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spColumn v7.00 - Upgraded December 2019
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New Features:
1. Added support for ACI 318-19 design standard (code) in English and Metric units.
2. Added support for CSA A23.3-19 design standard (code) in English and Metric units.
3. Included diagrams within PDF and DOCX reports generated using command line.

Resolved Issues:
1. Corrected the issue of report generation in Word format in spReporter.
2. Corrected the issue in spReporter when upgraded to Windows 10.0
3. Corrected the issue of displaying wrong message during design process in spColumn.
4. Corrected the reinforcement cover label for Sides Different reinforcement Menu.
5. Fixed the issue of user not being to preview the report in Word, PDF and Text formats when no printer is connected or when printer is offline.
6. Corrected the issue of proper location, Top or Bottom, not being displayed in the results and factored moments table(s) table for when M_{min} exceeds M_i for X and Y axis bending.
7. Fixed the issue of spResults not automatically refreshing after a problem is re-executed.

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spColumn v6.50 - Upgraded November 2018
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New Features:
4. Introduced new sp2D/3DView module with the following features, for viewing and navigating 2D diagrams and 3D surfaces
   (a) Advanced and flexible graphical interface
   (a) Toolbar for easy and quick access to commands and options
   (b) Settings dialog box to set or modify preferences
   (c) Ability to change diagram scale and aspect ratios, axes values, line types and line colors
   (d) Option to configure the program to automatically add selected diagrams to the report
   (e) Ability to manually add desired 2D diagrams to the report
   (f) Display options to toggle on/off various diagram features
   (a) Support for multiple viewports with pre-defined viewport configurations
   (b) 2D and 3D view controls for efficient zooming, panning and rotating of diagrams
   (c) Right click support on load points to get point specific information
   (a) Left panel with navigate and properties tab
   (b) All diagram navigation controls housed in the Navigate tab of left panel
   (c) Dedicated angle and axial load boxes for controlling all displayed diagrams and surfaces
   (d) Table to display a list of applied loads
   (e) Filters with configurable criteria to sort and display load points of special interest in the load point list table
   (f) Option for highlighting critical load points
   (g) Facility to export both original and sorted table of load points

(h) List of section design and investigation properties for quick and easy interpretation of results
(i) Section preview
(j) Properties tab in the left panel to list all section investigation and design properties

5. Introduced Critical Capacity method for calculating section capacity
6. Provided the option to select between Moment capacity and Critical capacity methods for calculation of section capacities
7. Added the ability in spReporter to accommodate diagrams
8. Added the ability in spReporter to remember explorer configuration

Enhancements:
8. Improved the Graphical report to EMF file
(a) Increased the amount of data provided in the graphical report to include details about reinforcement used and slenderness criteria when available
(b) Organized the included section properties and data in formatted tables
(c) Included a table to list the load points present in the report diagram along with their corresponding capacities and capacity ratios
9. Improved the structure of the table listing loads and capacity ratios.

Resolved Issues:
1. Prevented the appearance of irrelevant warning message at exit
2. Fixed the issue of cti files being deleted when spColumn is executed from the command line
3. Fixed the issue of installer creating start menu shortcuts for documents which no longer have an associated file in the installation package.
4. Fixed the issue of spReporter crashing with very large files.
5. Fixed the issue of the program crashing during execution due to conflict with MS SQL Server.

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spColumn v6.00 - Upgraded September 2017
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New Features:
1. Introduced new spReporter module with the following features, for generating, viewing, exporting and printing reports
   - Program results output in formatted tables, modernized headings and titles including a report cover page and table of contents
   - Export and print options in a panel to customize reports
   - Option to preview the report in pdf/word or text formats
   - Options for printer selection and customization of printer properties
   - Options for print settings including paper size, orientation, margins and range

- Option to export the customized report in .docx, .xlxs, .pdf, .csv or .txt formats
- Option to directly print the customized report in .docx, .pdf or .txt formats
- An Explorer panel to organize contents in a tree view for easy navigation between data tables
- Option to include/exclude parts of the output to customize the report
- Easy navigation options within the explorer tree view
- Option to collapse or expand the explorer tree view
- Explorer panel location options based on user preference
- Option to toggle explorer On/Off
- Large preview area to evaluate the generated report
- Standard navigation options in the report preview
- Toolbar for easy and quick access to commands and options
- Page viewing options for the report preview
- Zoom and pan options in preview area
- Select and copy data options from the report preview
- Standard navigation options in report preview via page numbers and buttons
- Settings dialog box to set or modify preferences

2. Introduced new spResults module with the following features, for viewing and exporting input and output data
   - Program results output in formatted data tables
   - Viewing area to display data tables including associated notes and titles
   - Option to toggle On/Off display of table notes
   - Manual adjustment of data table column widths
   - Ascending or descending sort option for each column in data table
   - Select and copy option from the data table
   - Standard navigation options within data tables
   - Option to highlight critical items in the data table
   - Toolbar for easy and quick access to commands and options
   - Auto adjust table option to fit column widths in the viewing area
   - Capability to switch to default/maximum permissible column widths
   - Option to export data table being viewed in .txt .csv or .xlxs formats
   - Standard navigation among data tables using table numbers and buttons
   - Settings dialog box to modify various program options and colors
   - An explorer panel to organize contents in tree view for easy navigation between data tables
   - Standard navigation options within the explorer tree view
   - Option to collapse or expand the explorer tree view
   - Explorer panel location options based on user preference
   - Option to toggle explorer On/Off

3. Introduced command line parameters to export reports in .docx, .xlxs, .pdf, .csv or .txt formats
4. Added a new print dialog box for printing default report directly from spColumn

Enhancements:
1. Reorganized the format of spColumn Command Line Help to make it more user friendly
2. Implemented a program warning when a section with unsupported or questionable geometry is being executed
3. Provided additional web based resources and online help options in the help menu

Resolved Issues:
1. spColumn
   - Resolved the issue of DXF module not remembering the name of spColumn data file during DXF export
   - Resolved the issue of showing load points for factored loads when the slenderness consideration is changed form No to Yes.

2. spSection
   - Corrected dragging feature to follow orthogonal movement when Ortho mode is on
   - Corrected snapping to the cover line while creating reinforcement using Linear Bar Pattern
   - Resolved geometry validation warnings in some sections created using mirror and combine commands

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spColumn v5.50 - Upgraded November 2016
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New Features:
1. Introduced new spSection Module for creating and modifying irregular sections
   - Provided advanced and flexible graphical interface
   - Provided flexible toolbar with Horizontal/Vertical arrangement and Small/Medium/Large icon size for easy and fast access to commands and options
   - Provided keyboard and mouse shortcuts for commonly used commands
   - Provided 2D & 3D view controls for efficient zooming, panning and rotating
   - Provided flexible snap and grid capabilities for accurately creating and modifying sections
   - Provided orthogonal mode for restricting cursor movement to horizontal and vertical direction when creating or modifying sections
   - Provided Undo/Redo capabilities

- Provided commands for On-fly drawing of solids and openings
- Provided capability to combine solids and openings for creating complicated sections
- Provided capability to select, modify, and add nodes for reshaping sections
- Provided commands for On-fly drawing of different bar patterns (Single/Linear/Rectangular/Circular)
- Provided capability to draw bars with different cover types (Clear/To bar center), sizes (Bar size/Bar area), and placements (By numbers/Bar spacing)
- Provided bar cover guide for accurate placement of bars in sections
- Provided settings dialog box to modify various program options and colors
- Provided drawing area dialog box for setting workspace limits and grid lines spacing
- Provided several selection options (All/Window/Single/Bars only)
- Provided capability to drag shapes and bars to easily rearrange them on screen
- Provided several modification commands (Move/Copy/Rotate/Delete/Mirror) to create and modify complicated sections
- Provided command to measure distance between two pints
- Provided validate command to check if the section is valid for analysis by spColumn
- Provided option for highlighting overlapped bars
- Provided option to automatically align the section centroid to coordinate origin after moving the section to spColumn

2. Introduced new DXF Import/Export Module
   - Provided option to automatically find section layer(s)
   - Provided option to manually assign Solid/Opening/Bars layers
   - Provided options to assign the unit system and unit length of imported section
   - Provided preview window to show the content of the DXF file
   - Provided options to turn ON/OFF the layers in preview window
   - Provided capability to zoom and pan in preview window
   - Provided options to export the created section in Single/Multiple layers to a DXF file
   - Provided option to align the section centroid to coordinate origin while importing the DXF file
   - Provided capability to evaluate imported DXF files

Enhancements:
1. Improved 3D failure surface visualization of the P-Mx-My interaction diagram
   - Provided advanced and flexible graphical interface
   - Provided flexible toolbar with Horizontal/Vertical arrangement and Small/Medium/Large icon size for easy and fast access to commands and options
   - Modified 2D & 3D view controls for efficient zooming, panning, and rotating

- Modified settings dialog box to change various program options and colors
- Provided option to Hide/Show the pointer
- Modified panel for vertical and horizontal cutting commands

Resolved Issues:
1. Resolved the minor issue related to display of column cross-section in 3D failure surface visualization

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spColumn v5.11 - Updated July 2016
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Resolved Issues:
1. Corrected the setting of "Concrete ultimate strain" value for non-standard materials to ensure the strain returns to standard value when user switches back to standard material.
2. Resolved an issue in v5.10 when user switches from ACI to CSA or vice-versa to ensure material properties actively match the selected code.

StructurePoint

CONCRETE SOFTWARE SOLUTIONS

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spColumn v5.10 - Updated April 2016

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New Features:
1. Added support for CSA A23.3-14 design standard (code) in English and Metric units

Enhancements:
1. Introduced input value limits for standard and non-standard material properties respectively

Resolved Issues:
1. Removed the conservative consideration of simultaneous application of minimum eccentricity about both axes for determination of minimum value of M2 for biaxial runs per ACI 318, R10.10.6.5
2. Resolved minor issues related to graphical display of P-M Diagram, import of DXF files, and base file save operations

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spColumn v5.00 - Upgraded December 2015

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New Features:
1. Added support for ACI 318-14 design standard (code) in English and Metric units
2. Introduced a 3D failure surface visualization of the P-Mx-My interaction diagram including nominal and factored section capacity

Enhancements:
1. Introduced additional validation of concrete maximum stress including user alerts when non-standard material properties are input.
2. Increased number of factored load entries from 5,000 to 10,000

Resolved Issues:
1. Introduced compression-controlled strain limits for high strength steel
2. Upgrade Design Assistant for compatibility with newer MS Excel 2013
3. Correct location and name of output file in batch mode

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spColumn v4.81 - Updated May 2012

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Resolved Issues:

1. Corrected nominal interaction diagrams for CSA A23.3 standards
2. Updated installation procedure for systems with 64-bit version of Windows 7

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spColumn v4.80 - Updated November 2011
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New Features:
1. Added support for ACI 318-11 code in English and Metric units

Enhancements:
1. Revised calculation of effective length factor, k, for slender columns by implementing exact formulas used in Jackson and Moreland Alignment Charts
2. Introduced options for EMF files created in batch mode to be named and sorted by Load Point number
3. Introduced a flag to indicate unexpected axial load capacity increase in transition zone between Balanced Point and Tension Control for ACI code

Resolved Issues:
1. Corrected value of steel strain corresponding to negative moment for axial loads
2. Removed lower limit of 0.4 on factor Cm in moment magnification calculations in nonsway frames for ACI 318-08
3. Corrected formatting of spColumn Command Line Help on Windows Vista and Windows 7
4. Resolved several issues related to program output, installation, and checking for updates

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spColumn v4.60 - Updated September 2010
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New Features:
1. Added capability to export graphical reports (screen printouts) to EMF files that can be imported into graphics and word processing software.
2. Introduced a command line parameter used in batch mode to export graphical reports to EMF files.

Enhancements:
1. Added an option to consider second order effects along the length of a sway column per ACI 318-08, 10.10.2.2
2. Revised calculation of second order to first order moment ratio for sway columns designed per ACI 318-08
3. Revised reporting of second order moments in the program text output to reflect directly notation used in ACI 318 and CSA A23.3 standards

4. Enhanced program documentation to clarify understanding of ACI 318-08 provisions for slender sway columns
5. Improved consistency in displaying warning messages in the GUI and the text results report

Resolved Issues:
1. Corrected a few minor issues in formatting of text and graphical output
2. Corrected checking the requirement for moment magnification along length in sway columns (ACI 318-02/05 10.13.5 and CSA A23.3-94/04 10.16.4.) when metric unit system is used

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spColumn v4.50 - Upgraded December 2009
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New Features:
1. Added support for ACI 318-08.
2. Added capability to import sections from DXF file.
3. Added capability to show nominal interaction diagrams.
4. Added capability to define percentage of each load type considered as sustained in calculating slenderness effects for non-sway columns.
5. Added checking of strength and stability of structure as a whole under gravity loads for slender sway columns per ACI 318-05/02 and CSA A23.3-04/94.

Enhancements:
1. Added capability to display P-M and Mx-My diagrams by selecting number of the load point coplanar with the diagram.
2. Added examples of input files and Design Assistant spreadsheets for C-shape and I-shape shear walls.
3. Provided consistent number rounding throughout program interface.
4. Discontinued displaying design and investigation results for slender columns when applicability of moment magnification method is exceeded.
5. Extended text results report to include:
    a. Distance from extreme compression fiber to centroid of extreme longitudinal tension steel (dt)
    b. Minimum clear spacing between longitudinal bars
    c. First-order and magnified (second-order) moments for slender columns
    d. Maximum steel strain corresponding to section capacity of biaxially loaded columns
    e. Radius of gyration
6. Reformatted text output for increased clarity and consistency.
7. Revised Manual and Help documentation to increase accessibility, enhance description of new program features and reflect added functionality.
8. Added default load combinations including Snow load case for CSA A23.3-94.

Structure|Point
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Resolved Issues:
1. Adjusted minimum clear bar spacing for CSA standards. Previously, more conservative minimum per ACI was used
2. Corrected capacity calculated for the first load point in Design Mode in case when the design fails
3. Removed inconsistencies from the disclaimer portion of the results report
4. Printing load point markers outside of interaction diagram area
5. Superimposing interaction diagrams for biaxially loaded sections
6. Saving and opening CTI files that include empty or commented fields in General Information section
7. Truncating the "col" extensions from data filenames include a dot and renamed using Save As command
8. Eliminated resetting of strength reduction factors for sections with confinement OTHER when design code is changed by the user

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spColumn v4.20 – Updated April 2009
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Enhancements:

1. Provided easier and faster access to software manual directly from the Help menu.
2. Modified program to indicate a Warning, in lieu of Error, when convergence issue is encountered in large sections.
3. Renamed pcaColumn, also formerly known as PCACOL and IRRCOL, as spColumn to better relate and support the registered trade name of the publisher, StructurePoint, formerly PCA's Engineering Software Group.

Resolved Issues:

1. Resolved issue in reinforcement size considered when "sides different" is selected.
2. Reset factors for snow load case to zero in data files created with previous versions of the spColumn.
3. Resolved issue in reporting the load combinations for section with uniaxial runs.
4. Modified result display to reflect max and min axial capacity accurately when reinforcement is small

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pcaColumn v4.10 – Updated May 2008
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Enhancements:

1. Introduced Snow as a primary (Basic) load case
2. Modified default load combinations for ACI 318-05, ACI 318-02, and CSA A23.3-04 to include Snow load case
3. Implemented functionality to reset load combinations to their default values for the selected design code
4. Increased program capacity to support:
   (a) 10,000 reinforcing bars up from 500
   (b) 10,000 exterior points up from 500
   (c) 10,000 interior points up from 500
   (d) 5,000 factored load entries up from 4000
   (e) 50 service load entries
   (f) 50 load combinations up from 20
5. Optimized numerical procedures for increased capacity
6. Reformatted display in dialog boxes and text output for increased clarity and consistency
7. Added functionality to allow user-specified files to save and read user-defined bar sets
8. Added version information to pcaColumn executable file
9. Discontinued using PCAPROGS.INI file and redirected all user-settings to Windows registry
10. Updated Manual and Help documentation to reflect added functionality

Resolved Issues:
1. Modified Material Properties dialog box to allow change to specific parameters without resetting all others (e.g. load combinations, phi factors, and ultimate concrete strain).
2. Resolved issue with converting earthquake (EQ) loads when unit system is changed
3. Resolved issue with reading specified strength of concrete (fcp) from a pcaColumn Text Input (CTI) file
4. Resolved minor functionality issues in several dialog boxes in pcaColumn, pcaSection, and pcaView
5. Corrected weight of #15 bar in CSA G30.18 bar set
6. Corrected pcaView caption to always display the name of the file that is currently open
7. Eliminated random occurrence of black screen issue in Investigation mode for sections without reinforcement

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pcaColumn v4.00 - December 2007
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New Features:

1. Added support for ACI 318-05 and CSA A23.3-04 design standards.
2. Added support for batch mode processing via command line parameters.
3. Added pcaColumn Text Input (CTI) files capability.
4. Added capability to export to points from P-M diagrams, Mx-My diagrams, and 3D failure surface.
5. Added capability to export sections in DXF format.
6. Added capability to customize display to include one or both sides of P-M interaction diagrams.

Enhancements:
1. Provided capability to report neutral axis location and maximum steel strain corresponding to section capacity.
2. Provided capability to report strength reduction factors in text output.
3. Customization of P-M diagram to show load point labels and splice lines (rays).
4. Provided shortcuts to display P-M and Mx-My diagrams for subsequent load points.
5. Changed number of bars increment to 1 from 4 in circular column design.
6. Increased filename length (including path) from 128 to 256 characters.
7. Improved handling of Axial Loads including negative increments and enhanced reporting.
8. Provided explicit export of interaction diagram (IAD) to specified files.
9. Provided capability to check for program updates on-line from Windows or program environment.
10. Improved security by introducing Digital signature.
11. Updated and enhanced manual documentation to include detailed design code references.

Resolved Issues:
1. Eliminated "Could not open file mapping object DDE_SVR" error.
2. Eliminated "License is not available" error occurring during solution.
3. Eliminated freezing/crashing of the program in some situations, e.g.
    (a) When opening two biaxial files in a row
    (b) When solving a section with bars outside of the section
    (c) When opening Service Loads dialog box with very large values of loads.
4. Eliminated black screen problem occurring after switching to Investigation mode from Design mode where no valid design existed.
5. Corrected capacity reduction per CSA A23.3-94 for sections with rho < 1%.
6. Mmin is no longer taken into account for CSA design if slenderness can be ignored.
7. Factored loads are now always correctly calculated from service loads.
8. Corrected issues encountered in design for reinforcement with fy=87 ksi.
9. Sections with zero area of concrete are now treated as invalid and cannot be solved until area of concrete is increased.
10. Report slenderness ratio over 100 always during solution.

11. Resolved bar layout issues encountered with circular columns.
12. Section type is now remembered when switching from Design to Investigation.
13. Iy label is no longer printed instead of Ix in Print Screen printout.
14. Correct units are now displayed in reinforcement Sides Different dialog box.
15. pcaColumn name is now used consistently in the program.
16. Terms "User Defined" and "Other" are now consistently used to designate Column Type and Confinement.
17. Status bar is now refreshed when a data file is open.

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pcaColumn - V3.64 - September 9, 2005
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1. The lshost.txt file now accepts multiple entries. Each entry has to be on a separate line. License manager will try these entries one by one until a valid license is found. As an entry, server name, server IP address, "no-net" or "LAN" can be used. "no-net" means that a standalone license will be used if it is available. "LAN" will make the license manager look for a license in the local area network (within the subnet only).

2. The Help | About box displays now detailed licensing information including: license type, license expiration, license server, and license ID. Licensing information is also shown in the printouts.

3. Issues with importing data from text files have been resolved.

4. Design for minimum steel area has been corrected.

5. The accuracy of calculating the concrete stress block resultant has been increased.

6. Text results are available for both sides of the P-M interaction diagram if Control Points or Axial Loads are selected.

7. Results are now cleared if Bar Layout option or Cover To option is changed.

8. A message is now displayed instead of proceeding with a design if Factored Load or Service Load list is empty.

9. The default value of Stiffness Reduction Factor for slenderness calculations is now 0.75 instead of 1.0.

10. The limit value of Service and Factored Loads has been increased to 1.0e12.

11. Superimposed diagrams are now fully shown instead of just one (positive) side.

12. Control point indicators are now shown on both sides of the P-M diagram.

13. Default value of Concrete Strength is now 4 ksi (30 MPa for CSA) instead of 0.

14. Pagination within Service Loads block of text output has been corrected.

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pcaColumn - V3.63 - October 26, 2004
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1. New feature, Bar Selection, in the Design Criteria allows selecting reinforcement based on either minimum number of bars or minimum reinforcement area. Only minimum number of bars was implemented in previous versions and it is the default option in this version.

2. Minor corrections in the text and graphical output were applied.

3. Issues associated with refreshing the Info Window were resolved so that all current properties of the analyzed section are displayed and printed.

4. Manual, Quick Start Guide, and Help files have been updated.

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pcaColumn - V3.61 - February 18, 2004
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1. For biaxial run, load case numbers are corrected in P-M and M-M diagrams.

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pcaColumn - V3.60 - February 16, 2004
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Modifications:

1. Provides complete P-M diagram.

2. For uniaxial run, calculates resisting moments corresponding to negative applied moments.

3. For uniaxial run and applied service loads, calculates resisting moments at the top and the bottom ends of the column.

4. Provides enhanced reporting of factored and resisting moments.

5. When CSA code is selected, reports the output using the CSA notations.

Bug fixed:

1. For braced columns, the program used to calculate Cm using the portions of M1 and M2 related to dead and live load only. This has been corrected such that Cm is calculated using the total M1 and M2.

2. For slenderness effect calculations of braced columns, Beta_D used to be greater 1.0 for some load combinations. This has been corrected such that Beta_d is calculated for a certain load combination as beta_D = (Factored Axial dead load)/(Total factored axial load) <= 1.0.

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pcaColumn - V3.53 - November 13, 2003
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Bug fixed:

1. Material property strain value range error corrected.

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pcaColumn - V3.52 - November 10, 2003
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Bug fixed:

1. P-M diagram was not plotted correctly for non-symmetric sections when biaxial run-option was selected.

2. Printing problem on Windows 98.

Changes:

1. Specifying the rupture strain of the reinforcing steel is no longer available in pcaColumn. Rupture strain will be always assumed to be equal to infinity.

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pcaColumn - V3.51 - October 23, 2003
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1. During startup of pcaColumn v3.50 on Windows NT 4.0 pre SP4, an error message was displayed - "GetLongPathNameA could not be located in KERNEL.DLL". It has been fixed.

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pcaColumn - V3.50 - September 2003 (32 bit release)
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General:

1. Program has been upgraded to 32 bit windows environment.

2. Program name changed to pcaColumn.

3. Includes Column+ for irregular column analysis (pcaSection module, formerly IRRCOL module).

4. Program reads data files from version 3.0 and 3.0b. Choice is given to interpret lateral load as wind or earthquake load.

5. Licensing software protection incorporated in the program.

Improvements and New features:

1. Program supports ACI 318-02 and CSA A23.3-94.

2. Number of load cases increased to 4 (Dead, Live, Wind, and Earthquake).

3. Number of service load entries increased to 50.

4. Number of load combinations increased to 20.

5. Number of factored load entries increased to 4000.

6. Number of points defining section increased to 500.

7. Number of points defining the opening in a section increased to 500.

8. Keyboard shortcuts added for most commonly used menu items.

9. Recent files list added to the File menu.

10. "Copy Diagram to Clipboard" command added to the View menu.

11. Printout can be directed to any available printer (not the default only).

12. Separate command for printing text results and graphics.

13. Colors added to the main window and toolbar icons.