

CREATED BY
THE PRODUCTIVITY PRESS DEVELOPMENT TEAM

Quick Changeover

for Operators: THE SMED SYSTEM



SHOPFLOOR SERIES



Quick Changeover for Operators

The SMED System

Created by
The Productivity Press
Development Team

Based on
*A Revolution in Manufacturing:
The SMED System*
by Shigeo Shingo

Productivity  **Press**

New York

Contents

Publisher's Message	ix
----------------------------	-----------

Chart: SMED's Conceptual Stages and Practical Techniques	x-xi
---	-------------

Chapter 1. Getting Started

Chapter Overview	1
Purpose of This Book	2
What This Book Is Based On	2
Two Ways to Use This Book	3
How to Get the Most Out of Your Reading	4
Becoming Familiar with this Book as a Whole	4
Becoming Familiar with Each Chapter	4
Explanation of Reading Strategy	6
Using the Margin Assists	7
Overview of the Contents	8
In Conclusion	
Summary	10
Reflections	11

Chapter 2. Important Terms and Concepts

Chapter Overview	13
Introduction: What is SMED?	14
Why SMED Is Important for Companies	15
The Trouble with Large-Lot Production	15
The Benefits of SMED for Companies	16
The Benefits of SMED for You	17
Definitions of Important Terms and Concepts	18
Manufacturing Processes	18
Manufacturing Operations	19
Setup Operations	19
In Conclusion	
Summary	20
Reflections	21

Chapter 3. Getting Ready for SMED

Chapter Overview	23
Basic Steps in a Setup Operation	24
Preparation, After-Process Adjustments, Checking of	
Materials and Tools	24
Mounting and Removing Blades, Tools, and Parts	25
Measurements, Settings, and Calibrations	25
Trial Runs and Adjustments	26
Analyzing Your Setup Operations	27
The Three Stages of SMED	28
Stage 1: Separating Internal and External Setup	28
Stage 2: Converting Internal Setup to External Setup	28
Stage 3: Streamlining All Aspects of the Setup Operation	28
In Conclusion	
Summary	29
Reflections	29

Chapter 4. Stage 1: Separating Internal and External Setup

Chapter Overview	31
Description of Stage 1	32
Checklists	32
Function Checks	34
Improved Transport of Parts and Tools	34
SMED at Work: Die Transport as External Setup	36
In Conclusion	
Summary	38
Reflections	39

Chapter 5. Stage 2: Converting Internal Setup to External Setup

Chapter Overview	41
Description of Stage 2	42
Advance Preparation of Operating Conditions	43
Function Standardization	44
Implementing Function Standardization	44
SMED at Work: Standardizing the Clamping Function of Press Dies	45
SMED at Work: Using Jigs to Center the Die	46
SMED at Work: Using Die Cassette Systems	47

Intermediary Jigs	48
SMED at Work: Using Intermediary Jigs on Multiple Press Dies	48
SMED at Work: Using Intermediary Jigs on Profile Milling Machines	49
In Conclusion	
Summary	50
Reflections	51
 Chapter 6. Stage 3: Streamlining All Aspects of the Setup Operation	
Chapter Overview	53
Description of Stage 3	54
Streamlining External Setup	54
Streamlining Internal Setup	56
Implementing Parallel Operations	56
Using Functional Clamps	58
One-Turn Attachments	59
One-Motion Methods	60
Interlocking Methods	61
Eliminating Adjustments	62
Fixed Numerical Settings	63
Visible Center Lines and Reference Planes	64
Least Common Multiple System	66
Mechanization	68
In Conclusion	
Summary	69
Reflections	70
 Chapter 7. Reflections and Conclusions	
Chapter Overview	71
Reflecting on What You've Learned	72
Applying What You've Learned	73
Possible Ways to Apply SMED	73
Your Personal Action Plan	73
Opportunities for Further Learning	74
Conclusions	74
Further Resources Related to SMED	75
 About the Authors	77