MAE 305L

Design Project

Final Report

Spring 2008
Final Report

• Based on your Preliminary Design Reports, you are requested to move forward and produce a detail design for the fixture
• This design will be described in detail in a Final Report which will contain:
  – All aspects of the Preliminary Design Report, amended as needed
  – Sufficient detail to enable the fixture to be made and assembled
  – Detailed instructions for the use of the fixture in making the part
• **Final Report** is due 25 March 2008, 2:00 pm
• Demonstration and delivery of the completed fixture is due 24 April 2008
CDR Format

• The CDR must be organized according to the outline below:
  – Cover Page
  – Problem Definition
  – Design Concept Description
  – Analysis of the Design Concept
  – Fixture Fabrication and Assembly
  – Operating Instructions
  – Summary and Conclusions

• Each of these elements must be in this order and begin on a new page

• Additional details on each of these elements are given in the following
Items Carried Forward from PDR

• The first part of the CDR will contain everything in the PDR, amended as necessary:
  – Cover Page
  – Problem Definition
  – Design Concept Description
  – Analysis of the Design Concept

• Changes to these sections can arise from:
  – Customer comments to the PDR
  – Modifications arising from the detail design process
Fixture Fabrication and Assembly

• All information needed to build the device
  – Brief narrative indicating what is contained in this section and a reference to the drawings to follow
  – Bill of materials including cost
  – Detail drawing of each part of the fixture
  – Parts list
  – Assembly drawing(s) and any special instructions needed to assemble the fixture

• This section should contain sufficient detail so that a person could build the fixture from the information contained herein
Bill of Materials

- A simple table giving
  - Raw materials required for machined parts of the fixture
  - Standard hardware required for the fixture
  - Quantities needed of each item
  - Unit cost
  - Total cost

<table>
<thead>
<tr>
<th>Material</th>
<th>Size</th>
<th>Unit Cost</th>
<th>Quantity</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel Plate</td>
<td>6” x 4” x 3/4”</td>
<td>$5.60</td>
<td>1</td>
<td>$5.60</td>
</tr>
<tr>
<td>Steel Bar Stock</td>
<td>1/4” x 1/2” x 12”</td>
<td>$1.20</td>
<td>1</td>
<td>$1.20</td>
</tr>
<tr>
<td>Hex Hd. Cap Screw</td>
<td>1/4-20UNC-2 x 1/2 LG</td>
<td>$.35</td>
<td>4</td>
<td>$1.40</td>
</tr>
<tr>
<td>Hex Hd. Cap Screw</td>
<td>1/4-20UNC-2 x 1 1/4 LG</td>
<td>$.70</td>
<td>4</td>
<td>$2.80</td>
</tr>
</tbody>
</table>

$11.00
Detail Drawings

• One drawing for each component of the fixture (except for standard hardware items)
  – If the fixture contains multiple instances of identical machined parts, only one drawing is required
• Contain sufficient information to allow someone familiar with machine-shop operations to make the component
• Adhere to commonly accepted drafting standards
• CAD-generated
• Review handout, “Dimensioning and Tolerancing” and what you learned in MAE 205
Information on Detail Drawings

- Sufficient views to unambiguously define part geometry
- Dimensions
- Tolerances
- Material
- Quantity (number of parts required)
- Drawing scale
- Name of part
- Part number
- Revision number and date
- Notes

An Example of a Detail Drawing is at the end of this handout
Parts List

• A simple table giving
  – Name and drawing number of each part
  – Standard hardware required
  – Quantity of each required

• May be included on assembly drawing

<table>
<thead>
<tr>
<th>Part</th>
<th>Number</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crankshaft</td>
<td>D31-34567</td>
<td>1</td>
</tr>
<tr>
<td>Coupling</td>
<td>B12-56789</td>
<td>1</td>
</tr>
<tr>
<td>Pulley</td>
<td>C4-10357</td>
<td>1</td>
</tr>
<tr>
<td>Hex Hd. Cap Screw</td>
<td>1/4-20UNC-2 x 1/2 LG</td>
<td>4</td>
</tr>
<tr>
<td>Hex Hd. Cap Screw</td>
<td>1/4-20UNC-2 x 1 1/4 LG</td>
<td>4</td>
</tr>
</tbody>
</table>
Assembly Drawing

- Shows how parts go together
- Parts identified by name and/or number, referencing detail drawings
- Required standard hardware (nuts, bolts, etc.) called out
- Generally not dimensioned

An Example of an Assembly Drawing is at the end of this handout
Operating Instructions

• A set of step-by-step instructions for using the fixture to make the part, including:
  – Mounting, securing, and aligning the fixture
  – Mounting, securing and aligning the blank in the fixture
  – Setting the zero position
  – Cutting tools to be used
  – Tool paths

• Include sketches as needed to illustrate the steps
Summary and Conclusions

• Your final message to the customer
Final Design Report (CDR)

• Your goal is that, twenty years from now, someone picking up your report:
  – Would understand the objective of your device
  – Would be convinced that your solution to the problem will work
  – Would be able to build the device
  – Would be able to operate the device