

Test Project Day 3

Mechanical Design Challenge

WSC2011_TP05_M3_EN

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CONTENTS

This Test Project proposal consists of the following documentation/files:

PROJECT 1	PROJECT 2
WSC2011_TP05_M3_EN.doc	WSC2011_TP05_M3_EN.doc
WSC2011_TP05_M3_PROJ1.dwfx	WSC2011_TP05_M3_PROJ2.pdf
Data Files folder > Project 1 > All files	Data Files folder > Project 2 > All files
Prints of all design changes	Prints of all design changes

INTRODUCTION

Your company has asked you to work on two design projects. The first is to modify the digital prototype of a partially completed metering pump. You have been asked to complete the pump assembly and make revisions based on a review of the design.

The second project is a proof of concept design for a scissor lift mechanism.

DESCRIPTION OF PROJECTS AND TASKS

PROJECT 1

After you have reviewed the prints, DWFx, and data files, you revise, model and assemble the metering pump. You also create exploded views, drawings, rendered images and an animation.

PROJECT 2

After you have reviewed the prints, PDF, and data files, you model the scissor lift. You also create exploded views, drawings, rendered images and an animation.

You have **6 hours** to complete the two projects.

INSTRUCTIONS TO THE COMPETITOR

OPEN AND REVIEW SUPPLIED FILES FOR PROJECT 1

1. Review the printed material.
2. *WSC2011_TP05_M3_2D.dwfx* lists the revision notes.
3. *WSC2011_TP05_M3.iam* is the incomplete assembly of the pump

MODEL AND ASSEMBLE THE PARTS FOR PROJECT 1

1. Review the notes in the DWFx file. Complete the tasks.

Redesign the cap.	Redesign part 520110200
Model the shaft and worm gear	Add counter bore holes to part 53190600

2. Assemble the parts you have modeled.

CREATE DRAWINGS FOR PROJECT 1

1. Drawing template files are located in the Data Files\Drawing Templates folder.
2. Use Save Copy As to rename the file using competition file naming conventions.
3. To complete the drawing:
 - i. On the first sheet, create an exploded shaded isometric view of the 6271-C-XX-XX subassembly with the redesigned cast part.
 - ii. Add balloons and a parts list. The parts list should have 3 columns, ITEM, QTY, and PART NUMBER.
 - iii. On a new sheet, create a detail drawing of the redesigned cast part.
 - iv. All annotation styles must meet ISO standards.
 - v. On new sheets, create detail drawings for revised parts 52110200 and 53190600.

- vi. Create a shaded exploded isometric view of the gear assembly, including the shaft, worm gear, bearings, seal, gaskets, and end plates (52170400 and 52170500).
- vii. Create detail drawings of the shaft and worm gear. Gear data is not required.
- viii. On the shaft drawing, apply tolerance dimensions to the bearing and seal diameters.

CREATE A RENDERED IMAGE AND ANIMATIONS FOR PROJECT 1

1. Using Autodesk Inventor, create an animation as follows:
 - i. Animate the constraint that drives the gear assembly and record the animation.
 - ii. The worm gear should complete at 2 revolutions.
 - iii. Save the file in AVI format using the competition file naming convention.
2. Using Autodesk Inventor, create an animation as follows:
 - i. Create a presentation file of the gear assembly.
 - ii. Record the animation.
3. Using Autodesk Inventor, create an animation as follows:
 - i. Create a presentation file of the 6271-C-XX-XX subassembly with the redesigned cast part.
 - ii. Record the animation.
4. Using Inventor Studio, create rendered images as follows:
 - i. Image of the pump assembly with the machined part.
 - ii. Image of the pump assembly with the redesigned cast part.
 - iii. Image size: 1024 x 768.
 - iv. Select a Camera, Lighting style, and Scene Style to best represent the assembly.
 - v. Save the file in PNG format using the competition file naming convention.
5. Using Inventor Studio, create an animation as follows:
 - i. Screen size: 800 x 600
 - ii. Length: 15 seconds
 - iii. At 0 seconds, the camera view should feature the complete pump assembly with the machined part.
 - iv. From 0 to 7 seconds, fade from the machined part to the cast part.
 - v. From 7 to 9 seconds, view the gear assembly.
 - vi. From 9 to 11 seconds, view the part revised to remove interference.
 - vii. From 11 to 15, animate the assembly to show that there is no interference.
 - viii. On the Output tab, check Preview; No Render.
 - ix. Save the file in WMV format using the competition file naming convention.

OPEN AND REVIEW SUPPLIED FILES FOR PROJECT 2

1. WSC2011_TP05_M3_PROJ2.pdf provides the design specifications.
2. Supplied images and part files are located in Data Files > Project 2

MODEL AND ASSEMBLE THE PARTS FOR PROJECT 2

1. Review the notes in the PDF file.
2. Create an assembly based on the scissor lift concept sketch. Use the supplied parts.
3. Create an assembly based on the design brief information.
4. Using the assembly created in the previous step, create positional representations of the lift in the lowest, middle, and highest positions.

CREATE DRAWINGS FOR PROJECT 2

1. Drawing template files are located in the Data Files\Drawing Templates folder.
2. Use Save Copy As to rename the file using competition file naming conventions.
3. To complete the drawings:
 - i. On the first sheet, create an shaded exploded isometric view of the scissor lift assembly.
 - ii. On a new sheet, create front views of the lift using the three representations.
 - iii. Add major dimensions to each view.

CREATE A RENDERED IMAGE AND ANIMATIONS FOR PROJECT 2

1. Using Autodesk Inventor, create an animation as follows:

- i. Using the scissor lift concept sketch, animate the constraint that drives the lift. The lift should complete one cycle from lowest position to highest to lowest.
 - ii. Record the animation.
 - iii. Save the file in AVI format using the competition file naming convention.
2. Using Autodesk Inventor, create an animation as follows:
 - i. Create a presentation file of the scissor lift assembly.
 - ii. Record the animation.
3. Using Inventor Studio, create a rendered image as follows:
 - iii. Image of the assembled scissor lift. This is the design brief assembly.
 - iv. Image size: 1024 x 768.
 - v. Select a Camera, Lighting style, and Scene Style to best represent the assembly.
 - vi. Save the file in PNG format using the competition file naming convention.
4. Using Inventor Studio, create an animation as follows:
 - i. Screen size: 1024 x 768
 - ii. Length: 10 seconds
 - iii. At 0 seconds, the camera view should feature the lift in the lowest position.
 - iv. From 0 to 10 seconds, raise and lower the lift once.
 - v. On the Output tab, check Preview; No Render.
 - vi. Save the file in WMV format using the competition file naming convention.

MARKING SCHEME

CRITERION	SUB-CRITERION	MARKS	
C1	Fulfilment of the Design Brief	7	3
C2	Physical simulation	3	2
C3	Exploded view simulation	3	2
C4	Photo rendering	3	2
	Sub-Total:	16	9
	Total:	25	