Overview
The initial problem was to design and implement a web tension controlling device to control the capping process. Capping is applied to the KYDEX material to provide protection and/or add decorative patterns. Currently, the tension is controlled by manually adjusting the air brake on the feed roller. The brake must be adjusted to maintain constant tension. Due to human error associated with the capping process, the company is losing about $6 million a year.

Objectives
Design and implement a web controlling tension device that can accurately measure the tension on the capping material. The system should be able to automatically adjust the pressure on the pneumatic brake to maintain constant tension. In addition, the system should be modular and able to work on other production lines.

Approach
- The team met with KYDEX personnel to view the current capping procedure and to determine customer needs and deliverables.
- Concept generation involved weighting of which functions and qualities were most important from the following: accuracy, controllability, modular, reliable, safe.
- The team requested a list of current capping materials as well as samples for tensile testing.
- Patent research led to the discovery of many existing web tension systems. Benchmarking was performed on the available systems.
- Discovery of existing web tension systems changed the scope of the project from design to implementation.
- The Montalvo all in one web tension system was selected as the best solution to the customer’s needs for roughly $12K.
- Tensile testing was performed and results were submitted to Montalvo for proper sizing of the tension system.
- CAD drawings were created to illustrate the feed path of the proposed tension system. Another CAD drawing was created for the aluminium wheel to be attached to the rollover counter.

Outcomes
Currently KYDEX LLC is waiting for final financial approval to purchase the quoted Montalvo system:
- The system will cost $12K which is ~0.20% of the estimated yearly loss of $6 million.
- The tension will be accurately and continuously controlled electronically.
- KYDEX requested a measuring device to monitor the amount of capping run. The team provided an analog rollover counter to display feet of capping material used.