

# SOLIDWORKS FLOW Simulation – 20 HORAS

## Lesson 1:

Creating a SOLIDWORKS Flow Simulation Project

Objectives

Case Study: Manifold Assembly

Problem Description

Stages in the Process

Model Preparation

Internal Flow Analysis

External Flow Analysis

Manifold Analysis

Lids

Lid Thickness

Manual Lid Creation

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Adding a Lid to a Part File

Adding a Lid to an Assembly File

Checking the Geometry

Internal Fluid Volume

Invalid Contacts

Project Wizard

Dependency

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

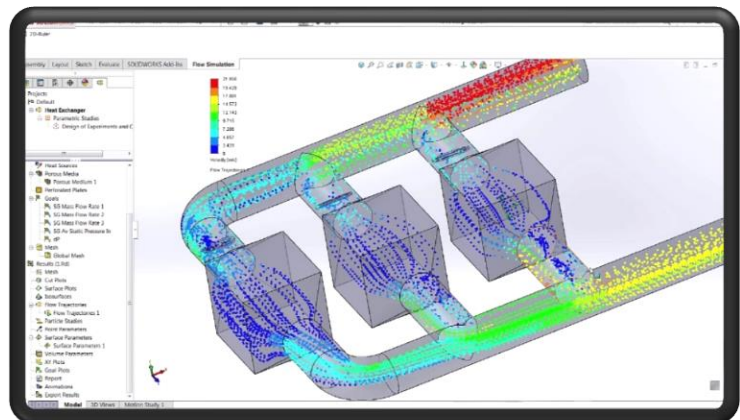
Changing Legend Settings

Orientation of the Legend, Logarithmic Scale


Discussion

Summary

Exercise 1: Air Conditioning Ducting



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## Lesson 2:

Meshing

Objectives

Case Study: Chemistry Hood

Project Description

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

Summary

Exercise 2: Square Ducting

Exercise 3: Thin Walled Box

Exercise 4: Heat Sink

Exercise 5: Meshing Valve Assembly

Boundary Conditions

SOLIDWORKS Simulation Contents

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## Lesson 3:

Thermal Analysis

Objectives

Case Study: Electronics Enclosure

Project Description

Fans

Fan Curves

Derating

Perforated Plates

Free Area Ratio


Discussion

Summary

Exercise 6: Materials with Orthotropic Thermal Conductivity

Exercise 7: Electric Wire

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#### Lesson 4:

External Transient Analysis

Objectives

Case Study: Flow Around a Cylinder

Problem Description

Stages in the Process

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

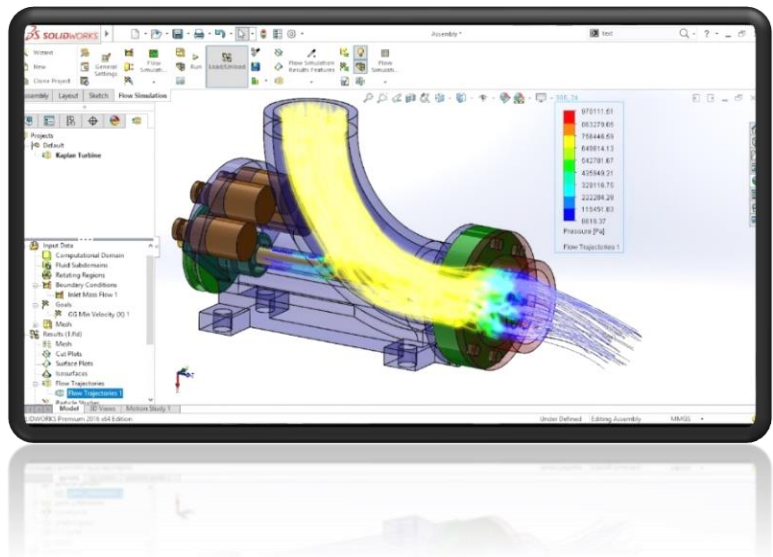
Discussion

Summary

Exercise 8: Electronics Cooling

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#### Lesson 5:

Conjugate Heat Transfer

Objectives

Case Study: Heated Cold Plate

Project Description

Stages in the Process

Conjugate Heat Transfer

Real Gases

Goals Plot in the Solver Window

Exercise 9: Heat Exchanger with Multiple Fluids

#### Lesson 6:

EFD Zooming

Objectives


Case Study: Electronics Enclosure

Project Description

EFD Zooming

EFD Zooming - Computational Domain

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### Lesson 7:

Porous Media

Objectives

Case Study: Catalytic Converter

Problem Description

Stages in the Process

Associated Goal

Porous Media

Porosity

Permeability Type

Resistance

Matrix and Fluid Heat Exchange

Specific area

Dummy Bodies

Design Modification

Discussion

Summary

Exercise 10: Channel Flow

### Lesson 8:

Rotating Reference Frames

Objectives

Rotating Reference Frame

Part 1: Averaging

Case Study: Table Fan

Problem Description

Stages in the Process

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Noise Prediction

Broadband Model

Part 2: Sliding Mesh

Case Study: Blower Fan

Problem Description

Tangential Faces of Rotors

Time Step

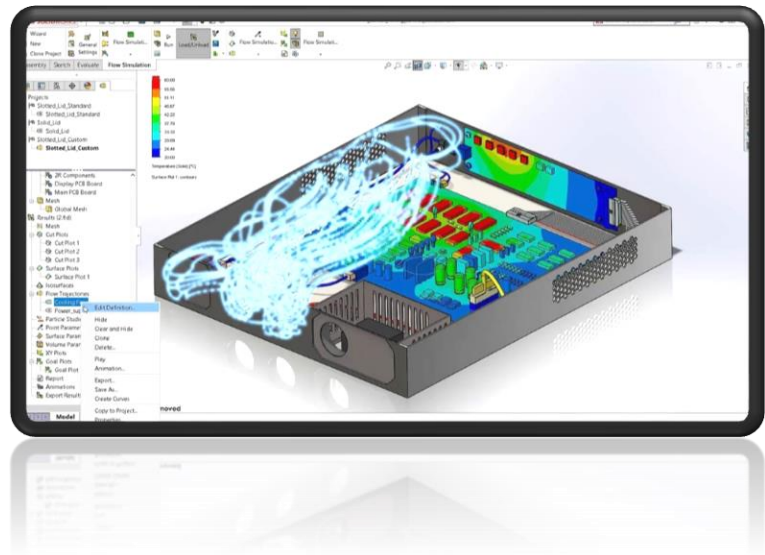
Part 3: Axial Periodicity

Summary


Exercise 11: Ceiling Fan

Boundary Conditions

Computational Domain



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### Lesson 9:

Parametric Study

Objectives

Case Study: Piston Valve

Problem Description

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

Summary

Exercise 12: Variable Geometry Dependent Solution

Boundary Conditions

### Lesson 10:

Free Surface

Objectives

Case Study: Water Tank

Problem Description

Free Surface

Volume of Fluid (VOF)

Summary

Exercise 13: Water Jet

Theoretical Results

Summary

Exercise 14: Dam-Break Flow

Experimental Data

Summary

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### Lesson 11:

Cavitation

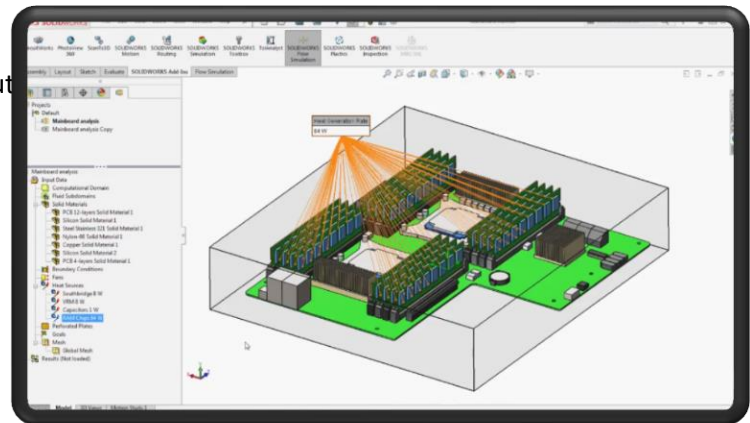
Objectives

Case Study: Cone Valve


Problem Description

Cavitation

Discussion



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**Lesson 12:**

Relative Humidity

Objectives

Relative Humidity

Case Study: Cook House

Problem Description

Summary

**Lesson 13:**

Particle Trajectory

Objectives

Case Study: Hurricane Generator

Problem Description

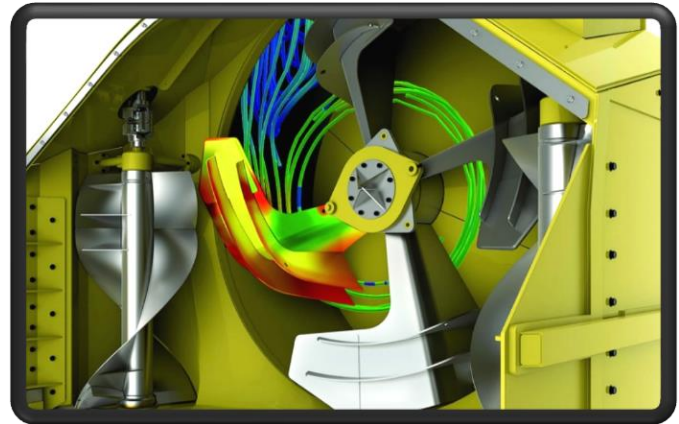
Particle Trajectories - Overview

Particle Study - Physical Settings

Particle Study - Wall Condition

Summary

Exercise 15: Uniform Flow Stream



**Lesson 14:**

Supersonic Flow

Objectives

Supersonic Flow

Case Study: Conical Body

Problem Description

Drag Coefficient

Shock Waves

Discussion

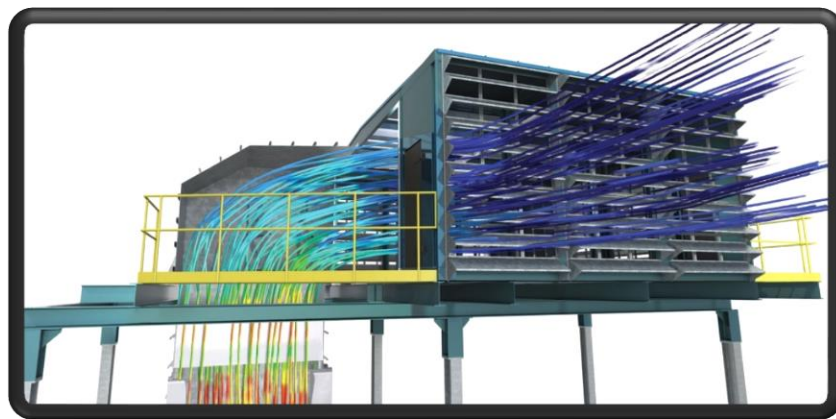
**Lesson 15:**

FEA Load Transfer


Objectives

Case Study: Billboard

Problem Description



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