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Chapter 9 IHSDM Analysis Introduction

Chapters 3 through 8 discuss how to input data into IHSDM. Chapters 10 through 12 will discuss the process of running each module for each type of project (3R, 4R, reconstruction, and new construction). This chapter will discuss which module to run, at what point in each design to run the module, and the information the project manager or designer can expect from the module.

This chapter will be broken into the different types of projects from 3R to New Construction. Each section will be further broken into the stages of design from conceptual to final design. This will allow the user quick access to the different analyses that they need to run. This will also allow the user to determine exactly what information they have to input into IHSDM.

3R Projects

Conceptual Design

In 3R projects the conceptual design stage has very limited information and IHSDM will not be a valuable tool to help the designer. Generally the information that is used is more from observing the site and reading any available reports on the project.

Preliminary Design

Once the designer is in the preliminary phase of a 3R project there probably is an alignment along the existing centerline, average pavement and shoulder widths are calculated, and existing Cross slopes are measured. Any traffic counts and available accident data will also be acquired by this stage. IHSDM will be helpful in the designer's determination if there are any areas in the project that do not meet the existing policies. Therefore, the following modules should be run on the existing alignment:

- Policy Review
- Design Consistency
- Traffic analysis
- Intersection Review

The following data will be used to run the modules:

- Horizontal alignment (Chapter 2)
- Vertical Alignment (if available) (Chapter 2)
- Cross slope data (if available) (Chapter 2)
- Lane Widths (Chapter 5)
- Shoulder Widths and Slopes (Chapter 4)
- Accident History (if available) (Chapter 7)
- Traffic counts (if available) (Chapter 3)
- Terrain (Chapter 3)
- Design\Posted Speeds (Chapter 3)
- Functional Classification (Chapter 3)

- Pavement Type (Chapter 4)
- Surface Type (Chapter 4)
- Bridge Location (Chapter 7)

Final Design

Once the project gets into final design the deficient locations will have been located and the decision will have been made to either mitigate the problem or proceed with a variance. If there were enough locations that required shoulder widening or slight alignment changes, the Project Manager may decide to rerun the Policy Review module. In that case, the designer will have to update the following information:

- Horizontal alignment (Chapter 2)
- Vertical Alignment (if available) (Chapter 2)
- Cross slope data (if available) (Chapter 2)
- Lane Widths (Chapter 5)
- Shoulder Widths and Slopes (Chapter 4)

4R and Minor Reconstruction Projects

Conceptual Design

In 4R projects the conceptual design stage is used to determine where there is need for realignment, widening, or overlay. Therefore, the following modules should be run on the existing alignment:

- Policy Review
- Design Consistency
- Traffic analysis
- Intersection Review

To do the analysis, the designer will have to input the following data for the existing alignment:

- Horizontal alignment (Chapter 2)
- Vertical Alignment (Chapter 2)
- Cross slope data (Chapter 2)
- Lane Widths (Chapter 5)
- Shoulder Widths and Slopes (Chapter 4)
- Accident History (Chapter 7)
- Traffic counts (Chapter 3)
- Terrain (Chapter 3)
- Design\Posted Speeds (Chapter 3)
- Functional Classification (Chapter 3)
- Pavement Type (Chapter 4)
- Surface Type (Chapter 4)
- Bridge Location (Chapter 7)

Preliminary Design

Once the designer sets an alternative alignment, the design consistency and policy review modules should be run.

The design consistency module is a quick and simple run that requires the following information:

- Design Speed (Chapter 3)
- Horizontal Alignment (Chapter 2)
- Vertical Alignment (Chapter 2)

The policy review module should be run to determine that all of the elements of the typical section meet policy. Although it may take some effort to input all of the following necessary information the first time, most of this information can be carried into subsequent runs:

- Cross slope data (Chapter 2)
- Lane Widths (Chapter 5)
- Shoulder Widths and Slopes (Chapter 4)
- Traffic counts (Chapter 3)
- Terrain (Chapter 3)
- Design Speeds (Chapter 3)
- Functional Classification (Chapter 3)
- Pavement Type (Chapter 4)
- Surface Type (Chapter 4)
- Bridge Location (Chapter 7)
- Auxilliary/Passing lane information (Chapter 5)
- Turn lane information (Chapter 5)

Final Design

Once a preferred alignment is established, the designer will need to run the following modules:

- Policy Review
- Crash Prediction
- Traffic Analysis
- Intersection Review

The design consistency and most of the policy review checks from the preliminary design stage should still be valid. But the project manager and designer will need to look at locations that may have sight distance problems and input the obstruction offset information for long enough stretches to do a policy review check on sight distance. The following information is needed in addition to the information already input for each alignment:

- Obstruction Offset (Chapter 6)
- Roadway Width (Chapter 5)

Major Reconstruction and New Construction Projects

The same process can be used for both reconstruction and new construction projects because the design will not be based on an existing alignment in either case.

Conceptual Design

During the conceptual design phase there will more than likely be multiple alternatives. The designer will not have time to run a full policy review analysis on each alignment. The designer will be able to quickly check the horizontal and vertical alignment, Cross slope calculations, and lane and shoulder widths against the policy. To do this the designer will need to input the following information:

- Horizontal alignment (Chapter 2)
- Vertical Alignment (Chapter 2)
- Cross slope data (Chapter 2)
- Design Speed (Chapter 3)
- Lane Widths (Chapter 5)
- Shoulder Widths and Slopes (Chapter 4)

Preliminary Design

Once the conceptual design is complete, the number of alternative alignments will be pared down to two or three alignments and a more thorough policy review and design consistency review can be completed. The following data will need to be added into IHSDM to run the required modules:

- Accident History (Reconstruction) (Chapter 7)
- Traffic counts (Chapter 3)
- Terrain (Chapter 3)
- Design\Posted Speeds (Chapter 3)
- Functional Classification (Chapter 3)
- Pavement Type (Chapter 4)
- Surface Type (Chapter 4)
- Bridge Location (Chapter 7)
- Auxilliary/Passing lane information (Chapter 5)
- Turn lane information (Chapter 5)

Final Design

Once a preferred alignment is established, the designer will need to run the following modules:

- Policy Review
- Crash Prediction
- Traffic Analysis
- Intersection Review

The design consistency and most of the policy review checks from the preliminary design stage should still be valid. But the project manager and designer will need to look at locations that may have sight distance problems and input the obstruction offset information for long enough stretches to do a policy review check on sight distance. The following information is needed in addition to the information already input for each alignment:

- Obstruction Offset (Chapter 6)
- Roadway Width (Chapter 5)