Problem Statement

Hoist lifts are an integral part of construction sites erecting high-rise buildings. Much of the work at the site is reliant on the availability of the hoist lift to transport construction material and contractors between various building levels. Despite advances in the construction industry, the hoist lift has not been upgraded to be more efficient for the companies that rent and use it onsite. Hoist lifts move at an average speed of ten floors per minute; it would take at least five minutes for the hoist lift to travel from the ground level to the top floor of a fifty-story building. Priority for the lift is biased towards lower floors, where travel times are shorter. This leads to workers on higher floors being unable to complete their assigned tasks for the day, as they are forced to wait indefinitely for hoist lift availability. The excruciatingly slow speed of these hoist lifts requires careful time management to avoid unnecessarily long wait times. For construction companies, the greatest consequence of inactivity is increased cost. Workers that are idle lose efficiency, leading to increased job hours, and longer jobs require a larger budget. Local construction sites report economic losses caused by the inefficiency of hoist lifts. With such glaring costs, a solution to efficiently manage and track the hoist lift would help the construction companies save time and money.

Currently, managers and supervisors at the job site do their best to keep the lift operating at all times. Radios are the primary form of onsite communication between workers and supervisors. The worker who is assigned to operate the lift relies on verbal calls, without any information about priority of current tasks. As of now, the only way to assess the current location of the lift is by visually estimating its position relative to the structure; however, this becomes a challenge on structures higher than ten stories. The current method for managing the hoist lift is a disorganized and informal queue that leads to indefinite wait times, frustrated workers, delayed productivity, and detrimental costs to construction companies.

Our solution is to provide construction teams with a desktop and mobile system that allows the workers to track the status of the hoist lift. The system will greatly benefit the construction companies by providing information that addresses the shortcomings of the current system for managing the hoist lifts. This solution will serve the workers on the site, and the supervisors who oversee the progress of construction. With the app, users can view in real time what floor the hoist lift is currently situated at, eliminating the wait time faced when relying solely on radio communication. This system benefits the supervisors by giving them greater ability to schedule and manage the lift activity, with access to the queue of tasks and requests currently waiting to be completed. Our system will not only indicate the availability of the lift, but also notify when the lift has been idle for a set amount of time. Additionally, workers on the various floors will get real-time notifications shortly before their hoist lift is going to arrive based on position in the queue. With this information the supervisor can manage the hoist lift’s current and subsequent tasks much more efficiently than before.

The display of real-time data pertaining to the accurate position of the hoist lift and approximate wait times will give the supervisors and the construction workers the power to manage their time effectively. With the information that our tool will provide, the prolonged and wasteful delays in productivity will be reduced, ultimately maximizing efficiency.