

## CONTENT

	Page
Preface	ix
1. People and processes	1
1.1 Introduction	1
1.2 What is total quality management (TQM)?	2
1.3 Why is Progress so disappointing?	5
1.4 Understanding processes	6
1.5 Understanding people	10
1.6 Summary	19
2. Can we satisfy the customers?	21
2.1 Introduction	21
2.2 Lubricem and its customers	22
2.3 Process variability and product specification	23
2.4 Process capability indices	28
2.5 Variability and change	32
2.6 Summary	36
3. Control charts with high-value products	38
3.1 Introduction	38
3.2 A Simple control chart	39
3.3 An alternative control chart	44
3.4 Monitoring variability	51
3.5 Summary	55
4. Control charts with low-value products	56
4.1 Introduction	56
4.2 What is a control chart?	57
4.3 Setting up a control chart	60
4.4 How good is the control chart?	67
4.5 Sampling frequency	72
4.6 Summary	76
5. Control charts for many heads or short runs	77
5.1 Introduction	77
5.2 Control charts with multi-head processes	78
5.3 Automatic control loops	87
5.4 SPC with short production runs	95
5.5 Summary	102
6. Cusums and training	104
6.1 Introduction	104
6.2 Cusum post-mortem analysis	105
6.3 The V-mask and decision interval charts	109
6.4 Training for quality improvement	117
6.5 Summary	121
7. Company culture and techniques for improvement	122
7.1 Introduction	122
7.2 SQC and SPC	123
7.3 Tools for quality improvement	129
7.4 More tools for quality improvement	132

7.5	A learning culture	138
7.6	Summary	143
8.	Reducing variability	145
8.1	Introduction	145
8.2	Quality improvement and cost reduction	146
8.3	Skewed variability	152
8.4	Measurement error	158
8.5	Repeatability and reproducibility	162
8.6	Variability due to many causes	166
8.7	Summary	171
9.	Planned experiments for quality improvement	173
9.1	Introduction	173
9.2	One factor at a time	174
9.3	Factorial experiments	181
9.4	Interaction between variables	186
9.5	Cost effective experiments	194
9.6	Inherent variation	201
9.7	Summary	202
10.	Achieving quality improvement	204
10.1	Introduction	204
10.2	Quality improvement	205
10.3	Process capability and stability	206
10.4	Measurement, variability and control charts	209
10.5	Experiments and other tools improvement	213
10.6	People and learning	216
10.7	Summary	219
Appendix A : Useful procedures		220
Procedure A – to assess the capability of a process		220
Procedure B – To assess the stability of a process		221
Procedure C – To Calculate a standard deviation		223
Appendix B : Useful statistical tables		226
References and further reading		229
Index		231