

# IDEA StatiCa Detail

in cooperation with:

**ETH zürich**

Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich

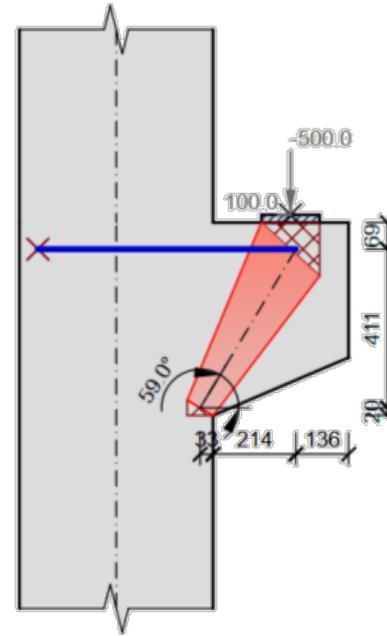
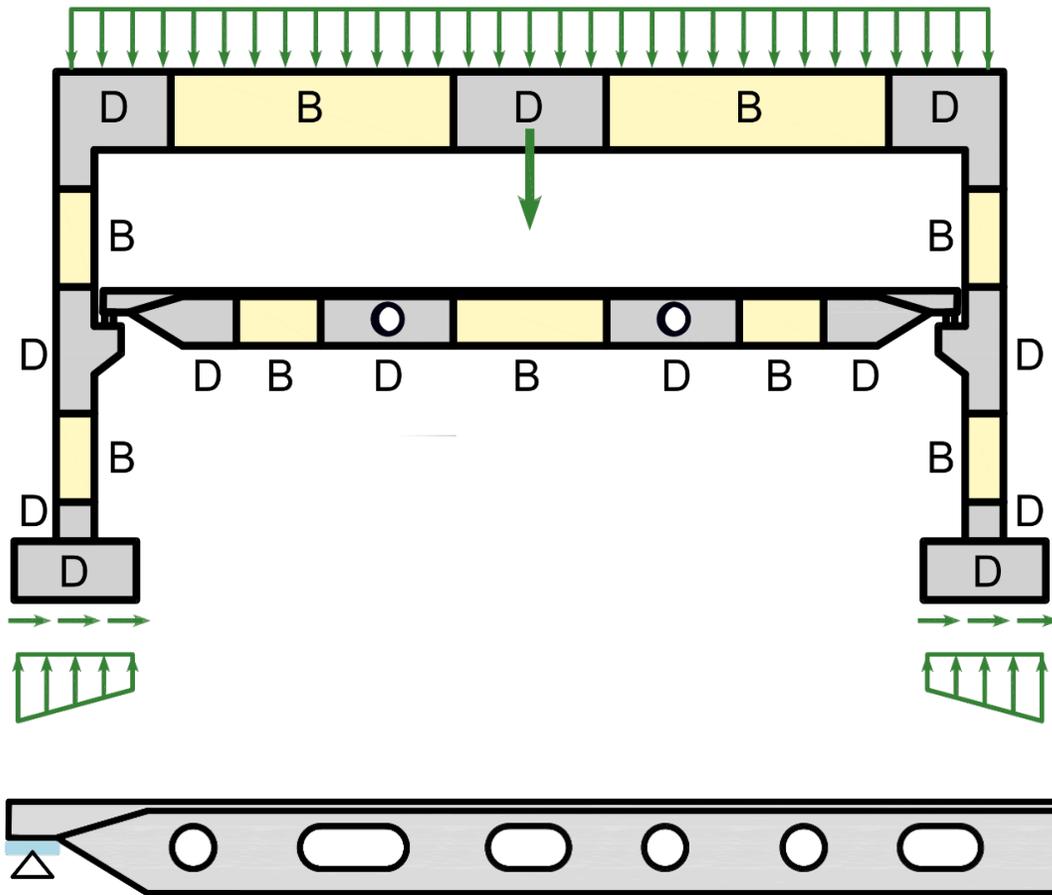
**A unique technology  
for ULS & SLS checks of  
Concrete  
Discontinuity regions**



The illustrated project is not related to IDEA StatiCa, and it is presented only for marketing purposes

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# What is IDEA StatiCa Detail?



IDEA Concrete Detail is a software tool for the design of discontinuity regions (D-regions).

In structures they coexist with the so called B-regions.

The difference between the two is that in D-regions, Bernoulli-Navier hypothesis that deformed planes remain plane is invalid.

Examples of D-regions include frame corners, regions where concentrated loads are applied, corbels, openings, dapped ends, foundations, and many other things.

# What is so unique about it?



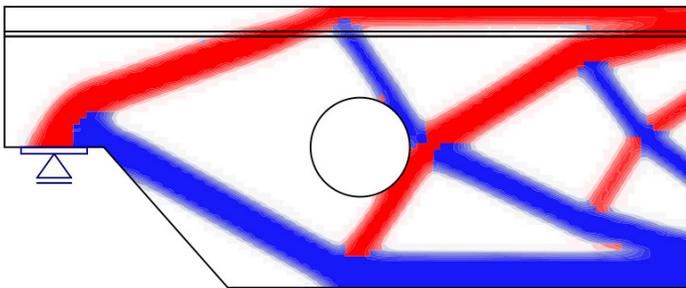
Before IDEA Concrete Detail there were 2 methods to analyse a D-region:

A) **Strut-and-Tie**, which oversimplifies the structure, provides results that are not coherent, because it gives only compressive and tension forces, and doesn't provide deformation and SLS checks.

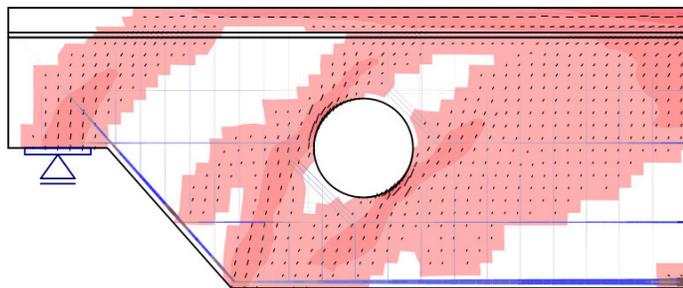
B) **Advanced FEM analysis**, which is very time consuming, requires a FEM expert to develop the concrete behaviour models, and doesn't provide code checks.

Our solution bridges this gap with a **new technology** that contains a topology optimization tool with energy minimization methods, to reveal stress paths in D-regions, and provide in minutes ULS & SLS checks for any geometry.

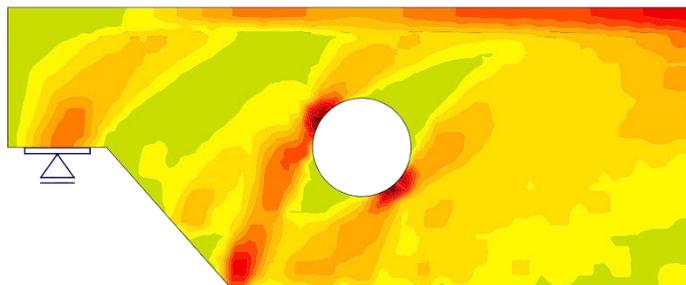
## Topology optimization



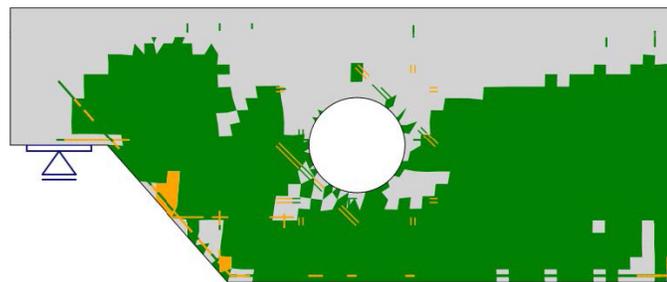
## Stress fields



## Concrete Stress / Strains



## Overall Check



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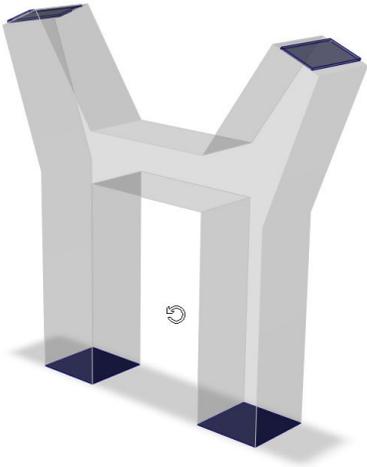
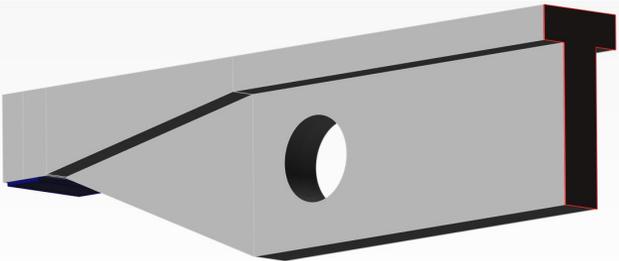
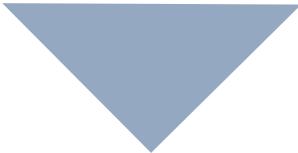
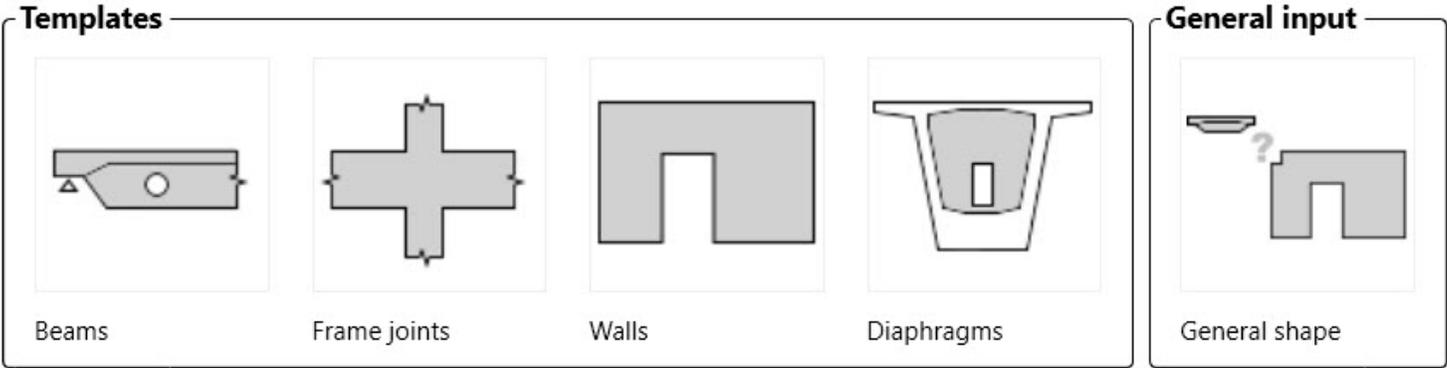
# What are the applications?



- Bridge piers
- Bridge diaphragms
- Prefabricated beams-columns
- Precast walls
- Special structures
- And others...

# 4

## How does it work?



IDEA StatiCa can create any geometry very easily, either through Templates, or General input, when we have arbitrary geometries.

The scope of the software is to provide a general solution for any type of structures.

# 4

## How does it work?

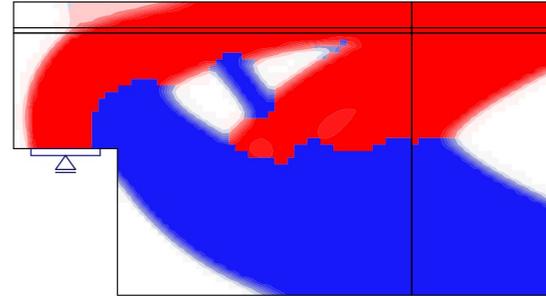
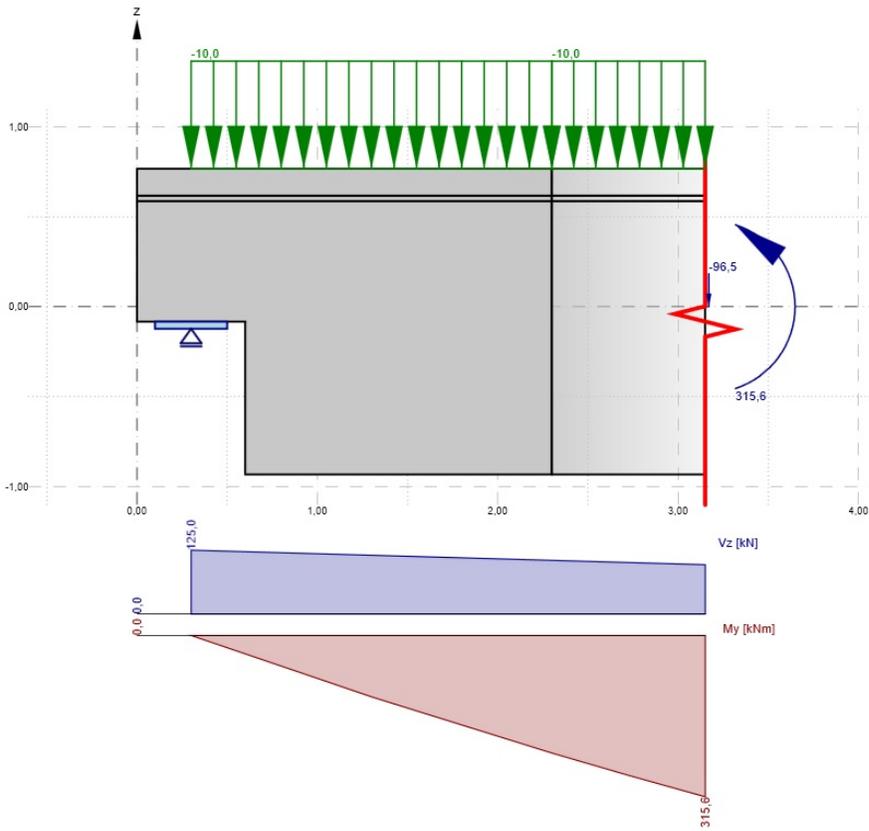


Input of boundary conditions and loads

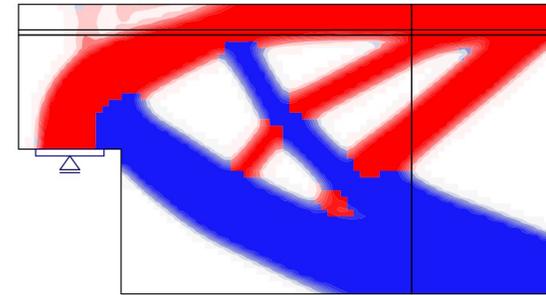
Topology optimization tool

After the input of boundary conditions and loads, the topology optimization is performed, which helps to identify the areas of tension and compression.

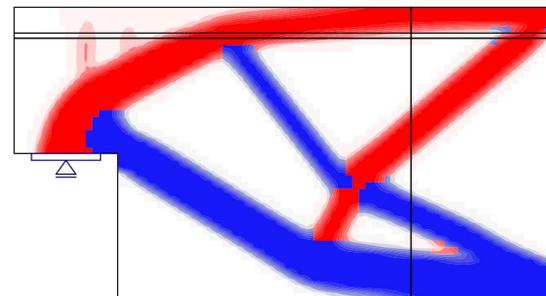
This is a fast and easy to use tool that can facilitate and speed up the task of reinforcement design significantly, since it provides the engineer precise information for the most critical areas.



Effective volume 80%



Effective volume 60%



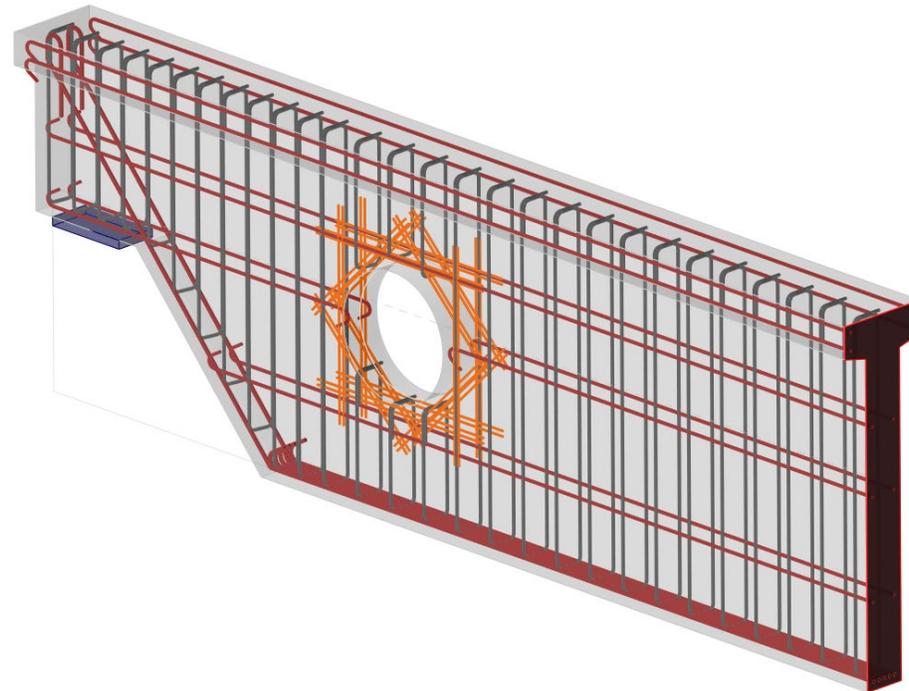
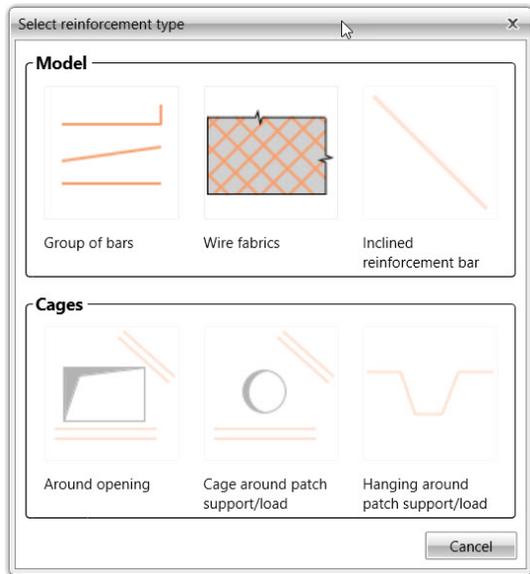
Effective volume 40%

## 4

# How does it work?



Input of all reinforcement from templates or manually



Then the detailed reinforcement model can be inserted, by using either predefined templates or manual input of any type of re-bars.

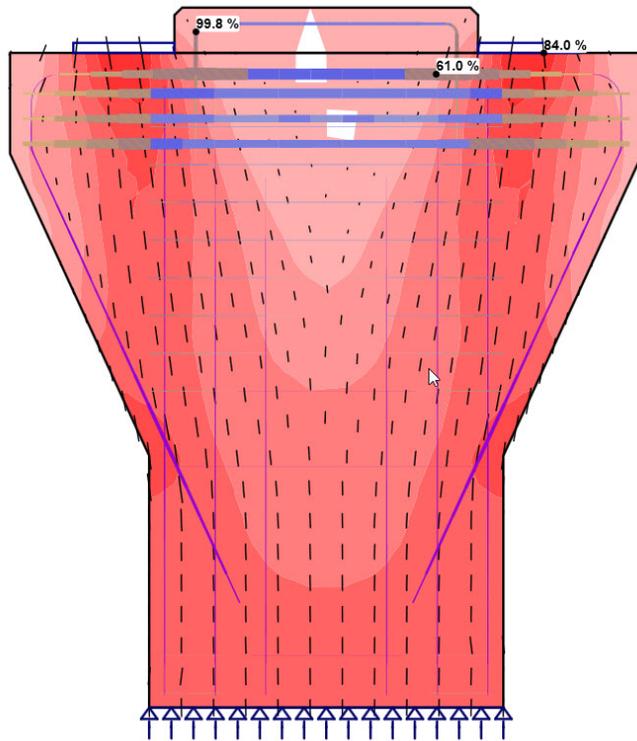
As mentioned, the topology optimization helps to identify where exactly the bars need to be positioned.

## 4

# How does it work?



Complete checks in minutes



## Stress flow / Overall check

- Compression stress fields
- Principal tensile stresses
- Load and support reactions
- Overall checks

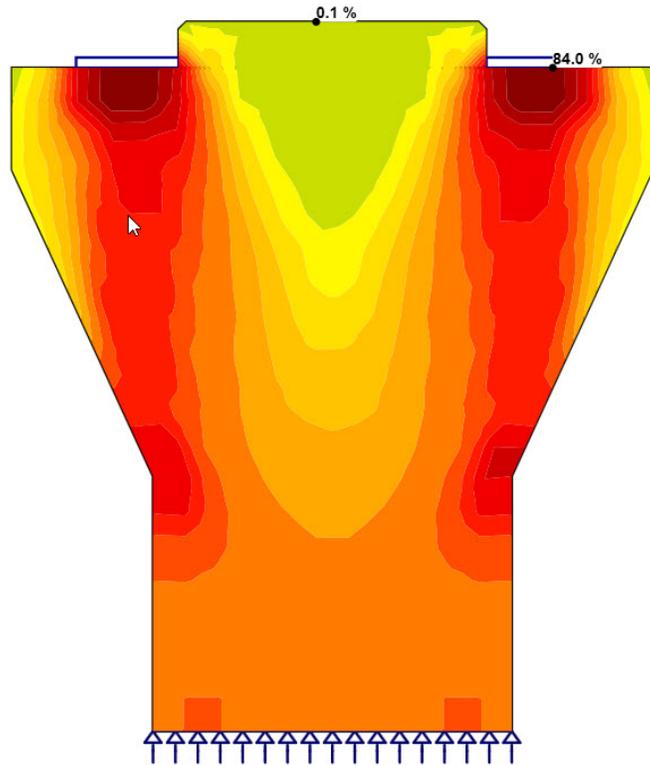
The final step is the Overall check of the structure which is done by non-linear analysis and provides both ULS & SLS checks.

## 4

# How does it work?



Complete checks in minutes



## Strength of Concrete

- Stress check value
- Principal stress  $\sigma_1$
- Principal stress  $\sigma_2$
- Principal strain  $\epsilon_1$
- Principal strain  $\epsilon_2$
- Compressive strength reduction factor

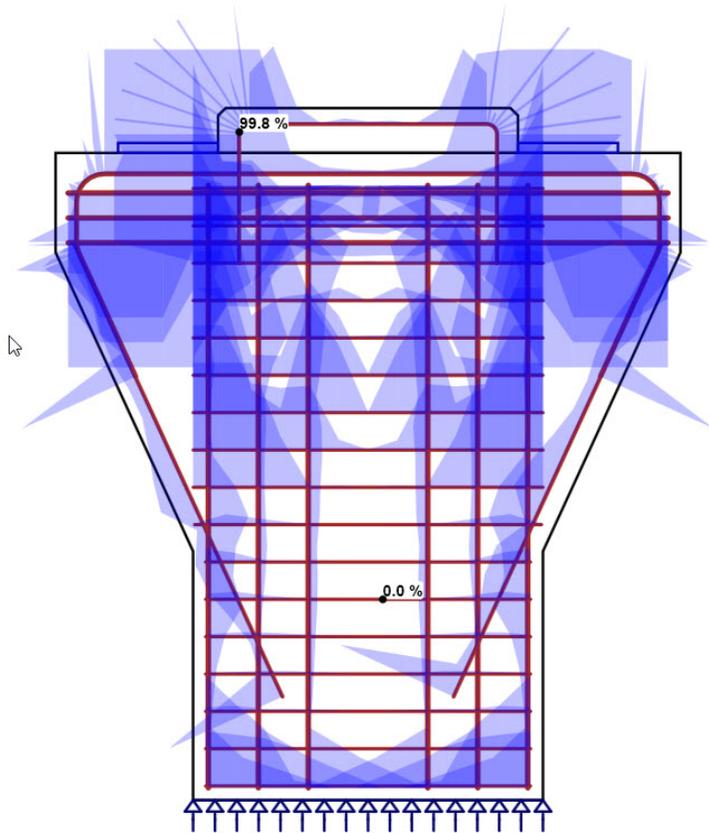
Detailed concrete checks are provided, such as utilization in stress, stresses in both principal directions, strains and also maps of reduction factors  $k_c$

## 4

# How does it work?



Complete checks in minutes



## Anchorage

- Bond stress check value
- Force check value
- Anchorage force
- Total force in the bar
- Bond stress

IDEA StatiCa Detail can also show the results for bond model and anchorage of bars.

This includes anchorage forces, total forces diagrams along the rebars, bond, and slip..

# 4

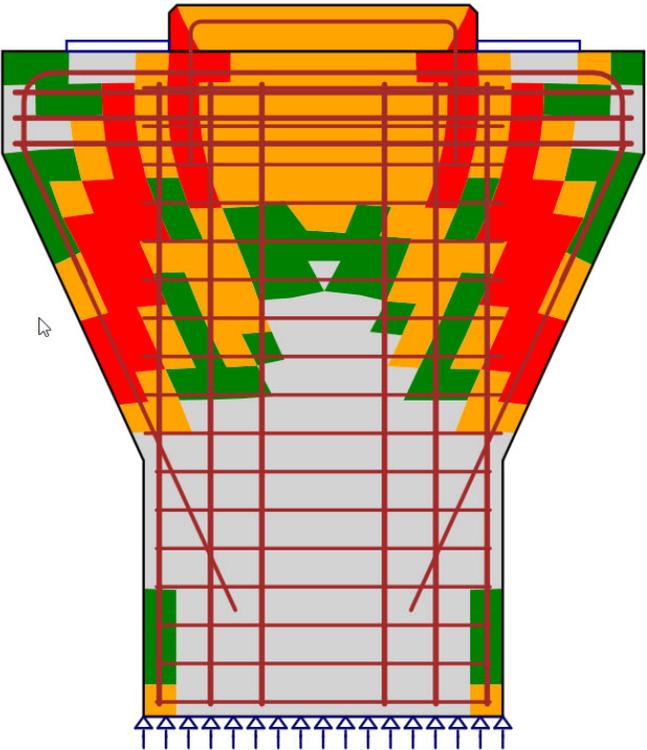
## How does it work?



Complete checks in minutes

Finally, results for crack width (excessive tensile strains) and deflections are provided, which give you an indication about detail's behaviour.

Location of places with excessive tensile strain in concrete



### Tensile fields

- grey: compression
- green: prior cracks
- yellow: permissible crack width
- red: inadmissible crack width

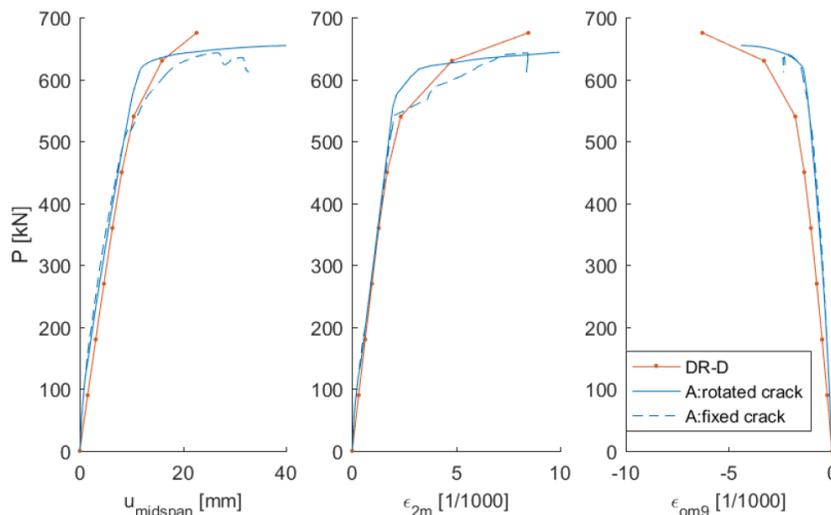
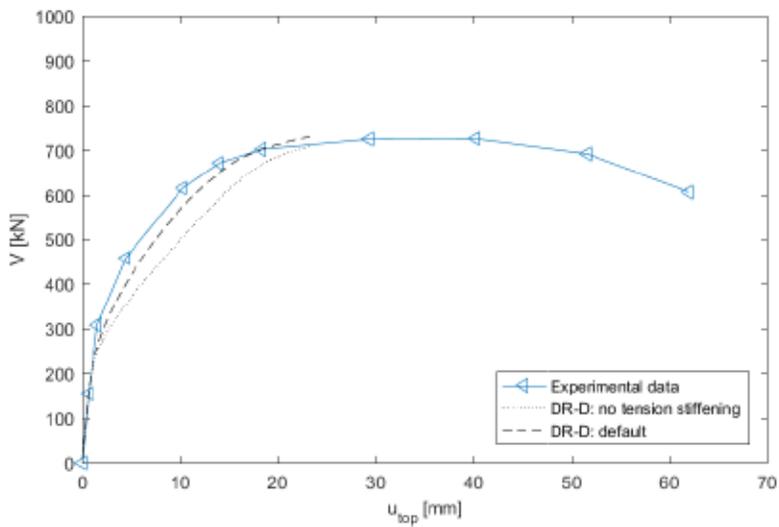
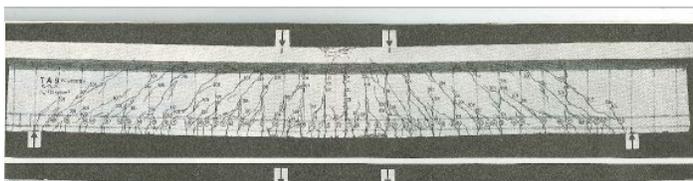
# 5 Is it verified?

Developed in cooperation with:



Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich

**Professor Kaufmann**



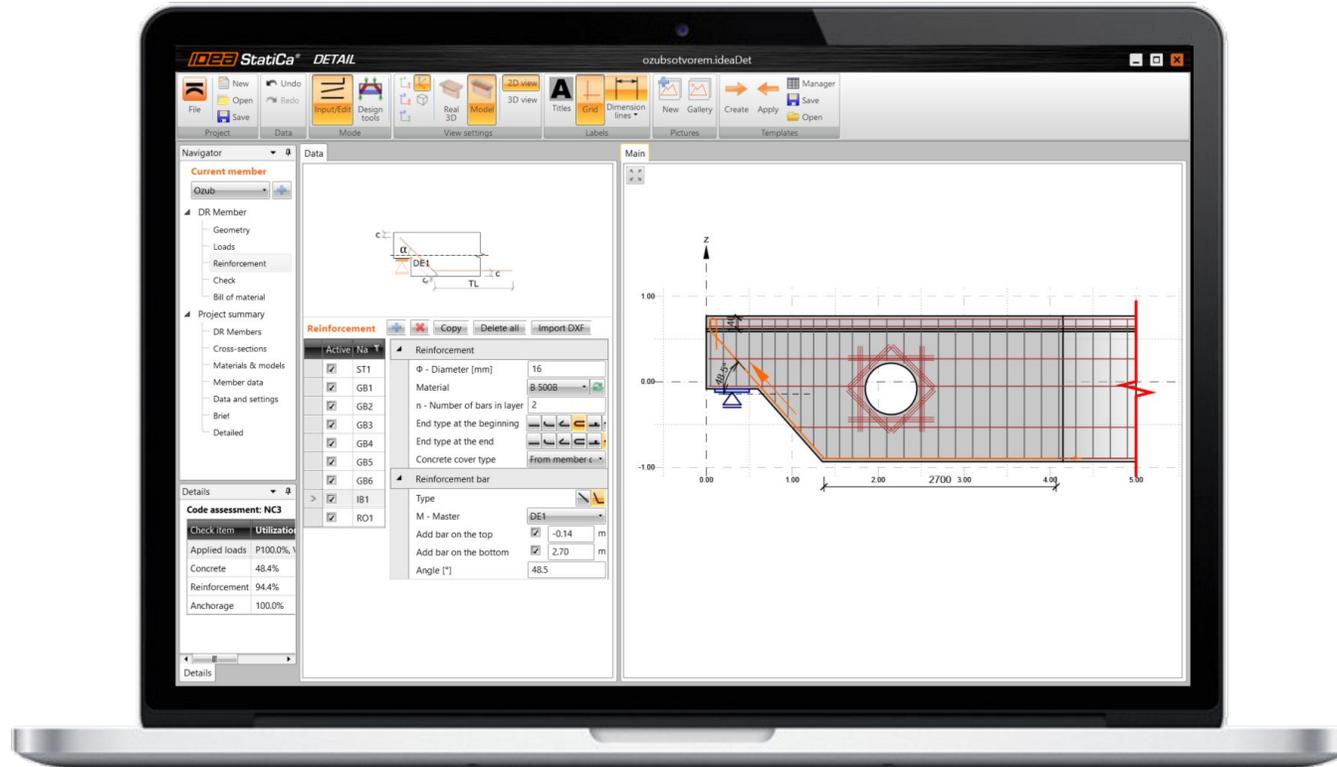
IDEA StatiCa Detail is the result of years of development, in cooperation with ETH Zurich – one of the most prestigious Universities in the world in Concrete Structures, which has verified and validated the analysis model, including all parameters entered into the calculation.

Professor Kaufmann and his team is working closely with our developers and continue to push the boundaries of structural analysis software, by offering this innovative new approach to the practicing engineers around the globe.

# Download our free trial

It takes 30 minutes of usage to see the potential of the software!!

[CLICK HERE](#)



# Ευχαριστούμε για την προσοχή σας!



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