

Contents

Figures	vii
Tables	xi
Preface	xiii
1 Introduction	1
2 Corrosion Control by Coatings	6
Theory of Corrosion	6
Corrosion Control by Coatings	11
3 Surface Preparation	26
Scientific Justification for Surface Preparation	27
Surface Preparation Methodologies	38
Preparation of Contaminated Weathered A-588 Steel Surfaces	50
Cleaning of Existing Paint Surfaces	51
4 Coating Systems for Steel Bridges	54
Overall Trends in Paint System Use on Bridges	55
Inhibitive Coating Systems	56
Zinc Rich Coating Systems	65
Barrier Coating Systems	89
Discussion	104
5 Coating System Selection and Specification Design	106
Coating System Selection	106
Coating System Specification	108
Guarantees	127
6 Job Execution	130
Contracting Methodologies	130
The Painting Contractor	133
The Preapplication Process	138
The Modern Application Process	149
Practicalities of the Job Process	160
Note on Literature Search	165

7	Quality Assurance and Quality Control	166
	Job Inspection	166
	Materials Assurance and Control	178
	Support of Inspection Decisions	186
8	In-Service Monitoring of System Performance	187
	Existing Practices	188
	Federally Encouraged Programs	189
	Difficulties with Proprietary Systems and Performance Specifications	190
	Quantification of Deterioration	190
	System Service Longevity	191
	Coating-System Failure	202
9	Costs	210
	Contractor's Estimation of Job Cost	211
	Shop Work Estimating: New Construction	230
	Galvanizing Costs	231
	Metallizing Costs	233
	Duplex-Systems Costs	234
	Comparative Cost Considerations in the Selection of Bridge Painting Methodology	234
	The Bridge Corrosion Cost Model (BCCM)	240
10	Trends, Directions, and Ongoing Research	243
	General Trends	243
	Trends in Surface Preparation	245
	Emerging Developments in Coatings Technology	248
	Trends in Specification Design	257
	Trends in Job Execution	258
	Efforts to Improve Inspection	260
	In-Service Monitoring Trends	260
	Analysis and Organization of Costs	262
11	Conclusions and Recommendations	263
	Overall Trends	264
	Surface Preparation	264
	Coating Systems	265
	Specification Design	267
	Contract Procedures	269
	Materials Control and Testing	271
	Associated Factors	271
	In-Service Monitoring	272
	Service and Costs	272
	Communication	273
	Notes	275
	Index	295