated automatically. After opening a network, select Update or Save to save the changes "permanently."

Graphical User Interface (GUI)

Edit (IHSDM Main Menu)

- The Edit > Preferences > Reporting/Data Display tab now includes options for “Mi/Km: X.ZZZZZZZ” and “MP(KP: X.ZZ” for Data Display (see Data Entry by Mileposts for more details).

Highway Viewer:

- Annotations: Highway names are now displayed automatically in the Highway Viewer. Users can move, edit, or delete these annotations by clicking on the text. In general, annotations can be added, removed, or toggled on/off by right clicking within the View and accessing the Annotation menu. Highway names can be toggled on/off but not deleted, while user created annotations can be deleted. Annotations can be added to any of the views (Plan, Profile, or Cross Section).
- A note was added to the Plan view stating that it is a “Stylized view of data for reference only.” This recognizes that, in some cases, the Highway Viewer display may not be a true representation of the actual roadway and may not display correctly. However, this does not affect the results of the evaluation (i.e., the graphical representation of the highway network is not used in evaluations).

Output / Reporting

Crash Prediction Module (CPM) Evaluation Reports:

- All previous references to Station have been changed to Location, to reflect the new capability of data entry by mileposts. (See Data Entry by Mileposts section for details).
- For ramps and C-D roads that cannot be evaluated due to the number of lanes (e.g., rural ramps and C-D roads with more than one lane; urban with more than two lanes), additional explanation is now provided in the “Evaluation Message” in the Evaluation Report (e.g., “more than one thru lane specified for a rural ramp”).

All Evaluation Reports:

- Changed the color of report table headers to a lighter blue to enhance the contrast for printing.
Help/Documentation

Documentation was added / updated, including:

- Added a Milepost “book” in the IHSDM Help Browser.
- Updated the Economic Analyses Tool “book” in the Help Browser.
- Engineers Manuals > Administration Tool > Crash Prediction Economic Analysis Dataset section (updated)
- Frequently Asked Questions (updated)
- IHSDM Interface and Data Organization > IHSDM Graphical User Interface > Main Menu Bar > Preferences > Reporting/Data Display Tab (updated)
- Other sections were revised, as needed.

IHSDM Tutorial:

- Revised Lesson 11: IHSDM Economic Analyses Tool (EA Tool) Tutorial
- Revised Lesson 2 (Data Entry) and 4 (Crash Prediction Module).
- Revised Lesson 12 on Using IHSDM with Data in Mileposts.

System Administration Tool (AdminTool)

Economic Analyses Model Data Sets

- Default comprehensive crash unit costs were updated to reflect revised values in FHWA’s draft final “Crash Costs for Highway Safety Analysis” and “Highway Safety Benefit-Cost Analysis Guide” documents. The new values (in 2016 dollars per crash) for the “KABCO” crash severity scale are:

  o K: $11,428,100
  o A: $662,200
  o B: $200,500
  o C: $126,700
  o O: $11,900

- In Part C of the Highway Safety Manual (HSM), the crash prediction models for certain facility types provide estimates of fatal and injury crashes (FI) rather than a breakdown by the KABCO severity scale. To estimate K, A, B, and C crashes from FI crashes, proportions of K, A, B, and C crashes for FI crashes are now provided for the following facility types (see figures below):

  o Rural two-lane (RTL) segments
  o Rural two-lane (RTL) intersections
  o Rural multilane (RML) segments
  o Rural multilane (RML) intersections
  o Urban/suburban arterials (USA) segments
- Urban/suburban arterials (USA) intersections

In the Economic Analysis process, the predicted FI crashes for these facilities are multiplied by the proportions to estimate K, A, B, and C crashes. The defaults provided can be modified by the user, if desired. (See the Economic Analyses Tool “book” in the Help Browser for more details, including a listing of the default FI to KABC proportions by facility type.)

Note that HSM models for freeway segments, freeway interchange components, and urban/suburban 6+ lanes and 1-way arterials provide breakdowns by the KABCO scale.