Problem Definition & Design Thinking

Title: Production Yield Analysis for Optimizing Manufacturing Efficiency

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Problem Statement:

In the manufacturing industry, especially for product-based businesses like skincare and haircare, a significant challenge lies in maximizing the usable output from raw material inputs. Many businesses lack a structured way to track, measure, and analyze their production yield. This leads to inefficiencies, increased waste, and loss in profitability.

The problem is how to implement a reliable and practical method to measure production yield, detect inefficiencies, and enhance overall productivity without increasing costs.

Target Audience:

- Small to mid-sized manufacturers
- Quality assurance and production teams
- Business owners in product-based industries (e.g., cosmetics, wellness)
- Startups seeking data-driven production improvement

Objectives:

- To establish a framework for analyzing production yield across all product lines.
- To identify causes of low yield and process losses.
- To reduce waste and improve output quality.
- To enable real-time and batch-wise tracking for better decision-making.

Design Thinking Approach

Empathize:

Manufacturers often find it difficult to track how much input material is being converted into successful product units. The lack of a yield analysis system causes confusion in budgeting, pricing, and production planning. Business owners also face challenges in locating the exact source of waste or inefficiency.

Key User Concerns:

- Not knowing where and why losses occur in production
- Inconsistent batch performance and lack of standardization
- High rework costs and quality failures
- No insights from data, leading to trial-and-error decisions

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Define:

The solution should allow businesses to calculate yield percentage and track defective units per batch. It should identify stages where rework or scrap happens and provide a summary of efficiency for decision-making.

Key Features Needed:

- Batch-wise input/output tracking system
- Yield % calculation (First Pass & Final)
- Loss/waste reason logging
- Report generation for audit and analysis

Ideate:

Potential solution ideas include:

- A web-based or mobile platform for yield tracking
- A dashboard displaying live yield metrics
- Integration with barcode or batch management systems
- Exportable batch performance reports for quality audits

Brainstorming Results:

- Clean, user-friendly interface with input fields for raw materials, good units, scrap, and rework
- Automated yield calculation logic
- Alerts for underperforming batches
- Charts showing trends over time

Prototype:

A basic digital prototype (Excel-based or Web app) where production managers can:

- Input raw material quantity and output quantity
- Automatically compute yield
- Log issues with each batch (e.g., machine error, human error, material quality)
- Generate a yield report at the end of the week or month

Key Components of Prototype:

- Real-time yield calculator
- Batch database with timestamps
- Visualization (graphs, tables) of batch performance
- Notes section for error tracking or loss analysis

Test:

The prototype will be tested by a focus group including small business owners, quality heads, and production team members. They will simulate entries using historical production data to evaluate the tool's usefulness and accuracy.

Testing Goals:

- Assess the accuracy of yield measurement
- Check usability for non-technical users
- Evaluate if the tool helps reduce waste and improve batch planning
- Gather feedback on additional useful features (e.g., cost tracking, raw material efficiency)
