

Operations Research Master's Oral Exam

Kingsley Fink

**Process Improvement of a MRAP (Mine Resistant Ambush Protected) Vehicle Production Line
(under the direction of Professor Thom J. Hodgson)**

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Abstract:

The MRAP, or Mine Resistant Ambush Protected, vehicle is a new military armored vehicle with the intent to sustain minimal or survivable damage due to the enemy's use of roadside bombs, mines, and IEDs, or Improvised Explosive Devices. BWW is a competing vendor for a contract to be a provider of MRAP vehicles. The United States government has stated that it has decided to fill its vehicle inventory with approximately 20,500 of the MRAP vehicles over the next five years. BWW tasked North Carolina State University to assist with the layout, resource allocations, and process of transforming a former automobile facility to produce these vehicles. Due to the deadlines imposed by the government, this needed to be completed promptly. After this analysis was complete, BWW decided, instead, to use their current manufacturing facility. BWW again turned to North Carolina State University to assist with the overall process at the facility. Using this manufacturing facility, BWW set an optimal output goal of 1 MRAP vehicle per day.

The production output of an assembly line can be optimized through the scheduling of the process through the use of Gantt Charts. To compare the different models with the revisions, we ran simulations to predict the change of the production output of the MRAP vehicles. The overall emphasis of the process improvement for this assembly line was performed on Station 9 to Station 12, which caused the largest lag in the overall assembly process. Using the simulation output, we can determine the number of vehicles produced per day.

Throughout this project, North Carolina State University personnel were in constant contact with the production company, BWW, in order to obtain the most updated and current information for this analysis.