

ETABS MATE

Concrete Structure Detailing Software



ETABS MATE
Concrete Structure Assistant Software
A Product of FARASA Engineering Group
ETABS MATE Version 1.3.611

New Features in Version 1.3.611

- Compatibility with ETABS 23 and all previous versions
- Simplified shear wall section drawing with new ETABS compatibility
- Defining different yield strength for transverse reinforcement ≤ 10 mm
- Separate shear design for columns in directions 2 and 3
- New interface for column transverse reinforcement configuration
- Different transverse reinforcement definition in Middle and End regions
- Using double closed ties in section definition and automatic design
- Ability to increase crossties in both section definition and auto design
- High pressure column provisions for welded and mechanical splices
- New interface for column detailing configuration
- Prepare equivalent beam height calculation method for L_0 length
- User-defined minimum L_0 (critical region height) for columns
- Uniform tie detailing based on Middle region length
- User-defined minimum tie and crosstie diameter
- New interface for define column transverse reinforcement details
- Column orientation indicator on section and layout plan
- Modular length parameter for beam typical rebars
- Beam profile label placement option in location plan
- Option to combine End and Middle column section details
- Corrected rebars Details longer than modular bar length in schedules table
- Improved COMMON TOOLS in side palette
- Updated joint shear and hooked bar development length reports
- Software guide updated to current version
- Updated steel and concrete prices in cost estimate report
- Improved algorithms and bug fixes



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■ Compatibility updates for ETABS 23 alongside all previous versions

This software version includes the necessary compatibility for importing models from **ETABS 23**. In addition to all earlier versions (**ETABS 9, ETABS 13, ETABS 15, ETABS 16, ETABS 17, ETABS 18, ETABS 19, ETABS 20, ETABS 21, and ETABS 22**) users can now also use the latest version, **ETABS 23**, for modeling and subsequent detailing with **ETABS MATE**.



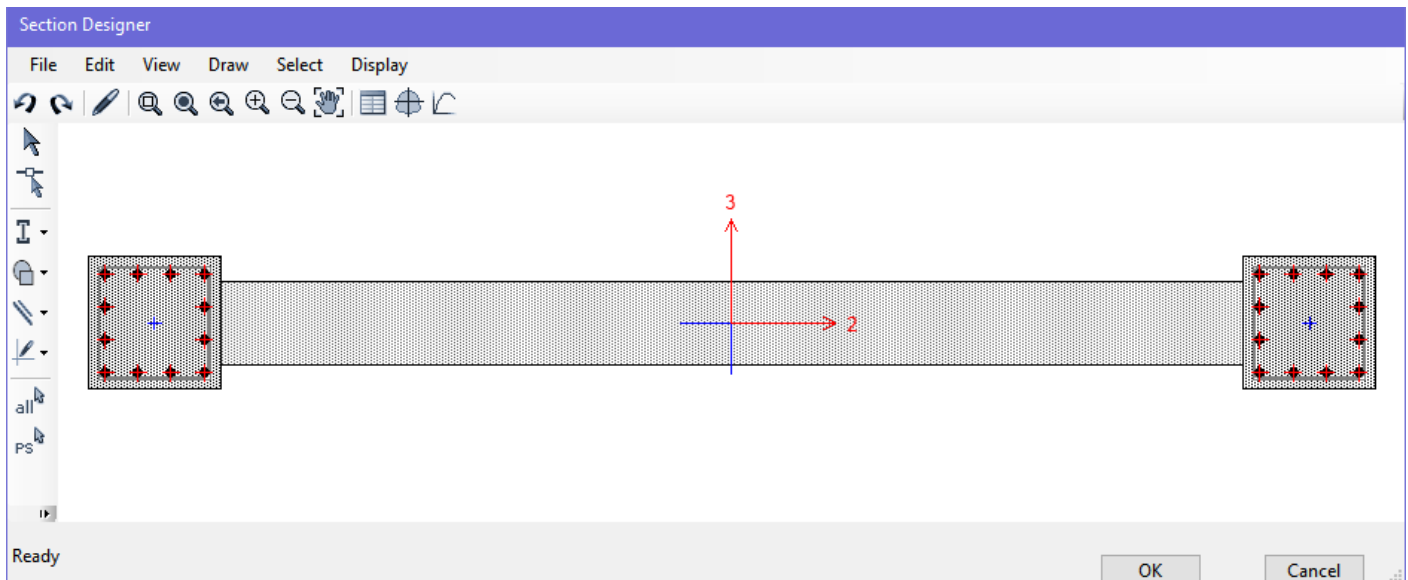
The process for transferring the model and design results from **ETABS 23** to **ETABS MATE** is identical to previous versions. For transferring the model geometry from ETABS, continue to use the e2k text export. For exporting the frame and wall design results, you may use either **Access** or **XML** outputs. To do so, select the **Concrete Frame Design Output** and **Shear Wall Design Output** tables.

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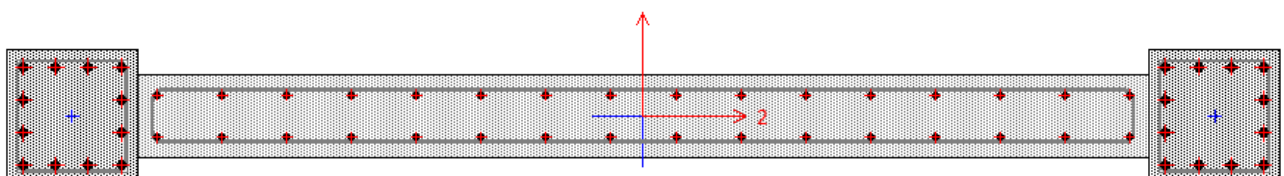
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■ Compatibility with new ETABS changes that greatly simplify shear wall section drawing

Starting from **ETABS** version **22.5** and later, changes have been made to the automatic definition of shear wall sections in the Section Designer interface. Instead of defining a single overall polyline for the entire wall, **ETABS** now defines the columns and the middle portions of the wall as multiple separate rectangles by default, as shown in the image below. This change ensures that the wall section defined by **ETABS** is more compatible with **ETABS MATE**, eliminating the need for the user to modify or redefine the wall sections and significantly increasing the speed of section definition and reinforcement assignment in **ETABS**.



As shown in the image, **ETABS** draws the columns as separate components and automatically sets their reinforcement details according to what is defined for the columns that are pierced with the wall. It is only necessary to right-click on the wall web and set the Reinforcing parameter to **Yes** to define the reinforcement details of the wall's middle portion. In this way, the wall section is easily defined, as shown in the image below. The new version of **ETABS MATE** includes the necessary compatibility to read wall data defined in this manner in **ETABS**, and you can take advantage of this new feature.

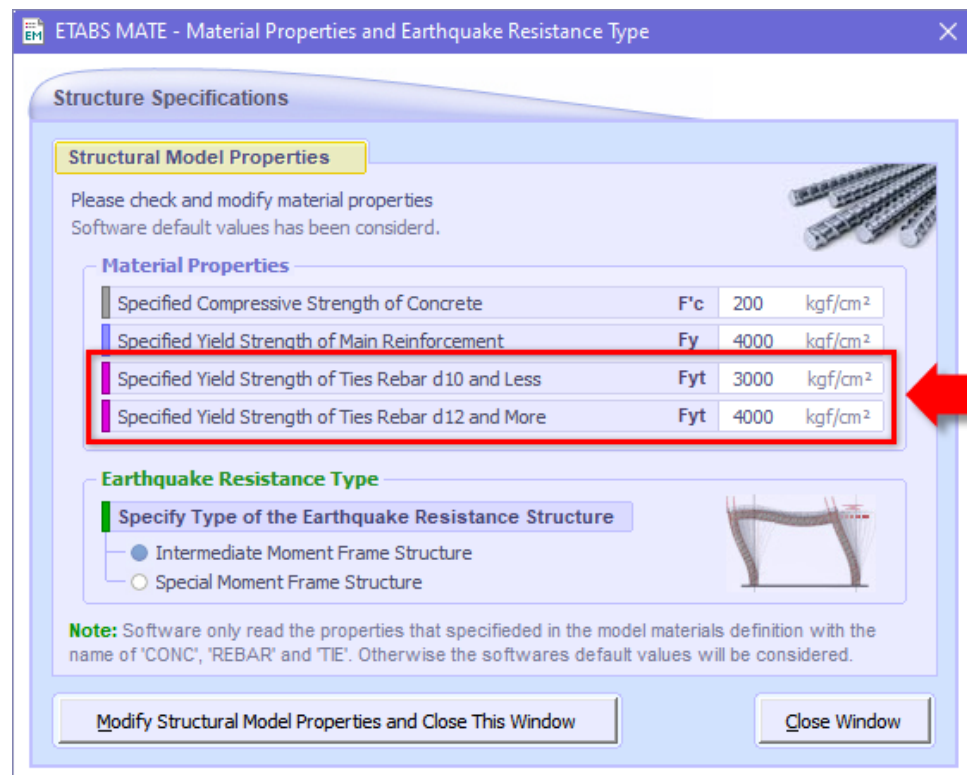


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■ Ability to define a different yield strength for transverse reinforcement with a diameter of 10 mm and below

Since many projects use multiple stirrup sizes, and the yield strength of 8 mm and 10 mm diameters is typically lower than that of 12 mm and larger diameters, this version introduces the ability to define one yield strength value for transverse reinforcement of 10 mm and below, and a different value for diameters of 12 mm and above. This feature enables a significantly more optimized design for the transverse reinforcement of beams, columns, and shear walls.



To do this, after importing the e2k file, you can define the Fyt values separately for diameters up to 10 mm and for diameters greater than 10 mm, as shown in the image. When the transverse rebar diameter is 10 mm or less, the software uses the first yield strength value in its calculations. When the transverse rebar diameter is greater than 10 mm, it uses the second yield strength value. This improves design accuracy and enables a more economical design.

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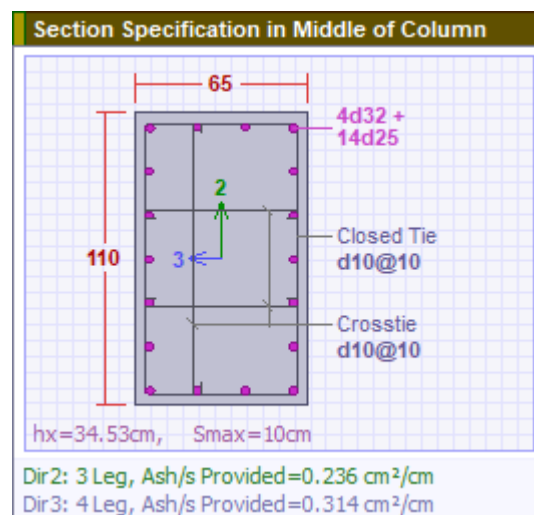
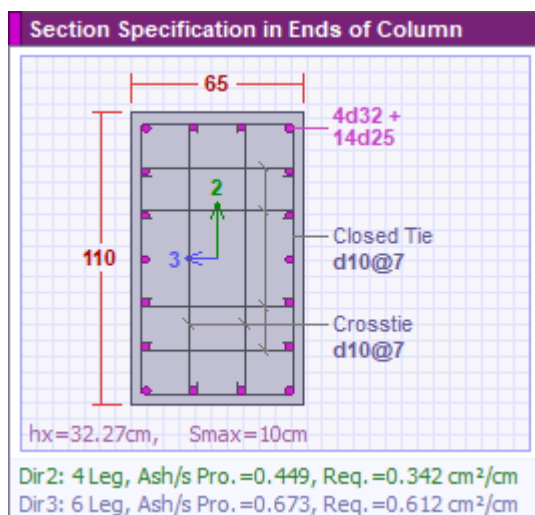
Concrete Structure Detailing Software

■ Separate shear control and automatic transverse reinforcement design for columns in the 2 and 3 directions

Since the required shear reinforcement quantity can differ between the two directions of a column, **ETABS MATE** not only checks the code provisions separately for each direction but also designs the ties and crosstie configuration independently for each direction, based on the shear reinforcement quantities calculated by ETABS. The software automatically satisfies the required transverse reinforcement in each direction by adjusting the tie spacing, determining the optimal crosstie arrangement, and adjusting the transverse rebar diameter. This feature provides a significantly more economical design for rectangular columns or columns with substantially different shear demands in each direction.

The software's strategy for column tie design and transverse reinforcement configuration is as follows: the first priority is to reduce the tie spacing down to the user-defined limit, then increase the number of crossties where possible, then use double closed ties if permitted, and finally increase the tie diameter. This cycle continues until a suitable detail is obtained. As shown in the image below, in the end section of the column, the software has satisfied the required transverse reinforcement without increasing the tie diameter by reducing the tie spacing and increasing the number of crossties in each direction, providing an optimized design for the required transverse reinforcement.

It should be noted that the crosstie arrangement and all other transverse reinforcement details can also be edited by the user, allowing the user to fully apply their preferences in the column detailing.



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■ New and highly practical interface for defining column transverse reinforcement properties and configuration

A highly practical and user-friendly interface has been designed for defining the transverse reinforcement details of columns. Through this interface, users can easily view or edit the closed tie and crosstie details of the project's column sections. As shown in the image, all column information, including the ductility type, primary or secondary section designation, high pressure or low pressure status, longitudinal rebar arrangement, crosstie configuration in each direction, tie diameter and spacing, the required transverse reinforcement quantity based on the code, and much more, can be viewed or edited through this interface.

ETABS MATE - Column Section Tie Definition

Define Column Sections Details

High Pressure Secondary Section SPECIAL Calculation Config

Select Column Section

- C65_12.3222
- C65_12.32
- C13065_18.25
- C13065_18.3225
- C55_12.25 [HP]
- C65_12.22 [HP]
- C11065_18.2522 [HP]
- C13065_18.25 [HP]
- C11065_18.3225 [HP]
- C65_12.2822 [HP]
- C65_12.2522 [HP]
- C13065_18.32 [HP]
- C65_12.32 [HP]
- C11065_18.32 [HP]
- C11065_18.322 [HP]
- C65_12.3222*(EM1)
- C65_12.22*(EM1)
- C65_12.22*(EM2)
- C65_12.22 [HP]*(EM1)
- C65_12.22 [HP]*(EM2)
- C65_12.22 [HP]*(EM3)
- C65_12.22 [HP]*(EM4)
- C65_12.22 [HP]*(EM5)
- C65_12.22 [HP]*(EM6)
- C11065_18.2522 [HP]*(EM1)
- C13065_18.25 [HP]*(EM1)
- C11065_18.3225 [HP]*(EM1)
- C65_12.2822 [HP]*(EM1)
- C11065_18.2522 [HP]*(EM2)
- C65_12.2522 [HP]*(EM1)
- C55_12.22*(EM1)
- C65_12.32 [HP]*(EM1)

Section Specification in Ends of Column

65 65

12d22

Closed Tie d10@8

Crosstie d10@8

hx=17.6cm, Smax=13cm

Dir2: 4 Leg, Ash/s Pro.=0.393, Req.=0.381 cm²/cm

Dir3: 4 Leg, Ash/s Pro.=0.393, Req.=0.381 cm²/cm

Section Specification in Middle of Column

65 65

12d22

Closed Tie d10@13

Crosstie d10@13

hx=17.6cm, Smax=13cm

Dir2: 4 Leg, Ash/s Pro.=0.242, Req.=0.066 cm²/cm

Dir3: 4 Leg, Ash/s Pro.=0.242, Req.=0.066 cm²/cm

Column Ends Transverse Reinforcements (in Lo)

Rebar S Ends

Φ 10 @ 8 cm Reset Tie D,S

Number of Crossties in Dir.2 2 Pcs

Number of Crossties in Dir.3 2 Pcs

Number of Confining Closed Tie 1 Pcs

Column Middle Part Transverse Reinforcements

Rebar S Middle

Φ 10 @ 13 cm Reset Tie D,S

Number of Crossties in Dir.2 2 Pcs

Number of Crossties in Dir.3 2 Pcs

Number of Confining Closed Tie 1 Pcs

Modify the Transverse Reinforcement Details of the Selected Section

Note: Transverse reinforcement of the Primary Section calculated automatically in base of ACI code by software. And Secondary Sections that marked by *(EM...) generated automatically by software to satisfy the shear requirements of any column that Primary Section cant satisfy its requirements.

Recalculate Secondary Section and Column Types

Resete All Secondary Sections

Reset Ties Details of All Sections

Close

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By selecting any section, indicators appear at the top of this interface, which are described below:



Primary Section

Indicates that the selected section is of the Primary type. The transverse reinforcement of primary sections is automatically designed by the software to satisfy the code requirements of the section, including limits on tie and crosstie spacing and diameter, as well as the $A_{sh}/s b_c$ relationships.

Secondary Section

Indicates that the selected section is of the Secondary type. The transverse reinforcement of secondary sections is designed by the software to satisfy, in addition to code requirements, the shear reinforcement quantity A_v/s calculated by ETABS for the column or the requirements for High Pressure columns. In other words, if the transverse reinforcement quantity of the Primary section does not meet the column shear reinforcement demand, the software automatically generates the Secondary section and designs its transverse reinforcement quantity to satisfy the column shear reinforcement demand. In addition to defining secondary sections, the software also automatically assigns these sections to the corresponding column. Secondary sections are named by the software using a combination of the primary section name and the suffix ***(EM...)**.

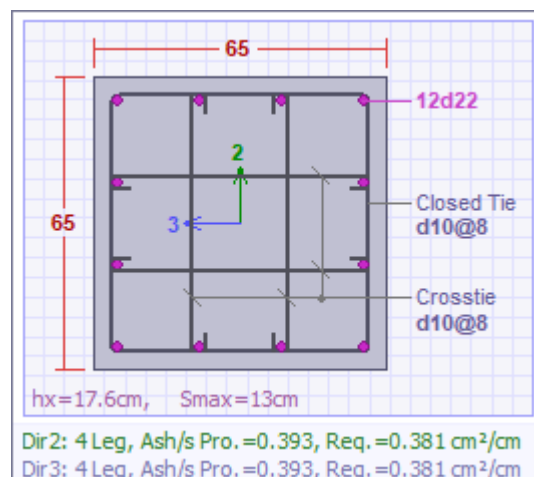
High Pressure

Indicates that the selected section is used for a column identified by the software as being under high compression. These sections are automatically named by the software using a combination of the primary section name and the suffix **[HP]**.

SPECIAL

Indicates that the transverse reinforcement of the column sections has been designed under the special ductility condition.

As shown in the image, other highly useful and practical information is also visible in this user interface, including the **Section Dimensions**, the details and configuration of the **Longitudinal Rebars**, the details of the **Closed Ties and Crossties**, the **Number of Transverse Reinforcement Legs** in each direction of the section, the parameter S_{max} , i.e., the maximum permissible tie spacing based on the ACI Code, the value of the parameter h_x , which is used in calculating the tie spacing, the parameter A_{sh}/s Req., i.e., the required transverse reinforcement quantity of the section, and the parameter A_{sh}/s Pro., i.e., the provided transverse reinforcement quantity supplied by the ties and crossties in each direction of the section.



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Number of Confining Closed Tie 1 Pcs

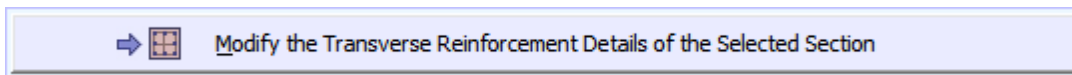
Number of Confining Closed Tie 1 Pcs

Modify the Transverse Reinforcement Details of the Selected Section

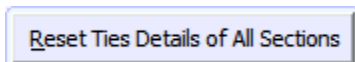
Note: Transverse reinforcement of the Primary Section calculated automatically in base of ACI code by software. And Secondary Sections that marked by *(EM...) generated automatically by software to satisfy the shear requiremnts of any column that Primary Section cant satisfy its requirements.

Recalculate Secondary Section and Column Types Resete All Secondary Sections Reset Ties Details of All Sections Close

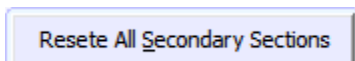
The buttons located at the bottom of this user interface are described below:



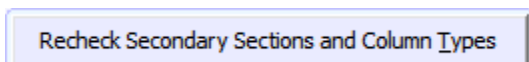
This button must be used to save the changes made, after editing the properties for any section.



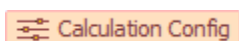
This tool recalculates the transverse reinforcement details of all primary sections based on the ductility type, code requirements, and the parameters defined in the column design configuration user interface. It then regenerates the secondary sections, designs their transverse reinforcement based on the shear demands of the corresponding element, and subsequently re-executes the column classification process. In other words, using this tool discards all user edits made to the column sections, and the details of all sections, including primary and secondary sections, are reset to the software's computational defaults.



This tool deletes all secondary sections, then regenerates them based on the primary section configuration, redesigns their transverse reinforcement details based on the shear demands of the corresponding element, and subsequently re-executes the column classification process. This tool is useful when the user has modified the transverse reinforcement details of the sections and wishes to have the transverse reinforcement details of the secondary sections redesigned based on the edited primary sections.



This tool re-checks the transverse reinforcement details of the secondary sections based on code requirements, the shear reinforcement quantity A_v/s calculated by ETABS, and the requirements for High Pressure columns. If, based on user edits, the generation of new secondary sections is necessary, new secondary sections are generated, and the software then re-executes the column classification process.



This tool provides access to the user interface for configuring the design and detailing of columns.

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■ Ability to configure column transverse reinforcement differently in the middle region and the special end regions

Given that code requirements for the special end regions of length l_0 at the top and bottom of a column are considerably more stringent than those for the middle region, the software now provides the capability to define the transverse reinforcement details of columns in the end regions separately from the middle region.

In other words, as shown in the image below, in addition to the tie spacing, other parameters such as the crosstie configuration and the number of closed ties in the section can be defined differently and independently for the top and bottom end regions and the middle region of the column. This feature enables a significantly more economical design for columns, particularly in structures with special ductility.

ETABS MATE - Column Section Tie Definition

Define Column Sections Details

Primary Section SPECIAL Calculation Config

Select Column Section

- C65_12.22
- C45_8.18
- C45_8.22
- C50_8.22
- C55_12.18
- C55_12.22
- C55_12.25
- C11065_18.2522
- C11065_18.2822
- C11065_18.3222
- C11065_18.3225**
- C11065_18.32
- C13065_18.32
- C65_12.2522
- C65_12.2822
- C65_12.3222
- C65_12.32
- C13065_18.25
- C13065_18.3225
- C55_12.25 [HP]
- C65_12.22 [HP]
- C11065_18.2522 [HP]
- C13065_18.25 [HP]
- C11065_18.3225 [HP]
- C65_12.2822 [HP]
- C65_12.2522 [HP]
- C13065_18.32 [HP]
- C65_12.32 [HP]
- C11065_18.32 [HP]
- C11065_18.3222 [HP]
- C65_12.3222*(EM1)
- C65_12.22*(EM1)

Section Specification in Ends of Column

ENDS

Diagram: 65x110 section with 4d32 + 14d25, Closed Tie d10@7, Crosstie d10@7. Dimensions: hx=32.27cm, Smax=10cm.

Dir2: 4 Leg, Ash/s Pro.=0.449, Req.=0.342 cm²/cm
Dir3: 6 Leg, Ash/s Pro.=0.673, Req.=0.612 cm²/cm

Column Ends Transverse Reinforcements (in Lo)

Rebar	S Ends	
Φ 10	@ 7 cm	Reset Tie D,S
Number of Crossties in Dir.2	2	Pcs
Number of Crossties in Dir.3	4	Pcs
Number of Confining Closed Tie	1	Pcs

Section Specification in Middle of Column

MIDDLE

Diagram: 65x110 section with 4d32 + 14d25, Closed Tie d10@10, Crosstie d10@10. Dimensions: hx=34.53cm, Smax=10cm.

Dir2: 3 Leg, Ash/s Provided=0.236 cm²/cm
Dir3: 4 Leg, Ash/s Provided=0.314 cm²/cm

Column Middle Part Transverse Reinforcements

Rebar	S Middle	
Φ 10	@ 10 cm	Reset Tie D,S
Number of Crossties in Dir.2	1	Pcs
Number of Crossties in Dir.3	2	Pcs
Number of Confining Closed Tie	1	Pcs

Modify the Transverse Reinforcement Details of the Selected Section

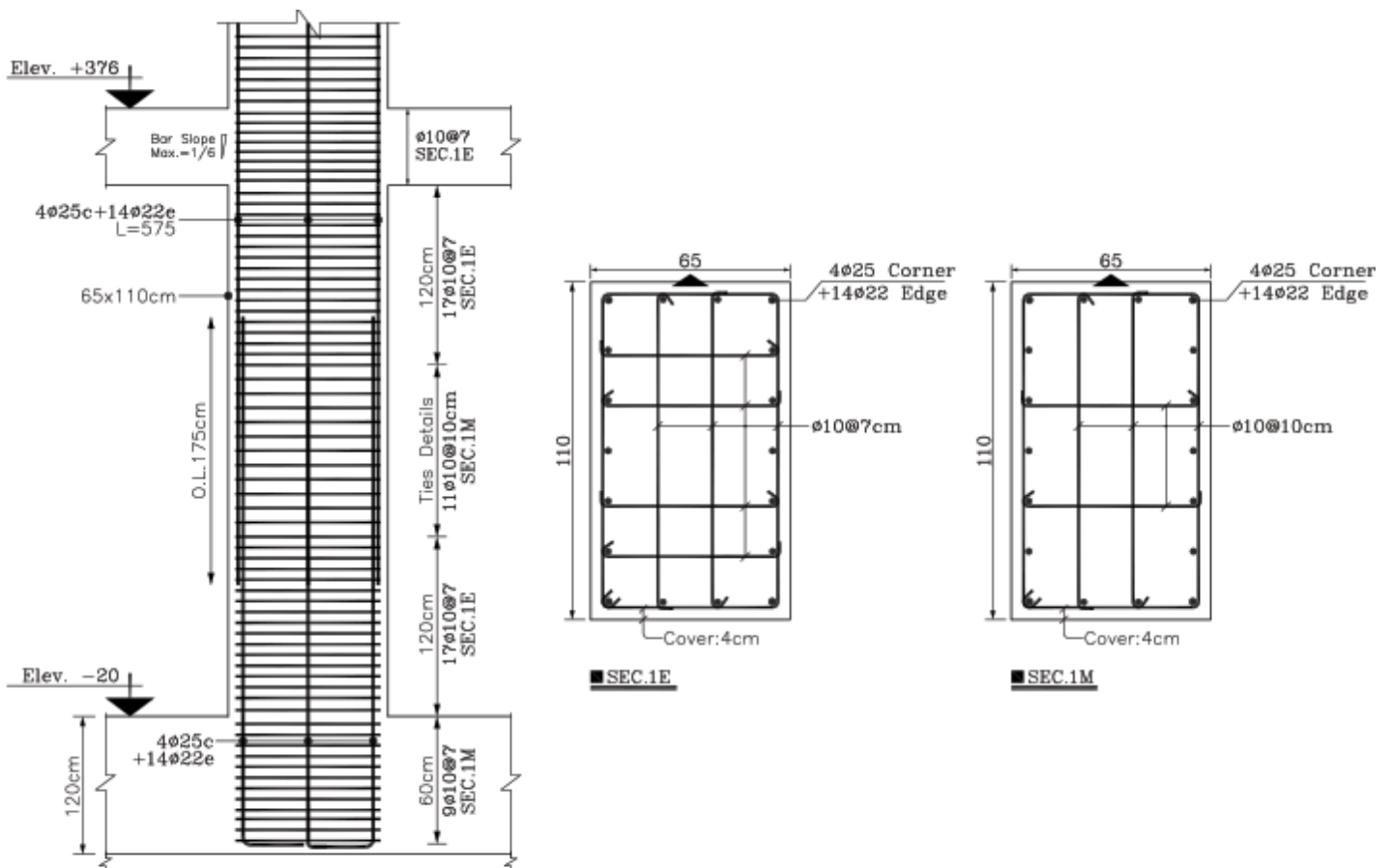
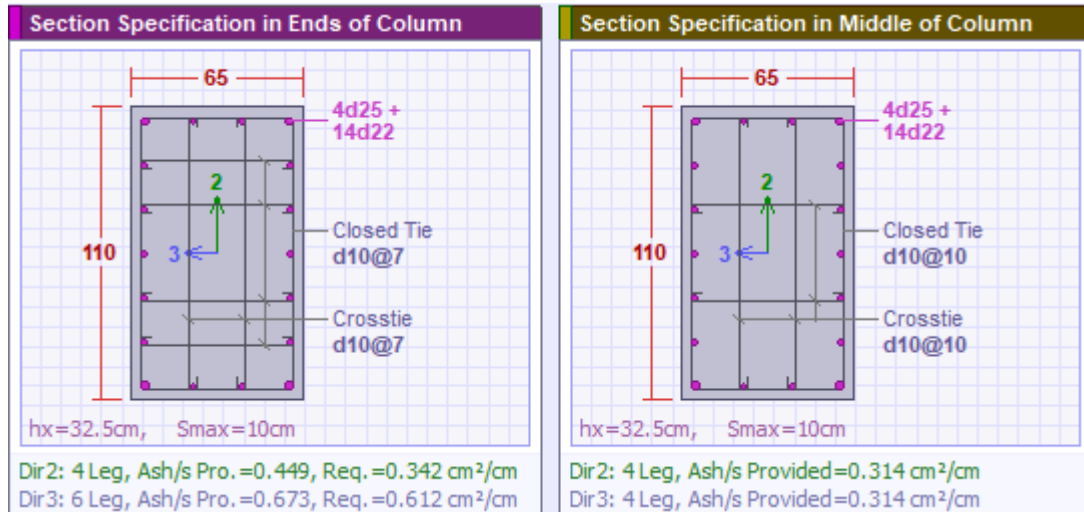
Note: Transverse reinforcement of the Primary Section calculated automatically in base of ACI code by software. And Secondary Sections that marked by *(EM...) generated automatically by software to satisfy the shear requirements of any column that Primary Section cant satisfy its requirements.

Recheck Secondary Sections and Column Types Resete All Secondary Sections Reset Ties Details of All Sections Close

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A sample of the software output for a column based on different tie detail definitions in the end and middle regions is shown in the image below.



■ COLUMN C1

Number=1

H.Scale 1:25
V.Scale 1:40
Sec.Sc. 1:20

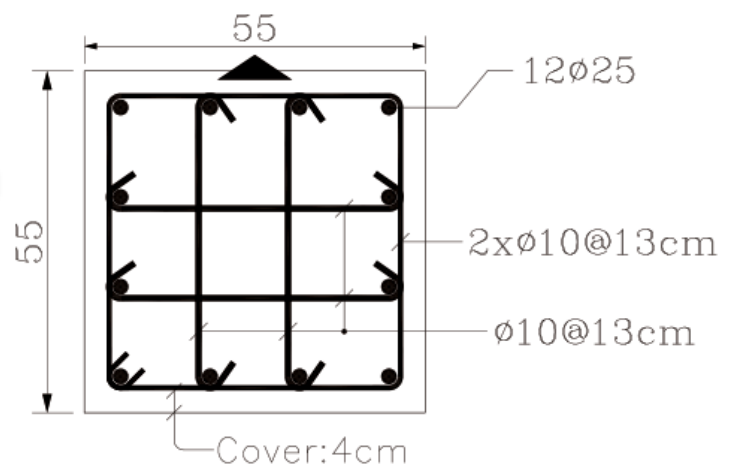
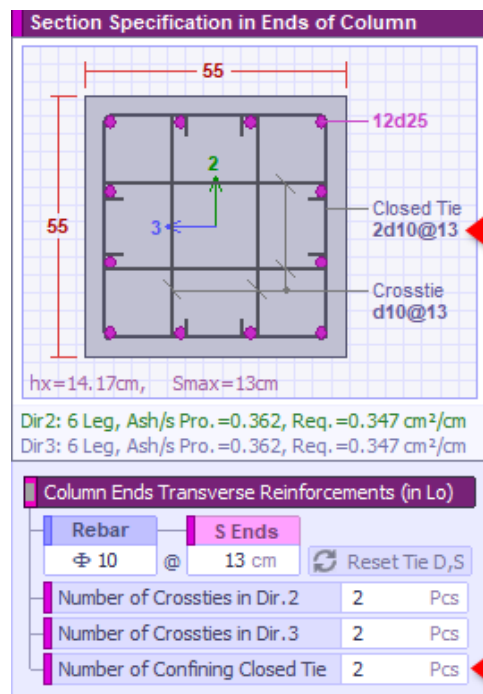
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■ Using double closed ties in the definition of column transverse reinforcement

Since using larger-than-conventional tie diameters in columns can cause numerous construction difficulties, the software now provides the ability to use double closed ties to satisfy the column transverse reinforcement requirements. By adding two legs in each direction to the total number of transverse reinforcement legs in the column section, this option allows a smaller tie diameter to meet the column transverse reinforcement requirements, which greatly facilitates column rebar placement on site.

To do this, in the column section transverse reinforcement definition interface, you can specify the number of closed ties in the **Number of Confining Closed Tie** field, as identified in the image below. This interface is accessible via the **Define** menu and the **Column Section Tie Details** option. In this mode, the program output for the column sections will be as shown below.



You can also configure the column tie design settings so that the software automatically uses double closed ties to avoid increasing the tie diameter. This topic is described on the following page.

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■ Configuring column transverse reinforcement design settings for the use of double closed ties

To allow the software to use double closed ties in the column transverse reinforcement design when necessary, select **Column Reinforcing Design Configuration** from the **Design** menu to open the column design configuration interface, as shown below. In this interface, enabling the option identified in the image allows the software to use double closed ties where necessary to avoid increasing the tie diameter. You can also specify the minimum diameter from which the software is permitted to use double closed ties. By default, the software is permitted to use double closed ties from a diameter of 10 mm and above.

Column Reinforcement Detail Design Configuration

Configuration Settings

Column Reinforcing Design SPECIAL

General Configuration of Column Detailing

- ☒ Do Not Consider Piered Columns in the Column Detailing and Labeling Procedures
- Method of Calculating the Equivalent Height of Beams Connected to the Column Joints**
 - ☒ Consider the Minimum Height of Connected Beams as Equivalent Beam Height
 - ☐ Consider Constant Beam Height for All Columns Joints Equal to cm
- Rounding Step for the Column Reinforcement Design Calculations cm
- Rounding Step for Lo Height Text inserting at the Ends Part of Column cm
- Column Dimension Multiplier for Calculate the Lo Height of Columns
- Minimum Considerable Value for Calculate the Lo Height of Columns cm
- Consider One Tie Detail for all Column Height if Middle Part is Less than cm

Transverse Reinforcements Design Configuration

- ☒ Calculate Column Transverse Reinforcement Details in Case of Special Moment Frame
- ☐ Force Software to Insert the Crossties Over All the Longitudinal Rebars in All Columns
- Minimum Diameter of the Rebar for Design Transverse Reinforcement mm
- Strategy of Configuration of Closed Ties and Crossties to Provide Transverse Steel**
 - ☒ Allow Software to Increase Number of Crossties in Section if Necessary
 - ☒ Allow Software to Use Double Closed Tie in Column Sections if Necessary
 - Only Use Double Closed Tie if Tie Diameter is Equal or More than mm
- ☒ Use Equal Crossties Number for Dir. 2 and Dir. 3 of Column in Square Uniform Sections
- Minimum Acceptable Space Between the Transverse Reinforcements cm
- Distance Step for Design Ties Spacing in Intermediate Moment Frame cm
- Distance Step for Design Ties Spacing in Special Moment Frame cm
- Pitch Step for Design Spiral Pitch in Circular Column with Spiral Ties cm

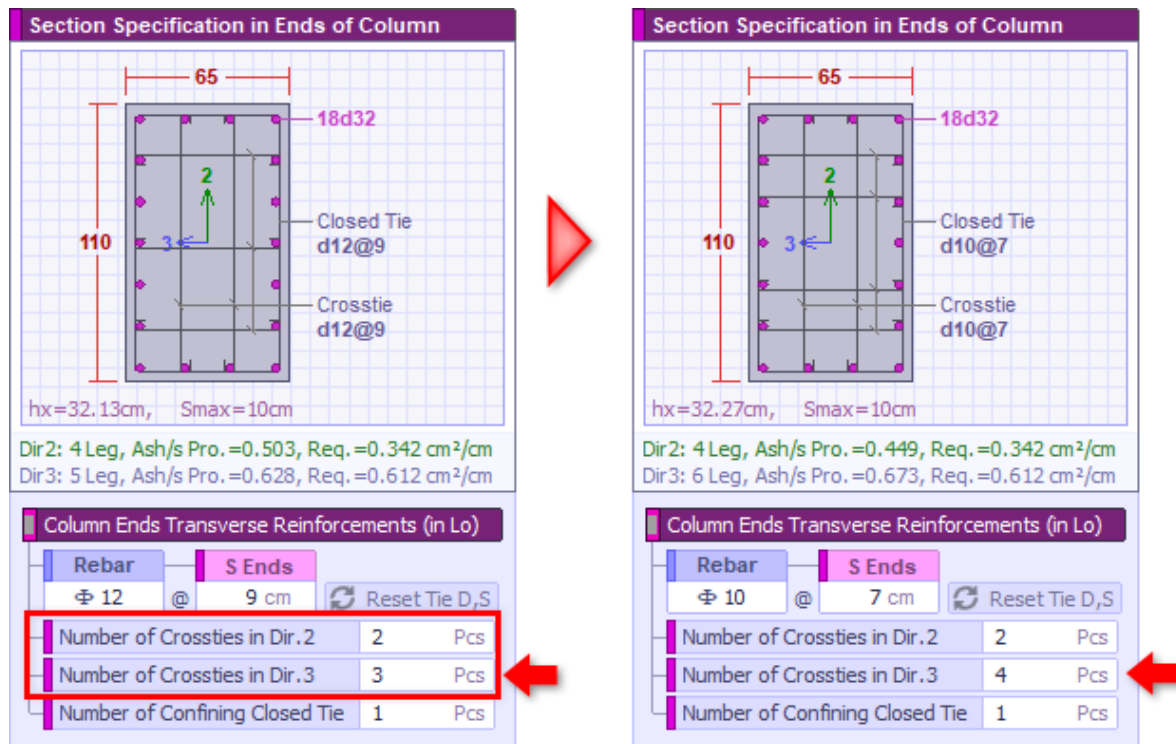
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■ Editing the number of crossties in the column section in each direction

Given that the clear distance between longitudinal rebars in column sections is typically less than 15 cm, the code permits longitudinal rebars to be restrained alternately. As a result, there are usually some unrestrained rebars in columns for which crossties can also be provided. In this case, increasing the number of transverse reinforcement legs can prevent an increase in the tie diameter that would otherwise be required to satisfy the transverse reinforcement demand.

To do this, in the column section transverse reinforcement definition interface, you can set the number of crossties parallel to direction 2 in the **Number of Crossties in Dir. 2** field, and similarly, the number of crossties parallel to direction 3 in the **Number of Crossties in Dir. 3** field, as identified in the image below. This interface is accessible via the **Define** menu and the **Column Section Tie Details** option. It should be noted that when the number of crossties is changed, the software automatically recalculates the diameter, Ash/s Pro., and tie spacing, and simultaneously updates and displays these parameter values, allowing you to select the most optimal crosstie arrangement in terms of both economy and constructability.



For example, as shown in the image above, by adding one crosstie in the direction 3 of the section, the transverse rebar diameter was reduced from 12 mm to 10 mm, which may be a more favorable configuration in many projects.

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■ Configuring column transverse reinforcement design settings to allow increasing the number of crossties

To allow the software to automatically increase the number of crossties in each direction during the transverse reinforcement design when necessary, select **Column Reinforcing Design Configuration** from the **Design** menu to open the column design configuration interface, as shown below. In this interface, enabling the option identified in the image allows the software to increase the number of crossties in each direction as much as possible when required, so that it can satisfy the required transverse reinforcement quantity before increasing the tie diameter.

Column Reinforcement Detail Design Configuration

Configuration Settings

Column Reinforcing Design SPECIAL

General Configuration of Column Detailing

- ☒ Do Not Consider Piered Columns in the Column Detailing and Labeling Procedures
- Method of Calculating the Equivalent Height of Beams Connected to the Column Joints**
 - ☒ Consider the Minimum Height of Connected Beams as Equivalent Beam Height
 - ☐ Consider Constant Beam Height for All Columns Joints Equal to cm
- Rounding Step for the Column Reinforcement Design Calculations cm
- Rounding Step for Lo Height Text inserting at the Ends Part of Column cm
- Column Dimension Multiplier for Calculate the Lo Height of Columns
- Minimum Considerable Value for Calculate the Lo Height of Columns cm
- Consider One Tie Detail for all Column Height if Middle Part is Less than cm

Transverse Reinforcements Design Configuration

- ☒ Calculate Column Transverse Reinforcement Details in Case of Special Moment Frame
- ☐ Force Software to Insert the Crossties Over All the Longitudinal Rebars in All Columns
- Minimum Diameter of the Rebar for Design Transverse Reinforcement mm
- Strategy of Configuration of Closed Ties and Crossties to Provide Transverse Steel**
 - ☒ Allow Software to Increase Number of Crossties in Section if Necessary
 - ☒ Allow Software to Use Double Closed Tie in Column Sections if Necessary
 - Only Use Double Closed Tie if Tie Diameter is Equal or More than mm
- ☒ Use Equal Crossties Number for Dir. 2 and Dir. 3 of Column in Square Uniform Sections
- Minimum Acceptable Space Between the Transverse Reinforcements cm
- Distance Step for Design Ties Spacing in Intermediate Moment Frame cm
- Distance Step for Design Ties Spacing in Special Moment Frame cm
- Pitch Step for Design Spiral Pitch in Circular Column with Spiral Ties cm

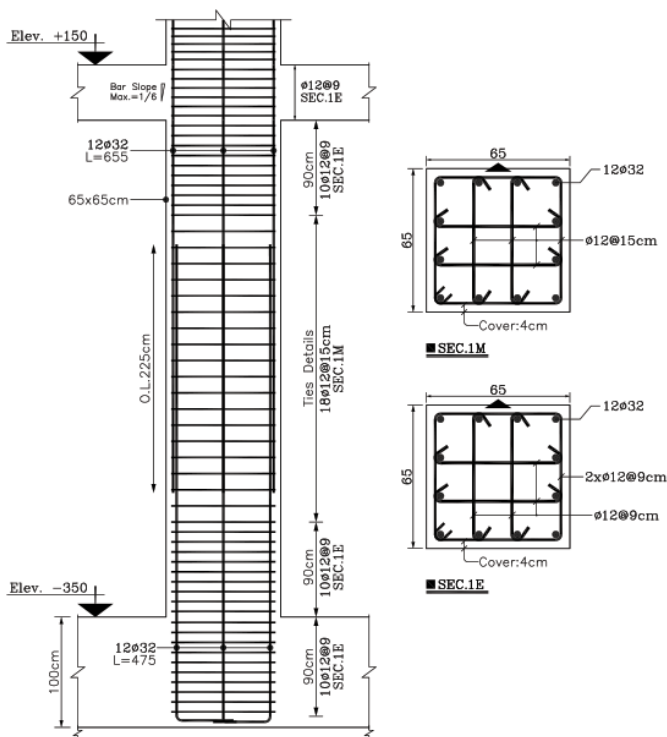
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■ Application of high pressure column provisions when the rebar splice type is welded or mechanical

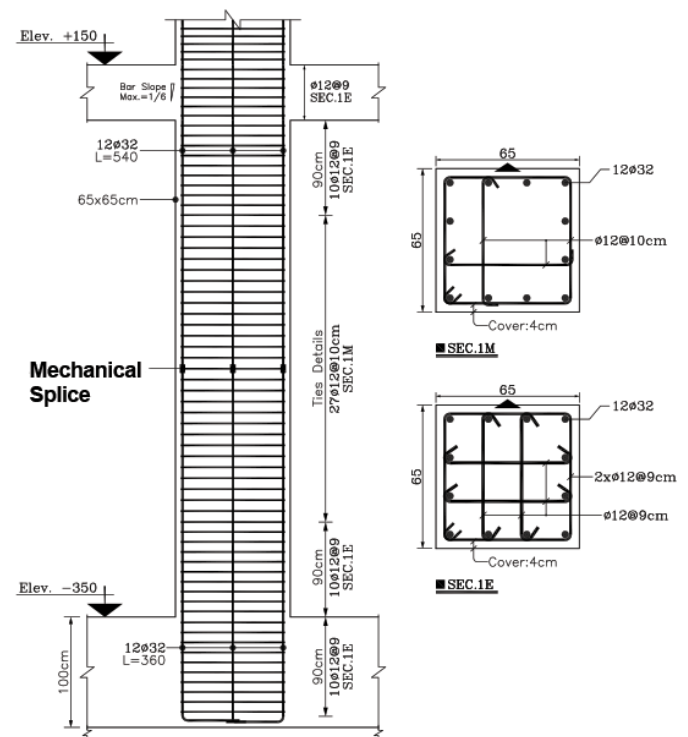
When a column is identified as high pressure, the specific provisions for high pressure columns must be applied in the design and detailing of the transverse reinforcement in the end regions and at the lap splice location in the middle region. These provisions include restraining all longitudinal rebars with seismic hooks and calculating the ties based on the column compressive force, in addition to the other special ductility requirements. However, if the splice type is mechanical or welded, these highly stringent provisions are not required in the middle region of the column. Therefore, when the splice type of a high pressure column is welded or mechanical, the software automatically detects the splice type and applies the corresponding code provisions in its design and detailing.

In the image below, the rebar splice of the left column is a lap splice, while the rebar splice of the right column is a mechanical splice. As can be seen, when a mechanical splice is used, the software has calculated a significantly lighter transverse reinforcement detail in the middle region of the column. This option contributes considerably to the overall economy of the project.



■ COLUMN C11

Overlap Splice



■ COLUMN C11

Mechanical Splice

ETABS MATE

Concrete Structure Detailing Software

■ A new interface for configuring the detailed design and detailing of columns

With the addition of numerous options for column design and detailing, the frame detailing design parameters configuration interface has been divided into two separate interfaces: one for configuring the beam detailing design parameters, and one for configuring the column detailing design parameters. The column detailing design parameters configuration interface is shown in the image below. This interface is accessible via the **Design** menu and the **Column Reinforcing Design Configuration** option.

Column Reinforcement Detail Design Configuration

Configuration Settings

Column Reinforcing Design SPECIAL

General Configuration of Column Detailing

☒ Do Not Consider Piered Columns in the Column Detailing and Labeling Procedures

Method of Calculating the Equivalent Height of Beams Connected to the Column Joints

☒ Consider the Minimum Height of Connected Beams as Equivalent Beam Height

☐ Consider Constant Beam Height for All Columns Joints Equal to cm

Rounding Step for the Column Reinforcement Design Calculations cm

Rounding Step for Lo Height Text inserting at the Ends Part of Column cm

Column Dimension Multiplier for Calculate the Lo Height of Columns

Minimum Considerable Value for Calculate the Lo Height of Columns cm

Consider One Tie Detail for all Column Height if Middle Part is Less than cm

Transverse Reinforcements Design Configuration

☒ Calculate Column Transverse Reinforcement Details in Case of Special Moment Frame

☐ Force Software to Insert the Crossies Over All the Longitudinal Rebars in All Columns

Minimum Diameter of the Rebar for Design Transverse Reinforcement mm

Strategy of Configuration of Closed Ties and Crossies to Provide Transverse Steel

☒ Allow Software to Increase Number of Crossies in Section if Necessary

☒ Allow Software to Use Double Closed Tie in Column Sections if Necessary

☐ Only Use Double Closed Tie if Tie Diameter is Equal or More than mm

☒ Use Equal Crossies Number for Dir. 2 and Dir. 3 of Column in Square Uniform Sections

Minimum Acceptable Space Between the Transverse Reinforcements cm

Distance Step for Design Ties Spacing in Intermediate Moment Frame cm

Distance Step for Design Ties Spacing in Special Moment Frame cm

Pitch Step for Design Spiral Pitch in Circular Column with Spiral Ties cm

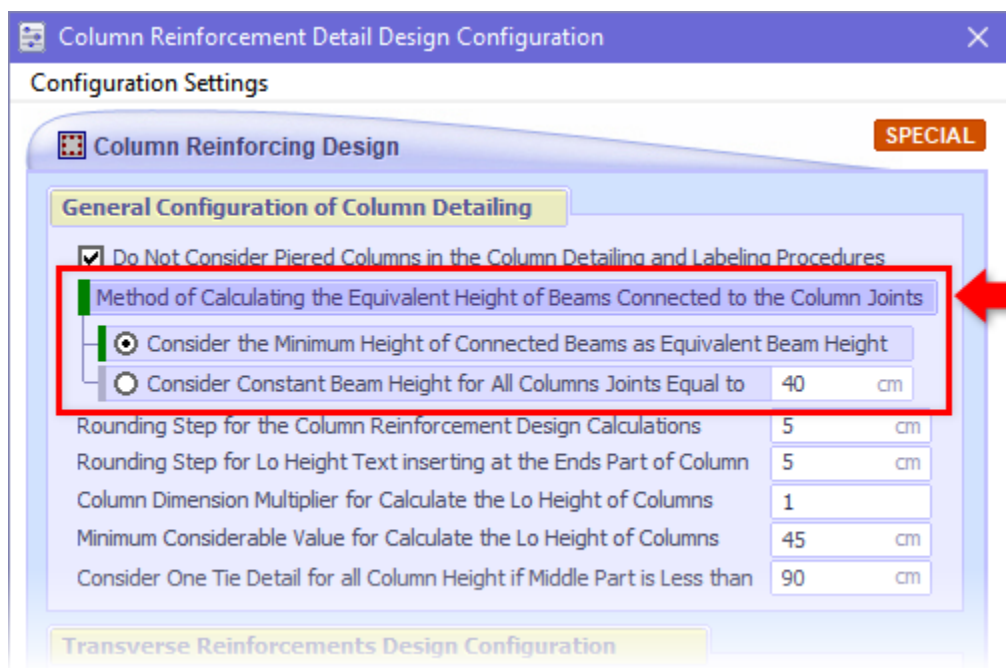
Apply Changes and Close Close

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■ Option for the method of calculating the equivalent beam height in l_0 length determination and column detailing

Since the parameter l_0 , which is the length of the critical region of the column, must be calculated based on the clear column height, the equivalent height of the beams framing into the columns must first be calculated for each column type in order to determine the clear column height. For this purpose, as shown in the image below, two different methods are provided, and the user may choose either at their discretion. These are described below.



☒ Consider the Minimum Height of Connected Beams as Equivalent Beam Height

In this mode, the software first collects the data of all beams connected to the ends of the columns belonging to a given column type at each story, and then considers the minimum height of these beams as the equivalent beam height at that story. Since this method yields a larger clear height, it calculates the critical region length more conservatively and more closely aligned with the actual project conditions.

☐ Consider Constant Beam Height for All Columns Joints Equal to 40 cm

In this mode, the software applies a constant value, provided by the user, as the equivalent beam height across all stories and for all column types.

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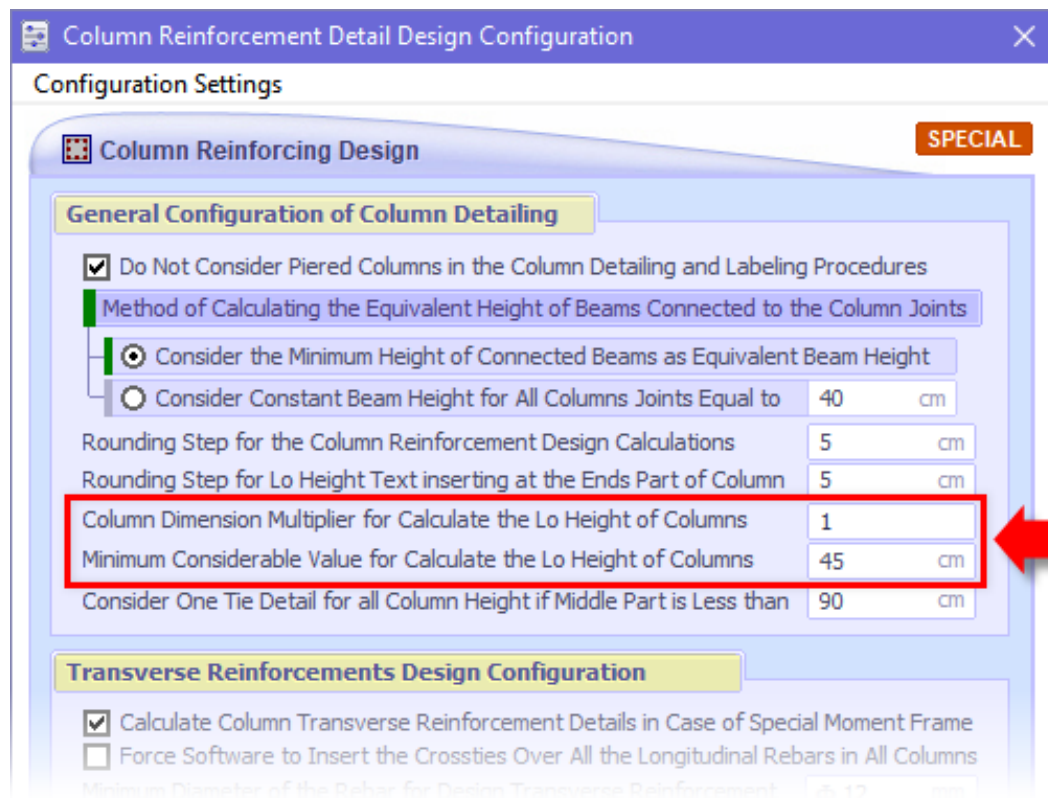
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■ Ability to define a minimum value for l_0 , the critical region height in columns

The software now provides the ability for the user to define a minimum value for the l_0 parameter, which is the height of the critical region of the column. Using this parameter, you can ensure that the critical region length of the column is never considered less than the value defined here. By default, this parameter is set to 45 cm in accordance with the code. Furthermore, since l_0 must also not be less than the largest column dimension, you can additionally define a minimum l_0 based on a multiplier of the column dimension. By default, this multiplier is set to 1 in accordance with the code.

As shown in the image below, these parameters can be defined through the column detailing design parameters configuration interface.

It should be noted that the column detailing design parameters configuration interface is accessible via the **Design** menu and the **Column Reinforcing Design Configuration** option.



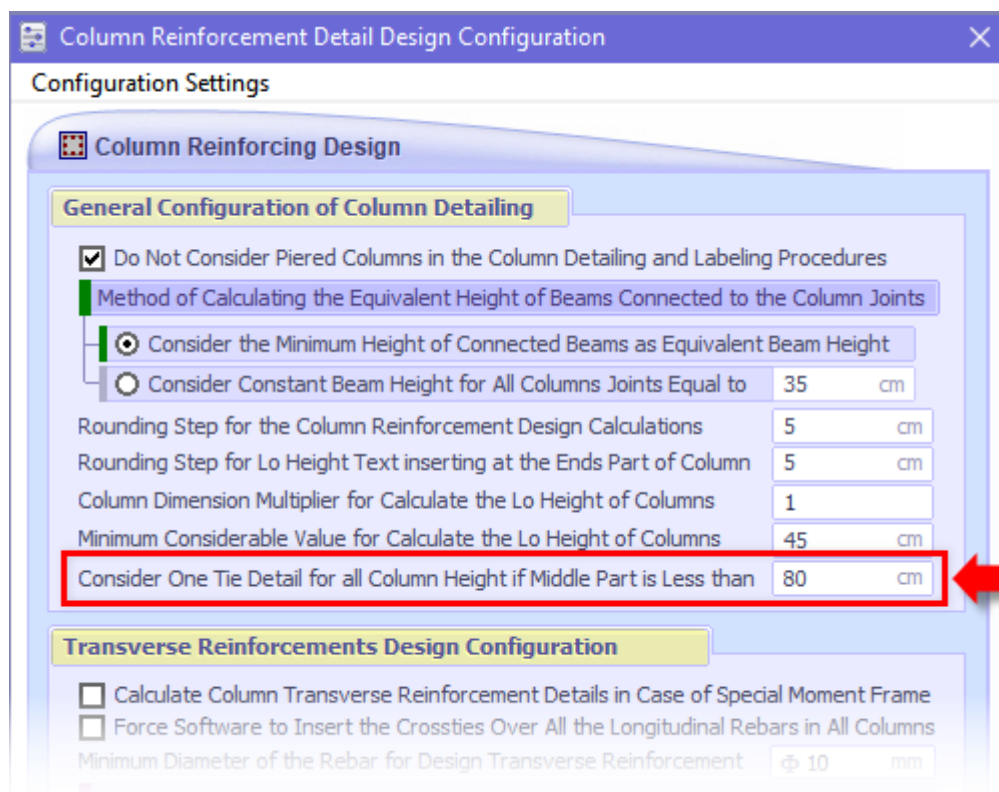
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■ Option for applying uniform tie details over the entire column height based on the middle region length

Typically, column ties are detailed differently for the end critical regions and the middle region. However, if the column height is short or the column dimensions are large, the end critical regions may become large, resulting in a very short middle region. In this case, only a few ties are placed in the middle region, which can cause the detail text annotations to overlap. Under these conditions, many engineers prefer that the entire column be tied uniformly. For this purpose, a parameter has been included in the design settings, allowing the user to specify that if the height of the middle region falls below this parameter, the entire column height will be tied uniformly based on the details calculated for the critical region.

As shown in the image below, these parameters can be defined through the column detailing design parameters configuration interface. By default, this parameter is set to 80 cm. It should be noted that the column detailing design parameters configuration interface is accessible via the **Design** menu and the **Column Reinforcing Design Configuration** option.



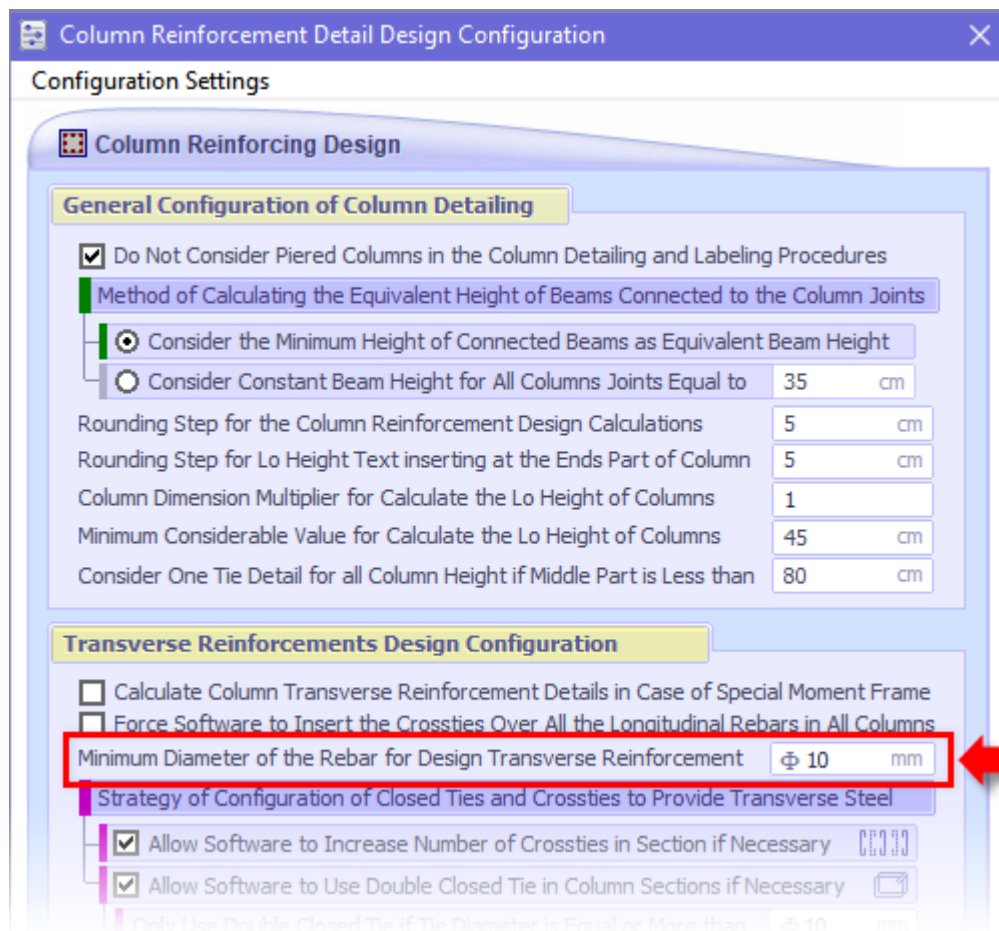
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■ Ability for the user to define a minimum transverse rebar diameter for column ties and crossties

The software now provides the ability for the user to specify a minimum diameter for the column transverse reinforcement calculation. If you wish to change the minimum diameter of all ties, this parameter allows you to easily modify the minimum tie and crosstie diameter for all sections, without the need to edit each section individually. Upon changing this parameter, the software automatically recalculates the transverse reinforcement details for all column sections based on the newly defined minimum diameter.

As shown in the image below, these parameters can be defined through the column detailing design parameters configuration interface. By default, this parameter is set to 10 mm in accordance with the code. It should be noted that the column detailing design parameters configuration interface is accessible via the **Design** menu and the **Column Reinforcing Design Configuration** option.

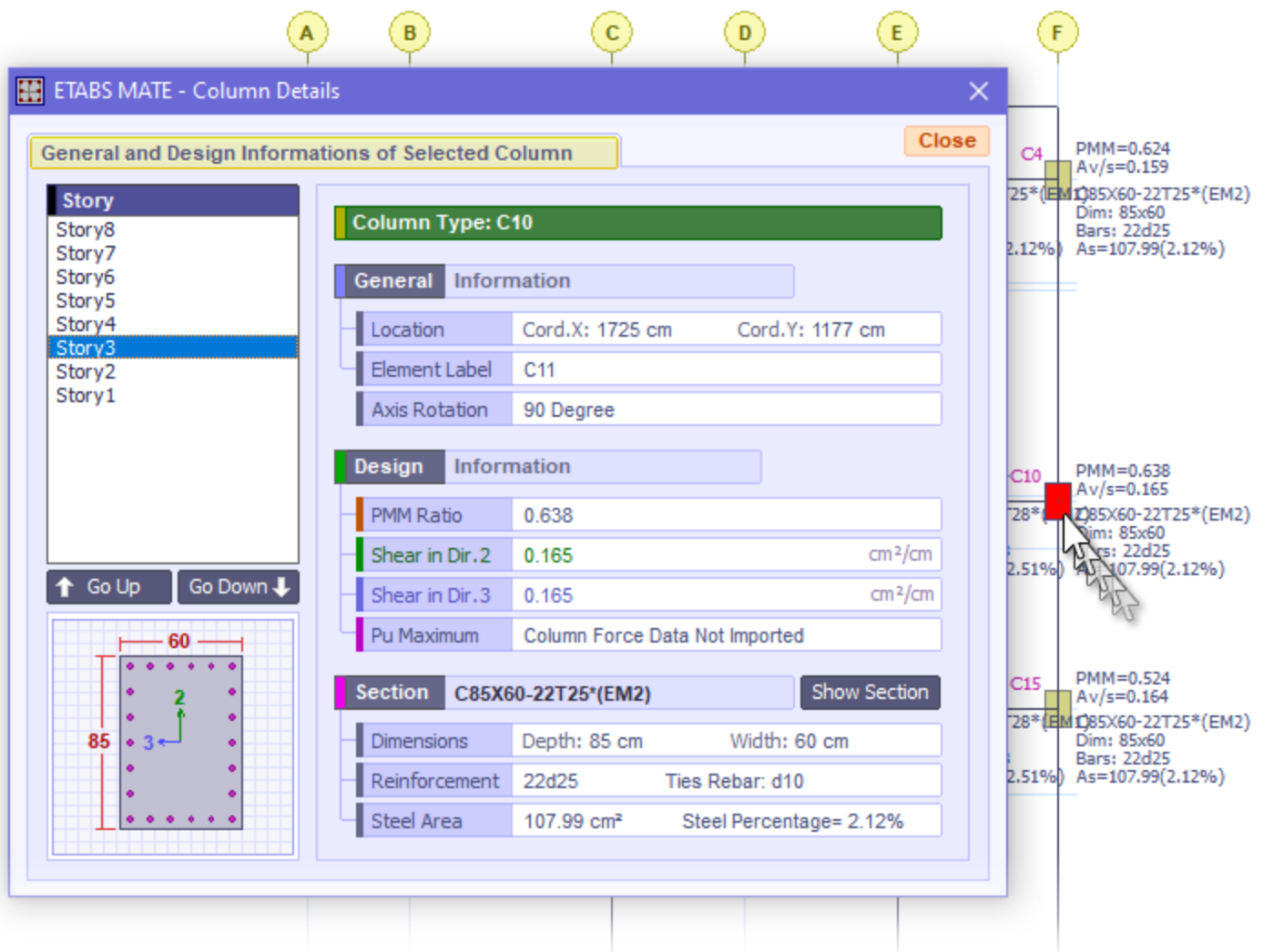


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■ Addition of a new and highly practical interface for viewing column geometry and design details

A highly practical interface has been designed for better viewing of column geometry and design details. This interface appears upon clicking on any column in the **Column Information** layer and, as shown in the image, displays the modeling details, design information including the **PMM Ratio**, the required transverse reinforcement quantity of the section in the **2** and **3** directions, the maximum compressive force applied to the column, and the section information assigned to the column. Furthermore, using the story list or the navigation keys, you can also view the details of columns located directly above or below the selected column, thereby easily observing and verifying the vertical details of each column type. Additionally, by using the **Show Section** button, you can view the complete section details, including the longitudinal and transverse reinforcement details.

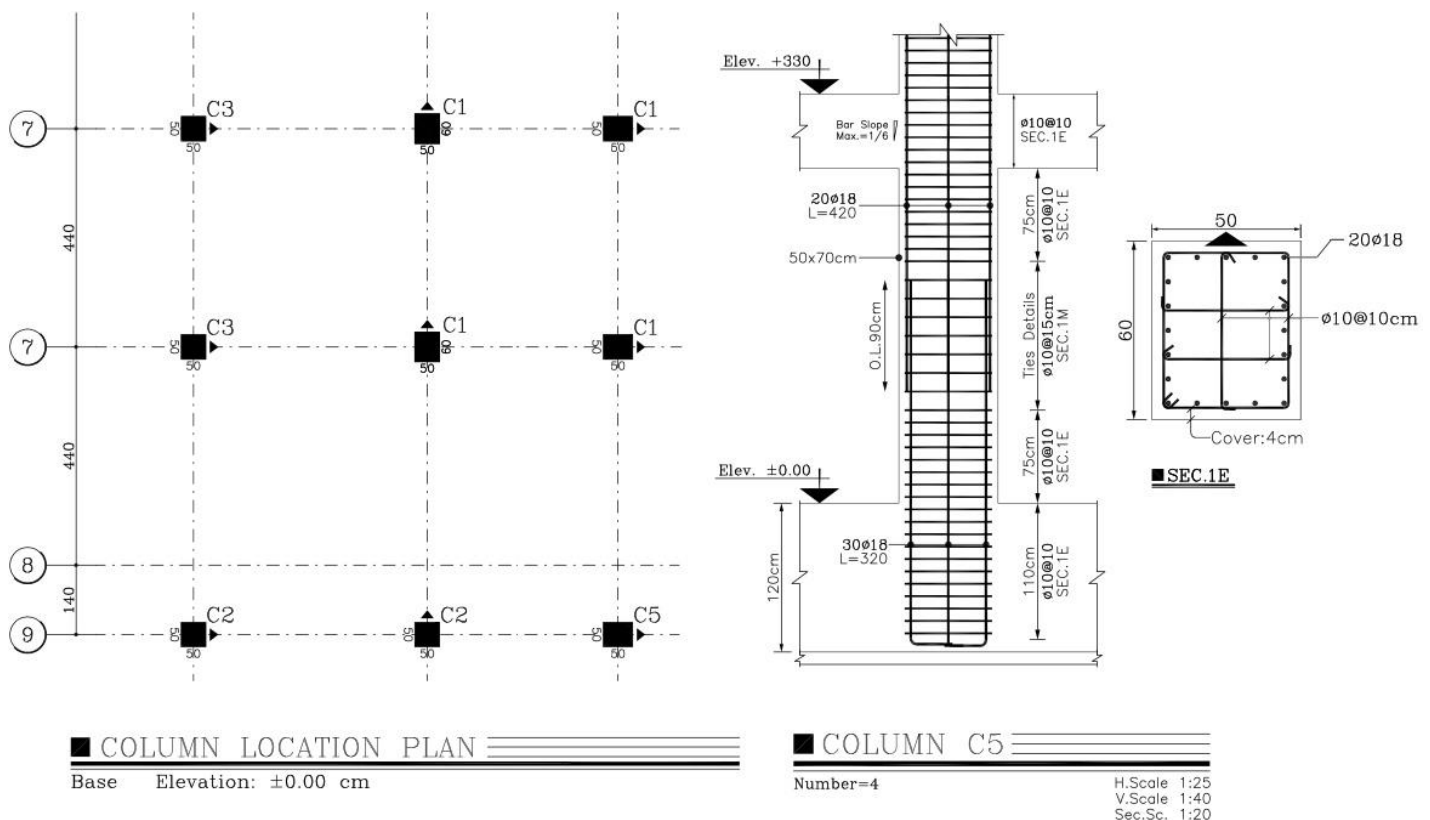


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■ Drawing of a column orientation indicator on the section and column layout plan to prevent errors

Since the column orientation in plan is critically important for rectangular columns or square columns with different numbers of rebars on the section faces, the software now provides the capability to indicate the column orientation using a directional symbol on the column section and in the column layout plan, as shown in the image below, to prevent construction errors. This option can play a significant role in avoiding construction issues. However, since only the lowest column section is displayed in the column location plan, care must be taken during structural modeling to ensure that the upper column sections are also drawn with exactly the same orientation as the lowest column section.



To enable this option, select **Export Frame Drawings to AutoCAD** from the **Export** menu, and then in the **Column** tab, enable the **Draw Direction Symbol for Column Insertion** option, as shown in the image below. This option is enabled by default.

☒ Draw Direction Symbol for Column Insertion

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■ Addition of a modular length parameter for beam typical rebars in the beam design configuration interface

Given that the standard rebar length may vary across different manufacturers or countries, the software now provides the capability for the user to configure the modular length of the beam typical rebars. To do this, select **Beam Reinforcing Design Configuration** from the **Design** menu to open the beam design configuration interface, as shown below. By default, this parameter is set to **1200 cm**.

ETABS MATE - Beam Reinforcement Detail Design Configuration

Configuration Settings

Beam Reinforcing Design Configuration Close

Beam Additional Rebar Calculation Method

☐ Parametric According to Beam Length ☒ Exact According to Beam Steel Diagrams

Beam Additional Rebar

Select the Allowable Rebars

- ☐ Rebar d10 As=0.79 Cm²
- ☐ Rebar d12 As=1.13 Cm²
- ☐ Rebar d14 As=1.54 Cm²
- ☒ Rebar d16 As=2.01 Cm²
- ☒ Rebar d18 As=2.54 Cm²
- ☒ Rebar d20 As=3.14 Cm²
- ☒ Rebar d22 As=3.80 Cm²
- ☒ Rebar d25 As=4.91 Cm²
- ☐ Rebar d28 As=6.15 Cm²
- ☐ Rebar d32 As=8.04 Cm²

Rebar Matching Iterations 10

Reinforcement Details Design Parameters

A = 0.33 B = 0.33 C = 0.875 D = 0.75 H = 12 x db

Ties Space Limits in Beam Transverse Reinforcing: Min= 6 cm Max= 20 cm

☐ Allow Software to Increase the Number of Legs in the Beam Ties Details Calculation

Ignore Value for Reinforcing Design of the Beam Additional Rebars 0 cm²

Rounding Step for Beam Additional Reinforcing Design Calculations 10 cm

Standard Modular Length of Rebar Used in Reinforcement Detailing 1200 cm

Join Beam Additional Rebars, if Gap Between Them is Less than 1 cm

☒ Consider One Add. Rebar Details, if Beam Length is Less than 100 cm

☒ Consider (As Top) / 2 for (As Bot) in Beam Ends, if More than 1 cm²

Structure Type ☐ Intermediate Moment Frame ☒ Special Moment Frame

☒ Consider Torsional Steel Areas in Beam Reinforcement Details Design Procedures

Distribute Type ☐ Inverse Flexural ☒ Uniform ☐ ETABS Design

☒ Use Torsion Section Properties in Beams that Require Torsional Reinforcements

Percentage of Minimum Torsional Steel for Face Rebar in Torsion Section 60 %

Beam Ties Details Calculation Method ☐ Method 1 ☒ Method 2

Apply Changes and Close Load Software Default Configuration Cancel

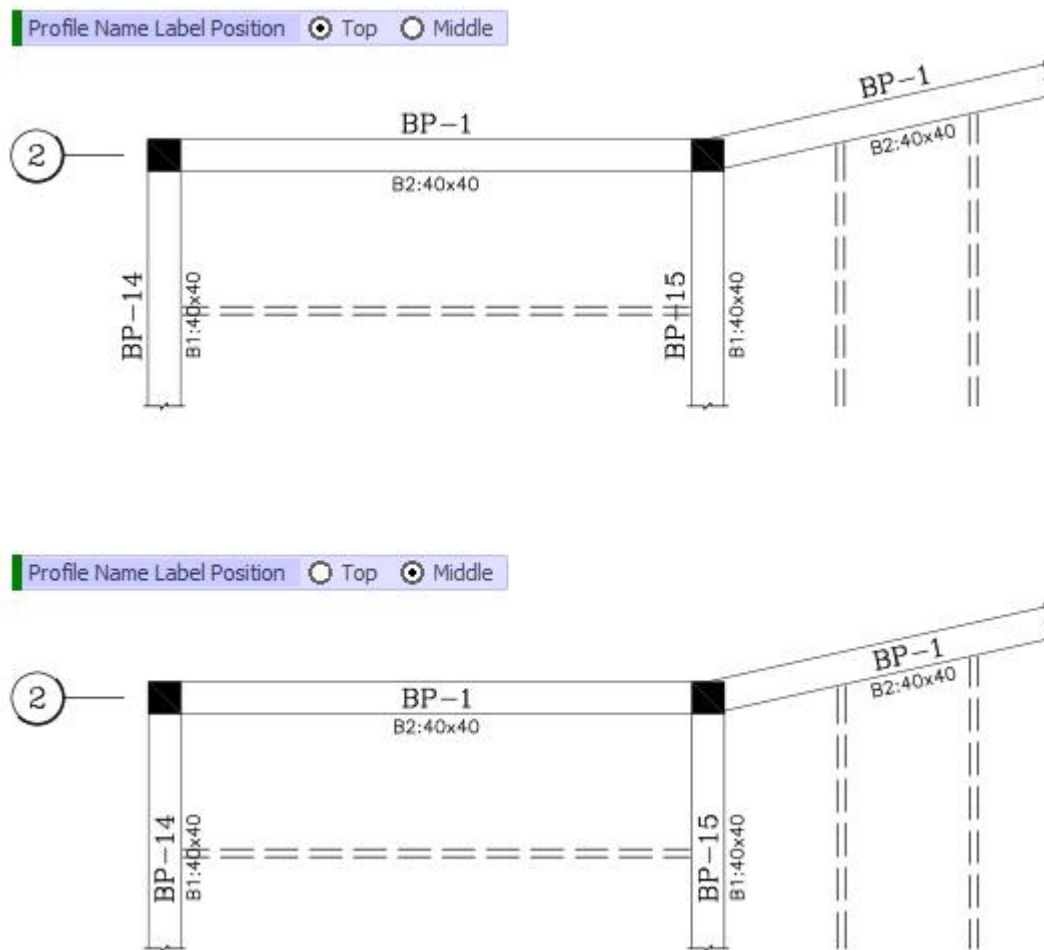
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■ Addition of an option to specify the placement of the beam longitudinal profile label in the beam location plan

This option allows you to specify the placement of the beam longitudinal profile name text. As shown in the image, two options are available for placing the text in the middle or at the top of the beam, and you may select either, as shown in the image below.

To access this option, select **Export Beam Profile Drawings to AutoCAD** from the **Export** menu, and then in the **Beam Plan Configuration** tab, select either **Top** or **Middle** for the **Profile Name Label Position** parameter. Sample AutoCAD outputs for each of these modes are shown in the image below. By default, this option is set to **Top**.



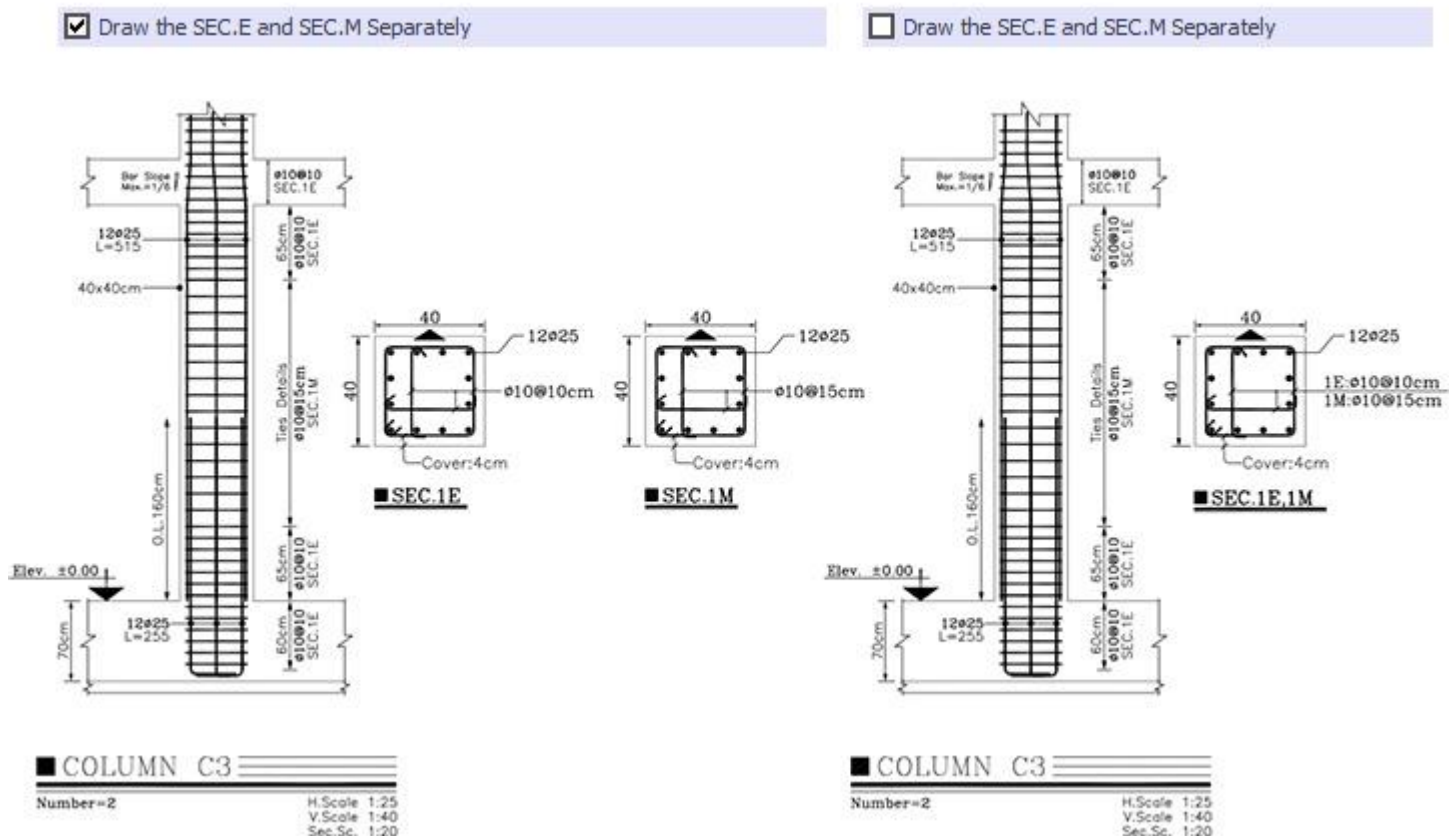
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■ Addition of an option to combine the end and middle column section details where possible

Since the transverse reinforcement configuration of columns may differ between the end and middle regions, the software draws two sections, Sec.E and Sec.M, alongside the column by default to clearly indicate the transverse reinforcement configuration for all parts of the column. To reduce the drawing sheet size when necessary, this option has been provided in the software to combine these two sections into one, where feasible.

To use this feature, select **Export Frame Drawings to AutoCAD** from the **Export** menu, and then in the **Column** tab, disable the **Draw the SEC.E and SEC.M Separately** option to allow the software to combine the column transverse reinforcement details into a single section where possible. This option is enabled by default to display the details in two separate sections for better clarity. However, for structures with intermediate ductility that do not have complex transverse reinforcement details, this option can be disabled to reduce the drawing sheet size.



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■ Correction of additional rebar details longer than one bar length in the rebar schedules

In beam detailing, it sometimes occurs that an additional rebar length is calculated to be greater than one standard bar length. In such cases, since rebars longer than the standard bar length must be spliced during construction, provisions have been made in this version to account for this in the rebar schedules. For rebars longer than the standard bar length, the number of splices and the required lap splice length, based on the rebar size and its position in the beam, are included in the rebar schedules, and the additional weight of the lap splice length is also accounted for in the rebar weight calculation. For example, as shown in the image below, in row 7b, the length and weight of the rebar exceeding the standard bar length have been corrected so that the final weight is calculated with complete accuracy.

ETABS MATE > STORY1 Beams Longitudinal Rebars Listofer						
Position Number	Rebar Shape (schematic)	Die. (mm)	Length (cm)	Weight (kg)	Number (pcs)	Weight Total (kg)
1b		Ø16	512	8.1	24	193.9
2b		Ø20	200	4.9	4	19.7
3b		Ø18	170	3.4	4	13.6
4b		Ø16	160	2.5	8	20.2
5b		Ø18	862	10.4	4	41.8
6b		Ø16	437	6.9	12	82.8
7b		Ø20	1847+1x130	48.8	4	195
8b		Ø18	850	13.4	4	53.7
9b		Ø16	1130	17.6	4	71.3
10b		Ø16	400	6.3	4	25.3
11b		Ø18	150	2.4	2	4.7
12b		Ø16	260	4.1	7	28.7
13b		Ø16	320	5.1	3	15.2
14b		Ø18	360	5.7	6	34.1
15b		Ø16	710	11.2	2	22.4
16b		Ø18	380	6	2	12
17b		Ø16	567	8.9	12	107.4
18b		Ø16	1180	18.6	4	74.5
19b		Ø18	390	6.2	6	36.9
20b		Ø16	1060	16.7	4	66.9

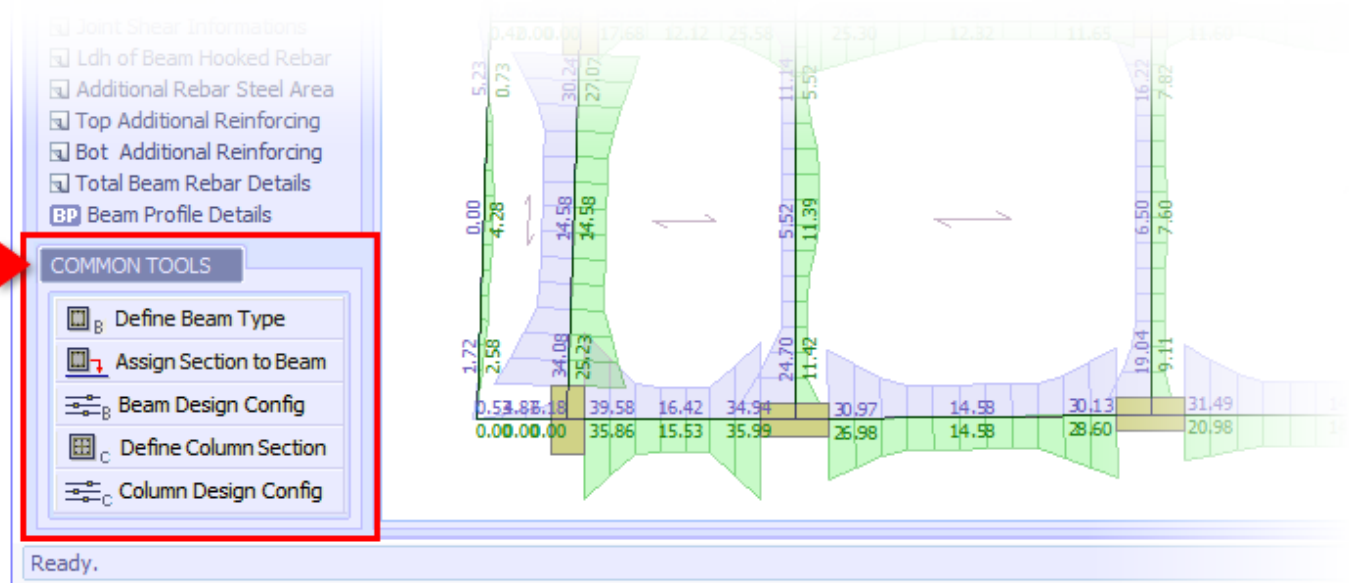


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■ Modifications to the COMMON TOOLS in the software's side palette

The frequently used tools that are continuously accessed by users have been incorporated into the **COMMON TOOLS** section of the software's side palette for greater convenience. These are described below:



Define Beam Type:

This tool opens a user interface for viewing and editing the details of beam sections. Through this interface, you can edit details such as the number and diameter of typical rebars, the minimum tie details of the section including the diameter, spacing, and number of crossies, the section name, and many other beam section details, or define new sections.

Assign Section to Beam:

This tool allows you to assign a newly defined section to the selected beam or beams.

Beam Design Config:

This tool opens a user interface for configuring the detailed design of structural beams. Through this interface, you can view, edit, and customize numerous parameters governing the detailed design of beams.

Define Column Section:

This tool opens a user interface for viewing and editing the details of column sections. Through this interface, you can view or edit the minimum tie details of the section, including the diameter, spacing, and number of crossies.

Column Design Config:

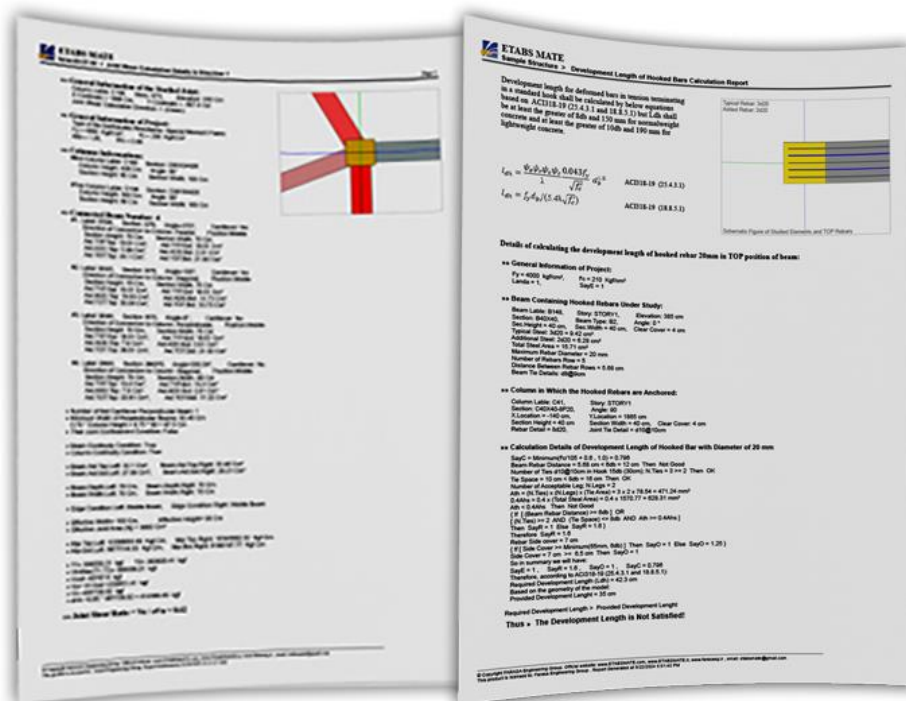
This tool opens a user interface for configuring the detailed design of structural columns. Through this interface, you can view, edit, and customize numerous parameters governing the detailed design of columns.

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■ Modifications to the joint shear and hooked bar development length detail reports

Changes and improvements have been made to the presentation of the joint shear calculation detail report and the hooked bar development length calculation detail report in end beams, so that the software now generates a more polished and practical report. Since the complete calculation procedure is presented in detail in these reports, they can be effectively used for inclusion in the project calculation book.



■ Update of steel and concrete material prices in the approximate project cost estimate

In the new version, given the significant changes in material prices, the steel and concrete prices used in the structural cost calculation have been revised and updated. These parameters are, of course, also editable by the user.

It should be noted that the project cost report is available via the **Report** menu and the **Estimated Material Report** option.

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Concrete Structure Detailing Software

■ Update of the software guide to reflect the changes and new features up to the present version

Given the fundamental changes to the software in recent versions, the software guide has been completely rewritten to comprehensively cover all parameters, new user interfaces, settings, and new features added to the software in recent years. This guide comprises 182 pages and has been revised based on the latest software update, version 1.3.611. This guide is available for download from the website's download section.

It is strongly recommended to carefully study all the material in this guide to ensure the correct use of the software and to become fully acquainted with all its capabilities. This guide has been prepared in PDF format so that it can be studied on various platforms, including mobile devices and computers.



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Concrete Structure Detailing Software

■ Changes to the software user interfaces for greater user convenience

For greater user convenience and improved user-friendliness, changes have been made to some of the software's user interfaces in this version. The most notable change is the separation of the frame design configuration interface into two separate interfaces: one for configuring the beam detailing design, and one for configuring the column detailing design.

■ Improvement of certain software routines and algorithms and correction of some bugs

To enhance software performance, correct certain bugs, and improve the graphical quality and drawing outputs of the software, changes and necessary corrections have been made to certain routines and code within the software.



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