

MAE 305L
Design Project
Preliminary Report
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Overall Goals

- The Design Project assignment you received today (along with this briefing) constitutes a Request for Proposals (RFP)
 - Statement of the problem that the customer wants you to address
 - Detailed requirements: the successful solution to the problem must satisfy all these requirements
- Each team is being asked to respond to this RFP
 - **Preliminary Design Report** – your team's proposed solution to the problem (Due 3 October 2011, 2:00 pm)
 - Final Design Report – detailed design and instructions for use (Due 26 October, 2:00 pm)
 - Demonstration and delivery of the finished article (7 December 2011)

Preliminary Design Report (PDR)

- The PDR is a proposal to the customer
- The PDR should communicate to the customer that your team:
 - Understands the problem and the requirements
 - Has a solution that will solve the problem and address all the requirements
- Ultimate goal of the PDR is to convince the customer that you have a solution that is worth pursuing to the next phase (detail design)

PDR Format

- The PDR must be organized according to the outline below:
 - Cover Sheet
 - Introduction and Summary
 - Problem Definition
 - Design Concept Description
 - Design Concept Analysis
 - Conclusions
- Each of these elements must be in this order and begin on a new page
- Additional details on some elements are given in the following

Cover Page

- Contents are:
 - Title, something like
Tool Maker's Vise Jaw Fabrication Fixture
A Preliminary Design Proposal submitted to:
 - Customer names
 - Course number and name
 - Semester
 - Submitted by:
Names of team members
 - Date

Problem Definition

- Problem Definition section shall include:
 - General statement of the problem
 - Detailed requirements
 - Any additional considerations arising from your understanding of the problem
- Don't hesitate to use the same words used by the customer in the RFP
- Include a drawing of the part your fixture is designed to produce

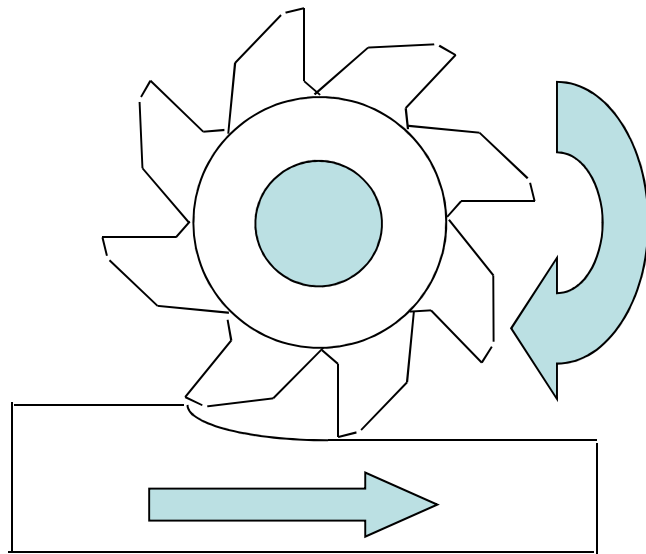
Design Concept Description

- Contains a clear, concise description of your proposed solution
 - Describe in general terms the configuration of your preliminary fixture design
 - Describe specifically how your fixture will be used to make the part
 - Major components and the function of each
 - Refer to the labeled drawing of the part
 - Refer to labeled sketch(es) of your preliminary design solution
 - Describe how your design addresses each of the customer requirements
 - Use of reference points to generate reproducible tool paths
 - Accurate location of blank in fixture
 - Accurate location of fixture on milling machine table
 - Clearance between cutter and fixture
 - etc.
 - Be sure to consider the availability of materials in the shop

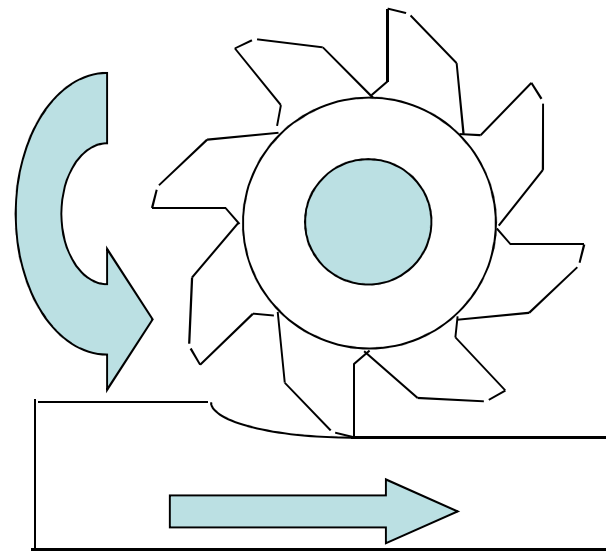
Analysis of the Design Concept

- Discussion to demonstrate that blank is accurately and securely held in fixture during all machining processes
 - Consider direction of cutting forces and moments, and the reactions imposed by your clamping system to maintain the part in static equilibrium during cutting
 - Use properly labeled free-body diagrams of the blank showing cutter forces and fixture reactions during each machining operation to clarify your analysis and discussion
 - Calculations are not required

Upmilling vs. Downmilling



Upmilling



Downmilling

Use of Sketches

- Sketches are informal drawings
- Used as an overview to convey general concepts and assist in visualization, usually in isometric view
- Intent is **not** to provide all the detail needed to build the fixture
- Sketches are suitable and appropriate for PDR
- Should be computer-generated
- Must be neat, clear, and labeled as needed
- Intended to clarify the written descriptions

Sample Sketch of a Simple Fixture

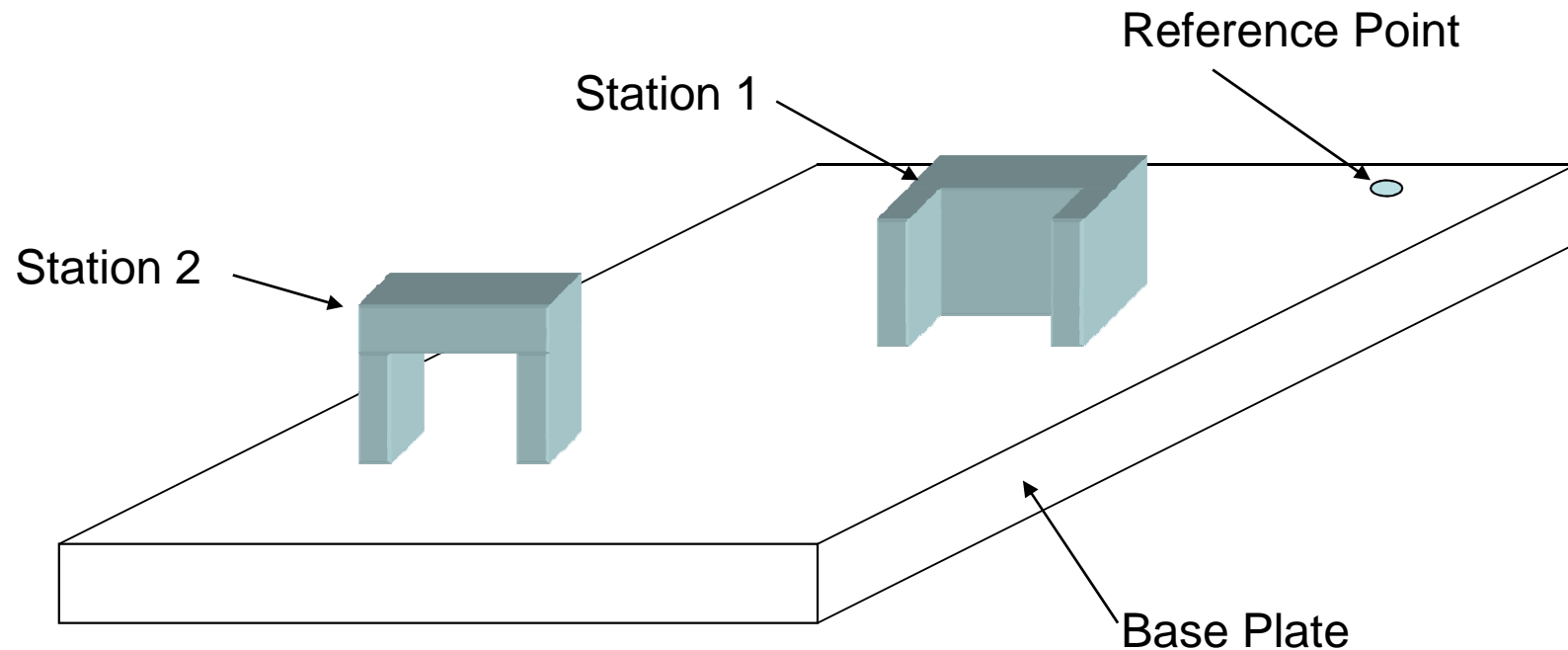


Figure 3. Preliminary design of fixture

Show only enough detail to demonstrate that requirements will be met.

Summary

- The PDR communicates your understanding of the problem, and your proposed solution to the problem
 - Organized in conformance with customer requirements as described herein
 - Neat
 - Concise
 - Contain sketches/figures as needed to illuminate key points