

**Report** 

# **Business Report Manufacturing Operations Analysis**



**This Project Is By Pattern Seekers Team**



## Executive Summary

This Comprehensive Analysis Examines The Performance Of Our Manufacturing Facility Across Five Key Operational Areas: Factory Overview, Machine Performance, Product Quality, Oee (Overall Equipment Effectiveness), And Production Insights. The Data Reveals Strong Operational Performance With An 89% Overall Performance Rate, Though Several Areas Require Attention To Optimize Efficiency And Reduce Waste.

### 1. Factory Overview Performance



### Key Metrics

Our Facility Demonstrates Solid Production Capabilities With An Average Output Of 166.95k Total Units. However, The Average Downtime Of 16.56 Minutes Per Cycle Indicates Room For Improvement In Operational Continuity. The 89% Performance Rate Suggests We Are Operating Near Optimal Capacity But Have Opportunities To Reach Excellence.

### Production Distribution By Product

The Product Mix Shows Significant Concentration In Chocolate Cookies, Which Account For 55.77% Of Total Production At 6m Units. This Is Followed By Custard Creams At 16.17% (2m Units), Jammy Creams At 14.46% (1m Units), And Bourbon Creams At 13.6% (1m Units). This Heavy Reliance On A Single Product Line Presents Both Efficiency Advantages And Diversification Risks.

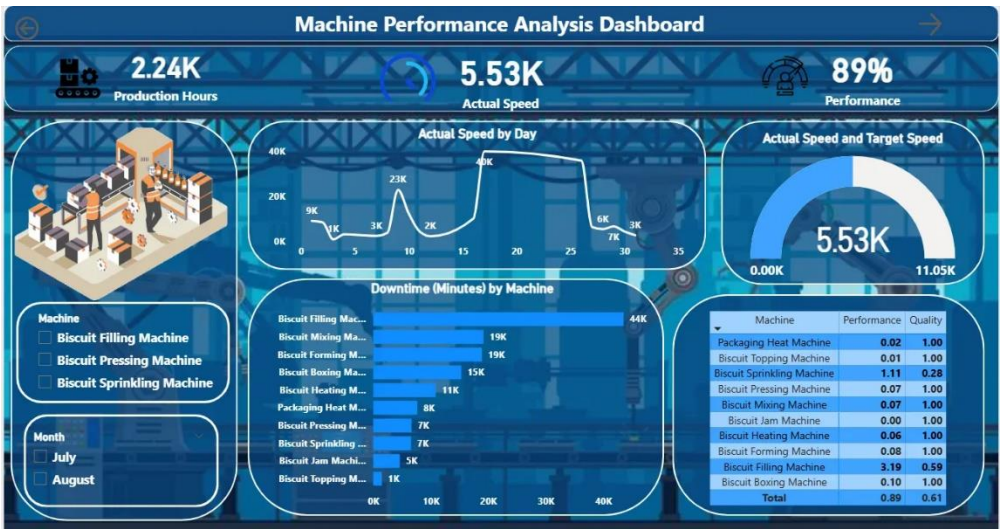
Production Trends

Daily Production Volumes Exhibit Significant Volatility, Ranging From 0.51m To 1.91m Units. The Peaks At Days 20 And 30 Suggest Potential Batch Scheduling Or Demand-Driven Production Patterns. The Dramatic Fluctuations Warrant Investigation Into Demand Planning And Production Smoothing Strategies.

Machine Performance Overview

Among Our Three Primary Machines, The Biscuit Filling Machine Leads With A Performance Score Of 3.2, While The Biscuit Pressing Machine Lags Significantly At 0.1. This Disparity Indicates A Critical Bottleneck That Requires Immediate Attention. The Biscuit Sprinkling Machine Performs Moderately At 1.1.

2. Machine Performance Analysis



Operational Metrics

The Facility Logged 2.24k Production Hours With An Actual Speed Of 5.53k Units, Maintaining The 89% Performance Rate. However, The Gauge Showing Actual Speed Against Target Speed (11.05k) Reveals We Are Operating At Approximately 50% Of Theoretical Capacity.

### **Speed Performance By Day**

Actual Speed Demonstrates Extreme Variability, With Peaks Reaching 40k Units And Valleys Dropping To 1k Units. Days 10 And 25 Show The Highest Productivity, While Days 0-5 And 30-35 Experienced Significant Slowdowns. This Inconsistency Suggests Possible Maintenance Cycles, Shift Changes, Or Material Availability Issues.

### **Downtime Analysis By Machine**

Downtime Presents A Critical Concern, With The Biscuit Filling Machine Experiencing The Highest Downtime At 44k Minutes, Followed By Both Mixing And Forming Machines At 19k Minutes Each. The Biscuit Sprinkling Machine Records 7k Minutes Of Downtime, Which Aligns With Its Higher Performance Score But Still Requires Optimization.

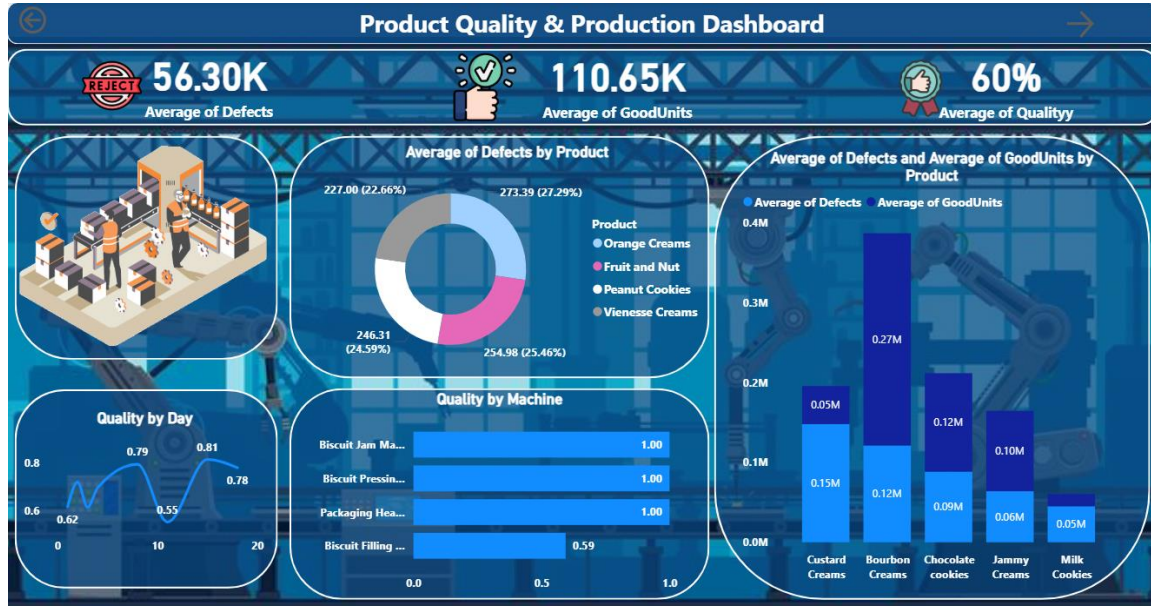
### **Individual Machine Performance**

The Detailed Machine Performance Table Reveals Concerning Quality Metrics:

- Biscuit Sprinkling Machine Shows The Poorest Quality Rating At 0.28 Despite A Performance Of 1.11
- Packaging Heat Machine Demonstrates Excellent Quality (1.00) With Minimal Performance Impact (0.02)
- Biscuit Filling Machine Achieves High Performance (3.19) But Moderate Quality (0.59)

The Aggregate Performance Score Of 0.89 Against A Quality Score Of 0.61 Indicates That While We Maintain Production Speed, Quality Control Requires Significant Enhancement.

### 3. Product Quality & Production Performance



#### Quality Metrics Overview

The Facility Averages 56.30k Defects Against 110.65k Good Units, Resulting In An Overall Quality Rate Of 60%. This Means That Approximately 40% Of Production Requires Rework Or Results In Waste, Representing A Substantial Cost Center And Efficiency Drain.

#### Defects By Product

Product-Specific Defect Analysis Shows Relatively Balanced Distribution:

- Viennese Creams: 27.29% Of Total Defects (273.39 Units)
- Fruit And Nut: 25.46% (254.98 Units)
- Peanut Cookies: 24.59% (246.31 Units)
- Orange Creams: 22.66% (227.00 Units)

This Even Distribution Across Products Suggests Systematic Quality Issues Rather Than Product-Specific Problems, Pointing Toward Potential Machine Calibration Or Raw Material Quality Concerns.



## Quality Trends Over Time

The Quality By Day Chart Shows Volatility Ranging From 0.55 To 0.81, With An Average Around 0.78 On Day 30. The Inconsistency Suggests That Quality Control Measures Are Not Consistently Applied Or That Variable Factors In The Production Process Need Stabilization.

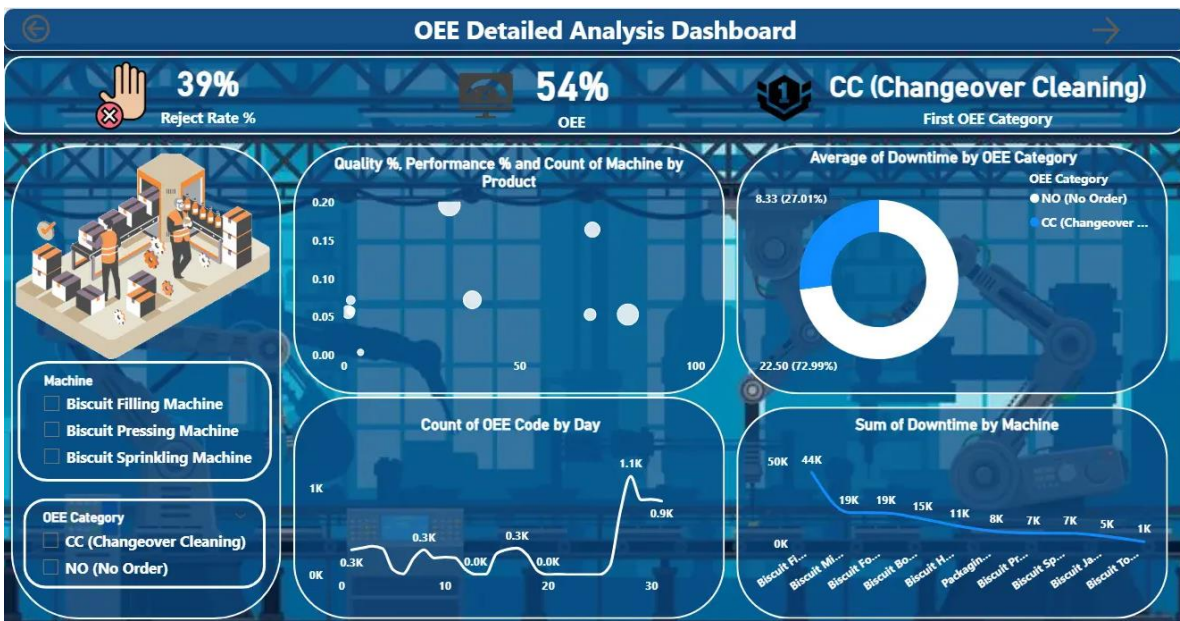
## Machine Quality Performance

Three Machines Achieve Perfect Quality Scores (1.00): Biscuit Jam Machine, Biscuit Pressing Machine, And Packaging Heat Machine. However, The Biscuit Filling Machine Significantly Underperforms At 0.59 Quality, Identifying This As A Primary Target For Quality Improvement Initiatives.

## Product Quality Vs. Production Volume

The Analysis Reveals An Inverse Relationship Between Production Volume And Quality For Certain Products. Bourbon Creams, While Having Moderate Defects (0.12m), Produce Substantial Good Units (0.27m), While Milk Cookies Show Minimal Production Volume But Proportionally Higher Defect Rates.

## 4. Oee Detailed Analysis



## **Oee Performance Metrics**

The Facility Operates With A 39% Reject Rate And 54% Oee, Significantly Below The Industry Benchmark Of 85% For World-Class Manufacturing. The Primary Oee Category Identified Is Cc (Changeover Cleaning), Accounting For 27.01% Of Total Downtime, With No (No Order) Periods Comprising 72.99%.

## **Changeover Impact**

Changeover Cleaning Represents A Critical Efficiency Loss, Contributing Significantly To The Reduced Oee. The Dominance Of "No Order" Periods Suggests Demand Planning Or Sales Pipeline Issues That Result In Idle Production Capacity.

## **Oee Code Frequency**

The Count Of Oee Code By Day Chart Shows Sporadic Spikes, With A Major Peak Near Day 30 Reaching 1.1k Incidents. This Pattern Correlates With Production Volume Changes And Suggests That Setup/Changeover Activities Intensify During High-Demand Periods.

## **Machine-Specific Downtime**

Downtime Distribution Across Machines Shows:

- Biscuit Filling Machine: 44k Minutes (Highest)
- Biscuit Mixing Machine: 19k Minutes
- Biscuit Forming Machine: 19k Minutes
- Packaging And Other Downstream Machines: 5k-15k Minutes

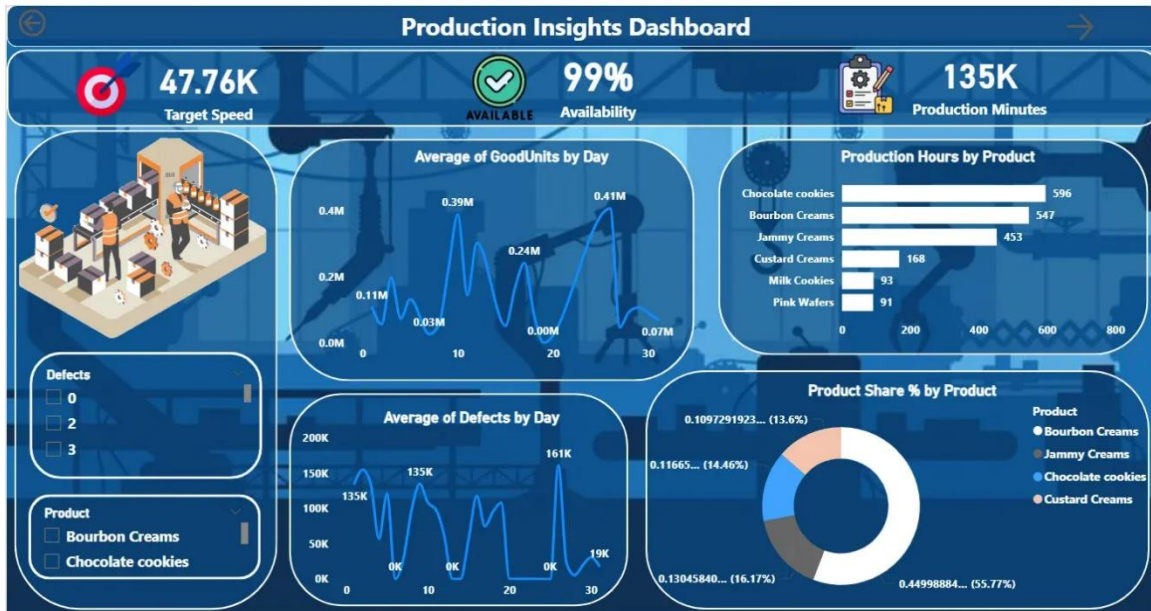
The Concentration Of Downtime In Filling Operations Indicates This As The Primary Constraint In Our Production System.

Quality, Performance, And Machine Count Correlation

The Bubble Chart Analysis Reveals That Machines With Higher Performance Scores Do Not Necessarily Correlate With Better Quality Outcomes. Several Machines Operate With High Machine Counts But Deliver Varying Quality

And Performance Metrics, Suggesting That Capacity Is Not The Limiting Factor—Efficiency Is.

## 5. Production Insights Dashboard



### Production Planning Metrics

The Facility Maintains A Target Speed Of 47.76k Units With 99% Availability And 135k Production Minutes. The High Availability Rate Indicates That Equipment Uptime Is Strong, But The Actual Output Relative To Target Speed Suggests Throughput Efficiency Issues.

### Good Units Production By Day

Daily Good Units Production Mirrors The Volatile Pattern Seen In Total Production, Ranging From Near-Zero To 0.41m Units. The Inconsistency In Daily Output Complicates Downstream Planning And Customer Delivery Commitments.

### Production Hours By Product

#### Resource Allocation Shows:

- Chocolate Cookies: 596 Hours (Highest)
- Bourbon Creams: 547 Hours



- Jammy Creams: 453 Hours
- Custard Creams: 168 Hours
- Milk Cookies: 93 Hours
- Pink Wafers: 91 Hours

This Distribution Aligns With Production Volume Priorities But Raises Questions About Product Profitability And Market Demand Alignment.

### **Defects Tracking By Day**

Defect Trends Show Dramatic Spikes, With Peaks Reaching 161k Defects On Day 30, While Many Days Record Minimal Defects. The Significant Day-To-Day Variation Suggests Reactive Rather Than Proactive Quality Management, With Periodic Quality Crises Rather Than Consistent Control.

### **Product Share Analysis**

The Product Share Distribution Closely Mirrors Production Hours, With Bourbon Creams, Jammy Creams, Chocolate Cookies, And Custard Creams Each Capturing 13-16% Of Total Production Share. This Balanced Portfolio Approach Provides Diversification But May Dilute Focus From Optimizing High-Margin Products.

### **Key Findings And Recommendations**

#### **Critical Issues**

1. Quality Performance: The 60% Quality Rate And 39% Reject Rate Represent Significant Waste And Cost. Immediate Root Cause Analysis Is Required, Particularly For The Biscuit Filling Machine.
2. Oee Performance: At 54% Oee, We Operate Well Below Industry Standards. The 72.99% "No Order" Downtime Indicates Severe Demand Planning Or Sales Coordination Issues.
3. Machine Bottlenecks: The Biscuit Filling Machine Experiences Both The Highest Downtime (44k Minutes) And Poorest Quality (0.59), Identifying It As The Primary Constraint.
4. Production Volatility: Extreme Day-To-Day Fluctuations In Both Output And Defects Suggest Inadequate Production Planning And Quality Control Processes.

## Strategic Recommendations

1. Quality Improvement Initiative: Implement Six Sigma Or Similar Quality Improvement Methodology Focusing On The Biscuit Filling Machine. Target Should Be To Raise Overall Quality From 60% To At Least 85% Within Six Months.
2. Oee Enhancement Program: Address The "No Order" Downtime Through Improved Sales And Operations Planning. Implement A Formal S&Op Process To Better Align Production Capacity With Demand.
3. Predictive Maintenance: The High Downtime On Key Machines Suggests A Shift From Reactive To Predictive Maintenance Is Needed. Implement Iot Sensors And Analytics To Anticipate Failures.
4. Production Smoothing: Reduce Daily Volatility Through Level-Loading Production Schedules. This Will Improve Quality Consistency And Reduce Changeover Frequency.
5. Bottleneck Management: Apply Theory Of Constraints Principles To Optimize The Biscuit Filling Machine Performance. Consider Adding Capacity Or Implementing Focused Improvement Initiatives.
6. Performance Monitoring: Establish Real-Time Production Monitoring With Automated Alerts When Key Metrics Deviate From Targets. Current Data Suggests Reactive Rather Than Proactive Management.

## Conclusion:

Our Manufacturing Operation Demonstrates Strong Availability (99%) And Solid Performance (89%) But Is Significantly Hampered By Quality Issues (60%) And Poor Oee (54%). The Data Clearly Identifies The Biscuit Filling Machine As The Primary Constraint And Quality Concern. Addressing This Bottleneck, Combined With Improved Demand Planning To Reduce "No Order" Downtime, Could Potentially Increase Effective Output By 30-40% Without Capital Investment. The Facility Has Strong Foundational Metrics In Availability And Speed But Requires Systematic Improvement In Quality Control, Preventive Maintenance, And Production Planning To Achieve World Class Manufacturing Standards.