

Abstract

E. & J. Gallo is a winemaking company located in Modesto, California. Our group was assigned to measure and analyze E. & J. Gallo's current state process for their 5-Buggies (transportation trailers) to find key areas of inefficiency. After analyzing their current state process, we designed a more efficient flow of materials for the 5-Buggy system within the Automatic Train Loading (ATL) station and found an optimal solution for tracking the 5-Buggies on the Modesto campus. Our project started with preliminary research on fleet management, material management systems, and tracking methodologies. Once these areas of research were fully understood, our project team was able to start creating a current state simulation to accurately visualize the flow of materials through the ATL. Gallo's concerns were confirmed as the simulation showed a bottleneck of pallets of material at the ATL with a starved 5-Buggy flow.

After analyzing the current state model, our group designed some potential solutions to test within the simulation. The group tested four different options; to synchronize the 5-Buggies in the queue, add an extra tractor in the system, add an extra automatic guided vehicle, or do nothing. Synchronizing the 5-Buggies in the queue yielded the best results from running experiments in the simulation. By redesigning this process, Gallo would try to maintain four to six 5-Buggies in the queue at all times. There would need to be monitors placed in key locations so all necessary departments can visually see when the queue is getting low.

After researching various fleet management tracking methodologies our project team focused on four potential solutions: Radio Frequency Identification (RFID), Wireless Sensor Network, Wi-Fi Real Time Location System (RTLS), and a Global Positioning System (GPS). Our team performed analyses on cost estimates of each of the systems, and also compared other key factors such as accuracy and ease of use. It was found that GPS was the optimal system to fit Gallo's needs. The cost was significantly lower than all other options, while still maintaining good accuracy and being easy to use.

The total cost to implement the system is \$40,159 with an annual maintenance and replacement cost of \$5,580. Gallo has a cost of downtime for the ATL as \$2,000 per hour; Gallo would only need to experience 20.08 hours of downtime to payback the cost of the system. This gave a return on investment of 249%, which meets Gallo's requirement of a 15% return on investment for a successful project.