

# TOPPING OUT

A BSA Climbing/Rappelling Manual



BOY SCOUTS OF AMERICA®

# Contents

<b>Introduction</b> . . . . .	7	<b>Youth Protection in the</b>	
Climb On Safely and <i>Topping Out</i> . . . . .	8	Climbing Environment . . . . .	18
Climb On Safely: The Eight Points . . . . .	8	<b>Universal Access</b> . . . . .	18
<b>Chapter 1: Standards and Inspections</b> . . . . .	9	<b>Challenge by Choice</b> . . . . .	18
Frequency of Inspections . . . . .	9	<b>Setting Goals</b> . . . . .	19
<b>Chapter 2: Safety and Leadership</b> . . . . .	11	<b>Debriefing</b> . . . . .	19
Lead Climbing . . . . .	11	<b>Getting There Safely</b> . . . . .	20
Identifying Hazards . . . . .	12	<b>Leave No Trace</b> . . . . .	20
Potential Environmental Hazards . . . . .	12	Plan Ahead and Prepare . . . . .	20
Potential Human Hazards . . . . .	12	Travel and Camp on Durable Surfaces . . . . .	20
Responding to Risks . . . . .	12	Dispose of Waste Properly	
Breaking the Chain of Poor Judgment . . . . .	13	(Pack It In, Pack It Out) . . . . .	21
Accident Prevention . . . . .	13	Leave What You Find . . . . .	21
Personal Gear Checklist . . . . .	13	Minimize Campfire Impacts . . . . .	21
Instructors and Supervision . . . . .	14	Respect Wildlife . . . . .	21
Who's Who in BSA Climbing/		Be Considerate of Other Visitors . . . . .	21
Rappelling Programs . . . . .	14	<b>In Conclusion</b> . . . . .	22
Maintaining High Instructor Standards . . . . .	15	<b>Chapter 3: Equipment</b> . . . . .	23
Exercising Good Judgment With Instructors . . . . .	15	Procurement . . . . .	23
Physical Fitness . . . . .	15	Visual and Formal Inspections of Gear . . . . .	23
Be Prepared . . . . .	16	Visual Inspection . . . . .	24
Rules of Safety . . . . .	16	Formal Inspection . . . . .	24
General Safety . . . . .	16	Record Keeping . . . . .	24
Clothing . . . . .	16	Helmet and Hardware Record . . . . .	25
Shoes . . . . .	16	Harness Record . . . . .	26
Hair . . . . .	16	Hints for Marking Equipment . . . . .	27
Jewelry and Accessories . . . . .	16	Organizing Equipment Records . . . . .	27
Safety Rules for Directors		Retiring Equipment . . . . .	27
and Instructors . . . . .	17	Helmets . . . . .	27
Safety While Belaying, Climbing,		Gloves . . . . .	28
and Rappelling . . . . .	17	Shoes . . . . .	28
Safety While Bouldering . . . . .	17	Tape . . . . .	28
Safe Supervision and Instruction . . . . .	17	Chalk . . . . .	29
		Carabiners . . . . .	29
		Locking Carabiners . . . . .	29

Double-Locking Carabiners . . . . .	29	Water Knot (Ring Bend) . . . . .	52
Nonlocking Carabiners . . . . .	30	Double Fisherman's Knot (Grapevine Knot) . . . . .	52
Bent-Gate Carabiners . . . . .	30	Bowline . . . . .	53
Beware of Look-Alikes . . . . .	30	Bowline on a Bight . . . . .	53
Carabiner Care . . . . .	30	Girth Hitch . . . . .	53
Inspecting Carabiners . . . . .	31	Clove Hitch . . . . .	54
Dangerous Carabiner Loading Conditions . . . . .	31	Prusik Knot . . . . .	54
Webbing . . . . .	31	Münter Hitch (Italian Hitch) . . . . .	55
Ready-Made Runners . . . . .	32	Münter/Mule Knot . . . . .	55
Webbing . . . . .	32	Mariners Hitch . . . . .	56
Accessory Cord . . . . .	33		
Harnesses . . . . .	33	<b>Chapter 6: Anchor Points and</b>	
Kinds of Harnesses . . . . .	33	<b>Anchoring Systems . . . . .</b>	<b>57</b>
Buckle Up! . . . . .	34	Check Every Time . . . . .	57
Fitting Commercially Made Harnesses . . . . .	34	Safety Lines . . . . .	58
Fitting Waist-Belt/Leg-Loop Harnesses . . . . .	34	BSA Climbing/Rappelling Anchors . . . . .	58
Safety Concerns for Harnesses . . . . .	35	Anchor Points . . . . .	59
Tied Harnesses . . . . .	35	Natural Anchor Points . . . . .	59
Belay/Rappel Devices . . . . .	38	Artificial Anchor Points . . . . .	61
Slotted Plate . . . . .	38	Webbing vs. Rope to Set an Anchor . . . . .	61
Tube Device . . . . .	38	Bolts and Hangers . . . . .	64
Specialized Belay Devices . . . . .	38	Bolt Placement . . . . .	64
Storing Equipment . . . . .	38	Types and Sizes of Bolts . . . . .	64
		Bolt and Hanger Standards . . . . .	64
<b>Chapter 4: Rope and Rope Handling . . . . .</b>	<b>39</b>	Pitons . . . . .	65
BSA Rope Standards . . . . .	40	Anchoring Systems . . . . .	66
Purchasing New Rope . . . . .	40	Equalized, Angle, Redundant, No Extension	
Cutting Climbing Rope . . . . .	41	Solid, Timely . . . . .	66
Marking Rope . . . . .	41	Equalized Anchors . . . . .	66
Maintaining Records . . . . .	41	Two Anchors . . . . .	68
Rope Care and Maintenance . . . . .	42	Cordelette . . . . .	69
General Rope Care . . . . .	42	Reminders for Safe Anchoring Systems . . . . .	69
Washing Rope . . . . .	43		
Hard Fall . . . . .	43	<b>Chapter 7: Belaying and Belay Signals . . . . .</b>	<b>71</b>
Rope Inspection and Retirement . . . . .	43	Belaying in the BSA . . . . .	71
Coiling a Rope . . . . .	43	Safety on Edges . . . . .	73
Mountaineer's Coil . . . . .	44	Belaying From Above . . . . .	73
Butterfly Coil . . . . .	44	Belaying From Below . . . . .	74
Bagging a Rope . . . . .	45	Sitting vs. Standing Belay . . . . .	75
Stacking a Rope . . . . .	46	Belaying Variations . . . . .	75
Tossing a Rope Down a Cliff . . . . .	47	Belaying With Belay Devices . . . . .	75
Storing Ropes . . . . .	47	Verbal Signals for Climbers and Belayers . . . . .	77
		Hearing-Impaired Participants . . . . .	77
<b>Chapter 5: Knots and Knot Tying . . . . .</b>	<b>49</b>	Rock! . . . . .	78
Know Your Knot's Strength . . . . .	49	Signals for Belaying Climbers . . . . .	78
Parts of a Rope . . . . .	50	Signals for Belaying Rappellers . . . . .	79
Safety Knots . . . . .	50	Getting Out of a Belay System . . . . .	80
Knots for Anchoring, Climbing, Rappelling, and Belaying . . . . .	50	Assess the Situation First . . . . .	80
Figure Eight on a Bight . . . . .	51		
Figure Eight Follow-Through . . . . .	51		
Double-Loop Figure Eight . . . . .	52		

<b>Chapter 8: Climbing and Bouldering</b> . . . . .	<b>81</b>	Hypothermia . . . . .	114
Falling . . . . .	81	Dehydration . . . . .	115
In Case of Injury . . . . .	82	Heat Emergencies . . . . .	115
Climbing Classification System . . . . .	82	First Aid for Heat Exhaustion . . . . .	115
Bouldering . . . . .	83	First Aid for Heatstroke . . . . .	116
Spotting . . . . .	83	Abrasions, Cuts, and Scratches . . . . .	116
Verbal Signals for Boulders and Spotters . . . . .	84	Rope Burns . . . . .	116
Climbing . . . . .	84	Emergency Response Plan . . . . .	117
Footholds . . . . .	84	Summoning Aid . . . . .	117
Handholds . . . . .	85	Reporting Aid . . . . .	117
Combination Holds . . . . .	87	What to Do if a Climbing/Rappelling Accident Results in an Injury . . . . .	118
Resting While Climbing . . . . .	89	What to Do if a Climbing/Rappelling Accident Results in a Fatality . . . . .	118
Down-Climbing . . . . .	89	Online Reporting Procedure for Injury or Illness . . . . .	118
Climb Smart! Program . . . . .	90	What to Do in Any Accident or Emergency Situation . . . . .	119
<b>Chapter 9: Rappelling</b> . . . . .	<b>91</b>	After an Emergency . . . . .	119
Anchors . . . . .	91	Emergency Response Equipment . . . . .	119
Rappel Rope . . . . .	92	Emergency/Technical Response Practice . . . . .	120
Why Rappellers Are Belayed . . . . .	92	<b>Chapter 13: Staffing and</b>	
Rappel Program Protocol . . . . .	93	<b>Instructor Training</b> . . . . .	<b>121</b>
Figure Eight Descender . . . . .	94	BSA Climbing Director . . . . .	121
Rappelling Technique . . . . .	94	BSA Climbing Instructor . . . . .	122
Autoblock . . . . .	95	BSA Climbing Instructor-in-Training (IIT) . . . . .	123
Beginning Descents . . . . .	96	Additional Training . . . . .	123
Releasable Rappel . . . . .	96	Staff Training . . . . .	123
Single-Rope Rappel . . . . .	96	Learning Objectives . . . . .	124
Double-Rope Rappel . . . . .	96	Training Schedule for BSA Climbing Instructors . . . . .	125
<b>Chapter 10: Site Selection</b> . . . . .	<b>99</b>	Learning by Doing . . . . .	125
Natural Rock Faces . . . . .	99	<b>Resources</b> . . . . .	<b>131</b>
Artificial Walls . . . . .	99	Challenge Course and Climbing/Rappelling Health History and Consent Form . . . . .	133
Selecting a New Site for a BSA Climbing/ Rappelling Program . . . . .	100	Hold-Harmless/Release Agreement . . . . .	134
Evaluating the Safety of a Climbing/ Rappelling Area . . . . .	101	Non-Scout Use of Scout Facilities . . . . .	135
Weather . . . . .	101	Non-Scouting Release & Indemnity/ Hold-Harmless Agreement . . . . .	137
Rock . . . . .	101	Sample Letter of Agreement for Camp Use . . . . .	138
Climbing and Rappelling Towers and Artificial Climbing Walls . . . . .	102	Safety CHECK . . . . .	139
Portable Climbing Structures . . . . .	102	Additional Resources . . . . .	140
<b>Chapter 11: Conducting a Climbing/ Rappelling Program</b> . . . . .	<b>103</b>	Scouting Literature . . . . .	140
Program Presentation . . . . .	103	Instruction and Guidebooks . . . . .	140
<b>Chapter 12: Incident Resolution, First Aid, and Emergency Response</b> . . . . .	<b>109</b>	History and Biography . . . . .	141
Incident Resolution . . . . .	109	Videos . . . . .	141
Order of Resolution . . . . .	109	Organizations . . . . .	141
Stay Calm . . . . .	110	Internet Resources . . . . .	142
First-Aid Certification . . . . .	112	<b>Glossary</b> . . . . .	<b>143</b>
First-Aid Emergencies . . . . .	112	<b>Index to Figures</b> . . . . .	<b>149</b>
Head Injuries . . . . .	112		
Sprains and Contusions . . . . .	113		
Spinal Injuries . . . . .	113		

# Introduction

Young people today seek challenges. Climbing and rappelling offer them worthy opportunities to learn new skills, test themselves, and have a terrific time. It's hard to top the satisfaction of climbing a rock face and rappelling down a steep pitch. The introduction of the Climbing merit badge in the spring of 1997 spurred interest in these activities throughout the Boy Scouts of America. The proliferation of climbing areas in Scout camps and the development of artificial walls and alpine gyms across the United States have made the chance to climb and rappel available to Scouts almost everywhere.

*Topping Out* details the Boy Scouts of America's recommended procedure for conducting climbing and rappelling activities at district and council sites such as summer camps, and at council high-adventure bases. In addition to explaining appropriate equipment and techniques, this manual describes the qualifications and training of the directors and instructors who conduct BSA climbing/rappelling programs at the district and council levels. It also lays out a sample daylong program. (Readers should be aware that this manual provides an orientation only, and by itself does not constitute training in how to climb or rappel.)

There is inherent risk in climbing and rappelling. With proper leadership and adherence to high standards, however, the risk is minimized. Many factors play roles in the BSA's history of safely operating climbing/rappelling activities. Among the most important are these.

- The BSA limits district and council activities to *bouldering*, *top-roping*, and *belayed rappelling*. The National Project COPE and Climbing/Rappelling Standards (No. 430-008) apply to district and council activities. Units that elect to participate in snow and ice climbing and lead climbing without a top-rope belay should receive training from a nationally recognized organization that trains climbing instructors.
- BSA units that want to conduct their own bouldering, climbing, rappelling, or other related climbing activities should follow the guidelines put forth in *Climb On Safely*.

ALTHOUGH THE BSA HAS AN EXCELLENT SAFETY RECORD, THERE IS INHERENT RISK IN CLIMBING AND RAPPELLING. TO MANAGE THAT RISK, SCOUTING USES THE PROCEDURES SET FORTH IN TWO CLOSELY RELATED PUBLICATIONS—CLIMB ON SAFELY (FOR UNITS) AND THIS *TOPPING OUT: A BSA CLIMBING/RAPPELLING MANUAL* (FOR DISTRICTS AND COUNCILS).

**CLIMB ON SAFELY:  
THE EIGHT POINTS**

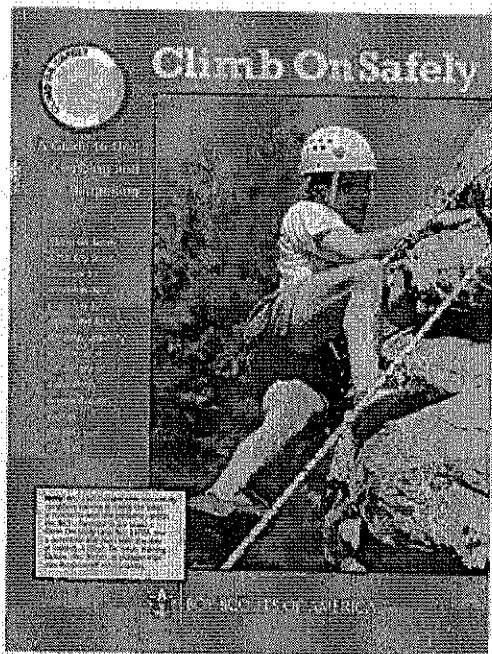
- 1 Qualified Supervision
- 2 Qualified Instructors
- 3 Physical Fitness
- 4 Safe Area
- 5 Equipment
- 6 Planning
- 7 Environmental Conditions
- 8 Discipline

**Climb On Safely and Topping Out**

To better assure the safety of participants and to standardize the qualifications expected of adults leading climbing and rappelling activities, the Boy Scouts of America has developed *Climb On Safely* as its recommended procedure for Scouting units conducting BSA climbing and rappelling activities at a natural site or a specifically designed facility such as a climbing wall or tower. Patterned after the successes of the BSA's Safe Swim Defense plan and Safety Afloat, *Climb On Safely* establishes the guidelines by which BSA unit climbing and rappelling activities are to be directed, and lays out the standards for equipment, sites, methods, supervision, and safety.

By comparison, the BSA's *Topping Out* manual addresses the needs of district, council, and unit climbing and rappelling activities. It is the BSA's most comprehensive publication on relevant aspects of climbing and rappelling. The manual may be a valuable resource for unit leaders in complying with *Climb On Safely* guidelines.

This manual is not intended to address every climbing/rappelling situation. For climbing and rappelling, the recommended reference is the seventh edition of *Mountaineering: The Freedom of the Hills*, edited by Don Graydon and Kurt Hanson. For caving, the recommended reference is *On Rope*, by Bruce Smith and Allen Padgett.



*Climb On Safely* establishes the guidelines for effectively and safely managing BSA unit climbing and rappelling activities.

# Chapter 1

## Standards and Inspections

The National Council of the Boy Scouts of America has developed the standards and inspection procedures detailed in this chapter to help ensure the highest degree of health and safety for participants and staff members engaged in climbing and rappelling activities conducted by BSA districts and councils.

### **Frequency of Inspections**

- National standards are revised annually, and the frequency and type of inspections must follow the current climbing national standards.
- All council or district climbing/rappelling activities—whether or not they are a part of a district activity, a summer camp, or a council high-adventure operation—must follow these standards and will be inspected accordingly.
- Climbing/rappelling activities may be inspected at times other than scheduled national resident-camp visitations.

THE COPE/CLIMBING  
VISITATION TEAM IS EMPOWERED  
TO INSPECT THE FACILITIES  
AND ACTIVITIES OF CLIMBING  
AND RAPPELLING PROGRAMS AND  
OF PROJECT COPE COURSES.

