



# **Structural Analysis & Design Software**



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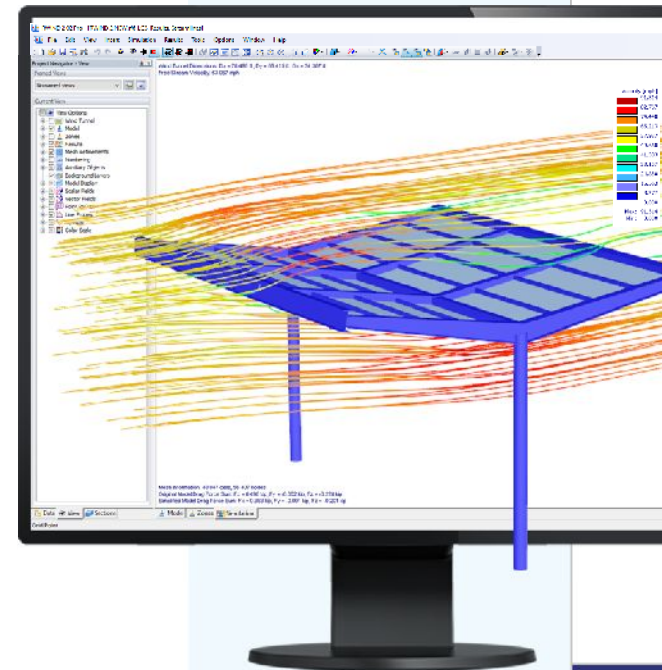
Moderator

Technical Support Engineer



Webinar

# CFD Wind Simulation with RWIND 2



# Questions During the Presentation

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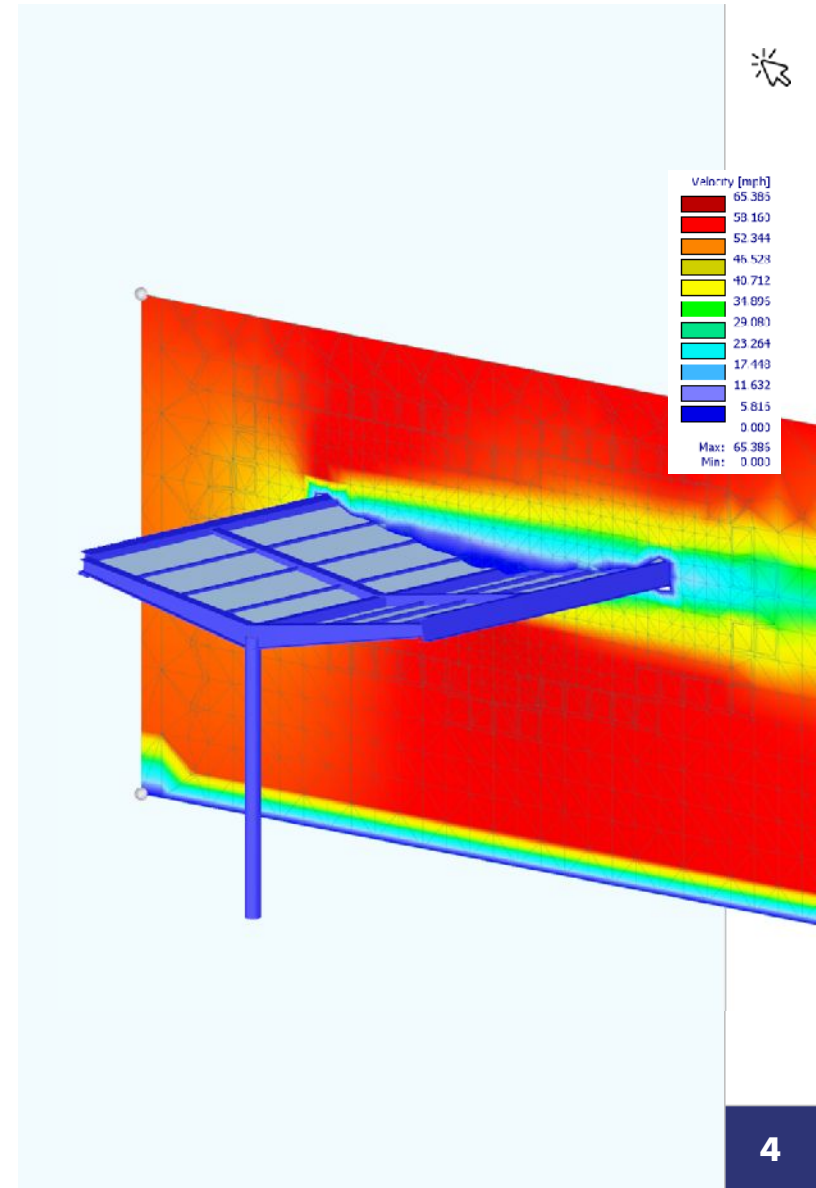
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# CONTENT

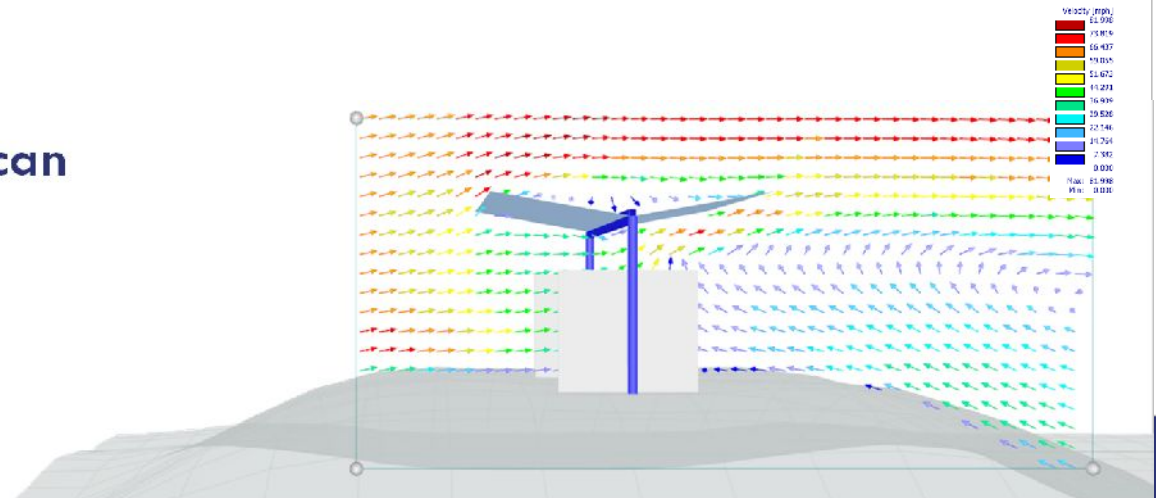
- 01 Introduction into RWIND 2 and CFD
- 02 Wind analysis input and settings
- 03 Wind load integration in RFEM 6
- 04 Influence of surrounding objects and terrain
- 05 Review of wind analysis results and data output

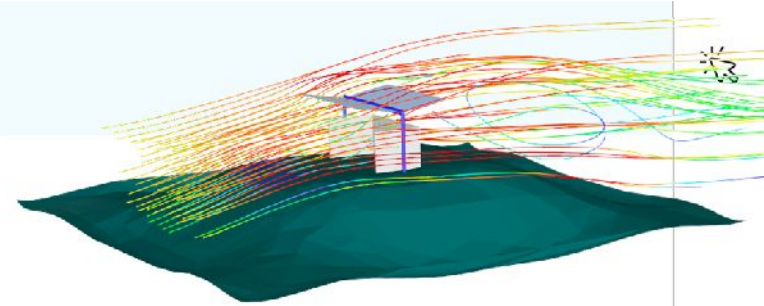




# CFD and Design Standards

- Engineering codes (ASCE 7, NBC, Eurocode, etc.) provide min. engineering requirements and loads for safety considerations
- ASCE 7 approved wind load methods:
  - Simplified Method
  - Analytical Method
  - Wind Tunnel Method
- CFD is not included...so how can it still be a useful tool?





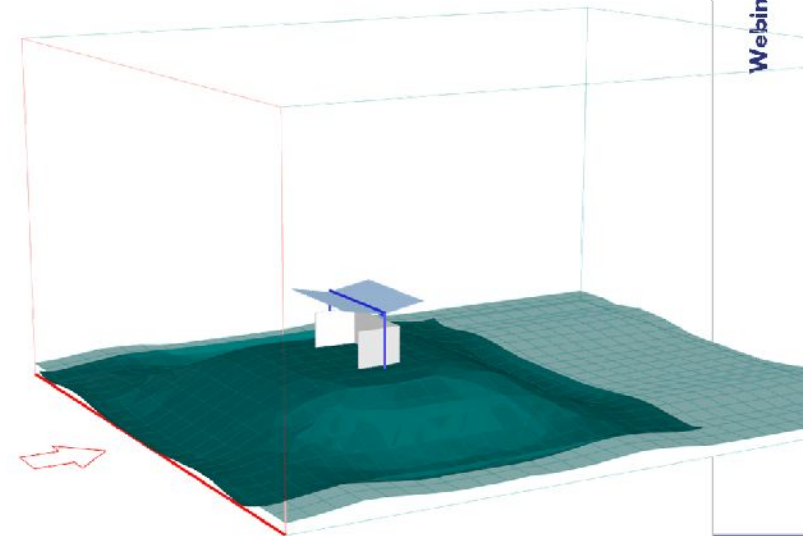
## CFD Benefits

CFD is a cost-effective engineering TOOL for many useful applications:

- Assess varying wind loads early in the design process
- Standards only provide minimum wind loads; increased loads may be necessary due to special cases (e.g., complex structure shapes)
- Structures completely outside standard w/ no min. guidelines to follow
- Surrounding terrain considerations (e.g., hills, adjacent buildings, etc.)
- Preliminary analysis before wind tunnel testing for cost/time savings
- Determine occupant comfort with applied wind loads
- Complex CFD method for complex structures with no standard guidelines

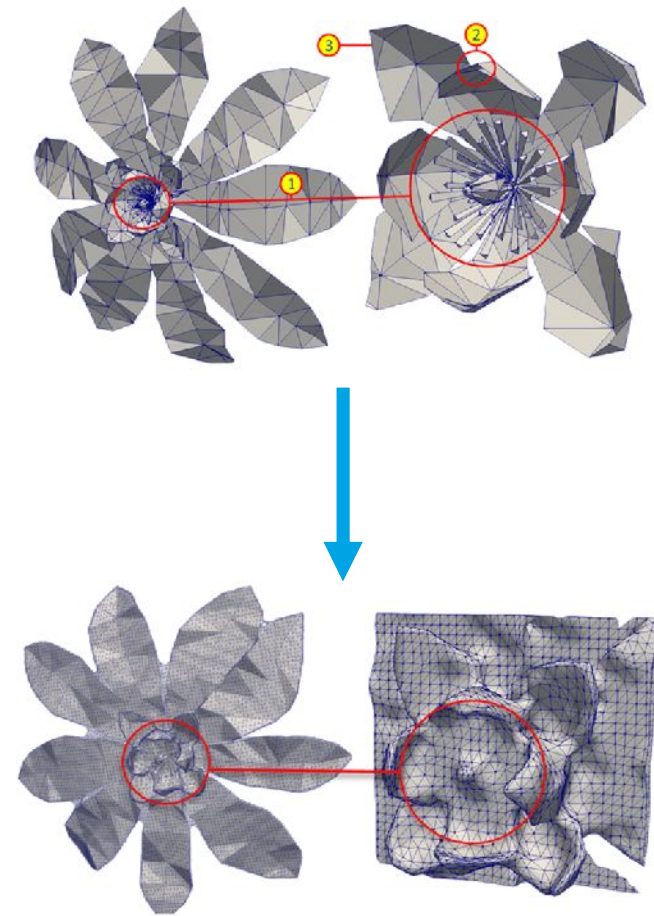
## RWIND 2 Theory and Background

- Collaboration with Dlubal Software, PC-Progress, and CFD Support
- Numerical CFD to apply fluid-mechanics simulation around objects in a wind tunnel
- OpenFOAM® for Windows solver from CFD Support
- Numerical solver RWINDSimulationSolver related to SIMPLE (Semi-Implicit Method for Pressure Linked Equations) solver algorithm



## RWIND 2 Mesh

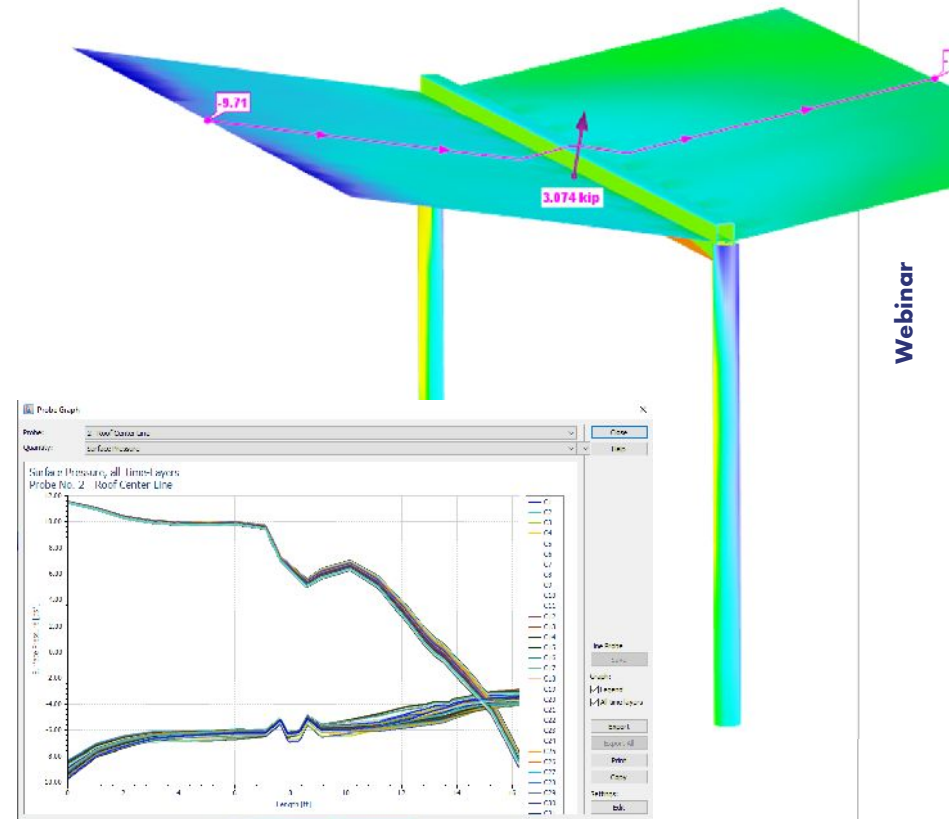
- Computational finite volume mesh pre-processing is **VERY** time consuming
- Simplified model implemented in RWIND 2 with "shrink-wrap mesh"
- Automatically corrects most, otherwise manual, mesh problems
- Level of detail, opening size, etc. are adjustable but affect calculation time
- Simplified model optional for advanced CFD users



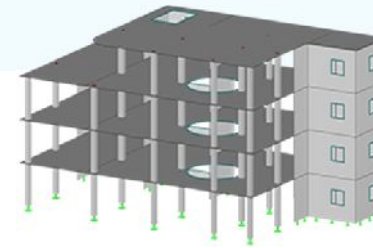


## RWIND 2 Pro vs. Basic Version

- Steady-flow simulation – flow field that does not change over time (Basic Version)
- Transient flow simulation w/ advanced LES turbulence model (Pro Version)
- Wind flow does change over time (e.g., Kármán vortex street or vortex shedding)
- Initial condition using the steady flow w/ defined time duration and time steps
- Graphical and diagram time varying results for each time step



# Free Online Services



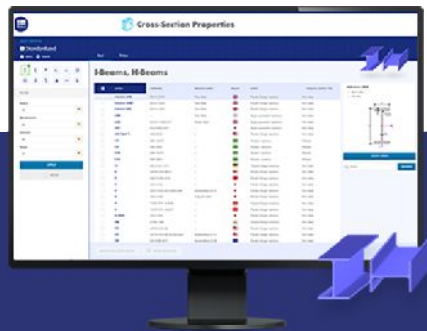
## Geo-Zone Tool

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

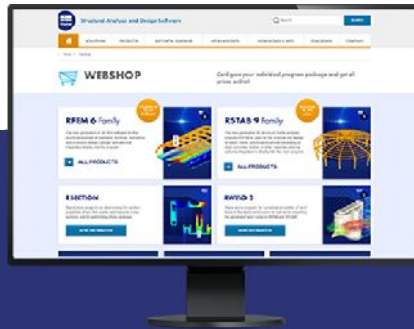
## Youtube Channel - Webinars, Videos

Videos and webinars about the structural engineering software.



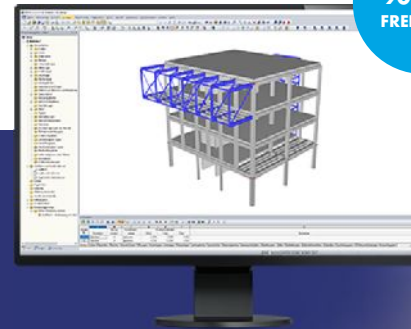
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## Trial Licenses

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.



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- Videos and recorded webinars
- Events and conferences
- Knowledge Base articles
- FAQs

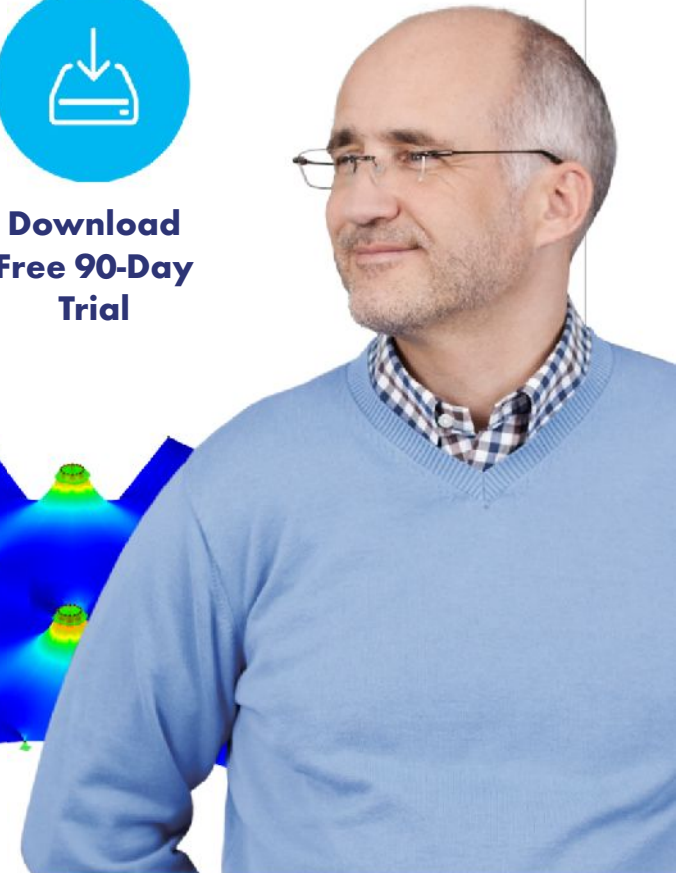
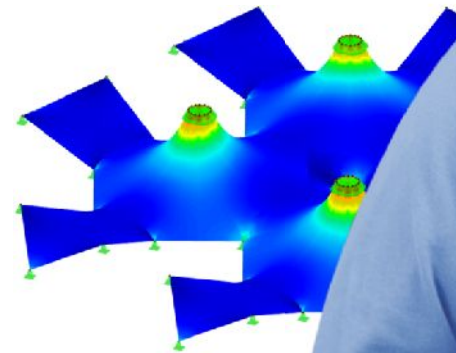
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