



PRODUCTION PLANNING & OPERATIONS MANAGEMENT

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- Blen Masresha has over 10 years of experience in Apparel manufacturing, business development, and sustainability.
- Served as Sourcing and Merchandising Manager for international apparel brands.
- Provides advisory support to SMEs and SEZ on project management, export market access, and investment readiness.
- Currently serving as a Grants and Business Development Consultant with the African Economic Zones Chamber (UAE & Ghana operations)



Learning Objectives



Understand the core principles of production planning



Calculate production capacity and balance assembly lines



Identify and reduce common defects



Apply practical tools to improve on-time delivery and efficiency



Solve real factory problems using case study methodology



Develop an action plan for your own production floor

Cost of Poor Planning

- ❑ Late delivery- Lost customers, penalties
- ❑ Low productivity -High labor cost per unit
- ❑ High defects -Rework, waste, returns
- ❑ Idle workers -Demotivation, low morale
- ❑ Machine breakdowns -Production stops

○ **Many garment factories operate at 50–60% efficiency while regional competitors operate at 75–85%. The gap is not machinery – it's management systems.**

Key Questions

Every Manager Must Answer:

1. Do we have the order? (Sales forecast / confirmed order)
2. Do we have the fabric? (Material planning)
3. Do we have the capacity? (Machine & labor availability)
4. Do we have the time? (Delivery deadline)

<https://www.youtube.com/watch?v=nG5-52a5lRo>

FUNDAMENTALS OF PRODUCTION PLANNING

What is Production Planning?

Production planning = Deciding:

1. WHAT to produce?
2. HOW MUCH to produce?
3. WHEN to produce it?
4. WITH WHAT resources (machines, people, materials)?



THE PRODUCTION PLANNING CYCLE

BOM & Material / Requirements

Capacity Check

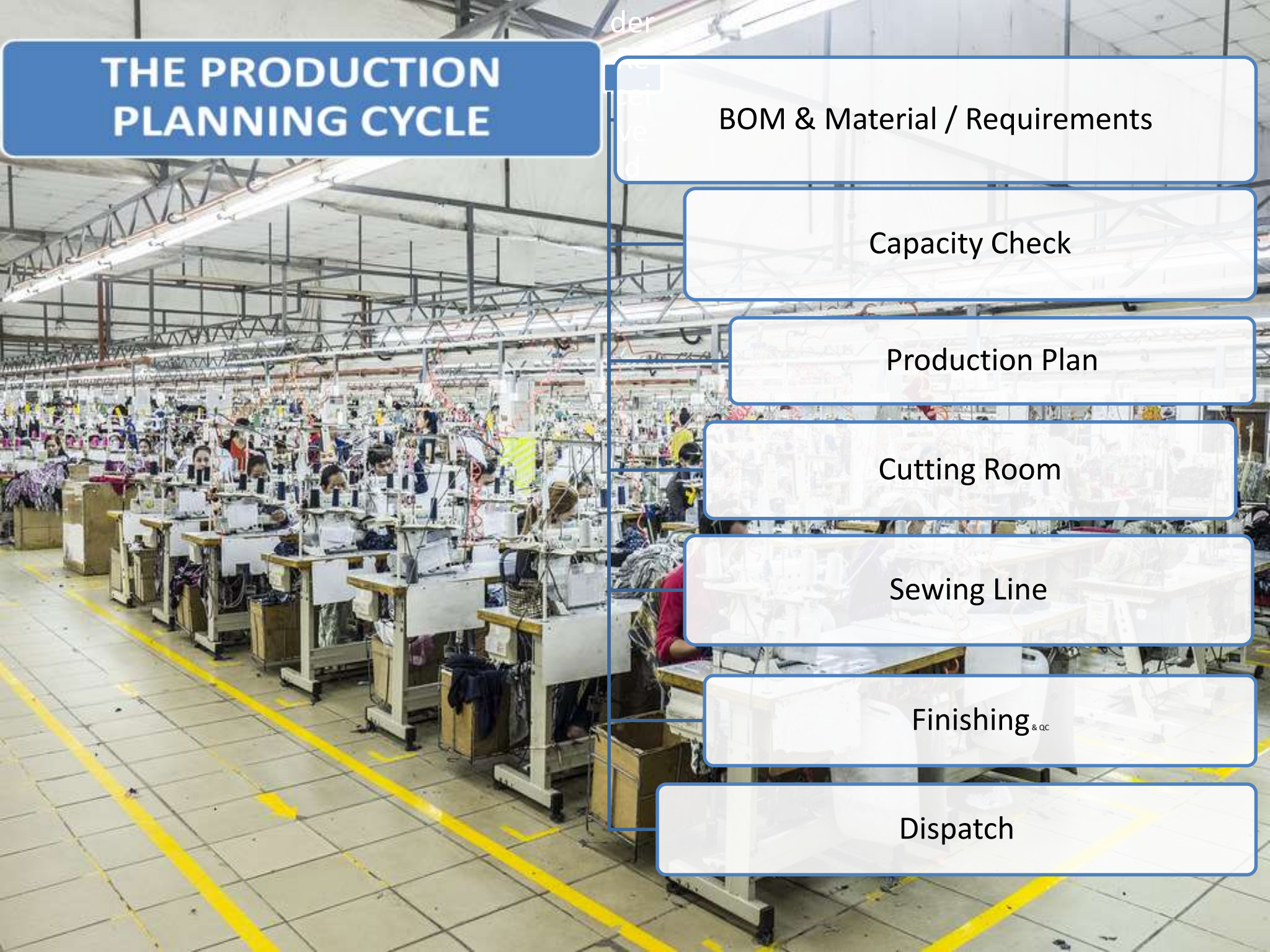
Production Plan

Cutting Room

Sewing Line

Finishing_{& QC}

Dispatch



KEY PRODUCTION DOCUMENTS

Document	Purpose
Production order sheet	Customer, style, quantity, deadline
Bill of Materials (BOM)	Fabric, thread, buttons, trims
Cutting Plan	Marker efficiency, fabric lay
Line Loading Plan	Which style on which line
Daily Production Report	Units produced, target vs actual
Defect Register	Types and frequency of defects

● REALITY CHECK: MANY ETHIOPIAN FACTORIES SKIP THESE DOCUMENTS AND RELY ON "MEMORY" – THIS CAUSES 80% OF PRODUCTION PROBLEMS.

CASE STUDY 1 – THE MISSING FABRIC PROBLEM

Company: XYZ Garments (Addis Ababa)

Order: 5,000 shirts for a local buyer

Deadline: 4 weeks

What happened:

- Week 1: Cutting started without checking fabric stock
- Week 2: Ran out of fabric – only 3,000 shirts cut
- Week 3: Supplier delayed – factory idle for 5 days
- Week 4: Overtime cost doubled, delivery late
- **Result:** Penalty paid, customer lost

Root Cause:

- ✗ No material planning before production started
- ✗ No BOM verification
- ✗ No supplier lead time considered

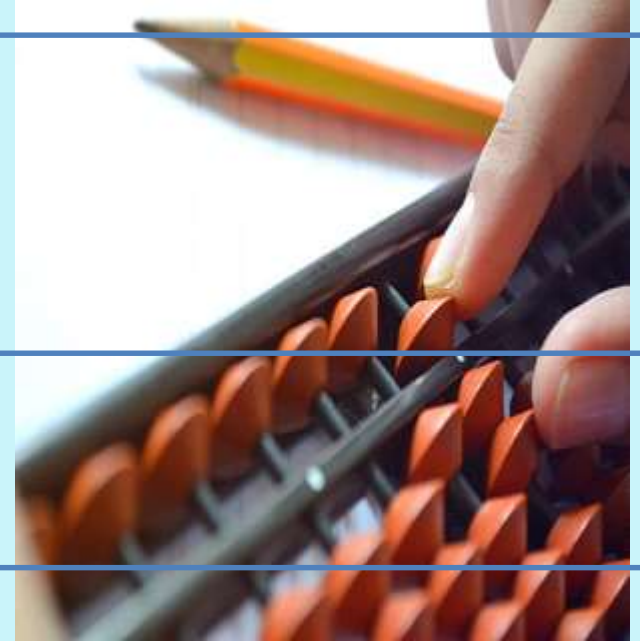




1. What was the real cost of that mistake?
 - Money lost?
 - Customer trust lost?
 - Worker overtime stress?
2. What ONE system would you put in place to prevent this?

CAPACITY PLANNING & LINE BALANCING

What is
Capacity?



Capacity =
Maximum
output a factory
can produce in a
given time

Simple Formula:

Total Available Minutes ÷ Minutes per Garment = Daily Capacity

Example:

20 machines × 8 hours × 60 minutes = 9,600 minutes available

Each garment takes 30 minutes to make

Daily capacity = $9,600 \div 30 = \mathbf{320 \text{ pieces/day}}$

This tells you if you can accept the order!

LINE BALANCING EXPLAINED

- ❑ **The Bottleneck Problem:-** A production line is only as fast as its **slowest operation**.

Cutting → Sewing → Buttonhole → Finishing
2 min 5 min 4 min 3 min

⊗ **Bottleneck = Sewing (5 min)** – everyone else waits

- **Line Balancing = Distributing work evenly**

- Cutting → Sewing → Buttonhole → Finishing
3.5 min 3.5 min 3.5 min 3.5 min

<https://www.youtube.com/watch?v=BnGxqJpOV0U>

CASE STUDY 2 THE 25% EFFICIENCY GAIN



Real Example: HIP

Company: Garment exporter making trousers

Problem: Line output stuck at 180 pieces/day

Target: Need 240 pieces/day for profitability

What they found

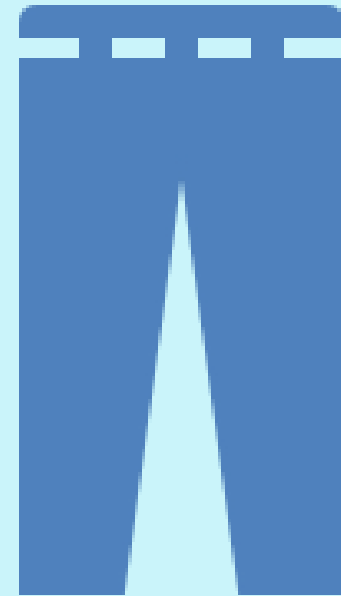
Operation	Time	Problem
Front pocket attach	4.5 min	Complex stitching, skilled operator needed
Side seam	2.0 min	Simple, machine idle
Waistband	5.5 min	Heavy bottleneck, waiting
Hemming	2.5 min	Fast operator, machine idle

Solution:

- Split waistband into 2 operations
- Moved one skilled operator to pocket
- Balanced all operations to 3.8–4.2 min

Result:

- ✓ Output increased to **235 pieces/day** (+30%)
- ✓ No new machines, no new workers just **rebalancing**



PRACTICAL EXERCISE 1

Balance This Line (15 minutes)?

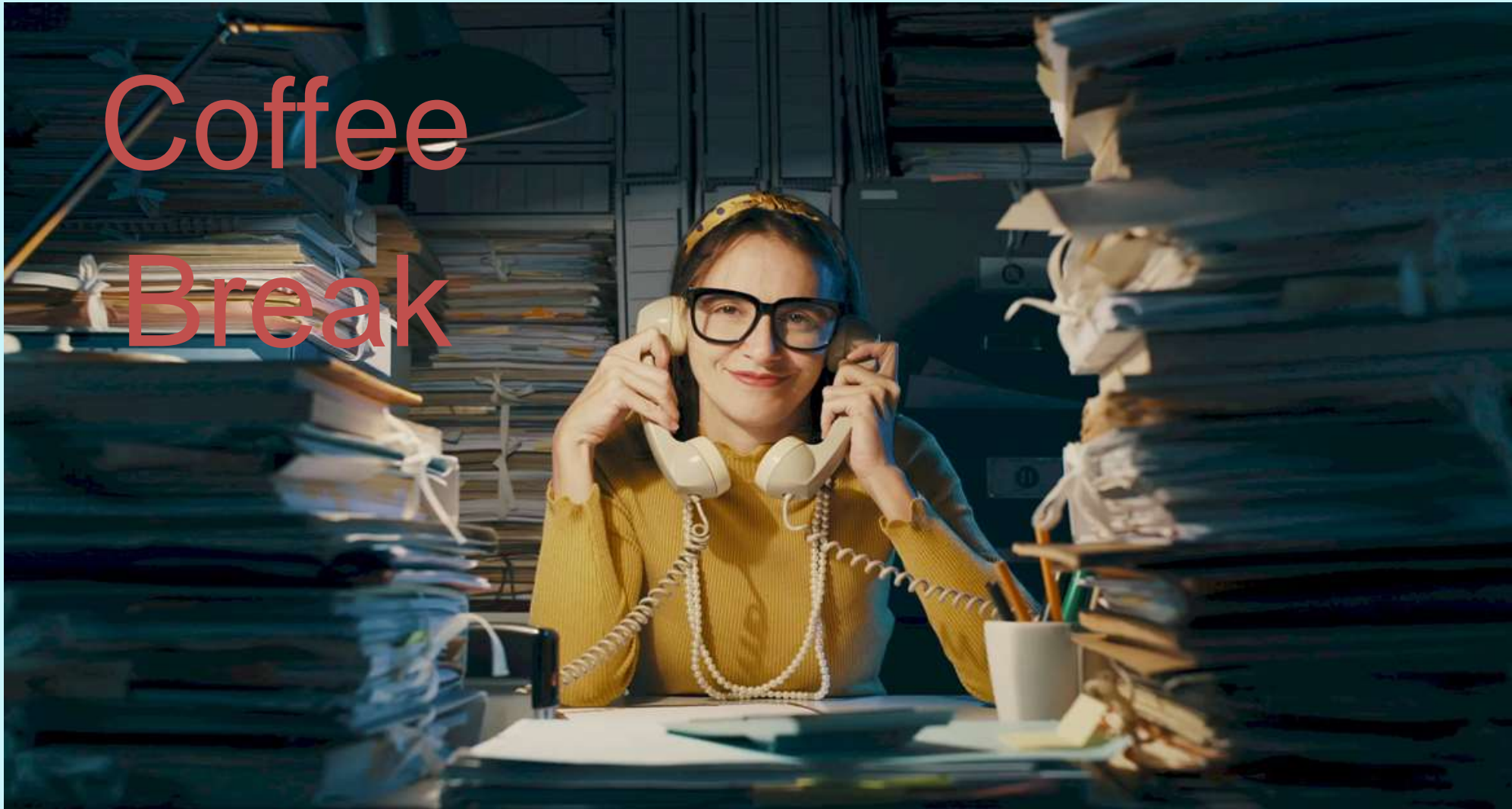


Tasks:

1. Identify the bottleneck
2. Suggest how to rebalance the operations
3. Calculate new output per 8-hour shift

Operation	Time (minutes)
Cutting	4.0
Front join	6.5
Sleeve attach	5.0
Side seam	4.5
Collar attach	7.0
Buttonhole	3.5
Finishing	4.0

Coffee Break



QUALITY CONTROL & DEFECT MANAGEMENT

The True Cost of Poor Quality

Defect Type	Hidden Cost
Rework	Extra labor, delayed delivery
Rejection	Lost material, lost profit
Returns	Shipping cost, customer trust
Brand damage	Future orders lost

The 1:10:100 Rule

Stage	Cost to Fix
Prevent defect	1 Birr
Detect in factory	10 Birr
Customer finds it	100 Birr

COMMON GARMENT DEFECTS IN ETHIOPIA

Defect	Cause	Prevention
Uneven stitching	Machine tension wrong	Daily machine check
Skipped stitches	Needle blunt	Change needle every 8 hours
Oil stains	Machine leaking	Clean machines, apron use
Color shading	Fabric batch mix	Cut by shade, separate rolls
Wrong measurement	Stretching during sewing	Use tape, check first piece
Loose threads	No trimming	End-of-line trimmer

QUALITY CONTROL STAGES

Stage 1 – Incoming (Fabric & Trims)	Check fabric for defects	Verify color against standard	Count trims against BOM
Stage 2 – In-Process (During Production)	Check first piece of every operator	Spot checks every hour	Stop line for repeated defects
Stage 3 – Final (Before Packing)	100% inspection for critical orders	AQL sampling for bulk orders	Measure, check, approve

CASE STUDY 3 – THE 40% REJECTION RATE

Root Cause Analysis:

Real Example: Addis Garment Factory Scenario:

- Order: 2,000 school uniforms
- Problem: 40% rejected at final inspection
- Customer refused shipment
- Factory lost 800,000 Birr

Solution Implemented:

- First-piece approval for every new style
- Hourly spot checks by supervisor
- Operator self-check training

Result: Rejection dropped to 5% within 3 months

Finding	What Happened
No incoming inspection	Fabric had shading variation
No in-process check	Operators made same mistake all day
No first-piece approval	Wrong pocket placement repeated 500 times
Final inspection only	Too late – all 2,000 already made

GROUP DISCUSSION 2



In your groups (15 minutes):



What is your factory's current rejection rate?



Where do most defects happen?

Cutting?
Sewing?
Finishing?



What is ONE quality check you can add TOMORROW that costs nothing?

CASE STUDY: SOLVING A REAL FACTORY PROBLEM

The "Birr Garments" Case

Background:

- Medium-sized garment factory, 150 workers
- Produces casual wear for local market
- Recently received export order from Kenya (5,000 pieces)

The Problem:

- Current production: 300 pieces/day
- Order requires 400 pieces/day to meet deadline
- Only 6 weeks to deliver
- Factory has 2 options:
- Work overtime (costly, workers tired)
- Reject order (lose opportunity)

FACTORY DATA – BIRR GARMENTS

Current Performance

Metric	Value
Workers	150
Sewing machines	120
Current output	300 pieces/day
Target needed	400 pieces/day
Working days/week	6
Shift hours	8
Average defect rate	12%

Production Analysis

Section	Current Time	Bottle neck?
Cutting	2.5min/piece	No
Sewing	9.0 min/piece	YES – slowest
Finishing	3.5 min/piece	No
Packing	1.5 min/piece	No

GROUP EXERCISE – SAVE THE ORDER!

- You are the management team. Find a way to reach **40 pieces/day** without:
 - ✗ Buying new machines (no budget)
 - ✗ Hiring new workers (no time to train)
 - ✗ Working more than 8 hours (union agreement)

Available Options:

- ✓ Rebalance the sewing line
- ✓ Reduce defects (each 1% reduction = +4 pieces/day)
- ✓ Improve layout (reduce walking/moving time)
- ✓ Better material flow (reduce waiting time)

❖ Your Deliverables:

- Your new production target plan
- specific actions you will take
- Expected output after changes

30 minutes

GROUP PRESENTATIONS

- ❑ **Each Group Presents (5 minutes each)**

- ❑ Your analysis of the problem

- ❑ Your proposed solutions

- ❑ Your expected results

- ❑ **Facilitator will provide feedback on:**

- ❑ Feasibility

- ❑ Cost-effectiveness

- ❑ Implementation speed

EXPERT SOLUTIONS – WHAT ACTUALLY WORKED

Solution Package Implemented:

Action	Result
Split sewing bottleneck into 2 operations	+50 pieces/day
Reduced defect rate from 12% to 7%	+20 pieces/day
Improved material trolley system	+15 pieces/day
Morning 10-minute team huddle	+10 pieces/day
Operator incentives for target achievement	+15 pieces/day

Final Result:

- ✓ 410 pieces/day achieved
- ✓ Order delivered on time
- ✓ Overtime avoided
- ✓ Workers got bonus

KEY TOOLS FOR PRODUCTION MANAGERS

Practical Tools You Can Use this Monday

Tool	Purpose	How to Use
Daily Production Board	Track target vs actual	Whiteboard in factory
First-Piece Approval	Prevent mass errors	Check 1 piece before bulk
Hourly Output Chart	Spot problems early	Supervisor walks line
Defect Log	Track root causes	Simple notebook
Line Balancing Sheet	Find bottlenecks	Time each operation
5S Checklist	Keep workplace organized	Daily 10-minute cleanup

THE 5S SYSTEM FOR GARMENT FACTORIES

Workplace Organization = Productivity

S	Japanese	Meaning	In Factory
1	Seiri	Sort	Remove unused items
2	Seiton	Set in order	Everything has a place
3	Seiso	Shine	Clean daily
4	Seiketsu	Standardize	Same method every day
5	Shitsuke	Sustain	Make it a habit

5S Impact:

- ✓ 30% less time searching for tools
- ✓ 20% fewer accidents
- ✓ 15% higher productivity

ACTION PLANNING

My 30-Day Production Improvement Plan

Action	Who	By When	Success Measure
1.			
2.			
3.			

Examples

- "Implement first-piece approval for all new styles" – Production Manager – Next week – Zero mass errors
- "Daily 10-minute 5S cleanup" – All supervisors – Tomorrow – Cleaner workspace
- "Track hourly output on whiteboard" – Line supervisors – Monday – Spot delays early

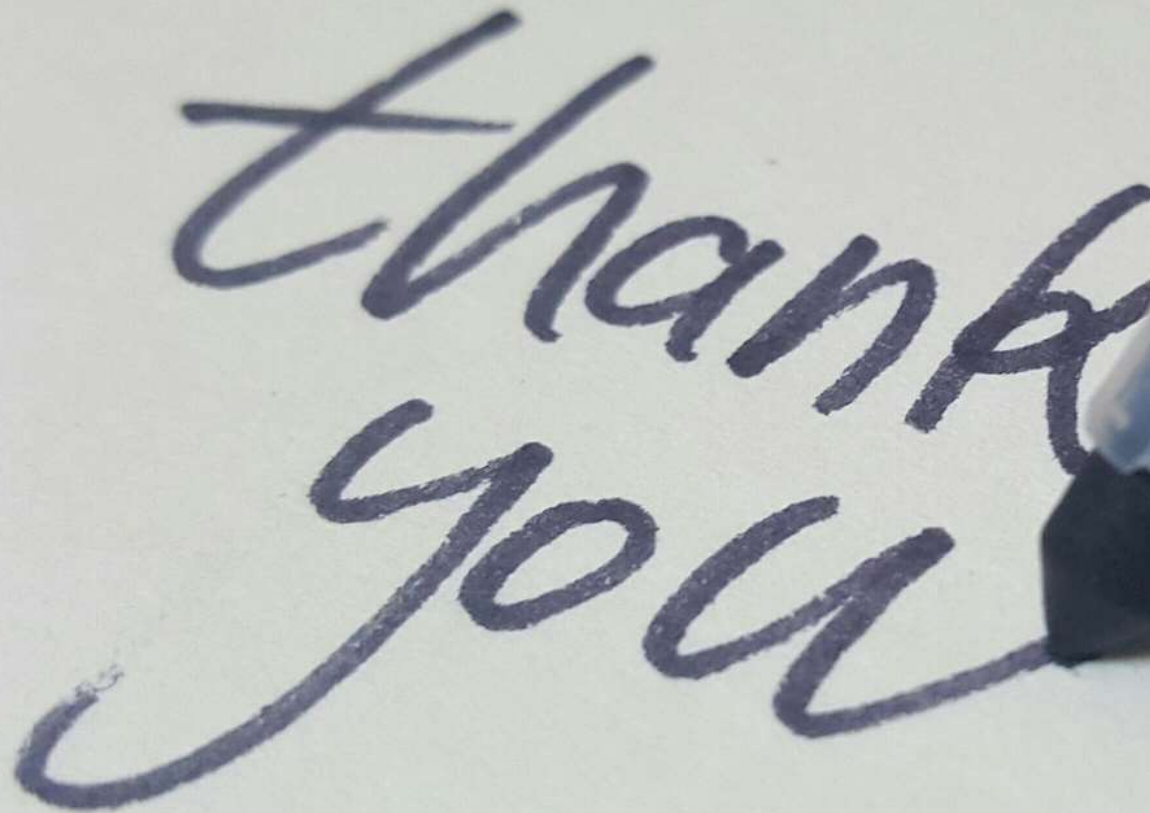
KEY TAKEAWAYS

- ❑ **Plan before you produce** – material, capacity, timeline
- ❑ **Balance your line** – find and fix bottlenecks
- ❑ **Inspect at every stage** – don't wait for final QC
- ❑ **Use data, not guesses** – daily production tracking
- ❑ **Small changes = big results** – rebalancing, 5S, defect reduction
- ❑ **Involve your team** – operators know the problems

CONTACT

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A close-up photograph of a blue marker writing the words "Thank you" in a cursive script on a white piece of paper. The marker is positioned at the end of the word "you", and its tip is visible. The background is a light blue gradient with white circular accents.

Thank
you