RoadMate

Urban & Rural Roads Design and Draughting Software for Civil Engineers

technocad
Civil Engineering Software

Description

Technocad urban design software is a suite of PC based programs for the design and automated draughting of civil engineering urban services. Incorporated in this suite are software packages that cover all aspects of civil engineering services design such as Roads, Sewer reticulation, Stormwater reticulation and Water supply. All the software has been written with knowledge gained in the civil design office where the need for *fully automated* draughting, rather than manually manipulated computer aided draughting, was identified as the only way of increasing design and draughting productivity.

RoadMate is the road software package of the Technocad urban design software. The purpose of the software is to provide an intuitive, easy to learn and easy to use graphical approach to roads design and draughting, whereby basic engineering parameters pertaining to the roads design are input by the designer whilst working inside an AutoCAD drawing. RoadMate gives you *final working layout, longitudinal section drawings and cross section drawings with the minimum amount of manual input*.

Work Smarter

Road alignments are co-ordinated and layout and longitudinal section drawings are created automatically from parameters chosen by the designer. All horizontal setting out calculations are done for you. Quantities are also calculated, both for areas in Cut situations and in Fill. In addition, topsoil stripping is also calculated, together with mass haul. Because you are working in AutoCAD, you can easily add extra notes, background images or attach reference files etc. prior to plotting the final working drawings. Let RoadMate do all the previously boring and mundane work!

Horizontal Layout Drawings

The designer simply has to draw lines or polylines representing the stakeline of the road(s) in plan in AutoCAD.

Curves are input by 'filleting' tangents with the required radii. Using the ‘Stakeline curve and PI’ editor, you can dynamically change curve radius, tangent length, arc length and PI positions. Maximum radius and tangent lengths are displayed whilst editing.

When you have created your road stakelines, simply show RoadMate the road by selecting the centreline, answer design data questions via an easy to use dialog box, and the following is calculated and drawn automatically inside your AutoCAD drawing:

- Road edges including horizontal curves
- Kerbs or shoulders
- Horizontal PI's numbered and
- co-ordinated to Cartesian or RSA Lo co-ordinate systems in an easy to read setting out table
- BCC and ECC chainages annotated in plan.

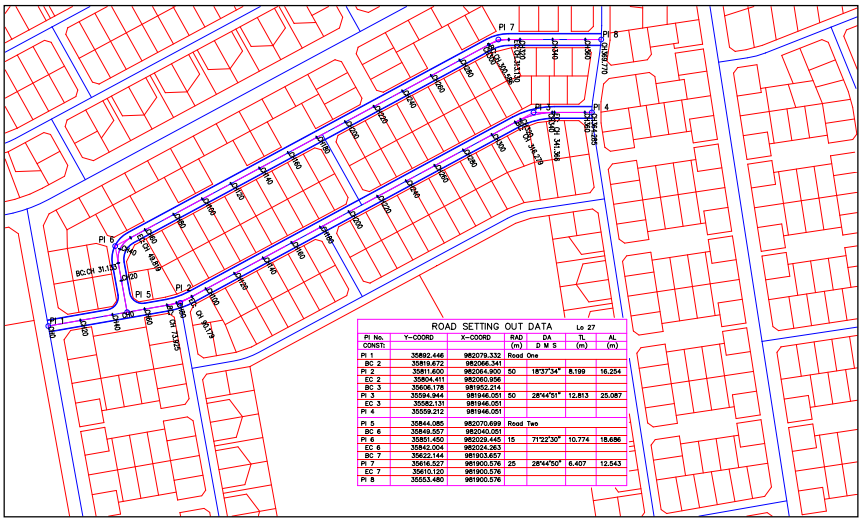

Figure 1- Road layout and setting out data produced automatically

- Curve data calculated and annotated in a table with Road name, PI co-ordinates including radius, deflection angle, arc length and tangent length.
- Chainages are optionally annotated in plan at selected chainage intervals (minor and major)
- Road intersections splayed using selected radii and chainages of intersections calculated automatically and annotated.

Vertical Alignment Long-section Drawings

Longitudinal sections can be drawn of a road with the capability of being able to enter ground profile data from many sources eg. Digital terrain models (DTM's), site peg surveys, archive manual drawings, contour drawings etc. This feature makes it more versatile in that not all designs justify aerial photography, global surface surveys or the digitising in of existing layout drawings. Features include:

- Extraction of long-section profiles automatically from SurfMate’s DTM – extremely fast and very accurate, picking up all changes in grade of a surface
- Preview of ground profile and road centreline prior to choosing of vertical PI (VPI) positions by draughting or typing
- Designer can choose whether to set vertical curve lengths or alternatively let RoadMate calculate vertical curve lengths according to user selected design speed and corresponding K-factors for sags and crests
- Designer can dynamically move a selected VPI (vertical point of intersection) and watch the effect on the gradelines either side of the selected VPI, together with the effect on the vertical curves at the current VPI, at the VPI to the left and at the VPI to the right of the current VPI. Great for sorting out problems with overlapping vertical curves on complex designs! View changes in grade and vertical curve length update in real-time.
- Vertical curve high and low point chainages and levels determined and annotated on longitudinal section - sort out drainage problems fast!

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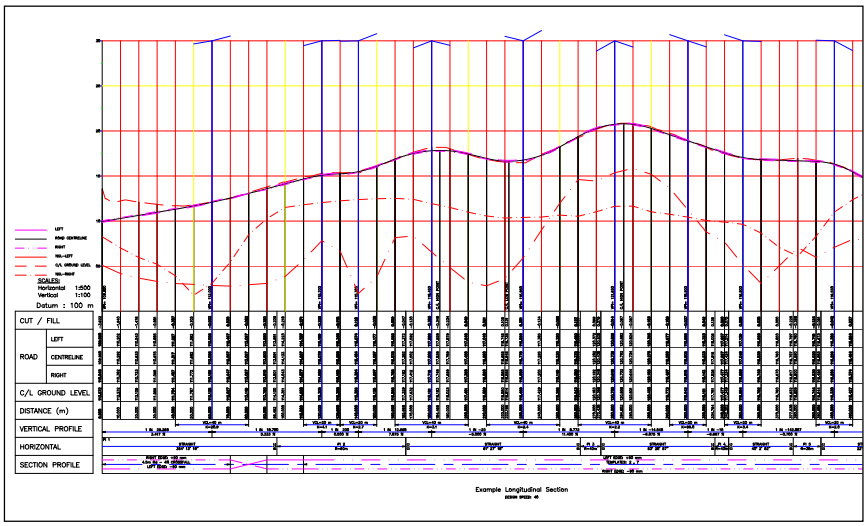

Figure 3- Typical Longitudinal section produced automatically

- Ground and road levels interpolated if required at constant chainage intervals
- Ground and road levels determined at special chainages such as road intersections or pipe/culvert crossings
- Annotation of horizontal curve BCC and ECC on longitudinal section
- Annotation of road cross-section profile description and transitions in profile on long-section based on cross-section information
- Longitudinal sections can be drawn between selected chainages
- Output in high quality final drawing format in AutoCAD. This allows for further editing and enhancement if required prior to plotting

Cross Sections

Cross-sections are taken perpendicular to the road centreline. Ground levels for cross sections can be extracted automatically from the Digital Terrain Model or typed in from survey data.
Designer can determine the distance left and right from the centreline at which existing ground elevations are to be calculated.
Centreline road levels are determined automatically from long-section vertical design.

Features include:

- Accurate existing ground elevation determination by seeking out changes in grade
- Scaling, spacing and positioning of cross-sections in the drawing is user selectable
- Able to accept varying number of cross section offsets for each section. This allows for the manual addition of any additional changes in grade if required. In addition those designers choosing to type in surveyed cross section data can have different numbers of offsets for each section
- User definable road templates varying from simple to complex shapes with transitions between templates. Cut and fill slopes variable by template including batter to edge of reserve
- Cross section template library able to be kept on a 'per-project' basis if required
- Road layer-work shown on cross section
- Road template viewer and extractor - road templates can be drawn in AutoCAD and simply "windowed" to form data file; relieves tedious typing in of data!
- View cross sections dynamically, moving forward or backwards along the road – 'movie-style'. Pause at any selected chainage.
- Starting and ending chainages can be selected for the drawing of cross sections
- Optimise the position of your road in cross section and automatically see the effect in the longitudinal section (profile)
- Export horizontal alignment data to ASCII file for electronic setting out

Volumes

Features include:

- Volume calculated from cross-sections
- Sub-grade cut/fill areas and quantities calculated and accumulated
- Mass haul calculated with cut/fill bulking ratio
- Embankment toe positions and elevations reported
- Road left/right edge positions and elevations are reported

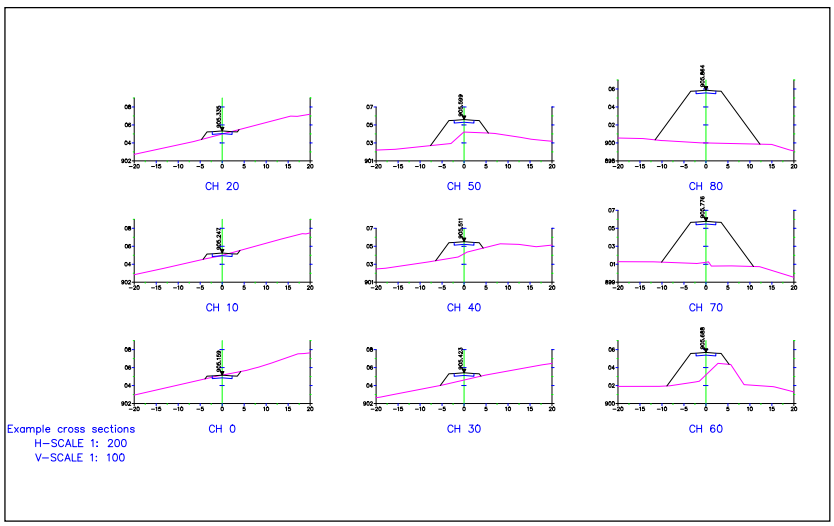

Figure 2 - Cross sections produced automatically

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3D Visualisation

Calculation and the drawing of the road toe line as well as other template lines as "strings" is performed. These strings, as well as the associated 3D faces (in full 3-dimensions) can be drawn onto the road layout drawing.

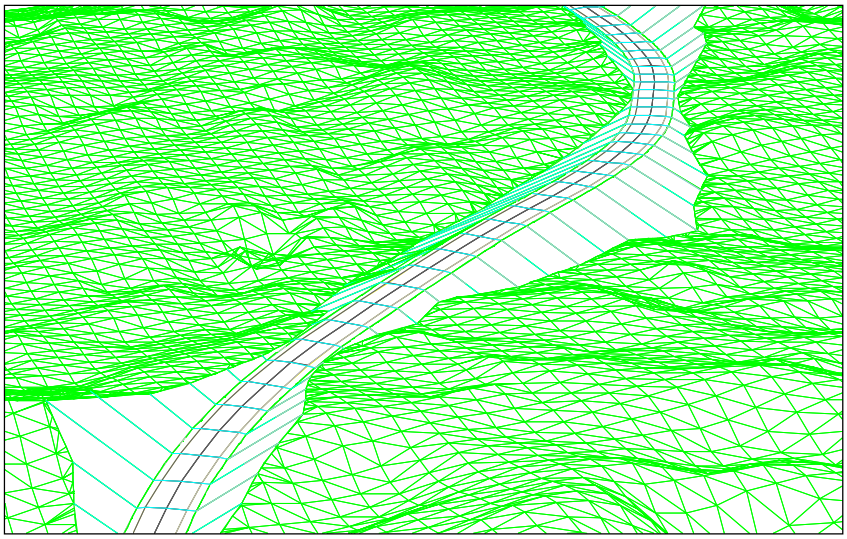
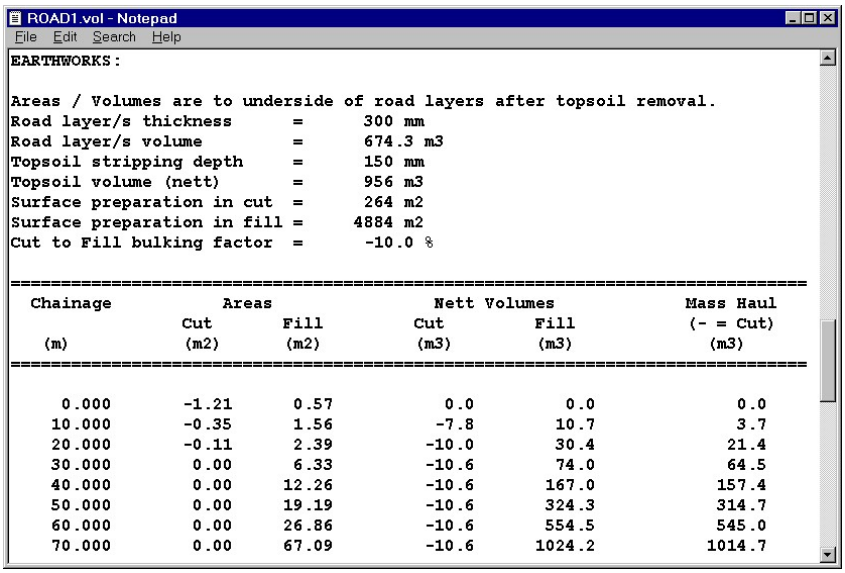


Figure 4 - 3D Visualisation

The designer can then use the strings to modify the original Digital terrain model (DTM), forming a new DTM of the original surface and the designed road merged together. The 3D faces allow for shading of a 3D view in AutoCAD. The 3D model can then be input to rendering software, such as Autodesk 3D Studio Max and photo-realistic images produced of the design.

Toolbox

Included with RoadMate is the Technocad 'TechTools' toolbox featuring lots of useful functions to make your draughting a pleasure! The toolbox is accessible via the pull-down menu or directly from a specially designed toolbar.



ROAD1.vol - Notepad
File Edit Search Help

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EARTHWORKS:

Areas / Volumes are to underside of road layers after topsoil removal.
Road layer/s thickness      =      300 mm
Road layer/s volume         =      674.3 m3
Topsoil stripping depth     =      150 mm
Topsoil volume (nett)       =      956 m3
Surface preparation in cut  =      264 m2
Surface preparation in fill =     4884 m2
Cut to Fill bulking factor  =      -10.0 %

==============================================================================
  Chainage          Areas                 Nett Volumes              Mass Haul
                 Cut       Fill          Cut        Fill            (- = Cut)
   (m)           (m2)      (m2)          (m3)       (m3)              (m3)
==============================================================================

     0.000       -1.21      0.57           0.0        0.0               0.0
    10.000       -0.35      1.56          -7.8       10.7               3.7
    20.000       -0.11      2.39         -10.0       30.4              21.4
    30.000        0.00      6.33         -10.6       74.0              64.5
    40.000        0.00     12.26         -10.6      167.0             157.4
    50.000        0.00     19.19         -10.6      324.3             314.7
    60.000        0.00     26.86         -10.6      554.5             545.0
    70.000        0.00     67.09         -10.6     1024.2            1014.7
```

Figure 5 - Road Earthworks report

On-line help

RoadMate has full-featured Windows on-line help with indexing and search features. Extensive use of graphics and examples makes this 'help' facility *really* useful.



Figure 6 - RoadMate Techtools Toolbar

Technical Support

Professional technical support is available with your subscription.

Purchase Options

You can purchase a short-term or long-term subscription. The choice is yours – whatever suits your budget and project requirements!

- Network licensing (LAN) is also available

Hardware Requirements

As per Autodesk recommendation for AutoCAD, AutoCAD Map or Autodesk Civil3D

Software Requirements

- AutoCAD Release 2027, 2026, 2025 & 2024 supported. Also, Autodesk Map 2027, 2026, 2025 & 2024 and Autodesk Civil 3D 2027-2024
- Operating systems: Windows 10 64-bit and Windows 11 64-bit
- SurfMate for extracting ground elevations.

Contact Details

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