



V 110 Connecting Rod Line Assembly Simulation

PROJECT SUMMARY

PMC developed an AutoMod simulation of a new connecting rod line at a truck engine plant. The plant intends to increase the production rate and needs to know if the new equipment proposed by a vendor will achieve the necessary throughput rate. The simulation was used to determine the expected throughput rate of the vendor's proposed equipment.

SYSTEM DESCRIPTION

The connecting rod line consists of seven synchronous transfer machines connected by gantries. Each machine contains between seven and forty stations. Each station has an individual tool life and probability of unscheduled breakdown. The machines are in sequence, and parts move sequentially from the beginning of the system to the end.

OPPORTUNITY

The engine manufacturer wants to verify that the vendor's claims for expected throughput are reasonable. Based on experience with similar equipment, the manufacturer believes that the vendor has underestimated the effects of tool changes and unscheduled breakdowns. Because there is virtually no internal buffer capacity in the connecting rod line, a tool change or a breakdown at any point on the line will stop the entire line. Even a small probability of an individual station breakdown will lead to large capacity losses because there are over sixty stations.

APPROACH

PMC was asked to develop simulation models of the V-110 connecting rod line assembly area that could be modified to evaluate several different scenarios. The objectives of the project were:

- Verify throughput
- Verify tool life estimates
- Determine station breakdown rates.

SOLUTION

A computer simulation of the connecting rod line was written. The simulation included vendor supplied estimates of tool life and station breakdown probability. The expected net system throughput was approximately half the estimate provided by the vendor. The simulation was used to experiment with several possible ways to increase throughput, including increased tool life, simultaneous tool changes and adding buffers between the machines. At best, the expected net system throughput was increased to only 65% of the desired rate.