Design Optimization of Vertical Drop Lifts in Automotive Assembly Plants – Team 2

Overview
Vertical drop lifts should aim to move cars along assembly lines as quickly and efficiently as possible with minimal maintenance assistance. Instead, they frequently require maintenance attention and slow down the productivity of assembly lines. Our team has been tasked with analyzing current VDL designs to find out how they work and their common failure modes, and to use this knowledge to create an optimized VDL design that improves assembly line speed and efficiency.

Objectives
Our objectives were to research how SmartDiagnostics technology could be used to make VDL maintenance pre-emptive, rather than reactive, and to design a creative alternative to the current VDL architecture that minimizes the effects of common VDL failure modes.

Approach
• Our team began by gathering information from the sponsor on what they expected us to accomplish in each phase of the project
• We then researched vertical drop lifts to figure out how they work and where they are likely to fail
• This helped us determine how KCF Technologies’ SmartDiagnostics data could be implemented to make VDL maintenance pre-emptive, rather than reactive
• We had two separate meetings with our sponsor to give them progress reports and ensure we were clear on project objectives for each phase
• We decided that the best way to approach the redesign was to simplify the design to reduce the number of potential errors
• This redesign is more efficient than the current system because it puts less stress on the frame and also removes the often-failing motor
• KCF Technologies tasked us with designing a creative alternative to the current VDL design and this redesign accomplishes that task in a very simple, yet effective manner

Outcomes
• Our project helped provide KCF Technologies with options to convey to their clients about how their SmartDiagnostics sensors could help save them money and time through pre-emptive maintenance on the current VDL architecture
• The redesign provided a creative alternative to the current VDL design and should reduce maintenance by eliminating or improving a large number of failure points

Angled view of the VDL redesign