

Safety Screening Procedures for 2R Projects

November 28, 2007

These procedures have been developed in conjunction with the updated DIB 79-03 *Design Criteria for Resurfacing, Restoration, and Rehabilitation (RRR)*. 2R is a subcategory of RRR. The two "Rs" are resurfacing and restoration. A 2R project restores a facility to its originally constructed condition and does not make general geometric improvements. Projects that pass the safety screens as discussed below may be developed as 2R projects and may be designed without processing design exceptions. All other projects are considered Rehabilitation (the 3rd R) and shall be designed based on RRR criteria contained in DIB 79-03 guidelines and discussed in the Highway Design Manual.

There are four safety screens are required to be evaluated by the district Safety Traffic Engineer to determine if a project qualifies as a 2R project. Calculations for these screens must be based on the most recent 3 or 5 years of available data. These screens do **not** apply to CAPM projects. Refer to DIB 81 for additional information on CAPM projects.

Safety Screens

1.0 Fatal plus Injury (F+I) Accident Rate screen. This safety screen addresses the overall safety of the facility within the project limits. It must be passed to be eligible as a 2R project.

1.1 For projects on expressways with four lanes or more and freeways, the F+I accident rates must be below either the statewide average **or** 0.35 accidents per vehicle miles (acc/mvm).

1.2 For projects on other highway types, the F+I accident rates must be below both statewide average **and** 1.0 acc/mvm.

2.0 Highway Width F&I screen. This screen addresses collisions related to roadway widths on 2 and 3 lane conventional highways where shoulder widths are less than standard per DIB 79. This screen applies only to roadways where shoulders do not meet current RRR standards as discussed in DIB 79. It must be passed to be eligible as a 2R project.

This safety screen compares average and actual F+I collision rates related to highway width (HW). HW collisions are defined as head-ons and side-swipes, plus collisions with primary locations of beyond right shoulder. It is recognized that other collision types may also be related to the highway width, but for this screen, only these parameters are to be used. The Highway Groups for this screen and the threshold percentage that apply to the corresponding group are listed in the table below.

Highway Group	HW F+I Collision Percentages
1 or 2 - 2C, Rural, Flat	18%
3 or 4 - 2C, Rural, Rolling	22%
5 or 6 - 2C, Rural, Mount	28%
8 or 9 - 2C Suburban > 45 mph	25%
12 or 13 - 3C Rural + Suburban	22%

These are the statewide average HW F+I percentages of average total collisions rates. For a given segment of highway, the average HW F+I rate can be calculated by multiplying the group's HW F+I percentage by the average total collision rate for the specific segment of highway. This is compared to the actual HW F+I rate. If the actual rate is equal to or below the statewide average the project passes this screen. If it does not then the project must to be processed as a RRR project. An example of the calculation is included below.

3.0 Safety Analysis. This safety screen addresses other potential safety issues that are not addresses by safety screens 1.0 and 2.0. Section 3.1 of this safety screen must be passed to be eligible as a 2R project. Improvements based on the analysis from Section 3.2 should be incorporated into the 2R project as discussed below.

3.1 The district Traffic Safety unit will perform a safety analysis to determine if there are other issues that would indicate general geometric improvements are needed. These issues can include items such as high fatal rates, and high collisions rate related to narrow shoulders in Highway Groups not listed above. Projects failing to pass this threshold should be discussed with the Traffic Liaison and the Design Coordinator.

3.2 The safety analysis should also determine if there are cost effective geometric improvements at spot locations that should be included in the project. Typical spot location improvements include items such as intersection improvements and spot location shoulder or bridge widening. These improvements should be included in the 2R project if they do not significantly impact project cost nor will significantly delay the project. Spot improvements cost totaling less than 10% of the total project cost are not considered significant. A project that can be delivered in the target construction season or the same fiscal year is not considered significantly delayed.

If it is not feasible to include all such spot location improvements in the project, they should be developed as candidate projects in the appropriate program or justify why not.

4.0 Pedestrian and Bicyclist Needs in or near Communities. The purpose is to address needs of pedestrians and bikes, and to improve general vehicular safety. Widening in areas of driveways allows a right turning vehicle the ability to use the shoulder thus clearing the traveled way as well as providing width to go around a left turning vehicle. This safety screen applies to conventional highways where shoulder widths are less than standard per DIB 79. This safety screen must be passed or shoulders must be widened to RRR standards to be eligible as a 2R project.

The criteria for pedestrian /bicyclist demand are: 1) Less than eight residential road connections and/or driveways per mile, or 2) less than 70 daily vehicular trips generated by businesses or subdivisions per mile. Other specific pedestrian / bicyclist generators such as schools and parks should also be considered.

Example

The project is an eight mile long segment of 2-lane rural conventional highway in rolling terrain (Highway Group 4). The existing lane and shoulder widths are 26' to 30' and the ADT is 3400. The average F&I and total collision rates for this facility are 0.62 acc/mvm and 1.32 acc/mvm respectively. The 5-year history indicates that F&I collisions included one head-on, two side-swipes and nine primary collision location of beyond right shoulder. There are a total of 22 F&I collisions. The actual F&I and total collision rates are 0.44 acc/mvm and 1.06 acc/mvm respectively. The RRR in-place standard shoulder width for 3400 ADT is 4 ft.

Safety Screen 1.0: Total F&I Rate

Q #1. Is the actual F&I collision rate less than statewide average (SWA) for this type of facility?

A. Yes, actual F&I collision rate (0.44 acc/mvm) < SWA F&I (0.62 acc/mvm)

Q.#2. Is the actual F&I collision rate less than 1.0 acc/mvm?

A. Yes, 0.44 acc/mvm (actual) < 1.0 acc/mvm (SWA)

Passes Safety Screen 1.0.

Safety Screen 2.0: Highway Width (HW) F&I

Q. Is the actual HW F&I collision rate less than SWA for this type of facility?

$$\begin{aligned}\text{Statewide average HW F\&I} &= \text{HW group rate} \times \text{SWA total accident rate} \\ &= 22\% \times 1.32 \text{ acc/mvm} \\ &= 0.29 \text{ acc/mvm}\end{aligned}$$

$$\begin{aligned}\text{Actual HW F\&I} &= \text{HW collisions} / \text{mvm} \\ &= (1 \text{ HO} + 2 \text{ SS} + 9 \text{ ROR Rt}) / (3400 \text{ ADT} \times 365 \text{ d/yr} \times 8 \text{ miles} \times 5 \text{ yrs}) / 1,000,000 \\ &= 12 \text{ acc} / 49.6 \text{ mvm} \\ &= 0.24 \text{ acc/mvm}\end{aligned}$$

A. Yes, 0.24 acc/mvm < 0.29 acc/mvm

Passes Safety Screen 2.0.