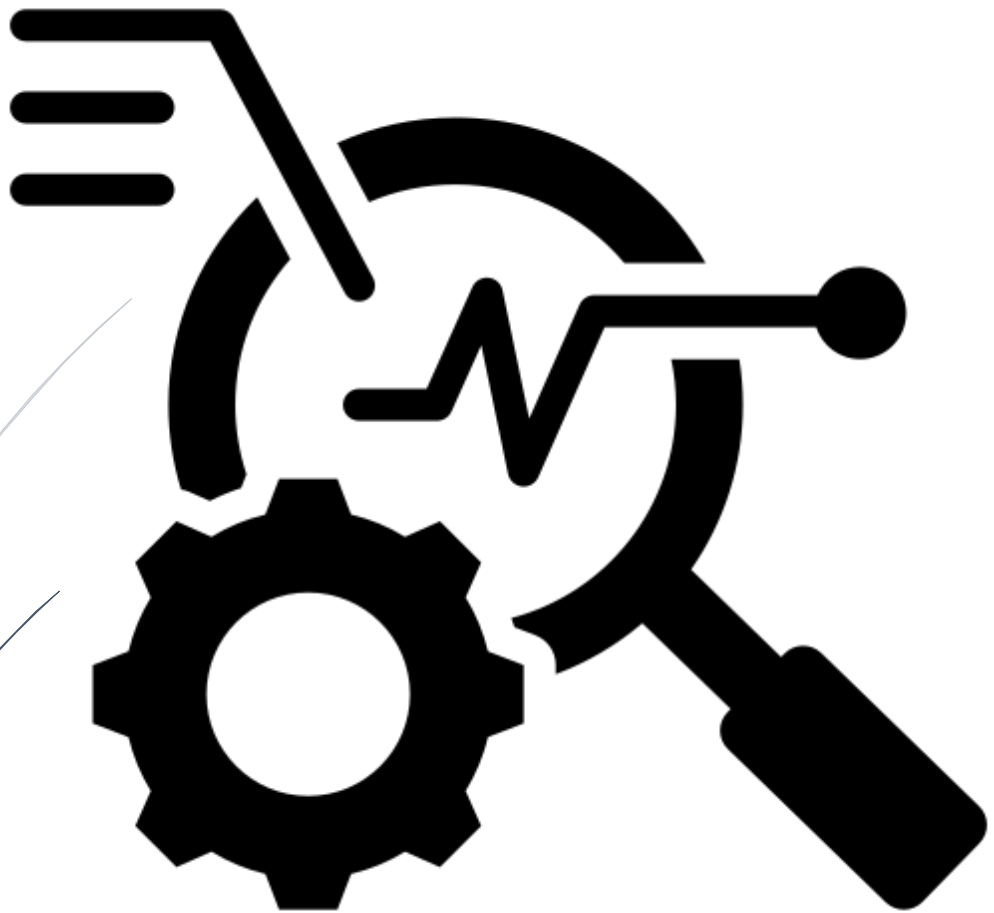


Report



Technical Manufacturing Operations Analysis Report



This Project Is By Pattern Seekers Team



1. Executive Summary

1.1 Key Performance Metrics

Overall Performance: 89%

Quality Rate: 60%

Oee: 54%

Availability: 99%

Reject Rate: 39%

1.2 Critical Findings

The Facility Operates With Excellent Availability But Suffers From Poor Quality Control And Suboptimal Oee. Primary Constraint Identified: Biscuit Filling Machine (M-001) With Highest Downtime And Lowest Quality Performance.

2. Production Analysis

2.1 Output Metrics

Average Production: 166,950 Units Per Cycle

Daily Range: 510,000 To 1,910,000 Units

Production Volatility: High (Varies 3.75x Between Peak And Valley)

2.2 Product Distribution

Chocolate Cookies: 6m Units (55.77%)

Custard Creams: 2m Units (16.17%)

Jammy Creams: 1m Units (14.46%)

Bourbon Creams: 1m Units (13.60%)

2.3 Downtime

Average Downtime: 16.56 Minutes Per Cycle

Most Problematic Machine: Biscuit Filling (44,000 Minutes Total)

3. Machine Performance

3.1 Speed Analysis

Actual Speed: 5,530 Units/Hour

Target Speed: 11,050 Units/Hour

Achievement: 50% Of Target Capacity

3.2 Machine Performance Ranking

Biscuit Filling Machine: 3.20 (Highest Output But Quality Issues)

Biscuit Sprinkling: 1.11

Biscuit Pressing: 0.10 (Bottleneck)

3.3 Downtime By Machine

Biscuit Filling: 44,000 Min (31%)

Biscuit Mixing: 19,000 Min (14%)

Biscuit Forming: 19,000 Min (14%)

Others: Combined 58,800 Min (41%)

4. Quality Analysis

4.1 Quality Metrics

Good Units: 110,650 Per Cycle

Defective Units: 56,300 Per Cycle

Quality Rate: 60%

First Pass Yield: 60%

4.2 Defects By Product

Products Show Similar Defect Rates (22-27%), Indicating Systematic Quality Issues Rather Than Product-Specific Problems.

4.3 Machine Quality

Perfect Quality (1.00): Jam Machine, Pressing Machine, Packaging Heat

Poor Quality (0.59): Filling Machine ← Main Problem

4.4 Quality Variation

Best Day: 81% Quality

Worst Day: 55% Quality

Average: 71% Quality

5. Oee Analysis

5.1 Oee Calculation

Oee = Availability × Performance × Quality

Oee = $0.99 \times 0.89 \times 0.60 = 54\%$

Target (World Class): 85%

Gap: 31 Percentage Points

5.2 Loss Categories

"No Order" Downtime: 73% Of Total Downtime

Changeover/Cleaning: 27% Of Total Downtime

5.3 Oee Components

Availability Loss: 1% (Minimal)

Performance Loss: 11% (Running Below Target Speed)

Quality Loss: 40% (Major Issue)

6. Production Planning

6.1 Production Hours By Product

Chocolate Cookies: 596 Hours (32%)

Bourbon Creams: 547 Hours (29%)

Jammy Creams: 453 Hours (24%)

Others: 288 Hours (15%)

6.2 Production Volatility

Daily Production Shows Extreme Variation With No Consistent Pattern, Indicating Poor Demand Forecasting And Scheduling.

7. Root Cause Analysis

7.1 Primary Issues

Issue 1: Low Quality (60%)

Root Cause: Biscuit Filling Machine Produces 41% Defects

Contributing Factors: No Preventive Maintenance, No Real-Time Quality Monitoring

Impact: \$850k+ Annual Loss From Defects

Issue 2: Low Oee (54%)

Root Cause: Quality Losses (40%) + Performance Losses (11%)

Contributing Factors: M-001 Bottleneck, Reactive Maintenance

Impact: Operating At 50% Theoretical Capacity

Issue 3: High "No Order" Downtime (73%)

Root Cause: Poor Sales-Operations Coordination

Contributing Factors: No Demand Forecasting, No Production Planning System

Impact: Lost Capacity, Inefficient Resource Use

8. Technical Recommendations

8.1 Immediate Actions (0-30 Days)

Priority 1: Fix Biscuit Filling Machine (M-001)

Complete Maintenance Overhaul

Calibrate All Sensors

Replace Worn Parts

Expected Result: Quality 0.59 → 0.85 (+44%)

Cost: \$20,000 | Roi: 3-4 Months

Priority 2: Implement Quality Controls

Install Real-Time Monitoring On M-001

Create Quality Checkpoints

Train Operators On Quality Standards

Expected Result: Catch Defects Early, Reduce Waste

Cost: \$40,000 | Roi: 4-6 Months

Priority 3: Preventive Maintenance Schedule

Create Maintenance Calendar For All Machines

Stock Critical Spare Parts

Expected Result: Reduce M-001 Downtime 44k → 25k Minutes

Cost: \$50,000 | Roi: 5-7 Months

8.2 Short-Term (1-3 Months)

Recommendation 1: Reduce Changeover Time

Standardize Changeover Procedures

Train All Operators

Expected Result: Cut Changeover Time By 50%, Gain 380k Units/Month

Cost: \$25,000 | Roi: 2-3 Months

Recommendation 2: Predictive Maintenance

Install Sensors To Predict Failures

Implement Monitoring System

Expected Result: Prevent Breakdowns, Reduce Unplanned Downtime 60%

Cost: \$90,000 | Roi: 8-12 Months

Recommendation 3: Quality Management System

Automated Inspection System

Real-Time Defect Tracking

Expected Result: Quality 60% → 85%

Cost: \$175,000 | Roi: 6-9 Months

8.3 Medium-Term (3-12 Months)

Initiative 1: Upgrade M-001 Capacity

Upgrade Existing Machine (Best Option)

Increase Speed 40%, Improve Quality To 90%

Cost: \$250,000 | Roi: 12 Months

Initiative 2: Production Planning System

Implement Scheduling Software

Demand Forecasting Tools

Expected Result: Reduce Volatility, Cut "No Order" Downtime 73% → 30%

Cost: \$250,000 | Roi: 10-14 Months

Initiative 3: Six Sigma Program

Train Quality Improvement Teams

Launch Improvement Projects

Expected Result: Systematic Quality Improvement

Cost: \$150,000/Year | Savings: \$1m/Year

9. Expected Benefits

9.1 Financial Impact

Current Annual Losses:

Quality Problems: \$1,250,000

Downtime Costs: \$900,000

Inefficiencies: \$650,000

Total: \$2,800,000/Year

After Improvements:

Quality Improvement Savings: \$812,500

Oee Improvement Revenue: \$1,500,000

Downtime Reduction: \$490,000

Total Benefit: \$2,802,500/Year

Investment Required: \$1,500,000

Payback Period: 6-7 Months

Roi: 187% In Year 1

9.2 Performance Targets

12-Month Targets:

Oee: 54% → 75%

Quality: 60% → 85%

M-001 Downtime: 44,000 → 20,000 Minutes

Production Volatility: Reduce By 60%

10. Implementation Plan

Months 1-3:

Fix M-001 Immediately

Install Quality Controls

Start Preventive Maintenance

Months 4-6:

Reduce Changeover Times

Implement Predictive Maintenance

Launch Quality System

Months 7-12:

Upgrade M-001 Capacity

Deploy Planning System

Start Six Sigma Program

Conclusion

The Facility Has Strong Availability (99%) But Is Held Back By Quality Problems (60% Rate) And The Biscuit Filling Machine Bottleneck. Fixing M-001 And Implementing Quality Controls Will Improve Oee From 54% To 75%+ Within 12 Months, Generating \$2.8m Annual Benefit Against \$1.5m Investment.

Critical Success Factor: Immediate Action On M-001 Maintenance And Quality Controls.