



Ferrovial

by **CGS Labs**



BIM-READY RAILWAY DESIGN SOLUTION



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Ferrovia is a professional, BIM ready solution for railway design and rail track analysis compliant with country-specific guidelines. Using its flexible, dynamic data model, it supports BIM workflows and processes, and IFC standardized data format. Ferrovia provides tools for alignment and profile design, detailed cross section design and editing, applied cant, turnouts and rail connections. Alignment and profile regression analysis tools provide users with options for comprehensive rail track realignment and tamping machine guidance capabilities. Carefully designed UI and workflows are consistent with the railway design engineering practice. This makes Ferrovia fast-to-learn and easy-to-use.



TRUSTED MOST
BY DESIGN PROFESSIONALS

FIELDS OF USE

01 DESIGN OF CONVENTIONAL RAIL TRACKS

02 HIGH-SPEED RAIL TRACKS

03 LIGHT RAIL

04 INDUSTRIAL RAIL TRACKS

05 UNDERGROUND RAIL TRACKS

06 METRO RAIL TRACKS

07 RAIL TRACK REALIGNMENT

08 RAIL TRACK REHABILITATION, ETC

REFERENCES



FEATURES

SUPPORT FOR BIM AND IFC

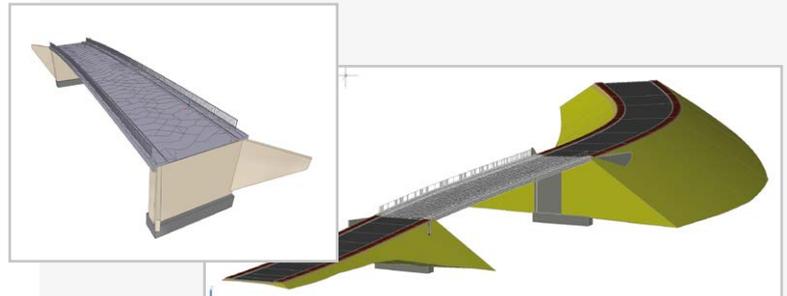
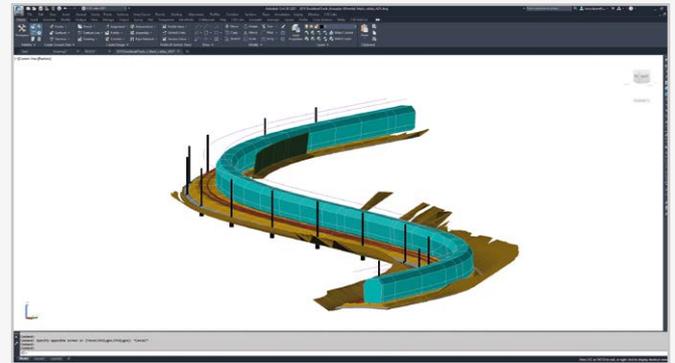
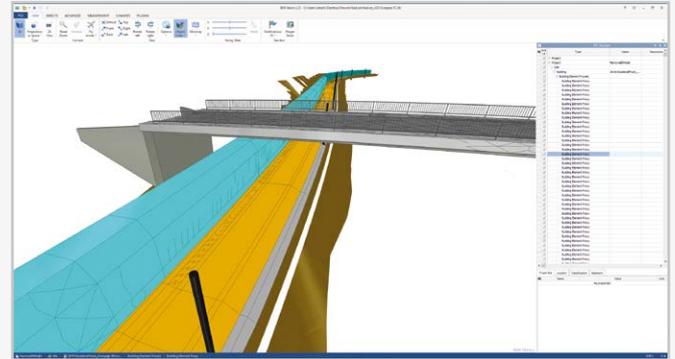


CGS Labs solutions provide extensive BIM data support not limited to CAD platforms in use. 3D roadway, railway or river channel models are generated as detailed 3D solid objects with extended BIM metadata attached to objects, or as multiple surfaces for use with computer guided machines etc.

Ferrovia offers capable Property Manager for adding and changing 3D solids property data, which enables COBie (Construction Operations Building Information Exchange) compatibility.

Ferrovia 3D models and attribute data can be exported to IFC files. IFC export format is regularly updated according to buildingSMART International specifications.

Clash detection tool enables designer to search for possible collisions among selected 3D solid objects within the drawing itself thus saving the time to export models and create clash analysis in third party applications outside CAD environment.

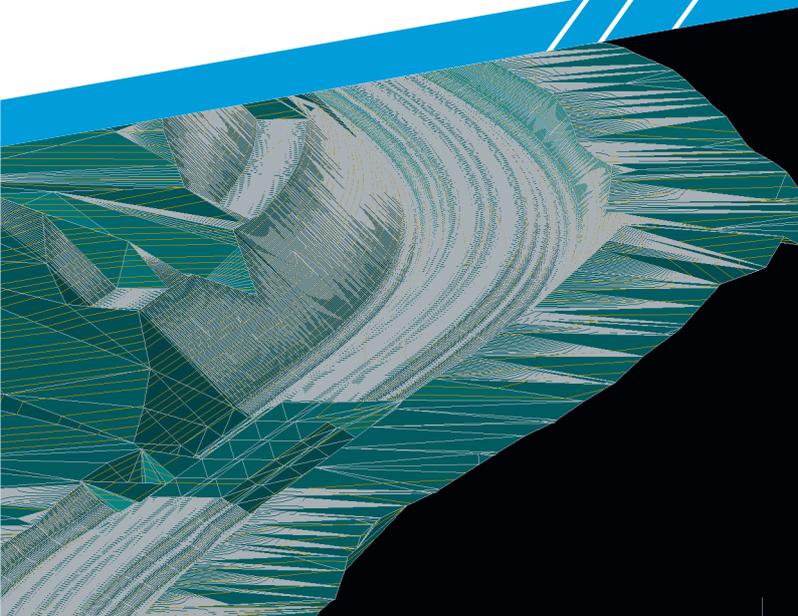


URBAN & SITE DESIGN

DIGITAL TERRAIN MODELING

The Surface creation tool is included in CGS Labs software to produce detailed Digital Terrain Model (DTM) based on various surveys or other input data: total station data files, points, break lines, blocks, etc.

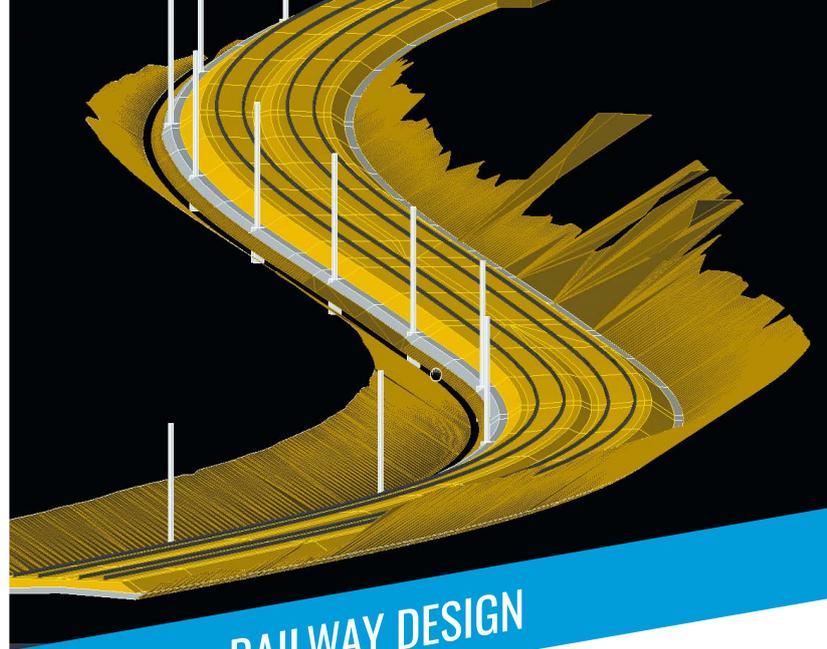
This offers the possibility to use Ferrovia on plain AutoCAD or BricsCAD. Civil 3D surfaces are supported automatically in Ferrovia.



GRADING

Creation of complex slopes with multiple conditions in cut or fill gives users the capability to cover various design scenarios and geometry requirements for all kind of road projects, from simple forest road design to complex intersection geometry design.

Furthermore, creating ponds, parking areas, platforms, road, rail tracks, river channels, and other features is easier and faster with CGS Labs grading functionality.

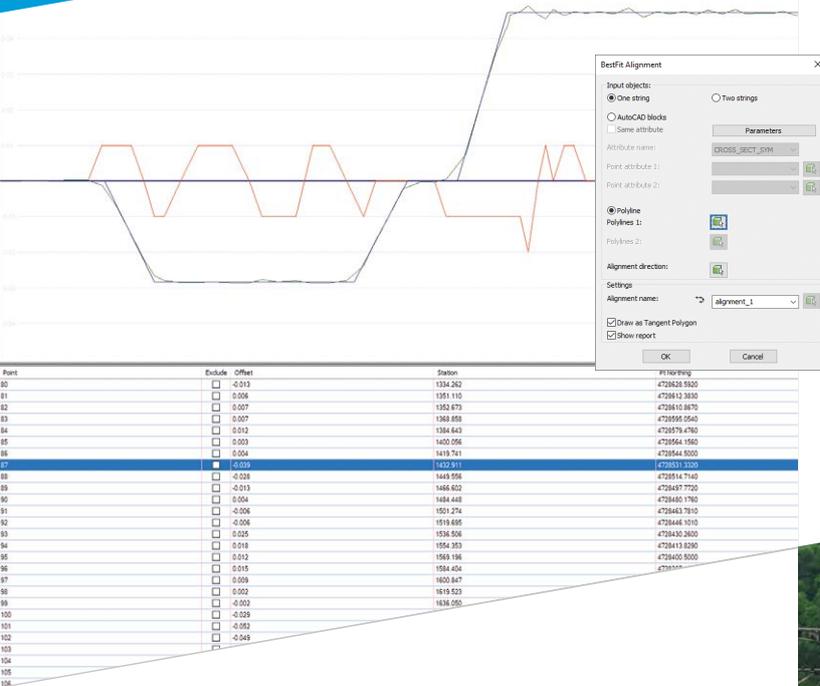


RAILWAY DESIGN

RAILWAY GEOMETRY DESIGN TOOLS

Ferrovia provides a wide set of advanced alignment, profile geometry design, and editing tools. They include P(V)I design, floating and fixed elements design, parallel alignment design, and alignment design created from the existing polyline, or ultimately creating a best-fit alignment based on existing rail track survey data.

Various alignment labeling, reports, and data export options provide the flexibility needed to cover a wide range of user requirements.



TRANSITION CURVES

Ferrovia supports a number of linear and nonlinear transition curves: Clothoid and a range of cubic parabolas, including; cubic parabola, modified cubic parabola, Czech parabola and Romanian parabola Imbonatitita.

Supported nonlinear parabolas include sinusoidal, Cosines, Bloss and S-curve parabola.

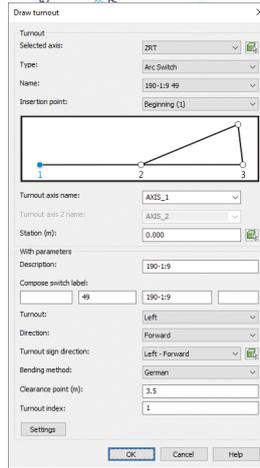
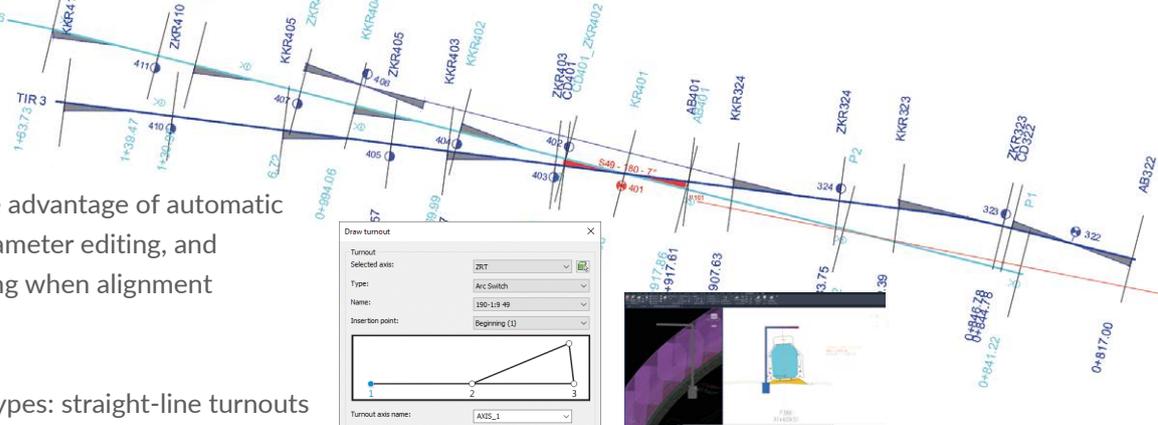
Transition curves apply uniformly to horizontal transition curves and to cant gradients areas.



TURNOUTS

In turnout design you can take advantage of automatic turnout insertion, turnout parameter editing, and automatic turnout repositioning when alignment geometry changes apply.

Included are various turnout types: straight-line turnouts (non-transformable), curve turnouts, symmetrical, and turnout crossings. Alongside predefined turnout geometry, a turnout catalogue provides users with the ability to edit or add custom geometry turnouts. Turnout reports provide the user with the tools to list turnout parameters and values in turnout tables, either in drawing or in external table files.



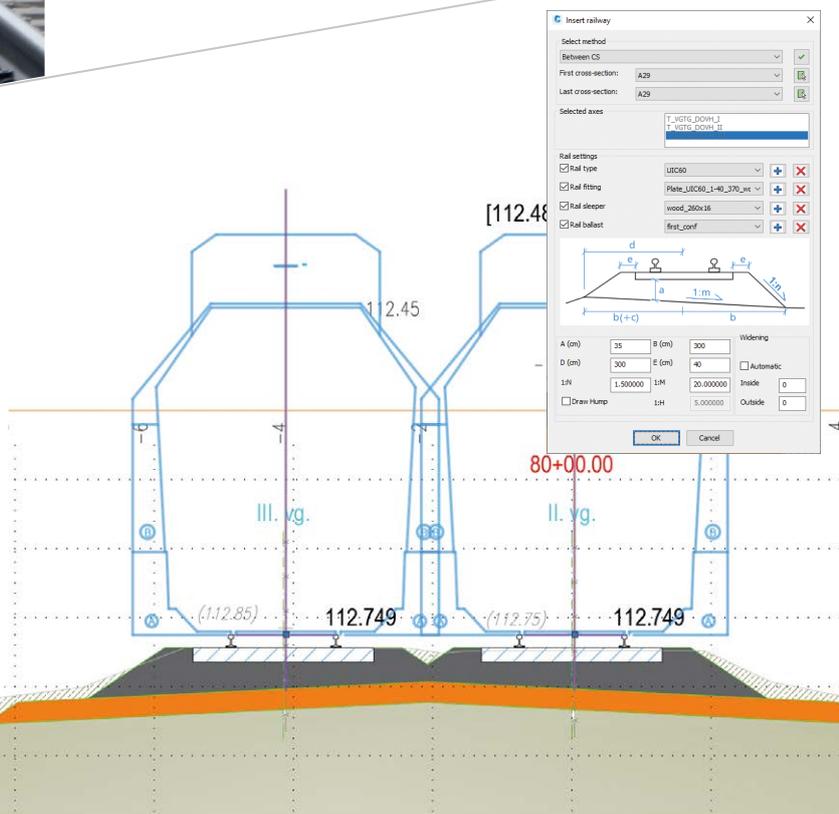
RAIL CONNECTIONS

Create rail connections interactively between parallel or non-parallel rail tracks in tangent or in curve with the geometry preview option.

Having the advantage of using the same or different turnout types for rail connection gives users a wide range of geometry options to fit rail connections within constraint areas and limited design possibilities. Detailed design and editing of vertical connections in profile view add value to the comprehensive yet comfortable use of Ferrovial rail connection tools.

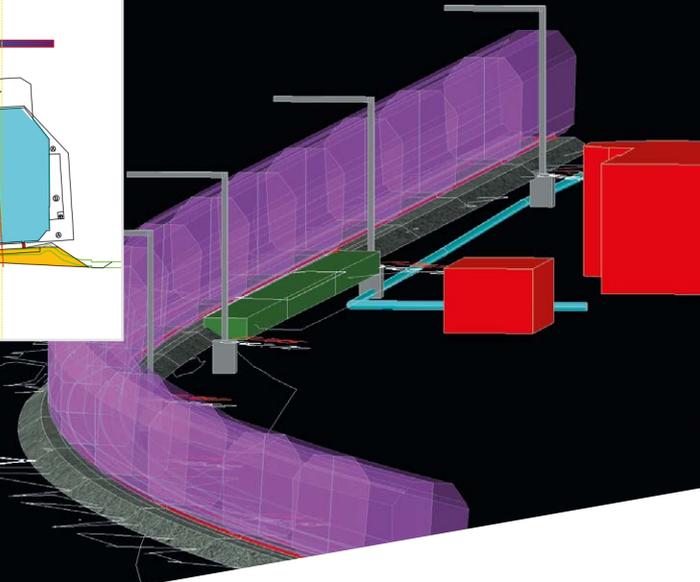
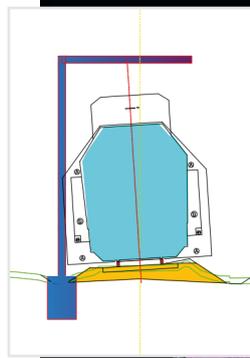
DETAILED CROSS SECTION DESIGN AND EDITING

Ferrovial makes it possible to design and edit rail track cross sections in a detailed way with almost no geometry limitations to the final project design. Adding multiple rail tracks to a single cross section gives users control over the geometry between various rail tracks, rail tracks and roads or other infrastructure objects your project requires, and lets you define these areas with great accuracy and detail.



3D SURFACE AND 3D SOLID MODEL

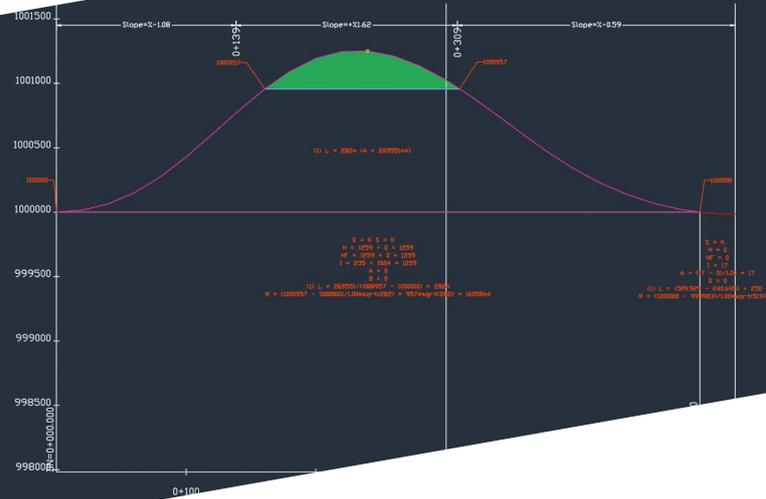
Rail track 3D models can be created as a 3D surface or 3D solid model. 3D rail track surface models can be generated automatically from 3D rail-track cross-section geometry and terrain model, or it can be built with the grading function. The 3D solid model is created based on cross-section areas, where materials and volumes can be defined as extended data. With 3D solid tunnels, bridges and similar objects can be represented as well. Solid objects can be aligned with arcs and transition curves. All solid models, including extended data, can be imported into Autodesk InRoads, Navisworks and then used in various BIM workflows.



QUANTITY TAKE-OFF (QTO)

Ferrovia calculates material quantity take-off and features a QTO data export tool with custom defined Pay Item (Bill of Materials) options. It gives users the possibility to link material defined in the drawing with a material database in cost estimate software, thus supporting digital data transfer and fast cost recalculation when project changes arise.

Dist.	[M]	Dist.	[M]	Dist.	[M]	Dist.	[M]
P1	0+0.00	0.000	0.000	0.000	0.000	0.000	0.000
P2	14.100	24.855	14.390	0.000	0.000	134.400	14.390
P3	0+20.00	3.451	0.000	0.000	18.692	4.277	0.000
P4	20.000	68.900	20.000	0.000	0.000	118.054	5.610
P5	0+40.00	3.439	0.000	0.000	12.663	4.276	0.000
P6	20.000	69.617	20.000	0.000	0.000	229.750	20.000
P7	0+60.00	3.522	0.000	0.000	10.274	4.279	0.000
P8	20.000	70.516	20.000	0.000	0.000	212.873	20.000
P9	0+80.00	3.529	0.000	0.000	13.823	4.186	0.000
P10	20.000	102.005	20.000	4.355	20.000	316.247	20.000
P11	0+100.00	6.677	0.436	0.000	18.081	4.196	0.000
P12	20.000	119.770	20.000	9.575	20.000	316.780	20.000
P13	0+120.00	6.700	0.541	15.875	0.000	4.230	0.000
P14	3.980	27.081	3.980	1.945	3.980	47.354	3.980
P15	0+125.00	6.669	0.436	0.000	17.728	4.244	0.000
P16	16.820	189.782	16.820	8.521	16.820	174.422	16.820
P17	0+140.00	6.662	0.436	0.000	17.057	4.243	0.000
P18	20.000	135.716	20.000	24.300	20.000	302.824	20.000
P19	0+145.00	6.669	0.436	0.000	17.245	4.243	0.000
P20	20.000	133.192	20.000	27.741	20.000	309.535	20.000
P21	0+150.00	6.570	0.524	0.000	13.960	4.243	0.000
P22	20.000	102.129	20.000	9.340	20.000	232.317	20.000
P23	0+160.00	3.543	0.000	0.000	12.423	4.243	0.000
P24	20.000	69.613	20.000	0.000	0.000	218.540	20.000
P25	0+120.00	3.398	0.000	0.000	12.431	4.243	0.000
P26	20.000	67.971	20.000	0.000	0.000	305.895	20.000
P27	0+140.00	3.399	0.000	0.000	18.879	4.242	0.000
P28	20.000	67.975	20.000	0.000	0.000	426.793	20.000
P29	0+160.00	3.399	0.000	0.000	21.599	4.237	0.000
P30	20.000	122.878	3.400	0.000	81.761	3.400	0.000
P31	0+165.48	3.543	0.000	0.000	23.879	4.242	0.000
P32	16.520	57.342	16.520	0.000	0.000	394.175	16.520
P33	0+160.00	3.399	0.000	0.000	26.442	4.239	0.000
P34	20.000	68.115	20.000	0.000	0.000	532.280	20.000
P35	0+160.00	3.432	0.000	0.000	26.586	4.189	0.000
P36	20.000	68.365	20.000	0.000	0.000	581.281	20.000
P37	0+120.00	3.424	0.000	0.000	25.542	4.189	0.000
P38	20.000	68.087	20.000	0.000	0.000	420.811	20.000
P39	0+140.00	3.436	0.000	0.000	20.541	4.176	0.000
P40	20.000	68.843	20.000	0.000	0.000	483.981	20.000
P41	0+160.00	3.448	0.000	0.000	19.849	4.176	0.000
P42	13.870	45.112	13.870	0.000	0.000	264.243	13.870



MASS HAUL DIAGRAM

Mass haul diagram presents a graphical view of the material moved in the proposed design site. Mass haul diagrams help designers and contractors understand where gross material movements occur and compare the economies of alternative designs.

ROAD DESIGN TOOLS

Road design tools are included in the Ferrovia Ultimate 4D software suite to provide users the tools they need to design roadways and rail tracks within the same project: Road-railway intersections for example, underpasses/overpasses, rail track construction access roads, side by side road/railway design, urban roads with tram lines, and more.



RAIL TRACK MAINTENANCE / REALIGNMENT (RTM)



HORIZONTAL AND VERTICAL REGRESSION ANALYSIS

Ferrovia provides advanced and comprehensive technology for alignment and profile regression analysis and geometry optimizations options. Based on various input survey data and multiple editable parameters, alignments with appropriate transition curves are generated automatically, giving users the possibility to create realignment projects of any scale. Single regression elements are supported as well.

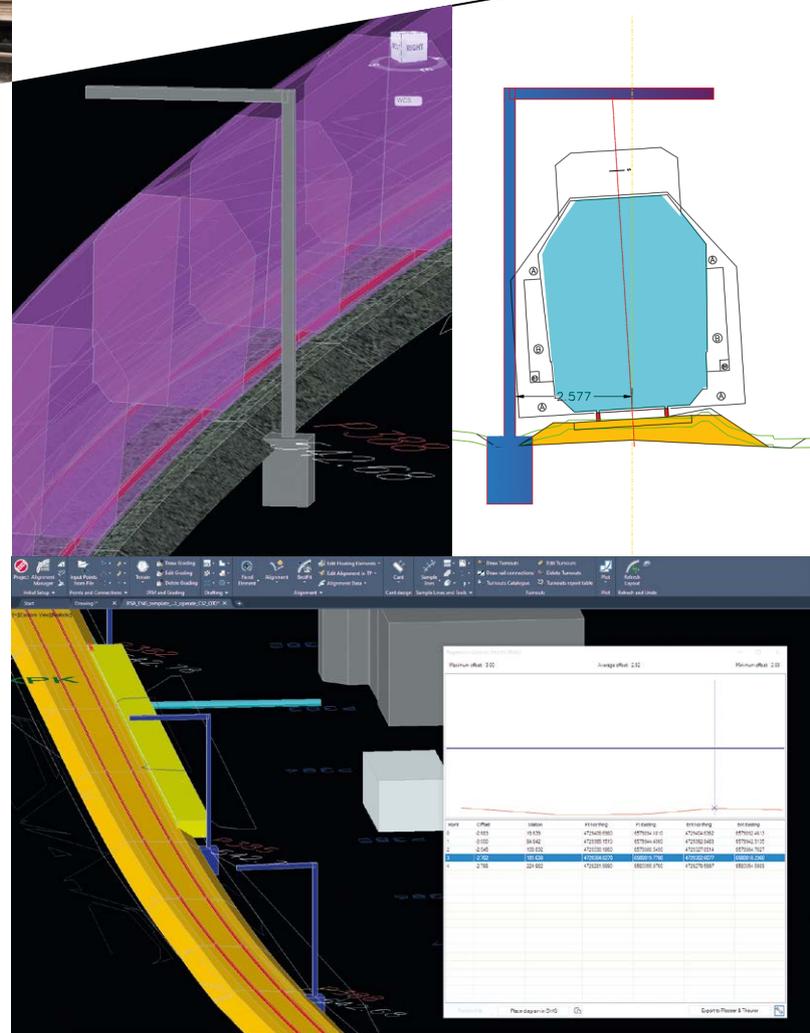
Options for converting surveyed rails to centerline review and edit regression points with point exclusion or inclusion in regression analysis lead to significant improvements in alignment or profile best-fit geometry.

Multiple diagram options give users detailed information on curvature, transition areas, applied cant, and slew. All regression data is dynamically updated when changes occur.

SIDE-TRACK OBJECTS OFFSET ANALYSIS AND INSURANCE DATA CALCULATION

The side-track objects offset analysis tool give designers the tools to inspect any objects position alongside any alignment investigated in order to get offset data from side track masts, platform edges, retaining walls, tunnel contour, side track or road edges, etc.

For rail track realignment purposes insurance values can be calculated between fixed side objects (like overhead power line masts for example) and surveyed rail track position data in order to get absolute track layout data.



SUPPORT FOR GOOGLE EARTH AND GOOGLE MAPS



GOOGLE MAPS & GOOGLE STREET VIEW

Google Maps Import makes it easy to import raster images and elevation data of a selected location from Google Maps into a DWG drawing in the selected coordinate system.

Google Street View functionality is also available to allow the user to view the selected area interactively within the CAD environment.



GOOGLE EARTH EXPORT

The Ferrovía BIM (3D solid) road infrastructure model can be quickly visualized directly into Google Earth. This allows us to present the project in an environment that enables the user to have exceptional visual performances.

GENERAL FEATURES

SUPPORTED LANGUAGES

- ✓ English
- ✓ Czech
- ✓ Hungarian
- ✓ Serbian
- ✓ Austrian German
- ✓ German
- ✓ Polish
- ✓ Slovenian

SUPPORTED CAD PLATFORMS

CGS LABS software runs on top of 2018–2024 versions of Autodesk AutoCAD and Civil 3D as well as BricsCAD Pro, BIM and Ultimate V21 to V23. AutoCAD LT and BricsCAD Lite are not supported! Only 64-bit versions are supported!



Bricsys® Application Partner
part of Hexagon



VERSIONS

	ULTIMATE	PRO	STANDARD
Survey data import	✓	✓	✓
Digital terrain modeling tool (CGS Labs DTM)	✓	✓	✓
3D Grading	✓	✓	✓
Support for Civil 3D in BricsCAD surface	✓	✓	✓
Alignment design	✓	✓	✓
Profile design	✓	✓	✓
Cross sections design	✓	✓	✓
Turnouts design	✓	✓	✓
Linear and nonlinear transition curves	✓	✓	✓
3D Railway modeling	✓	✓	✓
Points, lines and 3D solids projection to Profile View & Cross Sections Views	✓	✓	✓
Labeling and dimensioning tools	✓	✓	✓
Quantity Take-off & Mass Haul diagrams	✓	✓	✓
Interface for Civil 3D objects <-> Ferrovia	✓	✓	✓
Regression alignment and profile design (Best-Fit)	✓	✓	✓
Regression alignment and profile analysis and editing	✓	✓	✗
Rail Connections design	✓	✓	✗
Side-Track Objects Offset Analysis and Insurance Data Calculation	✓	✓	✗
Support for Plasser&Theurer tamping machinery	✓	✓	✗
Support for 3D solid objects	✓	✗	✗
Import of Google Maps geospatial data in CAD drawing	✓	✗	✗
Road design tools	✓	✗	✗
BIM object property tools (manager/editor/filter)	✓	✗	✗
3D/BIM object clash analysis within AutoCAD, Civil 3D, and BricsCAD	✓	✗	✗
Import/Export LandXML data	✓	✗	✗
Import/Export 3D/BIM model to IFC 4.2 data format	✓	✗	✗
Export 3D railway model to Google Earth	✓	✗	✗

ABOUT CGS LABS

Laboratory of ideas, a software company engaged in the digitization of built and the natural environment.

CGS Labs is innovative software company with more than 30 years of experience developing solutions for the design, construction and maintenance of transportation infrastructure. Our applications promote openBIM approach and standardized IFC data exchange. We contribute to greater transparency, quality and cost-effectiveness of construction projects and support sustainable decisions.

01 SOLUTIONS FOR THE DESIGN OF CIVIL INFRASTRUCTURE

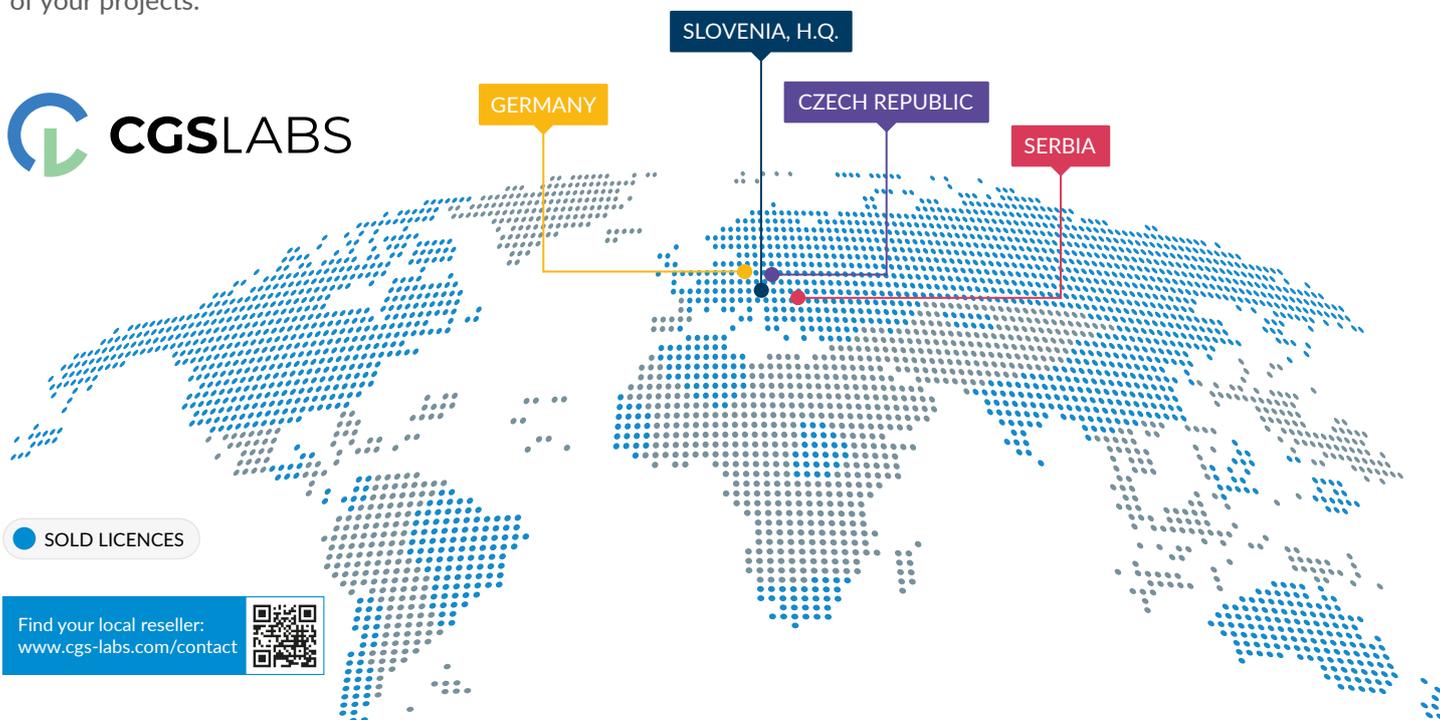
CGS labs develops specialized software solutions for the design of roads (Plateia, Autopath, Autosign), railways (Ferrovia) and channel - river engineering works (Aquaterra). Our software solutions incorporate local design standards.

02 CUSTOMER CARE & EDUCATION

We are not just a software vendor! Our goal is to successfully integrate CGS Labs solutions into your design processes. Our engineers help you get to the highest experience level for the use of CGS Labs software. Besides the always accessible on-line knowledge base, we organize traditional live customer trainings, as well as trainings per customer request, where we discuss selected topics according to the specific requirements of your projects.

03 TECHNICAL SUPPORT

Complete customer satisfaction is very important to us. If any problems should arise while using CGS Labs software, our team of experts is there to assist you, so your design process runs with minimum interferences or delays.



Find your local reseller:
www.cgs-labs.com/contact



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