



Danger!

Use of the abseiling device!

Your life could depend on the correct use of the abseiling device.

The abseiling device can also be used by two people to abseil.

Read the instructions before beginning the abseiling operation!

10.3 Information for Rescue and Emergency Personnel

The rescue services and the emergency personnel must be equipped with their own personal protective equipment (safety harness, etc.). The rescue/emergency personnel must bring with them all the equipment required for rescuing personnel from the hub, nacelle or tower.

The information stated in this safety manual must also be read by the rescue / emergency personnel.

10.4 Oil Spill – Immediate Measures

The objective of the immediate measures is to prevent or at least to contain a further uncontrolled escape of water-endangering substances and keep the areas of threatened or contaminated soil as small as possible, under consideration of safety engineering requirements.



Inform yourself about the oils used beforehand. The safety data sheets provide details of Water Hazard Classes and suitable measures for combatting oil pollution.

Measures

1. Decide and act quickly, so that the amount of oil reaching the environment is kept as small as possible.
2. Prevent further discharge (closure of valves, temporary sealing of cracks and holes, e.g. by means of sealing rags, sealing bags, sealing wedges, collection in containers, pumping out, transfer, etc.)
3. Bind the discharged oil – use approved oil binding agents and oil binder mats if the oil could not be pumped out or skimmed off in time. The damage can be limited by means of collecting containers, rolled foils and a shovel.
4. Prevent the oil from getting into the soil or bodies of water.
5. Remove contaminated soil.
6. Take the contaminated oil-absorbing materials to a local specialist waste disposal company for material recovery/conversion to energy or disposal. The national regulations are to be complied with.

11 Remaining in and on the Wind Turbine Generator System



Attention!

Fire Hazard!

The storage of combustible or highly inflammable materials in the wind turbine generator system is not allowed.

Personnel may not remain inside the WTG, and maintenance or repair work may not be carried out in or on the WTG under power supply. There is a danger of accident and a danger to life and limb. In order to prevent accidents, the following actions are to be carried out in the following order before and on entering the wind turbine generator system:

1. Shut down the WTG and secure against an unauthorized return to service
2. Put on the personal protective equipment
3. Disable the power supply for the work to be carried out – carry out corresponding Lockout/Tagout instructions (cf. Chapter 13)

Staying in the WTG while it is in operation is unavoidable in the case of certain maintenance and repair work. In such cases, particular care is called for and hearing protection must be worn.

In addition, the following safety regulations are to be complied with without fail:

- As a general principle, no person may stay in the WTG during a gale or a thunderstorm! If a thunderstorm comes up, the WTG must be left immediately.
- The WTG may only be entered in the company of a second person who can provide assistance or call for help in the case of an accident.
- The entrance door to the tower must be kept closed. Only in this way can the door be prevented from flying open and getting warped.
- Long open hair, loose clothing (e.g. flapping coats, tops with wide sleeves or trousers with wide legs) and scarves, ribbons, headscarves or jewelry may not be worn in the WTG! There is a fundamental danger of injury as a result of getting caught, trapped or drawn in by rotating elements! Clothing must always be tailored to suit the respective work and the weather conditions.
- Switch-on and shut-down procedures in accordance with the operating manual are to be complied with for all work which concerns the operation and adjustment of the WTG and its safety equipment.
- If any changes in the operating characteristics which are relevant to safety or any faults arise in the WTG, it must be shut down immediately and the event reported to GE Energy or the customer (if a maintenance contract has not been concluded with GE Energy).

11.1 Approaching and Entering Frosted Wind Turbine Generator Systems

Before parking near the turbine, stop approx. 350 m from the turbine and check the rotor blades for ice by means of binoculars and the sound of the rotation of the blades. If the turbine is running and ice is present on the rotor blades, call for a remote stop.

Once the blades have come to a complete standstill, verify that none of the blades is located over the entrance door of the turbine. If this is the case, call for a remote traverse of the yaw drive in any direction, so that the rotor is positioned on the side of the turbine opposing the door. As soon as the rotor is correctly positioned, call for a remote stop of the yaw drive and ask for confirmation of this operation.

Once the above conditions have been complied with, park your vehicle at a safe distance from the WTGS (at least 100 m). Watch out for falling ice as you approach the tower. If the wind is blowing against the opposite side of the door (or into the rotor at this point), you must proceed with extreme caution, since falling ice could be blown in your direction.



Warning!

Danger of slipping as a result of icy conditions!

There is danger of slipping as a result of the frozen ground and ice on the foundation and the stairs.

Sprinkle de-icing salt or sand over the foundation.

Use the handrail when going up the stairs.

Leave the immediate vicinity of the WTG after completing your work. Watch out for falling ice. Get into your vehicle. Do not call for a remote re-activation of the yaw drive and restart of the turbine until you are approximately 350 m away from the WTG.

11.2 Shut-down of the Wind Turbine Generator System

Before starting any service work, the wind turbine generator system must be deactivated. Proceed as follows:

1. Contact any remote monitoring groups that are supervising the site (before entering the wind turbine)
2. Contact any site operators or maintenance people (before entering the wind turbine)
3. Temporarily disconnect the Mark VIe controller from the site SCADA network:
 - Locate the SCADA network switch in the down tower assembly that houses the SCADA network switch
 - Disconnect the two fiber pairs (RX-TX and RX-TX) from the switch, taking the turbine off the site network
4. Press the "Stop-Reset" button to shut-down the plant manually.
5. Set the key-operated switch to "Repair".



Follow lock-out-tag-out procedures to de-energize, lock-out and tag-out equipment to ensure that unit equipment is always put in a safe condition. Wind conditions must be continuously monitored manually if LOTO procedures used mean that the unit is not capable of moving to minimum load condition.



Danger of accident!

The WTG must remain shut down as long as personnel are in the plant. Before it is returned to service by authorized personnel, check without fail that nobody is in the plant. Otherwise there is the danger of an accident!

11.3 Climbing the Tower

- Only persons who are physically fit and capable of coping with the ascent may climb the WTG.
- The WTG must be shut down and secured against unauthorized start-up before the tower is ascended. The WTG must remain shut down as long as anybody is climbing the tower or is on the tower platform.
- The entrance door to the tower must be kept locked, in order to inhibit access to unauthorized persons.
- In order to avoid accidents caused by falling objects, nobody may stand under the ladder while somebody is ascending the tower. Even a small screwdriver can cause very serious injuries if it drops from a great height.



Danger!

Danger through falling objects!

Falling objects can cause very serious injuries irrespective of their size and weight!

Never stay in the vicinity of the ladder while somebody is ascending or descending. The ladder may only be used by one person at a time. Only after this person has reached an intermediate platform and has closed the tower hatch or has reached the ground in the tower base and stepped back from the ladder may the next person approach the ladder.

- The safety harness must always be put on correctly before ascending the tower.
- Always check the safety harness and the entire safety equipment prior to use. Damaged PPE may never be used.
- Safety shoes and a hardhat must be worn when ascending the tower. Gloves must be worn if the tower is covered with ice.
- The maximum possible fall path must be kept to a minimum by means of rope-shortening devices or similar.
- Only use marked hooking points with an adequate load-bearing capacity.
- The tower may only be ascended by means of the ladder installed inside the tower or the hoisting passenger suspension devices/service platform which may be installed. (Follow the operating instructions of the manufacturer).
- The travelling safety hook must run freely in the rail while ascending and descending the tower. Never touch the travelling safety hook, otherwise there is a danger of injury!
- Both hands must be kept free during the ascent or descent. Tools, lubricants and other material may only be transported in a suitable bag. Permanent "3-point contact" with the ladder is only guaranteed by this means.
- Greater care needs to be exercised when climbing the ladder in wet conditions or if the tower is covered in ice.
- Only unhook the lanyard after you have reached the tower platform and the access hatch has been closed.
- Ensure that you are always protected by at least one lanyard with a fall arrest block.
- The rest platforms in the tower are fitted with hatches that must be kept closed at all times. The platform hatches must therefore be opened on reaching a platform and closed again immediately after crossing to the next section of the tower.

11.4 Deactivation of the Yaw Drive

Yaw stop switches are located in the tower base, below the nacelle and on the top box in the nacelle. The yaw drive and the automatic nacelle adjustment are disabled in the "Off" switch position, so that the nacelle is technically prevented from moving if there is a change in wind direction.

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11.5 Crossing to the Nacelle

The yaw stop switch on the uppermost tower platform must be placed in the "Off" position before crossing from the tower to the nacelle. The yaw drive and the automatic nacelle adjustment are thereby disabled.

Depending on the position of the nacelle, the available simple ladder is hooked into one of the holders to prevent the ladder from slipping. Some of the WTGs are provided with a permanently installed extension ladder.

Hooking points are available in the vicinity of every platform.

11.6 Entering the Rotor Hub/Walking on the Roof of the Nacelle

The roof of the nacelle may only be accessed for entering the rotor hub and for carrying out work on the wind vane, the anemometer and the obstruction light.

Only trained or instructed staff are permitted to enter the hub or walk on the roof of the nacelle. The rotor hub may only be entered at maximum wind speeds up to 15 m/s. The rotor lock on the high-speed shaft (brake disk on the coupling) must be engaged before the rotor hub is entered.

1. Place the yaw stop switch on the top box in the "Off" position.
2. Turn the rotor to the "Y" position, so that the rotor hub can be entered.
3. Engage the rotor lock on the high-speed shaft.
4. Turn the rotor blades to the 85° feathering position.



Fig. 30: Rotor in the "Y" position



Danger!

Life-threatening hazard through sudden start-up of the rotor if the rotor lock (brake disk on the coupling) on the high-speed shaft has not been engaged!

Always engage the rotor lock on the high-speed shaft before entering the rotor hub.

FOLLOW THE RESPECTIVE LOCKOUT/TAGOUT INSTRUCTIONS! (cf. Chapter 13)



Warning!

Maintenance work inside the hub may only be carried out at maximum wind speeds up to 15 m/s!

Always engage the rotor lock on the high-speed shaft. Use of the rotor lock on the low-speed shaft or only the brake on the high-speed shaft for this purpose is prohibited.



Danger!

Falling Hazard! Warning: strong wind currents!

Before climbing out of the nacelle enclosure through the roof hatch above the gearbox, the lanyard must be hooked on to the rail on the spinner.

The roof rail is to be selected as a hooking point for all other work on the roof of the nacelle.

5. In the hub, place the battery maintenance switch and the pitch maintenance switch on all three axis cabinets in the "Off" position.

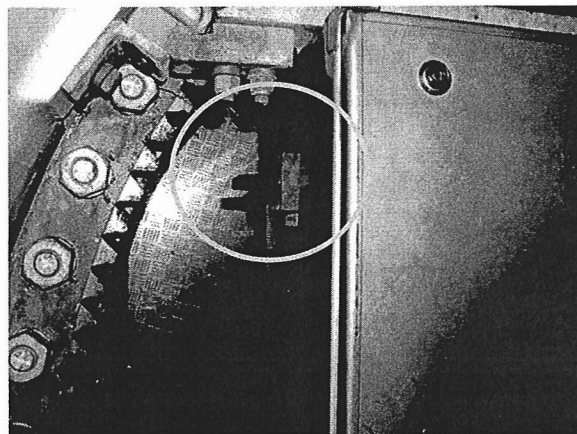


Fig. 31: Battery maintenance switch

6. Switch the pitch controller on the control cabinet to "Manual".

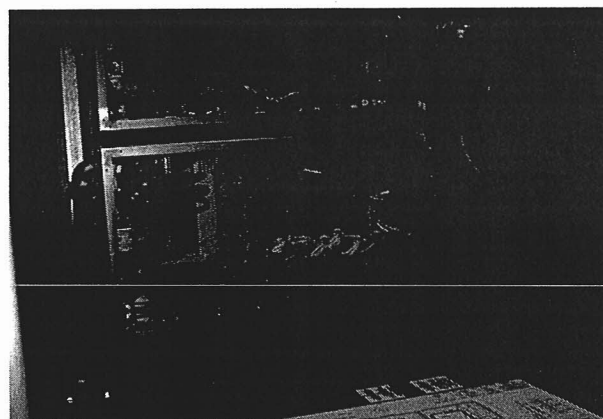


Fig. 32: Pitch controller

Walking on the Roof with Ice and Snow

If you have to walk on the roof of the nacelle or climb into the hub, first of all ensure that the rotor blades are in the Y position before you open the hatch. Otherwise there is danger of injury from falling pieces of ice.



Danger!

Danger of Slipping and Falling Hazard as a result of icy conditions!

There is a high risk of slipping and falling if the roof of the nacelle and the spinner are covered by snow and ice.

Completely remove any snow and ice from the roof before walking on it. Sprinkle sand on the cleared areas

Do not walk on the roof/spinner if the snow and ice cannot be removed completely and the danger of slipping cannot be excluded.

11.7 Activation of the Wind Turbine Generator System



Danger of accident!

The WTG must remain shut down as long as personnel are in the turbine. Before it is returned to service by authorized personnel, check without fail that nobody is in the turbine. Otherwise the danger of an accident arises!

Proceed as follows to return the WTG to service:

1. Make an entry in the service life card of the WTG
2. Connect the Mark VIe controller to the site SCADA network:
 - Locate the SCADA network switch in the down tower assembly that houses the SCADA network switch
 - Reconnect the two fiber pairs (RX-TX and RX-TX) from the switch, putting the turbine on the site network
3. Set the key-operated switch to "Operation".
4. Check the alarm message panel in home web page for error messages
5. Press the "Stop-Reset" button and then the "Start" button.
6. Inform the remote monitoring division that wind turbine is back in operation
7. Inform the operator / customer that wind turbine is back in operation

12 Information on Maintenance and Troubleshooting

Only trained or instructed staff may be deployed!

Trainee personnel or personnel undergoing orientation or general training may only carry out work on the wind turbine generator system under the constant supervision of an experienced person.

Personnel must familiarize themselves with the work environment around the wind turbine generator system before starting work!

As it is possible to start the plant by means of the remote monitoring system, the WTG must be shut down for maintenance work as described in Chapter 11.2. In addition, the service switch on the control cabinet must be placed in the "Maintenance" or "Repair" position. Once the maintenance or repair work has been completed, the service switch must be returned to the "Automatic" position.

Maintenance/inspection of the cable winch in the tower is the responsibility of the operator and must be carried out in accordance with the operating and maintenance instructions of the supplier of the cable winch.

Time limits for recurring tests/inspections prescribed or stated in the operating manual must be adhered to.

Suitable workshop equipment is essential for carrying out maintenance measures.

Work on electric equipment of the WTG may only be carried out by a skilled electrician or by instructed persons under the guidance and supervision of a skilled electrician in accordance with the electrical engineering regulations.

Any safety equipment which has to be dismantled to carry out maintenance and repair work must be re-installed and checked immediately after the maintenance and repair work has been completed!

The wind turbine generator system, in particular the connections and bolted connections, must be cleaned of any oil, consumables and process materials, dirt or old preservative agents at the beginning of any maintenance/ repair / conservation work.

Only entrust experienced persons with the fastening of loads.

Individual components and larger modules which need to be exchanged must be carefully attached and secured to lifting gear, in order to minimize the danger that emanates from them. Only use suitable lifting gear and load suspension devices which are in a technically perfect condition and have an adequate load bearing capacity!

Follow the operating instructions of the winch manufacturer.

Never stay or work below suspended loads.

Use the specified or other safe ascent equipment and working platforms to carry out installation work above head height. Wear fall protection equipment when carrying out maintenance work at great heights. Keep all handles, steps, safety rails, platforms, stages and ladders free of dirt.

Ensure that consumables and process materials and replacement parts are disposed of safely and in an environmentally-friendly manner!

13 Power Disconnection and Isolation Procedures (Lockout/Tagout Instructions)

Pursuant to EN 50308, wind turbine generator systems must be equipped with devices to disconnect and isolate them from all their energy sources during inspection and maintenance work.

These disconnecting/energy-isolating devices are prescribed for all mechanical, electrical and hydraulic energy sources.

GE Energy advises the plant operator/owner to develop specific procedures for the power disconnection and isolation of every individual subsystem.

Local and national regulations must be taken into account when developing workplace-specific Lockout/Tagout instructions.

The disconnection/isolation points are marked in the plant-specific circuit diagrams and hydraulic schematics supplied with the respective WTG.

Procedures for the Lockout/Tagout of power disconnection and isolation devices must consider the following aspects:

13.1 Identification of Installations, Processes, Circuits

(Individual mechanical, electrical or hydraulic subsystems)

13.2 Preparation for Shutdown / Notification of Affected Employees

- All personnel who may be affected must be notified before Lockout/Tagout devices are installed and after they have been removed. In addition to this procedure, authorized employees must be aware of any additional safety requirements prescribed for working on this type of equipment.
- Affected employees who work on or near an installation which is about to be disconnected and on which Lockout/Tagout devices are to be mounted must be notified thereof.

13.3 Identification of Energy Sources and Strengths

13.4 Deactivation of Energy Sources and the Mounting of Energy Control Devices

- The power disconnection and isolation devices (e.g. disconnecting switches or load interrupter switches, valves etc.) must be positioned in such a way that they interrupt the energy flow to installations, processes or circuits. The authorized employees are obliged to mount and secure Lockout/Tagout devices to these. They must hereby ensure that the power disconnection and isolation devices are "locked out" until further notice and remain in their safety or "Off" position.

13.5 Control of Stored Energy



Attention!

Residual risks from stored energy!

PLEASE OBSERVE THE RESPECTIVE LOCKOUT / TAGOUT INSTRUCTIONS!

- The authorized employee must ensure that all potentially hazardous energy in any form (stored, residual, chemical or potential energy) is relieved, dissipated, contained, discharged or otherwise controlled. Additional measures may be necessary to prevent the re-accumulation or re-storage of energy, in order to protect personnel. Stored energy can form e.g. in batteries, capacitors, through gravity or in chemical lines.

13.6 Verification of Isolation

- The authorized employee must verify that the isolation and de-energization of the respective installation, process or circuit has actually been carried out before maintenance work may be started. The check must confirm that the installation, process or circuit has achieved a "zero" energy state. (Test equipment, circuit activation attempts, measuring devices, visual inspections, etc. can be used to verify the zero energy state.)

13.7 Reconnection of the Installation to the Supply

The authorized employee must carry out the following measures before returning the installation to service:

- Inspection of the work area to ensure that all items which are not required for the operation of the installation have been removed and that all the guards have been replaced, that the machine/installation, process or circuit is operational and that all personnel are in a safe location.
- Removal of all locks, tags and other Lockout/Tagout devices from all power disconnection and isolation devices by the authorized employee who previously attached these LOTO devices.
- Notification of affected personnel that the energy supply is about to be restored to the machine/installation, process or circuit.
- Visual inspection and/or cycle test to verify that the service or maintenance work has been successfully completed. Provided that the work has been completed, the machine/installation, process or circuit may be returned to service. Otherwise, the requisite procedural steps must be repeated.
- Correct sequential run-up of the installation, process or circuit.

WTG operators must ensure that suitable disconnection regulations are available for their plants and construction sites and that they are implemented. GE Energy has developed installation-specific Lockout/Tagout procedures for the activities listed below. This list does not claim to be complete, however. It may be advisable to develop additional procedures as a result of changes to installations or to comply with construction site-specific disconnection regulations.

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Service Jobs / Subsystems	Installations, Processes, Circuits
Gear box / gearing lubricant	Nacelle – protection of the gear lubricant flow
Work in the converter cabinet / on the generator	Isolation of converter cabinet from dangerous energy / isolation of generator from dangerous energy
Surge protector / medium voltage	De-energize power distribution cabinet (PDC) at MV transformer.
Surge protector / high voltage	De-energize power distribution cabinet (PDC) at MV transformer.
Work on the synchronization switch	Isolation of the synchronization switch. De-energize power distribution cabinet (PDC) at MV transformer.
Work on the safety isolated WTG	Disconnection of the power distribution cabinet.
Disconnection of the 400 V power supply	Disconnection of the 400 V power supply to the power distribution cabinet in the tower base and to the top control cabinet in the nacelle and to the hub.
Disconnection of the 690 V power supply	Disconnection of the 690 V power supply to the power distribution cabinet in the tower base and to the top control cabinet in the nacelle.
Work on the transformer in the DTA converter filter cabinet	Disconnection of the transformer in the DTA converter filter cabinet
Work on the UPS voltage output	Disconnection of the 230 V UPS voltage output in the main cabinet and the control cabinet, the nacelle and the hub
Disconnection of the 24 V power supply unit in the main cabinet	Disconnection of the 24 V power supply unit in the main cabinet
Isolation of the 400 V power supply from the nacelle to the hub	Isolation of the 400 V power supply from the nacelle (top control cabinet) to the hub
Nacelle hydraulics	24 V transformer / interruption of the hydraulic supply
24 V transformer in the nacelle	24 V transformer in the top control cabinet (e.g. for exchanging the transformer)
Battery charging voltage nacelle / hub	Disconnection of the battery charging voltage to the hub
230 V power supply to the nacelle	Disconnection of the battery charger, interruption of the 230 V power supply
Nacelle / motors	Disconnection of the motor
400 V motor circuit breaker in the nacelle	Disconnection of the 400 V motor circuit breaker
Work in the hub	Disconnection of the motor (hub)
Work in the hub	Back-up battery pack in the hub
Locking the high-speed shaft	Nacelle / high-speed shaft (gear box)
Locking the low-speed shaft	Nacelle / low-speed shaft (gear box)
Work on the transformer	Isolation of the transformer in WTGS with a transformer in the tower

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ANNEX: Items and Installations which are subject to Inspection pursuant to the Accident Prevention Regulations

Article to be tested	Test before the initial operation	Exceptional tests	Regular tests	Proof of test	Regulations
Winches	To be checked by a technically competent person		Regular check by a technically competent person in accordance with the manufacturer's instructions and operational conditions.	Inspect and test log book and inspection sticker	Manufacturer's instructions
Doors Emergency exits	To be checked by a technically competent person. Doors must be executed so that they are self-closing, open in the direction of escape and can be easily opened from the inside at all times without auxiliary means.		Regular check by the operator. Once a year by a technically competent person.	Documentary evidence	Manufacturer's instructions
Escape routes			In case of danger, the work areas must be able to be evacuated via escape routes or escape equipment. It must be ensured that at least one escape route can also be used in the case of a power failure. Escape routes or escape equipment are: routes via ladders and abseiling devices.		
Hoisting passenger suspension device	To be checked by an expert. In addition to the experts of the Technical Inspection Association (TÜV), only experts for the inspection of hoisting passenger suspension devices who are authorized by the trade association are considered to be experts for the purposes of this safety regulation. The operator must ensure that a test run is carried out at the installation location in all directions of movement with the working load of the passenger suspension device in the presence of the supervisor before the initial operation.	The operator must ensure that hoisting passenger suspension devices are subjected to an exceptional test by a qualified person after cases of damage or particular events which could affect the carrying capacity, as well as after any repair work.	All components of the hoisting passenger suspension device must be inspected for operational safety by a technically competent person at least once a year. Shorter test intervals may arise as a result of the service conditions. The manufacturer's instructions are to be followed.	Documentary evidence	Manufacturer's instructions
Fire extinguishers			Regular check by a technically competent person or expert in accordance with the national regulations.	Inspection sticker or test report	

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Article to be tested	Test before the initial operation	Exceptional tests	Regular tests	Proof of test	Regulations
Personal protective equipment against falling (safety harness)	Check of the fall protection rail by an experienced person.		Users must check the PPE for its orderly condition and correct function before it is used. An experienced person must check the PPE for perfect condition at regular intervals. The manufacturer's instructions are to be followed.	Inspect and test log book, inspection sticker	Manufacturer's instructions
Abseiling device	To be checked by an experienced person.	To be checked by an experienced person after use.	Users must check the abseiling device for its orderly condition and correct function before it is used. An experienced person must check the abseiling device for perfect condition at regular intervals. The manufacturer's instructions are to be followed.	Inspect and test log book, inspection sticker	Manufacturer's instructions
Ladder		A technically competent person checks the orderly condition of mechanical ladders after any alterations or repairs.	A technically competent person checks the orderly condition of the ladders and steps once a year. Irrespective of this, the user must check the suitability and condition of the ladders before use. The manufacturer's instructions are to be followed.	Inspect and test log book, inspection sticker	Manufacturer's instructions
Electrical equipment	Check by a qualified electrician or under the supervision of a qualified electrician. (Also after alteration or repair) The test before the initial operation in accordance with Section 1 is not necessary if the manufacturer or installer confirms that the electrical installations and equipment are designed to comply with the provisions of this accident prevention regulation.		At specified intervals: The intervals are to be calculated in such a way that any defects which can be expected to arise are found in due time. The relevant electrotechnical regulations are to be complied with for the check. At the request of the trade association, an inspection and test log book with specified entries is to be kept. The manufacturer's instructions are to be followed.	Inspect and test log book	Manufacturer's instructions
First aid box	Pursuant to the Law on Medical Devices, which has been in force since 1st January 1995*, bandaging materials must have a CE-marking but do not have to have a use-by date. If a use-by date is stated, however, the Law on Medical Devices prohibits further use after expiry of the use-by date under penalty of a fine. First aid material without a use-by date must only be replaced in the event of soiling or damage. With the exception of plaster material, it remains usable over a long period, provided that it is stored in a clean and dry place.				

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2010-10-01

Health Safety & Environment Manual

Vestas Americas

Vestas American Wind Technology
Vestas Canadian Wind Technology

*"At Vestas we will never compromise when it comes to safety -
it will always have top priority -
no matter what!"*

Ditlev Engel – President & CEO – Vestas Wind Systems

DMS 0008-7897 R5 09 July 2010 Vestas Confidential VAME HSE Manual

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History of this Document

Rev. no.:	Date:	Description of changes
Old rev. 24	2009-09-03	HSE055 revised; HSE007 revised
Old rev. 25	2009-10-22	HSE073 revised; addition of new HSE018
Old rev. 26	2009-11-04	HSE016 & HSE019 added; HSE066 & HSE014 revised
Old rev. 27	2009-12-23	HSE018 & HSE073 updated; HSE095 & HSE098 under revision
DMS ver. 00	2010-01-01	Complete HSE Manual revamp / revalidation
DMS ver. 01	2010-04-15	Job Safety Analysis (JSA) (DMS# 0008-7897), Tower Climbing Practical Test (DMS# 0008-7965), PPE Plan (DMS# 0008-6837), and Pre-Lift Job Briefing Form (DMS# 0008-7980) updated.
DMS ver. 02	2010-05-07	Revisions to LOTO Program (DMS# 0008-7997) and Electrical Safety Program (DMS# 0008-7990).
DMS ver. 03	2010-05-14	New First Aid document (DMS# 0010-8007) added. Company Vehicles (DMS# 0008-7969) made obsolete and removed from manual.
DMS ver. 04	2010-07-09	JSA form (DMS# 0008-7897), PPE Plan (DMS# 0008-6837), Confined Space Permit (DMS# 0008-8016), Code of Safe Practices (DMS# 0008-7923), Extreme Weather Conditions (DMS# 0008-7907), Used Antifreeze and Glycol Management (DMS# 0008-8009), Site Safety Rules (DMS# 0008-7944), Respiratory Protection Plan (DMS# 0008-7994), Subcontractor Safety Plan (DMS# 0008-6835), and Hazard Identification and Control (DMS# 0008-7993) revised.
DMS ver. 05	2010-07-16	PPE Plan (DMS# 0008-6837) updated.
DMS ver. 06	2010-07-27	Extreme Weather Conditions (DMS# 0008-7907) updated.
DMS ver. 07	2010-09-10	Control of Hazardous Energy Program (DMS# 0008-7997; former title: LOTO Manual) updated.
DMS ver. 08	2010-10-01	VAME Electrical Safety Manual (DMS# 0008-7990), HSE Inspection Checklist (DMS# 0008-8003), Code of Safe Practices (DMS# 0008-7923), LOTO Manual (DMS# 0008-7997) revised. Preliminary Incident Report (DMS# 0008-7914) and Incident Report Investigation (DMS# 0008-7912) removed.



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Foreword: Safety First

At Vestas, we do not compromise on safety.

Safety is a deeply held value for us, serving as the foundation for all we do at Vestas.

The hallmark of all our activities is daily excellence in the protection of our employees, the public and the environment. Fundamental to the attainment of this vision are personnel commitment, mutual trust, open communications, continuous improvement and the involvement of all interested parties.

Vestas Americas is committed to being a safe company, preserving the natural environment while conducting our operations in adherence with all applicable laws, regulations and standards.

It is the policy of Vestas Americas that we meet the following principles:

- A safe and healthy work environment will be provided for the protection of our most vital resource—our employees. Employee safety is of the greatest importance to all levels of management and supervision, ranking in importance above production, quality, costs, and service. People are the most critical factor in a safety effort. Personal safety will not be compromised for any reason.
- While the responsibility for safety begins and ends with management, all Vestas employees share that responsibility. All employees, at every level, are fully responsible for their own safety and for the safety of those with whom they work. All injuries are preventable.
- Employees must perform all work tasks in a safe manner, and working safely is a condition of employment. Management will take disciplinary action against an employee who willfully or repeatedly violates workplace safety rules. This action may include verbal or written reprimands and may ultimately result in termination of employment.
- If an incident occurs, immediate reporting of the incident is required by US occupational health, safety and environmental laws. Employees must report all incidents, injuries, and unsafe conditions to their supervisors, and will not be subject to retaliation, penalty, or other disincentive for making such a report.
- Management must develop and communicate clear goals and objectives, and provide the financial resources and authority necessary to correct unsafe conditions and implement changes to improve workplace safety.
- Managers and supervisors will be held accountable for ensuring employees are aware of workplace hazards and are trained to work safely. We must think "safety first" in all our processes and prevent employees from being tempted or feeling obliged to ignore safety requirements. Every hazard can be managed.
- Employee recommendations to improve health and safety conditions will be given full consideration by management.
- Management will be actively involved with employees in establishing and maintaining an effective safety program in accordance with all applicable OSHA and EPA regulations.

	2/23/10		3/24/10
Signature	DATE	Signature	DATE
Bobbi Stedman, Senior VP, People & Culture		Martha Wyrsh, President, Vestas Americas	



Introduction to HSE Manual

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Scope

This HSE manual describes the general occupational health, safety and environmental guidelines for transportation, erection on-site, operation and decommissioning of Vestas Wind Turbines in the United States.

This manual outlines the general guidelines for ensuring safe working practices. This manual is aligned with Vestas specific work instructions. For the areas where this manual differs from the turbine-specific manual, this manual prevails.

All Vestas Americas employees and Vestas subcontractors are subject to the relevant requirements contained in the Vestas Americas HSE Manual.



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1.0	Occupational Health & Safety Management System		
1.1	Vestas Americas HSE Plan	DMS 0008-6844.R1	01-Jan-10
1.2	VAME HSE Definitions	DMS 0009-2994.R0	01-Jan-10
2.0	Workplace Expectations		
2.1	Drug-Free Workplace Policy	DMS 0008-7991.R2	01-Jan-10
2.2	VCWT Drug-Free Workplace Policy	DMS 0008-7899.R1	01-Jan-10
3.0	Safety Program Management		
3.1	Site Inspection Checklist (Form)	DMS 0008-8003.R3	01-Oct-10
3.2	Site Safety Meetings	DMS 0008-6845.R1	01-Jan-10
3.3	Safety Meeting Attendance Record (Form)	DMS 0008-6846.R1	01-Jan-10
3.4	Job Safety Analysis (JSA)	DMS 0008-7897.R5	09-July-10
3.5	Pre-Task Planning Form (PTP)	DMS 0008-7900.R1	01-Jan-10
3.6	Safety Walks Template	DMS 0008-8013.R3	01-Jan-10
4.0	Emergency Response		
4.1	Extreme Weather Conditions	DMS 0008-7907.R3	27-July-10
4.2	Pre-Work Ice Checklist (Form)	DMS 0008-7909.R2	01-Jan-10
4.3	Site Emergency Response Plan - Template	DMS 0008-7901.R2	01-Jan-10
4.4	Emergency Response Equipment – Monthly Checklist	DMS 0008-7902.R1	01-Jan-10
4.5	Descent Device Inspection (Form)	DMS 0008-7903.R1	01-Jan-10
5.0	Incident Reporting & Investigation		
5.1	HSE Incident Report (Form)	DMS 0008-7917.R3	01-Jan-10
5.2	Witness Statement (Form)	DMS 0008-7921.R2	01-Jan-10
5.3	Release to Return to Work	DMS 0008-8015.R1	01-Jan-10
6.0	Subcontractor Safety		
6.1	Subcontractor Safety Plan – CWT	DMS 0008-7999.R1	01-Jan-10
6.2	Subcontractor Safety Plan – AWT	DMS 0008-6835.R2	09-July-10
6.3	Contractor Qualifications Questionnaire	DMS 0008-8014.R1	01-Jan-10
7.0	General Safety		
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7.2	Code of Safe Practice Acknowledgement (Form)	DMS 0008-7939.R1	01-Jan-10



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8.0	Guest Worker		
8.1	Guest Agreement and Release of Liability (Form).....	DMS 0008-7954.R1.....	01-Jan-10
9.0	Hazard Identification & Control		
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10.1	Chemical Inventory List Template.....	DMS 0008-7987.R2.....	01-Jan-10
10.2	New Material Review (Form)	DMS 0008-7957.R1.....	01-Jan-10
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11.1	Personal Protective Equipment Plan.....	DMS 0008-6837.R6.....	16-July-10
11.2	Respiratory Protection Plan	DMS 0008-7994.R6.....	09-July-10
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11.4	Equipment Defect Record (Form)	DMS 0008-6839.R1.....	01-Jan-10
11.5	PPE Inspection Record (Form).....	DMS 0008-6840.R2.....	01-Jan-10
11.6	PPE Issue Record (Form).....	DMS 0008-6841.R2.....	01-Jan-10
11.7	Respirator Fit Test Record (Form)	DMS 0008-7962.R1.....	01-Jan-10
11.8	Respirator Protection Questionnaire (Form).....	DMS 0008-7960.R1.....	01-Jan-10
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13.5	Critical Lift Checklist (Form).....	DMS 0008-7982.R1.....	01-Jan-10
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14.0	Control of Energy (Lockout/Tagout)		
14.1	Control of Hazardous Energy Program	DMS 0008-7997.R8.....	10-Oct-10
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16.2	Confined Space Policy and Program – Canadian Provinces.....	DMS 0008-8017.R1.....	01-Jan-10
16.3	Confined Space Entry Permit	DMS 0008-8016.R2.....	09-July-10
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Vestas Americas HSE Plan

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1. Purpose

To ensure that Vestas Americas maintains an Occupational Safety, Health and Environmental program that creates a safe work environment for Vestas Americas employees and others on Vestas Americas worksites, meets the needs of the communities in which we do business and is compliant with all applicable governmental regulations.

2. Scope

Vestas Americas – All locations

3. Definitions

Word:	Definition
None	N/A

4. References

- OSHA 29 CFR Parts 1910 and 1926 (United States)
- Occupational Health and Safety Act, Regulation and Code (Canada)
- OHSAS 18001 Clause 4.2 Occupational Health & Safety Policy
- Vestas Demand – Environmental and Occupational Health and Safety Legislation

5. General Requirements

5.1 Localization:

- 5.1.1 For those areas where this Safety Handbook differs from the Vestas Group requirements, this Handbook shall prevail.
- 5.1.2 In some cases, Vestas Americas has implemented a requirement that may exceed a state or provincial requirement – the higher level requirement in the Safety Handbook will prevail.
- 5.1.3 In the event that a state or provincial requirement exceeds a Safety Handbook procedure – the higher level requirement will prevail.

5.2 All Vestas Employees

- 5.2.1 Worker safety is of vital importance and will not be compromised.
- 5.2.2 All personnel must use approved personal protective equipment (PPE) and clothing where hazards or conditions warrant its use.
- 5.2.3 Immediately report to the respective supervisor any unsafe acts, unsafe conditions and near-miss incidents.
- 5.2.4 Immediately report to the respective supervisor all injury or property damage accidents.
- 5.2.5 Perform all work in accordance with safe work practices and supervisor's direction.



- 5.2.6 Maintain good housekeeping in the work area.
- 5.2.7 Operate all vehicles and mobile equipment in accordance with applicable laws, site rules, manufacturer's specifications, and company safety policies.
- 5.2.8 Competent, trained personnel are expected to perform their jobs in a safe and proper manner.
- 5.2.9 All personnel shall be expected to conduct themselves courteously and in a manner that promotes positive public relations with fellow employees, supervisors, customers, subcontractors, government officials and the public.
- 5.2.10 All pertinent personnel are required to actively participate in safety inspections, safety meetings, incident / accident reporting and investigative requirements.
- 5.2.11 Any person using prescription and / or non-prescription over the counter medications, that may cause drowsiness or other side effects, which could influence their ability to work safely, are to notify their supervisor prior to beginning any safety sensitive task or working near others who are performing such tasks.
- 5.2.12 Telecommunication equipment such as cellular telephones, pagers, or similar equipment, must not be taken into a potentially explosive environment. i.e. electrical cabinet

5.3 The following are prohibited at all Vestas Americas workplaces:

- 5.3.1 Possession, sales, consumption or being under the influence of alcohol and/or illegal drugs
- 5.3.2 Riding any hook, hoist or other material handling equipment which is not specifically designed to carry riders
- 5.3.3 Fighting, horseplay, practical jokes and
- 5.3.4 Gambling
- 5.3.5 Theft and vandalism
- 5.3.6 Cleaning, adjusting or repairing of machinery while in operation
- 5.3.7 Operating any tool, piece of equipment or machinery without proper training
- 5.3.8 Firearms or hunting equipment
- 5.3.9 Removing and not replacing guards on moving belts, drive chains and reciprocated parts
- 5.3.10 Damaging, disabling or interfering with safety, fire fighting or first aid equipment
- 5.3.11 Arriving for work or remaining at work when ability to perform the job safely is impaired
- 5.3.12 Smoking in non-designated areas and
- 5.3.13 Possession of "strike anywhere" matches
- 5.3.14 Unauthorized alteration or removal of locks or tags

6. Responsibilities

6.1 Vestas Americas Executive Management:

- 6.1.1 Encourage employee and subcontractor involvement in the safety process.
- 6.1.2 Provide appropriate supervision at worksites.



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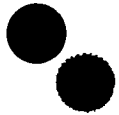
- 6.1.3 Ensure that all operations including those of subcontractors meet government mandated safety requirements.
- 6.1.4 Ensure performance and behavior meet the requirements of the Vestas Americas Occupational Safety and Health Program.
- 6.1.5 Communicate with employees, customers, subcontractors, and vendors regarding their corporate commitment to safety.

6.2 Safety / Environmental Department:

- 6.2.1 Develop and maintain effective written programs for all types of hazards that employees may be exposed to. Each program will be reviewed regularly and revised as needed based on regulatory or process changes.
- 6.2.2 Communicate each program to all personnel affected by the program.
- 6.2.3 Conduct and document regular audits of all Vestas Americas workplaces to identify areas of concern / non compliance and to continually improve the overall safety program.
- 6.2.4 Issue a Safety Alert or Bulletin when a serious safety concern is identified. Safety Alerts and Bulletins remain active / open until such time as the hazard is eliminated or the safety issue and its control processes are incorporated into service, safety or training documentation. (Refer to AME-BP.11.11.00 – Safety Alerts and Bulletins.)
- 6.2.5 Maintain all safety and environmental records in accordance with applicable governmental regulations.
- 6.2.6 Report safety performance to Vestas group, Vestas Americas management, employees of Vestas Americas and as required by governmental regulations.

6.3 Supervisory Personnel:

- 6.3.1 Ensure all incidents / accidents are reported, properly investigated and that corrective action is taken to prevent a recurrence.
- 6.3.2 Corrective actions taken must be documented and provided to the Safety Department.
- 6.3.3 Ensure workers are adequately qualified to perform assigned work.
- 6.3.4 Ensure training needs are identified and met.
- 6.3.5 Take the necessary action to correct any unsafe working conditions brought to their attention by workers.
- 6.3.6 Correct unsafe acts and behaviors in a proactive and positive manner.
- 6.3.7 Implement and use appropriate Codes of Safe Practice and associated Safe Work Procedures (service documentation / work instructions).
- 6.3.8 Ensure appropriate and well-maintained equipment is available and utilized to perform the work activity.
- 6.3.9 Be aware of applicable regulatory requirements.
- 6.3.10 Ensure workers are informed about job hazards and are prepared to deal with any site specific hazards on the worksite.
- 6.3.11 Ensure personal protective equipment (PPE) is readily available at the worksite, correctly used, stored, maintained, inspected and replaced when necessary.



- 6.3.12 Communicate with employees, customers, subcontractors, and vendors regarding their corporate commitment to safety.
- 6.3.13 Use safety meetings as one of the primary methods of dealing with safety performance, including the review and discussion of Codes of Safe Practice, Safe Work Procedures (service documentation / work instructions), corporate expectations, hazardous conditions and corrective measures.

6.4 Employees

- 6.4.1 Adhere to regulations, guidelines, and safety standards as required by government regulatory agencies, and those communicated by management and supervisors.
- 6.4.2 Follow all appropriate Codes of Safe Practice, Safe Work Procedures (installation and service documentation / work instructions) contained in this manual and in the installation and service documentation.
- 6.4.3 Report any hazardous or unsafe condition to an immediate supervisor.
- 6.4.4 Observe activities of fellow employees and subcontractors to ensure their safety and the safety of those around them, and correct unsafe acts in a proactive, positive manner to prevent an incident from occurring.
- 6.4.5 Respectfully refuse to perform work when unsafe conditions exist or when they are unable to perform the task competently.
- 6.4.6 Report all incidents / accidents, near misses, injuries, and illnesses to a supervisor.
- 6.4.7 Participate in, and use, all training offered by Vestas Americas.
- 6.4.8 Use and properly maintain the required personal protective equipment (PPE).

6.5 Subcontractors

- 6.5.1 Insist on safe performance throughout their operations by ensuring subcontractors and employees are competent to do their work properly.
- 6.5.2 Have effective health and safety programs that include programs for all hazards employees may be exposed to.
- 6.5.3 Ensure employees and subcontractors meet all the Vestas safety expectations.
- 6.5.4 Ensure their safety programs and operations comply with contractual and regulatory requirements.
- 6.5.5 Provide the time and resources required to enable subcontractors and employees to conduct their activities safely.
- 6.5.6 Identify and correct hazards, unsafe work conditions and unsafe acts.
- 6.5.7 Ensure appropriate and well-maintained equipment is available and utilized to perform the work activity.
- 6.5.8 Ensure all incidents / accidents are reported and investigated and that corrective action is taken to prevent a recurrence.
- 6.5.9 Ensure workers are informed about job hazards and are prepared to deal with any site specific hazards on the worksite.
- 6.5.10 Ensure personal protective equipment (PPE) is readily available at the worksite, correctly used, stored, maintained, inspected and replaced when necessary.



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6.6 Visitors

- 6.6.1 When visitors are present on worksites, they are required to meet the following safety responsibilities:
- a) Follow the instructions of the site supervisor or personal escort.
 - b) Wear personal protective equipment (PPE) correctly and when required.
 - c) Never walk about a worksite unescorted.

7. History of this Document

Rev. no.:	Date:	Description of changes
00	26-Sep-2005	First edition – Reformatted & new number 11-Apr-2007
01	23-Nov-09	Editing and updating
02	01-Jan-2010	Content and template updates



CONFIDENTIAL TRADE SECRET & CONFIDENTIAL
Vestas Americas HSE
Definitions

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1. Purpose

To ensure that Vestas Americas maintains an Occupational Safety, Health and Environmental program that creates a safe work environment for Vestas Americas employees and others on Vestas Americas worksites, meets the needs of the communities in which we do business and is compliant with all applicable governmental regulations.

2. Scope

Vestas Americas – All locations

3. References

- 3.1 OSHA 29 CFR Parts 1910 and 1926 (United States)
- 3.2 Occupational Health and Safety Act, Regulation and Code (Canada)
- 3.3 OHSAS 18001 Clause 4.2 Occupational Health & Safety Policy
- 3.4 Vestas Demand – Environmental and Occupational Health and Safety Legislation

4. Responsible Manager

- 4.1 Throughout this manual, the designations "Service Manager" and "Construction Manager" will be used for the manager who is responsible for the specific activity or workplace.
- 4.2 The responsible managers will have different titles depending on the geographical location and depending on whether the specific activity is a service or construction activity.
- 4.3 Typical titles for employees involved in service and construction activities are: "Site Manager", "Site Supervisor", "Supervisor", "Project Manager" and "Project Supervisor".

5. Competent Person

- 5.1 In the context of this manual, a "competent person" is defined as a person who has sufficient qualifications, technical knowledge or experience to enable him/her to avoid safety related risks and who has been appointed to carry out duties specified in writing.

6. History of this Document

Rev. no.:	Date:	Description of changes
00	01-Jan-2010	First Edition

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

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Case No(s). 12-0160-EL-BGN

Summary: Application of Champaign Wind LLC, Vol III, Parft 35 electronically filed by Mr. Michael J. Settineri on behalf of Champaign Wind LLC