Super 8...High Speed Paper Roll Alignment Set-Up

Overview
High speed printing requires precise alignment. Printer engines are able to send paper through a system at speeds up to 550 ft/min. Within these systems, the paper may encounter a 90° turn bar that changes the direction of the paper. Operators within Xerox facilities must manually set up the turn bar, which is simply a guess and check method. Set up time takes too long and wastes time and paper.

Objectives
The team’s goal was to create an alignment system to reduce set up time by up to 20%. The paper alignment had to be within five degrees of square. The actual alignment system also needed to be simple to use and manufacture, easily installed and maintained, and reliable.

Approach
- Customer needs were analyzed using an AHP chart, weighted hierarchal list, and a needs- metrics matrix
- Multiple concepts were generated and the most practical solution was selected
- Existing patents for laser measuring devices were reviewed to use for the alignment system
- Visited Xerox facility in Webster, NY to better understand turn bar system and customer needs
- CAD models of the winder, unwinder, turn bar, and the alignment system were created
- Proper ultrasound measuring devices used to determine distance from turn bar to reels of paper
- Testing was performed to determine the attempts to properly align turn bar with alignment system
- Through testing, it was determined that alignment system require only one set up

Outcomes
- All customer needs met with design of final alignment system
- With alignment system, Xerox will save (per year):
  - 260 hours of wasted time
  - 760,000 ft of paper
  - Over $18,000 worth of paper
- Set up time reduced from 4 attempts to 1 attempt, a 75% reduction