

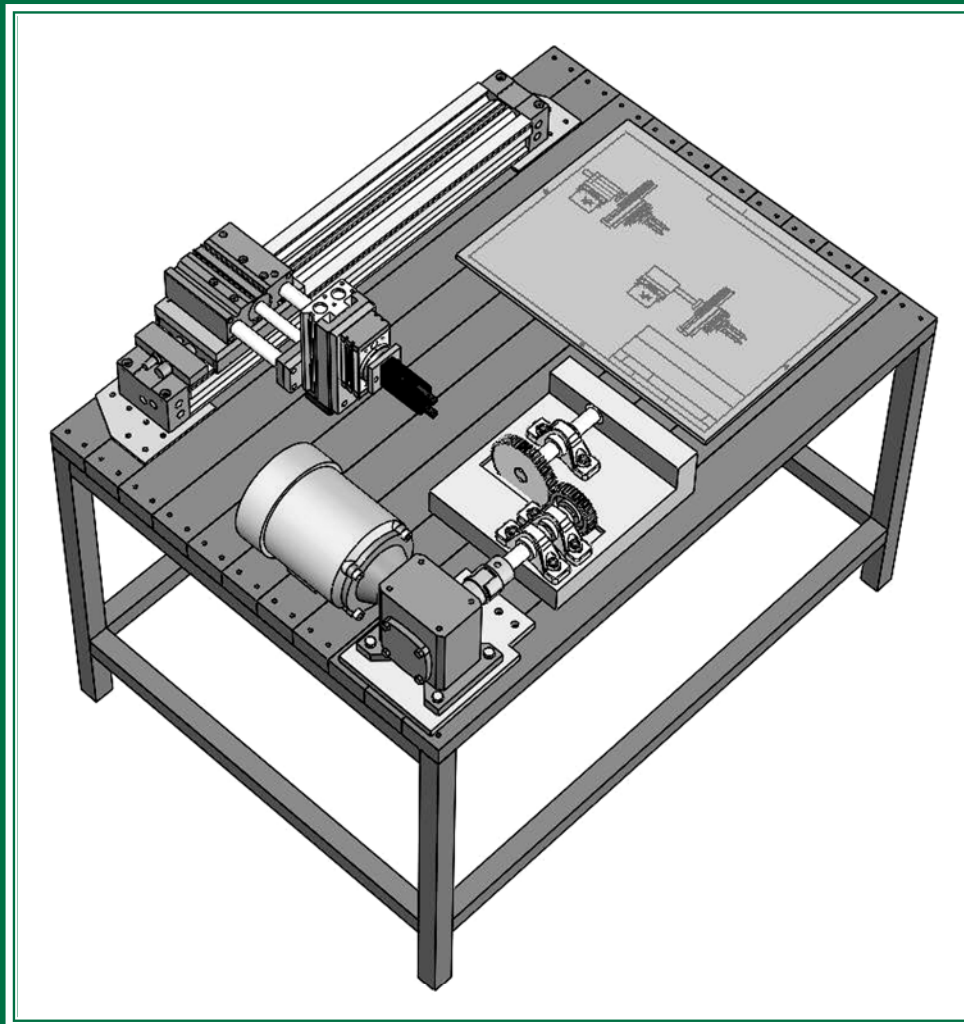
Inside:



Assembly Modeling with SolidWorks 2008

For the SolidWorks user that needs to understand Assembly Modeling

David C. Planchard & Marie P. Planchard



SDC
PUBLICATIONS

Schroff Development Corporation
www.schroff.com


SolidWorks

Solution
Partner

Better Textbooks. Lower Prices.

Table of Contents

| | |
|--|------------|
| Introduction | I-1 |
| About the Authors | I-2 |
| Dedication | I-3 |
| Contact the Authors | I-3 |
| Notes to Instructors | I-3 |
| Trademarks, Disclaimer, and Copyrighted Material | I-4 |
| Reference | I-4 |
| Table of Contents | I-5 |
| What is SolidWorks? | I-11 |
| Design Intent | I-13 |
| Overview of Projects | I-17 |
| About the Book | I-21 |
| Command Syntax | I-21 |
| Windows Terminology | I-22 |
| | |
| Project 1 – SolidWorks 2008 User Interface | 1-1 |
| Project Objective | 1-3 |
| Start a SolidWorks Session | 1-3 |
| Menu bar toolbar | 1-4 |
| Menu bar menu | 1-5 |
| Drop-down menus | 1-5 |
| Right-click Pop up menus | 1-6 |
| Consolidated menus | 1-6 |
| System feedback icons | 1-6 |
| Confirmation Corner | 1-7 |
| Heads-up View toolbar | 1-7 |
| CommandManager | 1-9 |
| Part | 1-9 |
| Assembly | 1-10 |
| Drawing | 1-11 |
| FeatureManager Design Tree | 1-12 |
| Flyout FeatureManager | 1-14 |
| Task Pane | 1-15 |
| Design Library | 1-15 |
| File Explorer | 1-15 |
| Search | 1-16 |
| View Palette | 1-16 |
| RealView | 1-17 |
| Document Recovery | 1-17 |
| Motion Study | 1-17 |
| Project Terminology | 1-24 |
| | |
| Project 2 – File Management, System Options, Templates, SolidWorks Explorer, and more | 2-1 |
| Project Objective | 2-3 |
| Project Overview | 2-4 |
| Assembly Task List – Before you begin | 2-6 |
| DELIVERY STATION Assembly Layout Diagram | 2-8 |
| Assembly Layout modeling methods | 2-8 |
| Assembly Considerations | 2-9 |
| File Organization | 2-10 |
| File Management | 2-13 |
| Activity: Create New File Folders | 2-13 |

| | |
|---|------------|
| System Options – File Locations | 2-14 |
| Document Templates | 2-14 |
| Reference Documents | 2-15 |
| Design Library | 2-17 |
| Activity: Set System Options and File Locations | 2-17 |
| System Options – Large Assembly Mode | 2-19 |
| Fully Resolved – Lightweight – Quick view / Selective open | 2-19 |
| Activity: Check Large Assembly Mode Setting | 2-22 |
| Assembly Template, Part Template, and Document Properties | 2-22 |
| Activity: Create an Assembly and Part Template with Document Properties | 2-26 |
| Download an SMC Component from 3D ContentCentral | 2-29 |
| Activity: Download a component from 3D ContentCentral | 2-30 |
| SolidWorks Explorer | 2-35 |
| Activity: SolidWorks Explorer – Rename and Save Components | 2-36 |
| Summary of SMC Components | 2-43 |
| FeatureManager and Component States | 2-44 |
| Comparison of Component States | 2-47 |
| Geometric and Functional Requirements | 2-47 |
| Activity: Measure Geometric and Functional Requirements | 2-48 |
| SolidWorks Toolbox Configuration | 2-51 |
| Activity: SolidWorks Toolbox | 2-51 |
| Project Summary | 2-52 |
| Questions | 2-54 |
| | |
| Project 3 – Assembly Modeling – Bottom-up design approach | 3-1 |
| Project Objective | 3-3 |
| Project Overview | 3-4 |
| Geometric and Functional Requirements of PLATE-A | 3-6 |
| Activity: Find the Geometric and Functional requirements of PLATE-A | 3-10 |
| PLATE-A Part | 3-14 |
| Activity: Create PLATE-A In-Context of the Assembly | 3-16 |
| Activity: Create a New Folder in the SolidWorks Design Library | 3-23 |
| Assembly Mating Techniques | 3-24 |
| LINEAR-TRANSFER Assembly | 3-26 |
| Activity: Insert Multiple Components at once in an Assembly | 3-27 |
| Customize the Keyboard | 3-28 |
| Activity: Customize the Keyboard | 3-29 |
| Activity: Create a New View | 3-30 |
| Modify the Base component: Fix / Float | 3-30 |
| Mate PropertyManager | 3-31 |
| Mates tab | 3-31 |
| Analysis tab | 3-35 |
| SmartMates | 3-38 |
| Types of SmartMates | 3-38 |
| InPlace Mates | 3-40 |
| Move Component tool | 3-41 |
| Rotate Component tool | 3-43 |
| Show Hidden Components tool | 3-43 |
| Assembly Features | 3-43 |
| Mate Reference | 3-43 |
| Mate Errors | 3-45 |
| MateXpert | 3-45 |
| Diagnose Mating Problems | 3-46 |
| Activity: Insert SmartMates between PLATE-A and the RODLESS-CYLINDER | 3-46 |
| Rigid and Flexible assembly states | 3-51 |
| Activity: Modify the Rigid State to Flexible | 3-52 |

| | |
|---|------------|
| Fasteners | 3-53 |
| Component Patterns | 3-56 |
| Activity: Apply Toolbox – Fasteners – SmartMate | 3-57 |
| Activity: Set the Toolbox directory | 3-60 |
| Project Summary | 3-63 |
| Questions | 3-64 |
| | |
| Project 4 – Bottom-up design assembly approach – Two Levels of Configurations | 4-1 |
| Project Objective | 4-3 |
| Configurations | 4-4 |
| Terminology review | 4-4 |
| Manual Configuration – Add Configuration tool | 4-5 |
| Configure component – Configure dimension tool | 4-7 |
| Design Tables | 4-8 |
| Activity: Apply the Collision Detection tool | 4-11 |
| Activity: Create a Distance Mate | 4-13 |
| Activity: Modify the Distance Mate | 4-15 |
| Activity: RODLESS-CYLINDER Configurations | 4-16 |
| Parent/Child Relation | 4-18 |
| LINEAR-TRANSFER Configurations | 4-19 |
| Activity: Three LINEAR-TRANSFER Configurations | 2-20 |
| Preparing for the next assembly | 4-24 |
| Project Summary | 4-26 |
| Questions | 4-27 |
| | |
| Project 5 – Top-down design assembly approach – Two Components with Configurations | 5-1 |
| Project Objective | 5-3 |
| Project Overview | 5-4 |
| Top-down design assembly modeling | 5-6 |
| In-Context | 5-7 |
| External References: General | 5-8 |
| External References: Suffix | 5-9 |
| External References: Lock / Break | 5-9 |
| 2AXIS-TRANSFER Assembly | 5-10 |
| Activity: Create the 2AXIS-TRANSFER Assembly | 5-10 |
| External References – InPlace Mates | 5-13 |
| Activity: Create In-Context, External References, and InPlace Mates | 5-16 |
| Activity: Review External References in PLATE-B | 5-19 |
| Activity: Customize the Assembly toolbar | 5-21 |
| Hole Selection | 5-22 |
| Activity: Hole Selection for PLATE-B | 5-23 |
| Mate the SLIDE-TABLE Assembly | 5-28 |
| Activity: Mate the SLIDE-TABLE to the 2AXIS-TRANSFER | 5-29 |
| Smart Fasteners | 5-32 |
| Activity: Measure and Insert Smart Fasteners | 5-33 |
| Edit Mates and Redefine Components | 5-36 |
| Activity: Redefining and Replacing Components | 5-37 |
| Activity: Apply the Interference Detection tool | 5-41 |
| Redefine External References | 5-46 |
| External Reference – Out of Context | 5-47 |
| Activity: Redefine External References – Out of Context | 5-47 |
| Activity: Locate InPlace Mates with the Filter FeatureManager tool | 5-53 |
| Activity: Insert Standard Mates between PLATE-B and the GUIDE-CYLINDER | 5-54 |
| Activity: Apply the Interference Detection tool | 5-56 |

| | |
|--|------------|
| Configurations | 5-57 |
| Activity: Two new GUIDE-CYLINDER Assembly Configurations | 5-61 |
| Activity: Two new SLIDE-TABLE Assembly Configurations | 5-65 |
| Top Level 2AXIS-TRANSFER Assembly Configurations | 5-69 |
| Activity: Create the Top Level 2AXIS-TRANSFER Configurations | 5-79 |
| Design Table: General Information | 5-72 |
| Project Summary | 5-76 |
| Questions | 5-79 |
| | |
| Project 6 – Part and Assembly Configurations, Custom Properties, Design Tables, & References | 6-1 |
| Project Objective | 6-3 |
| Project Overview | 6-4 |
| ROTARY-GRIPPER Assembly | 6-7 |
| Activity: Create the ROTARY-GRIPPER Assembly | 6-8 |
| Dynamic Behavior of Components | 6-12 |
| Activity: View the Dynamic Behavior of Components | 6-13 |
| GRIPPER and ROTARY assembly | 6-19 |
| Activity: Assemble the GRIPPER assembly to the ROTARY assembly | 6-20 |
| PLATE-D Part with In-Context features | 6-24 |
| Activity: Create the PLATE-D part In-Context of the ROTARY-GRIPPER | 6-25 |
| PLATE-D Holes | 6-28 |
| Activity: Create the PLATE-D Holes with the Hole Wizard tool | 6-28 |
| Activity: Display Updated Holders in the Assembly | 6-32 |
| Remove External References and InPlace Mates | 6-33 |
| Activity: Remove External References and InPlace Mates in PLATE-D | 6-34 |
| Activity: Apply the SmartMate tool to PLATE-D and the ROTARY assembly | 6-38 |
| PLATE-C Part | 6-41 |
| Activity: Create PLATE-C | 6-42 |
| Activity: Insert PLATE-C into the 2AXIS-TRANSFER assembly | 6-43 |
| Activity: Create the Cbore and Linear Pattern Feature | 6-46 |
| Activity: Copy a Sketch form one component to another | 6-51 |
| ROTARY-GRIPPER Design Table | 6-56 |
| Activity: Create the ROTARY-GRIPPER Design Table | 6-56 |
| PLATE-D Design Table with Properties | 6-58 |
| System Properties | 6-58 |
| User defined Properties | 6-59 |
| Activity: Create the PLATE-D Design Table with Custom Properties | 6-60 |
| Edit the ROTARY-GRIPPER Design Table | 6-69 |
| Activity: Edit the ROTARY-GRIPPER Design Table | 6-69 |
| Activity: Edit the PLATE-D part and Design Table | 6-72 |
| Project Summary | 6-76 |
| Questions | 6-77 |
| | |
| Project 7 – Assembly Drawings with Revision Table and Bill of Materials – Multiple Sheets, Views, and Custom Properties | 7-1 |
| Project Objective | 7-3 |
| Project Overview | 7-4 |
| 3AXIS-TRANSFER Assembly | 7-6 |
| Activity: Copy and Open Project 7 models | 7-7 |
| Activity: Insert SmartMates - 2AXIS-TRANSFER / LINEAR-TRANSFER | 7-12 |
| 3AXIS-TRANSFER Assembly Configurations | 7-14 |
| Activity: Create the 3AXIS-TRANSFER Assembly Configurations | 7-15 |
| 3AXIS-TRANSFER Assembly Drawing | 7-18 |
| Activity: Create the 3AXIS-TRANSFER Assembly Drawing: Sheet1 | 7-18 |
| Activity: Apply SolidWorks Explorer | 7-24 |

| | |
|--|------------|
| Activity: Modify the Title Block: Sheet1 | 7-29 |
| Activity: Create a Linked Note: Sheet1 | 7-30 |
| Activity: Add a Sheet – Insert an Isometric view | 7-31 |
| Bill of Materials | 7-34 |
| Activity: Create a Top-level Bill of Materials: Sheet2 | 7-36 |
| Activity: Create Custom Properties for the BOM: Sheet2 | 7-37 |
| Fasteners | 7-39 |
| Activity: Insert Fasteners from the MY-TOOLBOX folder | 7-39 |
| Activity: Replace Inserted Fasteners | 7-42 |
| Fastener Configuration | 7-44 |
| Activity: Create the 3AXIS-TRANSFER Fastener Configuration | 7-45 |
| Additional Information on Bill of Materials Tables | 7-47 |
| Exploded View | 7-47 |
| Activity: Create the 3AXIS-TRANSFER Assembly Exploded View | 7-49 |
| Balloons | 7-52 |
| Activity: Apply the AutoBalloon tool: Sheet2 | 7-54 |
| Custom Properties | 7-56 |
| Revision Table | 7-57 |
| Activity: Create a Revision Table: Sheet1 | 7-58 |
| Activity: Insert a Linked Note for Revision: Sheet1 | 7-60 |
| Drawing View Properties | 7-64 |
| Activity: Apply Drawing View Properties: Sheet1 | 7-64 |
| Activity: Add a Sheet: Insert two views | 7-66 |
| Activity: Create a Section view: Sheet3 | 7-68 |
| Activity: Copy a SolidWorks Part / Assembly with SolidWork Explorer | 7-70 |
| Project Summary | 7-74 |
| Questions | 7-75 |
| Project 8 – Top-down design, Layout Sketches, Block, Motion, and more | 8-1 |
| Project Objective | 8-3 |
| Project Overview | 8-4 |
| Link Values and Equations | 8-6 |
| Activity: Create Link Values and Equations in the DELIVERY-STATION | 8-7 |
| Input assembly, Reordering components, and Dissolve sub-assemblies | 8-12 |
| Activity: Create the INPUT-BASE-PLATE Part | 8-13 |
| Activity: Insert a New Assembly – Reorder - Components | 8-15 |
| Reusing Components: Component Pattern and Mirror Component | 8-19 |
| Activity: Reuse Components – Mirror Components tool | 8-20 |
| Insert the DELIVERY-STATION Assembly | 8-21 |
| Activity: Insert the DELIVERY-STATION Assembly | 8-21 |
| AssemblyXpert | 8-23 |
| Activity: Apply the AssemblyXpert tool | 8-25 |
| Layout-based Assembly design | 8-25 |
| Activity: Layout-based assembly design – Motion – Example 1 | 8-26 |
| Activity: Layout-based assembly design – Motion – Example 2 | 8-28 |
| Envelopes | 8-32 |
| Additional Assembly tools: Join, Split, and Explode Line Sketch | 8-32 |
| Activity: Join Feature and COSMOSXpress | 8-33 |
| Exploded Link Sketch tool | 8-38 |
| Activity: Create an Exploded View: 4Bar Linkage | 8-38 |
| Activity: Create an Explode Line Sketch | 8-39 |
| Motion Study – Physical Simulation tool | 8-40 |
| Assembly Motion | 8-40 |
| Animation Wizard | 8-41 |
| Physical Simulation | 8-42 |
| Linear / Rotary Motor tool | 8-42 |

| | |
|---|------|
| Spring | 8-42 |
| 3D Contact | 8-43 |
| Gravity | 8-43 |
| Activity: Create a Motion Study – Example 1 | 8-44 |
| Activity: Create a Motion Study – Example 2 | 8-45 |
| Project Summary | 8-47 |

| | |
|---|------------|
| Appendix | A-1 |
| ECO Form | A-1 |
| Display of dimensions and tolerances | A-2 |
| SolidWorks Keyboards Shortcuts | A-3 |
| Windows Shortcuts | A-4 |
| CSWA Certification | A-5 |
| Intended audience | A-5 |
| CSWA exam Content | A-6 |
| Why the CSWA exam? | A-10 |
| How to obtain your CSWA Certification? | A-11 |
| How to prepare to pass the CSWA Exam? | A-11 |
| How does an Institution become a CSWA Provider? | A-11 |
| Exam day | A-12 |
| What do I get when I pass the exam? | A-12 |
| Helpful On-Line Information | A-13 |

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

| | |
|-------------------------------------|--|
| Additional Information on CD | |
| CSWA Certification PDF file | |