



TRAINING

SCIAENGINEER

SCIA ENGINEER – NEW IN SCIA ENGINEER CONCRETE (1/2 DAY)

Description

During this course of half a day, you will learn about the capabilities of the **new concrete application** in SCIA Engineer 15. This is done on the basis of a number of **practical examples**. Both **new and experienced users** will get the answers to questions such as:

- How to adjust the various settings and parameters and what are their backgrounds?
- How to show the internal forces?
- How can I design longitudinal reinforcement and shear reinforcement?
- Which checks are integrated?
- What are the changes and benefits in comparison with the previous concrete menu?

What knowledge will you obtain?

A process of clear and precise handling will be treated for a more effective and efficient use of each of the studied functionalities.

At the end of the training, you will be able to:

- understand and apply the new features and settings, so that the correct parameters are assigned quickly to the bars;
- easily and correctly perform a reinforcement design of beams and columns, and to interpret the results correctly;
- perform the new checks and show the results in a summary table or a more detailed output.

Program

General project settings

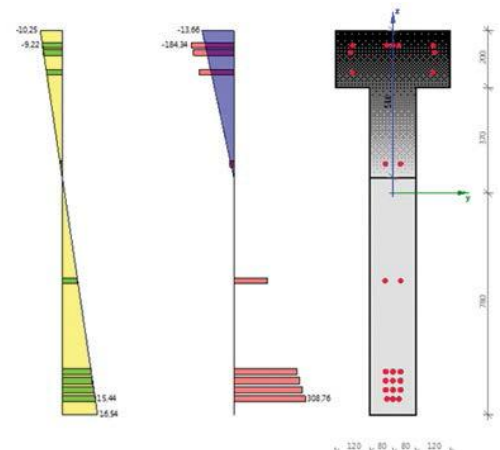
- How can I quickly adjust the settings and parameters?
- How to find quickly and easily a certain code setting?

Local settings

- What new parameters are available by the local settings?
- How to overwrite a specific setting for a particular element?

Internal forces

- Which internal forces are available?
- What effects are taken into account during the calculation?





TRAINING

SCIAENGINEER

Reinforcement design

- How to calculate the longitudinal reinforcement for beams and columns?
- What additional capabilities are included in the design of shear reinforcement?

Checks

- Which additional checks can be executed?
- How to perform a shear and torsion check?

Output

- What types of output are available?
- How to request a detailed output with images?

Working method

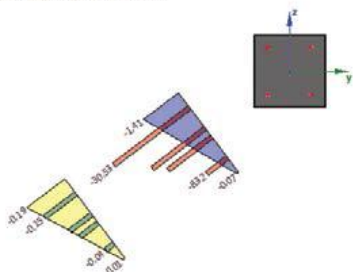
The training is provided by an experienced engineer from the Customer Service Department of SCIA. To guarantee the interaction between the participants and the trainer, the course is given for a small group of up to 8 people.

Each **participant will use the software** and will put the different topics of the course immediately into practice, under the supervision of the trainer. At the end of the training you will have the necessary knowledge to **use the parts discussed in an autonomous and efficient way**.

At the beginning of the training, each participant will receive a **syllabus**. This includes a detailed explanation of the different functionalities and treated examples.

After the training, the companies who do not have the ability to use all the features discussed in the license of the software, will have the opportunity to request a free try-out license which is valid for 30 days.

Stress and strain distribution



Extreme values of stress/strain in component

Type of component	Fibre/Bar	ϵ [%]	ϵ_{cr} [%]	σ [MPa]	σ_{cr} [MPa]	U.C. [-]	Status
Concrete - compression	5	-0.185	-3.5	-1.41	-13.3	0.11	OK
Concrete - tension	1	0	0	0	0	0.00	OK
Reinforcement - compression	4	-0.153	-2.25	-30.5	-45.4	0.07	OK
Reinforcement - tension	2	0	0	0	0	0.00	OK

Design shear resistance of the member with shear reinforcement

Design stress of shear reinforcement

$$\sigma_{s,red} = \frac{V_{Ed} \cdot k}{A_{sv} \cdot (\cot \theta + \cot \alpha) \cdot \sin(\alpha_s)} = \frac{24442}{0.305} \cdot 0.296 = 101 \cdot 10^3 \cdot (\cot(21.8) + \cot(90)) \cdot \sin(90) = 91.2 \text{ MPa}$$

Design yield strength of shear reinforcement

$$f_{s,red} = 0.8 \cdot f_{yk} = 0.8 \cdot 500 = 400 \text{ MPa} \quad (\text{because } \sigma_{s,red} < 0.8 \cdot f_{yk})$$

Note: Design yield strength of shear reinforcement was reduced to 0.8 \cdot f_{yk} (EN 1992-1-1, clause 6.2.3(3)), because design stress of the shear reinforcement is below 80% of the characteristic yield stress f_{yk} .

Design shear resistance of the member with shear reinforcement

$$V_{Rd,s} = \frac{A_{sv}}{s} \cdot z \cdot f_{s,red} \cdot (\cot \theta + \cot \alpha) \cdot \sin(\alpha_s) = \frac{101 \cdot 10^3}{0.296} \cdot 0.305 \cdot 400 \cdot 10^3 \cdot (\cot(21.8) + \cot(90)) \cdot \sin(90) = 107 \text{ kN}$$

Design value of the max shear force which can be sustained by the member

Strength reduction factor for concrete cracked in shear - value v

$$v = 0.6 \cdot \left(1 - \frac{f_{cm}}{250}\right) = 0.6 \cdot \left(1 - \frac{20}{250}\right) = 0.552$$

Strength reduction factor for concrete cracked in shear - value v_1

$$v_1 = 0.6$$

Coefficient taking into account state of the stress in the compression chord

$$\alpha_{cr} = 1 \quad (\text{for non-prestressed member})$$

Design value of the max shear force which can be sustained by the member

$$V_{Rd,max} = \frac{\alpha_{cr} \cdot b_w \cdot z \cdot v_1 \cdot f_{cm}}{(\cot \theta + \cot \alpha)} = \frac{1 \cdot 0.3 \cdot 0.205 \cdot 0.6 \cdot 12.3 \cdot 10^6}{(\cot(21.8) + \cot(21.8))} = 252 \text{ kN}$$



TRAINING

SCIAENGINEER

Prerequisites

A basic knowledge of the principles of SCIA Engineer is recommended.

Certificate

Each participant will receive an official SCIA Engineer “New in SCIA Engineer Concrete” certificate at the end of the training, signed by the trainer.

***Disclaimer:** The content of the training may be modified without notification (11/2015).*