EFFICIENT DESIGNING OF ROAD ALIGNMENT WITH DIFFERENT METHODS

Plateia by CGS Labs 25 YEARS
Table of Contents

INTRODUCTION............................................................................................................................................ 4
1. DEFINE NEW ALIGNMENT............................................................................................................................................. 4
   1.1 Alignment manager.................................................................................................................................................. 4
   1.2 Lane Manager ....................................................................................................................................................... 5
2. DESIGN ALIGNMENT ................................................................................................................................................... 5
   2.1 Draw with tangent polygon ....................................................................................................................................... 5
   2.2 Draw with floating elements..................................................................................................................................... 6
   2.3 Draw with Stick method.......................................................................................................................................... 8
   2.4 Other methods......................................................................................................................................................... 9
      2.4.1 Convert polyline to Tangent Polygon.................................................................................................................. 9
      2.4.2 Convert polyline to Elements............................................................................................................................ 9
      2.4.3 Convert to Floating elements alignment .............................................................................................................10
3. DESIGN SAMPLE LINES ............................................................................................................................................... 10
   3.1 Draw sample lines.................................................................................................................................................. 10
4. DRAPE TO SURFACE .................................................................................................................................................. 11
INTRODUCTION

These step-by-step instructions will lead you through the workflow procedure in order to get familiar with the software environment. »Starter .dwg files« should be used.

In this tutorial you will learn how to design a road alignment, sample lines and how to drape alignments to surface. There are many different methods for road design available. Few of them are described step by step.

1. DEFINE NEW ALIGNMENT

Open the drawing »DTM.dwg«.

1.1 Alignment manager

1. From the Ribbon under Layout tab, click Alignment Manager.

2. In Parameters dialog box specify:
   - Alignment name: Axis_road
   - Description (optionally),
   - Starting station: 0.00
   - Visibility: visible

   Check »Drape to surface« and select existing surface »DTM«.

3. Confirm with OK.

4. You can also define new alignment directly in Alignment manager dialog box with right click anywhere in the window.

5. Double click on Category. In Standard dialog box define:
   - Standard of the road: SLO
   - Road function: connecting roads
   - Road type: regional road – RC
   - Terrain type: Flat

   Design speed is automatically set to 80 km/h.
6. You can also view Critical parameters and Standard overview at the bottom of the dialog box.

7. Confirm with OK.

1.2 Lane Manager

1. Double click on Lanes to open Lane Manager. At the top of the window you have a list of predefined types of lanes. Select Default.

2. To add new lanes (for example bicycle lane) click Add at the bottom left of dialog.

   - Label: Lane_L2
   - Width: 1.0
   - Road-Lane: No

   Confirm with OK.

   The same for the right side: add new Lane_R2 with the same parameters as for Lane_L2.

   Confirm with OK to close Lane manager.

2. DESIGN ALIGNMENT

Plateia provides a wide range of methods to design road alignment: draw with tangent polygon, draw with floating elements, draw with stick method. It is also possible just to convert polyline to elements or alignment.

2.1 Draw with tangent polygon

Using a method Tangent polygon, you can describe any combination of main elements. You can interactively insert a tangent polygon across which main elements are drawn.
1. Your alignment »Axis_road« should be set as active (the icon next to the alignment name is coloured blue).

2. From the Ribbon in the Layout tab, click on the Alignment icon and select Draw with tangent polygon.

3. In Create Tangent Polygon dialog box, parameters are set to default. Confirm with OK.

4. Select first point of tangent polygon in the drawing. Continue with inserting a tangent polygon interactively. Main elements are drawn across it. Finish with Enter.

5. Draw lanes and widening dialog box opens. Program calculates individual lane widening. You can change parameters, import or save widenings in a file or check a calculation standard.

6. Confirm with OK.

2.2 Draw with floating elements

First, we define Construction elements of the longitudinal alignment, interactively with the command 21D1. Based on this elements, we define then an alignment with the method Floating elements.
1. In Alignment manager, define new alignment (right click in the alignment manager => new alignment). Define the alignment’s name and define to which surface it will be draped on.

2. From the Ribbon in the Layout tab, click on Fixed element icon and select Fixed element Tangent.

3. Select whether you want to draw a line or circle construction element. Run the command Fixed elements (or 21D1 command from menu) to draw every element separately.

4. When all construction elements are drawn in the drawing, from the Ribbon in the Layout tab, click on Alignment icon and select Draw with floating elements.

5. Select first fixed element in the drawing or press Enter to draw element at the beginning of the alignment (see the command line).

6. Select the second element. Dialog box with combinations from tangent to circle opens.

7. Select appropriate combination and confirm with OK.

8. Draw lanes and widening dialog box opens to review the parameters. Confirm with OK.

9. To continue, once again run the command Draw with floating elements (or 21E1 command from menu), select next two construction elements, specify the combination and confirm with OK.
10. A warning message can appear, to remind you that horizontal elements do not match the selected standard. The alignment could be drawn anyway, or you can change the parameters.

11. Confirm with OK.

2.3 Draw with Stick method

Using this method, you can »stick« the horizontal elements together in a sequence.

1. Define new alignment (right click in Alignment manager => new alignment).

2. Run the command 21E2 and define a start point in the drawing. You can also press Enter and define the start point later.

3. Drawing main elements with stick method dialog box opens. At the top of dialog box, you can select whether line/arc or spiral will be drawn. Define direction, length, end point or select an end point of the element in the drawing.

4. Press Draw button and continue with defining the next element. The program automatically moves you from line to spiral and from spiral to arc.

5. When finished, confirm with End.

6. Draw lanes and widening dialog box opens to review all the parameters. Confirm with OK.
2.4 Other methods

2.4.1 Convert polyline to Tangent Polygon

Using this method, you can convert any polyline to a tangent polygon. Based on a tangent polygon, main elements are drawn and labelled.

Run the command 21E4 and select a polyline to be converted. At each vertex, program draws the biggest possible arc taking into account the R/A ratio.

2.4.2 Convert polyline to Elements

Using this method you can convert a 2D polyline to the horizontal elements of an alignment. Straight polyline sections are converted to tangents and others (arcs) to curves. After converting the polyline to horizontal alignment elements, the original polyline is automatically erased from the drawing.
2.4.3 Convert to Floating elements alignment

Using this method, you can convert an existing alignment, drawn with tangent polygon method or stick method, to the alignment with floating elements. Constructions elements are additionally drawn.

3. DESIGN SAMPLE LINES

After the longitudinal alignment has been placed across the horizontal elements, you can construct sample lines. Using commands from the Sample lines command group, you can define sample lines in random stations: equidistant (at regular intervals), at specific stations, through selected points on the longitudinal alignment or in the main points of the alignment.

3.1 Draw sample lines

1. Set »Axis_Road« as active alignment (double click on its name in Alignment manager).

2. From the Ribbon in the Layout tab, click on 
   Sample lines icon and select Draw sample lines.
3. In dialog box, you can define sample lines parameters: the area where sample lines are drawn, distance between sample lines, width left and right, prefix of the sample lines name and starting counter.
   Check: Equidistant inside limits
   Over the whole interval
   At the end point
   Distance between sample lines: 30 m
   Width left: 30 m
   Width right: 30 m
   Prefix: P
   Starting counter: 1

4. Confirm with OK.

4. DRAPE TO SURFACE

In case you did not check the option »drape to surface« when defining alignment parameters (chapter 1.1), you have to drape longitudinal alignment and sample lines on surface additionally.

1. From the Ribbon in the Layout tab, click on the Drape icon.
2. Select a surface from a list and confirm with OK.