Project Plan and Product Specification

Group #13
General Capacitors - No Contact Gap Measurement

Team Members:

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1. Problem statement

Design a non-invasive method of accurately a measuring the distance between two hot rollers.

2. Project Scope/ Goal

The objective of this project is to design a device that measures the gap between two steel rollers without contact. The two steel cylinders are heated to around 300℉ and then used to roll material into thin films. The motivation behind this project is finding a more efficient and precise way of measuring the gap between the rollers, as the current method is touch based and employs the use of a strip of material with known thickness to estimate the thickness of the gap. The goal of this project is to design, build, and test a device that uses optical means to measurement of the gap.

3. Project Objectives

- Maximize maneuverability in the applied system.
- Use optical sensors to measure the gaps of the rollers up to two microns.
- Must be removable or detachable and easily reassembled.
- No contact with the rollers themselves.
- Reliable with a life of up to ten years.

4. Overall plan/ Methodology/ Approach

The device will be able to be easily installed onto the existing rolling machine and will utilize lasers and sensors to detect the amount and intensity of light that passes through the gap at several points down the length of the rollers. The prototype developed will comply with the spatial conditions of the current machine, the desired resolution, and the budget restrictions of the project.

5. Project Constraints

- The sensor or sensors cannot come in contact with the rollers, nor can any other system or piece in the design.
- The sensors or sensitive pieces in the design must not come too close to the rollers under heated operations.
- The total cost of the new system must not exceed $1,400.
- The design must be light enough to mount on the supportive braces on the top of the machine, or around another part of the machine.
- The design must be precise, up to two microns, and purely accurate.
- The design and structure must be simple enough to install or uninstall accordingly.

- There must be some sort of outside battery pack or power connection because the device cannot draw power from the machine it is being installed on.
- There must be as few pieces as possible, or the entire design must be one piece.

6. Deliverables

Create a task list and work breakdown structure, (WBS)
Indent or outdent tasks to finalize the WBS
Enter task durations or work estimates
Create dependencies between tasks (list the task that perquisite to the one at hand.
Tasks critical to the project
Gantt chart

7. Assign resources

Team Leader: Forrest Parker

- The Team Leader will coordinate regular team meetings and will be the main point of contact with the project sponsor and team advisor. They will be responsible for aiding in the development of a project schedule and making sure every member is on task.

Lead ME Designer: Sam Giaquinto

- The Lead ME Designer will evaluate and make the final decisions on the mechanical portion of the team's design. They will be responsible for keeping an organized record of design development.

Financial Advisor: Matt Nagy

- The Financial Advisor will initiate and keep records of the project budget, and will stay on top of adjustments that need to be made in budget planning.

All Team Members:

- Actively provide feedback and suggestion toward design
- Show respect to all other team members at all times
- Attend scheduled meetings
- Communicate effectively

8. Product Spec

Covers both design and performance specs

9. A Design spec

Measurable design and engineering features important to the design, examples include: geometric dimensions and tolerances, load/ stress bearing capacity, both static and dynamic, needed power, weight, various modules and components and integration within the designed system.

10. B Performance spec:

Expectations of performance in the field or when used by consumer including: instrumentations output requirements (operation range, accuracy, resolution), display features, detection capability, energy and fuel consumption, data transmission, and efficiency.