

Design & Engineering of an Automated Entertainment Industry Chain Motor

Students: Abhimanyu Sukumaran, Nicole Wong, Ethan Bushman

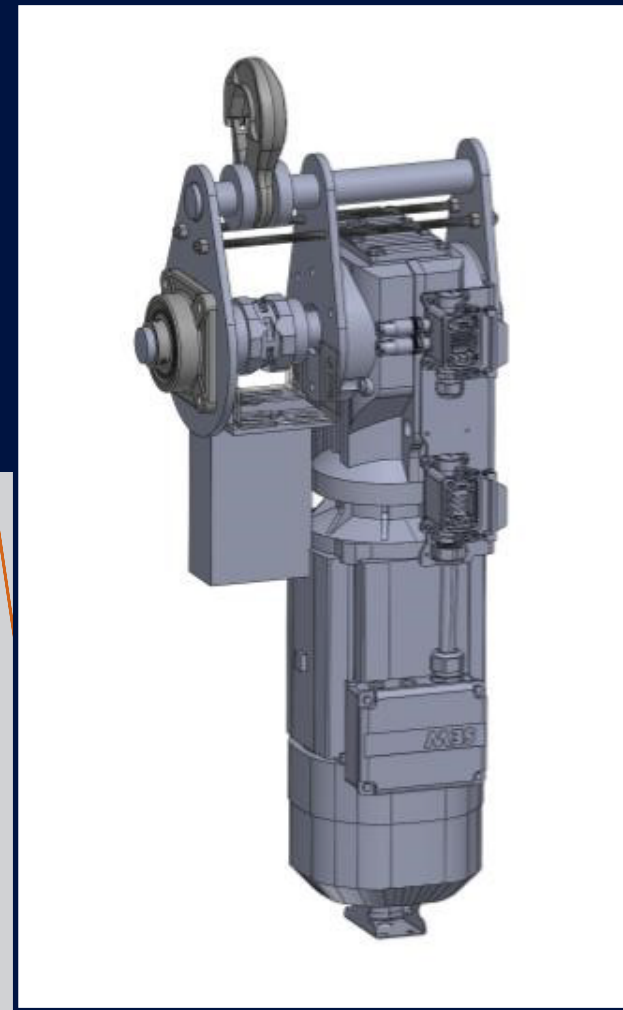
Sponsor: Creative Conners, Inc.

Faculty Advisors: Dr. David Giblin and Ed Weingart MFA

Senior Design Project ME64

Chain motors, also referred to as chain hoists, are one of the most commonly used machines to apply mechanical advantage to position and maneuver loads. Current models available are typically intended for industrial purposes, where they are used to move heavy loads at single, slow speeds.

For applications in the entertainment industry, slight modifications to chain motors are applied, such as painting it black and inverting it during installation. However, these alterations don't take the motor's horsepower or noisy operation into consideration, resulting in unideal speed and load capacities, and potentially disrupting a production or performance.



This project aimed to improve automation within the entertainment industry by designing, engineering, and prototyping a chain motor that operates quietly with a higher level of precision. Its targeted constraints were a load capacity of approximately 2000 pounds, and the ability to operate at variable speeds up to 12 inches per second.

The design takes full-system integration with the sponsor's product line into consideration with primarily off-the-shelf components, as well as simplification of both transportation and installation procedures. Design features include a static motor body, custom chain wheel and accompanying chain guides, and the ability to be rotated 90 degrees, such that it can be installed and rigged horizontally or vertically, depending on the venue and application. The design abides by BGV D8+ rigging standards, which state that the hoist must be static, support the attached load without need for secondary supports, and cannot be operated while people are under the load.

