

# TABLE OF CONTENTS

---

|  |           |
|--|-----------|
| DEDICATION .....                                     | 3         |
| <b>INTRODUCTION .....</b>                            | <b>4</b>  |
| <b>FOREWORD .....</b>                                | <b>6</b>  |
| ACKNOWLEDGEMENTS .....                               | 8         |
| TABLE OF CONTENTS .....                              | 10        |
| <b>ANATOMY OF SAILS .....</b>                        | <b>15</b> |
| SAILCLOTH CATEGORIES .....                           | 15        |
| Woven Polyester (Dacron) .....                       | 17        |
| Fabric "Hand" .....                                  | 19        |
| LAMINATED FABRICS .....                              | 20        |
| Laminated Sailcloth Building Blocks .....            | 21        |
| Scrim Sails .....                                    | 21        |
| Taffeta Fabrics .....                                | 23        |
| Identifying Scrim Layer Fiber Type .....             | 25        |
| Identifying Woven Taffeta Fiber Types .....          | 26        |
| Spinnaker Fabrics .....                              | 28        |
| SAIL LAYOUT .....                                    | 31        |
| Laid Fiber Construction .....                        | 31        |
| Cross-Cut .....                                      | 32        |
| Radial-Cut .....                                     | 33        |
| Spinnakers .....                                     | 34        |
| Specialty Downwind Sails .....                       | 35        |
| Miter-Cut .....                                      | 36        |
| HOW SAILS ARE BUILT .....                            | 37        |
| Panel Shaping .....                                  | 37        |
| Edge Shaping .....                                   | 37        |
| Panel Assembly .....                                 | 38        |
| Plies and Reinforcements .....                       | 39        |
| Local Reinforcing .....                              | 41        |
| Corner Reinforcing .....                             | 41        |
| Edge Tabling .....                                   | 42        |
| Sail Finishing Style and Hardware Installation ..... | 43        |
| Hardware Selection .....                             | 45        |
| <b>SAIL DAMAGE CAUSE &amp; PREVENTION .....</b>      | <b>46</b> |
| FLEX FATIGUE .....                                   | 47        |
| FIBER COMPRESSION .....                              | 47        |
| Likely Causes .....                                  | 47        |
| Reef Considerations .....                            | 48        |
| FLOGGING .....                                       | 49        |
| Mainsail Flogging .....                              | 49        |
| Headsail Flogging .....                              | 50        |
| Roller Furling .....                                 | 50        |
| FLUTTER .....  | 50        |
| DELAMINATION .....                                   | 53        |
| CHAFE .....  | 54        |
| Chafe Patches .....                                  | 55        |
| Full Batten Pocket Chafe .....                       | 56        |
| Minimizing Spreader Chafe .....                      | 58        |
| SAIL HARDWARE FAILURES .....                         | 59        |
| Batten Pockets .....                                 | 59        |
| Leech Battens .....                                  | 59        |
| Keys to Cruising Batten Pockets .....                | 60        |
| Full Length Battens .....                            | 61        |
| Luff Slides .....                                    | 63        |
| Slide Attachment .....                               | 66        |
| Machine-Sewn Webbing .....                           | 67        |



## TABLE OF CONTENTS

---

|  |            |
|--|------------|
| Slide Shackles .....                                   | 67         |
| Hand-Sewn Webbing Slides .....                         | 69         |
| Jib Hanks .....  | 69         |
| Grommet and Press Ring Failures .....                  | 71         |
| Wire Ring Failure .....                                | 74         |
| NATURAL CAUSES .....                                   | 76         |
| How Fabric Reacts to U.V. ....                         | 76         |
| Sun Covers .....                                       | 78         |
| Sun Cover Choices .....                                | 79         |
| Stitching .....  | 82         |
| Seam Coatings .....                                    | 84         |
| Webbing Wear and Tear .....                            | 84         |
| Plastic .....  | 88         |
| God's Creatures .....                                  | 88         |
| Mildew .....   | 89         |
| Profile of a Typical Mildew Problem .....              | 90         |
| How to Avoid Mildew .....                              | 91         |
| If Mildew Occurs .....                                 | 91         |
| OPERATOR ERROR .....                                   | 92         |
| Spinnaker Problems .....                               | 92         |
| Spinnaker Break-In Period .....                        | 92         |
| Hardware Snags .....                                   | 93         |
| Spreader Ends/Batten Ends .....                        | 94         |
| Spinnaker Overboard .....                              | 95         |
| Spinnaker Poles .....                                  | 96         |
| Dousing Sleeve Problems .....                          | 96         |
| Headsail Luff Tapes .....                              | 100        |
| Luff Rope Mainsails .....                              | 101        |
| Furling Mainsails: In-Boom Furlers .....               | 102        |
| In-Mast Furlers .....                                  | 102        |
| Reef Intermediate Tie-In Points .....                  | 103        |
| <b>SAIL LOFT VISIT .....</b>                           | <b>104</b> |
| SELECTING A SAIL REPAIR LOFT .....                     | 104        |
| Dirt .....   | 104        |
| Floor Space .....                                      | 104        |
| Franchise vs. Independent Loft .....                   | 105        |
| Production Loft vs. Repair Loft .....                  | 105        |
| Staff .....  | 106        |
| WORKING WITH THE LOFT .....                            | 106        |
| Bring a Work List .....                                | 106        |
| Clean and Dry the Sails .....                          | 106        |
| Remove Hardware and Personal Items .....               | 107        |
| Bring Your Spares .....                                | 107        |
| The Work Order .....                                   | 108        |
| Long-Distance Relationships .....                      | 108        |
| <b>TOOLS AND TECHNIQUES .....</b>                      | <b>109</b> |
| HANDTOOLS .....  | 110        |
| Shears .....   | 110        |
| Sharpening .....                                       | 111        |
| Cutting Single Layers .....                            | 112        |
| Cutting Multiple Layers .....                          | 112        |
| Razor Knife and Aluminum Ruler .....                   | 113        |
| Seam Ripper .....                                      | 114        |
| Pushpins .....   | 116        |
| Steel Awl .....  | 116        |
| Battery-Powered Drill Motor and Small Drill Bits ..... | 117        |





## TABLE OF CONTENTS

---

|   |     |
|---|-----|
| Waxed Hand-Sewing Thread                    | 117 |
| Wax   | 117 |
| Hand-Sewing Needles                         | 118 |
| Hand-Sewing Palm                            | 118 |
| Small Vise-Grips or Pliers                  | 119 |
| Hot Knife                                   | 119 |
| Torch                                       | 120 |
| Fid and Marlinspike                         | 120 |
| Tupperware Containers                       | 120 |
| SUPPLIES                                    | 121 |
| Acetone                                     | 121 |
| Webbing                                     | 121 |
| Spectra and Dacron Cord                     | 121 |
| Dacron Tape                                 | 121 |
| Sailcloth                                   | 121 |
| Adhesives                                   | 122 |
| Adhesive Application: Glue First, Cut Later | 122 |
| Adhesive Choices                            | 122 |
| 5200 Fast Cure                              | 124 |
| 3M 950 Seamstick, Common Seamstick          | 125 |
| Hot Glue                                    | 126 |
| Contact Cement                              | 126 |
| Spray Glue                                  | 126 |
| Insignia Cloth                              | 126 |
| Applying Insignia Fabric                    | 127 |
| HAND-STITCHING TECHNIQUES                   | 129 |
| Threading the Needle                        | 129 |
| Stitching with a Palm                       | 130 |
| Sewing through Thick Sections               | 132 |
| Hand-Sewing Stitch Patterns                 | 134 |
| Knotting the Thread                         | 136 |
| WORKING WITH FABRIC                         | 138 |
| Window Patches                              | 138 |
| Band-Aid Patches                            | 138 |
| SELECTING FABRICS                           | 139 |
| Repairing Reasonably New Sails              | 139 |
| Repairing Very Used Sails                   | 139 |
| Flattening Out the Sail                     | 141 |
| GETTING THE SAIL UNDER THE MACHINE          | 142 |
| COMMERCIAL SEWING MACHINES                  | 144 |
| Spinnaker Seaming                           | 144 |
| Dacron/Laminate Seaming                     | 145 |
| Dacron/Laminate Tabling                     | 145 |
| Corner Reinforcing                          | 146 |
| Hardware Attachment                         | 146 |
| Mega-Sewing                                 | 147 |
| ONBOARD SEWING MACHINES                     | 148 |
| MACHINE SEWING TECHNIQUES                   | 150 |
| Sewing Machine Adjustments                  | 150 |
| Thread Guides                               | 152 |
| Top Thread Tension                          | 153 |
| Bobbin Tension                              | 155 |
| Machine Timing                              | 156 |
| Needle Bar Height                           | 157 |
| Bobbin Hook Timing                          | 159 |
| Thread Selection                            | 160 |





## TABLE OF CONTENTS

|   |            |
|---|------------|
| SAIL CLEANING .....                         | 161        |
| General Cleaning and Rinsing .....          | 161        |
| Mildew .....                                | 161        |
| Rust .....                                  | 163        |
| Blood .....                                 | 163        |
| Oil and Grease .....                        | 163        |
| Food and Drink .....                        | 163        |
| ONBOARD REPAIR KITS .....                   | 164        |
| Keep It Dry! .....                          | 164        |
| <b>DO-IT-YOURSELF REPAIRS .....</b>         | <b>166</b> |
| REPAIR BASICS .....                         | 166        |
| Cleanliness .....                           | 166        |
| Matching Materials .....                    | 167        |
| Tapering Loads .....                        | 167        |
| Avoiding Stress Creation .....              | 167        |
| Gluing to Correct Side .....                | 167        |
| How Large Should the Fix Be? .....          | 167        |
| It's Not Rocket Science .....               | 167        |
| BAND-AID PATCH .....                        | 168        |
| SPINNAKER FABRIC "WINDOW" PATCHES .....     | 171        |
| WORKING SAIL WINDOW PATCH .....             | 177        |
| BIG SPINNAKER BLOWOUTS .....                | 181        |
| REPAIRING VERY OLD SAILS .....              | 186        |
| Reef Area Repair .....                      | 191        |
| When Is a Sail Not Worth Repairing? .....   | 191        |
| Vertical Rips .....                         | 192        |
| LUFF SLIDE AND JIB HANK REPAIRS .....       | 195        |
| REINFORCING OF CORNER HARDWARE .....        | 202        |
| Hand-Sewing Hardware Reinforcements .....   | 205        |
| BATTEN POCKET INBOARD END REPLACEMENT ..... | 207        |
| Batten Pocket Recap .....                   | 214        |
| BATTEN FINISHING .....                      | 215        |
| BATTEN SPLINTS .....                        | 218        |
| HEADFOIL TAPE REPAIR .....                  | 219        |
| <b>SAIL HANDLING SYSTEMS .....</b>          | <b>223</b> |
| MAINSAIL SYSTEMS .....                      | 223        |
| Luff Tracks .....                           | 223        |
| Lazy Jacks .....                            | 224        |
| Dutchman .....                              | 224        |
| Stackpack .....                             | 224        |
| Stowmasts .....                             | 225        |
| Furling Booms .....                         | 226        |
| HEADSAIL SYSTEMS .....                      | 226        |
| Hanks .....                                 | 227        |
| Headfoil Furlers .....                      | 227        |
| Downwind Sail Systems .....                 | 228        |
| Free-Flying Furlers .....                   | 228        |
| Spinnaker Socks .....                       | 229        |
| INDEX .....                                 | 230        |