Overview
Rockland Manufacturing was interested in testing alternative grinding wheels to find an improved wheel for their grinding process that will save money in labor and wheel costs. They are currently using the Pearl Silver wheel which is thought to be dated in technology compared to newer grinding wheels. They are most interested in testing for material removal rate, cost, and wheel life. They brought the Penn State team in to test grinding wheels and analyze the results to recommend an improved wheel.

Objectives
The team’s objectives were to acquire test wheels, test the wheels with various experiments relating to the grinding process at Rockland, analyze the data, and recommend an improved wheel(s) for Rockland’s process that will yield monetary savings and improved performance.

Approach
- Visited Rockland to gain complete understanding of their process and the problem
- Researched 9” X 7/8” X ¼” grinding wheels to understand differences in different wheels
  - Found that manufacturer and material (aluminium oxide/zirconium) varied between wheels
- Developed a list of top manufacturers and acquired both aluminium oxide and zirconium wheels from each manufacturer (limited by budget) which ranged greatly in price.
  - Acquired six wheels of each as we had two replications per three tests to reduce variability
- Developed and performed three tests relating to Rockland’s grinding process
  - Grind 6 one inch welds and time to completion
  - Grinding test of two different metals to quantify material removal rate and wheel life
    - Developed a CAD drawing of a jig and had Rockland manufacture the jig to hold the grinder to reduce variability in the experiment
  - Operator feedback tests where forms and test wheels were distributed to workers
- Analyzed the grinding test data by calculating averages of the replications and using the current grinding usage by Rockland. The financials of the current grinding process were extrapolated to help quantify the test wheels with respect to labor hours, labor cost, and wheel costs
- Compared the results with graphs to understand which wheels excelled, to make recommendations of savings per year in labor and wheel costs.

Outcomes
- The current Pearl Silver wheels performed the worst in the experiments.
- Recommendations based on wheel costs – No Change (Pearl Silver)
- Recommendations based on total costs
  - DeWalt Zirconium – Savings $61,495 per year
  - CGW Aluminium Oxide – Savings $50,731 per year
- Recommended to find bulk costs for further savings