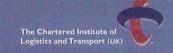
MAREHOUSE MANAGEMENT

A complete guide to improving efficiency and minimizing costs in the modern warehouse







CONTENTS

List of figures xii List of tables xv Acknowledgements xvii

Introduction

PART ONE 5

01 The role of the warehouse 7

Introduction 7
Types of warehouse operation 9
Why do we hold stock? 14
Supply chain trends affecting warehouses 18
The growth of e-fulfilment and its effect on the warehouse 19
Refrigerated warehouses (by Chris Sturman) 20
Materials handling and storage in a temperature-controlled environment 20
Energy management and plant maintenance 22
Stock management and housekeeping 23
Health and safety issues 24
Transportation issues 24
Summary and conclusion 25

02 Role of the warehouse manager 26

Introduction 26
Warehouse trade-offs 28
The warehouse manager's challenges 29
People management 32
Challenges 34
Attracting and retaining warehouse employees 37
An ageing and constantly changing workforce 37
Operating hours 38

Training	40		
Summary	and conc	lusion 40	0

PART TWO 41

03 Warehouse processes: receiving and put-away 43

Introduction 43
Receiving 44
Pre-receipt 45
In-handling 50
Preparation 50
Offloading 51
Checking 53
Cross docking 55
Recording 56
Quality control 57
Put-away 57
Summary and conclusion 58

04 Warehouse processes: pick preparation 59

Introduction 59
Preparation 60
Warehouse layout 70
Summary and conclusion 72

O5 Picking strategies and equipment 73

Introduction 73
Picker to goods 75
Goods to picker 78
Automated picking 82
Handling equipment 86
Storage equipment 90
Summary and conclusion 98

06 Order-picking methods 99

Introduction 99 Paper pick lists 99 Pick by label 100
Pick by voice 100
Barcode scanning 107
Radio frequency identification 110
Pick by light/pick to light 112
Put to light 114
Comparisons 116
Cost of errors 116
Deciding on type of picking system and equipment 118
Summary and conclusion 119

07 Warehouse processes from replenishment to despatch 120

Introduction 120
Replenishment 120
Value-adding services 121
Indirect activities 122
Stock management 123
Stock or inventory counting 125
Cycle counting or perpetual inventory counts 125
The count itself 126
Security 127
Returns processing 128
Despatch 131
Role of the driver 133
Summary and conclusion 133

PART THREE 135

08 Warehouse management systems 137

Introduction 137
Why does a company need a WMS? 138
Choosing a WMS 139
The process 140
Selecting the right WMS 140
What to look for in a system 143
Selecting a partner 145
Before the final decision 146

Implementation 146
Software as a service 147
Cloud computing 147
Summary and conclusion 149

09 Warehouse layout 150

Introduction 150
Data gathering 151
Space calculations 152
Aisle width 158
Other space 159
Warehouse layout examples 159
Finding additional space 161
Summary and conclusion 162

10 Storage and handling equipment 163

Introduction 163
Storage equipment 163
Storage options 165
Very high bay warehouses 173
Other storage media 177
Warehouse handling equipment 179
Vertical and horizontal movement 183
Automated storage and retrieval systems (AS/RS) 187
Specialized equipment 187
Recent technical advances 189
Summary and conclusion 191

PART FOUR 193

11 Resourcing a warehouse 195

Introduction 195
Processing activities 195
Other factors 210
Summary and conclusion 211

12 Warehouse costs 212

Introduction 212
Types of costs 213
Return on investment (ROI) 214
Traditional versus activity-based costing systems 216
Charging for shared-user warehouse services 220
Logistics charging methods 224
Hybrid 226
Summary and conclusion 226

PART FIVE 227

13 Performance management 229

Introduction 229
Why do we need to measure? 230
What should we be measuring? 230
How to choose the right performance measures 235
Traditional productivity measures 236
New performance metrics 238
Hard and soft measures 241
Integrated performance models 242
Benchmarking 243
Balanced scorecard 246
Summary and conclusion 249

14 Outsourcing 250

Introduction 250
The outsourcing decision 252
Core activity/core competence 254
Improvement in customer service 254
Cost reduction 255
Labour relations 255
Financial strategy 255
Flexibility 256
Role of third-party contractors 256
Preparing to outsource 257
Choosing the right partner 258

The transition 261
Managing a third-party relationship 261
Why contracts fail 261
The future of outsourcing 263
Summary and conclusion 266

PART SIX 267

15 Health and safety 269

Introduction 269
Risk assessments 271
Layout and design 275
Fire safety 276
Slips and trips 277
Manual handling 277
Working at height 277
Vehicles 278
Forklift trucks 279
Warehouse equipment legislation 281
First aid 281
Summary and conclusion 282

16 The warehouse and the environment 283

Introduction 283
Legislation 284
Warehouse energy usage 284
Energy production 287
The environment and waste 288
Packaging 289
Pallets 291
Stretch wrap 291
Cartons 292
Labelling 292
Product waste 292
Waste disposal 292
Hazardous waste 292
Forklift trucks 293
Summary and conclusion 293

PART SEVEN 295

17 The warehouse of the future 297

Introduction 297
Context 297
Views of the future: the landscape 298
Lean warehousing 301
Views of the future: the warehouse 302
Scenario One 304
Scenario Two 304
Other advances 306
Summary and conclusion 306

References 308 Useful websites 312 Glossary 313 Index 317