



Chapter 7

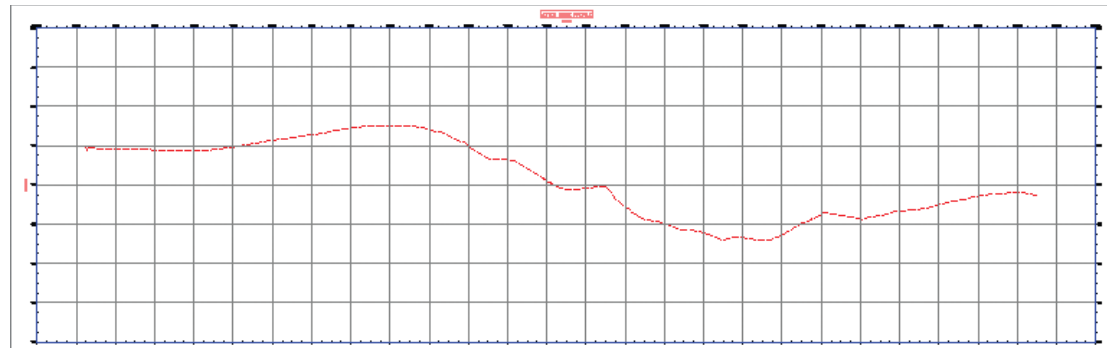
- Designing Vertically Using Profiles
 - Topics
 - Creating surface profiles
 - Displaying profiles in profile views
 - Creating design profiles
 - Editing profiles
 - Using design check sets and design criteria files

Creating Surface Profiles

- Before designing a profile, you need to see what the existing profile looks like.
- You can “slice through” a surface to create a surface profile.
- Surface profiles are dynamically linked to the surface and alignment.
 - If the alignment changes – the profile will change automatically
 - If the surface changes – the profile will change automatically.

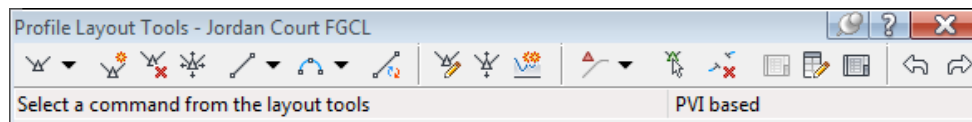
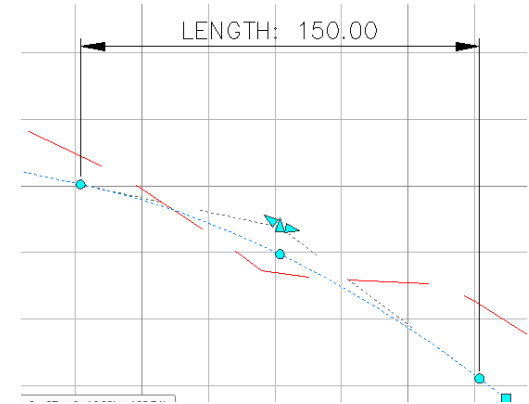
Profile Views

- Profiles cannot exist on their own; they must be displayed within a profile view.
- The profile view provides the grid backdrop and annotation for the profile(s).
- Profile views have their own styles; in fact, they're one of the most sophisticated types styles.



Design Profiles

- Design profiles “smooth out” the existing ground to create a safe and comfortable riding experience.
- They consist of tangents and vertical curves.
- Profile curve geometry is different; it can be circular, parabolic, or asymmetric.
- Similar to alignments, there is a special toolbar for layout.





Profile Terminology

PROFILE TERMINOLOGY

Familiarizing yourself with the following terms will be helpful as you work with design profiles:

Tangent The straight-line portions of a profile.

PVI Point of vertical intersection; the location where two tangents intersect.

PVC: Point of vertical curvature; in other words, the beginning of a vertical curve.

PVT Point of vertical tangency; in other words, the end of a vertical curve.

Parabolic curve A vertical curve that does not have a constant radius and follows the shape of a parabola.

Circular curve A vertical curve that has a constant radius.

Asymmetric A vertical curve that is created from two back-to-back parabolic curves.

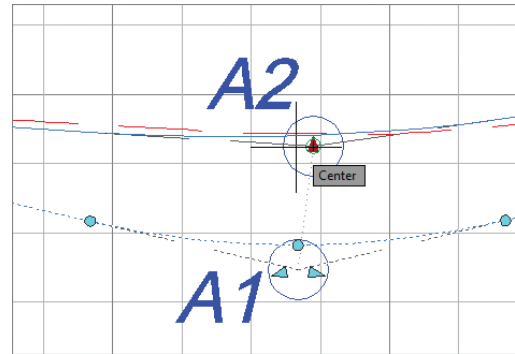
Crest curve A vertical curve at the top of a hill where the grade leading into the curve is greater than the grade leading out. The PVI is located above the curve.

Sag curve A vertical curve at the bottom of a valley where the grade leading into the curve is less than the grade leading out. The PVI is located below the curve.

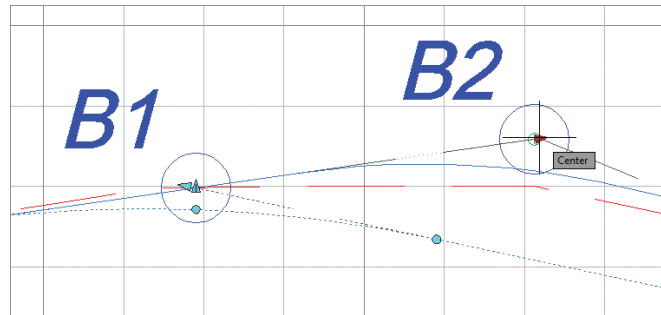
Editing Profiles: Grips



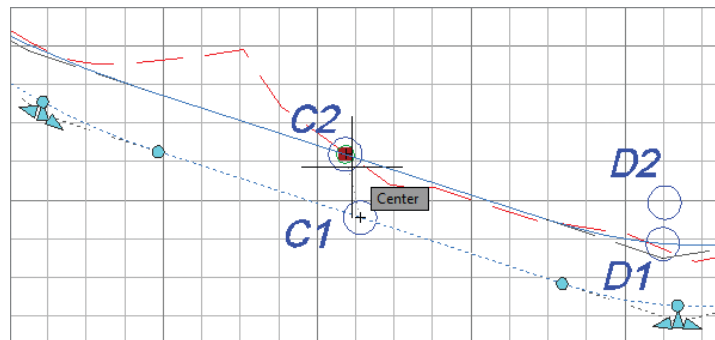
- PVI



- Tangent slope

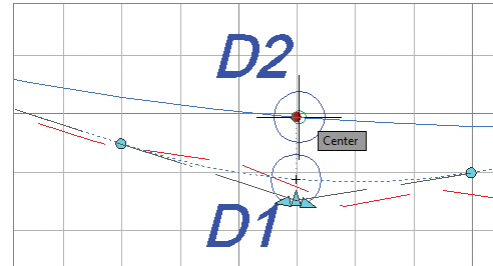


- Tangent midpoint

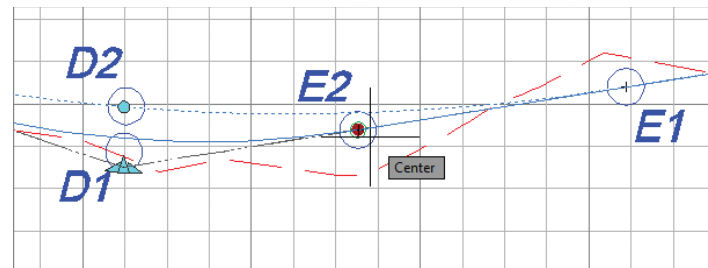


Editing Profiles: Grips

- Curve
Pass-thru
point

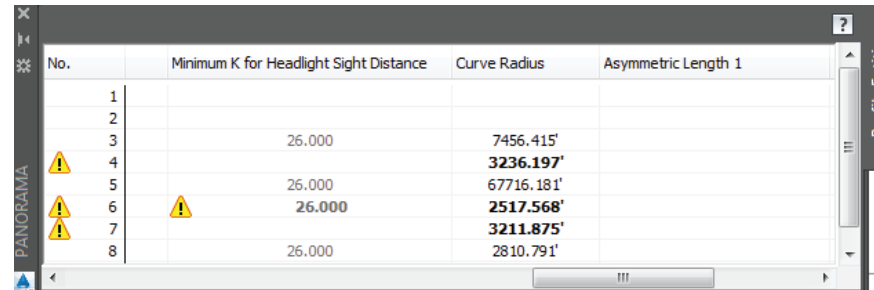


- Curve
start/end
point




Editing Profiles

- Profiles can be edited numerically using Profile Grid View, which opens Panorama.



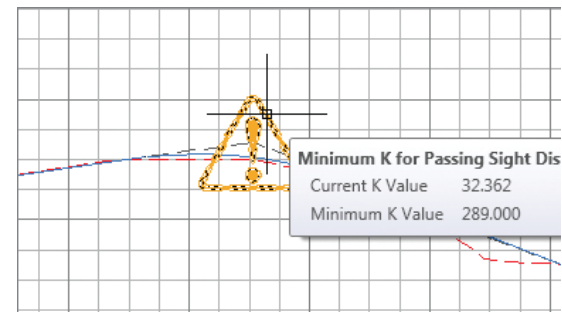
No.	Minimum K for Headlight Sight Distance	Curve Radius	Asymmetric Length 1
1			
2			
3	26,000	7456.415'	
4		3236.197'	
5	26,000	67716.181'	
6	26,000	2517.568'	
7		3211.875'	
8	26,000	2810.791'	

- They can also be edited by using the Profile Layout Parameters command. 
- It is good practice to round off values for PVI stations, elevations, and curve lengths.
 - This makes your design easier to construct and less prone to errors.

Design Check Sets

- Like alignments, profiles can be assigned a design check set to keep tabs on design parameters.
- Warning symbols appear where there are violations.

No.	Minimum K for Headlight Sight Distance
1	
2	
3	26.000
4	
5	26.000
6	26.000
7	
8	26.000

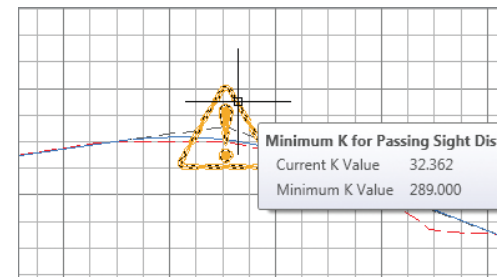


- The design is not modified; that is up to you.

Design Criteria Files

- Like alignments, a design criteria file can also be assigned to a profile.
- Design criteria files are more sophisticated and check more things.
- But just like design check sets, warning symbols appear where there are violations.

No.	Minimum K for Headlight Sight Distance
1	
2	
3	26.000
4	
5	26.000
6	26.000
7	
8	26.000



- The design is not modified; that is up to you.