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Rigging Physics for Rope Rescue

This ***two-day*** course gives participants a working foundation of the basic physical principles that govern rope rescue systems. These principles include friction, tension, compression, arresting force, and force multipliers.

Once these principles are understood, a variety of rigging systems will be evaluated with a specific emphasis on identifying and managing force multipliers which can undermine the integrity and safety of rescue and rope access rigging.

Prerequisites: To achieve the full benefit of this class, students should have previously completed rope rescue and fall protection training.

Safety and Rescue Training
for high-hazard work activities

Confined Space
Fall Protection
Tower
Rescue

Course Objectives

At the completion of this training, students should be able to:

1. Identify the qualities of different rescue knots and how they impact rigging performance.
2. Estimate compression and tension forces on anchors and high points.
3. Calculate the forces (vectors and resultants) applied to rope systems.
4. Analyze static and dynamic friction effects on rigging systems.
5. Estimate expected shock loads imparted on fall protection/belay systems.

Our programs reflect:

ANSI/ASSE Z490.1-2009 *Criteria for Accepted Practices in Safety, Health, and Environmental Training*

Course Outline

Knots: Microcosms of Rigging

- Nomenclature
- Principles of Rescue Knots
- The Effect of Knots in Rigging Physics

Anchor Considerations

- Bombproof vs. Marginal
- Compression and Tension
- Static Safety Factors
- Dynamic Safety Factors
- Critical Angles and Resultants

Friction

- Friction Formulas
- Using Friction When Lowering
- Managing Friction When Raising

Load Management

- Mainline Considerations
- Belay Line Considerations
- Calculating Fall Factors
- Belay Activation Reaction Time *(Required Hands-on Practical)*

Managing High-Tension Systems

- Highline Calculations
- Highline Design
- Highline Failure Study