Portable Girder Builder

Overview
High Steel Structures LLC. is seeking a portable device that will have the ability to be moved to the weld station in order to position two parallel flanges to the web in a horizontal orientation, making it possible to assemble girders with less labor and multiple work cells. The engineering challenges proposed in this project include withstanding the weight of a full size girder, supplying a 50 ton force to the both flanges, adjust the flanges relative to the web, and be capable of moving the entire length of the girder. A portable system will increase production time, optimize floor space in the facility, and minimize the difficulties with the current production procedures.

Objectives
The objectives for this project were to design a portable girder builder model using a 3D design software (Solidworks) capable of building a various range of steel girders and build a prototype which highlighted the key design features and able to demonstrate the designs function.

Approach
- Travel to High Steel Structures in Lancaster and gather customer needs and project requirements
- Review High Steel Structures current girder building process
- Research relevant patents and existing products
- Develop concepts based on customer needs and project requirements
- Develop a Solidworks model of concepts
- Develop three prototypes separate prototypes
- Analyse the model using finite element analysis and ensure the integrity of the design
- Develop the required subsystems required for the operation
- Assemble a final prototype which demonstrates the designs functions

Outcomes
The implantation of our teams design into High Steel Structures current facilities will have the following impacts to their company:
- Maximize floor space
- Reduce operation to one operator
- Reduce production time and therefore increase production volume
- Minimize difficulties associated with cambered or swept girders
- Save High Steel Structures millions of dollars and thousands of billable man hours over the projected 20 year lifespan.