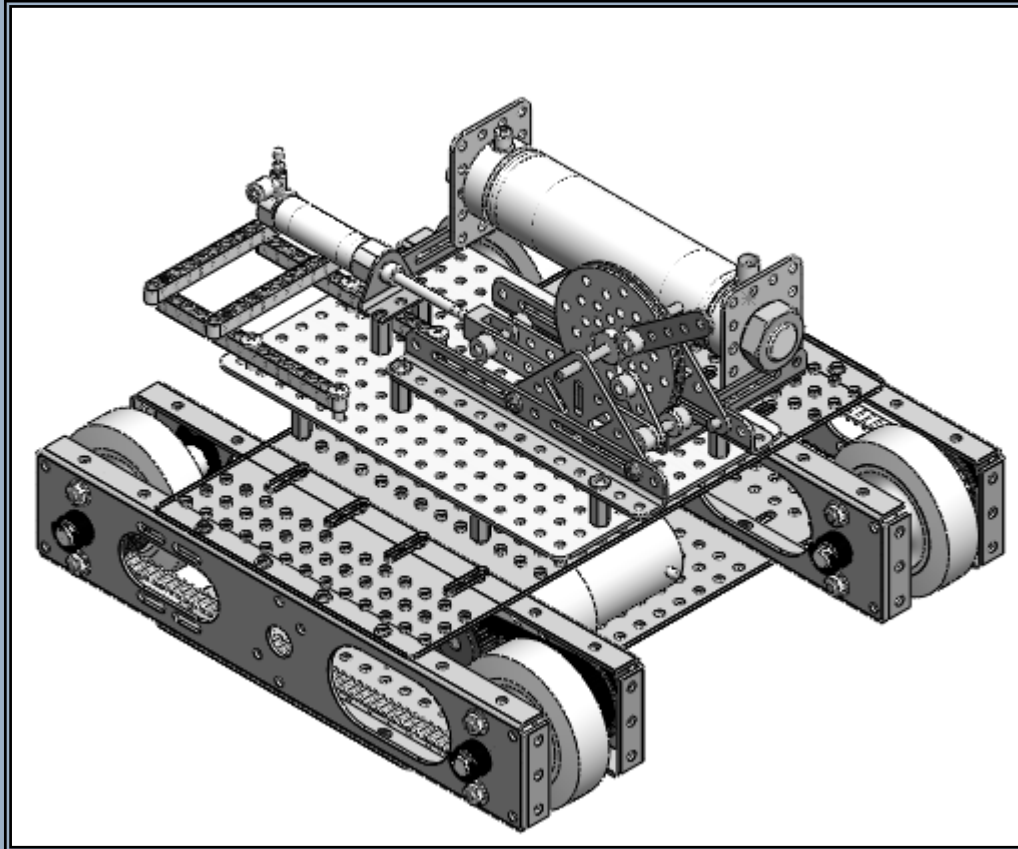


INSIDE:

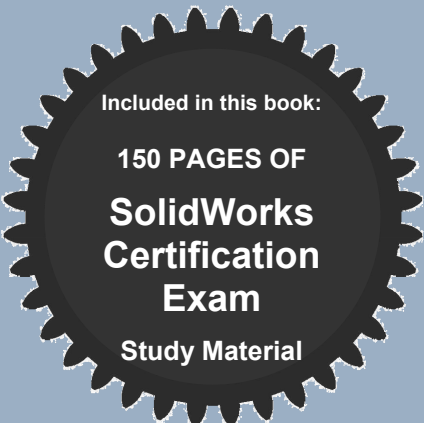


SolidWorks 2010 Tutorial

Introductory Level ♦ Project Based Tutorials ♦ Video Instruction



David C. Planchard & Marie P. Planchard, CSWP



SDC
PUBLICATIONS

Schroff Development Corporation
www.schroff.com

Better Textbooks Lower Prices



TABLE OF CONTENTS

Introduction	I-1
About the Cover	I-2
About the Authors	I-2
Acknowledgements	I-3
Contact the Authors	I-3
Note to Instructors	I-3
Trademarks, Disclaimer, and Copyrighted Material	I-4
References	I-4
Table of Contents	I-7
What is SolidWorks?	I-15
Design Intent	I-17
Overview of Chapters	I-20
About the Book	I-25
Windows Terminology in SolidWorks	I-25
Chapter 1 - Linkage Assembly	1-1
Chapter Objective	1-3
Chapter Overview	1-4
AXLE Part	1-5
Start a SolidWorks Session	1-6
SolidWorks User Interface and CommandManager	1-7
Menu bar toolbar	1-7
Menu bar menu	1-7
Drop-down menu	1-8
Right-click	1-8
Consolidated toolbar	1-8
System feedback	1-8
Confirmation Corner	1-9
Heads-up View toolbar	1-9
CommandManager	1-11
FeatureManager Design Tree	1-12
Fly-out FeatureManager	1-14
Task Pane	1-15
SolidWorks Resources	1-15
Design Library	1-15
File Explorer	1-16
Search	1-16
View Palette	1-16
Appearances/Scenes	1-17
Custom Properties	1-17
Motion Study tab	1-17
New Part	1-18
AXLE Part	1-22
AXLE Part-Extruded Base Feature	1-23
AXLE Part-Save	1-26
AXLE Part-Edit Color	1-27

AXLE Part-View Modes	1-28
SHAFT-COLLAR Part	1-31
SHAFT-COLLAR Part-Extruded Boss/Base Feature	1-31
SHAFT-COLLAR Part-Extruded Cut Feature	1-34
SHAFT-COLLAR-Modify Dimensions and Edit Color	1-35
FLATBAR Part	1-39
FLATBAR Part-Extruded Base Feature	1-39
FLATBAR Part-Extruded Cut Feature	1-42
FLATBAR Part-Linear Pattern Feature	1-44
LINKAGE Assembly	1-45
Mate Types	1-46
Standard Mates	1-46
Advanced Mates	1-47
Mechanical Mates	1-47
AirCylinder Assembly-Open and Save As option	1-48
LINKAGE Assembly-Insert FLATBAR Part	1-52
LINKAGE Assembly-Insert SHAFT-COLLAR Part	1-56
Motion Study-Basic Motion Tool	1-59
LINKAGE Assembly-Basic Motion	1-59
Chapter Summary	1-62
Chapter Terminology	1-63
Chapter Features	1-64
Engineering Journal	1-65
Questions	1-68
Exercises	1-69

Chapter 2 - Front Support Assembly **2-1**

Chapter Objective	2-3
Chapter Overview	2-4
Reference Planes and Orthographic Projection	2-5
HEX-STANDOFF Part	2-9
HEX-STANDOFF Part-Extruded Boss/Base Feature	2-10
HEX-STANDOFF Part-Hole Wizard Feature	2-14
ANGLE-13HOLE Part	2-15
ANGLE-13HOLE Part-Document Properties	2-17
ANGLE-13HOLE Part-Extruded Thin Feature	2-18
ANGLE-13HOLE Part-Extruded Cut Feature	2-20
ANGLE-13HOLE Part-Linear Pattern Feature	2-22
ANGLE-13HOLE Part-Fillet Feature	2-23
ANGLE-13HOLE Part-Second Extruded Cut/Linear Pattern	2-24
ANGLE-13HOLE Part-Third Extruded Cut Feature	2-26
TRIANGLE Part	2-31
TRIANGLE Part-Mirror, Offset and Fillet Sketch Tools	2-33
TRIANGLE Part-Extruded Boss/Base Feature	2-36
TRIANGLE Part-First Extruded Cut Feature	2-37
TRIANGLE Part-Second Extruded Cut Feature	2-39
TRIANGLE Part-Mirror Feature	2-41
TRIANGLE Part-Third Extruded Cut Feature	2-42
TRIANGLE Part-Circular Pattern Feature	2-44
SCREW Part	2-45

SCREW Part-Documents Properties	2-47
SCREW Part-Revolved Feature	2-47
SCREW Part-Extruded Cut Feature	2-51
SCREW Part-Circular Pattern Feature	2-53
SCREW Part-Fillet Feature	2-53
SCREW Part-Chamfer Feature	2-54
FRONT-SUPPORT Assembly	2-56
FRONT-SUPPORT Assembly-Insert ANGLE-13HOLE	2-56
FRONT-SUPPORT Assembly-Insert HEX-STANDOFF	2-58
FRONT-SUPPORT Assembly-Insert TRIANGLE	2-61
FRONT-SUPPORT Assembly-Insert SCREW	2-64
Chapter Summary	2-66
Chapter Terminology	2-67
Chapter Features	2-68
Engineering Journal	2-70
Questions	2-74
Exercises	2-75

Chapter 3 - Fundamentals of Drawing	3-1
Chapter Objective	3-3
Chapter Overview	3-4
Drawing Template and Sheet Format	3-5
Create a new Drawing	3-7
Drawing-Document Properties	3-9
Title Block	3-10
Create a Title Block	3-11
Company Logo	3-15
Create a Drawing Logo	3-15
Save Sheet Format and Save As Drawing Template	3-18
FLATBAR Drawing	3-21
FLATBAR Drawing-Open the FLATBAR Part	3-21
Move Views and Properties of the Sheet	3-25
FLATBAR Drawing-Position views	3-27
Detail Drawing	3-28
FLATBAR Drawing-Dimensions and Annotations	3-30
Part Number and Document Properties	3-35
FLATBAR Drawing-Part Number and Document Properties	3-35
FLATBAR Drawing-Linked Note	3-38
LINKAGE Assembly Drawing-Sheet1	3-41
Exploded view	3-45
LINKAGE Assembly Drawing-Exploded view	3-45
LINKAGE Assembly Drawing-Animation	3-47
Bill of Materials	3-48
LINKAGE Assembly Drawing-Bill of Materials	3-48
LINKAGE Assembly Drawing-Automatic Balloons	3-50
LINKAGE Assembly Drawing-Sheet2	3-51
LINKAGE Assembly Drawing-Sheet2 Section view	3-53
LINKAGE Assembly Drawing-Sheet2 Detail view	3-53
Design Table	3-55
FLATBAR Part-Design Table	3-55

FLATBAR Drawing-Sheet2	3-59
FLATBAR-SHAFTCOLLAR Assembly	3-61
Chapter Summary	3-66
Chapter Terminology	3-67
Questions	3-70
Exercises	3-71
Chapter 4 - Advanced Features	4-1
Chapter Objective	4-3
Chapter Overview	4-4
WEIGHT Part	4-6
Create the WEIGHT Part	4-7
WEIGHT Part-Loft Feature	4-12
WEIGHT Part-Instant3D-Extruded Cut Feature	4-13
HOOK Part	4-14
Create the HOOK Part	4-15
HOOK Part-Sweep Profile	4-20
HOOK Part-Swept Base Feature	4-21
HOOK Part-Dome Feature	4-21
HOOK Part-Threads with Swept Cut Feature	4-22
WHEEL Part	4-27
Create the WHEEL Part	4-29
WHEEL Part-Extruded Boss/Base Feature	4-30
WHEEL Part-First Revolved Cut Feature	4-31
WHEEL Part-Second Revolved Cut Feature	4-33
WHEEL Part-First Extruded Cut Feature	4-34
WHEEL Part-Second Extruded Cut Feature	4-36
WHEEL Part-Circular Pattern Feature	4-39
Modify Parts	4-42
HEX-ADAPTER Part	4-42
HEX-ADAPTER Part-Extruded Boss/Base Feature	4-45
HEX-ADAPTER Part-Extruded Cut Feature	4-45
AXLE-3000 Part	4-48
SHAFTCOLLAR-500 Part	4-49
Chapter Summary	4-52
Chapter Terminology	4-52
Questions	4-54
Exercises	4-55
Chapter 5 - PNEUMATIC-TEST-MODULE and ROBOT Assembly	5-1
Chapter Objective	5-3
Chapter Overview	5-4
Assembly Techniques	5-6
PNEUMATIC-TEST-MODULE Layout	5-7
FLATBAR Sub-assemblies	5-9
3HOLE-SHAFTCOLLAR Assembly	5-9
WHEEL-FLATBAR Assembly	5-16
Create the WHEEL-FLATBAR Assembly	5-17
WHEEL-FLATBAR Assembly-Insert 3HOLE-SHAFT-COLLAR Assembly	5-19
WHEEL-FLATBAR Assembly-Insert 5HOLE-SHAFT-COLLAR Assembly	5-21

WHEEL-AND-AXLE Assembly	5-25
Create the WHEEL-AND-AXLE Assembly	5-25
WHEEL-AND-AXLE Assembly-Insert HEX-ADAPTER Part	5-28
WHEEL-AND-AXLE Assembly-Insert SHAFTCOLLAR-500 Part	5-30
PNEUMATIC-TEST-MODULE Assembly	5-32
Create the PNEUMATIC-TEST-MODULE Assembly	5-33
Modify the LINKAGE Assembly	5-33
PNEUMATIC-TEST-MODULE-Insert LINKAGE Assembly	5-42
PNEUMATIC-TEST-MODULE-Insert AIR-RESERVOIR-SUPPORT	5-44
Component Patterns in the Assembly	5-46
PNEUMATIC-TEST-MODULE-Component Pattern	5-47
PNEUMATIC-TEST-MODULE-Linear Component Pattern	5-48
PNEUMATIC-TEST-MODULE-Insert FRONT-SUPPORT Assembly	5-50
Mirrored Components	5-52
PNEUMATIC-TEST-MODULE-Mirrored Component	5-53
PNEUMATIC-TEST-MODULE-Fix the MIRRORFRONT-SUPPORT	5-55
Component Properties	5-56
PNEUMATIC-TEST-MODULE-Insert WHEEL-AND-AXLE Assembly	5-56
PNEUMATIC-TEST-MODULE-Remove Rigid State	5-58
PNEUMATIC-TEST-MODULE-Review AirCylinder Configurations	5-59
Final ROBOT Assembly	5-64
Create the ROBOT Assembly	5-65
Insert the Robot-platform Assembly	5-65
Insert the PNEUMATIC-TEST-MODULE Assembly	5-65
Insert the basic_integration Assembly	5-67
Chapter Summary	5-68
Chapter Terminology	5-68
Engineering Journal	5-70
Questions	5-72
Exercises	5-73
Chapter 6 - SimulationXpress, Sustainability and DFMXpress	6-1
Chapter Objective	6-3
SolidWorks SimulationXpress	6-3
SolidWorks SimulationXpress-Analyze the Bent Bar	6-8
SolidWorks SustainabilityXpress	6-15
SolidWorks SimulationXpress-Analyze the CLAMP Part	6-15
Material Class	6-16
Material Name	6-16
Manufacturing Process	6-16
Manufacturing Region	6-16
Transportation and Usage region	6-16
Baseline	6-16
Find a Similar Material	6-18
View the Environment Impact for the Alternative Material	6-18
Run a Report	6-19
SolidWorks DFMXpress	6-19
SolidWorks SimulationXpress-Analyze the AXLE and ROD Part	6-20
Chapter Summary	6-21

Certified SolidWorks Associate Exam

Chapter 7 - Basic Theory and Drawing Theory	7-1
Introduction	7-1
Goals	7-1
Objectives	7-2
Identify the correct reference planes: Top, Right and Front	7-3
Identify material, measure and mass properties	7-4
Assign and edit material	7-4
Tutorial: Assign and edit material 7-1	7-4
Tutorial: Assign and edit material 7-2	7-5
Measure tool	7-5
Tutorial: Measure tool 7-1	7-6
Tutorial: Measure tool 7-2	7-6
Locate the Center of mass, and Principal moments of inertia	7-7
Tutorial: Mass properties 7-1	7-8
Tutorial: Mass properties 7-2	7-9
Procedure to create a Named Drawing view	7-10
Tutorial: Drawing named procedure 7-1	7-11
Tutorial: Drawing named procedure 7-2	7-11
Tutorial: Drawing named procedure 7-3	7-11
Tutorial: Drawing named procedure 7-4	7-12
Tutorial: Drawing named procedure 7-5	7-12
Tutorial: Drawing named procedure 7-6	7-13
Tutorial: Drawing named procedure 7-7	7-13
Tutorial: Drawing named procedure 7-8	7-14
Engineering Documentation Practices	7-14
Document Properties	7-15
Tutorial: Document properties 7-1	7-16
Tutorial: Document properties 7-2	7-16
Summary	7-16
Questions	7-18
Chapter 8 - CSWA - Simple Part Modeling	8-1
Objectives	8-1
Read and understand an Engineering document	8-2
Build a simple part from a detailed illustration	8-2
Tutorial: Volume / Center of mass 8-1	8-2
Tutorial: Volume / Center of mass 8-2	8-4
Tutorial: Mass-Volume 8-3	8-7
Tutorial: Mass-Volume 8-4	8-8
Tutorial: Simple Cut 8-1	8-11
Tutorial: Mass-Volume 8-5	8-12
Tutorial: Mass-Volume 8-6	8-14
Tutorial: Mass-Volume 8-7	8-16
2D vs. 3D Sketching	8-18
Tutorial: 3DSketch 8-1	8-18
Tutorial: Mass-Volume 8-8	8-20
Tutorial: Mass-Volume 8-9	8-22
Callout value	8-25

Tolerance type	8-25
Tutorial: Dimension text 8-1	8-26
Tutorial: Dimension text 8-2	8-26
Tutorial: Dimension text 8-3	8-27
Dimension text symbols	8-27
Tutorial: Dimension text symbols 8-1	8-28
Tutorial: Dimension text symbols 8-2	8-28
Build additional simple parts	8-29
Tutorial: Mass-Volume 8-10	8-29
Tutorial: Mass-Volume 8-11	8-31
Tutorial: Mass-Volume 8-12	8-33
Tutorial: Mass-Volume 8-13	8-34
Tutorial: Mass-Volume 8-14	8-36
Tutorial: Mass-Volume 8-15	8-37
Tutorial: Mass-Volume 8-16	8-39
Tutorial: Basic-part 8-1	8-41
Tutorial: Basic-part 8-2	8-44
Tutorial: Basic-part 8-3	8-47
Tutorial: Basic-part 8-4	8-50
Summary	8-52
Questions	8-53

Chapter 9 - CSWA - Advanced Part Modeling **9-1**

Objectives	9-1
Build an Advanced part from a detailed dimensioned illustration	9-2
Tutorial: Advanced Part 9-1	9-2
Tutorial: Advanced Part 9-2	9-6
Tutorial: Advanced Part 9-3	9-9
Tutorial: Advanced Part 9-4	9-12
Calculate the Center of mass relative to a created coordinate system location	9-17
Tutorial: Coordinate location 9-1	9-17
Tutorial: Coordinate location 9-2	9-19
Tutorial: Advanced part 9-5	9-20
Tutorial: Advanced part 9-5A	9-24
Tutorial: Advanced part 9-5B	9-25
Tutorial: Advanced part 9-6	9-27
Tutorial: Advanced part 9-6A	9-33
Tutorial: Advanced part 9-7	9-34
Summary	9-39
Questions	9-40

Chapter 10 - CSWA - Assembly Modeling **10-1**

Objectives	10-1
Assembly Modeling	10-1
Build an assembly from a detailed dimensioned illustration	10-3
Tutorial: Assembly model 10-1	10-4
Tutorial: Assembly model 10-2	10-13
Tutorial: Assembly model 10-3	10-20

Mate the first component with respect to assembly reference planes	10-30
Tutorial: Assembly model 10-4	10-30
Summary	10-34
Questions	10-35

Chapter 11 - CSWA - Advanced Modeling Theory and Analysis	11-1
Objectives	11-1
General Definitions	11-1
SolidWorks SimulationXpress	11-8
User Interface	11-9
Tutorial: SimulationXpress 11-1	11-10
Summary	11-21
Questions	11-227

Appendix	A-1
ECO Form	A-1
Types of Decimal Dimensions (ASME Y14.5M)	A-2
SolidWorks Keyboard Shortcuts	A-3
Windows Shortcuts	A-4
Helpful On-Line Information	A-5
CSWA Homework Answers	A-6

Index	I-1
--------------	------------