A Quick Guide to
Pipeline Engineering

D. Alkazraji
BEng, CEng, MIMechE

Series editor: Clifford Matthews

Matthews Engineering Training Limited
www.matthews-training.co.uk

WOODHEAD PUBLISHING LIMITED
Cambridge England
The Quick Guide Series vii
Invitation to New Authors viii
Preface ix
Summary xi

Chapter 1 Principles of Pipeline Design
1.1 Effect on the environment 2
1.2 Routing 4
1.3 Approval and legal considerations 8

Chapter 2 Design Approach
2.1 Factors that influence the length of a pipeline 10
2.2 Choosing a wall thickness for the pipeline 11
2.3 Choosing an appropriate material grade for the pipeline 12
2.4 Toughness 13
2.5 Operational pressure 14
2.6 Temperature effects 16
2.7 Surge 17
2.8 Pipeline coating 18
2.9 Pipeline protection 21

Chapter 3 Pipeline Construction and Risk Assessment Techniques
3.1 Pipeline manufacturing methods 23
3.2 Land preparation, excavation and pipe stringing 26
3.3 Corrosion protection 29
3.4 Pipeline codes and standards 32
3.5 Risk assessment techniques 34
3.6 Quantitative risk assessment 35
3.7 Qualitative risk assessment 38

Chapter 4 Pressure Testing and Commissioning
4.1 Pressure testing 43
4.2 Commissioning 48
Chapter 5 Pipeline Operation
5.1 Magnetic inspection 55
5.2 Ultrasonic inspection 58
5.3 Geometric tools 60
5.4 In-service defects and corrosion mechanisms 61

Chapter 6 Pipeline Maintenance
6.1 Assessment of internal and external corrosion features 75
6.2 Assessing dents/profile distortions 95
6.3 Significance of manufacturing and construction defects 103

Chapter 7 Pipeline Condition Monitoring and Repair Methods
7.1 Pearson survey 127
7.2 CIPPS survey 129
7.3 DCVG survey 130
7.4 Repair techniques 131

Chapter 8 Pipeline Decommissioning and Industry Developments
8.1 Pipeline decommissioning 139
8.2 Pipeline industry developments 141

References 149
Index 153