**Class-Led Example: Median High Tension Cable Barrier (HTCB) Installation**

By installing HTCB, it is anticipated that there will be a reduction in the overall Fatal, injury collisions, but an increase in the Property Damage Only (PDO) collisions. The numbers from [Hwy 2 HTCB study](http://www.transportation.alberta.ca/Content/docType233/Production/Hwy2HTCBFinalREPORT.pdf) are:

|  |  |
| --- | --- |
| Collision Type | Percent Reduction |
| Fatality | 50% |
| Major Injury | 77% |
| Minor Injury | 26% |
| Property Damage Only (PDO) | -230% |

It is desired to know the cost savings associated with installation of HTCB in the median of divided highways in Alberta.

Highway 1, Control Section 8. From km 0 to km 12.257. Assume gradient and curvature are 0. It is a 4 lane divided at grade expressway in a rural setting. The posted speed is 110km/h. Two-way AADT is 27,920 in 2018. Traffic growth rate is 2.5%.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | collision rate (100MVKM) | Fatal | Major | Minor | PDO |
| Alt1 | 11.916 | 2.80% | 13.55% | 25.23% | 58.41% |
| Alt2 | 18.820 | 0.89% | 2.07% | 11.83% | 85.21% |

* Alternative 1: Do not install cable barrier.
* Alternative 2: Install cable barrier along median.
* Alternative 3: Leave blank.

HTB design life is 20 years. Assume engineering costs to design the HTCB are $250,000. Cable barrier construction cost is $67,000 per km. Annual maintenance cost for HTCB is $5,324/km. This can be inputted in Cell G45 of Alt2 as the specified maintenance cost.

1. What is the benefit/cost ratio of installing the HTCB? 29.487

2. In what year will the installation of the barrier pay for itself (break-even)? 1

3. If the construction costs are marked up at 20%, what is the B/C ratio, and pay back year? 25.567, 1

**Class-Led Example: Milled Shoulder Rumble Strips Installation**

Shoulder rumble strips are an effective means of reducing run-off-the-road crashes. They are primarily used to warn drivers when they have drifted from their lane.

It is expected that shoulder rumble strips can reduce the ROR collisions by 20%-60%.

Hwy 2:24 is a 4 lane divided at grade expressway in a rural setting. AADT is 39112 (a two directional measure). Traffic growth rate is 2.5%. The posted speed is 110km/h. The pavement is 6 years old. The next overlay is in 14 years.

Collision rate is 47.984 per 100 million vehicle km for all types of collisions. Run-off-road collision rate is 44% of the overall collision (ROR collision rate should be used in the model calculation). Assume a ROR collision reduction of 30% after the installation.

Assume engineering costs to install the rumble strips is nil. Shoulder rumble strips installation cost is $2,550/km/direction (this includes the right hand and left hand shoulder). Annual additional maintenance cost is nil. Segment length is 1 km. Assume grade and curvature are 0. Analysis period is 14 years.

* Alternative 1: Do not install rumble strips.
* Alternative 2: Install shoulder rumble strips.
* Alternative 3: Leave blank.

1. What is the benefit/cost ratio of installing the rumble strips? 191

2. In what year will the installation of the barrier pay for itself (break-even)? 1

3. If the ROR collision reduction is reduced to 10%, what is the B/C ratio, and pay back year? 64, 1