

INDEX

A

A-c bridges, 429-432
A-end response assembly, 210
Acceleration, 38
Accelerometers, 72
Advancement in rate,
 active duty requirements, 5
 inactive duty requirements, 6
 preparation for, 4
 qualifications for, 3
 sources of information, 9
Aerodynamics, 32-38
Air density, effect on projectile, 15-17
Alarm and sensing devices in missile magazines,
 277
Ammeter, 423
Atmosphere, 32
 higher atmospheres, 35
 intermediate layers, 34
 ionosphere, 34
 mesosphere, 34
 stratosphere, 34
 thermosphere, 34
 troposphere, 33
Atmospheric jets, 52
Atomic and thermonuclear warheads, 261
Automatic and semiautomatic firing systems, 298
Automatic pistol, .45 caliber, 299
Automatic reset timing relays, 237
Automatic tracking cutout system, 468

B

B-end response assembly, 210
Bibliography for Advancement Study, NAVPERS
 10052, 8
Biological warheads, 260
Blasting caps, 377-382
Block diagrams, 446
Browning automatic rifle, 354-364

Browning .30 caliber M1919A4 machinegun, 335-
 342
Browning .50 caliber M2 machinegun, 342-345
BT-3 flight termination system, 274

C

Carbon dioxide fire suppression system, 283-285
Cathode-ray oscilloscope, 437-440
 controls and functions, 438-440
 precautions with, 440
Checkout car, 477
Chemical warheads, 260
Classified matter safeguarding, 500
Circuit breakers, 231
Continuity test, 426
Continuous rod warheads, 261
Control functional diagrams, 445
Coriolis, effect on projectile, 18
Corrective maintenance defined, 388
COSAL, 499

D

Data functional diagrams, 444
D-c bridges, 428
Demodulators, 183-185
Demolition, 377-386
 blasting caps, 377-382
 charges, 377
 procedure for locating breaks in firing circuit,
 384
 procedure for preparing and setting off, 382-
 384
 safety precautions, 385
Director assignment console, 158-160
Distress signals, 270
Doppler principle, 86
Drift, effect on trajectory, 22
DUD jettison devices, 214

INDEX

E

- Electrical devices used in launching systems, 224-247
 - control circuits, 238-247
 - firing circuit, 241-247
 - power control circuit, 238-241
 - safety precautions, 247
 - switches, 224-229
 - barrel switches, 228
 - circuit breakers, 231
 - interlock switches, 228
 - power relays or contactors, 230
 - relay principles, 229-238
 - rotary switches, 225-228
 - stepping relays, 233
 - time-delay relays, 235-238
- Electrical measurements, precautions and techniques in making, 448-450
- Electrohydraulic servovalve, 188-190
- Electrolytic capacitors, 431
- Elevation limit stop, 466
- Equipment troubleshooting pyramids, 447
- Error, detector, 172-178
- Error reducers, 185-190
- Explosive pellet warhead, 260
- Explosives, 248-258, 272-276
 - application of in rim, 272-276
 - BT-3 flight termination system, 274
 - missile sections and their explosives, 272-274
 - chemical nature of, 250
 - disposing of damaged or defective explosives, 275
 - history of, 249
 - military, 249
 - characteristics of, 254-258
 - classification of, 250
 - composition, 250
 - method of initiating, 252
 - nature of reaction, 251
 - sensitivity, 251
 - service use of, 253
 - nonmilitary, 248
 - propellants, 249
- External blast warheads, 258

F

- Fast system, 469
- Fault directories, 445
- Fault logic diagrams, 446
- Feedback loops, 67
- Feeder systems, 103, 108
- Fire control, principles of application, 24-31
- Fire control systems, elements of, 12

- Fire suppression systems, 278
- Firing circuit, 241
- Firing cutout systems, 467
- Flash signals, 271
- Flight principles, 35-44
 - acceleration, 38
 - aerodynamic forces, 35-38
 - basic motions, 35
 - mach numbers and speed regions, 38
 - missile airframes, 43
 - stability and lift in modern missiles, 39-43
- Foam used in firefighting, 286
- .45 caliber automatic pistol, 299
- Fragmentation warheads, 258
- Fuzes, types of, 262-264

G

- Gas laws, 47
- Gas test, 436
- Gases under pressure, 44
- Gravity, effect on projectile, 13-15, 28
- Guidance phases, 75
- Guidance systems, types of, 75-80
- Guided missile launching systems, 101-151
 - description of, 101-104
 - safety precautions, 150
 - Talos, 121-144
 - Tartar, 144-150
 - Terrier, 104-121
- Gun and missile weapons system, 152-169
 - functions and problems of fire control, 162
 - intersystem communications, 167
 - location and operation of consoles, 161
 - units,
 - basic weapon components, 154
 - control units, 153, 156
 - delivery units, 154, 157, 163
 - destructive units, 154, 157, 166
 - detecting units, 152 h,
 - target detection, location and identification units, 155
 - weapons direction equipment, 157-161
- Gunner's Mate (Missiles) rating, 1-10
 - advancement, 3
 - billets, 2
 - enlisted rating structure, 1
 - leadership, 2
- Gyroscopes, 69

H

- Hand grenades, 375-377
 - procedure for throwing, 375
 - safety precautions, 376
 - types and characteristics, 375

Handguns, 299-308
 assembly, 303
 cycle of operation, 304
 disassembly, 299-303
 .45 caliber automatic pistol, 299
 safeties, 303
 .38 caliber Smith and Wesson revolver, 305-308
 Hitting a moving target from a moving ship, 11- 31
 basic fire control principles, 11, 24-31
 application of principles, 24-31
 elements of fire control systems, 12
 definitions, 11
 influence of trajectory,
 by interior forces, 21
 by outside forces, 13-21
 HT-3 Terrier missile, 59
 Hybrid propulsion, 56
 Hydraulics and pneumatics in missile systems, 197-223
 air operated power unit, 213
 DUD jettison devices, 214 :
 hydraulic pneumatic power used inside system, 216
 hydraulic power in strikedown, mate and loading operations, 212
 launcher power drives, 204-210
 maintenance of equipment, 216, 220-222
 pneumatic operated handling equipment, 215
 pneumatic test sets, 215
 power drives for smaller launching systems, 212
 safety precautions, 222
 terminology, 197-204

I

Inductance bridge, 431
 Initial velocity, effect on trajectory, 21
 Ionosphere, 34

J

Jet propulsion systems, 47-56
 atmospheric jets, 52
 components of, 49-52
 hybrid propulsion, 56
 rockets, 53-56

K

Kelvin scale, 47

L

Landing party, 366-375
 equipment, 367-372, 374
 organization of, 366
 shelter, 372-374
 Launcher checks, missile replenishment and servicing, 455-586
 dummy director components, 460
 launcher synchronizing indication system, 461-463
 limit stop and automatic tracking cutout systems, 463-468
 missile mating and servicing, 477
 preparation of missile for testing, 480- , 486
 responsibilities of GMM, 477
 testing and repairing, 477
 unmating and mating, 478
 missile replenishment and strikedown, 468-477
 dockside replenishment, 470
 FAST system, 469
 handling below decks, 476
 lighter replenishment, 471
 missile component stowage, 476
 modified housefall rig, 468
 special handling equipment, 471-473
 steam method, 470
 strikedown, 473-476
 paper tape error recorder, 460
 power drive performance test, 455-461
 test signals, 457-460
 Launcher power drive, 172-190, 204-210
 demodulators, 183-185
 error detector, 172-178
 error reducer, 185-190
 receiver-regulators, train and elevation, 207
 servoamplifier section, 181-183
 synchro transmission 36:1, disadvantages of, 178-181
 Limit-stop system, 210
 Line-throwing gun, .45 caliber, 333-335
 Liquid propellant rockets, 55
 Liquid propellants, 51
 Liquid-fuel engines, prepackaged, 56
 Logs, 494-496

M

M1 carbine, .30 caliber, 314-318
 M1 rifle, .30 caliber, 308-314
 M3A1 .30 caliber submachinegun, 352-354
 M14 rifle, 318
 M16E1 rifle, 318-325

INDEX

- M60. 7.62-mm machinegun, 345-350
 - Mach numbers and speed regions, 38
 - Magazine log, 495
 - Magazines, 276, 279
 - alarm and sensing devices in, 277
 - relative humidity indicators, 277
 - sprinklers in, 279
 - temperature checking, 276
 - Maintenance checkoff lists, 496
 - Maintenance Data Collection Subsystem, 499
 - Maintenance Data Collection System, 395
 - Maintenance, general, 387-422
 - cleaning, painting, and preserving, 403-408
 - definition of, 387
 - levels, 389
 - lubrication, 396-403
 - charts, 401
 - fittings, 400
 - functions of lubricants, 397
 - grease guns, 398-400
 - greases, 398
 - hydraulic fluids, 403
 - oils, 397
 - qualities of lubricants, 396
 - tools, 398-401
 - Maintenance Data Collection System, 395
 - Navy Maintenance and Material Management System, 394
 - ordnance drawings, 389
 - planned maintenance, 393-396
 - safety precautions, 421
 - skills and processes, 408-420
 - cable splicing, 415
 - crimping, 412-414
 - removal and replacement considerations, 417-420
 - safety wiring, 416
 - shielding and bonding, 414
 - soldering, 408-412
 - tying and lacing, 414
 - watertight boxes and fittings, 415
 - special tools, 421
 - torque wrenches, 420
 - Maintenance of hydraulic and pneumatic equipment, 220-222
 - care of equipment, 221
 - periodic inspection, 220
 - system flushing, 220
 - troubleshooting, 221
 - valves, 221
 - Markers, location, marine, 264
 - Material records, 497
 - Mesosphere, 34
 - Meter operation, 423-425
 - Missile and booster carts, 477
 - Missile component stowage, 476
 - Missile flight and jet propulsion, 32-63
 - aerodynamics, 32-35
 - basic flight principles, 35-44
 - acceleration, 38
 - aerodynamic forces, 35-38
 - basic motions, 35
 - Mach numbers and speed regions, 38
 - missile airframes, 43
 - stability and lift in modern missiles, 39-43
 - jet propulsion, principle of, 47-56
 - atmospheric jets, 52
 - components of systems, 49-52
 - hybrid propulsion, 56
 - rockets, 53-56
 - missile propulsion systems, 44-47
 - surface-to-air missiles, 50-63
 - Standard missile round, 62
 - Talos missile round, 56-58
 - Tartar missile round, 60-62
 - Terrier guided missile round, 58-60
 - Missile guidance and control, 64-100
 - classification of Navy missiles, 87
 - components and instruments, 68-73
 - Doppler principle, 86
 - feedback loops, 67
 - guidance phases, 75
 - sensors and pickoffs, 73-75
 - subsystems and components, 64
 - surface-to-air missiles, 88-100
 - Standard, 95-98
 - Talos, 98-100
 - Tartar, 92-95
 - Terrier, 89-92
 - types of guidance systems, 75-80
 - beam-rider, 80-83
 - command, 79-80
 - homing, 83-86
 - self-contained guidance systems, 75-77
 - surface-to-air, 77-79
 - Missile logs, 495
 - Missile propulsion systems, 44-47
 - Missile sections and their explosives, 272-273
 - Missiles, Navy classification of, 87
 - Modified housefall rig, 468
 - Multimeter, 424
 - Multimeter measurements, 436
 - Mutual-conductance, quality test, 436
- ## N
- NavPers 10052, Bibliography for Advancement Study, 8
 - Navy Directive System, 489
 - Navy lights, 270

GUNNER'S MATE M 3 & 2

Navy Maintenance and Material Management System, 394
Navy SWOP allowance list, 498
Noise test, 436
Nonpointing zones, 465
Nuclear weapons reports and records, 497

O

Ohmmeter, 423
One-function schematic diagrams, 444
Ordnance alteration, 491
Ordnance Data, 491
Ordnance drawings, 389-393
Ordnance history cards, 497
Ordnance identification, data and sources of, 500
Ordnance Pamphlets, 490
Oscillation, 191-196
Overlay relay, 235

P

Parallax, 20, 28
Planned maintenance, 393-396
Planned maintenance subsystem, 499
Pneumatic power, 213
 air operated unit, 213
 DUD jettison devices, 214
 handling equipment, 215
 maintenance, 216
 tests sets, 215
Power control circuit, 238
Power drive performance test, 455-561
Power relays or contactors, 230
Precession, 69
Preventive maintenance defined, 387
Printed circuits, troubleshooting, 447
Printed form logs, 496
Propellants, 22, 249
Pyrotechnics, 264
 depth charge markers, 264
 distress signals, 270
 flash signals, 271
 Navy lights, 270
 signal lights, 268-270
 smoke and flare markers, 265-268
 stowage of, 271

Q

Quals Manual, 4

R

Ramjet engine, 52
Rate gyros, 71
Rate training manuals, 8
Ready service crane, 477
Record of Practical Factors, 7
Rectifier test, 436
Relative humidity indicators, 277
Relay principles, 229-238
 circuit breakers, 231
 power relays or contactors, 230
 stepping relays, 233
 time-delay relays, 235-238
Reports, forms, and records, administrative, 492
Representative shipboard weapons system, 155-157
 control units, 156
 delivery units, 157
 destructive units, 157
 target detection, location and identification, 155
Resistance test, 428
Rim, application of explosive in, 272-276
Rocket fuels, 50
Rotary switches, 225-228
 J type, 225
 JR type, 226-228
Rough missile log, 496

S

Safety ,
 demolition, 385
 electrical devices used in launching systems, 247
 general maintenance, 421
 guided missile launching systems, 150
 hand grenades, 376
 hydraulics and pneumatics in missile systems, 222
 small arms, 364
 test equipment and troubleshooting, 450-454
Safing and arming (S & A) devices, 264
Schematic diagrams, 446
Sensitive meter type relay, 236
Sensors and pickoffs, 73-75
Servomechanisms, application of, 170-196
 expanded version of, 171
 launcher power drive, components of, 172-190
 demodulators, 183-185
 error detector, 172-178
 error reducer, 185-190

INDEX

- Servomechanisms, launcher power drive, components of - Continued
 - servoamplifier section, 181-183
 - synchro transmission 36:1, disadvantages of, 178-181
 - quality and performance of servos, how to improve, 190-196
 - acceleration feedback, 194
 - integral control, 195
 - movable CT stator method, 192
 - oscillation, 191-196
 - output-rate damping (feedback method), 192-194
 - overshooting, 191
 - Shaped charge warheads, 259
 - Ship Armament Inventory List, 493
 - Short circuit test, 436
 - Shotguns, 325-333
 - Winchester M12, 330-333
 - Winchester M97, 325-330
 - Shoulder weapons, 308-325
 - M14 rifle, 318
 - M16E1 rifle, 318-325
 - .30 caliber M1 carbine, 314-318
 - .30 caliber M1 rifle, 308-314
 - Signal lights, 268-270
 - Small arms, 297
 - automatic and semiautomatic firing systems, 298
 - handguns, 299-308
 - assembly, 303
 - cycle of operation, 304
 - disassembly, 299-303
 - .45 caliber automatic pistol, 299
 - safeties, 303
 - .38 caliber Smith and Wesson revolver, 305-308
 - line-throwing gun, .45 caliber, 333-335
 - machine guns, 335-350
 - Browning machine gun, caliber .30, M1919A4, 335
 - Browning machine gun, caliber .50, M2, 342-345
 - M60, 7.62-mm, machine gun, 345-350
 - operating principles, 298
 - safety precautions, 364-366
 - shotguns, 325-333
 - Winchester M12, 330-333
 - Winchester M97, 325-330
 - shoulder weapons, 308-325
 - M14 rifle, 318
 - M16E1 rifle, 318-325
 - .30 caliber M1 carbine, 314-318
 - .30 caliber M1 rifle, 308-314
 - submachine guns, 350-364
 - Browning automatic rifle, 354-364
 - M3A1 .45 caliber, 352
 - Small arms log, 495
 - Smith and Wesson .38 caliber revolver, 305-308
 - Smoke and flare markers, 265-268
 - Smooth missile battery log, 496
 - Solid propellant engines, 53
 - Solid propellants, 51
 - Sprinklers in missile magazines, 279-296
 - automatic control devices, 289-291
 - carbon dioxide system, 283-286
 - safety, 294-296
 - salt water system, 279-283
 - sprinkler system testing, 291
 - use of foam in firefighting, 286
 - water-injection system, 287
 - Stabilization, 19
 - Standard missile round, 62
 - Standard missiles, 95-98
 - Stepping relays, 233
 - Stowage of pyrotechnics, 271
 - Stratosphere, 34
 - Strikedown, 473-476
 - Subsonic flight, 39
 - Supplies, administrative aspect of, 499
 - Surface-to-air missiles, 56-63, 88-100
 - Standard missile round, 62
 - Talos missile round, 56-58
 - Tartar missile round, 60-62
 - Terrier guided missile round, 58-60
 - Synchro transmission 36:1, disadvantages of, 178-181
- ## T
- Talos, 90-100
 - Talos launching system, 121-144
 - control, 140-143
 - feeder system Mk 11, 133-139
 - functioning, 143
 - Mk 7 launcher, 122-131
 - train and elevation power drives, 131
 - Talos missile round, 56-58
 - Talos strikedown, 373
 - Target selection and tracking console, 158
 - Tartar, 92-95
 - Tartar firing circuit, 241
 - Tartar launching system, 144-150
 - control panels, 148-150
 - functioning, 150
 - launcher, 144-146
 - magazines, 146-148
 - Tartar missile round, 60-62
 - Tartar strikedown, 475
 - Technical publications, 490
 - Terrier, 89-92
 - Terrier guided missile round, 58-60

GUNNER'S MATE M 3 & 2

- Terrier launching system, 104-121
 - feeder system, 108-116
 - launcher, 116-120
 - location and arrangement aboard ship, 104-108
 - operation, 120
 - Terrier strikedown, 474
 - Test equipment and troubleshooting, 423-454
 - cathode-ray oscilloscope, 437-440
 - electrical measurements, precautions and techniques in making, 448-450
 - meter operation, 423-428
 - resistance, capacitance, and inductance, 428-434
 - a-c bridges, 429-432
 - d-c bridges, 428
 - megger, 432-434
 - safety precautions, 450-454
 - transistor circuits, servicing, 440-442
 - troubleshooting, 442-448
 - tube testing, 434-437
 - Test for grounds, 426
 - Test for shorts, 427
 - Test signals, 457-460
 - Thermosphere, 34
 - 3-M subsystem, 498
 - 3-M System, 498
 - Time-delay relays, 235
 - Train limit stop, 466
 - Training films, 10
 - Trajectory, influence of,
 - by interior forces, 21
 - condition of propellant, 22
 - drift, 22
 - initial velocity, 21
 - by outside forces, 13-21
 - air density, 15-17
 - coriolis, 18
 - gravity, 13-15
 - parallax, 20
 - stabilization, 19
 - trunnion tilt, 19
 - wind, 17
 - Transistor circuits, servicing, 440-442
 - Troposphere, 33
 - Trunnion tilt, 19
 - Tube testing, 434-437
 - Two-man rule, security measure, 501
- V**
- Vacuum tube voltmeter, 424
 - Voltage and resistance charts, 447
 - Voltage distribution diagrams, 446
 - Voltage test, 427
 - Voltmeter, 424
- W**
- Warhead exchange, 480-483
 - Warheads, 258-264
 - fuzes, 262-264
 - safing and arming (8 & A) devices, 264
 - types of, 258
 - Water-injection fire suppression system, 287-289
 - Weapons assignment console, 160
 - Weapons direction equipment, 157-161
 - director assignment console, 158-160
 - location and operation of consoles, 161
 - target selection and tracking console, 158
 - weapons assignment console, 160
 - Weapons publications, 497
 - Weapons system concept, 152-155
 - basic weapon components, 154
 - control units, 153
 - delivery units, 154
 - destructive units, 154
 - detecting units, 152
 - Winchester M12, 330-333
 - Winchester M97, 325-330
 - Wind, effect on projectile, 17, 28

☆ U.S. GOVERNMENT PRINTING OFFICE: 1972-483-620/20

INSIDE REAR COVER

