CHAPTER 9

Fire Fighter I

Ropes and Knots

KNOWLEDGE OBJECTIVES

After studying this chapter, you will be able to:

- Describe the four primary types of fire service rope. (**NFPA 1001: 4.3.20**, pp. 295–297)
- List the two types of life safety rope and their minimum breaking strength. (**NFPA 1001: 4.3.20**, p. 295)
- Describe the characteristics of escape rope and fire escape rope. (**NFPA 1001: 4.3.20**, pp. 295–296)
- Describe the characteristics of water rescue throwlines. (**NFPA 1001: 4.3.20**, p. 296)
- Describe the characteristics of utility ropes. (**NFPA 1001: 4.3.20**, pp. 296–297)
- Describe the characteristics of webbing. (**NFPA 1001: 4.3.20**, p. 297)
- List the disadvantages of natural fiber ropes. (**NFPA 1001: 4.3.20**, pp. 297–298)
- List the advantages of synthetic fiber ropes. (**NFPA 1001: 4.3.20**, p. 298)
- List the disadvantages of synthetic fiber ropes. (**NFPA 1001: 4.3.20**, p. 298)
- List the types of synthetic fibers that are used in fire service rope. (**NFPA 1001: 4.3.20**, p. 298)
- Describe how twisted ropes are constructed. (**NFPA 1001: 4.3.20**, pp. 298–299)
- Describe how braided ropes are constructed. (**NFPA 1001: 4.3.20**, p. 299)
- Describe how kernmantle ropes are constructed. (**NFPA 1001: 4.3.20**, pp. 299–300)
- Explain the differences between dynamic kernmantle rope and static kernmantle rope. (**NFPA 1001: 4.3.20**, pp. 299–300)
- List the four components of the rope maintenance formula. (**NFPA 1001: 4.3.20**, p. 300)
- Describe how to preserve rope strength and integrity. (**NFPA 1001: 4.3.20**, pp. 300–301)
- Describe how to clean rope. (**NFPA 1001: 4.5.1**, pp. 301, 302)
- Describe how to inspect rope. (**NFPA 1001: 4.5.1**, pp. 301, 302–303)
- Describe how to keep an accurate rope record. (**NFPA 1001: 4.5.1**, pp. 303–304)
- Describe how to store rope properly. (**NFPA 1001: 4.5.1**, pp. 304–305)
- List the terminology used to describe the parts of a rope when tying knots. (**NFPA 1001: 4.3.20**, p. 305)
- List the terminology used to describe the bends in rope that are formed when a knot is tied. (**NFPA 1001: 4.3.20**, p. 306)
- List the common types of knots that are used in the fire service. (**NFPA 1001: 4.3.20**, p. 306)
- Describe the characteristics of a safety knot. (**NFPA 1001: 4.3.20**, pp. 307, 308)

- Describe the characteristics of a half hitch. (**NFPA 1001: 4.3.20**, pp. 307, 309)
- Describe the characteristics of a clove hitch. (**NFPA 1001: 4.3.20**, pp. 307, 310–311)
- Describe the characteristics of a figure eight knot. (**NFPA 1001: 4.3.20**, pp. 312–315)
- Describe the characteristics of a bowline knot. (**NFPA 1001: 4.3.20**, pp. 315, 316)
- Describe the characteristics of a sheet bend. (**NFPA 1001: 4.3.20**, pp. 315, 317)
- Describe the characteristics of a water knot. (**NFPA 1001: 4.3.20**, pp. 315, 318)
- Describe the methods used to hoist a tool. (**NFPA 1001: 4.3.20**, pp. 318–324)

SKILLS OBJECTIVES

After studying this chapter, you will be able to perform the following skills:

- Care for life safety ropes. (**NFPA 1001: 4.5.1**, pp. 300–301)
- Clean fire department ropes. (**NFPA 1001: 4.5.1**, pp. 301, 302)
- Inspect fire department ropes. (**NFPA 1001: 4.5.1**, pp. 301, 303)
- Place a life safety rope in a rope bag. (**NFPA 1001: 4.5.1**, pp. 304, 305)
- Tie a safety knot. (**NFPA 1001: 4.1.2, 4.3.20**, pp. 307, 308)
- Tie a half hitch. (**NFPA 1001: 4.1.2, 4.3.20**, pp. 307, 309)
- Tie a clove hitch in the open. (**NFPA 1001: 4.1.2, 4.3.20**, pp. 307, 310)
- Tie a clove hitch around an object. (**NFPA 1001: 4.1.2, 4.3.20**, pp. 307, 311)
- Tie a figure eight knot. (**NFPA 1001: 4.1.2, 4.3.20**, p. 312)
- Tie a figure eight on a bight. (**NFPA 1001: 4.1.2, 4.3.20**, p. 313)
- Tie a figure eight follow-through. (**NFPA 1001: 4.1.2, 4.3.20**, p. 314)
- Tie a figure eight bend. (**NFPA 1001: 4.1.2, 4.3.20**, p. 315)
- Tie a bowline. (**NFPA 1001: 4.1.2, 4.3.20**, pp. 315, 316)
- Tie a sheet or Becket bend. (**NFPA 1001: 4.1.2, 4.3.20**, pp. 315, 317)
- Tie a water knot. (**NFPA 1001: 4.1.2, 4.3.20**, pp. 315, 318)
- Hoist an axe. (**NFPA 1001: 4.1.2, 4.3.20**, p. 319)
- Hoist a pike pole. (**NFPA 1001: 4.1.2, 4.3.20**, p. 320)
- Hoist a ladder. (**NFPA 1001: 4.1.2, 4.3.20**, pp. 320, 321)
- Hoist a charged hose line. (**NFPA 1001: 4.1.2, 4.3.20**, p. 322)
- Hoist an uncharged hose line. (**NFPA 1001: 4.1.2, 4.3.20**, pp. 322, 323)
- Hoist an exhaust fan or power tool. (**NFPA 1001: 4.1.2, 4.3.20**, pp. 322, 324)

ADDITIONAL NFPA STANDARD

- **NFPA 1858**, *Standard of Selection, Care, and Maintenance of Life Safety Rope and Equipment for Emergency Services*
- **NFPA 1983**, *Standard on Life Safety Rope and Equipment for Emergency Services*

Fire Alarm

You and your partner are on the fourth floor of a multistory apartment building and find yourself trapped by a rapidly progressing fire. You get to a bedroom at the front of the building and know your only escape route is out the window. You don't have time to wait for the aerial ladder to get to you, so you quickly consider your training for self-rescue. You pull out your rope and begin the most important task you have ever done in your life.

1. What type of rope would you want to use for this type of activity?
2. What rope construction method would be used for this rope?
3. What type of knot would you use?