

# Code dependant deformations 2D

esas.19

## Code dependant deformations 2D

Analysis of total, immediate and additional deformations in RC surface structures including the calculation of cracks, short and long-term stiffness according the national code.



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## Code dependent deflection concrete plates and walls

Civil engineering concrete structures can be subject to excessive deflection as phenomena such as crack propagation, and concrete creep and shrinkage reduce their innate stiffness. Any structural analysis must take these effects into account. The Scia Engineer software system has a module that can process physically non-linear analyses of code dependant deflections (CDD) for reinforced concrete beams. This module enables the user to analyse concrete plates and walls in terms of non-linear stress-strain relationships in concrete, including the effect of cracks. In addition the user can make simplified concrete creep deformation calculations.

The distinctive features of the CDD analysis of 2D concrete members in Scia Engineer include:

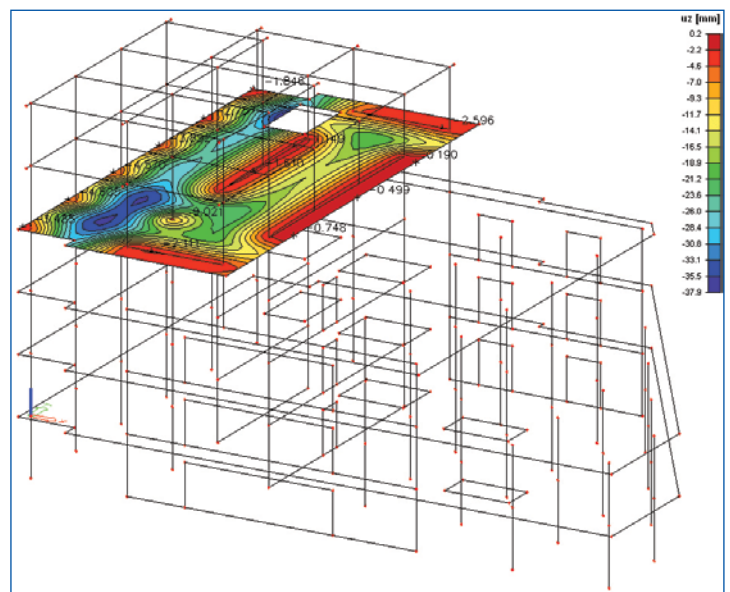
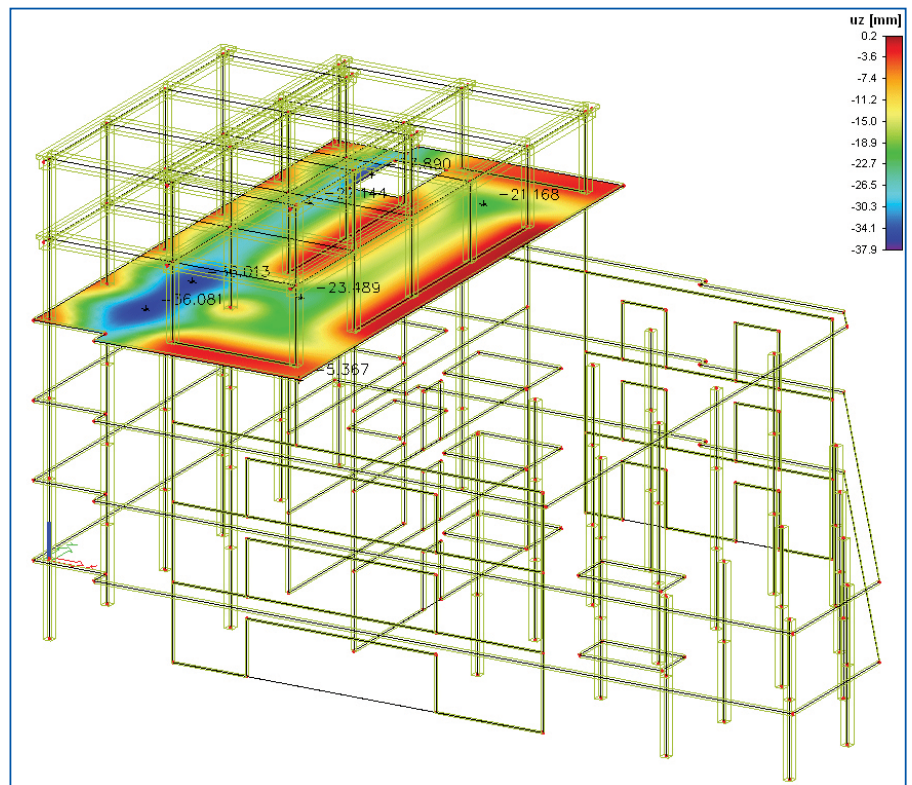
- The capacity to make stiffness calculations concerning the non-linear stress-strain relationships in concrete and its reinforcement;
- Using program generated necessary reinforcement figures in any analysis;
- Modifying the calculated necessary reinforcement area by multiplying it with a factor given in concrete setup;
- Calculating concrete creep deformation for selected combinations. This can be done twice, once using the standard concrete modulus of elasticity, and once using the effective modulus of elasticity. The difference between the two figures is considered as the creep deformation figure;
- The capacity to assess total deformation and deformation caused by short-term load.

In order to calculate code dependant deflections (CDD) in concrete, the user needs to do the following:

- Define any physical non-linear concrete combinations;
- Run a linear analysis;
- Have the program calculate any necessary reinforcement area figures;
- Run a non-linear analysis using the Concrete - CDD option;
- Display and study the linear/CDD/CDD results including creep deformation figures.

CDD calculations use the following national codes:

- Eurocode 2;
- NEN 6720;
- CSN/STN 73 1201;
- DIN 1045;
- Önorm B4700;
- BS 8110.



### Highlights

- ▶ Calculation of deflections based on regulations stipulated in standards.
- ▶ Long-term deflection obtained as multiple of short-term deflection and creep coefficient.
- ▶ Two step process: 1 - linear calculation + input of reinforcement + calculation of cracks and their effect on stiffness. 2 - calculation with modified stiffness.