

ABSTRACT

Good Karma Bikes is a non-profit organization that services and restores bikes that customers bring into the shop. Good Karma Bikes has plans for a dramatic increase in storage capacity for the next few years. Good Karma Bike's warehouse area is currently overflowing with bikes due to the large increase in demand. A redesign of the warehouse layout is needed to handle the increase of incoming bikes and to improve product flow through the space. The project team's objectives are to:

- Improve accessibility and reduce time it takes to unrack a bike
- Increase space utilization by improving bike storage capacity
- Decrease distance traveled during the process of fixing or stripping down bikes

The project team will follow a Gantt chart throughout the duration of the project and use various Industrial Engineering tools to identify how much space is required for the increased demand, how each tool, rack, and workstation within the facility should be laid out, and create a new way to store bikes in a more efficient manner. First, the team observed the flow of bikes through the facility, gathering value added and non-value added processes. In addition, the team tracked the motion of the workers by creating a spaghetti diagram. The dimensions and current layout were taken to create a current state facility model using Microsoft Visio. Next, the project team dived into gathering specific dimensions on the current bike racks to determine how many can be stored on the racks and the amount of square footage the racks take up on the shop floor. The team then used Microsoft Visio as well to create a digital design of the new proposed layout and the alternative layouts, using employee feedback, space requirements, and distance traveled to produce a final recommended layout. For the bike racks, the new design was created in Solidworks to visualize the looks of the rack and the dimensions of the parts before the actual build. From the findings, the group found that the proposed layout will help decrease the amount of square footage consumed by the racks and improve the flow of bikes through the warehouse. The proposed bike rack design increases the rack's capacity from 6 bikes to 9 bikes while shortening the length of the rack. The total cost of implementing this bike rack will be \$60 in material cost and free with labor because the design is simple enough for volunteers to build the racks from scratch. This low-cost bike rack is beneficial to the Good Karma Bikes because this prevents the company from purchasing a mezzanine which would have cost them about \$11,000. The new layout and bike storage process will shorten the time to unrack and place bikes onto the racks by a minute per bike, decreasing overall cycle time for bike maintenance. The project team highly recommends this new facility layout and bike rack design if Good Karma Bikes hopes to achieve enough capacity for their projected demand.