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Structural Analysis & Design Software

Webinar

RWIND 2 - Calculating Wind Loads with CFD Simulation

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Moderator

Technical Support Engineer

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Moderator

Technical Support Engineer

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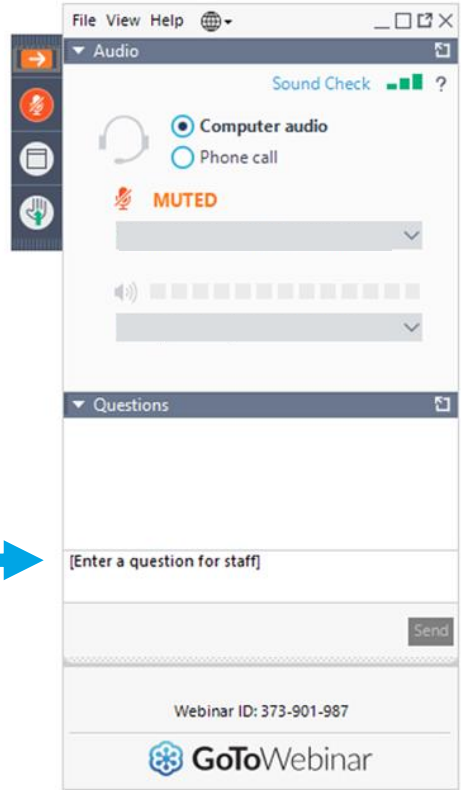
2
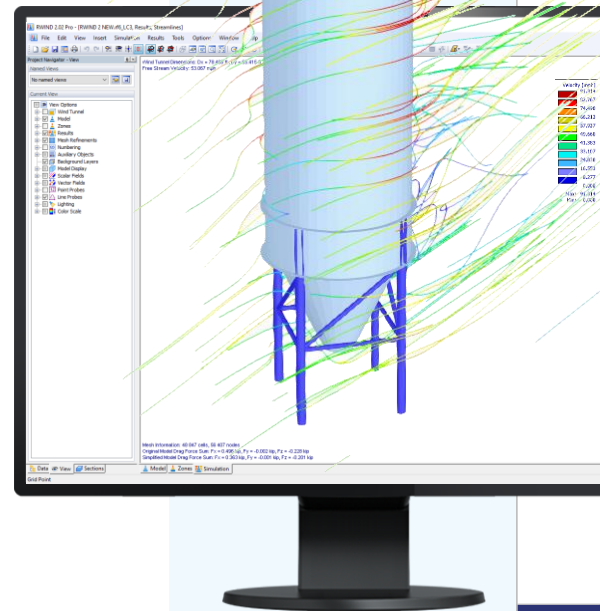
Questions During the Presentation

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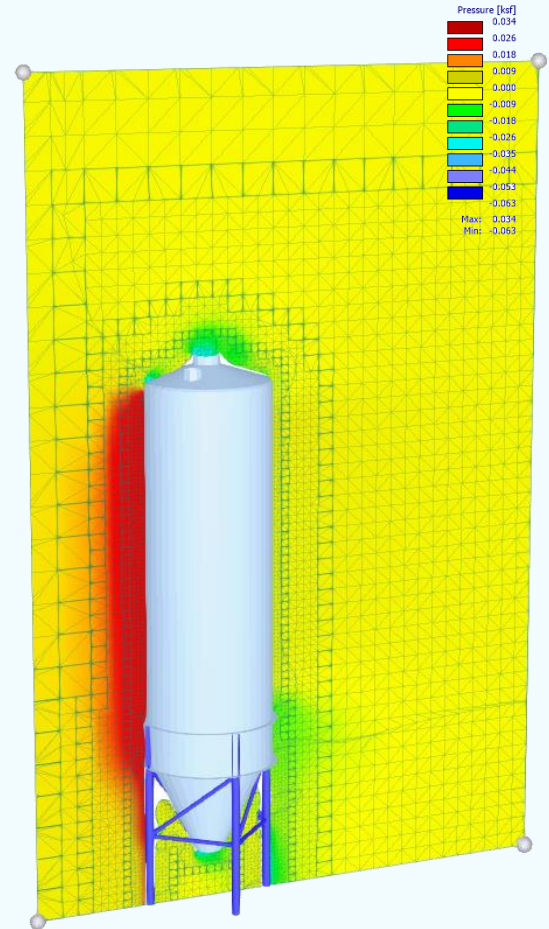
CFD and Design Standards

- 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

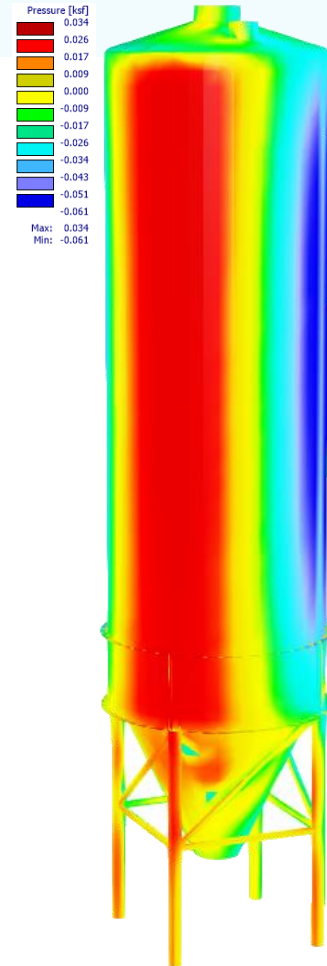- CFD is not included...so how can it still be used?

Pressure [ksf]

	0.034
	0.026
	0.017
	0.009
	0.000
	-0.009
	-0.017
	-0.026
	-0.034
	-0.043
	-0.051
	-0.061

Max: 0.034
Min: -0.061

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CFD Benefits and Advantages

CFD is a cost-effective engineering <u>TOOL</u> for many useful applications:

- 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

- Assess varying wind loads early in the design process

- Surrounding terrain/object considerations (e.g., hills, adjacent buildings, etc.)

- Determine occupant comfort with applied wind loads

- Preliminary analysis before wind tunnel testing for cost/time savings

- CFD methods for complex structures with no standard guidelines

- Taking the extra step for project wind analyses

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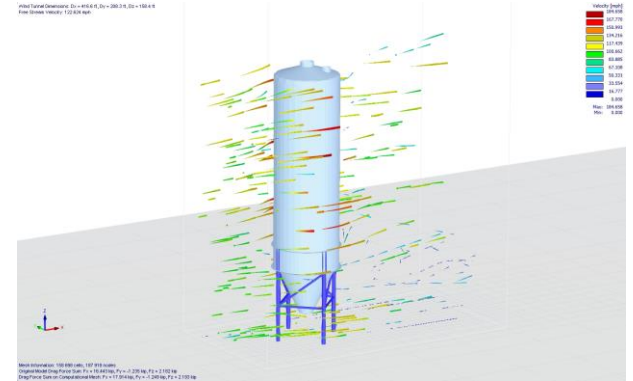
RWIND 2 Verification Examples

- VE 9054 | [Validation Example for Cp Value of the Flat Roof and Walls Based on ASCE 7-22](#)

- VE 9952 | [Validation Example for Cp value of the Main and Secondary Structural Members For Low-rise Building with 45-degree Sloped Roof Comparison to NBC 2020 and Japanese Wind Tunnel Data Base](#)

- Additional RWIND [Verification Examples](#)
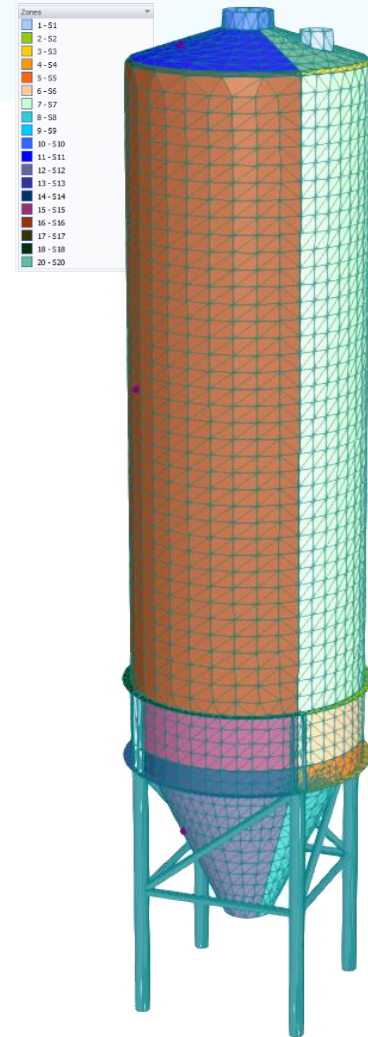

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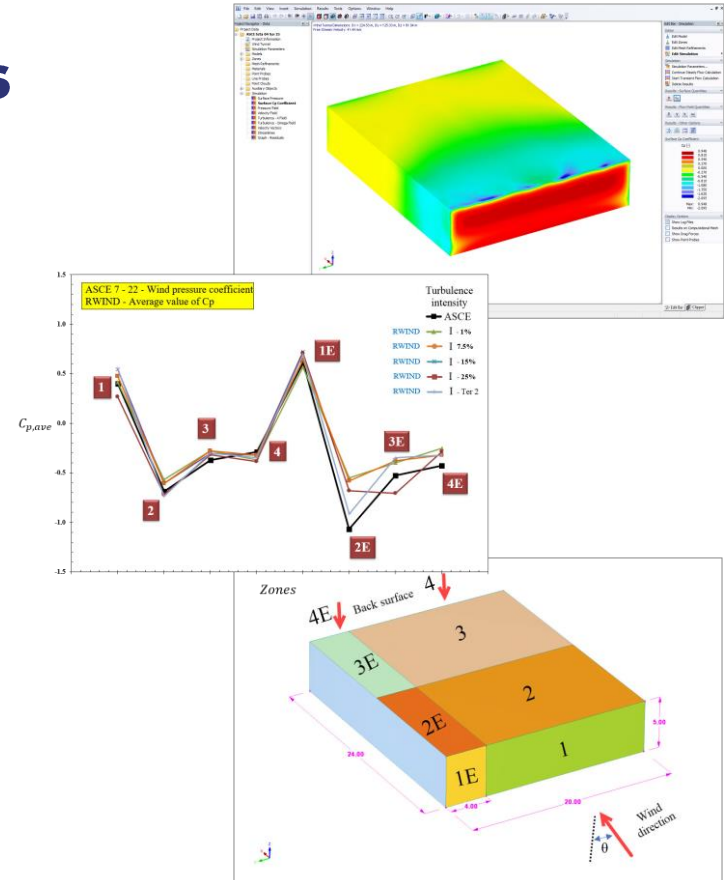
RWIND 2 Basic vs. Pro Version
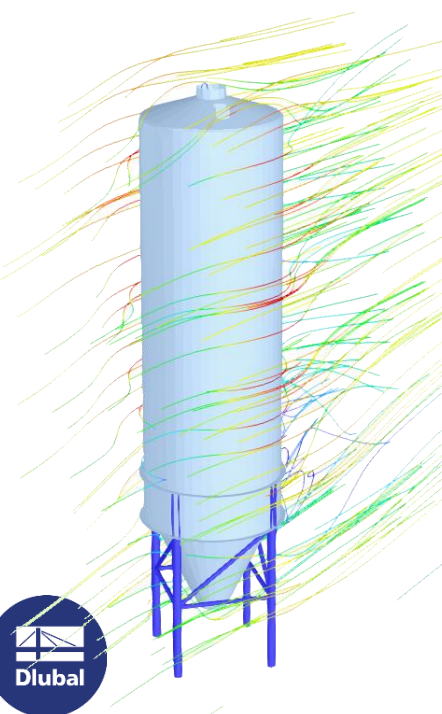
Feature	Basic	Pro
Steady flow calculation	✔️	✔️
Transient flow calculation	❌	✔️
Steady flow turbulence model: RAS k-ε, k-ω	✔️	✔️
Transient flow turbulence model: Spalart-Allmaras DDES	❌	✔️
Trajectories of flowing particles in transient flow	❌	✔️
Permeability, permeable surfaces	❌	✔️
Point cloud object type	✔️	✔️
Model editor (model creation, model repair, ...)	❌	✔️
Terrain editor	❌	✔️
Auxiliary objects (comments, dimensions, bitmaps, ...)	✔️	✔️
Edit object functions (split model, edit model mesh, ...)	✔️	✔️
Verification Data in Probes	✔️	✔️

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RWIND 2 New Features

- Wind tunnel size (new scaling options)

- Permeable surfaces (Pro Version) (e.g., fabric structures, permeable scaffolding, etc.)

- Generate zones from RFEM 6 surface numbers

- Adjust zone load factor to scale loads up/down

- Display RWIND results graphically in RFEM 6

- Static analysis with wind loads from experimentally measured pressures

- Trial extended to 90-days w/ limit of 20 total calculations

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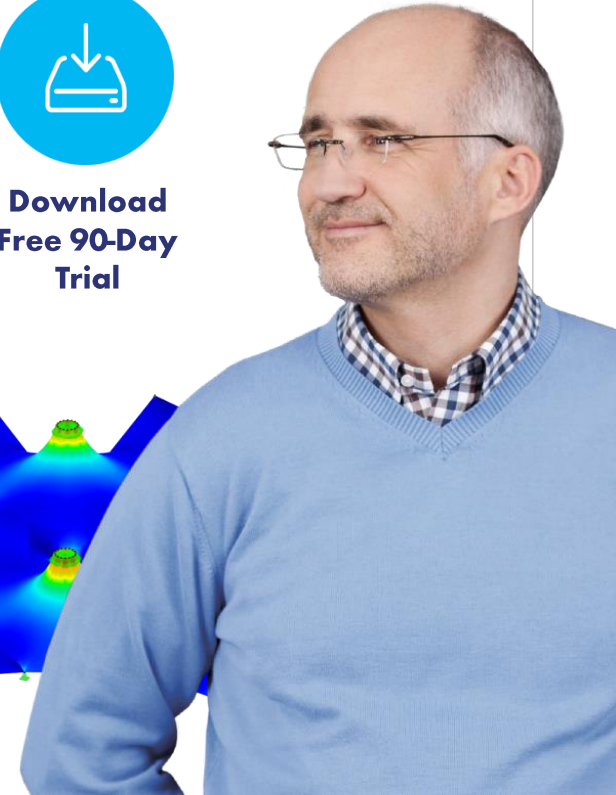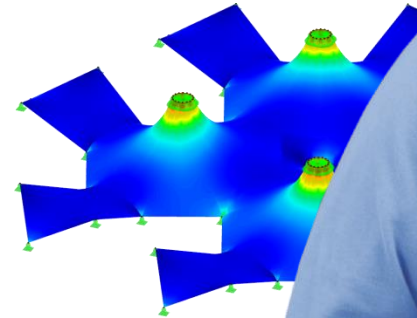
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For successfully completing the webinar:

Introduction to the New RFEM 6

1.0 Professional Development Hour (1 PDH)

Participant
John Smith

Instructor(s)
Amy Heilig, PE

Course content
- Overview of new generation programs and features
- Introduction to integrated design Add-ons
- Review of analysis and design results
- Improved printout report options

Software for Analysis and Design

Amy Heilig, PE
CEO - Dlubal Software, Inc.
Philadelphia, PA

Course date
Thu, Nov 11, 2021

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