

## 6\_2 OVERLAY vs. RESURFACING

Sometime during **Cross Slope Optimization** the "Design Slope" is set to -2% or 0%, and after the **Vertical Adjustment Settings** during the **Smooth Adjusted Vertical Alignment** procedure, the "Tolerance" is set to 1 or 0. Can you elaborate on the reasons for these different settings?

### Answer:

Generally "overlay" is defined as the placement of a surface course on top of the existing pavement at an exact depth (without any wedging). "Resurfacing" is also an overlay process, but may include additional variable depth(s) of pavement wedging layers.

During **CSO**, an arbitrary "Design Slope" is needed to compare to the existing ground slope to get the difference between the two (in red). It can be a constant -2%, 0%, or any random slope. The importance is placed in the "Slope Tolerance" field. A 0% Slope Tolerance simply means "match the existing cross slope" (Ground Slope and Corrected Slope columns are the same).

The screenshot shows the 'Cross Slope Optimization' dialog box. The 'Optimization Parameters' section has 'Slope Tolerance' set to 0.00%. The 'Design Cross Slope Definition' section has 'Design Type' set to 'Constant' and 'Design Slope' set to -2.00%. The 'Results' table shows the following data:

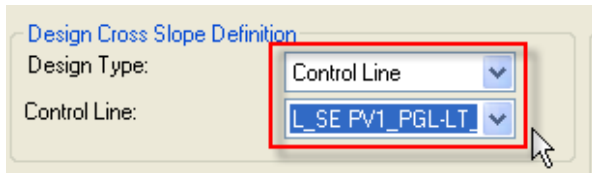
Station	Ground Slope	Design Slope	Difference	Corrected Slope	Delta Elevation	Delta G
12+60.00	-5.06%	-2.00%	3.06%	-5.06%	0.0000	0.0000
12+70.00	-6.43%	-2.00%	4.43%	-6.43%	0.0000	0.0000
12+80.00	-6.76%	-2.00%	4.76%	-6.76%	0.0000	0.0000
12+90.00	-6.80%	-2.00%	4.80%	-6.80%	0.0000	0.0000
13+00.00	-7.01%	-2.00%	5.01%	-7.01%	0.0000	0.0000
13+10.00	-5.79%	-2.00%	3.79%	-5.79%	0.0000	0.0000
13+20.00	-4.58%	-2.00%	2.58%	-4.58%	0.0000	0.0000
13+30.00	-3.73%	-2.00%	1.73%	-3.73%	0.0000	0.0000

If the Slope Tolerance is set to something greater than 0% and the difference between the Ground Slope and the Design Slope is within the set tolerance (Difference not red), then the Design Slope is used as the Corrected Slope.

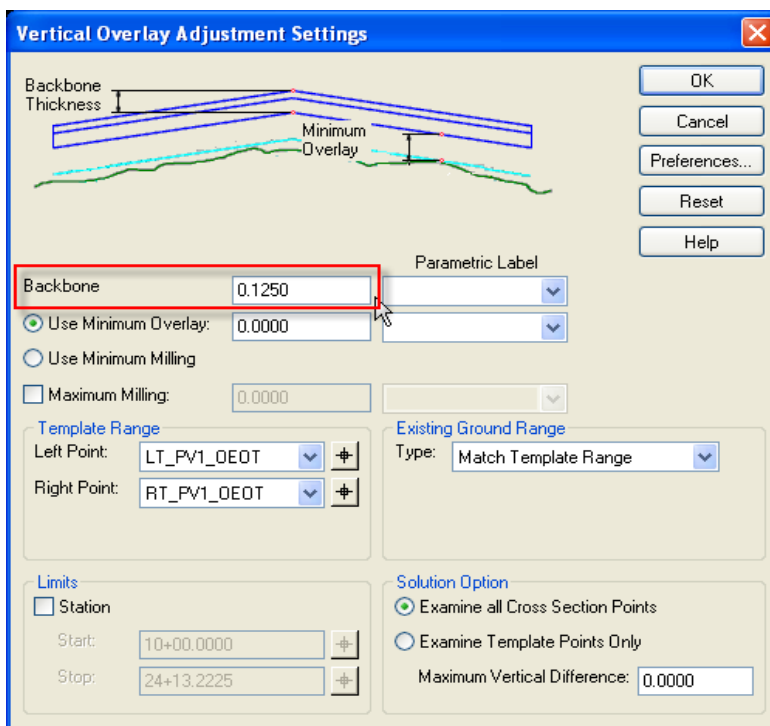
The screenshot shows the 'Cross Slope Optimization' dialog box with 'Slope Tolerance' set to 5.0%. The 'Design Cross Slope Definition' section has 'Design Type' set to 'Constant' and 'Design Slope' set to 2.0%. The 'Results' table shows the following data:

Station	Ground Slope	Design Slope	Difference	Corrected Slope	Delta Elevation	Delta G
12+60.0000	1.6%	2.0%	0.4%	2.0%	0.0376	0.0000
12+70.0000	0.4%	2.0%	1.6%	2.0%	0.1537	0.0000
12+80.0000	-0.7%	2.0%	2.7%	2.0%	0.2681	0.0000
12+90.0000	-1.3%	2.0%	3.3%	2.0%	0.3218	0.0000
13+00.0000	-1.7%	2.0%	3.7%	2.0%	0.3541	0.0000

For **CSO**, matching the existing cross slopes can be used for overlay (w/o wedging) or resurfacing (with wedging) projects. However, if you are not matching the existing cross slopes and a proposed super is used ("Design Type" is changed from **Constant** to **Control Line**), then a resurfacing grade (with wedging) is the only outcome because of the difference between the existing ground slope and the proposed super.

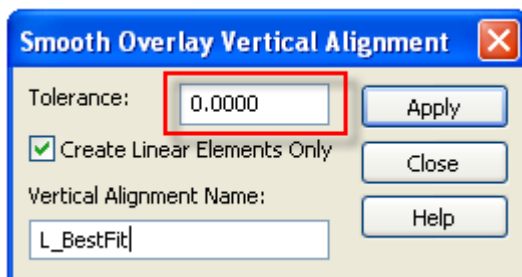


Another key element in determining an overlay or resurfacing project is to consider how will the proposed grade be determined. When the "Backbone Thickness" is keyed-in in the **Vertical Overlay Adjustment Settings**, it can be considered the exact amount of overlay depth or the minimal resurfacing depth for the surface course.



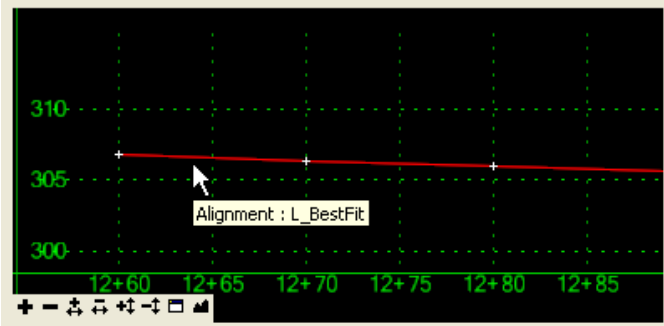
Note the "Use Minimum Overlay" setting is zero.

A "Tolerance" of zero in the **Smooth Overlay Vertical Alignment** procedure simply means "match the best-fit profile with the bottom envelope profile" which is the critical lowest profile derived from the critical points that was determined from the previous vertical adjustment step.



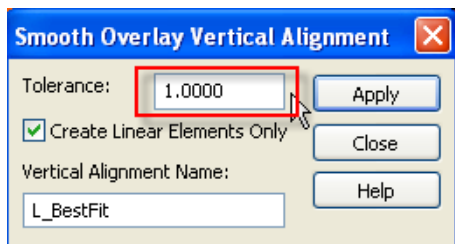
By forcing the best-fit profile to be the same as the critical bottom profile (red), the outcome is an overlay grade with an exact overlay depth (no more, no less).

Profile View (Overlay)



Note the overlay profile consists of straight-line VPIs of even 10' stations.

A Tolerance of one in the "Smooth Overlay Vertical Alignment" procedure simply means "create an envelope with a gap of 1' from the bottom critical profile (red) to the top profile (yellow) to pass the best-fit profile (green) through." Since the best-fit profile is higher than the critical profile, wedging takes place, thus producing a resurfacing grade.



Profile View (Resurfacing)

