

MEC432 Project Proposal



Project Title: Bearing Race Cleaning System

Background

Karma Machining & Manufacturing Ltd. is a contract machining service provider located in Edmonton. One product we make is races for roller thrust bearings. We currently use a messy and labour-intensive process to clean and package the finished parts, and as we increase our manufacturing capacity, we seek an automated process.

This project will provide the successful teams with an opportunity to work with a progressive, forward-looking manufacturing company, and to learn about the current and future challenges of manufacturing in Alberta.

Objective

The goal of this project is to design a system to clean and dry bearing races, to be integrated into an automated flexible manufacturing system.

Scope of Work

The following points summarize the scope of work:

- develop the initial requirements into detailed specifications
- investigate and analyze technologies that might be suitable for the system
- design a system that meets Karma's requirements

Preliminary Design Specifications

Some initial requirements are as follows:

- the finished parts are ring-shaped, with outside diameters ranging from 2" to 10" and thicknesses ranging from 0.25" to 2.5", and are made of alloy steel
- the machine is to be loaded and unloaded manually
- the process is to include cleaning and drying of the parts
- the system must not create any surface corrosion on the finished parts
- minimum required production rate is one part per minute
- the machine should use the minimum amount of shop floor space
- the following utilities are available for the machine:
 - 208 volt, 3-phase, 60 Hz power
 - compressed air, up to 100 psig and 3 scfm
 - domestic cold water (note that there is no sewer drain available nearby)
- manufacturing and commissioning cost should be less than \$10,000

Deliverables

The project deliverable is report that contains system- and component-level drawings, a cost estimate, and a bill of materials suitable to manufacture the system. Any electrical and control systems may be described and estimated at the system level only; Karma has expertise in this area to help the team.

Prototype Manufacturing Resources

Karma is a full-service machine shop, and is able to manufacture prototype parts and assemblies as required.

Project Client & Sponsor

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Available Meeting Time

As required at mutually agreeable times.

Maximum Number of Groups

We welcome two design teams.

Intellectual Property Ownership

Design IP ownership shall reside with the project sponsor.

Images



Figure 1 – Part of Karma Plant



Figure 2 – Roller Thrust Bearings