

Problem Definition & Design Thinking

Title:

Production Yield Analysis for Optimizing Manufacturing Efficiency

Problem Statement:

Manufacturers in industries like personal care and wellness often face inconsistencies in converting raw inputs into final sellable products. This lack of clarity in yield tracking prevents them from knowing how well their production process performs, often resulting in hidden losses, overconsumption, and inaccurate costing. There is a need to implement a simple yet insightful system that tracks input-output ratios, identifies sources of inefficiency, and helps maintain optimal output quality and quantity—without major operational disruptions.

Target Audience:

- Medium-scale personal care and wellness product manufacturers
- Floor supervisors and plant managers
- Quality assurance professionals
- Entrepreneurs launching scalable product manufacturing units

Objectives:

- To introduce an efficient system for monitoring production yields across product categories
- To distinguish between controllable and uncontrollable losses in the process
- To enable predictive maintenance based on yield variations
- To improve decision-making using automated reporting and trend visualization

Design Thinking Approach

Empathize:

In many production setups, employees and managers often don't get real-time feedback about how much product is being wasted or why a particular batch underperforms. This creates planning gaps, excess inventory use, and unreliable delivery timelines. There's also a lack of communication between teams about issues like material handling or machine downtimes that affect yield.

Common Concerns:

- Gaps in material tracking from stores to final packaging
- Unclear breakdown of rework, scrap, and usable units
- No consistent format for batch-wise analysis
- Yield issues spotted too late to fix in real-time

Define:

The system should make it easy for users to input data related to production volume, loss, rework, and output. It should categorize each loss event by reason and correlate with specific production stages to help pinpoint weak areas.

Necessary System Features:

- Material-in vs. product-out tracking for each product SKU
- Classification of defects and waste reasons
- Alerts on abnormal yield deviations
- Summary dashboards for supervisors and managers

Ideate:

Designing the solution could involve tools such as Excel-integrated forms, lightweight web applications, or mobile-based trackers. The interface should allow easy manual entry as well as integration with barcode scanning or IoT-based counters for automation.

Possible Ideas:

- Cross-platform yield tracker synced to production shifts
- Simple scoring for each batch based on yield efficiency
- Visual loss classification charts by batch or machine

- Embedded notes/comments by operators for each entry

Prototype:

A minimal web app or Excel-based tool will be developed to simulate a working version of the proposed yield tracker. It will focus on user-friendliness, with minimal training required. Operators will enter batch-wise data manually or using scanning inputs, and it will compute the yield and generate batch-level efficiency scores.

Key Elements of the Prototype:

- Interactive data fields (raw material, output units, defective units)
- Automatic calculation of yield % and defect rate
- Batch tagging and timestamp recording
- Graphs and tables for visualizing performance over time

Test:

The prototype will undergo testing in collaboration with actual production environments in selected small and mid-sized facilities. Feedback will be collected from real users to assess not only technical functionality but also how the tool helps improve operational clarity and planning.

Testing Focus Areas:

- Ease of data entry and interface use for floor staff
- Effectiveness in identifying yield bottlenecks
- Clarity of reports and their usefulness in daily planning
- Suggestions for version upgrades (e.g., mobile alerts, material traceability)