INDUSTRIAL SOLUTIONS LABORATORY

# ***Company Information***

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| **Company Name** | *perma USA* | **Date Submitted** | *04/27/2023* |
| **Project Title** | *Design a support flange to reduce impact of vibration on Single Point Lubricator performance.* ***(PERMA_VIBE)*** | **Planned Starting Semester** | *Fall 2023* |

## ***Senior Design Project Description***

**Personnel**

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

| Discipline | Number | Discipline | Number |
|---|---|---|---|
| Mechanical (ME) | 4 | Electrical (EE) | |
| Computer (CpE) | | Systems (SE) | |

**Company and Project Overview:**

perma is the innovative leader of single-point lubrication systems and supplies more single-point lubrication systems than any other manufacturer worldwide. To hold this position, we invest extensively in research and development. Our success is based on great ingenuity with automatic lubrication systems. More than 50 years of experience, continuous thinking ahead, and the constant implementation of new ideas result in exceptional solutions that meet even the highest technical requirements.

We are very committed to our customers and involve them in all new product developments from start to finish. This close supplier–customer partnership enables us to consistently improve the quality of our products and services.

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**Project Requirements:**

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| **PROJECT** | *Vibration Analysis - Lubricators performance* |
| Description of Design Problem | Most infield failures are influenced by vibration of the equipment the lubricators are mounted on. |
| Objective | Investigate the effect vibration has on performance and reliability of the current design. Determine if a specific type or frequency is more harmful than another. Determine best location, and sensor type for testing. |
| Output | Based on Vibration analysis, design a support flange that helps to mitigate the effect of the vibration leading to product failures. Support flange to be interchangeable to various lubricator nozzles |

Support flange STAR


**Expected Deliverables/Results:**

- Deliverables:
    - Collect, and organize vibration data for various Direct Mounting situations, across different Lubricator Sizes.
    - Documented method to compare vibration values
        - o Procedure
        - o Variables being tested
        - o Reproducibility evaluation
    - Based on Vibration analysis, design a support flange that helps to mitigate/dampen the effect of the vibration to the Lubricator Drive Motor leading to product failures.
        - o Material Selection
        - o Draft 3D Model
        - o Prototype cost to manufacture
        - o Performance Comparison

**Disposition of Deliverables at the End of the Project:**

Students are graded based on their display and presentation of their team's work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter's location, it must be returned to campus for the Expo. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

**List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):**

- Knowledge of material selection and product design
- Introduction to engineering materials and engineering mechanics
- Introduction to Statics and Dynamic systems
- Machine analysis and design
- Sensors and data acquisition
- Autodesk Inventor or Solidworks CAD software