



# **Structural Analysis & Design Software**

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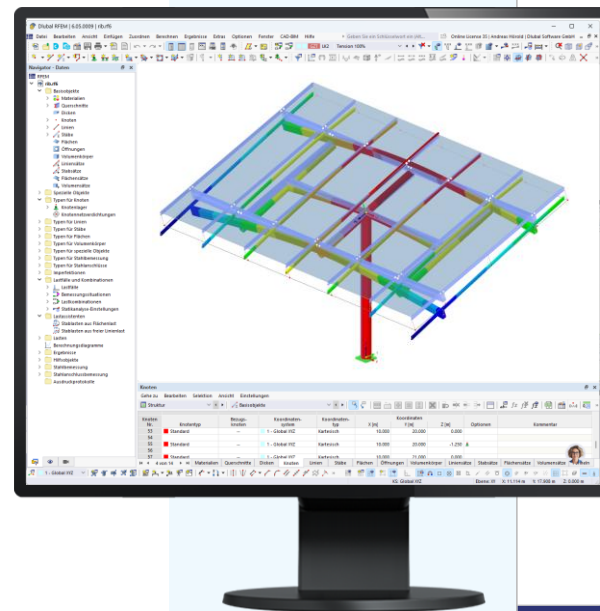


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Organizer

Head of Product Engineering  
Dlubal Software GmbH

## Webinar

# Structural Design of PV Systems: Identifying Challenges – Implementing Solutions with RFEM 6



# Questions During the Presentation



GoToWebinar Control Panel  
**Desktop**



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**Ask questions**

2

Questions

No questions yet

Questions from your attendees will appear here.

Submit a question

Enter your question

Your question will be sent to the staff

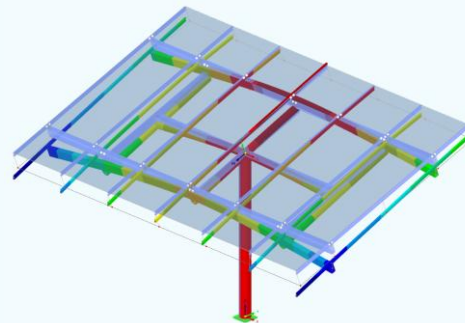
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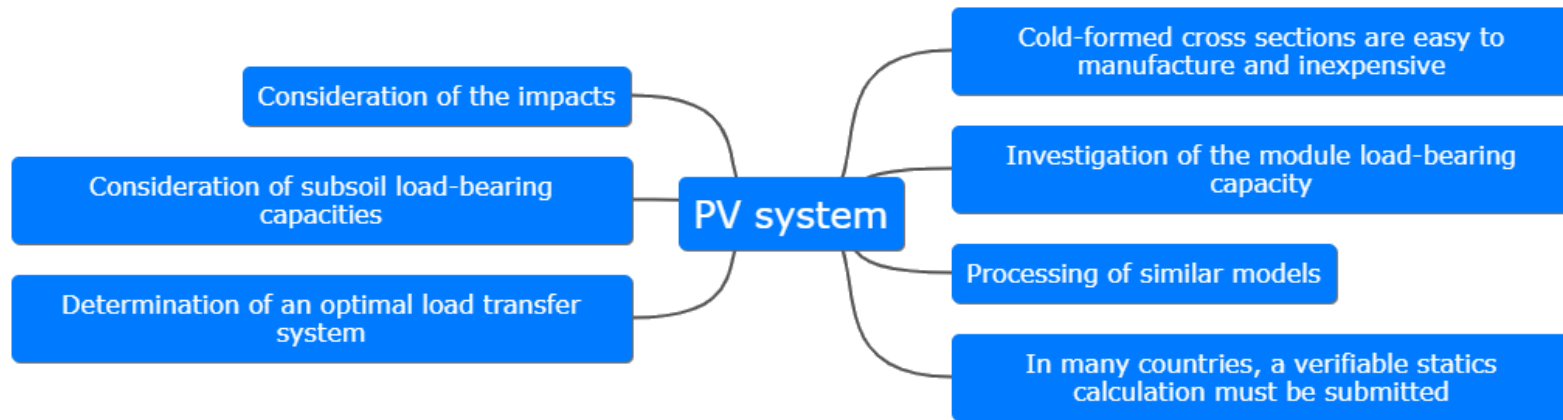


# CONTENT

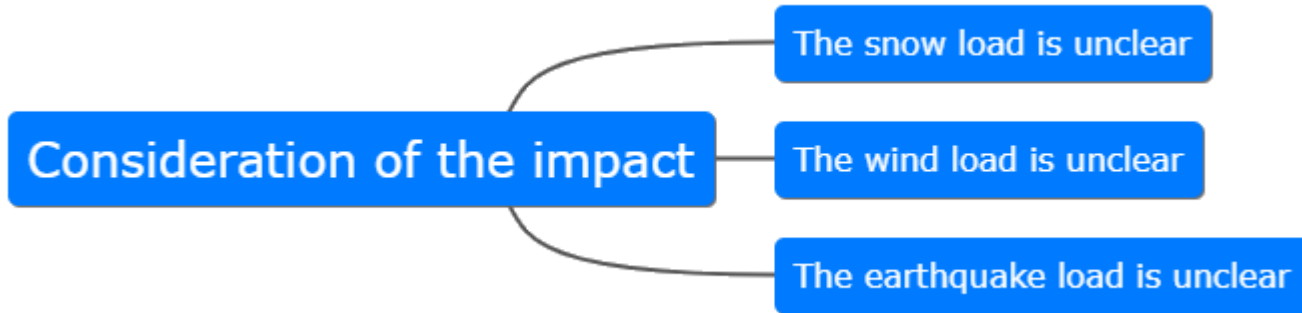
- 01** Why PV systems challenge structural engineers today
- 02** Typical challenges in structural design of PV systems
- 03** From theory to practice: how RFEM 6 simplifies everyday life
- 04** Live demo: structural design of a typical PV system with RFEM 6
- 05** Summary



# Why PV systems challenge structural engineers today



# — Typical challenges in structural design of PV systems

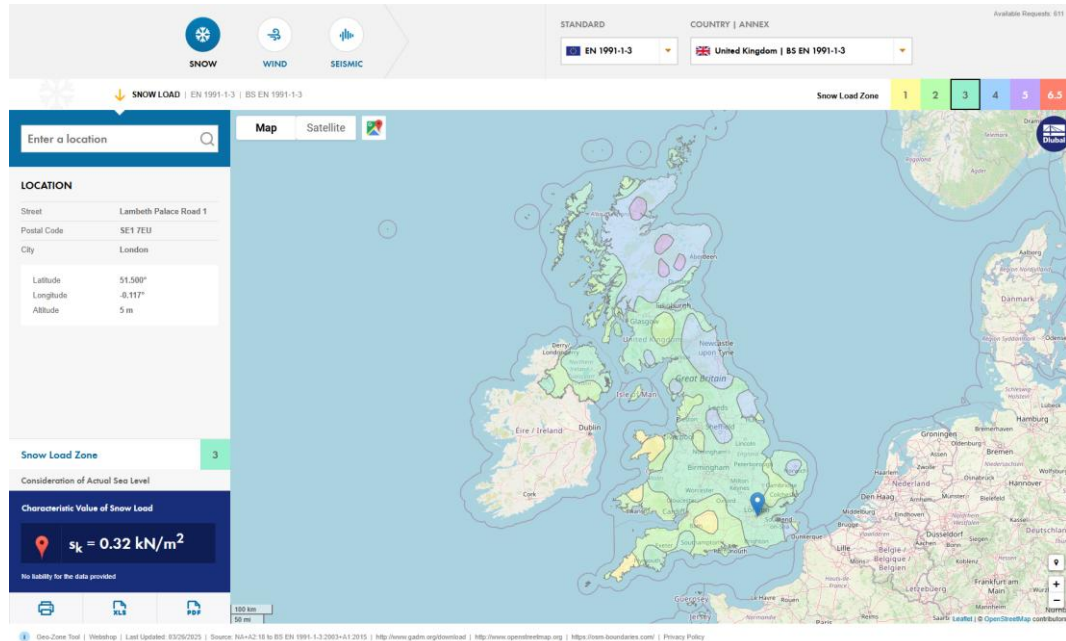


# Consideration of the impacts



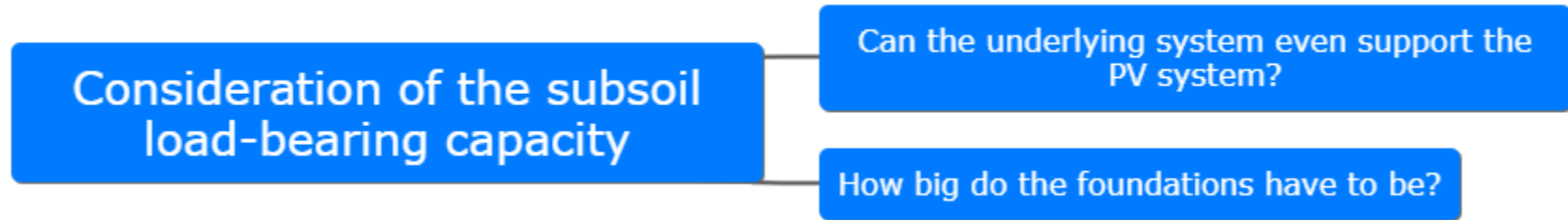
# Consideration of the impacts

From theory to practice: how RFEM 6 simplifies everyday life





# — Typical challenges in structural design of PV systems

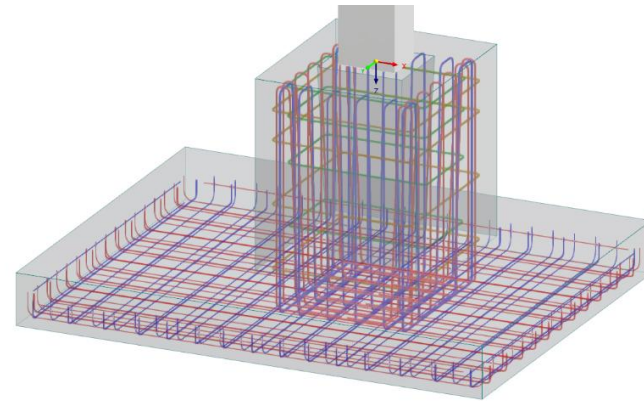
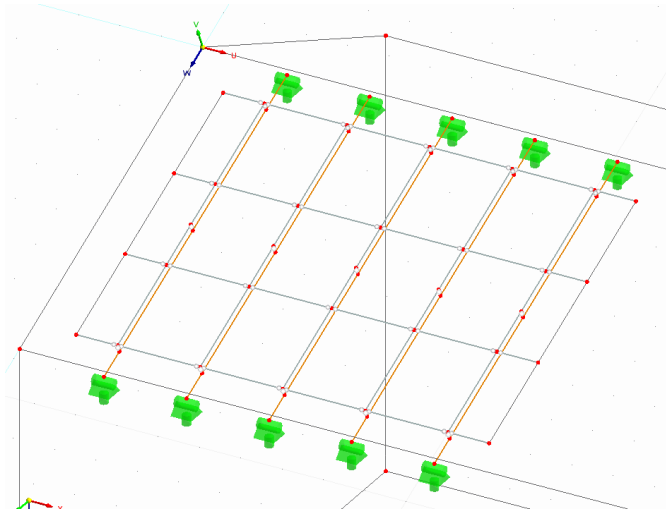


# — Consideration of the subsoil load-bearing capacity

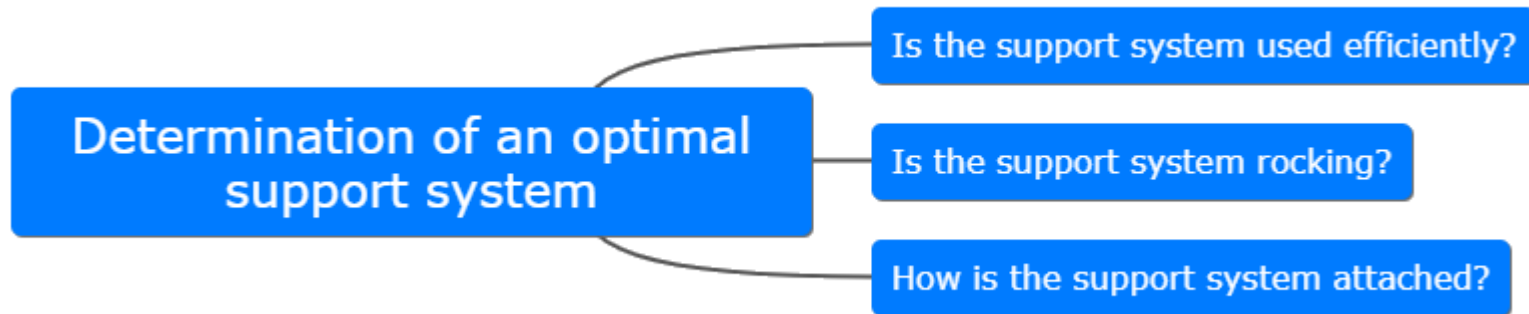


# Consideration of the subsoil load-bearing capacity

From theory to practice: how RFEM 6 simplifies everyday life



# — Typical challenges in structural design of PV systems

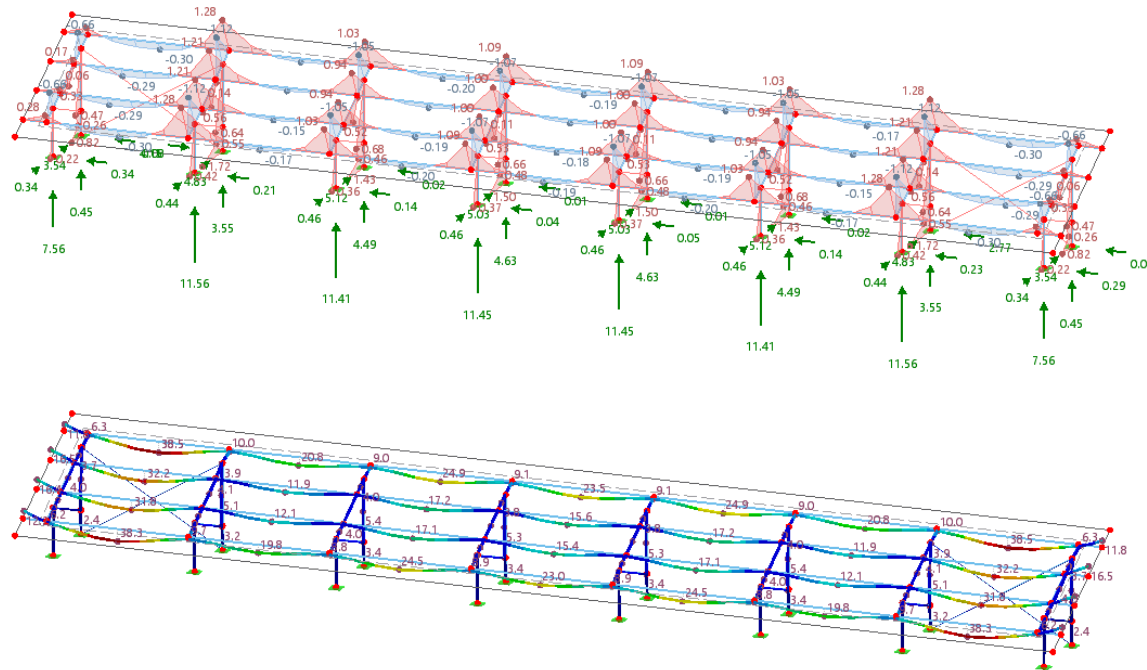


# Determination of an optimal load transfer system

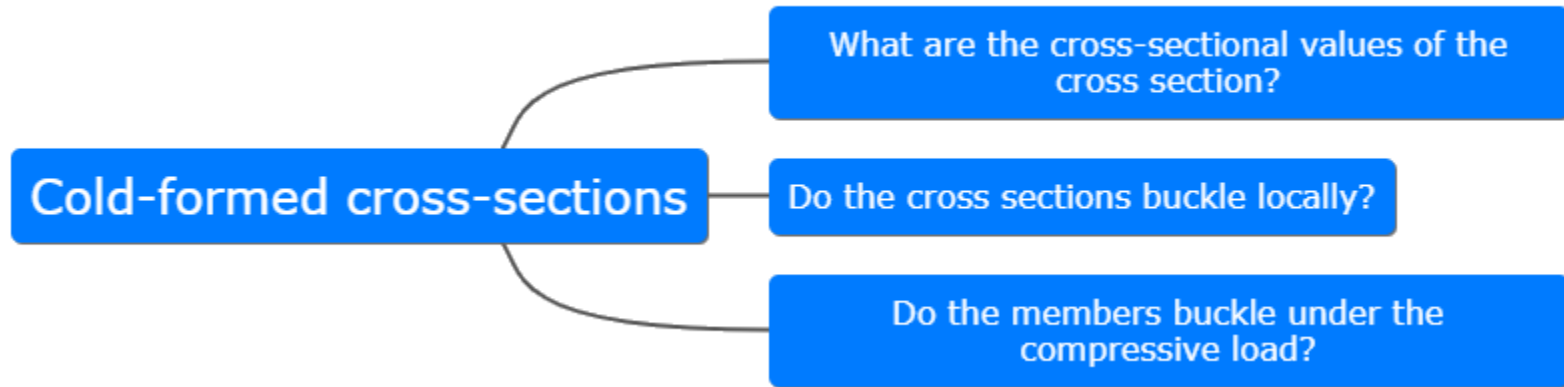


# Determination of an optimal load transfer system

From theory to practice: how RFEM 6 simplifies everyday life

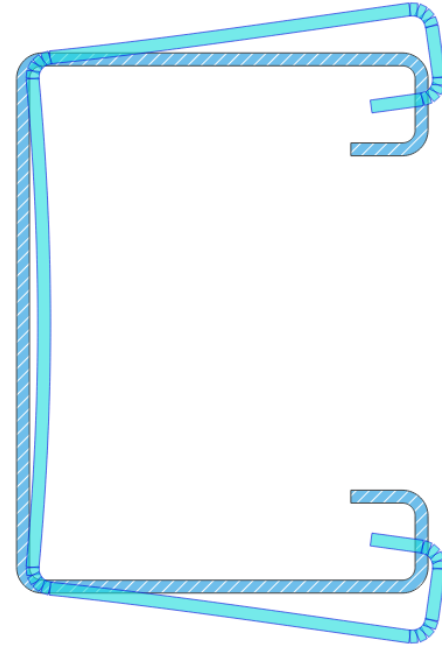


# — Cold-formed cross sections are easy to manufacture and inexpensive





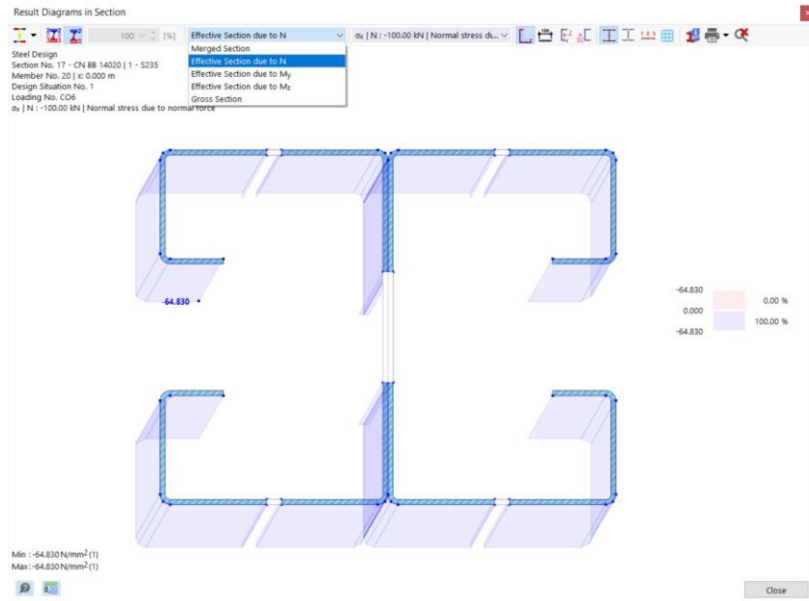
# Cold-formed cross-sections





# Cold-formed cross-sections

From theory to practice: how RFEM 6 simplifies everyday life



# — Investigation of the module load-bearing capacity

Investigation of the module  
load-bearing capacity

How do I deal with special designs?

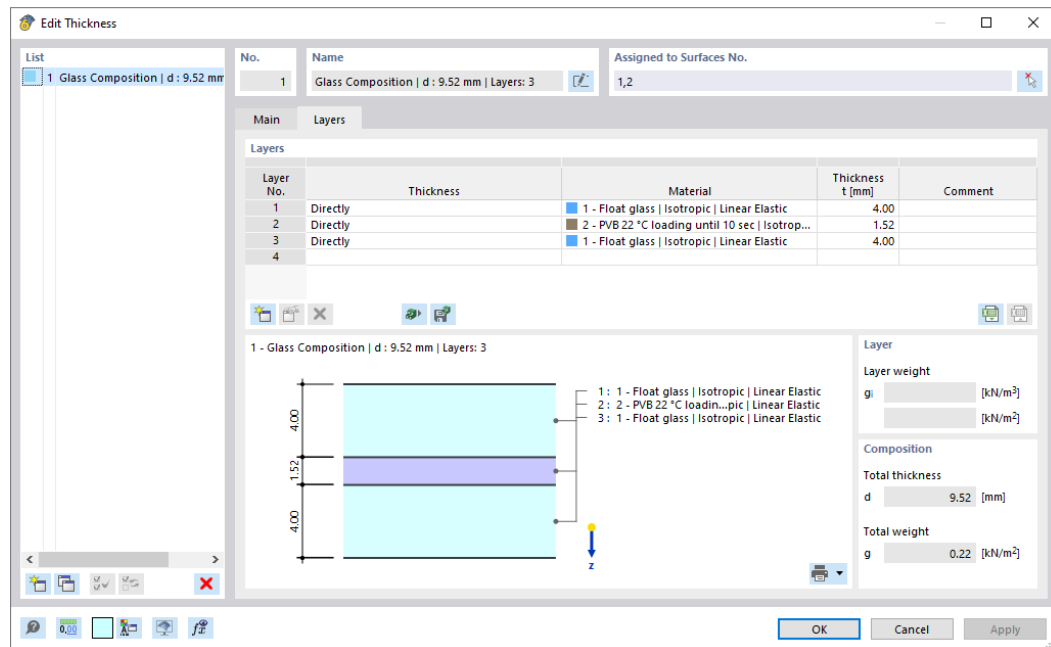
How do I deal with special loads?

# Investigation of the module load-bearing capacity



# Investigation of the module load-bearing capacity

From theory to practice: how RFEM 6 simplifies everyday life



# — Processing of similar models

Processing of similar models

How do I keep track of similar models?

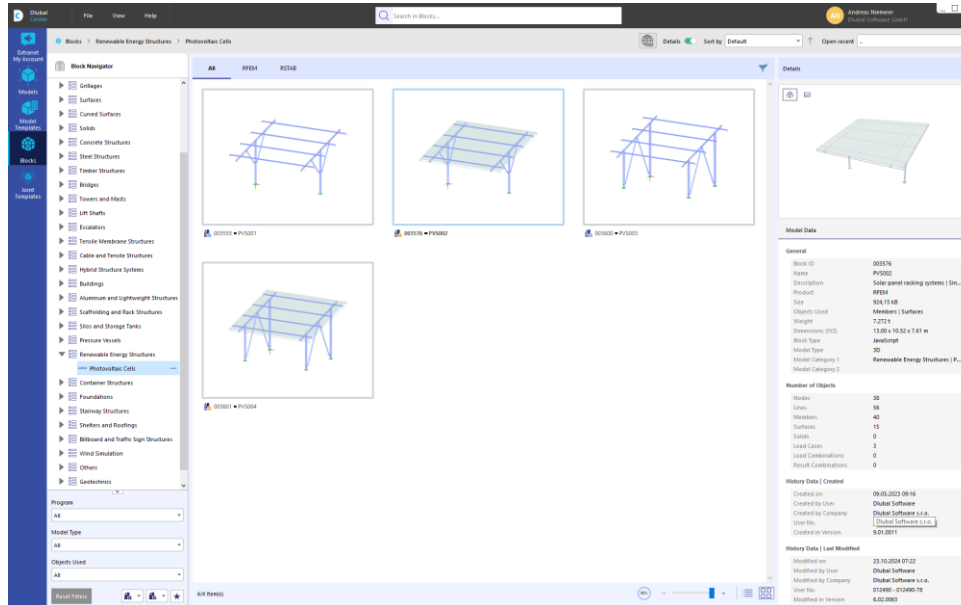
How do I process recurring models as efficiently as possible?

# Processing of similar models

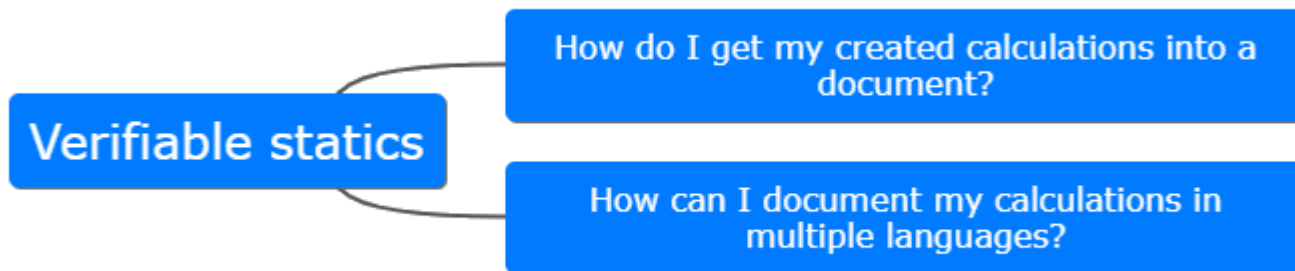


# Processing of similar models

From theory to practice: how RFEM 6 simplifies everyday life



- **In many countries, a verifiable statics calculation must be submitted**





# Verifiable statics

Design Check SP6100 | EN 1993 | CEN | 2015-06

Section Proof

Axial and shear stress acc. to EN 1993-1-1, 6.2.1(5) | Elastic design

$$\begin{aligned}\eta_{6.1} &= \sqrt{\left(\frac{\frac{\sigma_{x,Ed}}{f_y}}{\gamma_{M0}}\right)^2 + 3 \cdot \left(\frac{\frac{\tau_{Ed}}{f_y}}{\gamma_{M0}}\right)^2} \\ &= \sqrt{\left(\frac{\frac{204.054 \text{ N/mm}^2}{350.000 \text{ N/mm}^2}}{1.00}\right)^2 + 3 \cdot \left(\frac{\frac{-13.432 \text{ N/mm}^2}{350.000 \text{ N/mm}^2}}{1.00}\right)^2} \\ &= 0.587\end{aligned}$$

$$\begin{aligned}\eta &= \eta_{6.1} \\ &= 0.587\end{aligned}$$

$$\eta = 0.587 \leq 1 \quad \checkmark$$

$\eta_{6.1}$  Design ratio

$\sigma_{x,Ed}$  Design axial stress

$f_y$  Yield strength of stress point

$\gamma_{M0}$  Partial factor

$\tau_{Ed}$  Design shear stress


6.2.1(5), Eq. 6.1

6.2.1(5), Eq. 6.1

# Verifiable statics

From theory to practice: how RFEM 6 simplifies everyday life

Justus Maximilians-Gesellschaft  
Annenstraße 1  
11114 München



Model  
Ese 7 Verifiable statics

Date: 2019.09.09 Page: 1/18  
Sheet: 1

MODEL

**Structural Analysis**

**CLIENT**

Emergo GmbH

**CREATED BY**

Mr. Müller

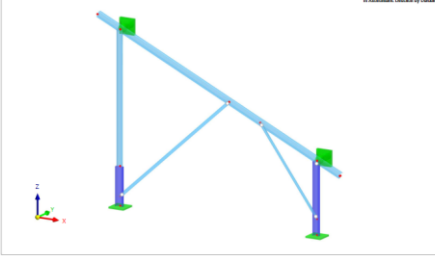
**PROJECT**

Anna 51

**Chapters**


- 1 Basic Objects 3
- 2 Special Objects 5
- 3 Types for Members 9
- 4 Types for Members 6
- 5 Local Cases & Combinations 6
- 6 Loads 8
- 7 Guide Objects 9
- 8 Static Analysis Results 11
- 9 Detail Design 29
- 10 Design Checksum 34

**MODEL**

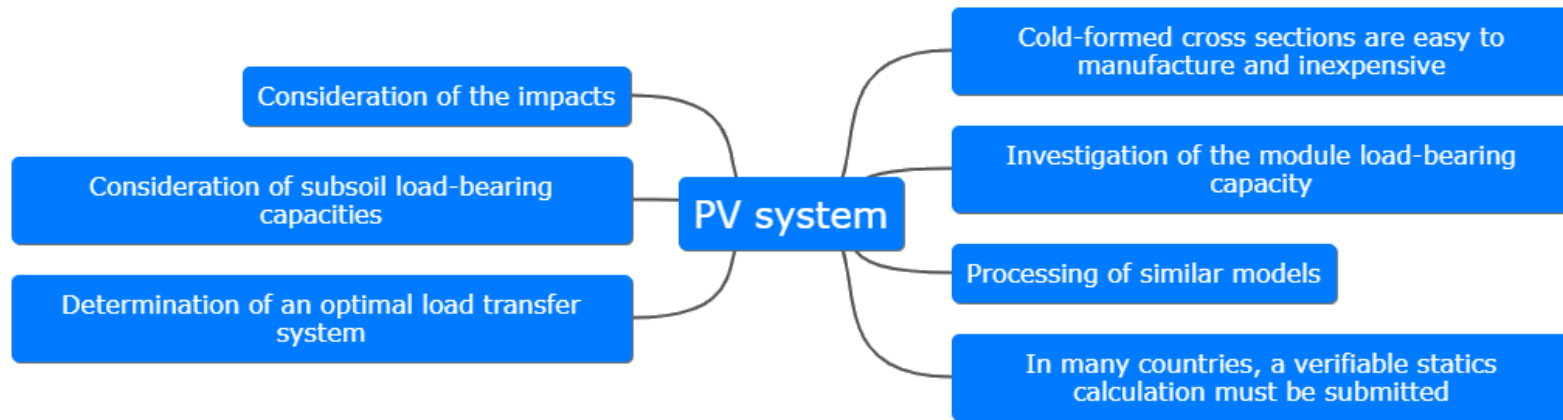


In accordance with the DLUBAL

www.dlubal.com | RFEM 6.10.0017 | General 3D structure analysis software



# Why PV systems challenge structural engineers today



# Online Courses

## RFEM 6 Master Class

All you need to know for a start!



TO THE RFEM COURSE

## Eurocode 2 Master Class

Deep Dive in Reinforced Concrete Design with RFEM 6!



TO THE EC 2 COURSE

## Eurocode 3 Master Class

Deep Dive in Steel Design with RFEM 6!



TO THE EC 3 COURSE

# Online Courses

## Eurocode 5 Masterclass

Deep Dive in Timber Design with  
RFEM 6!



TO THE EC 5 COURSE

## Course Package #1

Masterclass: Eurocode 2 - Eurocode 3  
- Eurocode 5



TO THE PACKAGE #1

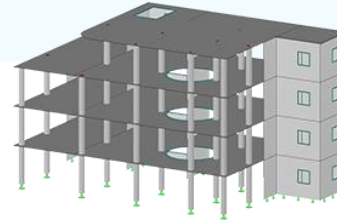
## Course Package #2

Masterclass: RFEM 6 - Eurocode 2 -  
Eurocode 3 - Eurocode 5



TO THE PACKAGE #2

# Free Online Services



## Geo-Zone Tool

Dlubal Software provides an online tool with snow, wind and seismic zone maps.

## Cross-Section Properties

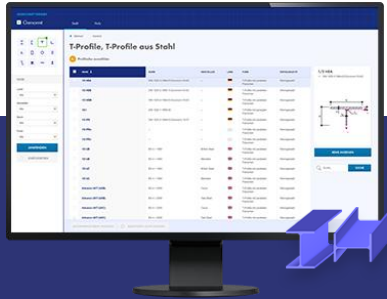
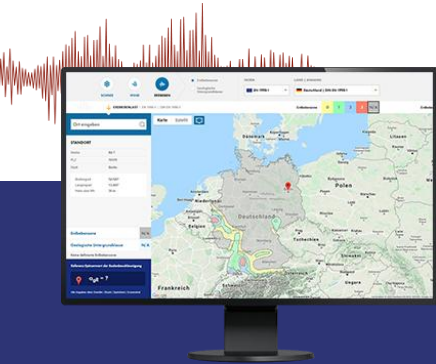
With this free online tool, you can select standardized sections from an extensive section library, define parametrized cross-sections and calculate its cross-section properties.

## FAQs & Knowledge Base

Access frequently asked questions commonly submitted to our customer support team and view helpful tips and tricks articles to improve your work.

## Models to Download

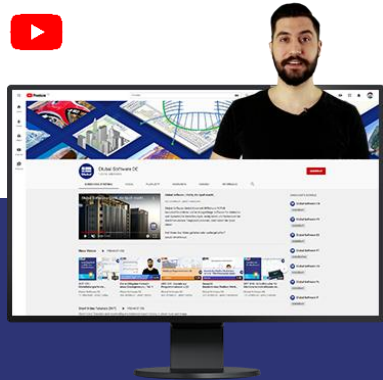
Download numerous example files here that will help you to get started and become familiar with the Dlubal programs.



# Free Online Services

## Youtube Channel - Webinars, Videos

Videos and webinars about the structural engineering software.



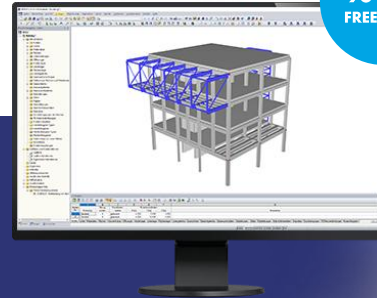
## Webshop with Prices

Configure your individual program package and get all prices online!



## Trial Licenses

The best way how to learn using our programs is to simply test them for yourself. Download a 90-day free trial version of our structural analysis & design software.



90-DAY  
FREE TRIAL

We offer free support via email and chat



# — Get Further Details About Dlubal



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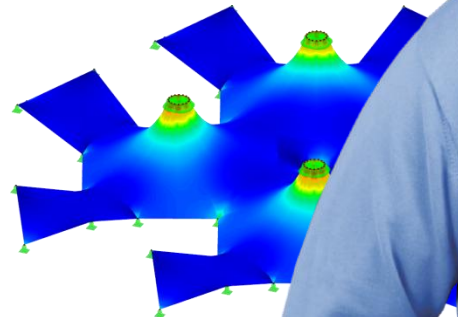
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