SolidWorks 2012 Part II - Advanced Techniques

Parts, Surfaces, Sheet Metal, SimulationXpress, Top-Down Assemblies, Core and Cavity Molds

Paul Tran, CSWP, CSWI





Files

Tutorial files on

enclosed CD

SolidWorks 2012 User Interface

The system feedback symbols

The 3 references planes

The toolbars

The status bar

2D sketch examples

XII

XXIII

XXIII

XXV

XXV

XVI

2-4

2-5

2-6

Table of Contents

Copyrights Notices Disclaimer Trademarks

Introduction:

į.	3D feature examples	XVII
	Advanced Modeling Topics	
Chapter 1:	3D Sketch	1-1
	Tools needed	1-2
	Adding 3D lines	1-3 1-4
	Using the tele key	1-4
	Using the tab key Adding dimensions	1-4
	Adding the sketch fillets	1-6
	Creating the Sweep profile	1-7
	Making the sweet feature	1-8
	Questions for review	1-9
	Exercise: Sweep with 3D Sketch	1-10
	Exercise: 3D Sketch & Planes	1-11
	Exercise: 3D Sketch & Composite Curves	1-18
Chapter 2:	Plane Creation	2-1
-	Tools needed	2-2
	Sketching the base profile	2-3

Creating the flat surface

Extruding with flip side to cut

Creating a tangent plane

	Creating a plane at angle	2-7 2-8
	Showing a sketch	
	Creating a plane coincident	2-9
	Creating a plane parallel	2-10
	Creating a plane offset distance	2-12
	Creating Plane perpendicular	2-13
	Creating a circular patterns	2-15
	Filleting the edges	2-17
	Questions for review	2-18
	Viewing the sections	2-19
	Exercise: Create new work planes	2-18
Chapter 3:	Advanced Modeling – 5/8" Spanner	3-1
	Tools needed	3-2
	Opening the part document	3-3
	Using min / max Arc conditions	3-4
	Creating the transition body	3-4
	Constructing a new work plane	3-6
8	Creating the close end	3-7
The state of the s	Making a hexagon cut	3-8
	Adding a recess feature	3-9
	Mirroring the recess	3-10
	Adding fillets	3-11
	Adding text	3-13
	Extruding the text	3-14
	Questions for review	3-17
	Exercise: Circular text wraps	3-19
Chapter 4:	Sweep w/ Composite Curve – Helical Ext. Spring	4-1
	Tools needed	4-2
	Creating the Sweep path	4-3
	Defining the Helix	4-3
2	Creating a plane at angle	4-4
	Adding other Hook features	4-5
	Creating a parallel plane	4-6
	Combining sketches using Composite Curve	4-8
	Creating Sweep profile	4-9
	Creating the Base Sweep	4-9
	Other Spring examples	4-10
	Questions for review	4-11
	Exercise: Circular Spring – Expanded	4-12
	Exercise. Circular Spring - Expanded	7-12

	Sweep - Variable Pitch Spring, closed ends	4-15
	Tools needed	4-16
	Creating the base sketch	4-17
	Creating a variable pitch helix	4-17
	Sketching the sweep profile	4-18
	Adding a pierce relation	4-18
	Sweeping profile along path	4-19
	Creating the flat ends	4-20
	Questions for review	4-21
	Exercise: Projected Curve & Composite Curve	4-22
	Exercise: Using Curve Through Reference Points	4-27
Chapter 5:	Advanced Modeling - Sweep vs. Loft	5-1
	Tools needed	5-2
	Understanding the draft options	5-3
	Opening the base	5-4
	Creating the upper inlet port - revolve	5-5
	Adding constant fillets	5-6
	Creating an offset distance planes	5-7
2	Creating the outlet port - Loft	5-10
	Adding the mounting bosses	5-11
9/1	Creating the rear inlet port	5-12
	Adding face Fillets	5-13
	Mirroring features	5-15
	Shelling the part	5-16
	Adding the ribs	5-17
	Mirroring the ribs	5-18
	Removing the sharp edges	5-19
Chapter 6:	Loft - Water Meter Housing	6-1
	Tools needed	6-2
	Constructing the body	6-3
	Creating an offset distance plane	6-5
	Creating loft profiles / features	6-5
	Constructing the Inlet / outlet profiles	6-6
	Using split entities	6-6
	Re-using the previous sketch	6-8
	Constructing the centerline parameter	6-10
0)	Creating the solid loft feature	6-11
	Using the shell command	6-13
	Adding the left / right brackets	6-14
	Adding the seal ring	6-15

	Adding fillets /chamfers	6-18
	Questions for review	6-19
	Exercise: Loft	6-20
Chapter 7:	Loft with Guide Curves – Waved Washer	7-1
	Tools needed	7-2
	Adding the construction geometries	7-3
	Creating a offset distance plane	7-4
	Creating a derived sketches	7-5
	Creating a curve through reference points	7-5
	Constructing the loft sections	7-7
	Creating the derived sketches	7-7
	Creating the loft feature	7-10
	Showing / hiding sketches	7-11
	Questions for review	7-12
	Exercise: V-Shape – 3 revolutions	7-13
	Deforming a solid	7-21
	Deform with curve-to-curve	7-21
	Setting the anchor faces	7-22
	Setting the stiffness	7-22
	Deforming a surface	7-23
	Deform with curve-to-curve	7-23
	Setting the anchor edges	7-24
	Mirroring a body	7-24
Chapter 8:	Surfaces – Lofted Surface	8-1
	Tools needed	8-2
	Creating offset distance plane	8-3
	Constructing the loft profiles	8-3
	Creating the loft surface	8-6
	Setting the start/end constraints	8-6
	Splitting surfaces	8-7
	Deleting surfaces	8-8
	Thickening surfaces	8-9
	Calculating the angle between faces	8-11
	Adding a full round fillet	8-12
	Sketching / extruding the slot contours	8-14
	Questions for review	8-17
	Lofted Surface - Remote Control Casing	8-19
	Tools needed	8-20
	Creating offset distance planes	8-21

	Sketching the loft sections	8-22
	Twisting the loft profiles	8-23
	Creating the loft surface	8-24
	Adding revolved surface	8-25
	Copying / moving surfaces	8-26
	Trimming surfaces	8-27
	Hiding surfaces	8-27
	Filling surfaces	8-28
	Knitting surfaces	8-30
	Adding fillets	8-31
	Thickening surfaces	8-32
	Removing the upper half	8-33
	Creating the lower half	8-35
	Questions for review	8-37
	Exercise: Loft_Delete Face	8-38
Chapter 9:	Advanced Surfaces – Surface_Offset_Ruled	9-1
	Tools needed	9-2
	Using offset surface and rule surface	9-3
	Creating the base loft	9-4
	Using the splitting lines	9-5
	Using offset surfaces	9-6
	Using ruled surface	9-7
	Using knit surfaces	9-8
	Creating a cut with surface	9-10
	Exercise: Advanced modeling with surfaces	9-13
	Exercise: Advanced surfacing techniques	9-15
	Using boundary and freeform surface	9-25
	Setting the boundary options	9-28
	Creating a free-form feature	9-30
	Adding free-form curves	9-30
	Adding free-form points	9-31
	Dragging with the triad	9-31
	Displaying the curvature comb	9-33
Chapter 10:	Surfaces vs. Solid Modeling - Helmet	10-1
	Tools needed	10-2
	Constructing the body of Helmet – surface loft	10-3
	Creating a perpendicular plane	10-4
	Sketching the sweep profile	10-4

	Sketching the sweep path	10-5
3	Adding a planar surface	10-5
1 0 1	Knitting the surfaces bodies	10-6
	Thickening the surface Knit	10-7
	Creating an extruded cut feature	10-8
	Creating a revolve cut feature	10-9
	Creating the Cut-out slot with draft	10-10
	Creating a sweep cut	10-13
	Adding fillets	10-13
	Exercise: Advanced loft - Turbine Blades	10-15
	Exercise: Advanced Sweep – Candle Holder	10-16
0	Using PhotoView 360	10-23
	Activating the Add-Ins	10-23
	Setting the appearance	10-24
	Setting the scene	10-25
	Setting the floor distance	10-26
	Setting the illumination	10-26
	Adjusting the render quality	10-27
	Setting the image file type	10-27
4	Saving the final image	10-28
	L3 – Final Exam	10-29
Chapter 11:	SimulationXpress - 5/8" Spanner	11-1
•	Tools needed	11-2
	Starting SimulationXpress	11-3
	Setting up the units	11-3
	Adding a fixture	11-3
	Adding load	11-6
10 Mar (10) 1 Mar (10) 1 Mar (10) 1 Mar (10) 1 Mar (10)	Selecting material	11-7
100 m 100 m 100 m 100 m 100 m	Analyzing the model	11-8
Partie Private	Viewing the Results	11-9
	Stress distribution	11-9
	Displacement distribution	11-10
	Factor of Safety (FOS)	11-10
	HTML report	11-11
100 Mars gas (17 Januari) 1 (17 Janu	Viewing the report	11-13
3 Year Gill. 2 Ship mile. 2 Ship mile. 2 Ship mile.	eDrawings	11-15
1996/01 1996/01 1996/01 1997/1275-00	Questions for review	11-19
	Exercise: Apply load	11-20
	Exercise. Apply load	11-20

Sheet Metal Topics

Chapter 12:	Sheet Metal – Post Cap	12-1
-	Tools needed	12-2
	Creating the base sketch	12-3
	Extruding with base Flange	12-3
	Creating an edge Flange	12-4
4	Editing an edge Flange	12-5
	Setting the auto-relief	12-5
	Creating a sketch Bend	12-7
	Adding holes in sheet metal parts	12-11
	Making the pattern	12-13
	Questions for review	12-14
	Sheet Metal - Vents	12-15
	Tools needed	12-16
	Creating the base sketch	12-17
, , ,	Extruding with base-flange	12-18
1	Using the miter flange options	12-19
	Creating a flat pattern	12-21
	Creating a forming tool	12-22
	The rectangle options	12-23
	Revolve the form body	12-25
	The position sketch	12-27
	Save the forming tools	12-29
	Applying the forming tools onto sheet metal part	12-30
	Position the forming tool	12-31
	Adding other sheet metal features	12-33
	Creating a Linear pattern of the forming tools	12-34
	Creating an axis	12-35
3.	Creating Circular patterns	12-35
	Questions for review	12-37
Chapter 13:	Forming Tools — Button w/Slots	13-1
-	Tools needed	13-2
	Sketching the base	13-3
	Revolving the base	13-4
	Adding slots	13-5
	Creating the split lines	13-7
	Defining the stopping & removing faces	13-9
	Saving in the design library	13-10

	Questions for review	13-12
	Sheet Metal – Mounting Tray	13-13
	Tools needed	13-14
	Creating the base flange	13-15
	Adding an edge flange	13-16
	Adding sheet metal cuts	13-17
	Un-folding a sheet metal part	13-18
	Folding the sheet metal part	13-20
	Accessing the design library	13-23
1	Adding the bridge lance	13-24
6-10	Creating a linear pattern Mirroring body	13-26 13-27
	Sheet metal chamfers	13-30
	Switching to the flat pattern	13-31
	Questions for review	13-32
Chapter 14:	Sheet Metal Conversions	14-1
	Tools needed	14-2
	Importing an IGES file	14-3
	Using the rip command	14-4
	Applying sheet metal parameters	14-5
	Adding fillets	14-6
	Creating a flat pattern	14-7
	Questions for review	14-8
	Exercise: Using STEP file & Smart Fasteners	14-9
	Weldments – Structural Members	14-24
	Enabling the weldment toolbar	14-24
	Adding the structural members	14-25
	Setting the corner treatments	14-25
	Adding the contiguous group	14-26
	Adding the parallel group	14-27
	Trimming the structural members	14-29
	Adding the foot pads	14-36
	Adding the gussets	14-37
. /*	Adding the weld beads	14-38
	Viewing the weldment cut list	14-40
1	Updating the cut list	14-41
	Creating a drawing	14-42
	Inserting the cut list	14-42
	Inserting the balloons	14-42

Top-Down Assembly Topics

Chapter 15:	Top-Down Assembly – Core & Cavity	Assembly	15-1
•	Tools needed	Level	15-2
	Opening the existing part		15-3
	Applying scale to parts		15-3
	Creating Radiate surfaces		15-4
1600	Adding parts into an assembly document		15-5
	Creating the core part		15-6
	Knitting the surfaces		15-7
	Hiding component		15-7
	Extruding with up to surface		15-9
	Editing part vs. edit assembly modes		15-10
	Creating the cavity part		15-11
	Creating an assembly exploded views		15-17
	Animating the explode / collapse configuration	S	15-20
	Questions for review		15-22
	Tooling Design - Part Level		15-23
	Tools needed		15-24
	Opening the IGES file		15-25
Sills I	Adding a Parting Lines		15-26
	Using the shut off Surfaces command		15-27
	Using Parting Surfaces		15-28
	Using Tooling Splits		15-30
OF IRESTA	Saving the 2 halves		15-32
	Separating the 2 halves		15-33
	Questions for review		15-35
Chapter 16:	Top-Down Assembly – Miniature Vise		16-1
	Tools needed		16-2
	Creating the base part		16-3
	Adding side flanges		16-5
9	Creating an offsetting distance plane		16-7
	Creating loft profiles and guide curves		16-8
	Creating a loft with guide curves		16-11
	Creating a new part in an assembly		16-15
	Understanding the inplace mates		16-15
	Offsetting existing geometry		16-16
	Creating a loft with guide cure		16-20
	Using loft with guide curve in an assemb	oly	16-22

	Extruding with up to surface option	16-25
	Creating Internal threads	16-27
	Making an assembly section view	16-30
	Adding the sub-components	16-32
	Questions for review	16-33
	Exercise: Lips & Grooves for Plastic Parts	16-35
	Exercise: Mounting Bosses for Plastic Parts	16-39
Chapter 17:	External References & Repair Errors	17-1
_	Tools needed	17-2
	Breaking all external references	17-3
	Understanding External Reference symbols	17-4
	Repairing Sketch level	17-5
	Repairing / replacing relations and dimensions	17-6
	Questions for review	17-7
	Exercise: Repair Errors and External References	17-9
	Level 4 Final Exam	17-17

Student Testimonials:

Some of the actual student testimonials after completing the training courses from the Author. All documents are filed at local SolidWorks resellers.

CSWP Core Preparation Practice

Preparation materials for the CSWP-Core examination	18-1
Part modeling and modifications	18-2
Configurations and design tables	18-20
Bottom up assembly	18-26

Student Testimonials:

Some of the actual student testimonials after completing the training courses from the Author. All documents are filed at local SolidWorks resellers.

SolidWorks 2012 Quick-Guides:

Quick Reference Guide to SolidWorks 2012 Command Icons and Toolbars.