Training: SOLIDWORKS Simulation Flow (2 days)

Prerequisites: Prerequisite: Knowledge of SOLIDWORKS and basic mechanical engineering concepts is recommended before taking SOLIDWORKS Flow Simulation.

Description: This course teaches the essential skills you will need to start performing basic computational fluid dynamics (CFD) simulations on your own using SOLIDWORKS Flow Simulation. This two-day training program provides an in-depth session on the basics of fluid flow analysis, in addition to covering meshing concerns, modeling concerns, analysis, post-processing, available options and preferences.

Introduction

- What is SOLIDWORKS Flow?

Lesson 1: Creating a SOLIDWORKS Flow Simulation Project

- Case Study: Manifold Assembly
- Model Preparation
- Internal Flow Analysis
- External Flow Analysis
- Manifold Analysis
- Lids
- Lid Thickness
- Manual Lid Creation
- Adding a Lid to a Part File
- Adding a Lid to an Assembly File
- Checking the Geometry
- Internal Fluid Volume
- Invalid Contacts
- Project Wizard
- Reference Axis
- Exclude Cavities Without Flow Conditions
- Adiabatic Wall
- Roughness
- Computational Domain
- Mesh
- Load Results Option
- Monitoring the Solver
- Goal Plot Window
- Warning Messages
- Post-processing
- Scaling the Limits of the Legend
- Changing Legend Settings
- Orientation of the Legend, Logarithmic Scale

Lesson 2: Meshing

- Case Study: Chemistry Hood
- Computational Mesh
- Basic Mesh
- Initial Mesh
- Geometry Resolution
- Minimum Gap Size
- Minimum Wall Thickness
- Result Resolution/Level of Initial Mesh
- Manual Global Mesh Settings
- Control Planes

Lesson 3: Thermal Analysis

- Case Study: Electronics Enclosure
- Fans
- Fan Curves
- Perforated Plates
- Free Area Ratio

Lesson 4: External Transient Analysis

- Case Study: Flow Around a Cylinder
- Reynolds Number
- External Flow
- Transient Analysis
- Turbulence Intensity
- Solution Adaptive Mesh Refinement
- Two Dimensional Flow
- Computational Domain
- Calculation Control Options
- Finishing
- Refinement
- Solving
- Saving
- Drag Equation
- Unsteady Vortex Shedding
- Time Animation

Lesson 5: Conjugate Heat Transfer

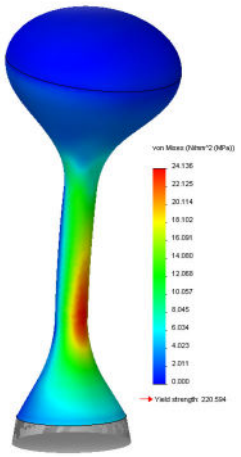
- Case Study: Heated Cold Plate
- Conjugate Heat Transfer
- Real Gases
- Goals Plot in the Solver Window

Lesson 6: EFD Zooming

- Case Study: Electronics Enclosure
- EFD Zooming
- EFD Zooming - Computational Domain

Lesson 7: Porous Media

- Case Study: Catalytic Converter
- Stages in the Process
- Associated Goal
- Automatic Goals
- Porous Media
- Porosity
- Permeability Type
- Resistance
- Dummy Bodies
- Design Modification



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Lesson 8: Rotating Reference Frames
- Rotating Reference Frame
- Part 1: Averaging
- Case Study: Table Fan
- Noise Prediction
- Broadband Model
- Part 2: Sliding Mesh
- Case Study: Blower Fan
- Tangential Faces of Rotors
- Time Step
- Part 3: Axial Periodicity

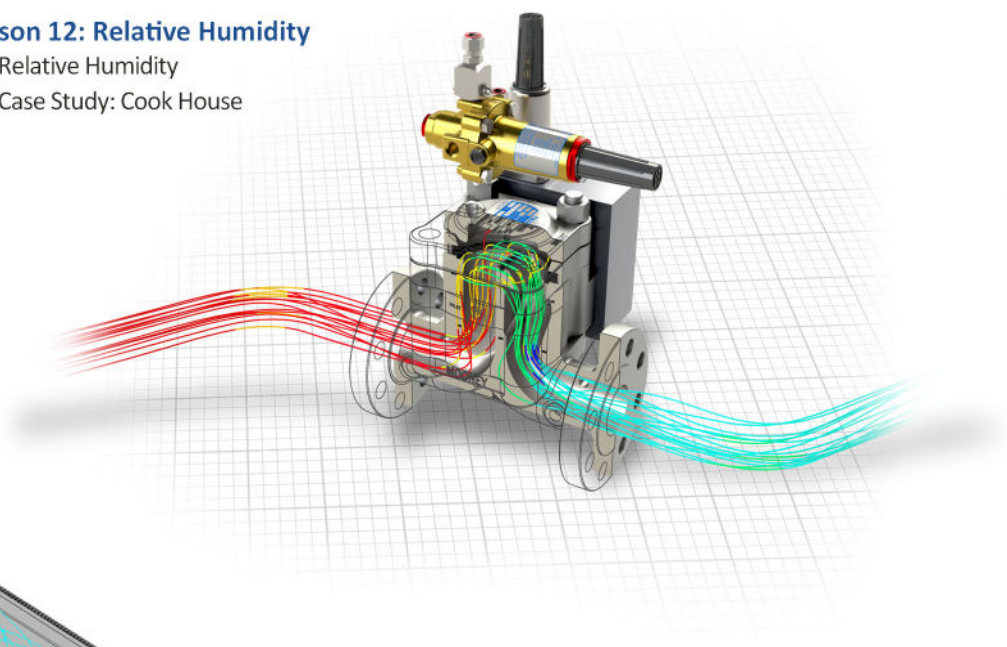
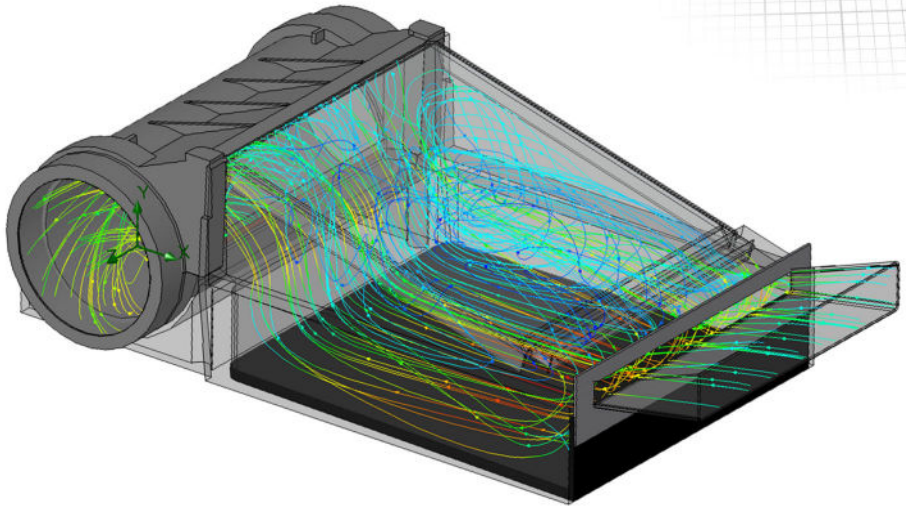
Lesson 9: Parametric Study
- Case Study: Piston Valve
- Stages in the Process
- Parametric Analysis
- Steady State Analysis
- Parametric Study
- Part 1: Goal Optimization
- Input Variable Types
- Target Value Dependence Types
- Output Variable Initial Values
- Running Optimization Study
- Part 2: Design Scenario
- Part 3: Multi parameter Optimization

Lesson 10: Free Surface
- Objectives
- Case Study: Dam-Break Flow
- Free Surface
- Volume of Fluid (VOF)
- Experimental Data
- Summary
- References
- Exercise 13: Heat Exchanger with Multiple Fluids
- Theoretical Results
- Summary

Lesson 11: Cavitation
- Case Study: Cone Valve
- Cavitation

Lesson 12: Relative Humidity
- Relative Humidity
- Case Study: Cook House

Lesson 13: Particle Trajectory
- Case Study: Hurricane Generator
- Particle Trajectories - Overview
- Particle Study - Physical Settings
- Particle Study - Wall Condition

Lesson 14: Supersonic Flow
- Supersonic Flow
- Case Study: Conical Body
- Drag Coefficient
- Shock Waves

Lesson 15: FEA Load Transfer
- Case Study: Billboard