ACP 1000-2.2-202x
Rescue and Fall Protection Standard: Rescue Training Requirements

January 2022

AMERICAN CLEAN POWER ASSOCIATION
Standards Committee
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ACP 1000-2.2-202x Rescue and Fall Protection Standard: Rescue Training Requirements

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FOREWORD

The Foreword section is included with this document for information purposes only and are not part of the American Clean Power Association (ACP) ACP 1000-2.2-202x Rescue and Fall Protection Standard: Rescue Training Requirements.

Foreword

This standard, national in scope, was developed by an Accredited Standards Committee functioning under the procedures of the American National Standards Institute (ANSI), with the American Clean power Association (ACP) as Secretariat.

It is intended that every employer whose operations fall within the scope and purpose of the standard will adopt the guidelines and requirements detailed in this standard.

The need for this standard activity grew out of the American wind energy industry’s desire to help define minimum training requirements for fall protection and rescue within the wind industry. The focus is to provide the tools with which employers may develop training programs that incorporate those elements. This standard can also be used to help evaluate third party training to ensure it meets minimum requirements. This standard applies to occupational activities. It does not apply to sports activities such as mountaineering.

Neither the Standards Committee, nor the Secretariat, states that this standard is perfect or in its ultimate form. It is recognized that new developments are to be expected, and that revisions of the standard will be necessary as the state-of-the-art progresses and further experience is gained. It is felt, however, that uniform guidelines for fall protection and rescue in the wind industry is very much needed and that the standard in its present form provides for the minimum criteria necessary to develop and implement a comprehensive training program for fall protection and rescue within the American wind energy industry.

Basic fall safety principles have been incorporated into these standards, including hazard survey, hazard elimination and control, and education and training. The primary intent is to ensure a proactive approach to fall protection and rescue training within the American wind energy industry.

The Rescue and Self-Evacuation Subcommittee solicits public input that may suggest the need for revisions to this standard. Such input should be sent to the Secretariat, American Clean Power Association, 1501 M St. NW Suite 900, Washington DC 20005 or standards@cleanpower.org.

This standard was developed by the Rescue and Self-Evacuation Subcommittee and approved by the Environmental, Health, and Safety Standards Committee for submittal to ANSI. Committee approval of the standard does not necessarily imply that all committee members voted for its approval.
# Table of Contents

1. **General Information** .................................................................................................................. 9  
   1.1 Purpose ................................................................................................................................. 9  
   1.2 Scope ................................................................................................................................... 9  
   1.3 Exceptions ............................................................................................................................ 9  
   1.4 Interpretations ....................................................................................................................... 9  

2. **Definitions** .............................................................................................................................. 9  

3. **List of Acronyms** ..................................................................................................................... 9  

4. **Adherence to Regulations** ....................................................................................................... 10  

5. **Types of Rescue** ..................................................................................................................... 10  

6. **Training Requirements by Type of Rescue** ........................................................................... 11
1 General Information

1.1 Purpose

This standard addresses definitions and nomenclature used for the ACP 1000-2 202X Rescue and Fall Protection Training Standard in the American wind energy industry.

E1.1 This standard identifies the recommended minimum training guidelines for persons rescuing in wind turbines and associated structures within the American wind energy industry. These guidelines have been developed through cooperative discussions with American Clean Power Association (ACP) membership representing a cross section of the industry.

This standard is the recommended minimum guidelines for a training program which includes shared best practices from many member companies in the American wind energy industry, and are only meant to be a guideline when evaluating, creating or enhancing a training program. Employers are encouraged to make additions to the guidelines where company policy or regulations require a more protective level of training.

1.2 Scope

1.2.1 This standard identifies the recommended minimum training guidelines for persons rescuing in wind turbines and associated structures within the American wind energy industry.

1.3 Exceptions

1.3.1 The scope of these standards do not include window cleaner belts or sports-related activities.

1.3.2 Body belts, window cleaner belts, chest-waist harnesses and chest harnesses, even when referred to as body supports, are not addressed by the provisions of this standard.

1.3.3 Systems that incorporate horizontal lifelines and personal protective systems for activities such as climbing, man riding, work positioning, rescue and evacuation may suitably incorporate components or subsystems specified herein. When incorporated into such systems, however, those systems, subsystems and components are not within the scope of these standards when used for recreational purposes.

1.4 Interpretations

1.4.1 Requests for interpretations of this standard shall be made in writing to the Secretariat of this standard.

2 Definitions

Definitions used in this standard are found in ACP 1000-2.1-202x Definitions and Nomenclatures Standard in the American wind energy industry.

3 List of Acronyms

Acronyms used in this standard are found in ACP 1000-2.1-202x Definitions and Nomenclatures Standard in the American wind energy industry.
4 Adherence to Regulations

4.1 This standard requires adherence to State and Federal regulations governing fall hazards in the workplace.

4.2 Where this standard appears to conflict with State or Federal regulations, such State or Federal regulations shall prevail.

4.3 Employers are not prohibited from adding protective requirements beyond what State and Federal regulations require, so long as the additions are at least as protective as the regulation(s).

E 4.3 Occupational Safety and Health Administration regulations are found in 29 CFR 1910 Subparts D and I, and 29 CFR 1926 Subpart M. Additional regulations which may apply are found in 29 CFR 1910.269. ANSI Z359, current revision, should be referenced when considering backup systems. Some State plans may have additional requirements for control of fall hazards.

Section 5(a)1 of the OSH act also requires employers to identify hazards, both real and predicted, in the workplace and put controls in place to mitigate those hazards. Where the regulations are silent, consensus standards and company policies shall be used to mitigate the identified and predicted hazards in the workplace.

4.4 Equipment used in fall protection and rescue has weight limits which have been identified for testing and certifying operation of the equipment in preventing and arresting falls from height while complying with regulations.

4.4.1 Fall protection and rescue equipment shall meet the requirements of ANSI Z359, current revision.

4.4.1.1 A person using this equipment shall not weigh less than 130 lbs. or more than 310 lbs. when equipped to climb with all the required personal protective equipment (PPE), clothing, and required pieces of equipment.

E 4.4.1.1 An employer wishing to have a climber outside of the certified performance weight range of any piece of equipment, certified to ANSI Z359, would have to have such equipment tested and certified to provide at least the level of performance the equipment was designed for, and be able to adhere to established OSHA and industry standards while using the equipment.

4.5 Employers should implement a risk-based assessment for activities which require persons to climb turbines and put risk mitigation procedures in place prior to the activity commencing.

E 4.5 A risk-based assessment is meant to identify factors which could affect the safety of the climbers. Factors such as physical, mental, skill level, experience of the climber and equipment limitations must be considered when assessing the risk of a turbine climbing activity.

Service lifts and climb assist systems should be treated as if they will not be available and therefore, the risk assessment should be made with this hazard as a possibility. Without a lift or assist device, the risk assessment should be formulated with a self-powered climb up and down the tower as a requirement.

5 Types of Rescue

5.1 Vertical Rescue describes a movement that is vertical in direction.
E 5.1 Many rescue systems can be used as passive, active or both. Employers are encouraged to select equipment which supports their risk assessment for the job assignments and the likelihood of using a rescue system in a specific mode of operation.

5.2 Horizontal Rescue describes a movement that is horizontal in direction.

5.3 Self-Rescue describes the movements an individual would use to rescue themselves.

E 5.3 Self-Rescue most commonly describes self-evacuation where the individual would use equipment to escape from a dangerous condition from a location at height.

Self-Rescue may also include the ability to rescue from other dangerous situations such as hanging from fall arrest lanyards after a fall has been arrested.

6 Training Requirements by Type of Rescue

6.1 Vertical Rescue training requirements shall include the following:

6.1.1 Demonstrate the ability to inspect and package the rescue system using manufacturer’s documentation.

6.1.2 Demonstrate an understanding of the employer rescue plan.

E 6.1.2 Employers are encouraged to have a rescue plan prepared before assigning employees to job assignments where a rescue may be required. Employees should be trained to understand the elements of the rescue plan and how they fit into the plan in an emergency.

6.1.3 Demonstrate the ability to perform a scene assessment and identify hazards which could endanger the rescue members or the victim requiring rescue.

E 6.1.3 This requirement is beyond the traditional hazard analysis which may have been created before the emergency requiring vertical rescue occurred. When an emergency occurs in a wind turbine, the hazard which created the emergency must be identified and controlled so that rescuers are not exposed to the same hazard.

Rescue operations may also create additional hazards that might not be present before the emergency occurred. Hazardous energy, enclosed spaces, environmental and human factors should be identified and controlled to prevent further injury to the victim as well as potential injuries to the rescue members.

6.1.4 Demonstrate the ability to identify the method for vertical rescue.

6.1.4.1 Identify the route of vertical rescue.

6.1.4.1.1 Be able to describe vertical routes in a tower.

6.1.4.1.2 Be able to describe vertical routes from a nacelle.

6.1.4.1.3 Be able to describe vertical routes from the hub.

6.1.4.2 Identify equipment function(s) required to accomplish the vertical rescue.

6.1.4.2.1 Identify mechanical advantage requirements to perform a lift of the victim.

6.1.4.2.2 Identify device functional requirements to complete a controlled lowering of the victim.

6.1.4.2.3 Identify additional pieces of equipment which may be required to support the raising or lowering of a victim.

E 6.1.4.2.3 There are many different rescue systems in use within the American wind energy industry. Each system may be made up of different parts that are used to accomplish the same task of raising and controlled lowering of a victim.
Employers are encouraged to train their personnel on the system or systems their employees will be assigned to use during their role as a rescue team member.

6.1.4.2.4 Identify the requirements for packaging the victim to complete the vertical rescue.

E 6.1.4.2.4 Victim packaging requirements for a rescue may vary depending on the type of injury, location in the turbine and possible damage to personal fall protection equipment. Employers are encouraged to develop guidelines which help establish criteria for rescue equipment which meets the needs for the types of anticipated victim movements in the wind turbines they have employees assigned to.

6.1.5 Demonstrate setting up the rescue equipment for a vertical rescue.

6.1.5.1 Demonstrate identifying an anchor of suitable strength.

E 6.1.5.1 Rescue anchors are selected for a static load use. Typical anchor strength requirements are for supporting a maximum of 2 persons, with a maximum weight of 310 lbs. per person and a 5:1 safety factor. This suggests that rescue anchors should be selected to support 3,100 lbs. for a 2-person load.

6.1.5.2 Demonstrate connecting the rescue system to the anchor using the manufacturer’s recommended method.

E 6.1.5.2 Certain rigging configurations can multiply forces on the rigging and the anchors. Employers are encouraged to identify sling angles which multiply forces beyond what the equipment is designed to withstand and establish criteria which maintains an acceptable safety margin.

6.1.5.3 Demonstrate connection of the rescue system to the victim or the packaging system following manufacturer’s recommended method.

6.1.5.4 Demonstrate lifting the victim using the rescue system mechanical advantage mechanism.

E 6.1.5.4 Rescue systems used in the American wind energy industry have different methods of mechanical advantage application. Some mechanical advantage systems are used in series or parallel with the main rescue system component and others have the mechanical advantage contained within the primary rescue system components.

Employers are encouraged to train the types of mechanical advantage systems their employees will be assigned to use as part of a rescue. Manufacturer’s documentation will identify how the mechanical advantage is to be used with the rescue device.

6.1.5.5 Demonstrate lowering the victim while maintaining control of the descent speed.

6.1.5.6 Demonstrate maneuvering the victim around and through obstacles while raising and descending.

E 6.1.5.6 There are many ways to maneuver a victim in descent. Some of these can include other mechanical systems and components to move the victim, devices which work on the loaded line to move the victim, and simply having another rescuer manually handling the victim. Some packaging systems incorporate devices to allow for changing the position of the victim from horizontal to vertical and any position in between.

Employers are encouraged to have training requirements for the method that they have chosen to use if maneuvering the victim is required in the vertical rescue.

6.1.5.7 Demonstrate slowing the descent speed as the victim approaches the point of landing on a surface.

6.1.5.8 Demonstrate landing the victim on a surface while maintaining control of the rescue system.
6.1.5.9 Explain hazards to the victim and others who may be directly below the point of lowering.
6.1.5.9.1 Explain steps that can be taken to reduce the risks to the victim and others who may be located below the point of lowering.

6.1.5.10 Demonstrate effective communication throughout the vertical rescue.

6.1.5.11 Demonstrate regular checks on victim condition throughout the vertical rescue.

6.2 Horizontal rescue training requirements shall contain the following:

6.2.1 Demonstrate the ability to inspect and package the rescue system using manufacturer’s documentation.

6.2.2 Demonstrate an understanding of the employer rescue plan.

E 6.2.2 Employers are encouraged to have a rescue plan prepared before assigning employees to job assignments where a rescue may be required. Employees should be trained to understand the elements of the rescue plan and how they fit into the plan in an emergency.

6.2.3 Demonstrate the ability to perform a scene assessment and identify hazards which could endanger the rescue members or the victim requiring rescue.

E 6.2.3 This requirement is beyond the traditional hazard analysis which may have been created before the emergency requiring horizontal rescue occurred. When an emergency occurs in a wind turbine, the hazard which created the emergency must be identified and controlled so that rescuers are not exposed to the same hazard.

Rescue operations may also create additional hazards that might not be present before the emergency occurred. Hazardous energy, enclosed spaces, environmental and human factors should be identified and controlled to prevent further injury to the victim as well as potential injuries to the rescue members.

6.2.4 Demonstrate the ability to identify the method of horizontal rescue.

6.2.4.1 Identify the route of horizontal rescue.

6.2.4.2 Be able to describe horizontal routes in a tower.

6.2.4.3 Be able to describe horizontal routes in a nacelle.

6.2.4.4 Be able to describe horizontal routes in a hub.

6.2.5 Identify equipment function(s) required to accomplish the horizontal rescue.

6.2.5.1 Identify mechanical advantage requirements to move the victim horizontally.

6.2.5.2 Identify the device functional requirements to move the victim horizontally while maintaining control.

E 6.2.5.2 Once a victim is moved horizontally away from an overhead anchor, a risk of uncontrolled swing is introduced to the rescue. Employers are encouraged to develop procedures which describe how to minimize a potential uncontrolled swing of the victim while moving them horizontally.

6.2.5.3 Identify additional pieces of equipment which may be required to support the horizontal movement of the victim.

E 6.2.5.3 There are many different rescue systems in use within the American wind energy industry. Each system may be made up of different parts that are used to accomplish the same task of moving a victim horizontally.

Employers are encouraged to train their personnel on the system or systems their employees will be assigned to use during their role as a rescue team member.
6.2.5.4 Identify the requirements for packaging the victim to complete the horizontal rescue.

E 6.2.5.4 Victim packaging requirements for a rescue may vary depending on the type of injury, location in the turbine and possible damage to personal fall protection equipment.

Employers are encouraged to develop guidelines which help establish criteria for rescue equipment which meets the needs for the types of anticipated victim movements in the wind turbines they have employees assigned to.

6.2.6 Demonstrate setting up the rescue equipment for a horizontal rescue.

6.2.6.1 Demonstrate identifying an anchor of suitable strength.

E 6.2.6.1 Rescue anchors are selected for a static load use. Typical anchor strength requirements are for supporting a maximum of 2 persons, with a maximum weight of 310 lbs. per person and a 5:1 safety factor. This suggests that rescue anchors should be selected to support 3,100 lbs. for a 2-person load.

6.2.6.2 Demonstrate connecting the rescue system to the anchor using the manufacturer’s recommended method.

E 6.2.6.2 Certain rigging configurations can multiply forces on the rigging and the anchors. Employers are encouraged to identify sling angles which multiply forces beyond what the equipment is designed to withstand and establish criteria which maintains an acceptable safety margin.

6.2.6.3 Demonstrate connection of the rescue system to the victim or the packaging system following manufacturer’s recommended method.

6.2.6.4 Demonstrate moving the victim horizontally using the rescue system mechanical advantage mechanism.

E 6.2.6.4 Rescue systems used in the American wind energy industry have different methods of mechanical advantage application. Some mechanical advantage systems are used in series or parallel with the main rescue system component and others have the mechanical advantage contained within the primary rescue system components.

Employers are encouraged to train the types of mechanical advantage systems their employees will be assigned to use as part of a rescue. Manufacturer’s documentation will identify how the mechanical advantage is to be used with the rescue device.

6.2.6.5 Demonstrate moving the victim while maintaining control of the speed.

6.2.6.6 Demonstrate maneuvering the victim around and through obstacles while moving horizontally.

E 6.2.6.6 There are many ways to maneuver a victim in a horizontal movement. Some of these can include other mechanical systems and components to move the victim, devices which work on the loaded line to move the victim and another rescuer manually handling the victim. Some packaging systems incorporate devices to allow for changing the position of the victim from horizontal to vertical and any position in between.

Employers are encouraged to have training requirements for the method that they have chosen to use if maneuvering the victim is required in the horizontal rescue.

6.2.6.7 Demonstrate slowing the horizontal speed as the victim approaches the point of landing on a surface.

6.2.6.8 Demonstrate landing the victim on a surface while maintaining control of the rescue system.
6.2.6.9 Explain hazards to the victim and others who may be directly below the point of a horizontal movement.

6.2.6.9.1 Explain steps that can be taken to reduce the risks to the victim and others who may be located below the point of movement.

6.2.6.10 Demonstrate effective communication throughout the horizontal rescue.

6.2.6.11 Demonstrate regular checks on victim condition throughout the horizontal rescue.

6.3 Self-Rescue training requirements shall contain the following:

6.3.1 Demonstrate the ability to inspect and package the rescue system using manufacturer’s documentation.

6.3.2 Demonstrate an understanding of the employer rescue plan.

Employers are encouraged to have a rescue plan prepared before assigning employees to job assignments where a rescue may be required. Employees should be trained to understand the elements of the rescue plan and how they fit into the plan in an emergency.

6.3.3 Demonstrate the ability to perform a scene assessment and identify hazards which could endanger the person making a self-rescue.

This requirement is beyond the traditional hazard analysis which may have been created before the emergency requiring vertical rescue occurred. When an emergency occurs in a wind turbine, the hazard which created the emergency must be identified and controlled so that rescuers are not exposed to the same hazard.

Rescue operations may also create additional hazards that might not be present before the emergency occurred. Hazardous energy, enclosed spaces, environmental and human factors should be identified and controlled to prevent further injury to the individual(s) self-rescuing.

6.3.4 Demonstrate the ability to identify the method of self-rescue.

6.3.4.1 Identify the route of self-rescue.

6.3.4.2 Be able to describe self-rescue routes in a tower.

6.3.4.3 Be able to describe self-rescue routes in a nacelle.

6.3.4.4 Be able to describe self-rescue routes in a hub.

6.3.5 Identify equipment function(s) required to accomplish a self-rescue.

6.3.5.1 Identify any mechanical advantage requirements to perform a self-rescue.

6.3.5.2 Identify the device functional requirements to conduct the self-rescue while maintaining control.

Self rescue is most commonly addressed as a vertical movement; either ascending or descending. The device functional requirements must control the movements such that an uncontrolled movement is not encountered.

6.3.6 Identify additional pieces of equipment which may be required to support the self-rescue.

Employers are encouraged to train their personnel on the system or systems their employees will be assigned to use for self-rescue.

6.3.7 Demonstrate setting up the self-rescue equipment for a self-rescue.
6.3.7.1 Demonstrate identifying an anchor of suitable strength.

E 6.3.7.1 Rescue anchors are selected for a static load use. Typical anchor strength requirements are for supporting a maximum of 2 persons, with a maximum weight of 310 lbs. per person and a 5:1 safety factor. This suggests that rescue anchors should be selected to support 3,100 lbs. for a 2-person load.

6.3.7.2 Demonstrate connecting the self-rescue system to the anchor using the manufacturer’s recommended method.

E 6.3.7.2 Certain rigging configurations can multiply forces on the rigging and the anchors. Employers are encouraged to identify sling angles which multiply forces beyond what the equipment is designed to withstand and establish criteria which maintains an acceptable safety margin.

6.3.7.3 Demonstrate connection of the self-rescue system to the individual performing the self-rescue.

6.3.8 Demonstrate control of the rescue device during the self-rescue.

E 6.3.8 A common direction of travel for self-rescue is mostly vertical as can be expected in an evacuation from a place of height. The individual performing self-rescue should be able to demonstrate control during the descent and slowing the descent speed as they approach the landing area.

6.3.8.1 Explain the hazards of remaining below the point of evacuation and steps to take which can reduce the hazards.

E 6.3.8.1 There can be many reasons for performing a self-rescue from height. Among these can include conditions where materials can be dropping from height such as can be encountered in a fire emergency, others preparing for self-rescue, and loose items around the point of egress.

Employers are encouraged to develop procedures which inform their employees what steps to take to protect themselves and reduce the risk from falling objects during after self-rescue.

6.3.9 Demonstrate effective communications throughout the self-rescue.