

Subject Index

A

- Accelerated atmospheric corrosion chamber, 374-84
- Accelerated corrosion testing
of bridge wires, 82-85, 89-91
for evaluation purposes, 305
in laboratory, 359
- Acid rain, 284, 287-88
and atmospheric corrosion
of metals, 79, 80, 87, 89, 327-35
of steels, 284
of zinc, 230-31, 232-34, 238-41, 284, 287-88
- Alloy elements. *See also* Aluminum alloys; Copper/copper alloys; Steel alloys
effect of, on corrosion in stainless steels, 71-76
- Aluminum
atmospheric corrosion of, 152
copper clad, 156-59
- Aluminum alloys
atmospheric corrosion of wrought, 191-205
barrier coatings for the protection of, in marine atmosphere, 206-19
marine stress corrosion behavior of, 134-35, 143
- Aluminum clad stainless steel, atmospheric corrosion of, 155-56
- Aluminum-zinc alloy coated sheet steel, effects of weathering of chromate passivation films on, 30-34
- Arc spraying, for applying barrier coatings to steel and aluminum alloys, 208-9
- ASTM Committee
A-1 on Steel, Stainless Steel, and Related Alloys, 53
A-10 on Iron-Chromium, Iron-Chromium-Nickel, and Related Alloys, 52
B-4 on Metallic Materials for Thermostats and for Electrical Resistance, Heating, and Contacts, 375
G-1 on Corrosion of Metals, 1, 386
- ASTM Standards
A763:, 120
B 3-1957: 202-3
B 537: 55
B 557: 196
G 1: 55, 131, 147, 149, 192, 203
G 1-81: 6, 340
G 30: 131
G 39: 128, 131, 133
G 50: 131, 139, 147, 192
G 50-76, 340
G 58: 133
G 92: 126
- Atmospheric corrosion
applications of the system for the, 256-57
of architectural copper work, 96-114
of bridge suspension cables, 78-95
of clad metals, 145-90
classification of, 249, 251-53, 255, 385-86
corrosion of steel and zinc in Scandinavia with respect to the classification of the, 264-81
and development of a stainless steel alloy against marine environments, 68-77
environmental effects of
on galvanized steel, 282-89
on zinc, 229-47
impact of precipitation on metal corrosion, 327-35
international standardization of the, 255-56
ISO CORRAG collaborative program, 385-431
laboratory research for, on maritime industrial atmospheres, 290-305
long-term behavior of various grades of stainless steel, 52-67
marine salts contribution to, 316-26
monitoring of, for shipboard environments, 354-65
and participation of stimulating anions, in, 291

- Atmospheric corrosion (*cont.*)
 - of stainless steels, 35-51
 - standards on resistance, 249
 - using classification of, to extend service life of materials, structures, and products, 248-63
- of weathering steels
 - in Louisiana bridges, 16-29
 - in marine, rural, and industrial environments, 5-15
- of wrought aluminum alloys, 191-205
- Atmospheric pollutants. *See* Pollutants
- Atomic absorption technique, 17
- Auger electron spectroscopy, 69

B

- Barbados, comparison of corrosion rate and chloride deposition in, 324
- Barrier coatings, for the protection of steel and aluminum alloys in marine atmosphere, 206-19
- Bethlehem (Pa.) test site, 14-15
- Brackenridge (Pa.) test site, 39, 42
- Brass, and corrosion resistance, 159, 313
- Bridges. *See also* Marine atmosphere
 - atmospheric corrosion of
 - suspension cables, 78-95
 - weathering steels in, 16-29
- Bronze, and corrosion resistance, 110, 151

C

- Ceramic coatings, and corrosion resistance, 215-16, 218
- Chlorides
 - corrosion effects of, 279
 - on aluminum alloys, 203-4
 - on bridge cables, 89
 - on stainless steel, 36, 71
 - on steel, 279, 298, 301, 302-3, 324
 - on weathering steels in bridges, 17, 19
 - on zinc, 279, 298, 301, 302-3, 324
- Chromate passivation films, effects of weathering on, aluminum-zinc alloy coated sheet steel, 30-34
- Chromium, impact of, on corrosion resistance, 35, 44, 74-75, 76, 143
- Clad metals, atmospheric corrosion of, 145-90
- Climat test, 318, 319, 322
- Colorimetric measurements, for analysis of corrosion of stainless steels in the atmosphere, 40, 42, 46-49
- Color vision, Herring theory of, 40*n*
- Comparative sulfidation tests, 309, 313

- Computer techniques, in corrosion protection, 220-26
- Connectors
 - corrosion problems of, 116
 - fretting corrosion of, 122-23
- Copper clad aluminum, atmospheric corrosion of, 156-59
- Copper clad stainless steels, atmospheric corrosion of, 154-55
- Copper/copper alloys
 - atmospheric corrosion of, 96-114, 150-51
 - and corrosion resistance, 143
 - degradation of, by atmospheric sulfur, 306-15
- Copper steel, corrosion resistance of, 14, 76
- Corrosion. *See* Atmospheric corrosion
- Corrosion behavior, long-term, of materials in the marine atmosphere, 125-43
- Corrosion expert system
 - concept of, 221-22
 - hardware for, 225
 - interactive operation of, 223
 - philosophy in creation of, 225-26
 - software for, 221-22, 223-24
- Corrosion film chemistry, and zinc corrosion, 234-41
- Corrosion monitoring, of shipboard environments, 354-65
- Corrosion prevention, future developments in, 123
- Corrosion protection, computer techniques in, 220-26
- Corrosion rate, time dependence of, 279-80
- CORTEC, and corrosion resistance, 83
- CORTEN weathering steel, corrosion resistance for, 150, 154, 159
- "Cross-talk" phenomenon, 116
- Cuba, comparison of corrosion rate and chloride deposition in, 324
- Czechoslovakia, interest in corrosion protection in, 248-63

D

- Dew point, measurement of, 341
- Differential aeration cell mechanism, 26, 27
- Dry deposition
 - effects of, 318
 - on galvanized steel and weathering steel, 339-53

E

- Electrochemical impedance measurement
 - of artificially rusted steel, 369-70
 - of rusted steel exposed to atmosphere, 367-68

Energy dispersive X-ray analysis, (EDXA), 17
 Environmental degradation, of telecommuni-
 cation hardware, 115-24
 Environmental effects
 on corrosion, 70-71
 of zinc, 229-47
 of galvanized steel, 282-89

F

Flaking, as problem of atmospheric corrosion
 with weathering steels in bridges, 17,
 19-21
 Flame spraying, for applying barrier coatings
 to steel and aluminum alloys, 208
 Fretting corrosion, of connectors, 122-23

G

Galvanization, and corrosion resistance, 80
 Galvanized steel
 effect of environmental factors on corrosion
 of, 282-89
 effects of dry and wet deposition on, 339-53
 Graphite, and corrosion resistance, 80, 87
 Green patina, and architectural copper, 113
 Guy strands
 corrosion problems of, 116
 hydrogen embrittlement of, 120-21, 122

H

Herring theory of color vision, 40
 Hunter scale for color lightness, 40
 Hydrochloric acid, corrosive effects of, 333
 Hydrogen embrittlement
 as factor in bridge wire failure mechanism,
 95
 of guy stands, 116, 120-21, 122
 Hydrogen evolution reaction, 29
 Hydrogen sulfide, corrosive effects of, 35-36

I

Inconel alloy, and corrosion resistance, 134,
 137
 Industrial environments, atmospheric corro-
 sion performance of weathering steels
 in, 5-15
 Infrared absorption spectrophotometry
 (IRS), 17
 International Organization for Standardiza-
 tion Technical Committee 156 in Cor-
 rosion of Metals and Alloys, 2, 385
 International Standards Organization Com-
 mittee of Metals and Alloys Corrosivity
 of Atmospheres, 305

International Standards Organization Tech-
 nical Committee 156 on the Corrosion
 of Metals and Alloys, 252, 255, 257
 Ion scattering spectroscopy, 231-32
 Iron-chromium alloys, corrosion resistance
 of, 35
 ISO CORRAG collaborative atmospheric ex-
 posure program, 385-431

K

Kure Beach (N.C.) test site, 6, 14-15, 39-40,
 43-44, 52-53, 125-26

L

Laboratory research, atmospheric corrosion
 in maritime industrial atmospheres,
 290-305
 LaQue Center for Corrosion Technology,
 Inc., (LCCT), 53, 125
 Lashing wire
 corrosion problems of, 115-16
 stress corrosion cracking (SCC) of, 117-20
 Lead coating, and corrosion resistance, 110,
 111, 112, 113, 158-59
 Louisiana, atmospheric corrosion problems
 with weathering steels in bridges in,
 16-29

M

Macrophotographic examinations, of corro-
 sion in aluminum alloys, 198
 Manganese sulfide, and corrosion resistance,
 75-76
 Magnesium, marine stress corrosion behavior
 of alloys of, 134-35, 143
 Marine atmosphere. *See also* Bridges
 atmospheric corrosion and development of
 a stainless steel alloy against, 68-77
 atmospheric corrosion performance of
 weathering steels in, 5-15
 barrier coatings for the protection of steel
 and aluminum alloys in, 206-19
 corrosion monitoring of shipboard environ-
 ments, 354-65
 corrosion of stainless steels in, 43-44, 46,
 52-67
 long-term corrosion behavior of materials
 in the, 125-43
 Marine salts, contribution of, to atmospheric
 corrosion, 316-26
 Maritime industrial atmospheres, laboratory
 research showing atmospheric corro-
 sion in, 290-305

Mayari R, chemical composition of, 5-6
 Mayari-R 50, chemical composition of, 5-6, 15
 Metal corrosion. *See also* specific metals
 impact of precipitation on, 327-35
 Metal joints, performance of dissimilar, 37, 43
 Metallic coatings, and corrosion resistance, 210, 212-14, 218
 Metallographic examination, of corrosion in aluminum alloys, 198
 Meteorological parameters, effect of, on corrosion, 276, 278
 Methyl mercaptan, effect of, on degradation of copper, 308
 Molybdenum, impact of, on resistance of stainless steel to corrosion, 35, 44
 Monel alloy, corrosion resistance of, 134

N

New Zealand, marine salts contribution to atmospheric corrosion in, 316-26
 Nickel
 atmospheric corrosion of, 151
 impact of, on resistance of stainless steel to corrosion, 35
 Nickel alloys, and corrosion resistance, 134, 143, 308-9, 313
 Nigeria, comparison of corrosion rate and chloride deposition in, 324
 Nitrogen dioxide, corrosive effects of, 331, 333
 NORDFORSK, 265

O-P

Ozone, effect of, on degradation of copper, 307-8, 313
 Painting, impact of, on corrosion, 5, 116
 Particulate matter, corrosive effects of, 80, 200, 204
 Patina formation, and corrosion resistance, 111, 113, 151, 152, 159
 Permanickel alloy, and corrosion resistance, 134
 Photometric evaluation, of atmospheric corrosion of stainless steels, 40, 42, 46-49
 Pitting
 and atmospheric corrosion of bridge suspension cables, 78, 85
 as problem of atmospheric corrosion with weathering steels in bridges, 17, 21-27
 in stainless steels, in marine environment, 55, 56

Plasma spraying, for applying barrier coatings to steel and aluminum alloys, 209
 Pollutants
 classification of, 258
 corrosive effects of
 on bridge cables, 79-80
 on galvanized and weathering steel, 341-42
 gaseous, 35-36
 on steel, 285-86
 on zinc, 278
 and degradation of copper/copper alloys, 306-15
 interaction of, with metallic alloys, 374-75
 Precipitation. *See also* Acid rain
 chemistry of, and impacts on metal corrosion, 327-35

R

Rain chemistry. *See* Acid rain
 Regression analysis
 in testing atmospheric corrosion
 of steel, 273-75
 of weathering steels, 8, 12, 349-50
 of zinc, 275
 Rural environments, atmospheric corrosion performance of weathering steels in, 5-15
 Rust
 definition of, 55
 monitoring of in-situ protective properties of, on weathering steel, 366-73
 Rust stain, definition of, 55

S

Salt, impact of adsorption and accumulation of, on development of corrosion, 16-17, 28
 Saylorburg (Pa.) test site, 6, 14-15
 Scandinavia
 comparison of corrosion rate and chloride disposition in, 324
 corrosion of steel and zinc in, with respect to the classification of atmospheric corrosivity, 264-81
 Scandinavian Council for Applied Research, 265
 Scanning electron microscopy (SEM), 17, 19, 82, 87, 231, 293, 307
 Service life, using classification of atmospheric corrosion to extend, for materials, structures, and products, 248-63
 Shipboard environments, corrosion monitoring of, 354-65

- Silicon, and corrosion resistance, 71-73
 Slate, and corrosion resistance, 112
 Slushing oil, and corrosion resistance, 80, 85, 87
 Sodium hydride cleaning process, 6, 8
 Stainless steels
 atmospheric corrosion of, 35-51, 150, 155-56
 copper clad, 154-55
 and development of an alloy, against marine environments, 68-77
 long-term behavior of various grades of, 52-67, 135-36, 143
 Steel
 atmospheric corrosion of, 150, 298, 301-2
 in Scandinavia with respect to the classification of, 264-81
 Steel alloys, barrier coatings for the protection of, in marine atmosphere, 206-19
 Steel corrosion, influence of sulfates on, 301-2, 302
 Steel substrates, atmospheric corrosion of, 152-54
 Stray current corrosion, 116-17
 Stress corrosion cracking (SCC), 29
 as factor in bridge wire failure mechanism, 87, 95
 of lashing wires, 117-20
 and long-term behavior in marine atmosphere, 138-39, 143
 Sulfates, influence of, on steel and zinc corrosion in, 301-2, 302-3
 Sulfur, and degradation of copper/copper zinc, 306-15
 Sulfur dioxide, corrosive effects of, 35-36, 80, 266, 278, 331, 340
 Suspension cables, atmospheric corrosion of bridge, 78-95
 Sweden, interest in corrosion protection in, 249
 Symposium on Degradation of Metals in the Atmosphere, 1-2
- T**
- Telecommunication hardware, environmental degradation of, 115-24
 Thermogravimetric analysis (TGA), 232, 236
 Thermal spray processes, for applying barrier coatings to steel and aluminum alloys, 208-9
 Time of wetness, and corrosion, 276, 283, 284-85
 Titanium, impact of, on corrosion resistance, 44, 46, 137-38
 Triiodide O₃, corrosive effects of, 340
- U**
- Underground corrosion phenomenon, 116-17
 USSR, interest in corrosion protection in, 249
- W**
- Weathering, effects of, on chromate passivation films on aluminum-zinc alloy coated sheet steel, 30-34
 Weathering steel, 5-6
 atmospheric corrosion of
 Louisiana bridges, 16-29
 marine, rural, and industrial environments, 5-15
 effects of dry and wet deposition on, 339-53
 monitoring of in-situ protective properties of rust on, 366-73
 Wet deposition
 and atmospheric corrosion of bridges, 79
 corrosive effects of
 on galvanized steel, 339-53
 on steel, 279
 on weathering steel, 339-53
 on zinc, 279
- X**
- X-ray diffraction (XRD), 17, 19, 231
 X-ray photoelectron spectroscopy (XPS), 30, 231
- Y**
- Yale University, atmospheric corrosion of architectural copper work at, 96-114
- Z**
- Zinc
 and corrosion resistance, 308, 313
 environmental effects of atmospheric corrosion on, 229-47, 286, 287-88
 influence of
 in barrier coatings, 210, 212-13
 chlorides on, 298, 301, 302-3
 sulfates on, 301-2
 in Scandinavia with respect to corrosion classification of, 264-81
 and wet deposition, 344
 Zinc carbonate, solubility of, 343-44, 351