



### **Company Information**

|                      |   |                                  |                    |
|----------------------|---|----------------------------------|--------------------|
| <b>Company Name</b>  | <i>Wanzl North America</i>  | <b>Date Submitted</b>            | <i>11/11/2024</i>  |
| <b>Project Title</b> | <i>Design and Build of a Shelving Upright Testing Machine (WANZL_SHELF)</i> | <b>Planned Starting Semester</b> | <i>Spring 2025</i> |

### **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.

| <b>Discipline</b> | <b>Number</b> | <b>Discipline</b> | <b>Number</b> |
|-------------------|---------------|-------------------|---------------|
| Mechanical        | 4-5           | Electrical        | 1             |
| Computer          |               | Systems           |               |

#### **Company and Project Overview:**

Wanzl North America's vision is to be the leading entrepreneurial player in terms of market share, agility, and game-changing solutions. WNA is a solution provider, creating value along the supply chain of our customers, from the online purchase to the delivery to their customers.

WNA, which includes the Technibilt, a French Company, and Cari-All brands, is headquartered in Newton, North Carolina. With nearly 500 employees and 160 MUSD of sales, WNA focuses on the retail, distribution, and airport market segments with marquee customers such as Walmart, Amazon, and most large grocers and retailers. In addition to being the largest manufacturer of shopping carts in North America, WNA has three (3) additional main product segments as well as a service business, providing turnkey solutions for asset protection and point-of-sale, as well as materials handling.

WNA is part of the Wanzl GmbH & Holding KGaA, headquartered in Germany and has 12 plants in 8 countries and more than a dozen sales and distribution centers worldwide, providing comprehensive, solutions-driven service and expert knowledge of local markets for customers across the globe through their 360° service.



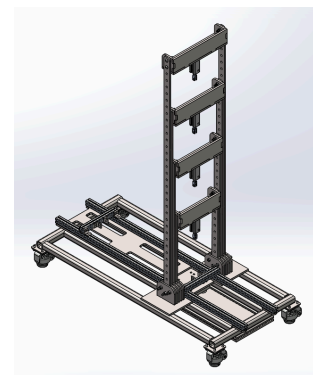
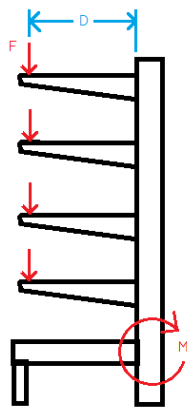
### Project Requirements:

Cantilever shelving systems are used extensively for retail operations. It is critical that the systems are designed and tested to ensure the systems do not present a tipping hazard. The project objective will be to design and build a cantilever shelving upright testing machine. Machine must be capable of applying a load to various sizes of shelving systems. Machine should measure reaction force at feet to confirm moment load being applied at base connection and measure deflection at a specified height. Outputs of load and deflection should be recorded and can be used to plot a stress-strain curve, helping to identify when material is yielding.

Free Body Diagram

Competitor Test Fixture

Concept Models



### Expected Deliverables/Results:

- A summary report of the project (PDF or PowerPoint).
- Cost analysis
- 3D CAD models, 2D drawings
- Hand calculations and Finite element analysis (FEA)
- Complete working test fixture with automated data reporting



**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):**

- Finite Element Analysis
- Solidworks CAD software
- Sensors and data acquisition
- Travel to the Wanzl NA Facility in Newton, NC and/or Denver, NC