

CREATED BY
THE PRODUCTIVITY PRESS DEVELOPMENT TEAM

Pull Production

FOR THE SHOPFLOOR



SHOPFLOOR SERIES



Contents

Publisher's Message	ix
Getting Started	xi
The Purpose of This Book	xi
What This Book Is Based On	xi
Two Ways to Use This Book	xii
How to Get the Most Out of Your Reading	xii
An Overview of the Contents	xiv
Chapter 1. Choosing Pull Production	1
The Context for Pull Production	2
What Is Pull Production?	4
Two Aspects	4
Pull versus Push	4
The Challenges of Production	5
The Problem of Forecasting Customer Demand	5
Small-Lot, Wide-Variety Production	5
Cost Reduction	6
Waste	7
When Pull Might Not Be the Goal	7
The Prerequisites of Pull Production	8
An Awareness of Waste and Commitment to the Principles of Continuous Improvement	8
Team-Based Improvement Activities	8
Process Measures	8
5S—Visual Order, Displays, and Signals	8
Quick Changeover Activities	9
A Multi-Task Trained Workforce	9
Cell Design	9

The Benefits of Pull Production	11
Company Benefits	11
Individual Benefits	11
In Conclusion	12
Summary	12
Reflections	13
Chapter 2. Understanding and Preparing for Pull Production	15
Approaches to Production Management	16
What Is Production Management?	16
What Is the Significance of Lead Time?	17
How Does Lean Production Impact Lead Time?	19
The Problem with Stock and Overproduction	21
Why Does Inventory Accumulate?	21
Why Is Inventory Bad?	22
Push versus Pull Production	24
Production Is Music	25
The Next Process Is Your Customer	26
Stop and Go versus Process and Go Production	27
What Is Flow Production?	28
The Value Stream	28
Seven Requirements for Flow	29
Leveling	30
Implementation Sequence	30
In Conclusion	32
Summary	32
Reflections	34
Chapter 3. Implementing Pull Production	35
The Improvement Infrastructure	36
Key Roles	36
The Promotion Office	37
Improvement Days	37
Improvement Meetings	37
An Improvement List	38

The Factory Floor	38
Kaizen Events	38
Five Steps to Pull Production	39
Step One: Identify the Current Process	39
Step Two: Co-Locate Equipment in Sequence	40
Step Three: Design Manufacturing Cells	42
Step Four: Initiate the Kanban System	46
Step Five: Shift to One-Piece Flow	47
Level Production	48
Shish-Kabob Production	49
Takt Time	50
The Load Leveling Box	51
Line Balancing	51
Cross-Training	53
Quality Systems	53
Levels of Quality	53
Errors versus Defects	54
In Conclusion	55
Summary	55
Reflections	57
Chapter 4. Managing Pull Production	59
The Rules of Pull Production with Kanban	60
Feedback with the Kanban System	60
Functions of Kanban	61
Types of Kanban	63
How the Kanban System Works	64
How Many Kanban Do You Need?	65
An Analysis of Pull Production	66
When Do You Pull?	66
Where Do You Pull From?	66
What Do You Pull?	67
What Do You Produce?	68
One-Stage versus Two-Stage Pull Systems	69
Supermarkets	69
Water Beetles and Milk Runs	70

In Conclusion	73
Summary	73
Reflections	75
Chapter 5. Extending Pull Production	77
Establishing One-Piece Flow Production	78
Seven Conditions for Flow	79
Steps to Achieve One-Piece Flow	80
Using Moving Lines and Feeder Cells	81
Linking Suppliers to the Pull System	83
Changes in Transport Methods	83
Changes in Delivery Sites	85
Supplier Kanban	87
Buffers	89
Challenges, New Thinking, and Success Factors	90
In Conclusion	91
Summary	91
Reflections	93
Chapter 6. Reflections and Conclusions	95
A Summary of Pull Implementation	96
Reflecting on What You've Learned	97
Opportunities for Further Learning	98
Conclusions	98
Additional Resources Related to Pull Production	99
Books and Videos	99
Newsletters	101
Training and Consulting	101
Website	101
About the Productivity Development Team	102