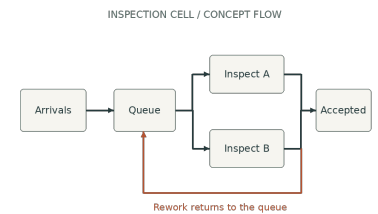


INDUSTRIAL ENGINEERING

Inspection queue capacity

Size inspection capacity for arrivals, rework, and breaks.



CONCEPT SCHEMATIC

Capacity brief; time-study data needed

THE PROBLEM

An inspection station may keep up on average and still build a queue during short arrival bursts or rework. This study compares staffing, buffer space, and routing rules using a discrete-event model of one inspection cell.

SCOPE

- Represent arrivals, inspection times, shift breaks, and a rework loop.
- Compare one or two inspectors, finite buffers, and dispatch rules.
- Report throughput, waiting-time distributions, work in process, and utilization.

PLANNED DELIVERABLES

- Reproducible discrete-event model and input-data template
- Scenario comparison with capacity and buffer recommendations
- Assumption register and a time-study collection plan

CONSTRAINTS

System

One bounded inspection cell with an explicit upstream interface

Inputs

Observed timing data or clearly labeled hypothetical scenarios

Routing

Defined acceptance and rework rules

Resources

Available staff, breaks, and physical queue space

VERIFICATION PLAN

Conservation

Reconcile arrivals, completions, rework, and remaining work.

Reference cases

Check deterministic and simple queue cases against hand calculations.

Replication

Use multiple random seeds and confidence intervals; test input sensitivity.

NEXT STEP

Define the cell boundary and collect arrival, inspection, and rework timestamps.

Hypothetical scenarios will be labeled. Staffing savings and measured throughput improvements require operational data and a trial.