# Application of discrete event computer simulation for non-destructive testing scheduling optimization.

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## ABSTRACT

Discrete event system simulation software allows users to conduct simula t ion experiments on a computer, enabling them to try different scenarios in a cost-effective and time-efficient manner. The results obtained from various modeling approaches can provide decision-makers with more informed decision-making.

The Quality Control (QC) station is the final checkpoint in a production line that ensures product quality. For certain critical products, it is necessary to ensure that all products are of acceptable quality. Due to cost and other considerations, some products may undergo limited rework (reproduction) to "produce" qualified products without compromising their performance. However, the quality of these reworked products needs to be ensured through inspection at the QC station. Therefore, when rework occurs, it significantly affects the existing and subsequent production scheduling.

By using discrete event simulation software, the impact between the original scheduling of the production line and the desired improvement dispatching rules can be simula ted. The First-Come, First-Served (FCFS) and Last-Come, First-Served dispatching rules are used as a comparison, along with the proposed improvement approach. Unsuitab le simulation results are eliminated, and a comparison is made with the current production line. The simulation results indicate that, compared to the current prioritization of rework, the FCFS approach, under a daily capacity release of 3 hours, leads to a decrease in the utilization rate of the bottleneck station machine (RT) from 99.07% to 85.92%,

representing a decrease of 13.15%. The utilization rate of RT bottleneck station personnel can decrease from 100% to 86.65%, a decrease of 13.35%. Furthermore, the average maximum inventory level of finished products decreases from the initia l 519.8PCS to 188.9PCS, resulting in a reduction of 330.9PCS or approximately a 63.66% decrease in inventory.