FedEx Express Station Simulation Project

Overview
For this particular project, FedEx asked the team to create a simulation model using FlexSim software of the processes currently taking place in their State College station. To create the model, the team learned the current process and analyzed provided data. The team collaborated with a team of students from Shanghai Jiao Tong University to create the simulation model. The created simulation model will be used to analyze how the station’s operations respond to delays and changed input parameters in the future.

Objectives
- Develop a station simulation for in-house processes using FlexSim simulation software.
  - Integrate data sources with the simulation
  - Utilize simulation model to see potential outcomes of different input parameters
- The model will meet all the requirements expected by FedEx:
  - Introduce freight into a station
  - Sort freight at the package level
  - Build freight at the package level into trucks and routes
- Penn State team will establish communication with a team in Shanghai, China.

Approach
- Learn State College Station’s process through site visits and data analysis.
- Break down process into segments and focus on understanding the logic of each segment.
- Learn FlexSim simulation software through tutorials, online forums, and trial and error.
- Create a base simulation model of process in FlexSim.
- Collaborated with Shanghai team to verify our understanding of process was correct.
- Incorporate provided data and assumptions into base simulation model.
- Verify model through analysis of output metrics.
- Perform a sensitivity analysis by changing arrival schedule, flight delays, and package volume and examining the outputs.
- Outputs of sensitivity analysis indicated that our model responded accurately to changed input parameters.

Outcomes
- The sponsor will be able to effectively analyze the process without spending any additional money.
- Delayed flights showed the largest changes in the outputs of the system.
- Simulation model will be used as a base model for FedEx to simulate their Pittsburgh station in the future.
- Communicated effectively with Shanghai team across cultural and language barrier.