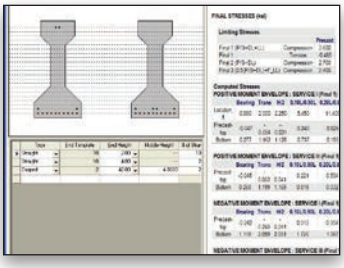
PRODUCT DATA SHEET

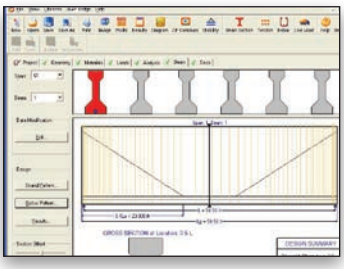
LEAP® CONSPAN®

Analysis, Design, and Load Rating of Simple- and Multiple-Span Precast and Prestressed Concrete Bridges

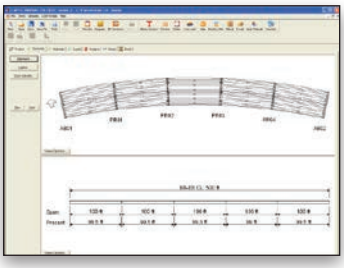
Powerful, efficient, and accurate, LEAP CONSPAN is a proven design, analysis, and load rating application for simple- and multiple-span precast, prestressed concrete bridges. LEAP CONSPAN offers flexible parametric modeling and seamless conformance to industry standards and specifications. Part of the LEAP Bridge Enterprise system, LEAP CONSPAN® integrates with LEAP GEOMATH®, LEAP CONBOX®, and LEAP RC-PIER® to provide a powerful bridge information modeling (BrIM) solution.



Automatically generate strand patterns and analyze stresses.



Comprehensive beam design includes automatic shear reinforcement generation.



Model complex flared girder geometry, including roadway alignment, support, and cross section layouts.

Integrated BrIM Solution Accelerates Concrete Bridge Design

LEAP CONSPAN is a specialized module of the industry-leading concrete bridge design solution, LEAP Bridge Enterprise. With this comprehensive system, bridge professionals are able to design the bridge in a whole-structure context, using a single, integrated application. Users enjoy synchronous access to bridge data and functionality – geometry, substructure, and superstructure analysis, design, and load rating.

Design-to-Spec Ensures Code Compliance

LEAP CONSPAN supports the following international bridge design codes to ensure compliance with mandated practices:

- 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

Parametric Design Streamlines Process

LEAP CONSPAN gives users flexibility and easy control over many functions and parameters of design. A powerful drawing editor enables users to create and compute beam cross-section properties quickly and accurately. Intuitive, single-entry input of design data saves time and ensures accuracy. Parametric design features support unlimited spans and beams and multiple beam cross-sections along spans. Automated design defaults are easily modified to suit local requirements.

Comprehensive Girder and Deck Design Improves Accuracy

The application delivers a built-in beam library containing standard-specified I-girders, bulb tees, box beams, double tees, single tees, rectangular beams, and more. Users can add custom cross sections to the beam library. Distribution factors, dynamic load allowances, allowable stresses and other parameters are established during the design of individual beams. Two design methods are available for bridge deck design: the Empirical Design Method and the traditional Strip Design Method.

Strand Pattern Generation Offers Advanced Options

The user can specify the strand patterns and debonding/shielding schemes, or LEAP CONSPAN will automatically generate them. Debonded strand limits are user-specified. Strand types include stress-relieved and low-relaxation. Strand patterns can be straight, draped, or a combination. Strands can be specified using the graphical user interface. Auto-generation capabilities are provided for shear reinforcement. LEAP CONSPAN also offers options to use transformed strand and rebar section properties.

Analysis Options Enhance Results

Users can model and analyze a bridge as a simple span, a series of simple spans, or simple for self weight and continuous for all superimposed dead loads and moving live loads. Composite and noncomposite dead loads can also be defined. LEAP CONSPAN maintains predefined LFD and LRFD live loads. It also allows users to define custom live-load specifications, limit states, load factors, and modifiers.

Advanced Geometry Layout Handles Complex Designs

Using flared girder geometry, users can define and analyze advanced/true geometry of bridges with non-parallel beams, varying start and end skews for spans, and beams with varying lengths in the same span – along straight or curved alignments.

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
Minimum of 512 MB, but more is recommended

Disk Space
200 MB

Input Device
Mouse

Find out about Bentley at: www.bentley.com

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Refined Distribution Factors Provide Flexibility

LEAP CONSPAN uses code-specified default distribution factors. It also delivers a powerful grillage-based option for computing refined distribution factors for many geometry configurations and visualizing distribution factors contours for the entire bridge. Users can also input custom distribution factors.

Comprehensive Engineering Functionality Improves Accuracy

Users can check service-load stresses against allowable limits. Factored positive moments and shears are checked against the ultimate strength capacity. LEAP CONSPAN can design mild reinforcement in the deck slab and also compute negative and positive moment reinforcing over the piers. Code criteria – cracking moment, horizontal shear, and anchorage-zone reinforcement – are calculated automatically.

Load Rating Provides Comprehensive Results

LEAP CONSPAN performs load rating of prestressed concrete bridge beams according to the AASHTO Manual for Condition Evaluation of Bridges (LFD) and the AASHTO LRFR Manual. The Vehicle Library provides a list of predefined trucks, and users can define their own rating vehicles. Comprehensive results are available for nominal flexural and shear strengths, as well as stress checks. In addition, the program supports California and Florida specifications. Other commonly used default values are easily customized.

Database Support Enhances Industry Integration

LEAP CONSPAN reads and writes information related to bridge geometry, materials, prestressing strand pattern, and shear reinforcement to and from user-specified bridges in AASHTOWare's Virtis/Opis systems.

Flexible Tools Improve Project Reporting

LEAP CONSPAN presents analysis results in a variety of easy-to-understand formats, from a one-page summary to comprehensive project reports. Analysis results and graphical sketches can be exported to spreadsheets and DXF formats.

LEAP CONSPAN At-A-Glance

Ease of Use

- Intelligent graphical user interface
- U.S. customary and metric (SI) units
- Toggle between LRFD and LFD
- Context-sensitive help
- 2D and 3D graphics
- Text and graphical report formats
- Export graphics to DGN and DXF formats
- Export results to Microsoft Excel

Structural Analysis Options

- Simple or continuous analysis models
- Multi-span bridge analysis (series of simple span analyses)
- Automatic computation of live-load distribution factors
- Refined methods for live-load distribution factors
- Optional transformed strand and rebar properties
- Automatic computation of beam, deck, and haunch weights
- Unlimited number of line, area, point, or trapezoidal loads
- Automated moving-load analysis

Structural Analysis Options

- Prestress loss calculation by code equations
- LRFD refined prestress losses (approximate and detailed)
- Load rating: LRFR or LFR
- User-defined rating vehicles

Design and Code Checking

- AASHTO Standard (LFD)
- AASHTO LRFD
- U.S. States: California and Florida
- CHBDC
- IRC
- Detailed reports and/or design summary
- Release and final stress check
- Vertical and horizontal shear check
- Cast-in-place deck slab reinforcement design
- Negative moment reinforcing check
- Restraining moment computation
- Automatic strand pattern and auto-debonding/shielding
- Automatic shear stirrup layout design
- Detensioning report
- Detailed stability analysis during lifting and transportation

User-Customizable Libraries

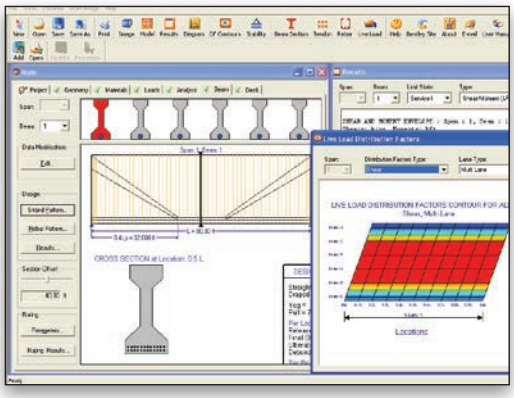
- Beam cross-sections
- Prestressing tendons
- Rebar
- Vehicle live loads
- Shear stirrups

Integration with Industry Applications

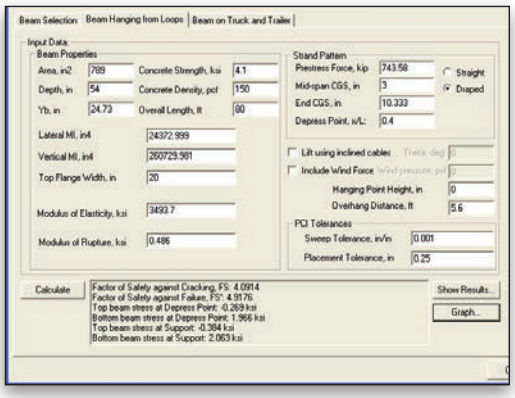
- DGN and DXF file formats
- Export superstructure reactions to LEAP RC-PIER

For more information, visit:

www.bentley.com/LEAP



Automatically design multiple girders in multiple spans in one project file.



The lateral stability module computes critical safety factors important for long spans.

Bentley® Sustaining Infrastructure

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