



## LEAP® GEOMATH®

### Parametric Bridge Geometry Layout and Design

LEAP GEOMATH is a geometry application for projects of any scope – from single-level crossings to multi-level complex interchanges with multiple horizontal alignments and vertical profiles. Parametric modeling and intelligent change tracking deliver ease of use and accuracy. Part of the LEAP Bridge Enterprise system, LEAP GEOMATH® integrates with LEAP CONBOX®, LEAP CONSPAN®, and LEAP RC-PIER® to provide a powerful bridge information modeling (Brim) solution.

#### Integrated Brim Solution Accelerates Concrete Bridge Design

LEAP GEOMATH is the geometry 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.

If any connected element is updated, the parametric relationship automatically updates the location computation. Thus, changes to any member automatically update the geometry of all other connected members.

For example, as the user moves a pier along the station and or updates the pier properties, the girder, bearing, and column locations are recomputed as per offset definitions.

#### Integral Pier Layout Provides Flexibility

LEAP GEOMATH exchanges integral pier data with LEAP CONBOX and LEAP RC-PIER. If a user defines a diaphragm at the pier, then the width of the diaphragm is set equal to the integral pier width. If no diaphragm is defined at the pier, then by default the integral pier width is set equal to the column width.

#### Fast Deflections Input Saves Time

LEAP CONSPAN writes the final deflection to the database for all beams in the program. Once a particular beam is designed with LEAP CONSPAN, LEAP GEOMATH reads this data from the central LEAP Bridge database.

#### LandXML Certification Enhances Data Sharing

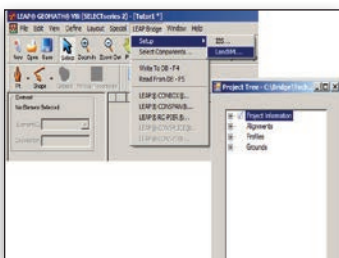
LEAP GEOMATH is a LandXML-certified application that can share data with any transportation project. Using the industry-standard LandXML database format, LEAP GEOMATH has the ability to import data from other LandXML-compliant applications such as Bentley's GEOPAK, InRoads, MXROAD, and MicroStation® as well as AutoCAD.

#### Easy Wing Wall Definition Improves Productivity

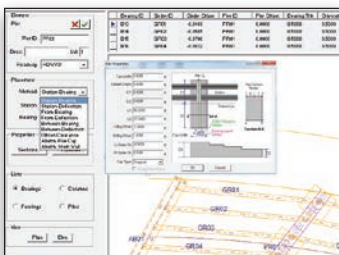
The application offers flexible layout of abutment wing walls. These can be straight or curved, and the bottom of the wing wall can be controlled by a linear slope or an arbitrary ground surface. LEAP GEOMATH automatically computes the required length of the wing wall.



Use LEAP GEOMATH to create bridge layouts at highway intersections.



Import highway alignment, vertical profile, and ground data.



Choose from multiple pier layout methods.

#### Roadway Geometry Definition Boosts Project Start Up

To start a typical project, the user rapidly establishes a roadway definition by creating an alignment, profile, and cross section set. Alternatively, roadway information can be directly accessed from Bentley's GEOPAK®, InRoads®, MXROAD®, or other infrastructure design programs through LandXML.

*“LEAP GEOMATH is a good geometry program that can handle complicated geometry with a variety of interactive input options. I found LEAP GEOMATH an easy program to learn and use.”*

— Kerrie Harrell,  
PBS&J Tallahassee, Florida

#### Parametric Bridge Layout Ensures Accuracy

Intelligent parametric modeling supports definition of precast and cast-in-place bridges using the bridge framing plan, which consists of piers, abutments, and girders. The user then defines footings and diaphragms. As each geometry element is defined, LEAP GEOMATH calculates its actual location in space.

## 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

512 MB minimum, more recommended

### Disk Space

200 MB

Find out about Bentley at: [www.bentley.com](http://www.bentley.com)

### Contact Bentley

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### Global Office Listings

[www.bentley.com/contact](http://www.bentley.com/contact)

# LEAP GEOMATH At-A-Glance

## Layout and Design

- Unlimited spans, piers, and girders
- Multiple alignments and roadways (using PI to PI notation or BC to EC form in segmental)
- Curved girder layouts
- Single or double bearing lines
- Beam cambers and deck deflections
- Pier dimensions and properties: Individual or global
- Diaphragms placed individually or in batch
- Relational tools: elevations and dependent elements automatically update as changes are made
- Precast, steel plate, or rolled steel girders
- U.S. customary and metric (SI) units

## Vertical Control

- Profile diagram
- Super-elevation diagram
- Delta elevation diagram

## Cross Sections

- Templates used to define cross section station for instantaneous section information
- Piers
- Choice of nine pier layout methods
- Automatic updates to pier cap elevations and other dependent elements as changes occur

## Columns

- Choice of three column layout methods: cap centerline, normal offset, and station and offset

## Footings

- Spread or combined footings
- Pile cap footings
- Drilled shaft foundations

## Girders

- Choice of eight girder layout methods
- Change flexibility: global bearing thickness and/or beam seat data
- Automatic calculation of girder bearing elevations, lengths, and more

## Element Features

- Input/calculate geometric information for ramps, including gore areas
- X,Y,Z coordinate output for slab, top, and bottom of girder; face of curb; edge of deck; and diaphragm to girder intersection
- Calculation of screed and final deck elevations at specified points
- Calculation of top and bottom of pier cap elevations
- Control of splice point locations
- Element data: cut, copy, and paste
- 3D bridge and graphic forms viewing
- Quantities computations for deck slab, haunch build-up, and girder concrete (including user-defined reinforcing factors)

## Deck Controls

- Production of deck contours of specified areas
- Individual contour selection for coordinates and elevation

## Section Manager

- Beam section library: add, delete, copy, and modify

## Measurement

- Distance, angle, station, and offset between any two objects
- Determination of point coordinates and clearance at PI
- Horizontal and vertical clearances

## Developed Elevation

- Vertical profile elevation views along alignment stationing

## Error Reduction

- Immediate visual check in graphic display
- Automatic data validation

## Interface

- Project bar with list of all project design data
- Simplified browsing, selection, and editing of component elements
- Level bar provides 64 levels with toggle On or Off flexibility
- Easy level reassignment of elements
- Context-sensitive pop-up menus

## Backdrop Image Import

- Aerial photography and/or topographic maps

## Import/Export CAD Files

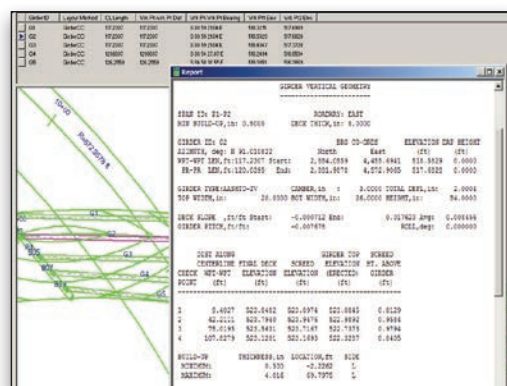
- Multi-layered CAD or MicroStation file creation
- DXF and DGN: export and import
- EDM and tab-delineated text files: read
- Profile view, cross section, and plan view export to DXF

## Output

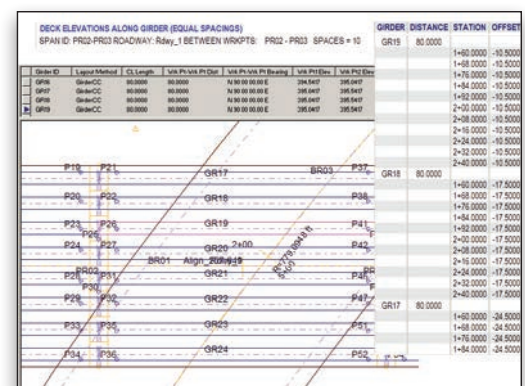
- Choice of 18 predefined reports and/or custom report creation
- Output to screen, hard copy, or disk
- Export of results to spreadsheet format and tab delineated formats

## For more information, visit:

[www.bentley.com/LEAP](http://www.bentley.com/LEAP)



The software offers girder vertical geometry reports.



Calculate finished deck elevations at tenth points along girders.