Project Name – Remote Operated Lifting Beam Sliders

Overview
The purpose of this project is to develop a safe, reliable, and simple remote operated slider system designed to translate heavy concrete slabs. At present, the lifting beam sliders are repositioned at different locations along a beam by workers. The project requires the solution to work in all environmental conditions, be remote operable, and be made of commercially available parts.

Objectives
The objective of the project is to conceptualize a method to remotely move the slider locations, while maintaining the required load capacity. A technical report, with detailed calculations behind each aspect of the solution is required for PE approval. The team must present High Concrete Group with a complete build plan for fabrication, this would include all detailed drawings and fabrication specifications, such as weld length, assembly order, and maintenance plan.

Approach
- Acquired customer needs and specifications about the project by meeting with the sponsor and operating/inspecting the lifting beam sliders
- Created detailed CAD models from AutoCAD drawings from travel lift manufacturer
- Generated all methods of translating objects from machine design
- Searched patents on similar products that are commercially available, with inferior load capacity
- Performed detailed stress analysis using FEA software to determine the required size for shafts and other load bearing elements
- Conceptualized and modelled ~30 tracked and trackless designs prototypes in SolidWorks
- Researched/implemented various safety/control mechanisms such as limit switches and VFDs
- Utilized concept selection matrices to determine top solutions
- Performed detailed calculations to determine all relevant parameters of the solution, such as potential wire displacement, necessary tension, torque requirements, and fatigue life
- Created a scaled physical prototype to prove selected concept will perform
- Redesigned final solution to reduce cost, looking at cost in manufacturing and purchasing products
- Created drawings, complete with detailed GD&T to manufacture solution

Outcomes
- The sponsor will be able to implement solution on all lifting beam in plant
- Eliminated all ergonomic issues associated with moving sliders
- Reduces the required labour to operate lift by 33%.
- Reduces time taken per person to move sliders by 5 minutes, saving HCG tens of thousands of dollars a year