Learn Guide

OPENROADS DESIGNER LEARNING GUIDE



Bentley[®]

LET'S START TO LEARN OPENROADS

Prepared For:



Prepared By:

SUCCESS SERVICE TEAM – CIVIL CONSULTANTS INDIA

Key Use

Highway/Road Design Geometrical Design Project Cost Estimates 3D Engineered Model Terrain Modelling (DTM) Automated Plan Profile

Who Can Refer?

Highway Design Engineers CAD Engineers, Students Transportation Professionals Pavement Design Engineers MX Road/Civil 3D Users Quantity & Billing Engineers

About

3D BIM (BETTER INFORMATION MANAGEMENT) ROAD DESIGN

Today's transportation market is evolving from linear project delivery methods to an integrated approach. With a need for all stakeholders to collaborate and offer expertise in the early stages of a project, roadway designers and engineers require software that seamlessly collaborates across disciplines, innovatively supports growing industry demands, and efficiently performs to meet increasing contract requirements.

OpenRoads Designer (ORD) introduces a new comprehensive modelling environment to provide construction-driven engineering to help accelerate project delivery of road networks, unifying design, and construction processes from concept to completion. The application provides complete detailed design capabilities for surveying, drainage, subsurface utilities, and roadway design. OpenRoads Designer redefines best practices for the generating design and construction deliverables and ensures the exchange of data throughout the project delivery and asset lifecycle.







Terrain Modeling





Rotary Design

Cut / Fill Volumes



3D Road Design



Utility Modeling



3D TCS Templates



Drainage Modeling

1-Click Operations



Hill Road Design



Quantity Estimates



Intersection Design



File Autosave

Pre-configurations

Background Maps

Properties Change

Hybrid Maps





Tabular Structured Data

Bing Maps Integration Geocoordinate Library



Pavement Markings





Vertical Profile Design Truck/Bus Laybys



A0/A1/A2/A3 Export



Design Speed Schema

Superelevation Editor

Design Standards

DWG Compatibility

Organized Folders

Road Safety Designs

























XYZ ACS Design

Multiple Reference





Kmz/Kml Import

Multiple Alignments



Report Exports











ADAPTIVE SIMPLIFIED LEARNING



"Design is not about how its looks like, it's also about how it works"

FUTURE WITH OPENROADS

and Many government non-government organizations are working on projects with project specific requirement of 3D or 5D BIM compliance. Even the early-stage contract documents also mention to carry out the project in accordance with 3D/5D BIM. It is expected that in future the conventional practice of project accomplishment will be replaced with these compliances. One of the recent examples of 5D BIM compliant project was Nagpur Metro (NMRCL). So, it is worthy to go for such advanced high-end technological software which can cater the present and futuristic project requirements.

Let's Do It

ORD IS THE NEXT GENERATION ROAD DESIGN SOFTWARE

ROAD DESIGN CHALLANGES

Different and multiple file formats of design files. No autocorrelation b/w elements of road design. No design change after annotation update, re-work required. Only 2D interface, No simultaneous engineered 3D Output. Multiple files were shared with other teams, so project was not synchronized which led to work repetition.



SOLUTIONS BY OPENROADS

ORD Provides you completely parametric modelling with advanced GUI with single file format (*.dgn). In ORD all the elements are autocorrelated with dynamic and robust editing on the go. It remembers the relationship and is much simplified and easy to adapt. It has been power packed with many automation processes like instant drawing production for deliverables.



He has achieved success who has worked well, laughed often, and loved much.

ELBERT HUBBARD

Design Components

ESSENTIAL ROAD DESIGN COMPONENTS



A Digital Terrain Model (DTM) is a digital file consisting of a grid of regularly spaced points of known height which, when used with other digital data such as maps or orthophotographs, can provide a 3D image of the land surface.



A Highway Alignment is 2D geometry line made from several individual elements such as straight lines & curves having specific length, direction, radius, and slope. Together they are united to form complex alignment.



A Corridor is a collection of several templates with different start and end chainages. A template is a typical cross section of road having pavement layer widths, depths, cross slope, cut & fill slopes, median, retaining walls etc.



A Plan & Profile drawing is used mainly for carrying out construction activities at actual site. A plan drawing contains straight & curve data and profile contains ground levels, road surface levels, horizontal & vertical schema.

why choose ORD?



WE ARE CREATIVE

Parametric Modelling Single File Platform (*.DGN) Elements are Autocorrelated Dynamic and Robust Editing Both 2D and 3D Output Precise Engineering

LEARNING

- **1. SURVEYED TERRAIN MODELING**
- 2. ROAD GEOMETRY DESIGN
- **3. TEMPLATE & CORRIDOR DESIGN**
- 4. SUPERELEVATION APPLICATION
- 5. DRAWING PRODUCTION
- 6. BEST PRACTICES OF USING ORD
- 7. FREQUENTLY ASKED QUESTIONS NOTE: <u>PRACTICE DATASET</u>



Testimonials

USER REVIEWS & COMMENTS (SOURCE: TRUST RADIUS)



MARTIN SMITH // STRUCTIRAL ENGINEER

Extremely powerful Engineering product which offers the ability to create accurate and professional models based on alignment style. The drainage designing and the ability on Road's design production and the coordination environment offered by OpenRoads Designer is good.



TEJSINGH RANA // PROJECT MANAGER

We are using it for all the infrastructure (road) projects we work on. We use it for design, analysis, and plan production of the infrastructure projects from start to end of the design period. It is very suitable for any widening, reconstruction, or new road projects where we need to look at the different alternative or alignments in 3D and then produce 2D plans using the 3D model



LINA MONICA ALI // BIM MANAGER

Though it took a fair bit of trying to understand the workings methods and environment of OpenRoads (especially for those transitioning from older versions), once familiar was quite helpful in speeding up the design & modelling works.



WARREN MCLACHLAN // ENGINEER

ORD is really focused on modeling of roads infrastructure projects but includes a few design workflows that are in other disciplines such as stormwater and drainage design and site modelling tools for developments. This is handy because you don't need a third-party application that you have to transfer your design files over to carry on with the project. Including LumenRT for free with ORD is by far the most helpful feature because of the visualisation capabilities which most software does not include.





Power Capabilities

FOR COMPLETE ENGINEERED ROAD MODEL DESIGN



PARAMETRIC MODELLING

Easy alignment drag & drop with 1-click increase & decrease radius, line length, direction. View terrain contours change typical cross-sections using properties and quick heads-up display.



SIMULTANEOUS 3D MODEL

With the terrain, 2D road plan & profile geometry, templates, corridor. ORD itself creates an engineered 3D model. Dynamic Cross- Section view at desired chainages & intervals with cut/fill details.



DRAINAGE & UTILITIES MODELING

3D Network modelling of Water, Effluent, Sewer, Electrical, Re-use, Fire, Stormwater can be done for Smart City Projects. Utility Clash checks can also be performed using OpenRoads Designer.



Terrain Modelling

From Survey Data

TERRAIN MODELLING

Introduction to Ribbon Interface Feature Definitions & Element Templates

Learn Series recording link (Session 1)

- 1. Select Workspace Training & examples Country specific Standards / Country kits / FoldersWorkset Training matric team specific
- 2. Seed file for a new file 3D only for terrain / 2D for alignment, c/s, superelevation etc.
- 3. Dropdown Top left corner "Workflow" mainly ORD Modeling
- 4. Templates => TCS; Corridor => Collection of templates (Project)
- 5. Civil cells Intersections/Truck lay byes/Bus bays
- 6. Keep checking the file names for 2D and 3D
- 7. File > Save settings Top view in new window opens fresh
- 8. Tools > Compress file > heavy file delete unnecessary files (40 mb to 8/10 mb)
- 9. Undo > Set mark > Stepwise undo is done all at once

Summary of useful tabs & tools:

1. Home: Element/Level manager

File	Home	Terrain	Geometry	Corridors	Model Det	ailing	Drawing Pro	duction Draw	ing Vi	ew					
N	one	•	Default	11	· 🗟	Attack	 □ • ● • ● • 		7g	¢ Civil	Corridor	Torrain	R	+aa	🕰 OpenRoads Help
0	1 30	0 * 3	2 0 • Q 0	• 43 0	+ Explorer	Tools •	🚮 • 📅 •	Selection [] •	•	Analysis •	Reports •	Import •	Geometry •	IRD	n Open RSS Reader
		Att	ributes			Prim	ary	Selection	Model	Analysis and	Reporting	Mo	del Import/Exp	ort	OpenRoads Help

- Explorer 1) File: dgn file subsets, 2) Items, 3) Model & contents, 4) Sheet index,
 5) Standards, libraries, 6) Subsurface utilities model, 7) Survey
- 2. Don't work directly on terrain work separately on 2D alignment & attach.
- 3. Properties -sheet index
- 4. Element selection/escape to come out of any command
- 5. Search ribbon search for any forgotten command displays the path also!
- 6. Notification window is attached to curser to indicate what our next action should be after entering into a particular command.
- 7. Using alignment & TCS (Template) OR creates 3D engineered model.
- 8. Reports complete quantities & much more
- 9. Dropdown Visualization LumenRT

2. Terrain:

File	Home	Terrain	Geometry	Corridors	Mo	del Det	ailing Drawing Product	ion Drav	ving	View						
Element	©. ¦□•	A From File	ohical Filter nents	Additional Methods •	Active	Edit Model	 Edit Complex Model Feature Management Boundary Options 	Transform	Points	Volumes	Hydraulic	Reporting	(Aquaplaning	Sight Visibility •	🔜 Graphical Filter Manager ᄎ Export To File	مع Label Terrain Contours المع Label Terrain Spots
Selec	tion		Create				Edit					Analysis			Miscellaneous	Labeling

- 1. Create 1) From file import from various (12-14) file types,
- 2) From elements CAD file (XYZ system) Triangulate & create,
 3) Most common is the point cloud from total stations.
- 3. Edit 1) Set active, 2) Surveyor's errors corrections etc.
- 4. Labeling Contours/spots labels

3. Geometry:



- 1. General tools import/export geometry, set design standards, civil accudraw
- 2. Horizontal geometry design tools lines, curves, reverse curves, tapers & offset
- 3. Vertical geometry design tools lines, curves, complex geometry
- 4. Common tools quick geometry in MX => table editor in ORD
- 4. Corridor:





Steps to create Terrain (Digital Terrain Model) from Raw Survey Data

- 1. From File: various file type terrains direct import like dtm, xml, fil, tin, txt, inp
- 2. Additional methods Ascii file (Total station XYZ) (LIDAR/Drone point cloud)
- Browse > select file > window for import create new text import setting file (.xml) – a) first line to import=2, b) feature type=spots, column delineators=comma, column mapping=assign titles, c) Geographic coordinate system all over world-click none if not sure, d) finish=save file like a std file to use repeatedly.
- Feature definition > terrain > existing > boundary Import > complete > close window > Fit view

🛃 Create Terrain Model From ASCII File		- 0	🗙 📗 🖊 Create Tes	at Import Settings File			- 0	з х
	- Global Options Terrain Models	•	Columns Basic Mode -	Define columns in imported file.				5
Create Terrain from ASCII File	Append to existing Terrain Mode Terrain Model to append to		File Format	Options © Delimited Separators				
	Projection	•	Columns	Fixed Widths				
	TargetDescription TargetUnits	EFSG:3404 NAD83(HARN) / North Caroline (NUS) US Survey Foot	Options	Feature Type Feature Symbology	Break Line V No Feature Definition V			
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	Filter Source File Units	None C						
	Feature Definition	•						
	Feature Definition	Terrain\Existing\Existing Boundary 🖂		Skip				
	Text Import Wizard	•		X. Y. Z				
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	Triangulation Options	•	1	-1378.279, -837.592, 1	38.316			
	Edge Method	No Removal	1	-1367.279, -837.592, 1 -1362.279, -837.592, 1	37.926			
	Import Options	Import Terrain Only	1	-1392.279,-837.592,1	39.451			
	Geographical Coordin	ateSystems	1	-1397.279,-837.592,1 -1402.279,-837.592,1	39.596 39.746			
	Source Source Description Source Units			-1407.279,-837.592,1 -1412.279,-837.592,1 -1417.279,-837.592,1 -1417.279,-837.592,1 -1422.279,-837.592,1 -1427.279,-837.592,1	33.886 40.056 40.176 40.336 40.506			

How to import CAD spot level terrain? (From graphical filter)

- 1. Home > Attach tools > references > attach CAD file >Attachment method -Coincident world > Fit view
- 2. Terrain > From graphical filter > terrain filter manager > Select existing filter OR create new filter (General – name, description, feature type (e.g., spot) & edit filter (preview); Filter by – e.g., Levels; then finish & again select created filter) > triangulation option – remove slivers > feature – existing boundary
- 3. Then select terrain > properties > Edge method Max edge length (100).

= [†] = [†] = □ □ □ ★ =			Edit Filter		
→ Sing geometry → Sing geometry → Sing filters → Sing here	General		Select Levels	Levels:	Selected Levels:
Graphical Filters dgnilb (Default) Graphical Concrete Filters Graphical Filters dgnilb (Default) Graphical Filters dgnilb (Default) Graphical Filters dgnilb (Default) Graphical Filters Graphical Filters dgnilb (Default) Graphical Filters Gra	Description Feature Type Filter Type Link to Terrain Features Edit Filter Filter By Colors Levels Line Veights Line Styles Element Types Cell Names Feature Definitions Transparency Templates Elevation Exclusions	Break Lines Linear Line	 Levels (3) Element Types Line Styles Line Weights Cell Names Civil Features Transparency Templates Elevations 	Dratt_Profie_LP_HP_lext Dratt_Profie_Sheet, Mayor_Gid Draft_Profie_Text Draft_Station Cardinal Lines Draft_Station Cardinal Points Draft_Station Cardinal Points Draft_Station Ticks Migor Draft_Station	Add->
				By Sel. 🕎 Prev. 🔏 Prev	/ Cancel Finish

- 4. Element selection > select > hover > properties > toggle buttons > switch ON
- 5. To limit the boundary, Switch ON spots & set edge method to Max Edge method (Value in m)

Name	Active Terrain Model: T
Feature Name	Terrain Model (Flement)
Feature Definition	Existing Boundary
Number of Points	52,215
Number of Point Featu	6
Number of Islands	0
Number of Voids	0
Number of Features	6
Number of Contours	0
Number of Breaklines	0
Number of Triangles	98,576
Edge Method	Max Edge Longth
Length	AD DOD'
Cengin	40.000
Major Contours	On
Minor Contours	On
Triangles	Off
Spots	Off
Flow Arrows	Off
Low Points	Off
High Points	Off
Breaklines	Off
Boundary	On
	Off
Imported Contours	
Imported Contours Islands	Off
Imported Contours Islands Holes	Off
Imported Contours Islands Holes Voids	Off Off

🔏 Label Terrain Contou	ırs —			×
Terrain Model:	Terrain Model (Element)			
<u>A</u> nnotation mode	All Contours	•		
Text Alignment	Up slope	•		
Dimension Style:	Lbl_PIn_Terrain Cont	•	9	زا
	A			

6. Labeling > label terrain contours > select terrain > all contours, follow line, Lbl_PIn_terrain contour elevations & Drawing annotation scale (increase to make visible).

7. Terrain import – From elements (CAD file) >select elements >Feature type break line>LC (Terrain filter manager Feature type break line for those features which we want to include in trial & drape void for those features which need not be included e.g., buildings – Levels: E_site_building & E_struc_building etc.), Feature definition – existing triangles.





Alignment Design

Horizontal Plan & Vertical Profile

Geometry Design of Roads (Horizontal & Vertical Alignment)

Learn Series recording link (Session 2)

- 1. New > Seed 2D (2D V8 DGN in the window top file name) (we can change/create seed file, default settings & view ports)
- 2. File > Settings > File > Design file settings to set the working units.
- Default views settings: Horizontal geometry View 1; Vertical geometry View
 3; 3D View 2; Dynamic sections View 4.
- 4. Import 3D terrain as an attachment to 2D file for geometric design:
- Home > Attach tools > references > attach DGN already created terrain file > Attachment method - Coincident world; Nested – Live nesting (depth=99) > Fit view
- 6. Select terrain & hover cursor > only 3 options should come > properties no changes allowed, all options grey, if we want to display contours, override symbols=yes then switch ON.
- 7. Select terrain & hover cursor > Set as Active terrain model
- 8. Long right click anywhere > View control > 2 views Plan/3D
- 9. Home > Primary > Models > Check the default 2D model & the attached 3D model which gets displayed as a result of setting "Active terrain model" (it gives default terrain for design & automatically creates 3D model).

References (1 of 1 unique, 1 displayed)	_		×
Tools Properties			
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Slot 🏴 🗋 File Name Model Description Logical Orientation Presentation Visible Edges 🖬 🔏 🦌 🤷			
1 ascii terrain.dgn Default Master Model Coincident - World Wireframe Dynamic 🗸 🗸 🗸			
Scale 1.000000000 : 1.00000000 Rotation 00°00'00" Offset X 0.000 Y 0.000			
Display O	verrides:	Allow	-
New Level Display: Config Variable 🔻 Georeferenced: No 💌			

1. Horizontal Geometry:

1. Civil accudraw toggle for entering alignment manually, anytime toggle for command.

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- 2. Line between points > select feature definition Geom baseline, then General tools > standards > feature
- 3. def toolbar > chain command for continuous line points
- 4. Arc > Arc between elements > Simple for radius, spiral arc spiral for radius with transitions > select FD
- 5. radius locking & trimming straights options available
- 6. All lines & arcs design values can be altered manually
- 7. Horizontal > Complex geometry > Complex by element > automatic & FD > select first element in proper direction by observing arrow direction.

- 8. Horizontal > Complex geometry > Complex by PI > fix curve specs & create complex directly saving time, if needed values can be changed later
- 9. Using handles alter geometry or enter values manually by clicking on the orange text. Select/hover for Geometry report.



2. Vertical Geometry:

- Select Plan centerline, hover for context menu & select 2nd option 'Open Profile Model' & select view port 3 & click in blank space of view port 3 window.
- 2. Civil accudraw toggle for entering alignment manually, anytime toggle for command.
- Lines > profile line between points >select feature definition Geom baseline, then General tools > standards > feature def toolbar > chain command for continuous line points
- 4. Curves > profile curve between elements > Parabola between elements
- 5. All lines & arcs design values can be altered manually
- 6. Vertical> Complex geometry > profile Complex by element > methodautomatic & FD Geom baseline
- 7. select first element in proper direction by observing arrow direction
- 8. Vertical> Complex geometry >profile Complex by PI > fix curve specs & create complex directly saving time, if needed values can be changed later
- 9. Set active profile for further report & work
- 10. Select/hover for Geometry report.

3. Other Important Geometry Tools:

- 1. Geometry > Common tools > Table editor to manually edit the elements dimensions Edit the required values and click Apply)
- 2. Geometry >Horizontal/Vertical>Geometry Builder Coordinates manual editing for creating geometry

Station	Back Tangent Length	Back Bearing	Back Spiral Length	Northing	Easting	Radius	Arc Length	Ahead Spiral Length	Ahead Bearing	Ahead Tangent Length	
0+000.000				231925.12738	702643.61045		J		92'58'56.6"	763.96467	
0+998.080	763.96467	272'58'56.6"	0.00000	231873.09843	703642.25603	1500.00000	468.23120	0.00000	110'52'03.0"	155.25323	
1+642.888	155.25323	290'52'03.0"	30.00000	231641.03600	704251.00336	1000.00000	435.41949	60.00000	83'20'29.4"	579.09006	
2+491.959	579.09006	263'20'29.4"	0.00000	231740.03789	705099.06572	0.00000	0.00000	0.00000	84'32'08.1"	876.60222	
3+472.690	876.60222	264"32'08.1"	30.00000	231833.45334	706075.57897	1000.00000	137.50894	50.00000	94*42*22.0"	902.98199	
4+489.052	902.98199	274'42'22.0"		231750.04668	707088.75312						

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	P	lace Non-Tangent Complex	Civil Element Un-Ruled				Place	Close
	C		Pa Desimeter II	0 000001 4 10 00	000			

3. Geometry > Standards > Design standards toolbar > Select specific standard library file & click weighing balance symbol > Hover over warning symbol to see comment OR go to Geometry > Standards>Civil message center & check warning descriptions & do corrections.

4. Geometry > Standards > Speed table – for speed schemes – different speeds for different stretches



Corridor Modelling

Templates (Typical Cross Sections)

Template Creation, Corridor Modeling, 3D Model

Learn Series recording link (Session 3)

1. Template Creation:

- 1. Template = TCS; Corridor = TCS schedule (Collection of templates)
- 2. Corridors > create > template > create template opens new window
- 3. RC on any folder > New > template
- 4. Blank graph (Violet box = Origin PCL (0,0)) RC > Add new component
- RC > Add component > Simple > Place the green point at origin and check/modify the constraints for other points (DC on point to open dialogue box)
- 6. Every point has 2 constraints Mostly used are Horizontal, vertical & slope to be taken from TCS diagram obviously both the constraints can't be same category
- 7. Review & edit template
- 8. Assemble a New Template Backbone from Existing Components
- 9. Constraint's illustration (thumb rule for a surface point, nearest left/right point or for a below point, top point).



10. Point color coding – No constraint: Green, 1 constraint: Yellow , Both constraints: Red (All 3 colors come into picture for transition templates)



- 11. Create template (for one side of CL) using various components available in the library, we can change all the dimensions and constraints to suit our TCS.
- 12. End conditions: the slope of embankment outside the pavement structure w.r.t. the terrain. Hence end conditions are a set of sloped embankment lines. Choose a particular set from library and drag & apply.

13. After creating one side template, check its monolithic nature by moving the origin point (no layer should break).



14. Copy & paste template & then drag the same template into same template & while dragging on, just RC & click Reflect & join it to the existing template – both the sides of TCS are now complete.



- 15. One more way to mirror is create blank template & then drag one-side created template & while dragging on, RC & select mirror & click exactly on origin to join both sides.
- 16. After completing template creation, if needed, upto us to merge the LHS & RHS same layers by RC on central common boundaries & selecting merge components option.
- 17. Right bottom corner Test: new dialogue box set target as active terrain model & edit the surface slope if needed & click "draw", check the end conditions by hovering the cursor up & down. – Close.
- 18. End conditions also can be edited & dynamic.
- 19. For placing barriers, road markings etc., DC on the edge points at which we need barriers/markings & then select feature definition for that point accordingly. Then save the template and close template window. It will not reflect in the template view immediately, but it will be incorporated into plan and in subsequent 3D engineered model.
- 20. All template files in single .itl file, which can be the common central library for an organization using say, 10 OpenRoads licenses.

2. Corridor Modelling:

- 1. Since corridor is the collection of all templates in a project, we need to create a corridor FIRST.
- 2. Open profile model >select horizontal alignment > context menu create corridor > name it . (encasing appears around the horizontal alignment = corridor placed.)
- Corridors > New template drop > alt+↓ > choose from template library > give start & end chainage for that particular template > optimum drop interval is 20/25 m > LC – template dropped.

3. Modelling of Approach Section (ROB/RUB) in OpenRoads Designer with Dynamic Retaining Wall Height & different Vertical Profile for Service Roads:



LEARN SERIES GUIDE | ORD



- 4. Violet dashed boundary& one sided large, dashed handle @ beginning (LHS)/end (RHS) for template selection
- 5. Yellow/blue solid boundary &both sided small solid handles throughout for corridor selection
- 6. Pale yellow solid boundary and one sided large solid handle @ beginning (LHS)/end (RHS) for transition selection
- 7. Any change at any time, in the template just saves the template file in the library. To make it reflect in our actual design, select that template by clicking on violet boundary/handle & in context menu, select 4th option Synchronize with library.
- Home > Primary > Explorer > Openroads model > dgn file > Corridors > RC on corridor name > Corridor creation tools > Corridor objects > multiple templates drop as per TCS schedule.
- 9. To change a particular template, just select by handle, & in context menu > properties > select another template from library.
- 10. Long LC on blank area View control > 2 views plan/3D to view the 3D engineered model.

Learn Series recording link (Session 4)

1. Template Transition:

- 1. OR automatically creates transition from one TCS to another, by intelligently recognizing the gap between two stretches with different TCS. If there is no gap as per TCS schedule, we need to decide to it & edit the corridor objects table accordingly.
- 2. Corridors > Transition > create transition > locate first then second template created. (Transition is a separate kind of template denoted by Dark yellow solid boundary & one-sided large handle @ beginning (LHS)/end (RHS).
- 3. Corridors > Transition > edit transition > locate transition template> window for appropriate linking of points – delete/edit the connecting lines as per proper 3D schematic to be formed > ok > next window – transition template testing window (we can edit point controls as well as add some component if required in this window itself if template is not displaying proper transition change from start to end – Check once in 3D view also!)> ok. (At curve locations also we can have transitions, even along with superelevation.



2. Dynamic sections:

Dynamic sections – how template follows ground profile – Corridors > Review
 > Dynamic sections > Open cross section view > Locate corridor or alignment
 > Select view 4 & click anywhere in view – Using controls view c/s at any
 chainage! (updates AUTOMATICALLY IMMEDIATELY as per revisions in P&P) –
 Toggle the view properties to see the cut & fill graphics (Red – filling; Green –
 Cutting) & to check Cut & Fill area values too.



3. 3D Drive:

 Corridors > Review > 3D drive through > select the 3D view (click anywhere in the blank area) > select centerline > dialogue box > go to presentation tab of view & change display style to 'smooth white background' for smooth traversing, no hanging > in dialogue box set parameters for traversing & play.

4. Corridor reports:

1. Corridors > Review >Corridor reports>Component quantities > Locate corridor > Following window will appear:

	Material	Surface Area	Volume	Units	Unit Cost	Total Cost/Material		
•	Cut Volume	0.0000	829417.9294	CuY	1.00	829417.93		
	Fill Volume	0.0000	2579783.7923	CuY	1.00	2579783.79		
	Mesh\Grading\TC_Ditch	152086.8657	0.0000	SqF	1.00	152086.87		
	Mesh\Grading\TC_Ditch Backslope	611742.2636	0.0000	SqF	1.00	611742.26		
	Mesh\Grading\TC_Fillslope	1477854.1708	0.0000	SqF	1.00	1477854.17		
	Mesh\Grading\TC_Med-Depressed	586036.1591	0.0000	SqF	1.00	586036.16		
F	Report		Tota	al Estimated	Cost: 6236	921.18		
*Clipping is not considered in quantities ** Corridor Name: practice								

- 2. Cut & Fill volumes will reflect from the end conditions
- 3. Pavement layers volumes will reflect from the templates
- 4. Unit Cost is editable to get the Total estimated cost of the project
- Click 'Report' for 25 m (Pre-defined Drop interval in the templates) wise full report (Bentley Civil Report Browser window will open) (Export – File > Save as > XML or HTML or Excel or Doc file)
- If report required as per new parameters, Home > Model analysis & reporting
 > Civil analysis > Qty report by named boundary.

5. Superelevation:

1. Before creating Superelevation sections, Go to Edit template window and in the 'Point properties' (DC on point) of those points which are supposed to rotate at curves for superelevation – WHETHER 'Superelevation Flag' box is checked or not – In the library templates, it will be mostly checked; BUT while creating New Template we need to check it attentively. Such points are mostly the PCL origin point (which acts as crown), Edge of Pavement Left &Edge of Pavement Right.

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	Point Properties			×	
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	Use Feature Name Override:	EOP_L		Close	INT_ToLeft
	Feature Definition:	Linear\Template Po	oints\Pavement' ~	< Previous	
	Superelevation Flag		[N	
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EOP2_L	Parent 2: Rollover	Values			
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EOP3_L	Horizontal Feature Constraint	6		~	744 15
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2. Ist way: If prepared SE .csv file already, Corridors > Superelevation > Calculate > Import Superelevation > import file.

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- 3. 2nd way: If want to create new as per standards, Corridors > Superelevation > Create >Create Superelevation sections >Edit name > Locate corridor or alignment > Select Rules file (India dataset)
- 4. SE Lanes color coding (RHC): Max SE at curves Dark orange, Little SE Yellow, No SE Green. Colors are different for Left hand Curve (LHC) & Right-Hand Curve (RHC). Left Hand Curve, we see Blue color patches at max superelevation section.

- 5. View attributes (Top left corner of View) > Turn 'Fill' ON.
- 6. Check values & wedges by selecting (clicking on) superelevation lanes & edit chainages if required.
- 7. 3rd way: Now, if there is error in creation of SE lanes at few places, Go to Corridors > Superelevation > Create > Create Superelevation lanes > Locate SE section (by snap to that Outer Green Boundary)> Edit table = Create, then we can check again by snapping lanes.



- 8. 4th way: even after doing all above SE is not created, it means sometimes Se doesn't get automatically assigned to corridor, so Go to Corridors > Superelevation > Calculate >Assign to corridor>Locate First Superelevation section > Locate next SE section (we can have multiple SE sections in a single corridor) OR Reset (RC) > Locate Corridor > Associate SE Dialogue Box >Edit > OK.
- Finally, Check the Corridor behavior in Dynamic Sections View to confirm the Changes. (Long RC in Dynamic section window > Place Horizontal temporary dimension > select start & end points on CW to display the dimension & slope).

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10. Superelevation editor: tabular form -

Superelevation Editor



Drawing Production

Plan & Profile Sheets (Deliverables)

Drawing Production (Plan, Profile & Cross-Section Drawings)

Learn Series recording link (Session 5)

- 1. Used for deliverables like C/S or P&P Drawings.
- 2. Mostly used tabs under 'Drawing Production' are Named Boundary (90%) & Annotations (10%) (Sometimes Text tab for some minor editing).
- Named boundaries > Place named boundary civil profile > Dialogue box 1st
 3. Named boundaries > Place named boundary civil profile > Dialogue box 1st
 3. Named boundaries > Place named boundary civil profile > Dialogue box 1st
 3. Named boundaries > Place named boundary civil profile > Dialogue box 1st

1. Boundaries creation – PLAN:

- 1. Drawing production > Named Boundary > Place named boundary > Dialogue box> Click Click Click
- Drawing seed file naming convention-e.g. In Plan tab, A1_Plan = A1 sheet size & Plan at centre; A1_Plan & Profile Plan = A1 sheet size, what are we going to create? -P&P, Plan=First we will create plan & then corresponding profile, Deliverable to L&T. (Seed files & their settings vary as per workspaces)
- 3. Settings Scale / Length = to be displayed on one sheet / Left & Right offsets from CL / Overlap = on Consecutive sheets / Boundary chords = curvature of the rectangular projection of sheet on actual alignment plan [This needs to be edited DURING PREVIEW as per the curvature of the alignment -We should give this value as 0(Before selecting centerline!) in order to avoid the plan curve going below in the profile section of the sheet, then there will be no more curvy rectangles, & if we want we can even ALTER those straight sided rectangular boundaries by using their handles separately to properly cover the particular unit length at curve locations!]



- 4. Very Important: Keep the 'Create Drawing' check box "Unchecked" during this phase of creating only Plan in the background because profiles are yet to be created; if it is checked, will immediately create the drawings with only the Plans at top!
- 5. Enter the Name & description & while in the Name tab, select the Centerline > Vertical attached line to define start location, click just before start chainage > every unit length (1000 m), a series of rectangles is created as we move cursor through the corridor (as mentioned in previous point, we can set boundary chord value to be 0 & adjust the rectangles)
- 6. After moving cursor and creating rectangular plan cuttings through entire corridor > 2 LC Boundaries created.

🔏 Place Named Bo	oundary Civil Plan — 🗆	×	🔏 Place Named Boundary	r Civil Profile — 🗆	×
 Place Named Base Drawing Seed: Detail Scale: Name: Description: Group: Name: Description: Start Location: Stop Location: Left Offset: Right Offset: Overlap: 	Dundary Civil Plan - □	II II II I ▼ ×	 Place Named Boundary Drawing Seed: Detail Scale: Name: Description: Method: Plan Group: Group: Name: Description: Vertical Exaggeration: Available Profile Height: ✓ Top Clearance: Elevation Datum Spacing: Station Datum Spacing: Profile Shifts: 	Civil Profile – Civil Profile – Civil Profile Profile PROFILE – CUSTOM 1:2000 – Practice – Practice – Practice-1 – (New) – GeomBL – From Plan Group: Practice-1 – 10.000000 – 133.33334 – 0.500000 – 5.000000 – 5.000000 – 5.000000 – Datum Stations –	
Boundary Chords:	O Create Drawing Show Dialog		Prome stints.	Use Terrains Use Active Vertical Create Drawing Show Dialog	0

2. Boundaries creation – PROFILE:

- Open profile model first! (Select Horizontal alignment > Hover cursor > Open profile model > View 3)
- 2. Drawing production > Named Boundary > Place named boundary > Dialogue box> Click on Profile
- 3. Vertical exaggeration = 10 => Available profile height = 20
- 4. Give name & description & Select the Vertical geometry's centerline from view 3 (NOT the horizontal one!).
- 5. The profile boundaries rectangular boxes will immediately appear automatically in view 3 as soon as we select the Vertical geometry's centerline because the 'Method' in the dialogue box is set to 'From Plan Group' will directly Synchronize with the boundaries in the Plan
- 6. Profile shifts = Datum stations
- 7. Check boxes: Check first 2 boxes 'Use terrains' & 'Use active vertical' & accept by single LC in view 3.

3. Drawing sheets production:

1. Open Named boundaries dialogue box

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r rione oroups					Practice-1	Practice	geometry.dgn	~		
					Practice-2	Practice	geometry.dgn	~		
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					Cross Section Groups					
					Other Groups					

- 2. ▷This dropdown arrow confirms the background creation of Plan/profile boundaries. If not present, go back to P&P boundaries creation stages.
- V Imp: Check mark 2 tools (last 2 in the row) in the toolbar: 'Show the create drawing dialogue'& 'Annotate plan drawing models.
 (Each time when you reopen this window after corrections!)
- 4. RC on Profile group name > Create plan/profile drawing = 'Create Drawing' dialogue box will open.

Create Drawing				×
Mode:	Plan and Profile			
Name:	Practice			
Drawing Seed:	ANSI D_Plan-Profile_PLAN 🔹	Drawing Seed:	ANSI D_Plan-Profile_PROFILE 🔹	
View Type:	Civil Plan	View Type:	Civil Profile	
Discipline:	Civil	Discipline:	Civil	
Purpose:	Plan View	Purpose:	Profile View	
-	Drawing Model		Drawing Model	
Seed Model:	Plan and Profile Sheet Definitions.dgnlib,	Seed Model:	Plan and Profile Sheet Definitions.dgnlib,	
Filename:	(Active File)	🖡 🔲 Filename:	(Active File)	O B
A	CUSTOM 1:2000 -	A	CUSTOM 1:2000 -	
Annotation Group:	Plan Grid	Annotation Group:	Framed Profile	
	Sheet Model		Sheet Model	<u> </u>
Seed Model:	Plan and Profile Sheet Definitions.dgnlib,	Seed Model:	Plan and Profile Sheet Definitions.dgnlib,	
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A	Full Size 1 = 1	A	Full Size 1 = 1	
Drawing Boundary:	ANSI D_Plan-Profile_PLAN 👻	Drawing Boundary:	ANSI D_Plan-Profile_PROFILE 👻	
Detail Scale :	CUSTOM 1:2000 👻	Detail Scale :	CUSTOM 1:2000 👻	
	Add To Sheet Index Make Sheet Coincident Open Model		QK	ancel

- 5. Annotation group for Plan view = Plan Grid; Annotation group for Profile view =Framed profile or Any other custom created as per requirement.
- 6. Drawing Model scale must be changed & kept same as the Sheet model Detail scale for both Plan view and Profile view. (here, e.g., CUSTOM 1:2000)
- 7. Keep Sheet model scale as Full-size 1=1.> OK.

8. Processing > For any superelevation/Curve widening, one dialogue box will appear – 'Resolve aliases for definition' (Drawing production will be paused) – Give targets > OK> Drawing sheets created.

Type Target Superelevation CL - EOP_L
Superelevation

- 9. Outer boundary (title box etc.) is created in the dgn library, we can create as per our requirement. All editing possible for all boxes as well as for drawing annotations.
- 10. File > Export > Exchange file types > PDF OR File > Export > Common file types >DWG/DGN.
- 11. Open bottom Model's bar Grey color icons = Boundaries (separate Plans and profiles) and White color icons = Final P&P drawing sheets. Any change in design causes updating in boundaries and subsequently in drawings.



4. Cross-Section drawing production:

- 1. (Imagine corridor as a loaf of bread & we're going to cut into transverse pieces!)
- 2. Open view 2 (3D) >Drawing production > Named Boundary > Place named boundary

> Dialogue box > Click on C/S icon – Drawing seed: A1_XS-Frame annotation = Pre-Setting file of how to generate the deliverable (We can create new drawing seed file in dgn library & even edit the existing seed file's settings as per our requirements!)

- Enter the Name & description & while in the Name tab, select the Centerline > Vertical attached line to define start location, click just before start chainage > Check box 'Include control points' to be checked.
- 4. every interval (say, 20 m), a series of slices (c/s) is created as we move cursor through the corridor > LC to accept. (Sliced c/s will reflect in 3D view, in which we can alter their sizes as per our requirement).

Co Pla	ace Named Boundary	/ Civil Cross Section — 🛛	×	• See Mint	• 5m1/Med (2
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	Drawing Seed:	ANSI D_XS - Frame Annotation]		
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5. ▷ This dropdown arrow confirms the background creation of C/S boundaries. Toggle ON both the tools - 'Show the create drawing dialogue' & 'Annotate plan drawing models'

REE Named Bour	ndaries				
× 😤 + 😵	8				0=
lame	T	Description	File Name	Show	
Plan Groups	5				
Cross Section	Groups				
Other Groups	5				



- 6. Annotation group = XS Frame and Grid.
- 7. Drawing Model scale must be changed & kept same as the Sheet model Detail scale for both Plan view and Profile view. (here, e.g., CUSTOM 1:100)
- 8. Keep Sheet model scale as Full-size 1=1. > OK.
- 9. All outer boundary (title boxes etc.) editable, drawing seed file editable/create new & ANY CHANGE IN ALIGNMENT automatically reflects in boundaries and drawings.

5. Intersection Modelling:

- 1. First, we need the geometry of the intersecting alignment (both horizontal and vertical) to be imported or created into our design model. (Feature definition Geom Baseline secondary)
- 2. Model detailing > Place civil cell (We can create our own specific by 'Create civil cell') > Pick civil cell browser > Select > Locate reference element (through road EOP) (main alignment CW's Edge of Pavement) >Locate reference element Secondary Road's CL> Select elements to view (Flow direction as per need) > LC to accept > Intersection will be placed along with its corridor modelling > Edit dimensions.



Material					- 0
Cut Volume	Surface Area	Volume	Units	Unit	Total
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Mesh/2 Aggregate & Soil (IPC-37-2010) (Granular Sub Base (GSB)	0.0000	14091.1010	CuM	1.00	14091.10
Mosh/2_Aggregate & Soli (IRC.37-2018)(Subgrade	0.0000	31698.3648	CuM	1.00	31698.36
Wesh/2_Aggregate & Soil (IRC:37-2018)/Wet Mix Macadam (WMM)	0.0000	8792.0760	CuM	1.00	8792.08
Mesh\3_Concrete/Rigid (IRC :58-2015)\TC_Curb	0.0000	309.3007	CuM	1.00	309.30
Mesh\Grading\TC_Cutslope	55175.2481	0.0000	SqM	1.00	55175.25
Mesh\Grading\TC_Ditch	7596.7915	0.0000	SqM	1.00	7596.79
Mesh\Grading\TC_Earth Shoulder	0.0000	1987.2046	CuM	1.00	1987.20
Mesh\Grading\TC_Fillslope	16017.7237	0.0000	SqM	1.00	16017.72
Mesh\Grading\TC_Topsoil	0.0000	4126.1196	CuM	1.00	4120.12
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ant. 3			dor Name:	CENTRE	UNE_IND_STD

Component Quantity Reports are the key to make decisions for billing & estimates.



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SHORT SUMMARY

Component quantity tool provides you summary of total project cost with quantity (volume & surface area) calculations of all pavement layers, bitumen, aggregates, soil, concrete, cut/fill earthwork with respect to unit rate inputs.



DETAILED REPORT

Detailed Report gives complete quantity calculations of all pavement components including pavement markings, safety barriers, retaining walls volumes, cut/fill slopes surface area, at desired intervals of start and end chainages.

HORIZONTAL ALIGNMENT REPORT

HorizontalAlignmentArea.xsl HorizontalAlignmentCheckIntegrity xsl HorizontalAlignmentControlLineDataTablexsl HorizontalAlignmentCurveDataTablexsl HorizontalAlignmentCurveSetElementReview.xsl HorizontalAlignmentCurveSetReview.xsl HorizontalAlignmentEventPointListxsl HorizontalAlignmentIntervalXYZ.xsl HorizontalAlignmentLengthxsl HorizontalAlignmentReview.xsl HorizontalAlignmentReviewASCILxsI HorizontalAlignmentReviewWithPl.xsl Horizontal Alignment Station Equations xsl HorizontalAlignmentToTIW-xsl HorizontalAndVerticalAlignmentReview.xsl HorizontalElementsTable xsl HorizontalElementsTableSimplified xsl HorizontalElementsXYZ.xsl HorizontalRegressionPointsNSIews.xsI HorizontalRegressionPointsReview.xsl

VERTICAL & STATION BASE REPORT

VerticalAlignmentCheckIntegrity.xsl VerticalAlignmentIntervalStationElevationi VerticalAlignmentIntervalStationElevationi VerticalAlignmentPointsXY.xsl VerticalAlignmentReview.xsl VerticalAlignmentReviewXSL VerticalAlignmentReviewXY.xsl VerticalAlignmentSightDistanceReview.xsl VerticalAlignmentToTIW.xsl VerticalRegressionLiftsNLowers.xsl VerticalRegressionPointsReview.xsl

StationBaseOffset_IND.xsl StationBaseOffset_Points_XYZ_IND.xsl StationBaseOffset_XYZ_IND.xsl StationOffsetAlignmentReport1.xsl StationOffsetAlignmentReport2.xsl

SUPERELEVATION & EVALUATION REPORTS

SuperelevationCalculation.xsl SuperelevationCrossSlope.xsl SuperelevationData.xsl SuperelevationDesign.xsl SuperelevationStations.xsl SuperelevationToCSV.xsl

CrossSectionGradebookxsl CrossSectionGradebookfromCLxsl CrossSectionGradebookWidexsl EarthworkQuantities:xsl ElementsComponentQuantitiesReportx ElementsComponentQuantitiesReportS EndAreaVolume:xsl MassHaulToTIW:xsl Quantities by Named Boundary Report: SightVisibilityAlternateReport:xsl SightVisibilityReport:xsl TerrainCheck:xsl Volumes:xsl

20 Report Formats

20 Report Formats

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17 Report Formats

3D Drive Through

3D DRIVETHROUGH OF ENGINEERED ROAD MODEL WITH CAMERA CONTROLS

Get 3D look & Feel of

- Embankment Cut/Fill
- Transitions & Tapering
- Intersection Civil Cells
- Pavement Layers
- Pavement Markings
- Crash Barrier (Safety items)
- Typical Cross Sections
- Sight Distance Visionary



3D Engineered Model is developed simultaneously while designing of road

Openroads Designer created 3D Model add value to precision as engineers & modelers can now have a look & feel of highway sections with shoulders, drains, medians, intersections, safety barriers, pavement markings, bridge decks, retaining walls, embankment heights.



QUICK QUESTIONS?

ANSWERS TO SOME MIND TINGLING CURIOSITY

CONCEPT DESIGN AND PROTOTYPE

Can we export designed alignment in Concept Station?	YES
Can we import conceptual alignment from Concept Station?	YES
Can we import 3D terrain mesh from concept to detail design?	YES

DETAILED DESIGN AND DELIVERABLES

Can we import designed centreline from MX Roads & continue?	YES
Can we get customize Plan & Profile Sheets & annotations?	YES
If I change my alignment, will all drawings be updated in one go?	YES

IMPORT & EXPORT COMPONENTS

Can we import terrain mesh from Google Earth?	YES
Can we export reports in excel or any other formats?	YES
Can we publish i-model of our whole design?	YES

FREQUENTLY ASKED QUESTIONS (FAQ)

1. Please provide minimum system configuration for operating ORD for larger models more than 20km road sections at one go.

Ans - There is no limit as such for road length design. Road of any length can be designed in one go. Below is the recommended system configuration.

Operating System	Windows 10 (64-bit) Windows 8 and 8.1 (64-bit) Windows 7 (64-bit)
Processor	Intel® or AMD® processor 1.0 GHz or greater. OpenRoads Designer is not supported on a CPU that does not support SSE2.
Memory	8 GB minimum 16 GB recommended. More memory almost always improves performance, particularly when working with larger models.
Hard Disk	9 GB free disk space (which includes the 5.6 GB install footprint for a complete installation)
Screen Resolution	1600 x 1200 or higher

2. Since multiple users work in a single project, please demonstrate how to split terrain model into smaller files. (Example 20km continuous road corridor to be broken into smaller sections like 1.5km, 3km etc.

Ans - Use the Terrain "Create" Tab group and click on "Additional Methods" and choose "Create Clipped Terrain Model"

3. What is the difference between Edge line method & Sliver method for Triangulation? Which mode of Triangulation is more accurate?

Ans - Remove Slivers - Long, thin triangles are dissolved based on a formula hard coded within the software. Note the Maximum Triangle Side Length is ignored. There are no user defined parameters. **Max Triangle Length**- External triangles whose external edge is longer in length than the user specified distance is deleted. Note the side option does not apply to internal triangles, only those on the edge of the model. Specify the Maximum Triangle Side Length in master units.

4. What is the concept behind keeping terrain and alignments separately in 3D & 2D seed files and how do they coordinate later?

Ans - 3D Seed file - to used when dealing with TERRAIN and SURVEY data ONLY, as these are 3D creations. 2D Seed file - to be used with geometry, corridors, superelevation etc. You create your geometry etc in the 'Default' 2D model, and ORD will look after the 3D world in the model 'Default-3D'.

5. Both Horizontal and vertical alignment design, can it be done based on specific IRC requirement at the time of alignment design itself, instead of checking in the last?

Ans - You can use Geometry Builder tool available under Horizontal and Vertical section of Geometry tab. Or even Table Editor can be used for fixing element attributes prior and then check later with design standards. This will reduce the number of warnings.

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1+465.817	443.66587	289°12'53.6"	30.00000	231648.35262	704108.24883	700.00000	272.05401	50.00000	83°40'22.5"	922.52385
2+626.290	922.52385	263°40'22.5"	0.00000	231776.54118	705264.35705	1000.00000	114.26402	0.00000	90°13'11.2"	1815.06759
4+498.490	1815.06759	270°13'11.2"		231769.35972	707136.60512					

Geometry Builder Window

	Table	Editor	Window
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- 6. Is it possible to develop the existing AutoCAD centerline into alignment design model with geomantic features? If possible pls explain the same.
- 7. Ans You can import geometry with following file extensions directly using Import Geometry in General Tools section of Geometry tab. Yes, any geometry can be imported directly here and then later on assigned a feature definition. Also, we need to switch on/activate "Civil Rule" Feature.

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Z	Import Horizontal Geometry From Ascii Fi	InRoads Geometry Files (*.alg)
Z	Import Horizontal Points From Ascii File	GEOPAK Geometry Files (*.gpk)
Z	Import Vertical Geometry From Ascii File	All Files (*.*)
7	Export Geometry	All Files (*.*) V

8. Is it possible to change the curve features based on Speed modification? pls explain the same.

Ans - Yes, there is a Speed Table Option present under Geometry Tab→ General Tools→ Standards→ Speed Table

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9. I have Horizontal alignment designed in MX Road, the same can it be used for profile design in Open Road?

Ans - Yes of course, horizontal as well as vertical alignment designed in MX can be imported directly using import geometry tool.

10. In both horizontal or vertical geometry design, the straight lines and curves are designed separately, and the continuous alignment is formed connecting these individual units by using complex geometry. Once complex geometry command is applied, is it possible to reverse back to get the alignment with separate lines (other than undo is there any method to drop the complex geometry). For example, in vertical alignment design, I have designed one alignment, the design steps till complex geometry is done. After some time, I have to edit the profile by adding some extra VIPs, so how it can be done.

Ans - Yes of course you can, just break the civil geometry rules by going to context menu and selecting option- "Remove Rule". After removing rule, select back again your centerline which is red in color and simply press delete key on keyboard.



11. For almost every highway project, as far as considered for flexible and rigid pavement, the pavement layers remain almost the same, only the thickness of each layer varies based on requirement. So is there any method to change the layer thickness of all layers all at once without editing in the template control points.

Ans - There is no as such quick way but yes you can use Macros to simply do that. Macros are inbuilt within ORD. Simply record the steps till the point of opening the point properties where you assign the vertical constraint. Make 4 macros for 4 layers.

12. What is "superelevation flag" in template creation?

Ans - Those Points whom you want to participate in Superelevation application like EOP_L, EOP_R and CL, superelevation flag is checked marked for them so that they can be rotated while applying superelevation over corridor and we can see in dynamic cross-section as well.

13. How to create new feature definition for a component?

Ans-We can create а new feature definition by editing our "Features_Annotations_Levels_Elem Metric.dqnlib" Temp file present at C:\ProgramData\Bentley\OpenRoads Designer CE\Configuration\Organization-Civil_Civil Metric\Dgnlib\Feature Definitions. Default Standards Open this file→Goto -Explorer+Openroads Standards + Features_Annotations_Levels_Elem Temp Metric.dgnlib + Feature Definitions→ Mesh→ Right click and select new on required folder. Also assign Feature Symbology in properties.

14. In MX roads, if we hover the mouse point through a string, we can know the X, Y and Z coordinates of all points in a string. In ORD, how can this be done?

Ans - Pls type in quick search box= Label coordinates

15. Default cut and fill slope is explored, please also explain if any modification required of cut and fill slope based on the project requirement.

Ans - Yes, they can be modified as per requirement. Simply double click on the end point of your end condition and define its slope or any other condition like it needs to be infinite or restricted to any horizontal or vertical distance.

16. Please explain one Typical cross section with RE/RET wall at both edge of Carriageway and another one is RE wall/RET wall for the edge of the slope at ROW constrain location.

Ans - Pls use default components→ walls—RE Wall within template creation window

17. How the template will be made for Divided carriageway (median)?

Ans - Please check within default Template library. Under Template→ Rural Divided→ copy this template and paste and rename and make changes as required or make a completely new one

18. How can we create a simple Civil Cell Step by step?

Ans - Model detailing > Place civil cell (We can create our own specific by 'Create civil cell') > Pick civil cell browser > Select > Locate reference element (through road EOP) (main alignment CW's Edge of Pavement) >Locate reference element Secondary Road's CL> Select elements to view (Flow direction as per need) > LC to accept > Intersection will be placed along with it's corridor modelling > Edit.

19. How to generate skewed cs w.r.t skew angle?

Ans - Use 2- Point method for any particular CS at any station or after cutting down the cross section, one needs to rotate those slices or named boundaries.

20. How to create a new drawing seed for a specific sheet size if we are using for the first time and we don't have library files?

Ans - Please refer to Chapter: Workspace Development of OpenRoads On-Boarding Guide v1.0

21. How can we insert different structures in horizontal and vertical profile? Do we need to create separate templates for it?

Ans - If the structures are modelled in 3d and referenced then they will automatically appear, else we need to draft and place them using drawing tools available in Drawing tab or even we can attach them by placing them as cells.

THANK YOU FOR YOUR LEARNING



Prepared For:



Prepared By:

SUCCESS SERVICE TEAM - CIVIL CONSULTANTS INDIA

Key Use

Highway/Road Design Geometrical Design Project Cost Estimates 3D Engineered Model Terrain Modelling (DTM) Automated Plan Profile

Who Can Refer?

Highway Design Engineers CAD Engineers, Students Transportation Professionals Pavement Design Engineers MX Road/Civil 3D Users Quantity & Billing Engineers