

## FORD MOTOR COMPANY

### MODELING OF REACTIVE MAINTENANCE USING DISCRETE EVENT SIMULATION

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Ford Motor Company is a global company that designs, develops, and manufactures automobiles. In 2015, Ford Motor Company sold approximately 6,674,000 vehicles throughout the world across its two brands, Ford and Lincoln.

Within Ford Motor Company's assembly plants, skilled trade technicians repair machinery reactively in order to maintain production. Currently, the determination of the number of skilled trade personnel placed within a plant is based on budget allocation driven from heuristic approximations. Ford Motor Company did not have a quantitative procedure to determine the actual manpower requirement for such personnel. To reduce ambiguity in Ford Motor Company's staffing policies, a discrete event simulation modeling methodology was created that can be replicated to quantitatively assess the effects of varying the number, physical positioning, and work assignments of skilled-trade personnel within a plant.

Using this methodology, a discrete event simulation was created that focused on the electricians staffed around two assembly lines within a Ford Motor Company plant where several vehicles are manufactured. The model achieved outputs that were within 3% of historical operating data. Using the validated simulation model, comprehensive scenario testing was performed.

A scenario was discovered that utilizes one fewer electrician per crew and is able to achieve current throughput rates with a minor increase in average electrician utilization. This scenario has the potential to save Ford Motor Company \$494,000 annually within the two lines modeled. If this modeling methodology is expanded to include the entirety of the Body Shop within the plant, it is estimated that annual savings of \$2,988,000 could be achieved. Furthermore, the created methodology has the potential to be expanded globally to realize even greater savings.