

STRAP 2011

Highlights

Non-linear elements:

New

"Gap" element

The gap element consists of two nodes defined at a specified distance from each other. The two nodes act as a single node when the deflections reduce the distance between them to zero.

For example:

- a node initially several millimeters from the ground becomes a support
- an expansion joint that transfers forces after the gap is closed

New

Non-linear spring

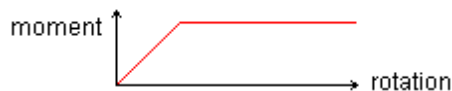
- different spring constants may be defined for different ranges of deflections
- the spring constant can change after a specified deflection
- the spring can become inactive after a specified deflection (or force) is reached

New

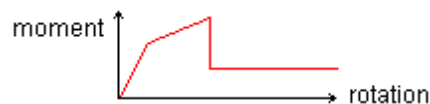
Plastic hinges

A beam end with a Plastic Hinge behaves like a hinge after a specified moment limit is reached. There are two options:

- a simple plastic hinge (the moment remains constant after the hinge forms):



- a hinge with Strain Hardening effects: the initial linear stage is followed by a second linear stage, followed by a drastic drop in moment capacity to a value which remains constant:



New

Automatic updates:

A new option to automatically download updated and revised program files from the program's internet web site.

Detailed List of Enhancements:

General:

- Grid lines may now be retrieved from a DXF file for the following two options:
 - New model - define with grid lines
 - Geometry - "grid line definition" option.
- Output tables: format improvements
 - vertical and horizontal lines
 - improved fonts
 - line shading
- The model can now be rotated by moving the mouse when the [Ctrl] or [Shift] key is pressed.
- "Draw walls" when a "selected level" is displayed: the walls either above or below the level may be displayed.

- "Display selected levels": the option has been improved so that the various problems that arose when a level was saved in a "view" have been corrected.

Geometry:

• **Nodes:**

- Define: the coordinate accuracy has been improved for nodes created when the definition plane is rotated on the screen.
- Move: revise one coordinate of selected nodes: the coordinate may now be specified by pointing to an existing node.

• **Beams**

- Offsets:
 - vertical offsets can be defined automatically for a series of selected beams so that either top or bottom faces of the beams are aligned.
 - horizontal offsets can be defined automatically for beams that frame into columns with the offset equal to half the column dimension
 - an unlimited number of offsets may now be defined (instead on 50)
- Delete: all loads on the beam are now deleted so that they do not appear on a new beam with the same number
- Split:
 - the existing loads on a beam that is split are now divided to the new beams.
 - the offsets on a beam that is split are now automatically applied to the new beams.

• **Elements:**

- Delete: all loads on the element are now deleted so that they do not appear on a new element with the same number
- Local axes: any side of an existing element may now be specified as the one that defines the local x1 axis.

• **Walls:**

- walls may now be defined by selecting beams that lie along the center-lines of the segments.
- center-to-centre dimensions may now be defined instead of external dimensions.
- a segment may now be divided into any number of smaller segments.
- an option has been added to preserve the shape of the wall when the length of one segment is modified, e.g. when the length of one segment of a rectangular wall is changed the program revises the opposite segment to maintain the rectangle.

- **Solid elements:** an improved element is now used which gives more accurate results in all cases, including bending.

• **Submodels:**

- an instance of an existing submodel can now be designated as a new submodel so that it can be modified without changing the other instances.
- a new option to add nodes in the main model to a submodel at the same level; this option facilitates revising the submodel after revisions have been made to the main model.

- "Check element definition" option:

- the program now checks for overlapping elements
- the program checks for elements with a common edge but no common nodes.
- the program checks for beams on the same line, even if they have different lengths.

Loads:

• **Global loads:**

- the program now assigns loads correctly to beams that intersect without a common node.
- the distribution areas of global loads applied to beams may now be displayed while the load case is being defined.
- the global loads applied to beams may now be displayed as regular beam loads (uniform, linear, etc)

Solution:

- When the program discovers that the program consists of two or more unconnected parts, it creates an error file that lists the nodes in each part.

Results:

- Element contour map: may now be displayed without the element boundary lines.
- Element "results along a line":
 - the center-line line may now be defined by selecting a node. A strip may be defined by selecting two nodes.
 - for elements with in-plane forces: the program can now calculate the bending moment along a strip of elements that represents a beam.
- Node deflections: the deflection of a node relative to two others may now be displayed, according to the deflection units or as a L/x value.
- Display element local result axes: the X and Y axis arrows are now displayed with different colours.
- Right-click:
 - wall results: the program now displays the wall number and section name.
 - node/beam/element/wall results: load cases or combinations may now be selected.
- Result options at bottom of screen: top or bottom face results may now be specified for elements.

Steel:

- A new option to calculate the optimal section from the section type assigned to the member in geometry, e.g. if the geometry property of the beam is IPE220, this option searches for the best IPE section.
- Detailed results may now be requested at any location along the member.
- Result summary table: a new option to display the critical combination for each design calculation.