SAFETY

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Different rescue scenarios call for different measures

Key techniques for preparedness in all wind turbine emergency situations

By Jeff Wild, DEUS Rescue and Hugh Biggle, Impact Access

Performing their duties at-height in wind towers over 100 meters, it isn't of a matter of if, but when tower technicians may be in need of rescue.

Falls, slips and trips, falling objects, electrical and mechanical issues, the fitness of workers, and weather conditions are all hazards that can play a part in accidents that may occur when working in and around wind turbines. Being well prepared and thinking through such scenarios in advance may make the difference between life and death.

The Occupational Safety and Health Administration (OSHA) requires that employers provide for "prompt rescue in the event of a fall or assure that employees are able to rescue themselves" to prevent the potential for suspension trauma. ANSI Z359.2-2007 also has guidance on rescue requirements, procedures and training that employers need to implement in their safety programs.

What Role Does Training Play in Being Prepared?

Accidents are bound to happen, but how workers react in such scenarios makes all the difference. Training is proven to substantially reduce workplace accidents. This should make ongoing training a high priority for maintenance crews.

Experience is always beneficial; however, when it's based on poor work practices, comes from a poorly trained source, or results from the passing down of information that isn't current with the most recent standards, experience can actually be a detriment to safe rescues. Staying up-to-date with current practices and standards is vital to ensuring workers are well-prepared in the event of an emergency.

Common Rescue Scenarios to Train and Prepare For

Here are some common rescue scenarios that can occur while working on wind towers:

1) Rescue from the ladder inside the tower which provides climbing access to the nacelle:
Although maintenance work is usually not performed on the ladders after the tower has been constructed, they provide workers with a means of access to the nacelle. That poses a potential threat to worker safety. This involves climbing to great heights, usually multiple times a day. Even though the climber can use the deck landings to rest, this climb can still be physically demanding, leading to cramping, fatigue, heat and cold stress, and more.

Other hazards in this scenario include slipping on an oily or muddy ladder, as well as the constant threat of items such as radios, cell phone and hardhats which can be dropped or fall, striking workers below.

Ladder rescues in this situation are challenging and must be planned from both the ground and from the nacelle. The size and portability of a complete rescue system is crucial, as it must be deployed and carried to the victim from the ground or down the ladder if it's stored in the nacelle.

2) Rescue from the top of the nacelle roof
This scenario can occur if an emergency happens while working on top of the nacelle or if the worker slips while moving on the nacelle, possibly while trying to access the hub.

Non-entry fall protection rescue is reserved for injured workers who are suspended by fall protection, but are conscious, alert and can adequately protect themselves during a lowering operation. To perform such a rescue, the rescuer must have access to the victim's anchor point, integrated lanyard rescue D-ring or harness D-ring.

It's also possible that the victim in such a situation may be injured or unconscious on top of the nacelle. In this case, it would be necessary to lower the victim over the edge of the nacelle. In cases where victims fall over the side, there may be a need to pick them up off of their fall protection equipment.

Challenges in this rescue scenario include deploying and carrying the entire rescue system to the top of the nacelle. Normally, the rescue equipment would be stored there, but there's still a need to get all the equipment through the top hatch to the top of the nacelle.

3) Rescue from inside the nacelle:
This scenario may occur at any time, as the worker is likely to be working inside the nacelle most of the time. Workers can encounter electrical hazards, sustain injuries from working on

the heavy equipment, or experience medical conditions that leave them incapacitated.

This rescue may be challenging because the employee may be working under or around equipment away from the escape hatch. Further, the employee will likely be working without a fall protection harness. There may also be a need to lift the technician up from where he's working, which may be down below the turbine housing or on the opposite end of the nacelle from the escape hatch. Putting the victim's harness onto him is imperative to complete the rescue.

The victim must also be transported from his location, up over equipment to the escape hatch. Cross haul techniques are best used for this to allow a single person to perform the rescue. Multiple lifting systems make this process very simple and efficient. Pulley systems should be carefully monitored while in use. If increased resistance occurs during the process, operations should cease to check the victim for a trapped body part or equipment.

4) Rescue from inside the hub: When a worker is inside the hub, rescue may be challenging, particularly if the rescue system is stored in the nacelle as it must be deployed and carried to the victim. Anchoring to pick the victim up may also prove difficult, meaning cross haul techniques must be used to move the victim's body up and diagonally out of the hub. Multiple lifting systems make this process feasible.

The hub is a very dirty, greasy environment, so it's important to ensure that the rescue system is not significantly affected by possible contamination.

5) Self escape in case of an emergency: Emergency scenarios can occur when a worker may need to escape the nacelle to ensure his own safety. The hazard from which a worker may need to escape affects the choice of the escape point. If there's significant heat in the nacelle the worker may be under major duress. In this case, ensure the rescue system operates with fire resistant rope.

Rescue scenarios, Continued from pg 45

Designing Effective Plans Before You Need Them

Designing effective rescue plans for each of these scenarios is critical to successful rescues. Rescue plans should include careful consideration of:

- Time, casualty management and first responder/medical help
- Direction of EMS to site/casualty or a central pick-up point
- Weather reports and site map made available to all employees and contractors on site
- Supplying local EMS with map coordinates of towers
- Clear marking of towers
- Arrangements for workers to direct EMS to accident tower site
- Drills involving EMS and tower hazards awareness. For example: Helicopter paramedics guided to a ground landing zone using green flares so as to avoid confusion with red FAA lighting

Proper planning can make a real difference in successfully rescuing workers when an accident occurs.

Putting it Into Action

The ultimate test of any rescue plan is in the execution. Of course, repetitive training is the key to ensuring workers take the correct actions when a real emergency occurs. Basic guidelines for responding to any rescue scenario always include:

- Don't put yourself in danger
- Assess the situation
- Raise the alarm
- Now, begin the rescue

A well-developed plan, effective training and a step-by-step approach to executing a rescue all increase the likelihood of positive outcomes when rescue emergencies occur.

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Performing a Job Safety Analysis Helps Ensure Successful Rescues

By Scott Connor
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Part of the daily routine of working on wind turbines is completing a job safety analysis or job hazard analysis (JSA or JHA). No matter what your company calls it, this anyalyis is a necessity. Part of the JSA should be a discussion on rescue planning, whether it is from the basement, nacelle, hub, top of nacelle, ladder, etc.

Many times we are aware that a general site rescue plan exists, but can be unsure if current staffing and eqipment resources allow for successful implementation. If you are part of supervisory or managerial team, you had better be sure! Relying on the local fire department to do the rescue is not a good idea since most wind farms are rural and 99 percent of all rural departments have little to no technical rope rescue training. Even if they did, a wind turbine and its components would more than likely be as foreign to them as trying to do a rescue from the space shuttle booster rockets. What's more, the response time is an issue. A big city fire department may have a greater level of training, but again, wind turbine rescue is usually not part of the training regimen. Twin energy absorbing lanyards and the vertical fall arrestors you see

on the ladders is not something for which I would expect a fire department high angle team to be trained.

Most state and provincial regulations require that if using fall arrest as a means of fall protection, your company must have a rescue plan. This can involve using your staff or contracting with a specialized rescue team. Even if the regulations don't plainly state this in your jurisdiction, you still need to protect the worker, as that is the intent of all safety regulations. Remember, you have supplied your worker with fall protection equipment that will stop them from falling to their death; but once they are suspended, you have introduced them to a new danger—suspension trauma. Keep in mind that even if they are not hanging (unconscious on top the nacelle, for example), you would need a rescue plan that would get your patient to the ground no matter the situation. In the event of an injury, there is a high likelyhood you will have to go to court. Defending claims in those circumstances requires that you prove due diligence in preventing the injuries. Considering your awareness of the suspension trauma issue and the fire department issue, preparedness is essential.

What follows is a framework for designing and implementing a JSA, and centers around three components:—work methods, equipment, and training.

Work Methods

Have the fall protection methods (i.e. travel restraint, work positioning, self-retracting lifeline/ energy absorbing lanyard) been evaluated recently for the different types of work and locations? Maybe the turbines have had physical modifications, such as hatches, decks, guardrails, man lifts, anchor locations, etc., that need to be taken into account. Get as much feedback from the field technicians as possible. You should also ask them for possible solutions. They are up there working every day, whereas it is sometimes difficult for the safety person to devise an effective solution without actually doing the specific jobs routinely.

Equipment

Considering the recent influx of new safety equipment technologies in the marketplace, it is crucial to investigate what is out there. Too often, we hear workers say they are using a piece of fall arrest equipment that will still allow them to hit the ground in many situations. They continue to use this equipment either because they are instructed to do so per a work procedure, or because no one has come up with a solution. There is always a solution, because the alternative is a fall injury. Most labor enforcement agencies have zero tolerance policies regarding fall incidents, so we must find a solution.

Rescue equipment also needs to be evaluated regularly. This often requires more than one type of device and technique. Don't be afraid to look around and see the capabilities of other devices. Alternately, make sure you keep up to date with what you manufacturer will allow you to do with your rescue device, as this often changes. Sometimes the manufacturer allows equipment to be used in different ways, while other times they will impart new restrictions.

Training

Technical rope rescue gear that a high angle rescue team uses will work, but is often complicated and requires constant training. This is not a good idea if you don't train monthly.

Choosing pre-rigged rescue equipment that is simple to use is key. Most manufacturers have something like this on the market, but we sometimes see way more complicated systems put into place. This is often due to decision-makers' acceptance of the status quo and failing to innovate. The person in charge is often convinced the complicated way the only way,as that is all they know or have been taught.

When your staff takes its fall protection and rescue training, they need to know the capabilities of their rescue equipment and PPE (along with any limitations your company or manufacturer may impose). Conducting hands-on

drills should include moving bodies (dead weight) around obstructions to give the participants a greater appreciation of what is physically possible. This will of course make for better rescue plans.

I always like people to be able to visualize the rescue realistically. What I mean by realistically is that they have taken into account the limitations of the equipment, staff and have addressed as many of the variables as they can.

The Resuce Has To Be Executable

For example, the rescue plan may state the rescuer will move the patient over an obstruction. That may work most of the time, but what if today the patient outweighs the rescuer by 100 pounds? Was that taken into account when preparing the rescue plan?

So in a nutshell: assess your work locations and methods of fall protection regularly so that you are doing the work as safely as possible; choose easy-to-use and easy-to-remember rescue equipment, since the main job of your personnel is not that of a professional rescuer; and train your staff to use your gear effectively and prepare realistic rescue plans so they can actually execute them when needed.

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PRODUCT

Capital Safety introduces Nano-Lok edge SRL

Capital Safety, home of the DBI-SALA® and PROTECTA® brands of fall protection equipment, recently has introduced the Nano-Lok Edge™—the first personal self-retracting lifeline (SRL) engineered for both foot level tie-off and sharp edge applications. While traditional general purpose products anchored at foot level and used in sharp edge environments may increase the risk of injury and create a false sense of security at height,

the Nano-Lok edge is designed specifically for use in sharp edge applications and retracts its unused lifeline so workers can anchor at their feet and move freely and with confidence at height . The Nano-Lok edge includes an 8 foot (2.4 meter) working length, ergonomic design, and is available in single or twin 100 percent tie-off units.

The Nano-Lok edge is the only personal SRL on the market to pass the most stringent leading edge standard set by ANSI Z359.14. Its tough lifeline material, patent pending energy absorber, and durable harness connector work together to absorb and limit the arresting forces in the event of a fall, and to mitigate the effect of a sharp edge on the lifeline even under harsh conditions.

"When workers anchor at their feet with traditional equipment that's not specifically designed for foot level tie-off, they're putting themselves at risk," said Jeff Martin, hard goods senior product manager at Capital Safety. "The Nano-Lok edge is specifically designed for leading edge work and foot level tie-off situations, so workers at height can do their job safely and with confidence."

The Nano-Lok edge personal SRL includes an integrated backpack style energy absorber, tough and flexible galvanized cable lifeline, various hook options, and an easy-to-install connector, The SRL can be safely used in fall clearance environments as low as 16 feet (4.9 meters).

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