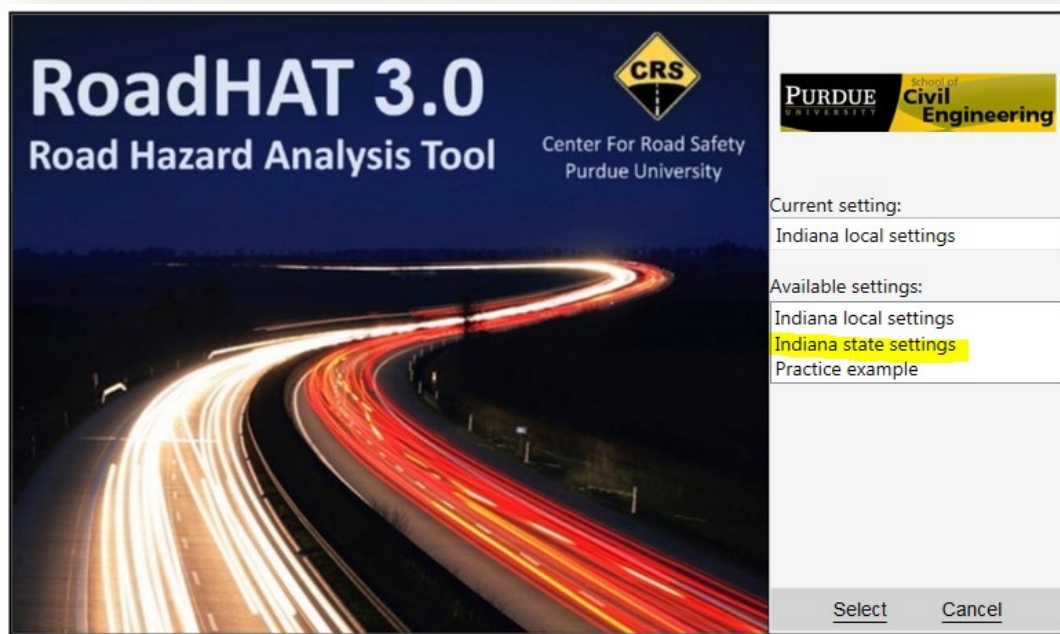


- Use the Current Version (Access through ITAP)
- Check the Settings – Use *Indiana state settings* for INDOT routes. Use *Indiana local settings* for local routes.

CHANGE SETTINGS → Indiana state settings (for INDOT projects).



Form F1: The output from **Form F1** can be used to evaluate how an existing roadway or intersection is performing compared to similar roadways and intersections in Indiana. **Form F1** cannot be used to predict future crashes for a change in design features, for example, adding turn lane, widening or reducing width of lanes/shoulders, modifying alignment or superelevation. The improvement of a design feature may have related Crash Reduction Factors (or Crash Modification Factors) that can aid in understanding the impact of changing a design feature (as a countermeasure to address certain crash patterns). These factors are used in benefit/cost analysis in **Form F5** to evaluate the cost-effectiveness of project decisions.

Form F1 should not be used to substantiate design decisions where design features of a facility will change as a result of a project. Crash prediction equations (safety performance functions) from the *Highway Safety Manual* (HSM) Part C should be used to evaluate effects on the frequency and severity of crashes due to changes in design elements. HSM Part C equations are also available through the Crash Prediction module of the Interactive Highway Safety Design Model (IHSDM).

| Index of Crash Frequency and Cost - Form F1 | | Form <u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> CDB Tool |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INPUT | | Calculate |
| Road Facility Type | Rural Two-Lane Segment | New Open |
| AADT (veh/day) | | Save SaveAs |
| Segment Length (mi) | | Reports Exit |
| Intersection Density (int/mi) | | Help |
| First Year with Crash Data (yyyy) | | Guidelines |
| Last Year with Crash Data (yyyy) | | Equations |
| Number of Crashes (crash/period) | | |
| Fatal and Incapacitating Injury Crashes | | Notes: |
| Non-Incapacitating and Possible Injury Crashes | | A road segment is a road stretch outside of intersection or interchange impact zones. The recommended for analysis length of a state road segment is close to 500 feet or greater. Intersection density is the number of minor intersections per mile. It does not include driveways. |
| Property Damage Only Crashes | | |
| Route or Road Type | Rural Two-Lane Segment | |
| Average Crash Cost (\$) | | |
| Fatal and Incapacitating Injury Crashes | 500000 | |
| Non-Incapacitating and Possible Injury Crashes | 30860 | |
| Property Damage Only Crashes | 4720 | |
| Crash Cost Year (yyyy) | 2017 | |
| OUTPUT | | Location |
| Expected Crash Frequency (crash/year) | | |
| Fatal and Incapacitating Injury Crashes | | |
| Non-Incapacitating and Possible Injury Crashes | | GIS |
| Property Damage Only Crashes | | Post |
| All Crashes | | Analyst |
| Index of Crash Frequency | | Date |
| Index of Crash Cost | | Comments |
| <div style="border: 1px solid red; padding: 5px; color: red;"> <p>Complete Location, Analyst, and Date at a minimum.</p> <p>Ensure Settings are <i>Indiana state settings</i> for INDOT routes.</p> </div> | | Settings: Indiana state settings |

Index of Crash Frequency and Cost - Form F1

INPUT

Road Facility Type 1

First Year with Crash Data (yyyy) 2

Last Year with Crash Data (yyyy) 3

Number of Crashes (crash/period) 3

Fatal and Incapacitating Injury Crashes

Non-Incapacitating and Possible Injury Crashes

Property Damage Only Crashes

Route or Road Type 4

Index of Crash F

INPUT

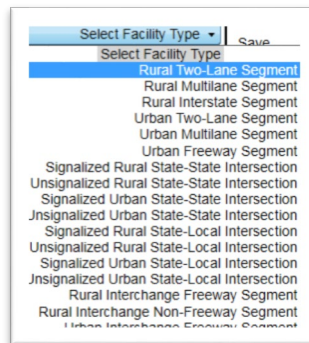
Road Facility Type

AADT (veh/day)

Segment Length (mi) 5

Intersection Density (int/mi)

1 Select the Facility Type. Intersections historically have higher crash rates than roadway segments. Locations that are near intersections should be run as both a segment and an intersection. Required input fields appear based on facility type selected.



3 Number of Crashes. Enter **ALL** crashes returned from ARIES, not just those related to a particular design element – this includes deer hits, drug and alcohol related crashes, etc. RoadHAT is calibrated for Indiana and uses crash data in its entirety.

Select appropriate ownership under Facility Type.

For an intersection of State routes, use State-State. State-State may also be appropriate for an intersection of a State route with local route, where the local route is similar to a State Route in functionality and operating characteristics. For example, the intersection of Dan Jones Rd. and US 36 in Hendricks Co. Dan Jones Rd is a Local route that functions similarly to US 36 at that intersection. Otherwise, select “State-Local”.

2 Crash Data. Use a minimum of three years of data. Enter the begin and end years that encompass the crash history pulled from ARIES, even if there are no crashes in those years. This input is used when calculating the ICF and ICC output.

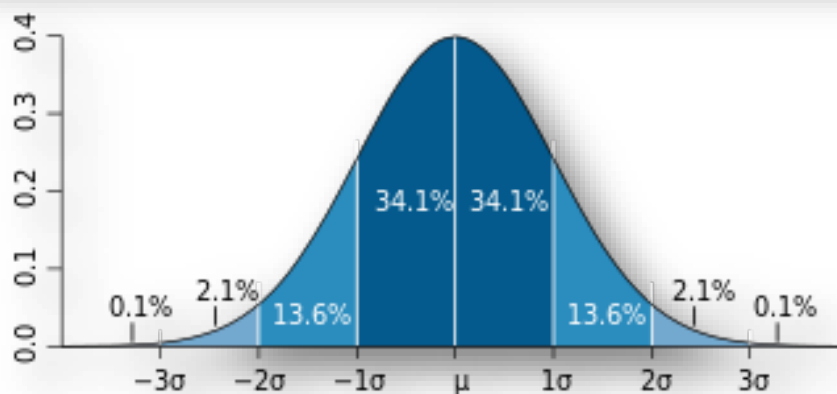
4 Select the Route Type. Usually the same as facility. Where a State-Local intersection was entered as State-State in the Facility Type field, State-Local should still be used in this field. The program generates Average Crash Cost (\$) information based on the selection. Use the default crash costs and crash cost year unless better data is available.

5 Additional Fields. Additional fields will appear based on the facility type selected. Facility-specific notes also appear.

For segment length, usually 500 ft either side of the project is a reasonable limit for a roadway segment.

Output is generated by selecting *Calculate* from the options in the upper right hand corner.

| OUTPUT | |
|------------------------------------------------|-------|
| Expected Crash Frequency (crash/year) | |
| Fatal and Incapacitating Injury Crashes | 0.178 |
| Non-Incapacitating and Possible Injury Crashes | 0.83 |
| Property Damage Only Crashes | 3.05 |
| All Crashes | 4.06 |
| Index of Crash Frequency 1 | -1.07 |
| Index of Crash Cost 2 | -0.82 |



Bell Curve illustrating Standard Deviation

1 Index of Crash Frequency (ICF). The Index of Crash Frequency (ICF) measures the difference between expected and reported number of crashes divided by the standard deviation of the difference in the estimate. For example, ICF=2 indicate that the number of crashes exceeds the expected number of crashes for that type of roadway by two standard deviations. An ICF of 0 indicates that a roadway is performing as expected. An ICF of 2 or higher may be considered a high crash location and should discussed with INDOT Traffic Safety.

2 Index of Crash Cost (ICC). The Index of Crash Cost (ICC) measures the difference between expected and reported crash costs. The ICC is used to consider the severity of crashes. For example, a road segment or intersection has an ICF = 0.3 but the calculated ICC = 1.8. These results mean that the number of crashes over the analysis period is close to expected for that facility but the severity of those same crashes is much higher that nominal; therefore, design solutions should be sought to reduce the severity of future crashes.