

# BENTLEY® AUTOPIPE®

## The most productive tool for pipe stress analysis

Bentley® AutoPIPE® is a native Windows® program for calculating piping code stresses, loads and deflections under both static and dynamic loading conditions. AutoPIPE analyzes systems of any complexity, with special features for buried pipeline analysis, wave loading, water or steam hammer, FRP/GRP pipe and built-in pipe/structure interaction.

AutoPIPE combines object-based graphics technology with dynamic input & result spreadsheets and advanced analytical capabilities not found in other programs to provide a truly unique tool for pipe stress analysis and design.

### Unique, Object-based Graphical User Interface

The object-based graphical user interface makes creation and modification of the pipe stress model easy. Point and click on the graphical model to insert, modify or delete pipe supports, loads or components. After each operation, the model display is automatically updated for instant visual feedback. Using AutoPIPE's graphical select options, you can insert, delete or modify components, supports, pipe properties, temperatures/pressures, or other parameters across an entire range of points with one command. Graphical selection of ranges is also used for cut, copy and paste operations. Check, sort or make global changes to the input data quickly using the interactive input grid spreadsheets. AutoPIPE allows up to 99 undo/redo operations to recover painlessly from mistakes or to iterate quickly through design scenarios.

### Advanced Analysis Features for Varied Piping Environments

AutoPIPE provides unique capabilities for underground, offshore FPSO platform and subsea pipeline analysis, dynamic loadings, nonlinear restraints and orthotropic piping analysis. Other advanced AutoPIPE capabilities include built in wave loading, buried pipeline analysis, pipe/structure interaction, calculation of local stresses, time history dynamic analysis, fluid transient and relief valve utilities, support gaps and friction, FRP/GRP pipe analysis, jacketed piping and 25 piping codes.

### Graphical Review of Analysis Results

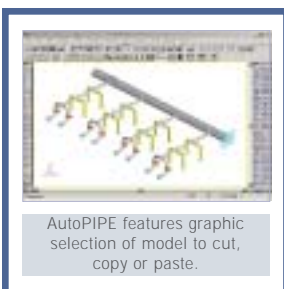
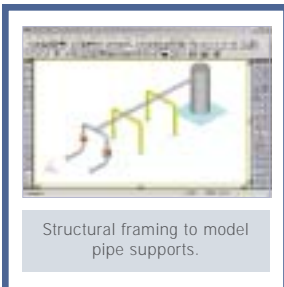
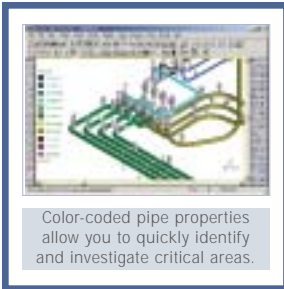
After analyzing a system, you can click on the graphical model to instantly view stresses, deflections, forces and moments. Color-coded results and pop-up windows enable the engineer to quickly identify and investigate critical areas without having to review a voluminous amount of batch output data. Up to 500 load combinations can be viewed with the powerful on-screen results grid which provides interactive filtering, sorting and printing of maximum result values.

### Interface with Plant Design CAD Systems

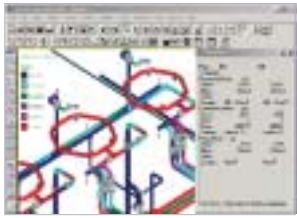
Import 3D plant design CAD models from Bentley® AutoPLANT®, Bentley® PlantSpace®, Intergraph® PDS™ or AVEVA PDMS into AutoPIPE to save time and ensure that the pipe stress models and CAD models are identical.

### Quality Assurance

AutoPIPE's rigorous quality assurance program has passed numerous independent on-site audits to 10CFR50 App. B, ASME NQA-1, and ANSI N45.2 standards, making AutoPIPE one of the few PC-based pipe stress programs approved for use in nuclear safety applications.



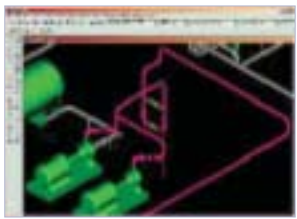
## BENTLEY AUTOPIPE AT-A-GLANCE



You can click on the graphical model to instantly view stresses.



View deflected shape plot to easily evaluate the response to different loads.



You can import 3D plant design CAD models from Bentley AutoPLANT, among others.

### SYSTEM REQUIREMENTS

- Processor:  
Pentium® II 400MHz
- Operating System:  
Windows 98 (2nd edition), Windows NT® 4.0, 2000 or XP
- Memory:  
128 MB RAM
- Disk Space:  
52 MB (100 MB recommended)

### Modeling

- OpenGL CAD graphics with toggle between single line, wire-frame and render drawing modes
- CAD style floating view and component toolbars
- Single line, double line or solid model view with interactive zoom, pan, or rotate model capability
- Single, double or quad view ports for CAD style work environment
- Graphical point and click capability for inserting, modifying or deleting piping components and loading parameters
- Graphic selection of sections of model to cut, copy or paste
- NEW** Interactive Input grid for checking and editing model data in a spreadsheet
- Up to 20 thermal, 10 static and dynamic load cases.
- Automatic renumbering of point names
- User specified vertical axis (Y, Z, or X)
- English, Metric, SI, and user-defined units with automatic unit conversions
- Undo/Redo up to 99 operations
- Color-coded model view based on pipe identifiers,
- Library of temperature-dependent code material properties and allowable stresses for most piping codes
- ANSI/ASME, DIN, JIS and GRP standard piping component libraries
- FRP and plastic pipe vendor libraries
- Customizable libraries for pipe components and materials
- Structural steel modeling using AISC standard structural steel library with nonlinear pipe/structure interaction
- Expansion joint modeling with tie rod assemblies
- Import model from AutoPLANT, PlantSpace, Intergraph PDS, Aveva PDMS or PlantFLOW™ (Bentley's flow analysis application used to calculate steady state single-phase pressures, flow velocities, temperatures, and fluid properties in gas or liquid piping networks)
- Export model geometry data as PXF files into AutoPLANT
- Export model geometry data as DXF files into AutoCAD® and MicroStation®

### Dynamic Analysis

- Time history dynamic analysis with built-in relief valve, water & steam hammer fluid transient utilities
- Mode shapes and natural frequencies
- Harmonic load analysis
- Response spectrum and shock spectra
- NRC spectra and code case N411
- NUREG.CR-1677 benchmark

### Piping Codes

- ASME B31.1, B31.3, B31.4, B31.8
- ASME Sec. 3, Class II & III
- European Standard Metallic Industrial Piping EN13480
- B31.4 Offshore, B31.8 Offshore & CSA\_Z662 Offshore codes
- Canadian CAN/CSA-Z662
- British Standard BS 806, BS 7159 (GRP piping code)
- Swedish Piping Code (SPC) Method 2
- Norwegian Det Norske Veritas (DNV) and TBK 5-6

### ABOUT BENTLEY

Bentley Systems, Incorporated provides software for the lifecycle of the world's infrastructure. The company's comprehensive portfolio for the building, plant, civil, and geospatial vertical markets spans architecture, engineering, construction (AEC) and operations. With 2003 revenues reaching \$260 million, Bentley is the leading provider of AEC software to the Engineering News-Record Design 500 and major owner-operators.

For more information, visit [www.bentley.com](http://www.bentley.com) or call 1-800-BENTLEY.

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- Dutch Stoomwezen D1101
- Japanese KHK, MITI class 3 and General Fire Protection code
- French RCC-M and SNCT

### AutoPIPE Quality Assurance Program

- Passed numerous independent on-site audits to 10CFR50 App. B, ASME NQA-1 and ANSI N45.2
- Formally approved test plans for verification of every new feature to AutoPIPE
- Integration testing for features implemented in previous versions with records of validation spanning more than ten years
- AutoPIPE QA & Reporting Services for nuclear plant engineering users to help meet safety related QA requirements

### Analysis

- Calculation of the effects of multiple wind, earthquake, thermal and dynamic loads
- Automatic generation of wind profiles per ASCE and UBC guidelines
- Wave loading and buoyancy for offshore applications
- Hydrotest analysis automatically converts spring hangers to rigid restraints and provides insulation on/off option
- Fluid transient utilities for water and steam hammer plus relief valve load analysis
- Automatic spring hanger sizing based on hanger data from 17 manufacturers
- Accurate nonlinear support gap and friction solutions
- Nonlinear pipe/soil interaction for buried pipeline analysis
- Jacketed piping analysis
- Integrated flange loading analysis per ANSI B16.5
- Nozzle flexibility analysis per API 650 App. P, ASME class 1, WRC 297 and Biljaard methods

### Results

- Graphical point and click to view stresses, deflections, or loads, at any point on the model
- NEW** Result grid for viewing, filtering and sorting results interactively
- Automatic or user-defined load combinations
- Calculation of maximum stresses along component without modeling intermediate points
- Rotating equipment evaluation for API 610, NEMA and API617, and user-defined rotating equipment
- Min/Max load summaries
- Export nozzle loads to WinNOZL module for calculation of local shell stresses
- Calculation and evaluation of code stresses for 25 standard piping codes
- Graphic viewing of results using color-coded model to highlight points that exceed user-specified criteria
- Filtering of results by stress, deflection or load criteria to output only the results needed

