



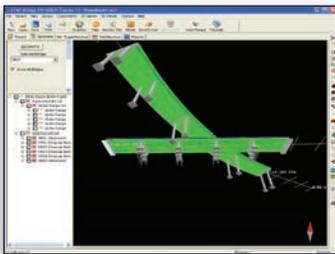
Key Components

- LEAP GEOMATH
- LEAP CONBOX
- LEAP CONSPAN
- LEAP RC-PIER

LEAP® Bridge Enterprise

Integrated Analysis and Design of Concrete Bridges

LEAP Bridge Enterprise is a powerful modeling and analysis solution for small to medium concrete bridges of all types: precast, cast-in-place, reinforced, and post-tensioned. This comprehensive *bridge information modeling* (Brim) system offers a synthesis of geometric modeling, substructure and superstructure analysis and design, and load rating in a single, information-rich environment. Intelligent data management, parametric modeling, and automated drawing production revolutionize the bridge delivery process.



Work with multiple bridge models and data.

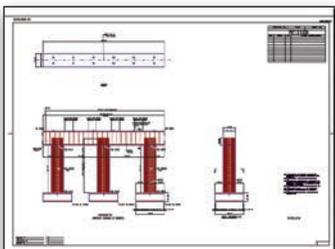
All-in-One BrIM Solution Accelerates Performance

Innovative analysis, design, and load-rating functionality come together in one advanced environment in LEAP Bridge Enterprise. The direct exchange of project information – including bridge geometry, materials, loads, prestressing strand pattern, and shear reinforcement – helps users improve decision making for design and construction while connecting and enhancing workflow processes.

From a single interface, users tap into the full power of four specialized modules that share a common information model:

- LEAP® GEOMATH® – Parametric bridge layout and design
- LEAP® CONBOX® – Analysis, design, and load rating for post-tensioned (PT) and reinforced concrete box girder, T-beam, and slab bridges
- LEAP® CONSPAN® – Analysis, design, and load rating for simple- and multi-span precast and prestressed concrete bridges
- LEAP® RC-PIER® – Analysis and design of reinforced concrete abutments, piers, and foundations

LEAP Bridge Enterprise offers seamless parametric bridge modeling and substructure and superstructure analysis in one integrated offering. A central project database ensures that bridge data is always accurate and up to date.



Generate production drawings in DGN and DWG formats.

The resulting information provides a rich data asset for as-built documentation, maintenance, and operations. When combined with Bentley tools for user collaboration and project data management, LEAP Bridge Enterprise becomes an ideal solution for professional bridge organizations, construction teams, maintenance and inspection crews, and bridge owner-operators. The software easily handles the vast majority of the bridges built today, making it the choice of bridge professionals worldwide.



Used by more than 1,800 bridge engineers worldwide, LEAP Bridge is developed by engineering professionals with expert knowledge of code specifications and design methodologies.

Design-to-Spec Ensures Code Compliance

LEAP Bridge Enterprise automates design-to-specification for U.S., Canada, or India bridge design codes to ensure compliance with mandated practices. The software is delivered for the user's choice of international design codes:

- American Association of State and Highway Transportation Officials (AASHTO) specifications:
 - » AASHTO Standard (LFD: Load Factor Design)
 - » AASHTO LRFD (Load Resistance Factor Design)
 - » AASHTO LFR (Load Factor Rating)
 - » AASHTO LRFR (Load & Resistance Factor Rating)
- Canadian Highway Bridge Design Code (CHBDC) specifications
- Indian Road Congress (IRC) bridge design specifications

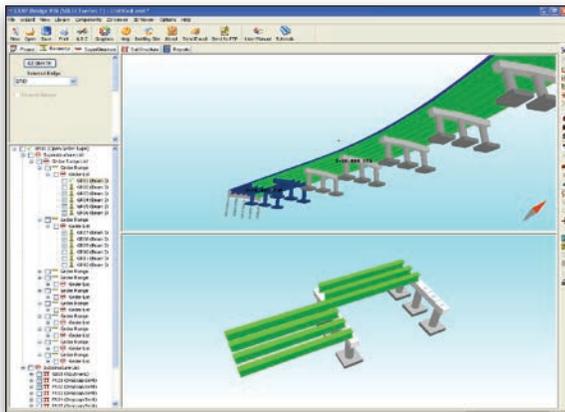
The system has the flexibility to mix and match design and rating methodologies for verification. For example, users of the U.S. version can switch between LFD/LFR and LRFD/LRFR specifications.

Data Reuse Saves Time and Reduces Errors

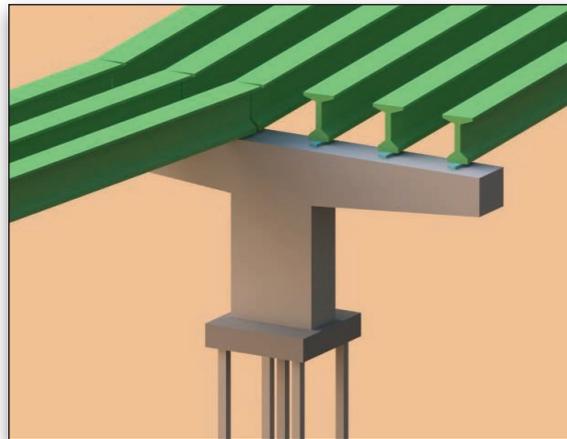
Reuse of data helps users improve productivity as it eliminates the initial time wasted on data entry and reduces operator error – particularly as design modifications are made and changes need to propagate throughout the entire bridge structure. Engineering professionals are able to focus on complex engineering issues and perform more analyses and code checks to refine their designs. Users can define detailed alignment, profile, and cross-section information or directly obtain civil data from GEOPAK®, Bentley InRoads®, and MXROAD®. Import of roadway information and ground data from LandXML files is also available.

ABC Wizard Speeds Bridge Definition

The Automated Bridge Creator (ABC) wizard helps users quickly define superstructure and substructure geometry and specify



Use the integrated suite of LEAP modules via one GUI.



Use powerful visualization features to visually verify bridge models.

material properties. The software automatically generates full bridge models, enabling users to focus on analysis and design procedures. Users can define the superstructure as prestressed girders, cast-in-place (CIP) reinforced and PT box girders, T-beams, or slabs. The substructure can be integral, drop-cap, tapered, inverted-T pier cap, or hammerhead type piers, with spread, pile, drilled shaft, or well foundation (India version) footings.

2D/3D Visualization Enhances Model Verification

Powerful visualization capabilities enable users to rapidly verify modeling input as they work. The bridge is viewed in profile, elevation, and cross-section views. Solid and transparent viewing options aid in the exploration of areas with complex geometry. The software also produces 2D views of superstructure and substructure components, with dimensions, which can be saved in DGN or DXF formats for production of preliminary drawings.

The 3D Viewer lets users view superstructure and substructure in 3D detail – down to the reinforcement design. Longitudinal reinforcement, shear reinforcement, and PT-Tendons are shown for box girder bridges. Prestressing strands, deck longitudinal, and transverse reinforcement and stirrups are shown for precast girder bridges. Flexural and shear reinforcement in cap, all reinforcement in columns, and flexural and temperature/shrinkage reinforcement in footings are shown for substructure elements. Users can specify the construction sequence and view a time-lapse construction animation.

Unified Database Ensures Project Consistency and Accuracy

All project information is recorded and stored in a LEAP Bridge database. This unified database facilitates the software's parametric design capabilities as well as the

exchange of data with other BrIM-enabled solutions. Changes to the design trigger updates throughout the project, eliminating the need to make multiple, time-consuming corrections to all project components.

Integrated Design and Analysis Streamlines Workflow

LEAP Bridge Enterprise provides a unified environment for the design of superstructure and substructure. It delivers accurate and efficient solutions for pier and abutment design, automating layout, analysis, and design of integral/monolithic piers as well as stem wall or pile cap abutments. Results from superstructure analysis are taken directly to the substructure model.

BrIM and LandXML Compliance Offers Direct Data Exchange

LEAP Bridge Enterprise uses BrIM technology to directly communicate with other Bentley solutions, including MicroStation®, Bentley InRoads, GEOPAK, MXROAD, and more. In addition, LEAP Bridge Enterprise is LandXML registered and certified, enabling users to directly exchange information such as horizontal alignments, vertical alignments, cross sections, and roadways with other applications that support LandXML.

Project Information Management Protects Data Assets

LEAP Bridge Enterprise can be a data command center for your bridge projects. Reciprocal data exchange provides not only a seamless mechanism for information modeling, but also ensures the reuse and preservation of critical bridge information.

Drawing and Reporting Tools Automate Deliverables Production

A drawing tab automates the generation of drawings based on the final designs created using the LEAP CONSPAN and LEAP RC-PIER modules. Drawings can be generated in MicroStation DGN format. User options are also provided for specifying border templates and symbology – commonly defined as *.dgnlib by most U.S. state departments of transportation. Report generation options make easy work of publishing project information. Reports can be printed, saved as HTML files, or exported to spreadsheets.

AASHTOWare Integration Boosts Project Startup

LEAP Bridge Enterprise is integrated with the AASHTO BRIDGEWare database to ensure easy reuse of information and eliminate data entry that can take precious time.



BRIDGE INFORMATION MODELING



BrIM: A Synthesis of Planning, Engineering, Design and Construction

With the integrated process of LEAP Bridge Enterprise, users synergistically develop a precise bridge data model that improves overall project accuracy and consistency. The results provide important information that proves to be a useful asset, not just for the design phase but also for the life of the bridge.

This synthesis of bridge information development can carry through all the project phases, from conception to detailed design, design to fabrication and manufacturing, and construction to operations. BrIM is a practice that endeavors to enable any person requiring information about a given bridge to access and reuse information relevant to his or her purpose during the lifecycle of the infrastructure.

For example, a structural detailer can access rebar information, a bridge modeler can extract key design measurements, and a road design engineer can access the exact geometry and position of the bridge deck from accurate as-built information. Moreover, bridge owners can access historical trending, traffic analysis, and cost information along with physical models of the infrastructure for capital project planning.

System Requirements

Software

Microsoft .NET Framework 3.5 or higher

Processor

1 GHz 32-bit (x86) or higher

Operating System

Microsoft Windows 7, Windows XP

Memory

1 GB recommended

Disk Space

1 GB recommended

Input Device

Mouse

Find out about Bentley at: www.bentley.com

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Outside the US +1 610-458-5000

Global Office Listings

www.bentley.com/contact

Integrated Bridge Solution Improves Project Delivery

Bentley is committed to providing tools that help engineering professionals design and deliver high-quality, sustainable infrastructure. LEAP Bridge is a major offering within the Bentley bridge solution, which also includes world-class applications for road design, digital terrain modeling, bridge design, structural engineering and analysis, steel and concrete reinforcement detailing, and bridge load rating and analysis.

LEAP Bridge is compatible with ProjectWise®, Bentley's platform for connecting people and information across project teams.

Running LEAP Bridge with ProjectWise and/or ProjectWise® Navigator, users are able to perform a synthesis of *bridge information modeling*, continuously sharing, reusing, and repurposing data. They enjoy the many benefits of real-time collaboration and streamlined engineering content management – working across multiple locations and time zones, among numerous contributors, companies, and stakeholders. Users of the Bentley bridge solution enjoy the full benefits of a real-world solution for delivery, maintenance and operation of bridge systems – improving ROI in data at every step of the bridge lifecycle.

LEAP® Bridge Enterprise At-A-Glance

Ease of Use

- Intelligent graphical user interface
- U.S. customary and metric (SI) units
- Comprehensive 3D bridge models
- 2D views, with dimensions
- Graphical feedback of input data
- Customizable libraries
- Text and graphical report formats
- Automated bridge creation (ABC wizard)

Intelligent Concrete Design

- Precast, prestressed girder
- CIP and PT box girder
- CIP and PT T-beam
- CIP and PT slab
- Multi-column piers
- Hammerhead piers
- Drop-cap piers
- Integral piers
- Stem wall and pile cap abutments
- Spread and combined footings, raked and straight piles, drilled shafts, and well foundation (IRC)

Structural Analysis Options

- Strut-and-tie modeling (U.S. version)
- Single girder or whole-width analysis
- Prestress loss calculation by code equations

- Thermal load analysis

- Prestress loss calculation by time-dependent specs (LFD and LRFD; CHBDC)
- Live load distribution factors (LFD and LRFD; CHBDC)
- Live loading and load combinations (LFD and LRFD; CHBDC; IRC)

Design Code Checks and Load Rating

- AASHTO Standard
- AASHTO LRFD
- U.S. States: Florida and California
- CHBDC
- IRC
- AASHTO LFR and LRFR load-rating checks

Powerful Modeling and Visualization Tools

- Solid and transparent views of reinforcement
- Multi-bridge capabilities
- Roadway information and ground data import
- 2D and 3D viewing: full bridge and individual components
- Ground and relative location of roadway and bridge
- Construction animation

Versatile Reporting Options

- Reports on full bridge or its components
- Copy/Paste to Microsoft Word
- Options to print preview or save in HTML formats
- Export to Microsoft Excel
- Customization with company logo and information

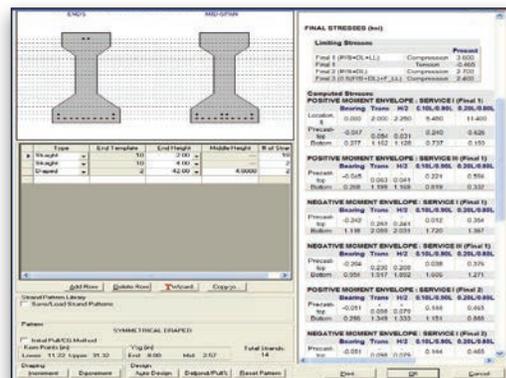
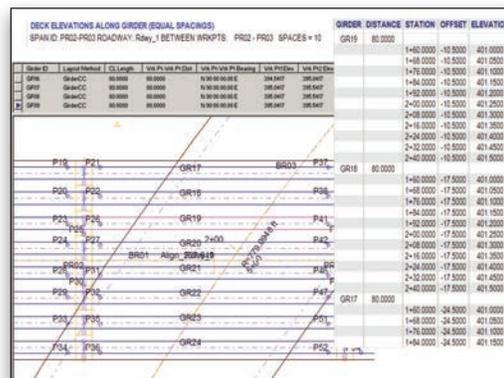
Automated Drawing Generation

- DGN and DWG drawings
- Plan and elevation drawings
- Bridge framing plans
- Precast, prestressed concrete girders
- Piers

Integration with Other Software

- Direct data exchange with other Bentley solutions, including MicroStation, GEOPAK, Bentley InRoads, MXROAD, and more.
- AASHTO BRIDGEWare database
- File formats: DGN, DXF, XML, and LandXML

For more information, visit: www.bentley.com/LEAP



Calculate finished deck elevations at tenth points along girders.

Automatically create strand patterns and analyze stresses.