The goal of the project was to optimize the performance and minimize baggage jams of the Checked Baggage Inspection System (or CBIS) at the Charlotte Douglas International Airport through Mechanical Improvements.

**Scope of project included:**
- Design, build, testing and implementation of the Tilt Table
- Design, build, testing and implementation of the Slide Table

**General Requirements**
- Design, build and test the Tilt Table and Slide Table.
- Create models in SolidWorks with alterations for improvement of selected mechanical areas within CBIS.
- Analyze drafted models and create prototypes using purchased materials to function in designated areas.
- Ensure prototype is designed to specifications and able to be installed onsite.

**Performance Specifications**
Designed and fabricated tables must allow seamless transfer of bags from upper belt to lower belt without jams on either belt. Tilt table, slide table and any other determined mechanical designs must be ready to install without modification and simple maintenance. Any incomplete mechanical projects will be prepared for easy transfer to next design team.

**Performance Verification**
- Stress Analysis: Finite Element Analysis (FEA) to ensure material strength with stress of weight distribution upon the design
- Feasibility: Designed to proper specifications based on current tables. Easy interchangeability of rollers for maintenance.
- Design of Experiments: Test trials were created to analyze functionality of tables through Minitab to eliminate bias.

**Design Features**
- Counterbalance with static calculations to ensure stability and angle
- Replaced excess metal with rollers to improve dynamics of any luggage bag

**Design Material**
- Carbon steel was the selected material in order to flex and withstand fatigue
- Welds were used to connect the steel components

**Design Features**
- Rollers for minimum friction between baggage and table

**Design Material**
- Aluminum was selected for its lightweight and strength capabilities

**Impact**

**Ease of Work**
With proper functioning mechanical parts, maintenance employees can focus on other responsibilities instead of repairing and monitoring current tables.

**Cost Savings**
The increased efficiency will assure no maintenance employees have to stop or reroute this area of the CBIS, ensuring there will not have to be extra maintenance costs or employee costs.

**Luggage Delay Minimization**
Although the redesigned tables might not be a major cause of flight delays or luggage loss, the improved design could help to prevent system failure from impacting flyers and flight times. Any minimal changes to rerouting baggage as a result of a faulty table could impact many different people going to various locations.

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