

User Manual B. COLUMN REINFORCEMENT DETAILS







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Chapter B: Reinforcement details of columns

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Pillar editor

SCADA Pro's new Shoring Editor, called "Reinforcement Details", is part of a new innovative set of tools for managing details and producing integrated drawings.

With the New Column Editor you can edit, modify, fill in cross-sections, details, reinforcements, as well as view intensive sizes, diagrams, results and deformations, check your possible modifications and reinforce the cross-section with sheaths, IOPs and cages.

It is a comprehensive, flexible and very easy to use tool that helps the designer to save valuable time in the creation of wood types.

OBSERVATION:

The basic requirement for accessing the "Reinforcement details" tool is that the dimensioning of the column continuity must have been done beforehand.

Access to the New Shoring Editor, "Reinforcement Details", is achieved in 2 ways:

1) Within the section "Dimensioning>> Columns>> Results>> Reinforcement details"





and opens the dialog box

2) With the "Sizing" section active and right-click on the pole

CHAPTER B: COLUMN REINFORCEMENT DETAILS



Editor Υποστυ	λωμάτων		– 🗆 X
Γεωμετρία		(€) (€) (⊕) (∰) (↓) (↓) (↓) (↓) (↓) (↓) (↓) (↓) (↓) (↓	
	λωμάτων Επκόλυμη 40 mm Yun (m) Τοποθέτηση Διαστόσεων H 6 H X Y X/Z H 1 1.2 H Ανάπτυγμα Σχεδιαφιά Μ Η 1 1.2 H Πότου Οχεζισοφιά Πόχος (m) 90 Επκάλωμη (mm) Πόχος (cm) Επκάλωμη (mm) Κλιαστες Σχεδίσσης Λειστομέραο 1: 20 Ανάπτυγμα 1: 50 Ονομασία K/9 - 6 Τύπος ΣΤ/ΛΟΣ Διαστάσας (cm) 50 /40		
+ MN - Copy Poste OK Cancel	H - Hơr (cm) 600 /120 Eµ600v (cm^2) 2000.00 / 2000.00 prak % - cm^2 4.0 - 80.00 pcák % - cm^2 1.02 - 20.36 P4600 89 18		

The Pillar Editor includes the following 14 modules:

Γεωμετρία	Αποκατάσται
Κύριος Οπλισ	🔀 Μανδύας
Συνδετήρες	ΙΟΠ-Ελάσμαι
Μ Διαγράμματα	M Проотаоја
ΣΟΕντατικά	뚡 Κλωβος
Αποτελέσματ	
Διερεύνηση	
Η ΓΓ Παραμορφώα	
Ελεγχοι	
< >	< >

The following chapters describe the modules in detail one by one.

The horizontal bar above the drawing interface helps to manage the design.



In detail:





for 3D visualisation of the beam reinforcement.

With the mouse wheel you can move and zoom the drawing, and with left button you can rotate it.





It is the state in which you receive information. By moving the mouse over the design elements on the right, the corresponding parameters on the left are updated.

It is the state in which some processing/modification is performed. With Edit active, you select the command, enter the parameter and execute with the mouse on the drawing.



Διαγραφή It is

the state in which a deletion is performed.

▲ The transition from "Edit", "Add", "Delete" to "Info" is done with a right click.

α) DIVORCE

It is now possible to calculate the influence of reinforcement corrosion on the mechanical characteristics of structural elements (see EPC Annex 7F) by entering the initial and measured diameter. The program automatically calculates the corrosion rate Xcor, the corresponding degradation factors rcor and all the corresponding degraded quantities (resistances and deformations) according to the type of analysis.

An important modification introduced by the 3rd revision of CEE is the reduction factors for the mechanical characteristics of structural elements with corroded reinforcement rcor

In , Annex 7F proposes indicative values of the softening factor in relation to the corrosion rate Xcor, calculated from the following relationship

$$X_{cor} = \frac{\Delta A}{A_s} = \frac{A - A}{A_s} = \frac{D^2 - D^2}{D_s^2}$$

Where Ds : initial, nominal diameter of the reinforcement Ds,cor : measured diameter of corroded reinforcement

The deterioration factors shall be calculated as follows:



CAMPSY

• The reduction factor, $r_{cor,Fy}$, of the resistance moment $F_{y,cor}$, of the structural element where corroded reinforcement occurs relative to the resistance moment of the element without corroded reinforcement, F_y , is defined as:

$$_{rcor,Fy} = \frac{F_{y,cor}}{F_{y}} = 1,00-1,30_{cor}$$
 (F.2)

• The reduction factor, $r_{cor,\vartheta y}$, of the yielding strain, $\vartheta_{y,cor}$, of of a structural element where corroded reinforcement occurs with respect to the deflection at yield of the element without reinforcement corrosion, ϑ_y , is defined as:

$$rcor, \vartheta y = \frac{\vartheta y cor}{\vartheta} = 1,$$
(F.3)

In practice, it is assumed that the deformation in the leakage remains constant regardless of the degree of corrosion.

• The reduction factor, $r_{cor, \vartheta u}$, of the strain at failure, $\vartheta_{u, cor}$, of of a structural element where corroded reinforcement occurs relative to the deformation at failure of the element without reinforcement corrosion depends on the magnitude of the axial force, v, that stresses it and is defined as:

$$_{rcor,\theta u} = \frac{\theta u, cor}{\vartheta_{u}} = 1, 00 - \text{ for } v \le 0, 20$$

$$_{rcor,\theta u} = \frac{\theta u, cor}{\vartheta_{u}} = 1, 00 - 3, 50 \text{ for } 0, 20 < v \le 0, 40$$

$$_{x} = 1, 00 - 3, 50 \text{ cor}$$
(F.4.b)

For v > 0, 40 not enough evidence from the literature has been evaluated. It is reasonable,

however, to

it could be assumed that the values of $r_{cor,\partial u}$ would be smaller than those obtained from relation F.4.(b) above.

Note that, in each case, $\vartheta_{u,cor}$ will be taken to be greater than or equal to ϑ_{v} .

ADVERTISEMENT

For the shear strength of structural members the provisions of Annex 7C of the Regulation apply, where the shear resistance due to the contribution of fasteners (V_w)

is calculated on the basis of their corrosion-reduced cross-sectional area divided by a safety factor of 1,50. For degrees of corrosion fasteners greater 35 %, the following shall apply

obtain $V_w = 0$.



In the program the above procedure is carried out automatically by entering the initial and the measured diameter and the program will automatically calculate the corrosion rate Xcor, the corresponding degradation factors rcor and all the corresponding take-off values (resistances and deformations) depending on the type of analysis.



b) BOX CONTROL

EXEXXOC KOLBOU With the Node check command, you perform the check prescribed by EC8 for CIPs in §5.5.2.3 & §5.5.3.3.3 . A prerequisite for the check to be performed is that you have activated the corresponding checkbox "Node check in the Node check box" in the Pillar Parameters in the Dimensioning.

Editor Υποστυλ	ωμάτων		€	🙀 🕸 🍨 Info	– 🗆 X
Kypoc Onko Kypoc Onko Switeripec Auryodukara Enervainokariagióc Kapauopeják Switeripec Aurozkádjan Aurozk	Emckhulup 40 mm Tonsbérnyn Διοστόσουν X Y Xr/2 Avårmvyua Πάνω 00 10 Πάνω 00 50 50 Επκάλυψη (mm) 40 10 10 Κλάμκας Σχοδίασης Δαστάσες ων. 50 51 Δαστάσες ων. 57 50 51 Διαστάσες ων. 57 50 51 Διαστάσες ων. 57 50 51	Yun (m) H 6 h1 1.2 h2 1.7 h2 1.7 Max 1.7 Max 1.7 Max 1.7 Max 1.7 Max 1.0 Max 1.0		Jackburgn I (1) Jackburgn I (1) M Ynorrivaga Jackburgn I (1) Jackburgn I (1) <tr< th=""><th>X Default Aportzpó Default 0 dat5 Ovcquo Ala5 0 50 hw(cm) 50 0 80 bw(cm) 30 a 6.03185 As erva 6.03185 as kritray 6.04247</th></tr<>	X Default Aportzpó Default 0 dat5 Ovcquo Ala5 0 50 hw(cm) 50 0 80 bw(cm) 30 a 6.03185 As erva 6.03185 as kritray 6.04247
Сору	Eμβαδόν (cm^2) 200 pmax % - cm^2 4.0	00.00 / 2000.00	2000002/10.00 (to-12.1) 2000002/10.00 (to-12.1)		
OK Cancel	Ράβδοι 8Φ18		Construction process		Ynoloyapús OK Cancel

Ελεγχος Κόμβου			×
	Διεύθυνση Ι (1) Υποστύλωμα Ι (1) hc(cm) 50 Ι (2) II (1) bc(cm) 40 ΙΙ (2) As cm^2 15.26i Συνδετήρες φ 10/9 n 2	nw(cm) 50 bw(cm) 30 As ανω 6.03185 As κάτω 8.04247	Default οκός Δεξιά νομα Δ16 nw(cm) 50 bw(cm) 30 As avω 6.03185 As κάτω 8.04247
			Υπολογισμός
			OK Cancel





In the field 🛄 (2)

I and II are the two directions horizontal and vertical according to the local axes of the pole. (1) and (2) relate to the beam members coinciding at the pole node. Simple cases such as



belong to (1), while if more members coincide at the



pole in the same direction

Select the Address and press the Default button. The program automatically fills in corresponding fields for the selected address.

 \times

Διεύθυνση Ι (1)			~ I	Default
Υποστύλωμα	_Δοκός Αρ	ιστερά	Δοκός Δε	ξiá
hc(cm) 50	Ονομα	Δ15	Ονομα	Δ16
bc(cm) 40	hw(cm)	50	hw(cm)	50
As 15.26 cm^2	bw(cm)	30	bw(cm)	30
Συνδετήρες	As ανω	6.03185	As ανω	6.03185
φ 10/9	As κάτω	8.04247	As κάτω	8.04247
n 2				

So the dimensions of the elements that exist in the node are filled in. For the column, the area of the vertical reinforcement of the column As for the selected direction and the corresponding horizontal connectors are indicated and for the beams, As upper is the cross-section of the upper reinforcement of the beam, As lower is the cross-section of the lower reinforcement of the beam.

Press the Calculate button

Ελεγχος Κόμβου (EC8 &5.5.3.3) Διευθυνση : I(1) Στύλος : hc= 50 bc= 40 As=15.27 hjc=42.00 Δοκός : bw= 30 hw= 50 As1=6.03 As2=8.04 bj=40.00 Δοκός : bw= 30 hw= 50 As1=6.03 As2=8.04 bj=40.00 hjw=42.00 bj=40.00 Asd=14.07	^ 	Υπολογισμός ΟΚ
1 -445.18 2.91 0.11 731.41 1576.05 647.73 1 0.00280 0.00603 5.43 2 -298.26 1 93 0.07 732 38 1644.05 599.52 1 0.00280 0.00832 9.26	~	Cancel

And fill in the blank field with the results of the Node Check for the selected Address and for each combination.



The summary results are listed at the end of the Results file. Here the requirement for a Column Cross-section Change or not, as well as the possible requirement for additional horizontal (Ash) and vertical (Asv) reinforcement, and the worst combination is indicated:

 Διεύθ 	-Έλεγχος Vjhd (KN)	; Κόμβου <= nfcd ³	Δοκών - Υπο * (l-νd/η)*b (KN)	στυλω j*hc	μάτων π Αλλαγ Διατ.	αρ. ή Στ.	5.5.3.3 E Vjhd (KN)	C8 (KN Y) Ash (cm^2)	Asv (cm^2)
I(1)	731.41		1576.05 (1)	Ι Οχ	ι	661.62(20)	7.20	0.00
II(1)	411.70		1501.00 (1)	Ι Οχ	ι	411.70(1)	0.00	0.00

The classification of the node into Extreme and Intermediate is done automatically by the program.

(c) COPYING-OPPOPULATION OF EQUIPMENT



The Copy and Paste commands allow you to copy the reinforcement of one column/element to another (Paste), so that any modification you make to the cross-section of a column/element can copied to another column/element, at the same or a different level, without having to repeat the process.

USE:

- To copy the reinforcement of a post/element to other levels, you only need to select

Copy and paste the levels up and down with and and , and Paste.

- To copy the reinforcement of a post/element to another post/element, click COPY, close the Details window and open the details of the other element at the same or different level and PASTE to copy the reinforcement of the selected element.

d) **REVISION**

Επαναυπολογισμός

The Recalculate command restores the reinforcement resulting from the dimensioning to the cross-section.



Select OK to save the modifications and close the Editor window, or Cancel to get out the window without saving.



Geometry

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τεωμετρία			0.0.0.0 m	💥 🕸 🏘 🕸 🐐 Info
🚺 Κύριος Οπλισ		-Υψη (m)		
Συνδετήρες	Επικάλυψη ³⁰ r	nm H 2.98		
Μ Διαγράμματα	Το ποθέτηση Διαστάσεων	h1 0.76 H	l l	
ΣΟΕντατικά	X Y XY	Z h2 1.26		
Αποτελέσματ	Ανάπτυγμα	🗹 Σχεδιασμός Αναπτύγματος		
Διερεύνηση	Πάνω	Κάτω		
н	Οχι Συνέχεια	~ Συνέχεια ~	0 ¹ <u>3</u> ¹ 3	
Υ Παραμορφώα	Πάχος (cm) 50	Πάχος (cm) 50	++	
Ελεγχοι	Επικάλυψη (mm) 30	Επικάλυψη (mm) 30		
	Κλίμακες Σχεδίασης		(¹⁵⁰)	
< >	Λεπτομέρεια 1: 20	Ανάπτυγμα 1: 50		
Επαναυπολογισμός	Ονομασία	K1 - 17	2 C	
	Τύπος	ΣΤΥΛΟΣ	· · · · · · · · · · · · · · · · · · ·	
	Διαστάσεις (cm)	25 /76		
Y = 771.00				
+ M-N -	H - Hcr (cm)	298 /76		
	Εμβαδόν (cm^2)	1900.00 / 1900.00	2.(m) - 1, 91	· · · · · · · · · · · · · · · · · · ·
Сору	pmax % - cm^2	4.0 - 76.00	160	-1/ 1
Paste	pcalc % - cm^2	1.07 - 20.36		
ОК	Ράβδοι		2 A	
Cancel	8Φ14+4Φ16			
Cancer			○ 13204/11.00 (b2-1.26) ○ 4205/20.00 (bur-0.26)	
			8368/11.00 [81-0.76] 7.[m]=1.24	

The **Geometry** section opens a screen that includes, in the centre, a set of design parameters and, on the right, a design interface that adapts to changes in the parameters.

• In the "Overlay" field, changing the value updates the corresponding detail.





• In the "Dimension placement" field:

Select the address, X and left-click in the design environment, point to the points beginning and end for dimensioning, and the point for placing the dimension.



Similarly for the other two addresses.

• In the "Heights" field:

You can modify the total height of the column as well as the critical heights above and below. Every change updates the plan.





• In the "Growth" field uncheck the Growth Design in case you don't want it to appear on the stilts.

Ανάπτυγμα 🔽 Σχεδιασμός Αναπτύγματος						
Πάνω		Κάτω				
Συνέχεια	-	Θεμελίωσης - Πέδιλο 💌				
Πάχος (cm)	60	Πάχος (cm) 90				
Επικάλυψη (mm)	25	Επικάλυψη (mm) 25				

- - Thickness and Overlap refer to the members to which the top and bottom supports are attached, and which you can modify. The design will be updated automatically.



respectively:



• In the "Drawing scales" section select the drawing scale for the details and for the expansion:

Κλίμακες Σχεδίασης —				
Λεπτομέρεια 1:	20	Ανάπτυγμα 1:	50	

• At the end, a box appears where some elements of the column, as derived from the dimensioning, are listed and are not editable.

Ονομασία	K1 - 17
Τύπος	ΣΤΥΛΟΣ
Διαστάσεις (cm)	25 /76
H - Hcr (cm)	298 /76
Εμβαδόν (cm^2)	1900.00 / 1900.00
pmax % - cm^2	4.0 - 76.00
pcalc % - cm^2	1.07 - 20.36
- 105	
Ράβδοι	

8Φ14+4Φ16



Main armament



In the Main Reinforcement field you can make modifications and interventions to the main reinforcement of the column.

The main reinforcement is divided into cheek and corner bars. By moving the mouse over the

Info detail bars of the cross-section, the state , is activated and you see its characteristics (type, type).

The logic behind the interventions is as follows: You select the command, point to the bar and intervene.

2.1 How the interventions on the rods are performed

To modify the diameter and type of the angle bars 2.1.1

Διόρθωση Ράβδων . select the

. automatically updates the field

. left click on an angle bar within the detail of the column cross-section.

Επεξεργασία . the is activated



status, and you select the new diameter

and the new type* . you move the mouse to the bar and the modification is made.



2.1.2 To modify the number, diameter and type of bars in the side rail

. select the Διόρθωση Ράβδων

. left-click on a strut bar within the detail of the column cross-section.

. the status is activated	
. automatically updates the المعتفر	Φ 16 m m
and the field	4 Φορά + n + n + n + + S3 + S2 + τεις σιδήρων (mm) S2 S3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

. write the number of bars of the rib , Αριθμός 6

.set the individual distances according to the figure or leave as is to automatically distribute them at equal distances.

. you move the mouse to the bar of the rib and the modification is made on one rib, and in the same way on the other rib.





2.1.3 To insert cheek bars when there are no cheek bars

Προσθήκη Ράβδων

Προσθήκη

Παρειάς



- . select the command
- . the status is activated
- . you select Pariah, Diameter
- . write the number of bars of the rib

. with a left click you point to one corner bar and then to the opposite side of one side

- Φ

Αριθμός 6

16

▼ mm

and Type*

and possibly the distances.



- . and on the other side
- . right click and the status is activated



In cases where two corner bars have different diameters and you want insert tie rods between them, activate the checkbox rods.

Info





2.1.4 To delete bars



. select from the horizontal bar the

. the status is activated

. left-click to delete the bars through the detail of the column cross-section.

Προσθήκη Γραμμής Διάστασης (αποστάσεις σιδήρων)

. right click and the status is activated

Info

2.1.5 To insert dimension lines

- . select the command
- . the status is activated



Info

. you choose the format of the

. left click to show the beginning and end bars

. with a right click you activate the



*In addition, when modifying and adding the bars, you choose the type of bars per case.





Within the Type field:



you choose one of the types. Each type activates the corresponding fields on the right, where you enter the corresponding values in cm.



In all types you have the possibility to insert both upper and lower hooks.

select -90, +90 and Hook Calculation for automatic calculation, or enter your own values directly.





2.1.6 To exclude a rod from the Biaxial Bending test



. with a right click you activate the



2.1.8 New command for processing of horizontal and vertical trunk bars in walls

It is now possible to change the vertical and horizontal trusses in the walls, a very useful function especially in the valuation of existing buildings.

For the vertical bars the change is made in the column editor with the well-known bar correction tool. With these changes the results in the design book are automatically updated and obviously these bars are also taken into account in the overall strength of the wall.

The vertical bars are indicated in the results by the y and z directions. There is the possibility of two entries per direction as in the following table



Where by y we can have differentiation of the vertical trunk bars

INTETOS (JUNITEROF		1 40ATA	
ΚΑΘΕΤΕΣ	ΕΣΧΑΡΕΣ	PABARN KOPMOY	2Φ10+ 2Φ10 (πλευρα by) 5Φ10 (πλευβ	oαbz)
OPIZONT.	ΕΣΧΑΡΕΣ	PABAON KOPMOY	Φ 8/10.0 (Πλευρα by) Φ 8/10.0 (Πλευρ	oα bz)
Μανδυες	Φ / Hcr.	. (cm)	(y) Φ 8/10.00 (z) Φ 8/10.00	1

2.1.9 Corrosion

By right-clicking on a main bar you can now not only modify its diameter but also set the remaining diameter due to corrosion.

CHAPTER B: COLUMN REINFORCEMENT DETAILS





Selecting "Corrosion" opens a new dialog box titled Corrosion (CAN.EPE)

0						
Διάβρωση (ΚΑΝ.ΕΠΕ.)						
Αρχική Διάμετρος	Ds (mm)	14	14			
Απομένουσα Διάμ	0	0				
Εφαρμογη σε ολες τις ιδιες διαμέτρους του Στοιχείου						
Εξοδος	Εφαρμογή στη επιλεγμένη ράβδο					



Initial Diameter indicates the initial value of the selected diameter which is the same at the beginning and end of the rod.

In Residual strength the default values are zero. The user is asked to set the value of the corrosion-residual diameter at the beginning and end of the bar.

By selecting

Εφαρμογη σε ολες τις ιδιες διαμέτρους του Στοιχείου

, these prices will

will be applied to all the main bars of the selected element that have the same diameter, and will also change their colour to yellow to easily identify the bars where the corrosion has been applied.

Γωνιακά 🗸 Φ	0 14 ∨ mm	Y		
Τύπος				
Type 1	v 7 cm (cm) L1 0 L2 0 L3 0 L4 0 L5 0	Ż		
	 Ο cm Υπολογισμός Αγκίστρων 		Διάβρωση (ΚΑΝ.ΕΠΕ.)	×
Napsóc Apiθμóc 1 © Φορό 1 © Φορό 1 0 1 0 1 51 52 52 0 0 1 1 1 52 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Να μην συμμετέχει στόν Ελεγχο Διάξονικής Κάμψης Προσθήκη Ράβδων Εφορμογή σέ όλες τις ίδιες ράβδους Διάγραφή Ράβδων Ομάδας Προσθήκη Γραμμής Διάστασης (αποστάσεις σιδήρων)	• • • • •	ΑΡΧ Αρχική Διάμετρος Ds (mm) 14 Απομένουσα Διάμετρος Ds,cor (mm) 13 Εφαρμογη σε ολες τις ιδιες διαμέτρους τα Εξοδος Εφαρμογή στη επιλεγχ	Η ΤΕΛΟΣ 14 12 12 υ Στοιχείου μένη ράβδο
By selecting	Εφαρμογή στι	η επιλεγμένη ράβδο	. these values will be ap	plied to the
specific bar.			, mese raides init be up	

CHAPTER B: COLUMN REINFORCEMENT DETAILS



Tunoc 0 14 mm Tunoc 0 7 0 10 Type 1 0 7 0 10 Type 2 0 0 0 10 10 Type 2 0 0 0 10			Διάβρωση (ΚΑΝ.ΕΠΕ.) Αρχική Διάμετρος Ds (mm) Απομένουσα Διάμετρος Ds,cor (mm) Εφορμογη σε ολες πειδιες διομέ Εξοδος Εφορμογή στ	ΑΡΧΗ ΤΕΛΟΣ 14 14 13 13 τρους του Στοχείου Τ Τ _α Ολεγμένη ράβδο Τ
In the bars of the trunk of the to the whole side	e wall, the option	Εφαρμογή στη ε	πιλεγμένη ράβδο	applies



Co	onnectors- Gratings	
Editor Υποστι	ιλωμάτων	÷ – – ×
😥 Γεωμετρία		④ 🗨 🕀 🎆 💥 🕼 🍕 🤹 📠
Κύριος Οπλισ		
Συνδετ/Εσχα	Túnoc	<u>ү</u>
Μ Διαγράμματα		ż
ΣΟΕντατικά	Type 1 Γωνία Γωνία 45	
Αποτελέσματ	Μήκος Μήκος	
Διερεύνηση Η	Type 2 60 60	
EVEXXOI	v	
< >	Στοιχεία Συνδετήρα Διάμετρος (mm) Φ 6 ~	
Επαναυπολογισμός		→ 22 ≪ 428 / 10.42 × 104 / 1.42
ΕΛεγχος Κομβου Y = 434.00	Στό κρίσμο Υψος (h2) 0 cm 0 h2	
+ M-N -		
Сору		
Paste	Αριθμός Τμήσεων γ 2 z 3 Προσθήκη Συνδετήρα	
Αξιολόγηση	Διόρθωση Συνδετήρα	
OK	Οριζόντιες Εσχόρες (cm)	
Carleer	y: Φ 8 ∨ / 10 z: Φ 8 ∨ / 10	

In the Connectors field you can make modifications and interventions to the connectors of the column.

The logic followed is similar to the Main Armament. You select the command, point to the connector, change type, diameter or individual distances.



Within the Type field you can change the type of connector. For Type 1 and 2 fasteners you set the angle and its length.

Διάμετρος (mm)		• 6	-	
Αποστάσεις Ανά			112	
Σε όλο το Υψος (Η)	0	cm	0-	5
Στό κρίσμο Υψος (h2)	0	cm	0 h2	
Στό Υπόλοιπο Υψος	0	cm	0 h1T	r
Στό κρίσμο Yuoc (h1)	0	cm	0	

The Connector Details field includes the Dimensions from which you select the new diameter, and the Distances.

By zooming in on the connector detail within the design environment in mode, the connector turns red and the field is updated with the connector details, indicating the diameter and individual distances between them throughout the column height, critical heights and remaining height.

3.1 How the operations on the fasteners are performed:

3.1.1 To modify a connector

. select the command Διόρθωση Συνδετήρα . the status is activated

. select connector

. select the new diameter, write the new distances, select new type

. press right click.

3.1.2 To insert a new connector

. select the command

Προσθήκη Συνδετήρα

. the status is activated

. select diameter, distances and type

. left-click to show the bars enclosed by the new connector.

The drawing is automatically updated and a new clip detail is created that shows all its characteristics.

3.1.3 To delete a connector



. select from the horizontal bar the

. the status is activated

. left-click to delete the connector through the detail of the column cross-section.

. with a right click you activate the



• You now have the possibility to numerically enter or change the number connector sections in the columns.

(If you delete a connector, make sure that you also update the number of segments in the corresponding field.)

- Λοιθυός Τυόσεων	
Αριομός τρησεών	Ποοσθάνο Συνδοσάοσ
	προσθηκή Ζυνσετήρα
y 4 Z 4	
	Διόρθωση Συνδετήρα

The program automatically calculates and displays the segments of the installed fastener. However, it is possible to set the number of segments you wish, a feature particularly useful for valuations of existing buildings.

OBSERVATION:

The program in the selection of fasteners in the dimensioning of the poles, taking into account the homomorphism, means that, in a cross-section all fasteners will have the same diameter and the same distances between them.

So when making modifications to the fasteners, it is recommended that you take care of homomorphism. Otherwise, in the subsequent rechecks, the program itself will take into account the most unfavourable connector per region and homomorphize with it.

However, you have the possibility to have different connectors per area (branch), e.g. a crosssection C. The program arms the two branches itself. If you wish, you can intervene in the Controls field (see &9) in the table to change the connectors and re-check. Then return to the Connectors field and make the modifications to update both the drawing and the prints.

3.1.4 Horizontal wall frame reinforcement

In the new version of SCADA Pro, the possibility of inserting, designing and modifying the horizontal reinforcement of the trusses in the walls has been added.

Regarding the modification of the horizontal reinforcement, a new field was added to the editor in the "Connectors - Gratings" section to change it.



💽 Editor Υποστυλ	ωμάτων	
だ Γεωμετρία 🕄 Κύριος Οπλισμί		
τη Συνδετ/Εσχαρε τη Διαγράμματα Ε΄ Εντατικά Αποτελέσματα Διερούτηση τη Παραμορφιάσι Ε΄ Ελογχοι Μανδύας τη Προστασία	Tipe 1 Type 2 Type 2 Type 3	
Σ Κλωβος Enavaunaλογισμός Ελαγχος Κάμβου Y = 600.00 + + N-N - Conu	Δηματρος (nm) Φ 10 ✓ Δηματρος (nm) Φ 10 ✓ Αποιστοιος Abir To Yapo (h) 15 om 21 Στιά κρίσιμο Yapo (0 om 0 2 Στιά κρίσιμο Yapo (0 om 0 2 1 Στιά κρίσιμο Yapo (0 om 0 2 1	
Copy Paste Δομητική Αξιολόγηση ΟΚ Cancel	Αρθιμός Τμήσουν Προσθήμος Τμήσουν γ 2 2 Ορίζητας Εσχάρος (cm) χ Φ γ: Φ 10 /	

The definition of the horizontal bars is done per y and z direction.

The directions only make sense when there are T or C-shaped columns. For rectangular columns, set by y or z depending on the direction of the wall.

ΚΥΡΙΟΣ ΟΠΛΙΣΜΟΣ	43Φ14	1
ΙΚΑΘΕΤΕΣ ΕΣΧΑΡΕΣ ΡΑΒΔΩΝ ΚΟΡΜΟΥ	2Φ10+ 2Φ10 (πλευρα by)	5Φ10 (πλευρα bz)
OPIZONT.EXXAPES PABAON KOPMOY	Φ 8/10.0 (πλευρα by)	Φ 8/10.0 (πλευρα bz)
Μανδυες Φ / Hcr. (cm)	(y)Φ 8/10.00	(z)
Περισφιγξη ωwd	(y)απ.: 0.08 υπ.: 0.17	(z)απ.: 0.08 υπ.: 0.17

OBSERVATION:

Recall that the horizontal trunk bars are obtained by testing the trunk in shear. If the need for denser bars than the column connectors arises, these bars are indicated. Otherwise, the minimum reinforcement shall be that specified in the parameters.

It is recalled that until now the calculation of the reinforcement was done in the program and the result was only displayed in the print issue

· · ·						•		
ΤΕΛΙΚΟΣ ΟΠΛΙΣΜΟΣ	. (Φ)							
Κύριος Οπλισμός Φ 8Φ16+20Φ18+14Φ20								
Εσχάρες Ράβδων Κορμού	т	rλευρά by	υρά by πλευρά bz					
Κάθετες	Φ					6Φ10)	
Οριζόντιες	Φ/(cm)					Φ8/10.	0	
Κατεύθυνση			у			z	-	
Μανδυες Φ / Hcr	Φ/(cm)		Ф8/10.00					

In the reinforcement details of the columns and in the section "Connectors - Gratings"



CHAPTER B: COLUMN REINFORCEMENT DETAILS

두 Γεωμετρία 🕄 Κύριος Οπλισ				
Συνδετ/Εσχα 1 Διαγράμματα	Τύπος	^		1
	Type 1	Γωνία 45	r n	Γωνία 45
	Type 2	Μήκος cm 80		Μήκος cm 80
Υ Παραμορφως Ελεγχοι	T 3	~		
>	Στοιχεία Συνδε Λιάτε	πήρα ποος (mm)	n • •	

to the types of fasteners, a new type, the horizontal grating, has been added.



With the initial dimensioning of the element, the horizontal truss reinforcement is automatically placed and designed.







This detail is now transferred to the stilotypes

For the **processing** (modification or deletion) of the originally placed horizontal reinforcement of the trunk, the same applies as for the fasteners.

To **insert** new reinforcement for the trunk, follow the procedure below:

After opening the dialogue box of the reinforcement details of the columns, select the section "Connectors/Grids" and then the type "Or. Grating"



After selecting the diameter and the distance in the respective fields shown below (it is necessary to specify them both in the "Connector data" field and in the "Horizontal Gaps")

CHAPTER B: COLUMN REINFORCEMENT DETAILS



Type 6 Favid Type 7 Favid Type 7 Favid Type 7 Favid Strongda Sudempa Favid Anorroace Avd Favid Strongda Sudempa Favid Anorroace Avd Favid Strongda Sudempa Favid Opdjavnaz Baydeax (ma) Favid Y Z Favid Opdjavnaz Baydeax (ma) Favid Favid Y Docelyn Zavid Favid Y Strongea Favid Y <th></th> <th>z</th>		z
Image: Control of Contro	Τγρε 6 Γωνία Γωνία	· · · · · · · · · · · · · · · · · · ·
Type 7 m m m Co. Explos m m m Struction Vuoc (hr) m m m Opdok Tubraw m m m Y 1 m m m Opdownes Exclose (m) m m m m Y 1 m m m m Y 1 1 m m m m Y 1 1 m m m m m Y 1 1 m m m m m m m m m Y 1	45 Мі́кос Мі́кос	• •
ConEncyclor Zircyckia Zuvčenijon Auctricia (mm) Tircyckia Zuvčenijon Zircyckia Zuvčenijon Dopčkjon Tuvace (mi) Dipologi (mi) Zircyckia Zuvčenijon V (mi) Dipologi (mi) Dipologi (mi) Zircyckia (mi) V (mi) Dipologi (mi) <td< td=""><td>Type 7 cm cm 80</td><td>· · · · · · · · · · · · · · · · · · ·</td></td<>	Type 7 cm cm 80	· · · · · · · · · · · · · · · · · · ·
Qp.Emplos Zorogła Sułempo Akornizou, Avid Zoł kraz Nakowa		
Zroyda Xuđenja Akorridac, Avd Iz do kratov (fr) Zroj vrakova (fr)	Ορ.Εσχάρα ν	
Anormozoc, Avá 1	- Στοιχεία Συνδετήρα Διάμετρος (mm) Φ 8 ∨	•••••
1 1		
21 v Yrakkono Yupo (h) 0 m 0 m 1 <td>Στό κρίσμο Υψος (h2) 0 cm 0 h2</td> <td></td>	Στό κρίσμο Υψος (h2) 0 cm 0 h2	
2x is polyar type (h.) 0 0 ApAuls(Tulymaw 1 1 Y 4 2 2 ApAuls(Tulymaw 1 2 Opd/pmax Explace (m) 1 1 y: 0 1 1	Στό Υπόλοιπο Υψος 0 cm 0 h1	
ApRuck Turbrauw Y 4 2 Deodelymatic Modernipe Opolomata Envication 0 2 0 Y: 0 2 0 1 Y: 0 2 0 2 Y: 0 2 2 2	Στό κρίσμο Υψος (h1) υ cm 0	
Y 4 2 ∆öplävna; Exyloca (m) Quilövna; Exyloca (m) 2 0 Y 0 1	Αριθμός Τμήσεων Προσθήκη Συνδετήρα	
	γ 4 2 Διόρθωση Συνδετήρα	· ·
	Οριζόντιες Εσχόρες (cm)	
	у: Ф <mark>8 ∨</mark> / 10 z: Ф <u>8 ∨</u> / 10	· · · · · · · · · · · · · · · · · · ·
		• •
		· · · · · · · · · · · · · · · · · · ·
		•
		40 1

Select the "Add Connector" command and then show as the first vertex a corner iron of the wall and successively the following corner irons. As a second iron you must show <u>HOWEVER</u> the one along the long side. By indicating the fourth corner as well, the reinforcement is automatically drawn both as an expansion and as reinforcement within the detail.



OBSERVATION

The selection of diameter and distance in the "Horizontal Gaps" field



is the one that updates the calculations and is also taken into account in the calculation. The program, in the initial dimensioning, automatically updates this field, but in case of modification or placement from the beginning, you must update it "manually".



3.1.5 Corrosion

By right-clicking on a fastener you can now not only modify its diameter but also set the remaining diameter due to corrosion.

🛬 Γεωμετρία		
💼 Κύριος Οπλισ		
Συνδετ/Εσχα	Τύπος	
Μ Διαγράμματα		Ż
Εντατικά Αποτελέσματ	Type 1 Towia Fawia 45 45 45 Mixoc, on Mixoc, on 60	
τη Παραμορφώκ Ελεγχοι		, 06 98 010
	Στοιχεία Συνδετήρα Διάμετρος (mm) Φ 8 ✓	•12 •••••
Επαναυπολογισμος	Αποστάσεις Ανά	Ф16
Ελεγχος Κόμβου	Σε όλο το Υψος (H) 10 cm 31	• • • • • • • • • • • • • • • • • • •
Y = 600.00	Στό Υπόλοιο Υψος 0 cm 0 μη	¢22
+ M-N -	Στό κρίσμο Υψος (h1) 0 cm 0	Φ25
Сору		028
Paste	Αριθμός Τμήσεων Προσθήκη Συνδετήρα	035
Δομητική Αξιολόγηση	γ 4 2 2 Διόρθωση Συνδετήρα	
ОК		Διάβρωση
Cancel	Οριζόντιες Εσχάρες (cm) γ: Φ 12 ∨ / 5.8 z: Φ 10 ∨ / 15	· · ·
		<u> </u>

Selecting "Corrosion" opens a new dialog box titled Corrosion (CAN.EPE)

Διάβρωση (ΚΑΝ.ΕΠΕ.)		
	APXH	ΤΕΛΟΣ
Αρχική Διάμετρος Ds (mm)	14	14
Απομένουσα Διάμετρος Ds,cor (mm)	0	0
Εφαρμογη σε ολες τις ιδιες διαμέτρους του Στοιχείου		
Εξοδος Εφαρμογή στη επιλεγμένη ράβδο		

Initial Diameter indicates the initial value of the selected diameter which is the same at the beginning and end of the rod.

By selecting



In Residual strength the default values are zero. The user is asked to set the value of the corrosion-residual diameter at the beginning and end of the bar.

Εφαρμογη σε ολες τις ιδιες διαμέτρους του Στοιχείου

, these prices will

will be applied to all the fasteners of the selected element that have the same diameter, and their colour will be changed to yellow to easily identify the bars where the corrosion has been applied.

	490 CT 984 (98-7)	
뚡 Γεωμετρία		
🚺 👬 Κύριος Οπλισ		
Συνδετ/Εσχα	Τύπος	
Μ Διαγράμματα		ż
ΣΟΕντατικά	Type 1 Γωνία Υγου	
τουρέλετου Α	45	
Διερεύνηση	Minkoç cm Tune 2	
Παραμορφώα	80 80	
Ελεγχοι		, Διάβρωση (KAN.EΠΕ.) Χ
<u> </u>		ΑΡΧΗ ΤΕΛΟΣ
< >	Στοιχεία Συνδετηρα Διάμετρος (mm) Φ 8 ~	
Επαναυπολογισμος	Αποστάσεις Ανά	Anoμένουσα Διάμετρος Ds,cor (mm) 7 6
Ελεγχος Κόμβου	Σε ολο το Υψος (Η) 10 cm 31 Στό κρίσιμο Υψος (h2) 0 cm 0 h2	 Εφαρμογή σε ολες της ίδιες διαμέτρους του Στοχσίου
Y = 600.00	Στό Υπόλοιπο Υψος 0 cm 0 h1	Εξοδος Εφαρμογή στη επλεγμένη ράβδο
+ M-N ·	Στό κρίσιμο Υψος (h1) 0 cm 0	
Paste	Αριθμός Τμήσεων	· · · ·
Δομητική 45ιολόνιστρ	γ 4 Z 2 Διόρθωση Συνδετήρο	
OK		
Cancel	Οριζόνπες Εσχάρες (cm)	
		40-40-

By selecting Εφαρμογή στη επιλεγμένη ράβδο, , these values will only be applied to the specific connector.



Charts



The Diagrams field (with the preceding dimensioning scenario active) opens the window of the diagrams of the column's intensive quantities for each load and each combination. As you move the mouse along the column within the diagrams, you can read the values of the intensive sizes over the entire height of the column. (You can find this command in the Results and in the corresponding chapter of the manual).


τυλωμάτι	ωv					2	—
						0	€, €, 🖤 🐔 🗙 🕸 🕸 🔹 🕯
۰							
Συνδι	υασμός	~ 1	\sim	Ανά Μήκοα	; (cm) 50		` —]
		+ 1.	35Lc1 + 1	.50Lc2			
L(m)	N(kN)	Vy(kN)	Vz(kN)	Mx(kNm)	Mz(kNm)	Му	
0.00	429	24.14	16.32	0.05	20.25		
0.50	425	24.14	16.32	0.05	8.24	_	
1.00	422	24.14	16.32	0.05	-3.97		
2.00	419	24.14	16.32	0.05	-15.99		
2.4	412	24.14	16.32	0.05	-37.69		
2.1		2	10.01	0.05	57.05		
						_	
- I							
							♦ 12000 (10.00 (10.00))
							O 72868/16.46 (New-6.86) O 12868/16.46 (R1-1.16) O
						_	
<						>	

In the Intensity field you can read in detail the values of all the intensities, for each load and combination, for each pole length that you define Aνά Μήκος (cm) 50

you .

								100-11								Tab/Ka
	-						10	Digital Color								LENIOG
+ by +	•		XA	PAKTHPI	ΤΙΚΑ ΔΙΑΤ	OMHE	1		Ροπές Αντο	cộc (kNm)	1	BAS	Η	12	KOPYCH	11
	11	Τύπος	Αρι- Νέλα	Kó Kó	ιβος	Υψος Υφ Η(m)	IOC Har		Ait080von A	MRd (kNm)	+y	-Y _86	+2 -2	+y 15	-7 +	Z 42
		TIOT	K6 6	6	14	2.40	0.50		(max) Pomi Avroync	MRd (kNm)	169	-161	232 -198	169	-172 16	9 -20
	1		and Course	FEQMETP	A AIATOM	Σ			TEAIKOS OBAIS	MOT 400						
a		Témoc	Furia	by	p1				Κύριος Οπλισμός	02 (4)			8016+4	020		
		nooconiii	HOTTON .	(cm)	(cm)	-		_	Εσχάρες Ράβδων Κορ	200	π)	teupà by			πλευρά bz	
		POUL LINIKU	0.0	30	40		<u> </u>		Κάθετες	•						
	S	-	ΣΚΥΡΟ	DAEMA	1	1	- 1/1		Οριζόντιες	Φ/(cm)			-			
Ποιότητα	fox (MPa)	Yn	Yes	nax c . (N.M	max e ; (t	4) f (MS	a) T _{re}	(MPa)	MaxSucc @ / Her / H	(f)((cm)	(D.0.14	y 0.00/10.00			Z 08/10 00/10 00	
C12/15	8.85	1.00	1.00	0.0035	0.002	1.60		0.18	Line of the Friday of the Frid	antenit		0.00.10.00				
	_		XAAYBAT	OTAIEMO	Y		1									
			nal r an			-	Emed	άλυμη								
	1 koion	ulta F* (Pa) T_{μ} (M	-a) Yei	Yes	max z ;	c(n	mm)								
Οπιλομός κάμψης	\$2.	20 200	00 300	1.00	1.00	0.02	- 2	25								
Συνδετήρες	54	20 200	00 300	1.00	1.00	0.02										
1		ΕΛΕΓΧΟΙ	ΣΕ ΚΑΜΨ	H ME OPO	ΗΔΥΝΑΜΗ											
			Yeard	lun mile	BATH		KORYM									
Max Ανηγμένη Αξον	2006	V.	Συν8 69	δυασμός 69	BAEH 0.30		КОРУФ 0 30	н								
Μαχ Ανηγμένη Αξον Αξανική Υπολογισμο	/iktj	V a N az (kN	Συν8 69	5υασμός 69	BAEH 0.30 293.43		0 30 280 23	NH								
Μαχ Ανηγμένη Αξον Αξανική Υπολογισμο Ροπη Υπολογισμου	/iich où	V a N az (kN M _{sz} (kNs	Συνί 69 1)	38	BAEH 0.30 293.43 y 20.47	z 54.61 Bi	KOPY0 0 30 280 23 y 1.89 1	et z 15.94								
Μαχ Ανηγμένη Αξον Αξανική Υπολογισμου Ροπη Υπολογισμου ΠΕ	ΡΙΒΑΛΛΟ	۷ ی N at (kN M at (kN YZA BPA)	Συνί 69 1) ΥΝΣΕΩΝ Σ	биадµо́с 69 38 КҮРОДЕМ	BAΣH 0.30 293.43 y 20.47 (0 ΑΤΟΣ (0)0	z 54.61 84 30)	KOPY0 0 30 280 23 y 189 1	e z 15.94								
Μαχ Ανηγμένη Αξον Αξανική Υπολογισμο Ροπη Υπολογισμου ΠΕ Βά	ού ΡΙΒΑΛΛΟ ση Υποστυλ	V a N _{str} (kN M _{str} (kNr ΥΣΑ ΒΡΑΧ ιώματος	Συνί 69 1) ΥΝΣΕΩΝ Σ	биалио́с 69 38 КҮРОДЕМ	BAΣH 0.30 293.43 y 20.47 ATOΣ (0/0) Κορυφή	z 34.61 81 30) Υποστυλώμα	КОРУФІ 0.30 280.23 у 1 1.89 1	NH 2 15.94								
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ΣυΕντατικά		COMB	N	My	Mz	Vy	Vz	Mx			
-	Αρχή	1	429.19	12.70	20.25	24.14	16.32	0.05			
τοιμοάΛατοπΑ	Τέλος	1	412.99	-26.46	-37.69	24.14	16.32	0.05			
	Αρχή	2	386.55	9.43	16.17	19.11	12.08	0.04			
Διερεύνηση	Τέλος	2	370.35	-19.57	-29.69	19.11	12.08	0.04			
H	Αρχή	3	423.54	69.20	101.92	84.17	57.82	0.83			
🗖 Παραμορφώκ	Τέλος	3	410.34	37.62	55.43	84.17	57.82	-1.36			
00	Αρχή	4	302.62	68.43	100.12	82.69	57.17	0.82			
Ελεγχοι	Τέλος	4	289.42	36.83	53.66	82.69	57.17	-1.34			
<u> </u>	Αρχή	5	424.36	70.05	100.94	83.42	58.45	0.57			
	Τέλος	5	411.16	36.95	56.27	83.42	58.45	-1.61			
< >	Αρχή	6	303.44	69.28	99.14	81.93	57.80	0.56			
	Τέλος	6	290.24	36.16	54.50	81.93	57.80	-1.60			
Επαναυπολογισμός	Αρχή	7	420.79	66.38	105.17	86.69	55.72	1.68			
	Τέλος	7	407.59	39.83	52.64	86.69	55.72	-0.51			
Ελεγχος Κόμβου	Αρχή	8	299.88	65.60	103.37	85.20	55.07	1.67			•
	Τέλος	8	286.68	39.04	50.87	85.20	55.07	-0.50			
Y = 300.00	Αρχή	9	421.62	67.22	104.19	85.94	56.35	1.42			
	Τέλος	9	408.42	39.16	53.48	85.94	56.35	-0.76			
+ M-N -	Αρχή	10	300.70	66.45	102.40	84.45	55.70	1.41			
	Τέλος	10	287.50	38.38	51.71	84.45	55.70	-0.75			
Сору	Αρχή	11	404.73	5.96	85.24	71.72	8.37	-0.39			
Paste	Τέλος	11	391.53	-19.16	43.81	71.72	8.37	-0.64			
	Αοχή	12	283.82	5.18	83.44	70.23	7.72	-0.41			
Δομητική	Τέλος	12	270.62	-19.94	42.04	70.23	7.72	-0.63			
Αξιολόγηση	Αοχή	13	403,91	5.11	86.21	72.47	7.74	-0.14			
011	Τέλος	13	390.71	-18.49	42.97	72.47	7.74	-0.39			
UK	Αοχή	14	282.99	4.33	84.41	70.99	7.09	-0.15			
Cancel	Τέλος	14	269.79	-19.28	41.20	70.99	7.09	-0.38			
Concer	1 anos			10120						``	
										,	
	For Help, pres	s F1							CAP N	UM //	

The Investigation field, corresponding to the Results field, opens the txt file containing the results of the sizing checks for all combinations in detail.



In the Deformations field you can see how the upper and lower sections of the column are deformed, in each load and in each combination, as well as the reinforcement, which depending on whether it is compressive or tensile is symbolized in blue or red respectively.



Checks

Ελεγχ	(ος σ	ιε και τε διό	τμηα	η		Y			Z					
Ελεγχ	ος σ	τε περ	οίσφι	ξŋ			ΕΚΤΈΛΕΟΙ	η ελεγχα	9V					
Επαναϋπολογισμός Ικανοτικής Τέμνουσας														
Περίσφιξη ☑ Να ληφθούν υπόψιν οι μέγιστες αποστάσεις του κανονισμού														
Μαχ Αι	nóστ	ταση	(cm)	5	0	Υπολ	ογισμός	νέας από	όσταση					
Au	ito		(Ορισ	μός κ	ορυφών	συνδετή	ήρων - Κι	όμβων					
Ναλη	φθο	ύν τα	στο	οιχεία	з тоџ	πίνακα γ	μα τον έλ	λεγχο σε	: διάτμη					
Area		Φ	s	n	N	di1	di2	Vd	ων					
1	у	6	5	2	0	40.00	40.00	0.024	0.000					
1	z	6	5	2	0	40.00	40.00	0.024	0.000					

Through the Controls field you can perform local checks on the pole depending on the modifications you have applied to its reinforcement.

So in cases modifications or additions have been made to the main reinforcement you should activate the bend check, and if modifications or additions have been made to the fasteners then you should activate the shear and tension check.



OBSERVATIONS:

NEW: If you modify the bending reinforcement, new strength moments result, thus there is a need to re-check at a satisfactory cutting moment. Press the key
Enguine being rise being rise to represent the set of the set of

Επαναϋπολογισμός Ικανοτικής Τέμνουσας and ved will now be

Updated

▲ In addition, if, during the initial sizing, the number of sections of the The number of fasteners taken into account by the program in the initial shear and tension check is always n=2 (worst case) for both directions, with no possibility at this stage to take into account the actual sections per direction. This can be done in the retest.

9.1.1 For the Recheck on Bend:

. you activate the check	box	🗹 Ελεγχος σε κάμψη	and
select the command		Εκτέλεση ελέγχων	

The program re-checks in biaxial bending based on the bars you have placed and displays the message "Failed" or shows you the numbers of combinations where the cross-section fails at the beginning and end respectively.

ATTENTION

The biaxial bending recheck concerns only the equilibrium of the cross-section with the given reinforcement (adequacy check) without examining the other restrictions of the regulation (minimum bar spacing, maximum percentage of reinforcement in the cross-section, etc.). In other words, it is possible that the program may show a failure in bending in the initial dimensioning and that in the re-check the same cross-section, with the same bending reinforcement, may show that it is sufficient. This means that the initial dimensioning showed failure either by exceeding the maximum percentage of reinforcement or by exceeding the maximum number of bars.

The type of failure is also shown in the record of the investigation at the end of the biaxial bending test.

1 98 76.798 40.508 165.702 1 99 -24.810 -2.454 88.114 Αποτέλεσμα Διαξονικης : 1 (1=okey,0=δεν βγαίνει 10=max As 11=max αριθμός),

9.1.2 For the Shear Recheck:

. you activate the checkbox Ελεγχος σε διάτμηση and

. select the command ______ to populate the table below, updated with the modifications you have made.



Area		φ	s	n	N	di1	di2	Vd	ων	^
1	у	12	6	2	0	37.50	25.00	0.323	0.000	
1	z	12	6	3	0	37.50	25.00	0.168	0.000	
2	у	8	10	2	0	50.00	25.00	0.323	0.000	
2	z	8	10	4	0	50.00	25.00	0.168	0.000	
3	z	8	10	2	0	50.00	25.00	0.168	0.000	
3	у	8	10	4	0	50.00	25.00	0.323	0.000	~

OBSERVATIONS:

. select the

- You also have the possibility to intervene in this table and change the diameter φ, the distance s or the number of segments n.
- With the Na ληφθούν τα στοιχεία του πίνακα για τον έλεγχο σε διάτμηση command enabled the changes you make directly in the table are taken into account in the recheck. If you do not activate Na ληφθούν τα στοιχεία του πίνακα για τον έλεγχο σε διάτμηση then for

the recheck will take into account the original values, i.e. those that come automatically from the editor with the Auto option.

Εκτέλεση ελέγχων

During the shear recheck, the program calculates new fastener spacing based on the new fastener diameter and the new number of segments.

The procedure is as follows:

From the initial sizing a required Asw/s of fasteners in the y and z directions has been derived for the critical and non-critical length. A total of 6 values.

So, based on the new shape of the fastener and the new diameter, the program starts from the maximum distances defined by the regulation and starts an iterative procedure in order for the resulting Asw/s to be greater than the required one. The required value is given in brackets.

EΛΕΓΧΟΣ ΜΕ ΒΑΣΗ ΤΑ max ΚΑΝΟΝΙΣΜΟΥ ΔΙΕΥΘ.ΥΥ: = 11.00(κρίσιμο) / 25.00 ΔΙΕΥΘ.ΖΖ: = 11.00(κρίσιμο) / 25.00 ΕΛΕΓΧΟΣ ΔΙΑΤΜΗΣΗΣ Περιοχή 1 y: 0 n=2 Asws=37.7 (2.1) z: 0 n=3 Asws=56.5 (1.2) y: 1 n=2 Asws=37.7 (1.5) z: 1 n=3 Asws=56.5 (0.1) y: 2 n=2 Asws=37.7 (2.2) z: 2 n=3 Asws=56.5 (1.3) Περιοχή 2	<u>^</u>	
y: 0 n=2 Asws=27.2 (2.1)	\sim	

The results are displayed in the box and divided by:



- area (in cases where the cross-section has more than one area, e.g. cross-section C, P),
- direction (y, z) and
- height (0: critical area above, 1: non-critical area, 2: critical area below) : by selecting

the commands :	Z
Y	
Z	

On the cross-section, the cross-sectional area is shown with a cross-sectional area in Y or Z direction and a horizontal line shows the y or z direction, respectively.

Thus you can easily distinguish regions and directions, and read without difficulty the results of the check, calculated according to these directions (regardless of the direction of the local axes of the cross-section).

A You can do as many checks as you like, simply by intervening in the table and changing either the diameter ϕ , the distances s, or the segments n.

Area		Φ	s	n	Ν	di1	di2	Vd	ων	^
1	۶	10	6	2	0	37.50	25.00	0.323	0.000	
1	z	12	6	3	0	37.50	25.00	0.168	0.000	
2	у	8	10	2	0	50.00	25.00	0.323	0.000	
2	z	8	10	4	0	50.00	25.00	0.168	0.000	
3	z	8	10	2	0	50.00	25.00	0.168	0.000	
3	у	8	10	4	0	50.00	25.00	0.323	0.000	~



Just remember to choose Then after you end to armature, to go to field connectors and to make modifications, so that both the design and the issue are updated.

9.1.3 For the Recheck in Containment:

. you activate the checkbox

Ελεγχος σε περίσφυξη and Auto to m

. Then select the command

the modifications you have made.

Area		Φ	s	n	N	di1	di2	Vd	ων	^
1	у	8	10	2	0	37.50	25.00	0.05	0.000	
2	у	8	10	2	0	50.00	25.00	0.05	0.000	
2	z	8	10	4	0	50.00	25.00	0.05	0.000	
3	z	8	10	2	0	50.00	25.00	0.05	0.000	
3	у	8	10	4	0	50.00	25.00	0.05	0.000	
										~

to populate the table below, updated with

the table automatically updates the diameter ϕ , distances s, sections n, cross-section dimensions d1, d2 by area and direction. To fill in the column N representing the number of connector nodes, i.e. the number of clamped iron bars, follow the following procedure

. select the areas in each direction one by one

 Ελεγ Ελεγ Ελεγ Ελεγ 	χος α χος α χος α	ов кај ов біс ов пеј	μψη άτμη φίσφ	ση ιξη		Y Ектё	εση ελι	Ζ Έγχων	
No No	ι ληφ	θούν	uпó		μένιστει	αποστά:	DEIC TOL	κανονισ	uoú
Μαχ	Απόσ	ταση		50	Y	, πολογισμ	ός νέας	απόστας	ης
ł	uto			Ορισμ	ός κορυ	φών συνδ	ίετήρων	r - Κόμβω	w
No)	ηφθα	ούν το	а от	οιχεία	тоџ піча	іка уіа та	ν έλεγχ	ο σε διάτ	rµησr
Area		Φ :	s	n N	di1	di2	Vd	ωv	^
1	у	8	10	2 0	37.50	25.00	0.05	0.000	
1	z	8	10	3 0	37.50	25.00	0.05	0.000	
2	у	8	10	2 0	50.00	25.00	0.05	0.000	
2	z	8	10	4 0	50.00	25.00	0.05	0.000	
3	z	8	10	2 0	50.00	25.00	0.05	0.000	
	v	8	10	4 0	50.00	25.00	0.05	0.000	~

Automatically, the area is outlined to make it easy to locate

. select the command Ορισμός κορυφών συνδετήρων - Κόμβων

. by left-clicking you show all the irons in this area that are clamped by the fasteners, regardless of the direction, starting from one iron and ending with the same one.



Area		Φ	s	n	N	di1	di2	Vd	ων
1	у	8	10	2	12	50.00	25.00	0.014	0.000
1	z	8	10	3	12	50.00	25.00	0.014	0.000
2	z	8	10	2	12	50.00	25.00	0.014	0.000
2	у	8	10	3	12	50.00	25.00	0.014	0.000

Repeat the process in the other direction, showing exactly the same irons. Alternatively, if you shift-select both directions of the same region and set the vertices only once, both values of N will be filled in simultaneously.

OBSERVATION:

In the added column concerning ωv , and this phase, the designer has to manually enter the sizes (only for the wall columns, for the these fields are filled in automatically). The value is indicated in the investigation for each column respectively. Also the value of the opened axial nd must be filled in manually (only for wall columns).

```
Κολωνάκι Ο (45.000-30.000) - 200.000
N=1453.55 Ac=0.60 Ao=0.08 vd=0.12 bo0=0.39 bo1=0.20 Σbi=0.2344 μφ=1.667 pv=0.003 ων=0.062
a=0.31
Wwdreq = 0.08 Wwdcalc=0.21
Τελικοί Συνδετήρες Φ10/0.11
```

Vd	ων
0.014	0.000
0.014	0.000
0.014	0.000
0.014	0.000

In the column relating to ωv the designer must manually enter the size. The value is indicated in the investigation.

(only for wall columns, for poles these fields are filled in automatically)

me same procedure is followed for the second region to fill the whole column N. The number of segments n is already filled.

Area		Φ	s	n	N	di1	di2	Vd	ων
1	у	8	10	2	12	50.00	25.00	0.014	0.000
1	z	8	10	3	12	50.00	25.00	0.014	0.000
2	z	8	10	2	12	50.00	25.00	0.014	0.000
2	у	8	10	3	10	50.00	25.00	0.014	0.000

At this point you have 2 possibilities:

- 1. Examine, by area and direction, whether the controls are met in tension.
- 2. Based on a given diameter, calculate the distance that the fasteners must have to satisfy the tightening check.

OBSERVATION:



In the summary results the values according to the modified reinforcements are updated and indicated

Let's look at each case in detail:

1. To test whether your cross-section with the table data is satisfied when checking in tension:

. select the Εκτέλεση ελέγχων . see the results of the checks in the white box ΕΛΕΓΧΟΣ ΠΕΡΙΣΦΙΞΗΣ Περιοχή 1 y: 0 Wwd=0.197 (Wwdt=0.100) Ικανοποιείται Ζ: 1 Wwd=0.219 (Wwdt=0.100) Ικανοποιείται Περιοχή 2 z: 0 Wwd=0.205 (Wwdt=0.100) Ικανοποιείται y: 1 Wwd=0.219 (Wwdt=0.100) Ικανοποιείται

You also perform tests by changing either the diameter ϕ , or the distance s or the number of segments in the table and by clicking on Run tests to see the results.

Remember after you have concluded, go to the Connectors field and make the modifications to update both the project and the issue.

2. To calculate the distance of fasteners for a specific diameter:

. Write the diameter

Area		Ф	s	n	N	di 1	di2	Vd
1	у	12	10	6	12	100.00	30.00	0.028
1	z	8	10	2	12	100.00	30.00	0.022
2	z	8	10	5	10	80.00	30.00	0.022
2	у	8	10	2	10	80.00	30.00	0.028

. you set a maximum distance from which the program will start checking

Μαχ Απόσταση (cm) 50

Υπολογισμός νέας απόστασης

. select the command ________ and the program completes the column

s with the calculated distances

Area		Ф	s	n	N	di 1	di2	Vd
1	у	12	44	6	12	100.00	30.00	0.028
1	z	8	21	2	12	100.00	30.00	0.022
2	z	8	20	5	10	80.00	30.00	0.022
2	у	8	21	2	10	80.00	30.00	0.028

If you check the checkbox 🔽 Να ληφθούν υπόψιν οι μέγιστες αποστάσεις του κανονισμού then.

when calculating the distances that satisfy the checks, the programme shall also take into account the maximum distances in the Regulation.



Remember, after you have finished, go to the Connectors field and make modifications to update both the project and the issue.

EUROCODE 8-1 IMPORTANT REMARKS:

Regarding the calculation of the wall edge restraint fasteners at their critical height, based on EC8-1.

For the initial dimensioning of the wall, the following applies:

- It is mandatory to check for tightening at its critical length except in the case where vd is less than 0.15 (for DCM only) and except in the case where vd is less than 0.15 (for DCM only). case the result is negative.
- The number of connector segments considered by the program in the initial shear and tension test is always n = 2 (worst case).
 status) for both addresses. It is not possible at this stage to take into account the actual segments per direction. This can be done in the recheck.
- 3. A key change from the calculation of vd in ECOS and EC8-1, is that in ECOS the vd is calculated and relates to the column (axial reduced to the column and area of the column) whereas in EC8-1 the vd is calculated with the whole axial and the whole cross-section. This also applies to the control reduced CT. Note that with "whole" axonal and area sizes the results are generally more favourable.

In the exploration and at the end of the file, the sizes calculated are detailed.

```
Κολωνάκι Ο (60.000-40.000) - 200.000
N=753.13 Ac=0.80 Ao=0.18 vd=0.28 bo0=0.55 bo1=0.32 Σbi=0.4087 μφ=4.520 pv=0.002 ων=0.12
Wwdreq = 0.24 Wwdcalc=0.26
Τελικοί Συνδετήρες Φ8/0.10
```

In the above text, 200 cm is the total dimension of the wall. Then the axial N which is the total, Ac=2x0.4=0.8 m2 (the total cross-section for the calculation of vd), vd which as we said refers to the whole cross-section and the sizes Ao, bo0, bo1, Σ bi which refer to the column. The quantities ρv and ωv refer to the mechanical percentage of vertical truss reinforcement.

Wwdreq is the size required by equation 5.20 of EC8, while Wwcalc is the realisable and corresponds to F8/10 (dimensional) and the corresponding volume of the column based on the following formula

Wwdcalc = $(V_s / V_o) \cdot (f_{yd} / f_{cd})$

As far as the size Vs for the connectors is concerned, the program, always in the initial dimensioning and always for the walls, takes into account the direction perpendicular to the small side of the wall. This is to compensate for the unfavourable effect of the two-part connector, which is taken into account in both directions, whereas in at least one direction a connector with more than two parts is normally obtained. Finally, I emphasize that the segments and Vs only concern Wwdcalc.



In the following we will clarify some things concerning the recheck in tensioning within the column details and when the same sizes are calculated The detail of the cross-section is this

Editor Υποστυλι	ωμάτων	
뚡 Γεωμετρία		
💼 Κύριος Οπλισ	Ελεγχος σε κάμψη γ	
🖭 Συνδετήρες	Ελεγχος σε διάτμηση	` <u> </u>
	Ελεγχος σε περίσφιξη	l z
Σ Εντατικά	Περίσφιξη Μα ληφθούν υπόψιν οι μέγιστες αποστάσεις του κανονισμού	
	Μαχ Απόσταση (cm) 50 Υπολογισμός νέας απόστασης	
Allorenzopul	Auto Ορισμός κορυφών συνδετήρων - Κόμβων	
Διερεύνηση	Να ληφθούν τα στοιχεία του πίνακα για τον έλεγχο σε διάτμηση	
Η Παραμορφώα	Area Φ s n N di1 di2 Vd ων	
A Same	1 z 6 5 2 0 60.00 40.00 0.000 0.000	
	1 y 6 5 2 0 60.00 40.00 0.282 0.000	
	2 z 6 5 2 0 60.00 40.00 0.000 0.000	
	2 y 6 3 2 0 00.00 40.00 0.282 0.000	
Επαναυπολογισμός		
Ελεγχος Κόμβου		→
Y = 300.00		
+ M-N -		
Сору		
Paste		
Δομητικη Αξιολόγηση		
ОК		
Cancel		
		<u> </u>
		320

Initially a column was added concerning ωv and this stage the designer has to manually enter the magnitude. The value is indicated in the investigation and is everywhere the same for the rectangular wall. Also the value of vd where it is zero and is also the same for rectangular wall has to be manually filled in.

Then I have to press the "Auto" button to fill the table with the dimensioning data



CHAPTER B: COLUMN REINFORCEMENT DETAILS

📧 Editor Υποστυλωμάτων

🔀 Γεωμετρία								Ð, Ə,	🕀 🖑 🐔 🏅
🚺 Κύριος Οπλισ	Ελεγχος σ	ε κάμψη		v	,		7		
🕎 Συνδετήρες	Ελεγχος σ	ε διάτμησ	η		Εκτέλεσ	η ελέννα	Z		
村 Διαγράμματα	Ελεγχος σ	ε περίσφι	ξn		ERTENEO	il cucitic		z z	
Σ Εντατικά	🗹 Να ληφθ	ούν υπόι	hin oi hi	έγιστες αι	ιοστάσεις	; του καν	ονισμού		
<u> </u>	Μαχ Απόστ	αση (cm)	50	Yno	\ογισμός	νέας απ	όστασης		
Αποτελέσματ	Auto	0	Ορισμός	κορυφών	ν συνδετι	ήρων - Κ	όμβων		
Διερεύνηση	Να ληφθο	ύν τα στο	ιχεία το	u nivaka	για τον ἐ	λεγχο σε	: διάτμηση		
Παραμορφώα	Area	Φs	n N	di1	di2	Vd	ων		•
00	1 z	8 10	2 0	60.00	40.00	0.282	0.128		
Ελεγχοι	1 у	8 10	4 0	60.00	40.00	0.282	0.128		
	2 z	8 10	2 0	60.00	40.00	0.282	0.128		• ••• ••
< >	2 у	8 10	4 0	60.00	40.00	0.282	0.128		
Επαναυπολογισμός									
Ελεγχος Κόμβου									• •
Y = 300.00									
+ M-N									
T P									1
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Δομητική Αξιολόγηση									· · · · · ·
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CHAPTER B: COLUMN REINFORCEMENT DETAILS



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	/χος	σε π	ερισφ	η							ż				
	ληα	ρθού	ιν υπό	ωιν α	οι μέ	γιστες αι	ιοστάσει	ς του και	νονισμού						20
Μαχ	Апос	ποστ	n (cm)) 5	0	Упо	λονισμός	νέας απ	όστασης						
	Auto			Ορισ	LIÓC P	ເວດດາດຕຸ	ν συνδετ	ήρων - Κ	ώμβων						
	ηφθ	θούν	τα στ	οιχεία	а тоц	літака	για τον ε	 έλεγχο σι	ε διάτμηση						
Area	3	Φ	s	n	N	di1	di2	Vd	ων						
ώc 1	z	8	10	2	8	60.00	40.00	0.282	0.128						
1	у	8	10	4	8	60.00	40.00	0.282	0.128						
2	z	8	10	2	0	60.00	40.00	0.282	0.128						
> 2	у	8	10	4	0	60.00	40.00	0.282	0.128						

and show the bars enclosed by staples as usual. I do the same for the second line by y.

By carrying out the checks

ΕΛΕΓΧΟΣ ΜΕ ΒΑΣΗ ΤΑ max ΚΑΝΟΝΙΣΜΟΥ ΔΙΕΥΘ.ΥΥ: = 8.00(κρίσιμο) / 20.00 ΔΙΕΥΘ.ΖΖ: = 8.00(κρίσιμο) / 20.00 ΕΛΕΓΧΟΣ ΠΕΡΙΣΦΙΞΗΣ Περιοχή 1 z: 0 Wwd=0.262 (Wwdt=0.218) Ικανοποιείται y: 1 Wwd=0.350 (Wwdt=0.218) Ικανοποιείται Περιοχή 2



the above values are displayed. Wwd is Wwdcalc and Wwdt is Wwdreq.

Must always be Wwdcalc> Wwdreq, Wwd> Wwdt

For the first directionz (parallel to the long side) we have Wwd=0.262Wwdcalc=0.26 these two quantities coincide.

Wwdt=0.218, while from the original sizing Wwdreq=0.24. Here we have a difference compared to the size of the original dimensioning which is justified by the fact that in the original I do not have the exact positions of the bending irons in order to calculate the distances correctly. However, the differences will not be large. The exact one is of the recheck.

Similarly, in the other direction I have a larger value of the Wwd size due to the presence of the square connector.

In summary, in order to achieve the same result as the original sizing in the wall recheck, I have to define 2 connector sections and choose the direction that is perpendicular to the small side of the wall.

Finally, as regards the other forms of walls (Gamma, Tau etc.) the element is divided into rectangles and the check is done per rectangular leg in the same way as explained above.

About the Circumference

Specifically for the **Clamping** it is noted that it has been incorporated for all existing types of reinforcement in the columns and the metal cage in the program. The increase of concrete strength and deformation at fracture is done for all reinforcements (connectors, plates and IOP).

The new values are shown on existing cross-section data page in the reinforcement printout.

Bracing works only on poles (not on walls) and requires closed reinforcement on all sides. On the clamping of the walls finally in them is taken into account only when I have reinforcement with IOP or laminates.

A The increased strength and deformation values are shown on the first page of the
reinforcement printout. This page refers to the existing cross-section.

	Σελίδα : 2
ΥΠΑΡΧΟΥΣΑ ΔΙΑΤΟΜΗ	
Υποστ. : Κ3 - Μέλος : 9 - Συνδεσμολογία (Κόμβοι) Αρχής : 3	Τέλους: 9
ΕΙΔΟΣ: ΟΡΘΟΓΩΝΙΚΟ by=40 bz=40 Ύψος H=3	.0 Hcr= 0.60
ΣΚΥΡΟΔΕΜΑ : C12/15	
fck (Mpa)= 12 γcu/γcs= 1.50/1.00 maxεc(N,M)= 0.0035 fcc (Mpa)= 13.71	
fctm (Mpa)= 1.60 τrd(Mpa)= 0.18 maxεc(N)= 0.0020 εc(N,M)= 0.0084 ε	c(N)= 0.0069



PILLAR-WALL REINFORCEMENTS

SCADA Pro has integrated the tools for the rehabilitation and reinforcement needs of the columns and walls, as required by the Interventions Regulation (EIA)



ΙΟΠ-Ελάσμαι

Μροστασία



and all the controls and procedures required for them.

OBSERVATION:

The process of initial placement or changing the parameters of the existing reinforcement is iterative and includes the following steps in summary:

- 1. Armament details
- 2. Choice of aid
- 3. Default
- 4. Placement of reinforcement
- 5. Throughout the cross-section
- 6. Calculation of endurance moments
- 7. Checks
- 8. Issue
- 9. Analysis
- 10. Choice of scenario
- 11. Script execution
- 12. Combinations
- 13. Checks
- 14. Issue
- 15. Show I and print aid (again from the beginning)
- 1. Armament details
- 2. Choice of aid
- 3. Default
- 4. Introduction of different reinforcement elements
- 5. Calculation of endurance moments
- 6. Checks
- 7. Issue
- 8. Analysis

and the process is repeated...



Restoration

The Rehabilitation section includes the tools for the rehabilitation needs of the columns and walls, as required by the Interventions Regulation (EIA).



The scholar can choose from the three types of restoration , by activating one or more and using

Τἑυχος Μελέτης Προσθήκη

the command

to include them in the issue.

The "Delete" option deletes the corresponding section from the printout.

In addition, in SCADA Pro, the techniques and materials for the restoration and reinforcement of structural members are enriched with the materials and techniques of EM4C, Sika and SINTECNO. The designer has direct access to the libraries of EM4C, Sika and SINTECNO through the

orders	EM4C	Sika	SINTECNO	
By selectir	EM40	C Sika	SINTEC	, for each type of restoration you select

the corresponding material, while at the same time a reference is made to the specific material, with a detailed description of the product, its characteristics and its application.



Cloaks

The Mounds section includes the tools for the reinforcement needs of the columns and walls, as required by the Interventions Regulation (EIA).

According to the CEE, a reinforced concrete jacket is defined as a closed reinforcement throughout the whole cross-section, while when there are reinforcements selectively on some sides of the column, these are defined as additional layers of concrete.

📑 Editor Υποστυλά	ωμάτων							
Αποκατάσται	ß			\odot	Ð. 🕐 🐔	× 🕸 י	中国。	
Μανδύας ΙΟΠ-Ελόσματ Γη Ποσπασία Κλωβος	Τοποθέτηση Επικάλωψη(imm) 30 Πάχος (om) 7 Πλευρά Σε άλη την Διστομή Υλικά Σκυρόδευο : C25/30	Πάχη (cm) Μή 0 0 0 0 Μανδύας Περίσ Χάλυβας (Υώσιος) :8:	ත (cm) ආදිතුද 500C EM4C	Ţ				
< > EnavaunoJoyaudoç Eherygoç KóyBou Y = 771.00 + M+N Copy Paste OK	Βλήτησ - Αναρτήρος :8500C Ελεγχαι Επιλογή πλαυράς Υπό Υπολάγισμός Συνολικά Γο Αναρτήρος Διάμετρος(mm) 14 Διάμετρος(mm) 14 Αριθμός 0 hs(mm) 0 Βλήτρα Διάμετρος(mm) 12 \ Αι Επικόλυψη (mm) Τ2 60 36 Μι	Χάλυβος (Συνδ/ρων) θμη επιτελεστικότητος κιος Συνορμογής (cm) σοστό Εντασης μέσω χοπομού τριβής(%) show φ σθμός 37 ριφος Εμιτήςτως (mm) γιος Εμιτήςτως (mm)	BSOOC Ska B - SD 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 10 om c 1 ναλλάξ 72 αλόγισμός ανέλεγχος					
Cancel		Δ	Τεύχος καγραφή		200 072 60			

Define all Materials (sheathing, main reinforcement and fasteners)

TAING		
Σκυρόδεμα : C12/15	Χάλυβας (Κύριος) :S220	EM4C
Βλήτρα - Αναρτήρες :S220	Χάλυβας (Συνδ/ρων) :S220	Sika

In the new version of SCADA Pro 21, new materials have been added to reinforce and protect existing structures and the lists of existing materials have been fully updated and adapted. Now, when the designer selects the reinforcement material, all technical characteristics, including its thickness, are automatically taken into account. All materials also have a link to the corresponding technical brochure of the company producing it.



You set for the mantle Coating and Thickness, and apply the mantle either across the cross-section or by selecting the "Side" and pointing with the mouse to the corresponding side. In this way you can set different thicknesses per side.
 However, the coating shall be applied uniformly over the entire material content.

Τοποθέτηση								
Επικάλυψη(mm) 0								
Πάχος (cm) 0								
Πλευρά								
Σε όλη την Διατομή								

• The minimum **thickness of** the sheathing varies depending on the shotcrete, special concrete)

Τοποθέτηση			
Επικάλυψη(mm) 20	Πάχη (cm) Μήκη (cm)		
Πάχος (cm) 10	0 0 0 0		
η την Διατομή	Μανδύας Περίσφιξης		
Υλικά			
Σκυρόδεμα : C20/25	Χάλυβας (Κύριος) :Β500C	Cilie	▝ၬ≝Ϥ╧╝╵╷
Βλήτρα - Αναρτήρες :Β500C	Χάλυβας (Συνδ/ρων) :Β500C	ыка	3

When the Thickness per side is different, select the "Side" command and point the mouse to the corresponding side.

If it is the same across the cross-section select "Across the Cross-section".

In addition, you have the possibility to insert a Confinement Sheath (sheath section), reinforcing part of the cross-section by defining the corresponding Thicknesses and Lengths. You select the command "Confinement Mantle" and point the mouse at the side:

Τοποθέτηση Ξηικάλυψη (mm) 20	Πάχη (cm)	Μήκη (cm)	
Dáxoc (cm) 10	8	50]
Πλευρά	12	70	1
Σε όλη την Διατομή	Σε όλη την Διατομή Μανδύας Περίσφιξης		
Υλικά			
Σκυρόδεμα : C20/25 Χάλυβας (Κύριος) :B500C			
Βλήτρα - Αναρτήρες :Β500C Χάλυβας (Συνδ/ρων) :Β500C		ыка	

EXAMPLE:

In the above example, the overlap is 20 mm, the thickness of the main (vertical) side is 10 cm, the thickness and length of the first (upper) horizontal side is 8 cm and 50 cm respectively and the second (lower) horizontal side is 12 cm and 70 cm respectively.



• Insert mantle reinforcement, via the "Main Reinforcement" and "Connectors" command (see Chapters 2 and 3) and then,



 calculate the new interaction diagrams of the new reinforced cross-section, through the





OBSERVATION

Completed the integration of the **clamping** for all existing types of reinforcement in the columns. Increase in concrete strength and deformation at break is done for all reinforcements. Bracing works <u>only on poles</u> (not on walls) and requires <u>closed</u> reinforcement on all sides. The new values are shown on existing cross-section data page in the reinforcement printout. The increased strength and deformation values are shown on the first page of the reinforcement printout. This page refers to the existing cross-section.

								Σελίδα : 2
			Y	ΤΑΡΧΟΥΣΑ Ι				
Υποστ. :	K3	- Μέλος	<u>;: 9</u>	- Συνδεσμο	λογία (Κόμ	ιβοι) Αρχής :	3	Τέλους: 9
ΕΙΔΟΣ: ΟΡ	ΘΟΓΩ	NIKO by=4	40 bz=40)		Ύψο	ις H= 3.0	0 Hcr= 0.60
ΣΚΥΡΟΔΕΝ	/IA :	C12/15						
fck (Mpa)=	12	γcu/γcs=	1.50/1.00	maxɛc(N,M)=	0.0035	fcc (Mpa)= 13	3.71	
fctm (Mpa)=	1.60	тrd(Mpa)=	0.18	maxɛc(N)=	0.0020	εc(N,M)= 0.00	84 εc	(N)= 0.0069
						_		



You are returning to the Cloak for the missile calculation.

• In the **Connectors** field, enter the Diameter and the distance between the connectors of the jacket.

OBSERVATION:

- Their design within the "Connectors" needs to appear on the formwork. For their calculation it is necessary to fill in this field.
- Select the desired Performance Level

Στάθμη επιτελεστικότητας (Α - DL



A, B or C for inelastic analysis

***** for the elastic analyses of CAN.EPE

- There are 3 mechanisms for transferring the compressive force Fcm of the sheath, is transferred as shear force at the interface:
 - by friction
 - through welded hangers
 - 1 through missiles

all three of the above mechanisms are activated within available fitting length "uo". The shear strength at the interface is therefore obtained from the contribution of the friction, suspension and bolt mechanisms.

OBSERVATION

- ▲ In SCADA Pro the main mechanism for taking up the shear force is that of bolts. The friction mechanism and the suspension mechanism are optional and are chosen by the designer if they will participate in the shear strength of the interface.
- For the participation of the hangers it is required to specify the diameter, the number and the distance hs between the original and the adjacent new longitudinal reinforcement.

Αναρτήρες			
Διάμετρος(r	nm) 14	*	show
Αριθμός 0	hs(mm)	0	SHOW

- For the participation of the friction mechanism it is required to specify one of the two sizes:
 - ^{\perp} Either the fitting length and the program calculates the tension received the friction with a coefficient of friction μ =1
 - Lither a percentage of the intensity (%) that the friction mechanism will receive
 - ▲ In the case where friction and suspension mechanisms are not taken into account all tension is taken up by the bolts.

Μήκος Συναρμογής (cm)	0
Ποσοστό Εντασης μέσω μηχανισμού τριβής(%)	0



• In the **Balls** field you set the Diameter and the program calculates the Number and the distance between them, as well as the Overlap Bottom, Top and Side:

Βλήτρα					
Διάμετρος(mm) 14 🔻	Αριθμός	18	Σειρ	ές	1
Επικάλυψη (mm) Κάτω Πάνω Πλευρική	Avà(cm)	16.741		Ξναλλ	ġξ
84 70 42	Μήκος Εμπ	ιήξεως (m	m)	84	

IMPORTANT OBSERVATIONS ON THE MANTIS SHRIMP MOTHS

In order to calculate the required sheathing bolts in beams and substructures, the following steps are required:

- 1. Insert the cloaks
- 2. Perform the analysis of the Rule of Law (elastic/elastic)
- 3. In sizing, you call the combinations of the above analysis
- 4. Open the reinforcement details of the elements that have sheaths and in the Sheaths field do a Calculation

	· ·	Ĩ											
Πλευρά /		Βλήτρα											
Πλάτος (cm)	Φ (mm)	Smin (mm)	Smax (mm)	Ελάχ. Πλήθ.	Απαιτ. Πλήθ.	Sκάπω (mm)	S πάνω (mm)	S πλευ. (mm)	Sεμπ. (mm)	Τελικός Αριθμός	Avá (cm)	Σει- ρές	Εναλ λάξ
1/35.0	14	70	800	6	12	84	70	42	84	12	17.2	4 1	OXI
2/55.0	14	70	800	9	17	84	70	42	84	17	11.8	5 1	OXI
3/35.0	14	70	800	6	12	84	70	42	84	12	17.2	4 1	OXI
4/55.0	14	70	800	9	17	84	70	42	84	17	11.8	5 1	OXI
												-	
	ΕΛΕΓΧΟΣ ΕΠΑΡΚΕΙΑΣ ΣΥΝΟΛΙΚΟΥ ΟΠΛΙΣΜΟΥ ΔΙΑΤΜΗΣΗΣ												
	Vsd (kN	ly '	Vrd,so (kN)	Vrd,: (kN	sn I) Vs	d <vrd,so+< td=""><td>Vrd,sn</td><td>Vsdz (KN)</td><td>Vrd,so (kN)</td><td>Vrd,s (kN</td><td>sn V⊴)</td><td>sd<vrd,s ,sn</vrd,s </td><td>io+Vrd</td></vrd,so+<>	Vrd,sn	Vsdz (KN)	Vrd,so (kN)	Vrd,s (kN	sn V⊴)	sd <vrd,s ,sn</vrd,s 	io+Vrd
ΒΑΣΗ	51	4.65	432.21	103	7.31	NAI		216.63	201.7	0 729	9.96	NA	1
ΚΟΡΥΦΗ	51	4.65	432.21	103	7.31	NAI		216.63	201.7	0 729	9.96	NA	

Cloak projectiles on Pillars:

Sbelow: the distance of the 1st projectile from the base of the substrate Supper: the distance of ^{the} 1st projectile from the top of the substrate Slateral: the distance of the projectile from the side of the substrate Semp.: length of insertion of the projectile

• In the **Controls** field, by selecting the commands :





Calculate Overall: performs checks on the mantle (based on the EPEQ) on all sides and displays the results per side

Select side: you select side to run the checks on a side-by-side basis. Select the side to select the side, set the diameter of the bolts and select the "Calculate" button. The program automatically calculates all the required elements of the bolts for the given side.

The results of the checks are displayed at the bottom of the window:



At the beginning of the tests the intensive sizes of the pole at the top and base of the pole are displayed

Mx = -0.71 -0.71 My = 14.38 -42.38 Mz = -6.83 15.24

A The shear strength values per direction are shown below based on § 8.2.2.2 of the CEE.



And finally, the thickness of the jacket for the specific side is shown as well as all the sizes calculated for the projectiles.

t(cm)=8.00 (>=8 && <=12) Fcm(KN)=126.106 (2.599,126.106) Smin(cm)=7.00 Smax(cm)=48.00	*
4	

The program calculates the required number of bolts based on the intensity a minimum percentage based on the surface area of the mantle and places the largest one.

▲ In the above example the minimum number as a percentage is 13 while the number calculated is 18, which is the final number of missiles.

NOTE:

In the new version of SCADA Pro the command of deleting the reinforcements for the beams and poles respectively has been added.

Pressing the "Delete" button deletes the mantle of the selected pole and recalculates the interaction diagrams.



Finally, select the **Booklet** command to enter the checks in the corresponding chapter of the study booklet.

The "Recheck" command will be enabled in a later version of the program.

The detailed printout of the results appears in the "Extras" section and in the "Print" option



	T 1 W 11	DV10 E 1/2	
Διαθεσιμα Κεφαλαία	Τεύχος Μελετης	Πληθος Σελίδων :	
	Ενίσχυση Στύλων Lev: 3	Δεόομενα Κτιρ	JIOU
Η Ανάλυση		Μετακίνηση Πο	άvω
 Ενισχύσεις 		Μετακίνηση Κά	ίτω
Υποστυλωμάτων		Διανοαφό	
- 2100µn U			
-Στάθμη 2		Διαγραφή Ολ	ωv
Στάθμη 3		Εισαγωγή Αρχι	είου
Ε· Σιδηρά		Διόρθωση Κειμε	ένου
Τοιχοποιία			
⊞ Προμετρηση Υλικών		Διαμόρφιαση Σε	λίδα
		Σελιδοποίηση	0
		Εξαγωγή Μελέ	πης
		Εκτύπωση Μελ	έτης
		Report Mala	της
		Καταχώρησι	η
		FEDDOC	

Select the "Reinforcements" section and then select the level or levels you want to print, where all the results of the checks for calculating the number of bolts per side are detailed:



ΕΝΙΣ	хүхн	MEMA		(A 'H	ΠΡΟΣ	ΘΕΤ	ΕΣ Σ	τρογι	εις ο	ΠΛΙΣΜ	FN	ΟΥ ΣΙ		λF	ΔΕΛΙΟ	οα: 3)Σ
ΣΚΥΡΟΔ	EMA :	C20/	25									1	EFXY	TO		-
ΠΕΡΙΓΡΑ	ФН:															
YAIKO :				ПЕР	ІГРАФН	:										
fck (Mpa))= 20	γq	cu/ycs	;=	1.50/1.0)0 n	naxeo	:(N,M)=	: 0.0)3 max	(23)	N)= (0.002	0		
fctm (Mpa	a)= 2.3	20 тr	d(Mp	a)=	0.25	y	Rd=	1.2								
ΟΠΛΙΣΜΟ	DΣ											Επικ	άλυψ	ηc(I	mm)=	20
Κύριος :	BS	500 Es	s(Gpa	a)= 2	00 1	fyk(N	lpa)=	500	γsu	/γss=	1.	15/1.0	ma	XES(N)= 0	.02
Συνδετήρ	οες: Βξ	500 Es	s(Gpa	a)= 2	00 1	fyk(N	lpa)=	500	γsu	/γss=	1.	15/1.0	ma	XES(N)= 0	.02
Βλήτρα:	BS	500 Es	s(Gpa	i)= 2	00 1	fyk(N	lpa)=	500	γsu	/γss=	1.	15/1.0	ma	xɛs(N)= 0	.02
Αγκύρ Βλήτι	ωση οων															
Desil 1				ΣΕ		NAA	ΥΣΗΣ	:								
				BA	ΣН	N=-1	12 21	KN	Mv=	17.3161	Im		Mz=6'	3 361	KNm	
				KO	РҮФН	N=-1	12.21	KN	Mv=	50.34K	Nm		Mz=-1	38.2	7KNm	
			i					0	AITA	05 444	NI A					
	-		3	16.50	0.00	urruó	-	16:00		<u>02 Mia</u>	NΔ	<u>YA</u>				
	• 2			Σus	ρίος Οπ/ νδιπόρες	Φ/ (s cm)	±0φ20	00	(πλευο	á hi	<u>م م</u>	/10.00		(πλεμο	á hz)
				Ελά	ίνιστο Πά	ivocl	Μανδι	ύα: 8	mm	M	ivom	n Dáv	nc Ma	νδύο	12 n	0.02)
											- YIOI	o nax	5 110	0000	1. 121	
				Στά	θμη Επι	τελεσ	ΓΙΚΌΤη	τας: /	A - DL							
		Y			ΜΟΣ Α	PIΘ	MOY	ВЛНТ	ΡΩΝ	ΑΝΑ Π	VE	YPA		_		
Πλότος	Πάχος	Fom			Μηχαι	πομός	ς Τριβ	ής			┯┻	Avo	ερτήρ	ες		
(cm)	(cm)	(KN)	U	o(cm)	Umax(cm)	µ (%)	Vrd1	(KN)	Ф (mm)	Aρ	ιθμός	hs (r	nm)	Vrd2	(KN)
1/35.0	10.00	136.3	30	0.00	18	5.49	0.0	0	0.00	14		0	(0		0.00
2/110.0	10.00	136.1	17	0.00	18	5.47	0.0	0	0.00	14		0	(D		0.00
3/35.0	10.00	136.3	30	0.00	18	5.49	0.0)	0.00	14		0	(0		0.00
4/110.0	10.00	136.1	17	0.00	18	5.47	0.0	0	0.00	14		0	(D		0.00
						_										
						_										
-							_	Βλήτο								
Πλευρά /	Contin	Constru	E1.4		A	04			- -		_	Televi	(n)			Ever)
(cm)	(mm)	(mm)	Ελα) Πλήθ	(. ος Γ	Απαιτ. Ίλήθος	<u>зка</u> (mn	πω [s n) [(mm)	(mm)	ι <u>δεμ</u> (mn	п. 1)	Αριθμ	ός («	em)	Σειρές	εναλ λάξ
1/35.0	70	600	-	8	13		84	70	4	2	84		13 2	3.7	1	OXI
2/110.0	70	600		25	13		84	70	4	2	84		25 1	1.8	1	OXI
3/35.0	70	600		8	13		84	70	4	2	84		13 2	3.7	1	OXI
4/110.0	70	600		25	13		84	70	4	2	84		25 1	1.8	1	OXI
											ĺ					



IOP-Creatures

Steel plates or fibre-reinforced polymers (FPM) are a type of reinforcement designed to increase flexural strength and increase ductility <u>through strapping</u>. Regardless of the material, the plates act as additional external tension reinforcement due to the inadequacy of the existing one in the existing cross-section to reinforce the tension zone against normal tension.

▲ According to paragraph 8.2.1.3 of the CEE Code, a reinforced concrete section can be strengthened in bending by the addition of steel or fibre-reinforced polymer laminates. The technique is mainly applied to beams and slabs and rarely to columns, as it is not allowed to be applied in areas that are likely to be subjected to compressive stress. Exceptionally, it may also be used in areas subject to compression only if appropriate measures are taken, e.g. preventing local buckling of the longitudinal steel by applying clamping.

Editor Υποστυλ	ωμάτων	
Αποκατάστος		• • • • • • • • • • • • • • • • • • •
χ Μανδύος ΙΟΠ-Ελόσματ Μ Προστα	Τύπος Ενίσχυσης Χαλύβδινα Ελάφματα. Υλικό Κάλυβας (Κύριος) :S275(Fe430) ΕΜ4C Sika SINTECNO	
χώς Κλιαβος	Στάθμη επιτελεστικάτητος Προσπελασμότητα (Tiv. Z4.3) A - DL Κανανική (Συνήθης) ~ Τοποθέτηση Δ Μήχος (cm) Ο Πλάτος (cm) Ο Αγούρωση (cm) Ανοφορά πλευράς	
< > > Επαναυπολογιαμός Ελεγχος Κόμβου	Αρομος Στρωσεών Ο Ετοιχεία Λωρισών Δεν συμμετέχει στην κάμψη Πλέσος (σπ) Ο Σε δλη την Διατομή Απόσταση(σπ) Ο	
Y = 300.00	Τεύχος Δισγραφή Ελεγχαι 1/1 Αυτόματος Υπολογισμός Πάχους	
Copy Paste Sourmon		
Αξολόγηση ΟΚ		
Cancel	1]	



	 Steel Cr 	eatu	res:				
					Τύπος Ενίσχυσης	Χαλύβδινα Ελάσματα	~
•	Select	τον	Press	Ai		Χαλύβδινα Ελάσματα ΙΟΠ (Ινοπλισμένα πολυμερή)	
	steel plates						
			Υλικό Χάλυβας ((Κύρια	ос) :S275(Fe430)	EM4C Sika SINTECNO	

• You define the

In the new version of SCADA Pro 21, new materials have been added to reinforce and protect existing structures and the lists of existing materials have been fully updated and adapted. Now, when the designer selects the reinforcement material, all technical characteristics, including its thickness, are automatically taken into account. All materials also have a link to the corresponding technical brochure of the company producing it.

EM4C	Sika
EPH-C	DING

By selecting , for a type of structural reinforcement you select the corresponding material, while at the same time a reference is made to the specific material, with a detailed description of the product, its characteristics and its application method.

• You select the Performance Level and Accessibility

Στάθμη επιτελεστικότητας

A - DL 🗸

Προσπελασιμότητα (Πιν.Σ4.2) Κανονική (Συνήθης) 🗸

• In the Place field, select:

Default: to automatically fill in the Length of the post and the Width of the laminate which by default is equal to the width of each side of the post applied.

Г	Τοποθέτηση		-			
	Μήκος (cm)	300	Dávoc (mm)	0	Default	
			holdes (min)		Αναφορά	1
	Πλάτος (cm)	40	Αγκύρωση (cm)	0	πλευράς	1

- Then, enter the **Thickness** and **Anchorage Length** of the plate, in two ways:
- 1. for each Side : by selecting the "Side" button and pointing the mouse at the side)
- 2. For the whole cross-section: by selecting the "All cross-section" button

OBSERVATIONS

1 The Default option enters the data of all sides of the post.

Πλευρά
Σε όλη την Διατομή

- If you want to insert plates on all sides with the same thickness, first enter the thickness and
- the anchor length, then select the "Default" button and then press the "Across Crosssection" button.
- To change afterwards the thickness of the whole cross-section, enter the value for new thickness, and press the "Default" button <u>without pressing the</u> "All cross-section" <u>button again.</u> The existing laminations are adjusted to the new thickness.
- **Side reference**: to display the number of the side selected with the mouse and to display the reinforcement data for that side.



- Number of Layers: set the number of layers of reinforcement.
- Strip data:

The positioning of the lamellae may be uniform or in the form of continuous or discontinuous strips with gaps in between.

Therefore, with Continuous placement enabled, you set the width of the lane, and for intermittent placement you also set the distance between the lanes.

Στοιχεία Λωρίδων	
Συνεχόμενη τοποθ	θέτηση
Πλάτος (cm)	0
Απόσταση(cm)	0

with the option active, the plate on that side will not contribute to the المعرفي with the option active, the plate on that side will not contribute to the section.



• By selecting the **Checks** button, the program calculates and displays in the results, based on the cross-section of the laminate and the quality of the material, two minimum thicknesses t1 and t2 per side.

63



• Pressing the "Delete" button deletes the lamina or IOP of the selected pole and recalculates the interaction diagrams.

OBSERVATION

You need to re-adjust the thickness of the tyres based on the minimum t1 and t2 and redo the checks. But because the way of calculating the t2 thickness is an iterative procedure, by selecting the key:

ΑυτόματοςThe program automatically calculates the final minimum thickness t2Υπολογισμός Πάχουςrequired.

- A But you must still import it and do the final checks.
- Adequacy of the laminate or EOP is achieved either by increasing the thickness or increasing the number of layers.
 - In the results section



- The checks for the adequacy of bending strength for the whole cross-section and shear strength of the concrete, per direction, based on section (vi) of § 8.2.1.3 (a) of the CEE Code, are shown first.
- Then and by side $\square AEYPA : 1$ $\Delta M = 45.86$ $\sigma jd1 = 293995.859$ $\sigma jd2 = 447795.526$ min T(mm) : t=0.400 t1=0.693 t2=0.455

is calculated, i.e. the difference between the design moment and the moment of resistance of the original cross-section and if this difference is positive (which means that reinforcement is required) t1 and t2 are calculated based on the above. The value t is the thickness given by the designer.

EXAMPLE

In the above example, the thickness t entered is less than the required t1 and t2. t=0.7 must be inserted. However, if the thickness t=0.4 is maintained and 2 layers are inserted, then the results become



 $\label{eq:main_state} \begin{array}{l} \Pi \Lambda EYPA: 1 \\ \Delta M = 45.86 \\ \sigma j d1 = 293995.859 \\ \sigma j d2 = 316639.253 \\ min \ T(mm): t = 0.400 \ t1 = 0.347 \ t2 = 0.322 \end{array}$

That is, a minimum thickness of t=0.35 is required with two layers

If $\Delta M=0$, no amplification is required so t1=t2=0

- Finally, the shear test based on § 8.2.2.2 (iii) of CEE is shown.

Ελεγχος σε Διάτμηση	
ΠΛΕΥΡΑ: 1 Vjd=29.288	
ΠΛΕΥΡΑ: 2 Vjd=117.152	
ПЛЕҮРА: 3 Vjd=29.288	
ΠΛΕΥΡΑ: 4 Vjd=117.152	_
y: VRdtot = 862.622 (Vrds=628.318 Vjd=234.304) Vrdc=123	3.5 ≡
z: VRdtot = 215.656 (Vrds=157.079 Vjd=58.576) Vrdc=142.	10' _
<	•



Τεύχος

Select the Issue command to enter the checks in the corresponding

						Σελίδα : 3
		ΕΝΙΣΧΥΣ	Η ΜΕ ΧΑΛΥΒΔΙ	ΝΑ ΕΛΑΣΜΑ	ТА	
ΠΟΙΟΤΗΤΑ :	S275(F	e430)				
Es(Gpa)= 21	0 fyk(M	pa)= 275	γ'm= 1.21	γRd= 1	.2 ।	maxes(N)= 0.02
Συγκόλλησι Σφράγιση	n					
		ΣΕΝΔΡ	Ο ΑΝΑΛΥΣΗΣ :	*******		
1 ENTATIK	4 .	Στάθμη Προσπε 3	Επιτελεστικότητας : .λασιμότητα : Καν ΤΟΙΧΕΣ ΡΟΠΕΣ	A - DL ονική (Συνήθης) ΑΝΤΟΧΗΣ Ε	ΝΙΣΧΥΜΕΝ	ΗΣ (ΤΕΛΙΚΗΣ)
				Σ		
	My (KNm)	Mrd,y ΤΕΛΙΚΗΣ	My<=2/3 Mrd ΤΕΛΙΚΗΣ	Mz (KNm)	Mrd,z ΤΕΛΙΚΗΣ	Mz<=2/3 Mrd ΤΕΛΙΚΗΣ

	(KNm)	(KNm)	ΤΕΛΙΚΗΣ	(KNm)	(KNm)	ΤΕΛΙΚΗΣ
ΒΑΣΗ	2.141	3.478	OXI	76.322	123.977	OXI
ΚΟΡΥΦΗ	5.898	18.513	OXI	-37.175	-116.679	OXI
	Vy (KN)	Vrd,cy (KN)	Vy<=Vrdc	Vz (KN)	Vrd,cz (KN)	Vz<=Vrdc
ΒΑΣΗ	28.374	68.166	OXI	0.939	68.166	OXI
ΚΟΡΥΦΗ	28.374	65.916	OXI	0.939	65.916	OXI

			ΔΕΔΟΝ	IENA FIA K	AOE	ΠΛΕΥΡ	4		
Πλευρά /	Msd		ΔМ	σjd1			(i	ojd2 KPa)	
(cm)	(KNm)	(KNm)	(KNm)	(KPa)	β	fctm (KPa)	tj (mm)	Le (mm)	σjd2 (KPa)
1/40.00	76.32	31.81	44.51	227743.27	0.70	2200.0	1.40	258.49	239356.78
2/40.00	5.90	4.06	1.83	227743.27	0.70	2200.0	1.40	258.49	239356.78
3/40.00	76.32	31.81	44.51	227743.27	0.70	2200.0	1.40	258.49	239356.78
4/40.00	5.90	4.06	1.83	227743.27	0.70	2200.0	1.40	258.49	239356.78

chapter of the Study Document:



												Σελίδα : 4
			ENI	ΣΧΥΣΗ	H ME X	ΑΛΥΒ	ΔΙΝΑ	έλας	MAT	Ά		
-					Σ	FOIXEIA	ΕΛΑΣΝ	ΛΑΤΟΣ				
Πλευρα/	Mérces	Πλάτος	Αγκύρω) Storia	Πάχος	min	min	5			Λωρίδε	ς
(cm)	(cm)	(cm)	ση	σεις	ť	_t1	t2	ετογή	Απά	όσταση	Πλάτος	ς Συνεχόμ.
	(,	(,	(cm)	,	(mm)	(mm)	(mm)		(cm)	(cm)	Τοποθετ.
1/40.00	400.00	40.00	40.00	1	1.40	1.36	1.29	NAI	0.00		0.00	NAI
2/40.00	400.00	40.00	40.00	1	1.40	0.06	0.05	NAI	0.00		0.00	NAI
3/40.00	400.00	40.00	40.00	1	1.40	1.36	1.29	NAI	0.00		0.00	NAI
4/40.00	400.00	40.00	40.00	1	1.40	0.06	0.05	NAI	0.00		0.00	NAI
				E۸	ELXO	Σ ΣΕ <i>Ι</i>		ΗΣΗ				
Πλευρά/ Πλάτος (cm)	tj (mm)	sj (cm)	wj (cm)	Aj (cm2)	bw (cm)		ρj	hj, (ci	,ef m)	(K	σjd iPa)	Vjd (KN)
1/40.00	1.40	40.00	40.00	5.60	40.	.00	0.003	5 3	36.00	1	155581.91	78.41
2/40.00	1.40	40.00	40.00	5.60	40.	00	0.003	5 3	36.00	1	155581.91	78.41
3/40.00	1.40	40.00	40.00	5.60	40.	00	0.003	5 3	36.00	1	155581.91	78.41
4/40.00	1.40	40.00	40.00	5.60	40.	00	0.003	5 3	36.00	1	155581.91	78.41

	Δ	ΙΕΥΘΥ <mark>Ν</mark> ΣΗ	Y-Y		Δ١	ΕΥΘΥΝΣ Η	Z-Z		
Vjd (KN)	Vrds (KN)	VRdtot (KN)	Vsd (KN)	VRdtot> Vsd	Vjd (KN)	Vrds (KN)	VRdtot (KN)	Vsd (KN)	VRdtot> Vsd
156.83	201.06	357.89	28.37	NAI	156.83	201.06	357.89	28.37	NAI

• Fibre-reinforced polymers (IOPs):

In the new version of SCADA Pro, the way of entering and calculating the IOPs in the columns has been improved.

More specifically, in the IOP input dialog box, when the specific reinforcement type is selected, the material is no longer listed as steel plate quality but the corresponding IOP with its characteristic strength.





Τύπος Ενίσχυ (λικά	σης	ION (Ivon	λισμέν	α πολυμ	ερή)	e1	~
IOI : Fyk:	=3200.0	00(MPa)		EM4C		Sika	
Γύπος με	: ίνες γι	υαλιού 🗸		s	INTEC	NO	
τάθμη επιτελε	στικότη	ιτας	П	ροσπελα (Πιν.)	ισιμότι Σ4.3)	סזן	
A - DL 🚿	_		Kava	ονική (Συ	νήθηα) ~ (
Τοποθέτηση							
Μήκος (cm)	0	Πάχος (mm)	0.129	De	fault	
Πλάτος (cm)	0	Αγκύρωση	(cm)	0	Ανα πλε	φορά υράς	*
Αριθμός Στρά	ύσεων	0					
Ακτίνα στρογ	γύλευσ	^{ης} 0	Στοι)	κεία Λωρ	ίδων		
Δεν συμμε	τέχει σι	πν κάμψη	υΣ	υνεχόμε	νη τοι	ιοθέτης	η
Πλε	uoà		Πλά	πος (cm)	60	
Σε όλη τη	γ Διατα	ρμή	And	όσταση(α	m)	0	
Τεύχα	ος			Δ	ιαγρα	pή	
Ελεγχ	χοι	1/1		Α Υπολο	υτόμα γισμός	τος Πάχου	ς

There is also a checkbox for the type of IOP.

Γύπος με ίνες άνθ	(мра) рака V	1	EM4C		Sika
τάθμη επιτελεστικότητο	ος	П	ροσπελι (Πιν.	οσιμότη Σ4.3)	та
A - DL 🗸		Kava	ονική <mark>(</mark> Σι	υνήθης)	\sim
Τοποθέτηση Μήκος (cm) <mark>Ο</mark>	Πάχος (mm)		0	Def	ault
Πλάτος (cm) <mark>Ο</mark>	Αγκύρωση (α	:m)	0	Αναφ ηλει	popá Ipác
ακηνά στρογγολευση ακμών (mm) Δεν συμμετέχει στη Πλευρά Σε όλη την Διατομ	ο ν κάμψη ή	Σ Πλά Απά	υνεχόμε πος (cm	:vn топ) :m)	οθέτηση 0 0
Τεύχος			4	ναγραφ	ή
Ελεγχοι	1/1		Α Υπολο	υτόματ γισμός Ι	ος Τάχους



Also, the fields "Length", "Width" and "Not involved in bending" are disabled because there is no such thing as a reinforcement with IOP "open", i.e. it is always placed in the whole cross-section and always involved.

Also, the "Anchoring" field, which was needed for the calculation of ojd2, was disabled and is no longer calculated and not taken into account if the reinforcement is closed.

Finally, a new field was created to enter the radius of curvature of the edges, a quantity required for the calculation of the new compressive strength and the new maximum deformations of the concrete due to confinement.

ТОП		EM4C		Sika				
Τύπος	πος με ίνες άνθρακα 🗸			SINTECNO				
τάθμη επ	πελεστικότη	ητας	Π	ροσπελα (Πιν.Σ	σιμότη (4.3)	та		
A - D	A - DL 🗸 🗸			Κανονική (Συνήθης) 🗸				
Τοποθέτη	וסח							
Μήκος (cm) 0	Πάχος (mm)	0	Def	ault		
Πλάτος ((cm) 0	Αγκύρωση	(cm)	0	Ανα πλει	ρορά υράς	*	
Αριθμός	Στρώσεων	0			s			
Ακτίνα α ακμών (προγγύλευα mm)	^{ארק} 0	2100	(εια Λωρι		oAima	-	
	оррегедего				in ion	overnju		
	Πλευρά		TIAC	πος (cm)		0	-	
Σε ό	λη την Διατο	phi	And	ισταση(α	m)	0		
	Τεύχος			Δ	αγραφ	ή		
Ελεγχοι 1/1			Αυτόματος Υπολογισμός Πάχους				,	

This new compressive strength and the two new maximum deformations of the concrete are now indicated on the printout of the existing section

						Σε	λίδα : 2	
ΥΠΑΡΧΟΥΣΑ ΔΙΑΤΟΜΗ								
Υποστ.: Κ4	- Μέλος : 4	- Συνδεσμολ	\ογία (Κά	όμβοι) Αρχή	jς: 4	Τέλους	: 8	
EIΔΟΣ: ΟΡΘΟΓΩΝΙΚΟ by=40 bz=60 Ύψος H= 3.0 Hcr= 0.60							0.60	
ΣΚΥΡΟΔΕΜΑ : C20/25								
fck (Mpa)= 20 γc	u/γcs= 1.50/1.00	maxɛc(N,M)=	0.0035	fcc (Mpa)	= 23.23			
fctm (Mpa)= 2.20 тго	d(Mpa)= 0.25 i	maxɛc(N)=	0.0020	εc(N,M)=	0.0047	εc(N)= 0.0	027	
ΟΠΛΙΣΜΟΣ Επικαλυψη c(mm)= 25								
ΟΠΛΙΣΜΟΣ				-	Επικα	∧υψη c(mm)	= 20	
ΟΠΛΙΣΜΟΣ Κύριος : S400	Es(Gpa)= 200	fyk(Mpa)=	400	γsu/γss=	Επικα 1.15/1.0	Λυψη c(mm) maxεs(N)=	= 20 0.02	
ΟΠΛΙΣΜΟΣ Κύριος : S400 Συνδετήρες : S400	Es(Gpa)= 200 Es(Gpa)= 200	fyk(Mpa)= fyk(Mpa)=	400 400	γsu/γss= γsu/γss=	Επικα 1.15/1.0 1.15/1.0	<mark>Λυψη c(mm)</mark> maxεs(N)= maxεs(N)=	20 0.02 0.02	
ΟΠΛΙΣΜΟΣ Κύριος : S400 Συνδετήρες : S400	Es(Gpa)= 200 Es(Gpa)= 200 ΥΦΙΣ	fyk(Mpa)= fyk(Mpa)= ΤΑΜΕΝΟΣ (400 400 ΟΠΛΙΣΝ	γsu/γss= γsu/γss= ΛΟΣ	Επικα 1.15/1.0 1.15/1.0	Λυψη c(mm) maxεs(N)= maxεs(N)=	= 20 0.02 0.02	
ΟΠΛΙΣΜΟΣ Κύριος : S400 Συνδετήρες : S400 Κύριος Οπλισμός	Es(Gpa)= 200 Es(Gpa)= 200 ΥΦΙΣ 10Φ18	fyk(Mpa)= fyk(Mpa)= ΤΑΜΕΝΟΣ (400 400 ΟΠΛΙΣΜ	γsu/γss= γsu/γss= IOΣ	Επικα 1.15/1.0 1.15/1.0	Λυψη c(mm) maxεs(N)= maxεs(N)=	= 20 0.02 0.02	
ΟΠΛΙΣΜΟΣ Κύριος : S400 Συνδετήρες : S400 Κύριος Οπλισμός Συνδετήρες Φ / (cm)	Es(Gpa)= 200 Es(Gpa)= 200 ΥΦΙΣ 10Φ18 Φ8/10.00/10.00	fyk(Mpa)= fyk(Mpa)= ΤΑΜΕΝΟΣ	400 400 ΟΠΛΙΣΝ	γsu/γss= γsu/γss= ΛΟΣ	Επικα 1.15/1.0 1.15/1.0	<mark>Λυψη c(mm)</mark> maxεs(N)= maxεs(N)= z	= 23 0.02 0.02	



Protection

The **Protection** section includes the tools for the protection needs of poles and walls, as required by the Intervention Regulation (EIA).



The scholar can choose from the three types of protection , by activating one or more of them Τέυχος Μελέτης

and using the command

to include them in the issue.

CHAPTER B: COLUMN REINFORCEMENT DETAILS



		Σελίδα : 4							
	ΥΠΑΡΧΟΥΣΑ ΔΙΑΤΟΜΗ								
Υποστ.: К4	- Μέλος : 33 - Συνδεσμολογία (Κόμβοι) Αρχής : 26	Τέλους: 34							
ΕΙΔΟΣ: ΟΡΘΟΓΩ	2NIKO by=40 bz=40 Ύψος H= 3.0	Hcr= 0.60							
ΣΚΥΡΟΔΕΜΑ :	C20/25								
fck (Mpa)= 20	γcu/γcs= 1.50/1.00 maxεc(N,M)= 0.003 maxεc(N)= 0.0020)							
fctm (Mpa)= 2.2	0 τrd(Mpa) 0.25								
ΟΠΛΙΣΜΟΣ	Επικάλυψι	η c(mm)= 25							
Κύριος: Β	500 Es(Gpa)= 200 fyk(Mpa)= 500 γsu/γss= 1.15/1.0 ma	κεs(N)= 0.02							
Συνδετήρες : Β	500 Es(Gpa)= 200 fyk(Mpa)= 500 γsu/γss= 1.15/1.0 ma	κεs(N)= 0.02							
	ΥΦΙΣΤΑΜΕΝΟΣ ΟΠΛΙΣΜΟΣ								
Κύριος Οπλισμός	8Φ16								
Συνδετήρες Φ / (cn	n) Φ8/10.00/10.00 y Φ8/10.00/10.00	Z							
	ΑΠΟΚΑΤΑΣΤΑΣΗ ΥΦΙΣΤΑΜΕΝΗΣ ΔΙΑΤΟΜΗΣ								
Αντιδιαβοιυτική									
Προστασία	Υλικά επιφανειακής εφαρμογής που λεπουργούν ως αναστολείς διάβρωσης	για το							
	χαλυβοίνο οπλίσμο κατάσκευων 12.2. και εφαρμοφνταί με εμποτίσμο.								
NAI									
Αποκοτάστοσο	Επισκευαστικά κονιάματα δομητικής αποκατάστασης σκυροδέματος.								
Ω.Σ.									
NAI									
	Τσιμεντοειδή συνδετικά υλικά δομητικής αποκατάστασης ρωγματώσεων που	εφαρμόζονται							
Πλήρωση	με συγκόληση ή/και ενεμάτωση.								
Ρωγματωσεων									
NAI									

OBSERVATION:

In the new version of SCADA Pro 21, new materials have been added to reinforce and protect existing structures and the lists of existing materials have been fully updated and adapted. Now, when the designer selects the reinforcement material, all technical characteristics, including its thickness, are automatically taken into account. All materials also have a link to the corresponding technical brochure of the company producing it.



Cage

The Cage section includes the tools for the reinforcement needs of poles and walls, as required by the Interventions Regulation (EIA). The contribution of the cage is in the <u>confinement and shear</u> strength.






CHAPTER B: COLUMN REINFORCEMENT DETAILS

Χάλυβας	×
Ποιότητα ε Σταθερές	S275(Fe430 ∨
Es (Gpa) Evk (Mpa)	210
γsu	1.15
γss	1
Max Παραμό	ρφωση
εs	0.02
ОК	Cancel

- You define the Material of
- Select the desired Performance Level and Accessibility

Στάθμη επιτελεστικότητας		Προσπελασιμότητα (Πιν.Σ4.3)
B - SD	\checkmark	Κανονική (Συνήθης) \vee
A - DL B - SD Γ - NC ******	A, B or C for in ***** for the o	elastic analysis elastic analyses of CAN.EPE

• In the Laminations field, you set the height and thickness of the laminations as well as the distance between them and the anchor length.

Ελάσματα			
h (cm)	10	t (mm)	1
avà anòo	20		
Αγκύρω	20		

• In the **Angular Dimensions** field, you specify the dimension of the angular plate, which is assumed to be isosceles, and its thickness.

Διαστάσει	ς Γωνιακ	ιού	
b <mark>(</mark> cm)	5	t (mm)	5

• By selecting the **Checks** button, the program calculates and displays the results. At the beginning of the checks, the bending capacity check and the shear capacity check of the concrete are shown.

Then appear the shear test of the reinforced element.

CHAPTER B: COLUMN REINFORCEMENT DETAILS



Ελεγχοι 1/1	
My : Msd(78.750) <=2/3Mrd'(82.284)(1) : Ikavonoisirai Mz : Msd(-35.931) <=2/3Mrd'(-37.543)(1) : Ikavonoisirai My : Msd(-139.492) <=2/3Mrd'(-136.432)(1) : Ikavonoisirai Mz : Msd(16.659) <=2/3Mrd'(16.969)(1) : Ikavonoisirai	^
Vy: Vsd(-17.647) < Vrd,c(101.139)(1) : Ікаvопоігітаї Vz: Vsd(-73.236) < Vrd,c(84.676)(1) : Ікаvопоігітаї Vy: Vsd(-17.647) < Vrd,c(98.591)(1) : Ікаvопоігітаї	
Vz: Vsd(-73.236) < Vrd,c(81.896)(1) : Ікаvопоігітаі	^
EΛΕΓΧΟΣ ΣΕ ΔΙΑΤΜΗΣΗ ΠΛΕΥΡΑ : 1 Vjd=64.408 (σjd1=1304.35 σjd2=282.49) ΠΛΕΥΡΑ : 2 Vjd=21.187 (σjd1=1304.35 σjd2=282.49) ΠΛΕΥΡΑ : 3 Vjd=64.408 (σjd1=1304.35 σjd2=282.49)	
Implement Vid=21.187 (orid1=1304.35 orid2=282.49) y: VRdtot = 156.613 (Vrds=114.240 Vjd=42.374) Vrdc=101.13 z: VRdtot = 476.105 (Vrds=347.288 Vjd=128.816) Vrdc=84.67	*
< >	

The increased strength and deformation values are shown on the first page of the reinforcement printout. This page refers to the existing cross-section.

		Σελίδα : 2						
ΥΠΑΡΧΟΥΣΑ ΔΙΑΤΟΜΗ								
Υποστ.: Κ3 - Μέλος: 9 - Σ	υνδεσμολογία (Κόμβοι) Αρχής : 3	Τέλους: 9						
ΕΙΔΟΣ: ΟΡΘΟΓΩΝΙΚΟ by=40 bz=40	Ύψος Η= 3.0	Hcr= 0.60						
ΣΚΥΡΟΔΕΜΑ : C12/15								
fck (Mpa)= 12 ycu/ycs= 1.50/1.00 maxe	c(N,M)= 0.0035 fcc (Mpa)= 13.71							
fctm (Mpa)= 1.60 rrd(Mpa)= 0.18 maxe	cc(N)= 0.0020 εc(N,M)= 0.0084 εc(I	N)= 0.0069						

Also, in the case of the cage on the second page with the reinforcement, the dimensions of the angular

	•			ΣΕΝΑΡΙΟ ΑΝΑΛΥΣΗΣ :	****
•	• ⁴	•		Στάθμη Επιτελεστικότητας : ****	****
				Προσπελασιμότητα : Κανονική	ή (Συνήθης)
1 *		•	3	Στοιχεία Γωνιακού Ελάσματος :	: b (cm) = 5.00 t (mm) = 1.0
•	•	•			

Finally, the dimensions of the plates are shown in the next table, in the shear test

ΕΛΕΓΧΟΣ ΣΕ ΔΙΑΤΜΗΣΗ									
Πλευρά/ Πλάτος (cm)	t (mm)	s (cm)	h (cm)	Aj (cm2)	bw (cm)	ρj	hj,ef (cm)	σjd (KPa)	Vjd (KN)
1/40.00	1.00	20.00	5.00	0.50	40.00	0.0006	24.00	126358.12	7.58
2/40.00	1.00	20.00	5.00	0.50	40.00	0.0006	24.00	126358.12	7.58
3/40.00	1.00	20.00	5.00	0.50	40.00	0.0006	24.00	126358.12	7.58
4/40.00	1.00	20.00	5.00	0.50	40.00	0.0006	24.00	126358.12	7.58

• Pressing the "Delete" button deletes the cage of the selected pole and recalculates the interaction diagrams.



GENERAL OBSERVATIONS:

The members of the columns and/or walls that have been reinforced are highlighted on the screen:

- 1. In plan view: the junction is coloured "yellow"
- 2. In 3D: the member is coloured "yellow"



In addition, depending on the type of aid, the corresponding indicative letter appears:

- Cloak: "M"
- Lamma (Lama) : "L"
- ♦ IOP: "I"
- Cage:

A prerequisite for the display of the highlighting is that you have selected the Τεύχος button in the window of the respective aid

	Editor Υποστυλωμάτων – 🗆 🗙
Αποκατάστος	●● ● ● ● ● ● ● ● ● ● ● ●
Ματιδύος : ΟΠ-Ελόαματ Ματιδύος ΙΟΠ-Ελόαματ ΟΠ-Ελόματ ΟΠ-Ελόματ ΟΠ-Ελόματ ΟΠ-Ελόμα ΟΠ-Ελόματ ΟΠ-Ελόματ ΟΠ-Ελόματ ΟΠ-Ελόματ ΟΠ-Ελόματ ΟΠ-Ελόματ ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα ΟΠ-Ελόμα	Toroldman Toroldman Executive(m) 20 P(a)r(m) 0 P(b)r(m) 0 P(b)r(m) 0 Toroldman Toroldman
> Εποτουπολογαμός Ελεγχος Κάφθου Υ = 1000.00 + Υ = 1000.00 + Υ = 22 - Capy Paste OK Cancel	IMpreso-Averaging, Blooks, Bl

"K"



- A prerequisite for the introduction of the detailed details of columns and walls within the design environment is:
- 1. the "Armament Details" command for the corresponding poles and walls has been selected beforehand, and

2. in the respective windows to press the "OK" button. Then, the import of the "project.inf" design plan will include the detailed details of columns and walls.



Using the "**Modify>Correct**" command allows the detail to be co window.



Select the "**Fix**" command and left click on the detail. The corresponding editor window opens automatically where you can make the necessary modifications. By pressing the OK button you save the changes which automatically update both the drawing and the issue.