



E-Connection

1560-13

**Appendix E
Safety Plan
Offshore Windpark
Rijnveld West**

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Rijnveld West**



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P105/Juli 2008

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1 Introduction

This document describes provisions, regulations and operations in relation to safety at offshore wind park Rijnveld West.

The wind park Rijnveld West consists of 41 wind turbines and a high voltage offshore station. All offshore wind turbines are identical, type V90, made by Vestas and have a variable speed. The V90 wind turbine has three upwind rotor blades. The rotor diameter is 90 m. The hub height of the rotor-axis of the wind turbines is 65 m above LAT.

The electrical infrastructure consists of the 22 kV cables from the wind turbines to the offshore high voltage main station. This power station transforms the 22kV to 150 kV for efficient energy transportation. One 150kV cable transports the electrical energy towards a 150 kV station onshore.

The wind turbines can be accessed by boat using the landing platform or the offshore access system.

The turbines can be recognized by a number which will be on top of the nacelle for recognition from a helicopter and at the side of the tower for recognition from a boat.

To access the wind turbines special training is required.

The document outlines the responsibilities and obligations of parties involved (e.g. Supervisors, Personnel, Client) in relation to safety.

2 Safety

2.1 Safety management

2.1.1 Supervisor's obligation and responsibility

The responsibility of the supervisor involves making the safety procedures comprehensible and relevant to the personnel on all levels involved, planning for, implementing and supervising appropriate safety measurements and keeping necessary records thereof.

On board of the service vessel the Captain shall maintain a register of all personnel (incl. Consortium's personnel and visitors) on board on a daily basis.

Each new employee will receive induction from his/her supervisor with the outlines of his/her job, including the safety aspects thereof.

2.1.2 Employee's obligations and responsibility

The employees are responsible for their own activities and for the protection of themselves and others. They are also responsible for the prevention of damage to the environment.

- Each individual employee is responsible to carry out his/her work in a safe manner and in accordance with the requirements of the Consortium Health, Safety and Environment Protection Policy.
- Each individual employee shall familiarise himself/herself with and make use of any information issued by the Consortium relating to safety and working environment matters.
- Each individual employee shall inform his/her supervisor and/or the safety officer and/or the safety manager of any potential hazard which he/she may identify during his/her work.
- No one shall undertake any tasks unless he/she has received adequate instruction and information, appropriate tools and equipment or protective clothing. If in doubt he/she shall seek guidance in procedures or contact his/her supervisor.
- Each employee has a duty to ensure that he/she does not compromise the safety and integrity of any plant equipment and to carry out his/her tasks in such a manner that his/her own safety or the safety of others is not endangered.

2.1.3 Other

All project personnel will be obliged, and also visitors to the site locations and vessels will be encouraged, to actively contribute to the safety of the work and to identify any safety topic.

2.1.4 Safety Meetings

In order to maintain and enhance the safety awareness of site personnel and crew members on vessel, toolbox or informal safety meetings will be held every fortnight. During the meetings possible hazards, problems on the job and related safe practices will be emphasised and discussed.

Meetings will be attended by all personnel directly involved in the operations and will be chaired by the safety co-ordinator. Toolbox meetings will be organised before undertaking any non-routine or unusual activity.

The outcome of the toolbox meetings will be on the agenda of the project group meeting, attended by the project leader, the site manager and the safety co-ordinator. It will also be discussed on the Safety Committee, summoned every second month.

All safety meetings will be minuted with action items and copy of the minutes will be sent to all the project safety managers.

2.2 Risk Management

It is standard procedure of the Consortium to carry out an identification of hazard in relation to the various activities to be carried out and to make an assessment of the risks for personnel, equipment and material.

Well in advance of the actual activities the project team will carry out a hazards identification during a risk assessment meeting. For each hazard a critical factor will be established.

The result of the risk assessment meeting will be presented in a Hazid & Risk Assessment Report. This report will contain a list of identified hazards and for each hazard a table of the assessment of the risks. Each table will provide:

- Description of the operation
- Description of the activity
- Identified hazard
- Possible/potential effects to people and equipment
- Criticality factor for the risk
- Proposed risk reduction measures ("Plan van Aanpak")
- Any other safety requirement
- The residual risk

2.3 Personal Safety equipment

Personal protective equipment shall be understood as being any equipment, clothing or similar which is to be worn or carried by the user for protection against one or several risks which can endanger the user's safety or health.

During the performance of any work all personnel shall wear personal protective equipment where appropriate. The personal protective equipment shall give full protection against the risk it is intended to meet without acting as an irritant during work. It shall be designed to weigh as little as possible and be easy to put on and take off.

The user is responsible for the current and daily check of the equipment. The Consortium is, however, responsible for the yearly check if a such is prescribed.

See Figure 1

1. Safety helmet with a chin-strap.
2. H-belt (delivered by Vestas).
3. Lanyards, one line with fall damping device, one line with shortening device (delivered by Vestas).
4. Fall safety device (delivered by Vestas).
5. Footwear with rubber sole properly tightened to the feet.

When climbing in the tower, the fall safety device must be fastened directly to the D-ring of the H-belt.

Before ascending the wind turbine has to be stopped.

Only one person at a time is allowed to ascend.

The safety equipment is to be checked before and after use.

If for some reason the service crew has to stay over for a longer period (estimated maximum time: 2 days) there is a survival kit available inside the tower. This kit consists of:

- Medical kit, see Appendix "First aid kit"
- Sleeping bags
- Food and water supply
- Special clothing
- Flash light with back-up batteries
- Radio with back-up batteries
- Two-way telephone

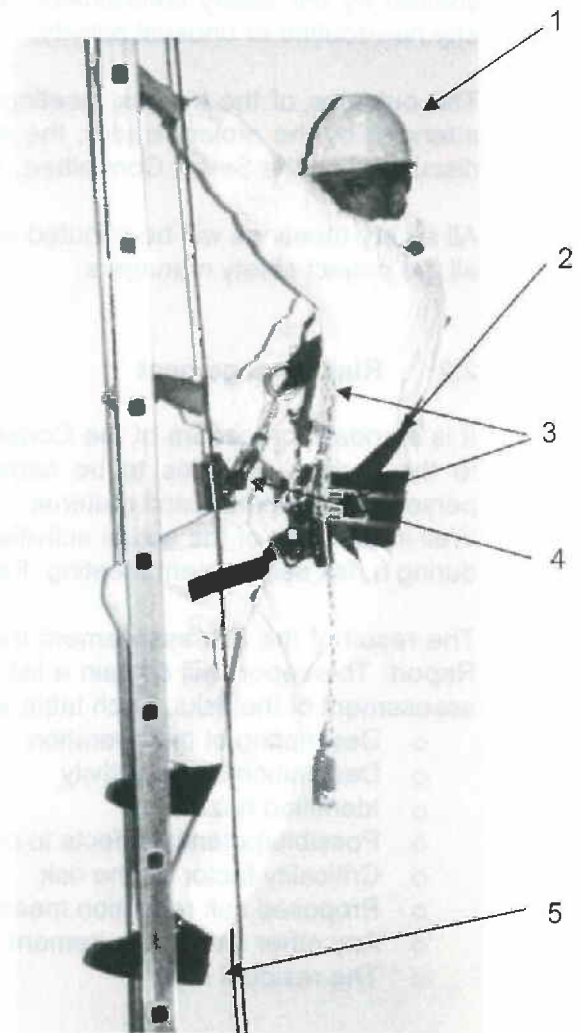


Figure 1

2.3.1 Safety helmets

- The employer must ensure that:
 - the employees are provided with a helmet
 - the employees are instructed in the correct use of the helmet
 - instructions for use are available
 - The employees must use safety helmet where it is required.
- The helmet must be able to protect against shock from above and from the side.
- The helmet must be adjusted to the user.
- The user must inspect the helmet himself/herself and make sure the helmet is in order and that the expiry date of the helmet has not been exceeded.
- The helmet will not be called in for a check.

In the wind turbine:

While working within the wind turbine the safety helmet shall always be worn during work or in places where there is a danger of touching live wires or where there is a risk of head injury:

- from materials, tools or other objects which topple, slip, fling out or fall down
- from projecting or swinging burden/loads
- caused by the head colliding with objects in confined spaces

On the boat:

In accordance to the safety regulations, all personnel and visitors on the boat must wear safety helmets whenever they are outside the accommodation. Safety helmets must not be modified by drilling, painting, decorating or attachment stickers.

The safety helmet must be fitted with a chin strap, which will be worn in position and secured when appropriate e.g. working in high winds, in elevated position, or in close proximity to a helicopter.

The use of aluminium or metal safety helmets is strictly forbidden.

2.3.2 Personal floating devicesOn the boat:

On the boat all personnel shall wear approved life vests or buoyant work vests when:

- transferring to/from any unit or structure at open sea or inland water
- operating or riding in any open or semi open water craft
- working at any over water location not equipped with handrail protection or working outside handrail protected areas. In addition the personnel shall be connected to the structures with safety belts and lifelines
- working on deck with risk to be thrown or washed overboard by wires, waves etc.
- during boat drills

The immersion suits (or equivalent) with a whistle, light and retro reflective material will be on board all units for all personnel and located in cabins if applicable.

During each boat drill, all persons will be checked if they are familiar with their immersion suit or life vest. After the drill, the immersion suits or life vests will be returned to their designated place and carefully checked.

Spare immersion suits/life vests will be stowed in the passengers accommodation, wheelhouse and near the lifeboat stations in appropriate, labelled boxes.

In the helicopter:

The life-vest worn inside of the helicopter may not be of a self inflatable kind (activated through contact with sea water): should the helicopter at water impact sink or turn over, the inflated life-vests will be an obstacle when leaving the helicopter, since it will force the passenger to the helicopter roof and thus prevent the passenger from leaving the helicopter.

The manually inflated life vest used inside of the helicopter has one carbon dioxide filled cylinder, activated by pulling one of the red strings. The life vest can be in- or deflated using the mouth piece.



Figure 2

The life vest is fastened by a buckle, a waist strap and a crotch strap, all tightened properly. It is equipped with a spray hood, folded into the collar of the vest. It also has a transmitter, a whistle and a lamp, which runs on a fresh water battery, used to localise the person in distress.

During flight a survival suit must be worn. The survival suit has to be kept in a good condition, i.e. not torn and clean from e.g. oil spill. The zipper has to be closed and if the survival suit is equipped with a special locking device, e.g. zipper-fastener, this must be used. Documents are to be kept in special pockets on the survival suit.

When the survival suit is put on sharp edged objects, e.g. watch, should be removed. The life vests are only allowed to be taken off when inside the turbine or the tower.

The life vest is worn on top of the immersion suit and harness.

Hoisting:

When being hoisted the same life vest as onboard the boat is used, i.e. of a self inflatable kind. This means that the life vest has to be exchanged when leaving or entering the helicopter.

2.3.3 Shoes

- It is mandatory that safety shoes/boots must be worn whenever outside the accommodation – on boat, in helicopter and whilst working inside the tower or turbine.
- The user of the protective footwear is responsible for the daily maintenance; if the shoes/boots are slippery through grease or mud, they have to be cleaned.
- The equipment will not be called in for check.
- Leggings can be used where there is danger/risk of sparks, molten metal splashes, corrosive substances.
- Knee protectors can be used where there is danger/risk of harmful effects of working while kneeling.
- In the accommodation area proper footwear should be worn.

2.3.4 Hearing protection

- The employer must ensure that:
 - The employees are provided with ear protectors if the noise level is very disturbing or the sound pressure level exceeds 85 dB.
 - The employees are educated in maintenance of the protective equipment.
 - Instructions for use are available
- The employee must use ear protectors if the work demands it. As a rule of thumb, hearing protection must be worn if a conversation at a distance of 1 m can not be followed.
- The user is responsible for the daily maintenance of the ear protectors.
- The equipment will not be called in for a check.

During helicopter flight and when being hoisted hearing protection should be used.

2.3.5 Eye protection

- The employer must ensure that:
 - Signs indicate where eye protectors shall be used.
 - The employee is provided with eye protectors where it is necessary.
 - The employee is educated in the use of the eye protectors and is informed of the risk if the protective equipment is not used.
 - The employee is educated in maintenance and cleaning of the eye protectors.
 - Instructions for use are available.
- The employee must use eye protectors where work demands it.
- The user of the eye protectors is responsible for the daily maintenance.
- The equipment will not be called in for a check.

Eye protectors shall always be used:

- Where indicated by compulsory signs.
- If work is performed in dust and draught.
- Where angle grinder and rotating wire brush are used.
- Where sandblasting is carried out.
- Where work is performed on systems filled with liquid (especially if these systems are under pressure), e.g. hydraulic systems.
- Where spray painting is carried out.

2.3.6 Hand protection

Gloves are used to protect against mechanical or chemical effects, burns, cold and heat. In the data sheets over consumables (Substances and Materials manual 947614) it will be pointed out which substances can affect the human body.

- The employer must ensure that the employees are provided with gloves and that the employees are educated in the necessity of using gloves.
- The employee must use the protective equipment if required, however, this will often be a personal judgement.
- When the protective equipment is worn out or polluted it must be destroyed.

2.3.7 Breathing protection

Breathing protectors shall protect against inhalation of polluted air and/or lack of oxygen. In the data sheets over consumables (Substances and Materials manual 947614) it will be pointed out when and which type of masks that are to be used.

- The employer must ensure that:
 - The employee is provided with suitable breathing protectors which fit the employee and which will not cause unnecessary inconvenience.
 - Breathing protectors will be used during work.
 - The employee is instructed and educated in the use of the protective equipment.
 - The employee maintains and cleans the breathing protectors.
 - Instructions for use are available.
- The employee must use protective equipment where it is required.
- The individual is responsible for the daily maintenance.
- Masks will be called in for a check.

2.3.8 Fall safety protective equipment

Each employee has his/her own personal harness to be used within the tower as well as when being hoisted by helicopter.

The helicopter company assumes responsibility for the harness being suitable also for hoisting.

- The employer must ensure that:
 - The employee is provided with suitable protective equipment.
 - The system does not cause unnecessary inconvenience during work.
 - The protective system is used when circumstances are available.
 - The employee is instructed and educated in the use.
 - The employee is informed of the risk/danger if the protective system is not used.
 - The employee is educated in maintenance and storage of the protective equipment.
- The employee must use protective system where it is required.
- The employee is responsible for the daily check of the equipment (wire breaks, cracks, wear or other damages).
- The protective equipment will be called in for a check once (1) a year. Any repair must be performed by a competent company, normally the supplier.

2.4 Life saving equipment

2.4.1 Safety equipment onboard the boat

All units will be equipped with the necessary lifesaving equipment in accordance with the regulations and will be regularly inspected and maintained.

The safety equipment onboard the boat mainly consists of:

- I. Life rafts/boats
- II. Personal floating devices
- III. Ringbuoys
- IV. Additional safety equipment

The Captain is fully responsible for inspection and maintenance of the lifesaving equipment.

I. Life rafts/boats

The lifeboats will be maintained in the best possible condition. They will be fully equipped with radio, water (if applicable), rations and pyrotechnics at all times.

Detailed instructions for use and maintenance are described in the available training manuals.

Launching /handling instructions will be displayed in the accommodation and inside the life raft/boat. It is of the utmost importance that the operating procedures for the releasing gear of the units lifeboats are fully understood.

II. Personal floating devices

As described in 2.3.2

III. Ringbuoys

In a man overboard situation a ring buoy will be thrown near the person even if the buoy is out of reach to mark the approximate position and assist in the rescue operation (for each unit check with Safety Plan on correct location).

IV. Additional safety equipment

Additional safety equipment may consist of e.g. portable radios and distress signals. The location of the equipment is shown on the unit's Safety Plan.

2.4.2 Safety equipment onboard Helicopter

Apart from standard fire fighting equipment to combat an engine fire, there is also a safety dinghy and floats. The dinghy is to be used on instruction of the helicopter crew and is equipped with an emergency kit containing among other things a first aid kit, thermal protection and means of distress signalling. The floats are used for increasing floating capacity and stability, should it be necessary to land on water.

2.4.3 Safety equipment in wind turbine

Should a fire in the lower part of the turbine prevent safe rescue by use of ladder, descent must be made on the outside of the tower, using a rescue- and descent device.



Figure 3



Figure 4

This device is attached to the fixing point of the nacelle crane and allows a person to lower himself to the ground at a controllable rate of descent or to evacuate a person not being able to do so himself/herself (0.7 m/s as a standard with a load of 150 kg).

The safety equipment should only be used by instructed personnel and only with rope delivered by the producer.

The device has to be placed so that the hand wheel can rotate freely. The rate of descent is regulated automatically.

The rescue- and descent device must be checked after every unpacking/use, by visual as well as mechanical inspection.



Figure 5

2.5 Fire protection

2.5.1 Fire protection on a vessel

Each unit will be equipped with sufficient and regularly maintained fixed and/or portable fire fighting equipment needed to protect the unit, personnel and equipment. The fire fighting equipment, pumps and station(s) will be inspected at intervals not exceeding 7 days. A record of inspection will be maintained in the units logbook.

Crews will be trained in the use of this equipment.

Each unit will have designated fire fighting team(s).

Fire fighting equipment, pumps and FiFi stations will be inspected as per Planned Maintenance Systems (PMS) requirements.

In the event of a fire on the unit, the Captain will direct the action to be taken.

A person discovering a fire will sound the alarm and apply the nearest suitable extinguishing agent.

All personnel will be assigned specific duties to be carried out in the event of a fire and will be trained in the use of fire fighting equipment.

Passengers are to muster at the life raft stations.

2.5.2 Fire protection in wind turbine

In case of any type of fire in the turbine, the power station must immediately be contacted for a disconnection of the grid.

If a smaller fire is under development during a stay in the nacelle, the turbine must always be disconnected at the main high voltage circuit breaker. In the nacelle the breaker is switched off by the red button (marked TRIP F60) on the nacelle controller. In the tower bottom the breaker is switched off by pushing the red button placed on the breaker in the high voltage section.

The other crew members must be alerted by means of e.g. radio communication.

The wind turbine is equipped with a powder fire extinguisher. In case of heavy build-up of smoke, the tower must be evacuated by climbing out on the nacelle, safely hooked to the rail. For emergency descending, a descent device will be used. The service elevator is not to be used in case of fire.

2.5.3 Fire protection in helicopter

The helicopter is equipped with standard fire fighting equipment to be used in case of engine fire.

2.6 Personnel related incidents and accidents

In case of illness/injuries during maintenance the following action should be taken:

- report conditions to unit manager
- examination
- consultation with medical network if necessary
- treatment
- decision to evacuate or to remain on board
- client involvement if evacuation or further medical help is required

In case of Medical Evacuation the following information should be obtained via a coastal radio station:

- Radio Medical Advice (RMA)
- Transport facilities

Regular contact with all parties involved should be maintained, see section 2.11 Communication.

2.7 Safety transport by boat

During maintenance the crew will be transported to the wind turbine from the mother ship by a rubber boat. Hooks attached to the platform ladder rail will be used to assist the personnel when transferring from the rubber boat to the work platform.

When using an open boat (Rubber boat, MOB boat, FRC or work boat):

- Minimal 2 crew members on board
- All persons on board must wear a self inflatable life vest fitted with warning lights
- VHF set must be on board
- The launching of the boat shall be carried out carefully and in accordance with the appropriate procedures.
- Before launching, machinery and equipment shall be checked.
- Weather conditions and other traffic shall be taken into consideration when operating the boat.

2.8 Safety transport by helicopter

The Dauphin is equipped with 7 doors, the right hand sash door being used for hoisting. Helicopter crew consists of 2 helicopter operators and one hoist crane operator.

2.8.1 Maasvlakte procedures

- Entering the helicopter with rotor blades standing still:
The hoist operator gives a sign for take off. Inside of the helicopter life vests will be distributed and put on. Before entering, check that the steel cases holding the standard service equipment for the wind turbine and a satellite phone for communication with on shore control room are brought along. The cases must be securely fastened inside of the flight compartment.
The hoist operator shows the passengers where to sit. Safety belt and hearing protection has to be used when travelling by helicopter. Hearing protection is stored in the helicopter and in the departure hall, should it not be brought along as personal safety equipment.
- Entering the helicopter with turning rotor blades:
The hoist operator will let the passengers know when it is safe to approach the helicopter. The passengers must never pass underneath or near a helicopter tail rotor. Hearing protection shall be used when approaching the helicopter. Hearing protection is to be found in the departure hall, should it not be brought along as personal safety equipment. Inside of the helicopter life vests will be distributed and put on. NB! These life vests are manually inflatable and thus not part of the personal safety equipment, which are self inflatable.
The hoist operator shows the passengers where to sit. Safety belts and hearing protection have to be used when travelling by helicopter.

Cellular phones shall be turned off during flight.

No passengers are allowed in the helicopter when it is being re-fuelled.

2.8.2 Emergency landing

The procedure for emergency landing is to be found in Appendix "Emergency Landing Procedures".

Instructions from the helicopter crew must be observed.

2.8.3 Emergency landing on water

The procedure for emergency landing is to be found in Appendix "Emergency Landing on Water Procedures".

Instructions from the helicopter crew must be observed.

Do not activate the life vest while still inside of the helicopter.

2.9 Hoisting

2.9.1 Hoisting platform

The high voltage station turbine will be equipped with a permanent helicopter hoisting platform. The requirements for a helicopter winching area is a clear zone, 5 m in diameter and completely free of obstacles. The helicopter used for hoisting operations will be a Dauphin SA365N3 with a rotor radius of 6 m.

2.9.2 Hoisting personnel

The decision to follow through the hoisting operation under prevailing weather conditions lies with the helicopter operator. For hoisting at night, additional lighting applies.

Hoisting maintenance personnel to the platform on top of the high voltage station can be done in approximately 2 minutes. Special training for the maintenance crew is required.

2.9.3 Hoisting down

After having brought the helicopter to the high voltage station, the hoist operator – in communication with the pilot - gives a signal to prepare hoisting. One hoist is divided into three phases:

1. preparation within the helicopter
2. the actual hoisting
3. releasing hoisted person

Phase 1 - preparation within the helicopter

- Exchange of helicopter life vest for the personal self inflatable life vest.
- Hoist operator assists with putting on harness, unless a personal harness is being used, in which case it has been put on before entering the helicopter.
- The fastener from the harness is tightened.
- Hoisting hook is attached to the harness.

Phase 2 - the actual hoisting

- The person to be hoisted removes the safety belt and moves close to the doorway.
- The cable is stretched and the person to be hoisted is pulled outside.
- By now the helicopter hovers at ± 40 ft, lateral distance ± 20 m. The person being hoisted is hoisted down till ± 5 m above the platform.
- The hoisted person must have his/her legs stretched out in order to enable the hoist operator to better judge the distances when hoisting.
- The helicopter is ordered to climb till clear of obstacles. The person being hoisted remains on the same level of height.
- The helicopter moves horizontally until it hovers at ± 3 m lateral distance from the platform edge.
- The person being hoisted throws the static line on the platform. This is done in order to avoid static electricity discharge.
- The helicopter moves to the centre of the platform.
- The person being hoisted is lowered down.

Phase 3 – releasing hoisted person

- The cable is released from the harness when the hoisted person is sitting in a squatted position, firmly holding on to the safety rail on the platform.
- The harness is hooked to the safety rail on the nacelle roof.
- A signal to the hoist operator when freed from the harness must be given.
- The hoisting cable should be guided as it is being winched upwards so that it will not get caught in obstacles.

All hoisting of personnel is done with a helmet fitted with a chin strap and hearing protection. A voice procedure for hoisting down is to be found in the Appendix "Voice Procedure for Hoisting".

2.9.4 Hoisting up

1. Preparation on platform.
2. Completion onboard helicopter.

Phase 1 – Preparation on platform

- The skylight hatch must be kept closed during the whole operation.
- The hoisting cable is lowered.
- The static line must touch the platform before anyone reaches for the safety hook on the cable.
- The safety hook is attached to the harness.
- The person to be hoisted places him-/herself directly under the hoist.
- When ready, a sign is given to the hoist operator.
- Further directions are given from the hoist operator.

Phase 2 – Completion onboard helicopter

- The hoisted person remains passively hanging in the harness when approaching the helicopter.
- The hoisted person will be pulled in with his/her back towards the helicopter.

- Once inside the cable is given some slack so that the hoisted person can get away from the doorway.
- Harness is being unhooked.
- The self inflatable life vest is exchanged for a manually inflatable one.
- The hoisted person sits down and fastens the safety belt.

All hoisted personnel use a helmet fitted with a chin strap and hearing protection.
A voice procedure for hoisting up is to be found in the Appendix "Voice Procedure for Hoisting".

2.9.5 Hoist failure

Should the hoist installation prove to be faulty before the person to be hoisted is attached to the hoisting cable, the operation must be called off. Should the error occur during hoisting, the hoisted person must remain passive. The crew shall try to bring the person in safely as soon as possible. First attempt shall be to lower the person on to the platform. Should that fail, efforts will be made to find an alternative platform, such as on a nearby ship.

2.10 Diving

It is not permitted to dive except by professional divers and only then in accordance with applicable accepted diving procedures/manuals.

2.11 Communication

On line telephones will be installed inside of the towers for communication between tower - tower and tower – on shore control room. During maintenance Vestas' personnel will use radio transmitters, allowing members of the crew to communicate between tower-tower and tower-boat. The first thing to do after entering the tower from the boat is to check the radio communication.

When service crew is brought to the wind turbine by helicopter communication with the control room is done by means of a satellite phone brought along. Communication between helicopter crew and service crew on helipad is done by hand signs (standard signals).

In an emergency situation communications will be carried out as detailed in the Emergency Telephone List, see Appendix "Emergency Telephone List"..

When a unit is engaged in cargo handling operations an effective radio communication link on a designated radio channel shall be maintained at all times between unit and offshore installation.

The Captain should observe periods of radio silence.

2.12 Presence around wind turbine

The wind turbine will be fitted with beacon lighting in accordance with IALA recommendations. The lighting is powered by a diesel generator inside of the tower.

Foghorns will be used to indicate the presence of the wind farm. The foghorns can be heard from a distance of two nautical miles.

A protection system is used in the vicinity of the wind turbine, indicating to a surveillance monitor any vessel colliding with the tower.

Under no circumstances is anyone allowed to be in or near the wind turbine during thunderstorms.

3 Cargo and Dangerous Goods Procedures

Dangerous goods are items that may cause a risk to health, safety or property.

The Captain/Service Manager is responsible for ensuring that personnel involved in its operations have been given relevant information with regards to the product in use, and to ensure that proper protective equipment is supplied and used.

It is the responsibility of the contractor, when purchasing a product covered by this procedure, to ensure that the producer/importer/supplier has fulfilled his/her obligations in accordance with the regulations.

The Captain/Service Manager is responsible for handling and temporary storage of a product covered by this procedure.

3.1 Ordering and Purchasing

In cases where products covered by this procedure are ordered/purchased by a Business Unit and/or subcontractors, the Man In Charge (MIC) of the supplier automatically assumes the responsibilities for supplying data sheets, ensuring correct marking etc. All products should have the labels required for the product. The Service Manager has overall responsibility.

3.2 Checking Before Shipment

When products covered by this procedure are packed in containers etc. for shipment offshore, the following should be checked:

- Products that may react with one another shall be shipped in separate containers etc.
- Broken bags, boxes, bottles, drums, cylinders etc. shall not be shipped.
- The content of a container shall be properly secured.
- The container shall be marked with the symbol for the most dangerous of the substances stored in it.
- The described chemical substances are registered on Data Sheets.
- Products not in accordance with this procedure, shall not be sent.
- The containers shall be marked "DANGEROUS SUBSTANCES STORED".

3.3 Handling Offshore

The Captain must be notified prior to loading or back-loading dangerous goods.

The Captain is responsible for making sure that cargo of products covered in this procedure is handled and temporarily stored in accordance with the regulations.

The cargo manifests/packing list shall carry clear information of any type of substances that are stored in containers etc. (Such as copy Data Sheet etc.).

When such substances are landed, the Captain, will advise the receiver of the substance(s).

The responsible for cargo handling and the responsible for the chemical or harmful substance will co-operate in arranging the unloading in accordance with a safe code of practice.

All substances covered by this procedure shall be stored in separate lockers and areas as specified in the regulations.

3.4 Products Marking

It is the responsibility of a producer, an importer or a supplier to mark all products covered by these procedures in accordance with the existing regulations.

3.5 Toxicological Data Sheets

Any purchase department of a Business Unit and/or subcontractor, dispatching material governed by this procedure, shall ensure that relevant product information is delivered with the material as required:

- Name of substance
- Composition
- Danger to health and/or environment
- First aid
- Information to medical personnel
- Protective measures
- Packing (boxes, bottles etc.) being marked in accordance with existing requirements.

Above information shall be completed on the Toxicological Data Sheet by the supplier in English, Norwegian and/or Dutch text if applicable.

3.6 Symbols for Use on Labels

Symbols on labels shall be in accordance with IMDG Code requirements.

3.7 Containers

The Consortium will be responsible for ensuring that all cargo containers and lifting gear used to transport materials to or from offshore installations are correctly chosen for the purpose in terms of type, size and load carrying capacity, that all certification is fully in date at the time of use, and that the load to be carried is properly secured. General recommendations are contained in the BSI Code of Practice for Offshore Containers.

The Consortium shall ensure that cargo within containers is adequately stowed and well secured. A packing certificate is required for all dangerous cargo packed into containers and cargo must be stowed and segregated as per the relevant regulations. This is equally applicable to offshore back-loading.

The Captain has the authority to carry out random inspections and, if such an inspection of any container reveals inadequate stowing, lashing or securing arrangements, he has the right to refuse the container.

3.8 Cargo Handling

The Captain must ensure that all deck cargo is correctly stowed and secured.

Areas on deck which are not to be used for cargo stowage should be clearly marked or otherwise indicated.

All cargo operations are to be supervised by a responsible Officer on the unit at all times.

All cargo should be accompanied by a cargo manifest clearly identifying the goods and giving details regarding contents, weight and destination.

All cargo should be marked so as to be readily identifiable from the manifest.

The Captain has the authority to refuse cargo if insufficient information is given, or the cargo is incorrectly manifested, or he has reason to believe that dangerous goods are contained in unmarked cargo.

Prior to commencing cargo operations offshore, the program should be discussed and agreed between the Service Manager and units Captain. Any factors limiting the units expected performance must be indicated to the installation. Any failure of main engines, thrusters, steering gear, control systems or other plant must be immediately reported to the installation.

Leftovers from Maintenance Consumables must be returned to the service stock. All backloaded cargo must be inspected by a responsible and competent person to ensure that it is in a safe and secure condition and will not create a hazard to the crew or unit. All lifts should be inspected to ensure that there are no loose items on top of or inside the cargo, that they are properly slung, that all doors, lids, etc., are properly secured, and that all open skips are fitted with nets.

Dangerous cargo labels on empty cleaned containers must be removed prior to backloading to the unit.

4 Housekeeping and Personal Behaviour

4.1 Housekeeping

Each unit shall abide by the following general house keeping rules:

- It is not permitted to make modification to equipment, tools, systems, machinery etc. without proper authorisation.
- Offices, living quarters, workshops, public spaces, kitchens, galleys, pantries and the like shall be kept tidy and clean.
- Floors shall be kept clean and free from oil, grease and other slippery substances. Rugs and mats shall be secured in place.
- Steps, walkways, passages, doors and doorways shall be kept clear of obstructions.
- Soiled cleaning materials, scrap and waste oil shall be duly stored in containers for correct disposal.
- Oils, fuels, paint and similar flammable materials shall be stored in dedicated spaces. Due attention shall be paid to separation, ventilation, electrical arrangements and during hot- and electrical work. Accesses to such spaces shall be marked accordingly. The same applies to the storage of chemicals other than normal domestic chemicals such as scouring powder, toilet cleaners, detergents etc.
- All equipment, tools and materials shall be stored in the appropriate stores after use.
- Loose tools, equipment and materials shall not be left unattended in overhead areas.
- Always close watertight doors after passage.
- Access to safety equipment (fire extinguishers, safety control stations, etc.) shall not be blocked.
- Work clothes and boots are not permitted inside offices, common spaces such as mess rooms, living quarters and accommodation.

4.2 Smoking

On vessels smoking is only permitted in designated areas.

Smoking on deck is not allowed when taking bunkers and when flammable cargo is handled or carried on deck, during tank cleaning of tanks that contained flammable cargo.

Smoking is also prohibited when local regulations prescribe, e.g. operating within 500 m of an offshore installations and in the proximity of oil/gas terminals.

It is strictly forbidden to smoke in bed.

4.3 Alcohol/Drugs

The use and possession of alcoholic beverages and drugs on the various work locations shall be forbidden.

This means that drugs of any kind or any other intoxicating substance are not permitted unless specially required for medical use or other proper reasons. Anyone who has medicine prescribed by a doctor has to inform his/her supervisor when arriving on the work location.

It is the responsibility of supervisors to ensure that personnel under their control and authority are not under influence of alcohol or drugs. Ignoring this policy will lead to immediate dismissal from the project.

5 Statutory Regulation for Offshore Operations

5.1 Statutory regulation applicable to offshore workers

The Labour Act for the North Sea Mining Industry applies to workers on auxiliary ships employed for more than 30 days and all offshore workers who work on the Dutch part of the continental shelf – also where this lies outside territorial waters.

The Act issues rules to specify the legal status of the worker and his/her terms of employment.

5.2 Environmental legislation

Only environmental hazard, damage and obstruction which might stem from the operation falls within the environmental legislation. Environmental risks for the employees (gases, fumes or liquids) fall under the “Arbowet”.

6 Environmental Management System

The protection of the environment is a main concern of the management of the Consortium and therefore the operations are conducted in such a way that no damage to the environment is caused.

An environmental management system, including occupation health and safety, is drawn up to satisfy the needs of all interested parties. Conditions critical to the environment (during production, handling, use, maintenance and disposal) must be identified, evaluated and planned for.

The environmental management system is adapted to NPR-ISO 14004:1997 (Handbook for Vestas, definition and references).

The storage facility will include provisions for spillage containment. Sufficient stock of material and equipment to mitigate any effect of accidental spillage will be available and immediate action will be taken as to minimise any impact of accidental spillage. The consortium will immediately notify Client of any accidental spillage and the action taken.

In order to illuminate the effectiveness of quality and environmental work a quarterly report must be made by the Vestas Quality and Environment Department to the Vestas Management Group. Reports must include the collection, analysis and evaluation of information and proposals for improvements and the setting of new targets. A summary reports is to be sent to subsidiaries, departments and employees.

7 Incidents/Accidents Reporting

Reporting of incidents/accidents is emphasised, not to punish individuals, but, in order to improve the work system.

The term "Accident" is here referring to any event which caused injury or illness to personnel and/or damage to the environment and assets.

"Incident" is any unwanted event or dangerous situation which caused or could have caused injury or illness to personnel and/or damage to the environment or to property.

Reporting of incidents/accidents will be carried out in accordance with procedure, but the reporting shall also include reporting to authorities (if applicable) and Client.

The procedures will be made as for SCC-procedures (VCA-procedures).

8 Training

8.1 Emergency and Contingency Situations

All personnel shall have the training required according to national or flagstate legislation, international and/or port state legislation.

All service engineers are VCA certified and fully trained in offshore emergency responding. This training does not require any prior maritime education. It comprises practical exercises using safety equipment, vessels, cordage and fire extinguishing equipment.

Contents of training:

<u>Survival:</u>	Life jackets Hypothermia Protection against cold Safety suits Heli-hoist Lifesaving first aid
<u>MOB-Boats:</u>	Positioning, lurching, manoeuvring and landing Equipment and contents Rescuing a person from the water Boarding an access ladder from a boat

Emergency Radios and Pyrotechnics

<u>Life Rafts:</u>	Positioning and launching Equipment and contents Boarding from the water Stay at the life raft How to afloat a capsized raft
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<u>Basic maritime knowledge:</u>	Knots and hitches Lashing Mooring
----------------------------------	---

<u>Fire Fighting:</u>	Fire extinguishing theory Portable fire extinguishers CO ₂ equipment
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The training course will be held at Fredrikshavn Nautical School.

A change in working circumstances or new equipment might initiate safety training. This should be determined by the Business Unit Manager of the contractor and the Safety Manager (Vestas).

The Line Manager of the contractor shall identify already in the contract negotiation stage what (additional) safety training is required.

The Captain/Safety Manager has developed procedures for emergency and contingency situations. The Safety Manager trains the personnel for emergency situations. Assignment of personnel and the action that each person shall take in various situations should be specifically outlined and posted (muster list). Safety co-ordinator must ensure that new arrivals read and understand these procedures and regulations as per muster list.

8.2 Emergency Drills

On site Safety Co-ordinators must ensure themselves that their personnel is familiar with the location and use of the safety-, lifesaving- and fire fighting equipment.

8.3 First Aid

All maintenance personnel has been trained in first aid, though only one is by Safety Manager appointed to act as safety co-ordinator (internal emergency staff), capable of administering first aid in the event of an accident and of fighting simple fires. This person should also be informed of the order of evacuation and under what circumstances the ambulance, fire brigade or police must be called in.

8.4 Emergency Messages

Only the Captain or his/her appointed replacement may authorise transmission of distress messages. These will comply with the format detailed in the applicable Radiotelephony Distress Procedures.

9 Practical Advice by Inspection

9.1 Inspection of machinery

During inspection of the machine the following procedure must be followed:

- a. During inspection there must always be at least two persons at the turbine.
- b. Full-feathering of the blades is done by pressing <PAUSE>, and when the blades stand still or rotate slowly the <Emergency stop push button> is activated, and the turbine stops.
- c. You may now climb the turbine but remember to wear:
 - Footwear which is suitable for climbing towers.
 - H-belt with the fall safety device fastened directly to the D-ring of the H-belt.
 - Safety helmet.
- d. Always make sure that there is nobody below you in the turbine when you start the ascent.
- e. If you bring tools, lubricants etc. keep these in a bag locked onto the safety belt or in a kitbag.
- f. During ascent the fall safety device or the supporting strap MUST be mounted. The aluminium rungs of the ladder are not stable at fall, if you mount the fall safety hook on them. Use the fittings for the ladder in stead.
- g. Close the trap doors in the landings when you have passed.
- h. Please notice where the Emergency stop push buttons are located in the nacelle.
- i. The controller must be disconnected by the circuit breaker (marked CONTROLLER) in the board arrangement and locked by means of a padlock, where only authorized personal has control over the key/keys, if you work on the electrical part of the controller.
- j. The generator must be disconnected by the circuit breaker (marked generator) in the board arrangement and locked by means of a padlock where only authorized personal has control over the key/keys, if you work on the terminal of the generator or inspect the generator cables and the controller. (There will still be light in the turbine, if it is disconnected).
- k. Unauthorized persons must under no circumstances move the covering plates which covers the rotating or the electrical parts, especially the high voltage installation. Take care that safety straps do not catch rotating shaft when you stay in a working turbine.
- l. The rotor locking system must be activated (see 12.4) before anyone climbs out in the nose cone or work on the rotating parts in the nacelle.

- m. Before descent/leaving the turbine by the roof, close the nacelle skylight. Make sure that you have gathered all tools and REMEMBER that the red Emergency stop bottoms must be deactivated.
- n. Oil or grease must be cleaned up because of the risk of slipping.
- o. Check that covering and locking of the high voltage installations are intact and undamaged.
- p. Check that the high voltage cables between the high voltage installations in the nacelle and the bottom are intact and do not have any visible mechanical damages, such as squeezed/ cut of strips, mechanical parts etc.

9.2 Oil leak and waste

When inspecting the machinery you should always check oil waste and loose bolts very carefully. By the covers and axle lead-ins the gearbox can "sweat" a little. This, along with brake dust, can soil the gearbox a little. Dirt should be wiped off, as it otherwise can be difficult to determine whether there is a significant leak.

By a significant leak means oil drops running down the gearbox. Such a leak means oil waste to an extent that repair is necessary. Loose bolts in the structure means danger. They should be tightened immediately. If it is a matter of several bolts or repetitions, contact Vestas' service department.

9.3 Influence by lubricants

The lubricants used in the wind turbine can be aggressive and you should prevent the lubricants from contact with your skin or clothes.

If you are inspecting a gearbox, take care **not** to breathe in the hot oil vapour.

9.4 Operation of the rotor lock system

The rotor lock system must not be used while the rotor is rotating. Set the wind turbine into PAUSE and activate <Emergency stop push button>, to activate the disk brake.

Adjust the lock systems holes on a level with the lock system mandrel by "Coaxing" the brake (emergency stop push button).

At correct position turn the handle to the position "+" (the handle perpendicular to the main shaft) and pump the lock system mandrels out. Observe at the right side during pumping!

At de-locking turn the handle into "-" position and pump the lock system mandrels in.

When mandrels are fully out or in, set the handle in "lock" position.

9.5 Control unit and board arrangement

Only authorized or instructed persons are allowed to open the doors of the control unit cabinet. The operation panel is located behind the door of the com controller cabinet.

Before inspection or working at the turbine, the remote control MUST be deactivated. Use * to toggle between "remote commands active/deactive" in picture 7. Remember to activate the remote control, when the inspection or the work is completed. Eventually dismount the telephone connection or the connection on the communication module. Use Picture 11.33 to set a review.

9.6 High voltage installations

As a fundamental rule it is not allowed to dismount or even move behind the protected zone of the high voltage installations.

As an operator/serviceman you are only allowed to be behind the sealed off area when the high voltage installation has been disconnected, secured and visibly earthed. This operation has to be carried out by authorized personnel (HV-authorized) prior to any work being performed on the HV-installation.

Further we are referring to the national laws and regulations for work on high voltage installations.

9.7 Cast Resin Transformer

The wind turbines are equipped with RESIBLOC – a Cast Resin Transformer, which fulfils the requirements of oil-filled and dry-type transformers without having their limitations.

These transformers can be characterised as self-extinguishing.

9.8 Switch Gear

The SF6-Safering is a circuit breaker with a detector based on a pressure sensor, which reacts on a sudden increase of pressure in SF6-tank. The sensor will not react on a slow increase due to normal temperature change.

The SF6 gas is kept in the SF6 tank even after a serious internal short circuit, giving the benefit of increased personnel safety, no need for ventilation and no entering of SF6 gas or decomposits to the atmosphere.

The gas pressure on the manometer will be checked every maintenance visit.

All components in the SF6 tank of the safering unit are maintenance free. It has no exposed live parts and all mechanical parts are surface-treated to prevent corrosion. Moving parts are lubricated at the factory for the product's life expectancy.

ANNEX 1 Wind Turbine Emergency Stop Push Buttons

The wind turbine has four EMERGENCY STOP push buttons, which are located at:

- The com controller.
- The nacelle controller.
- The main bearing housing.
- The yaw ring.

The Emergency stop push buttons are red with yellow background. Emergency stop push button is activated when the red button is pressed down. When Emergency stop push button is activated, the blades will pitch (full feathering) and the brake will be activated, so the turbine stops. All other motors are stopped so all movement stops. There is still power supply for light, and supply for controllers.

ANNEX 2 Wind Turbine Operating Strategy and Error Handling

Operating Strategy

The operating strategy is built on 4 operating states:

The VMP-controller is always in one of the following states:

- RUN
- PAUSE
- STOP
- EMERGENCY

Each operating state can be seen as an activity level, where RUN is the highest activity level and EMERGENCY is the lowest.

It is important that each operating state is very accurately defined. Thereby you can always tell how the turbine will react, when you know the operating state and the external conditions. All software which is handling different things such as yawing, pitch system, generator, thyristors etc. have to follow the actual operating state.

The following gives a brief description of the four operating states and their characteristics.

RUN:

- Brake is off
- The turbine is allowed to operate and produce power.
- The turbine is allowed to connect the generator to the grid.
- The pitch control system will choose the optimum operation.
- The turbine will yaw automatically.
- The cooling system is allowed to start ventilators.
- The operating panel displays RUN.

The pitch control system will control, when the generator shall be connected to the grid.

By optimum operation is understood that the pitch control system determines, if the generator shall be connected to the grid or not. It also controls the switching between speed control and power control and chooses the optimal blade angle.

PAUSE:

- Brake is off.
- The hydraulic pump maintains the working pressure.
- Automatic yaw is active.
- The pitch control system regulates the tip angle of the blades against 90°.
- The turbine is idling.
- The cooling system is allowed to start ventilators.
- The operating panel displays PAUSE.

This operating state is very useful, when testing the turbine, because everything is functioning normally, but the turbine is not running automatically.

STOP:

- Brake is off.
- The pitch system is by-passed mechanically by opening the full-feathering solenoid valves.
- The hydraulic pump maintains the working pressure.
- Automatic yaw is not active.
- The cooling system is not active.
- The operating panel displays STOP.

EMERGENCY:

- Brake is off.
- The emergency circuit is open.
- All outputs from the computer is set deactive.
- The computer is still running and measuring all inputs.
- The operating panel displays EMERGENCY.

When the emergency circuit is open, the computer-outputs are by-passed, making it impossible for the computer to activate any of the actuators.

The brake is only engaged if one of the emergency buttons is activated.

At emergency stop button (manual emergency) the state is at emergency, which the only exception that the brake is applied.

Changing between operating states

As described we have a very consistent knowledge of the activities in the turbine, just by knowing, which of the four operating states is active.

The following describes, how it is possible to change between the operating states.

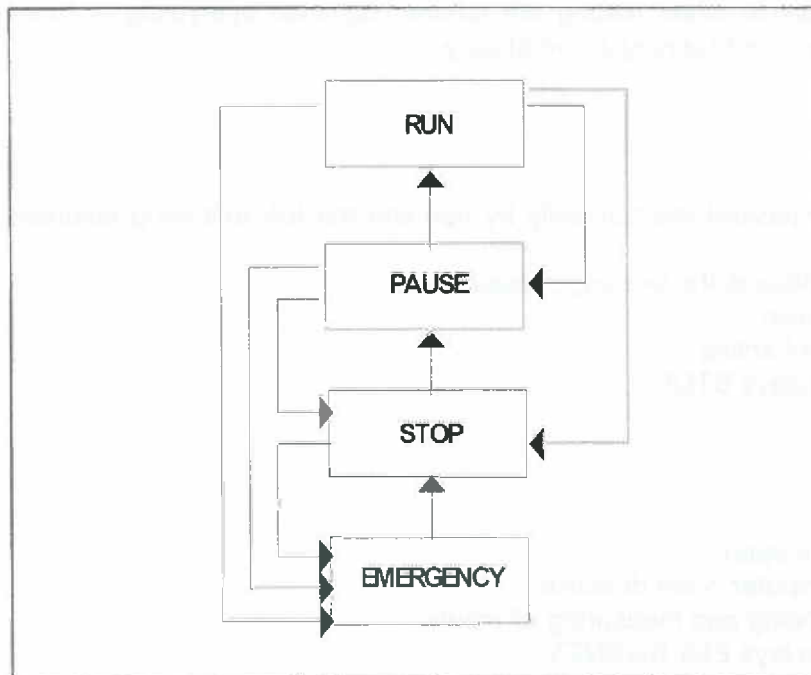


Figure 6 Possible changes between activity levels

As illustrated by Figure 6, it is possible to increase the activity level step by step. Decreasing the level it is possible to decrease more than one level.

This way of changing between the operating states is primarily chosen in order to give the best safety strategy and error handling.

If the turbine tries to go to a higher activity level, it has to climb one level at a time. This system ensures that if an error is detected, while the activity level is ascending through the levels, then the ascending will STOP.

Another feature of this system is that if a detected error is so fatal that there has to be a change in operating state from RUN to EMERGENCY, this can be done immediately without having to go through PAUSE and STOP.

In the following we will give a brief description of the actions taking place, when there is a change from one operating state to another.

Increase in activity level

EMERGENCY to STOP:

If conditions for being in STOP is OK then

- Close emergency circuit.
- Build up working pressure.

STOP to PAUSE:

If conditions for being in PAUSE is OK then

- Start auto yawing.
- Close full-feathering valves.

PAUSE to RUN:

If conditions for being in PAUSE is OK, then

- Check that the turbine is upwind.
- Produce power if wind.

Decrease in activity level**STOP to EMERGENCY:****PAUSE to EMERGENCY:****RUN to EMERGENCY:**

- Open emergency circuit.
- Set all outputs deactive.
- Reset all logic

PAUSE to STOP:

- Stop auto yawing.
- Open full-feathering valve.

RUN to STOP:

- Stop auto yawing.
- Open full-feathering valve.
- Disconnect generator if connected.

RUN to PAUSE:

- If the generator is connected, then reduce power to zero and disconnect the generator by the thyristors.
- When the generator is disconnected, reduce generator speed against zero RPM.

Error Handling

As described earlier the operating states of the turbine are constructed as shown on Figure 6.

From this figure it is seen that error handling is a question of bringing the activity level of the turbine to a lower level. The detection criteria is specified for each error type.

In order to describe the operational safety strategy and the error handling for each error type that can occur, we define the following information for each error.

Log	:	Name of the error.
Detection	:	Description of how the error is detected.
Reaction	:	The maximum activity level when the error is present or not reset.
Acknowledge	:	The error can be reset automatically, manually at the turbine or from remote-control.

If in a given operation state an error occurs, which has specified a lower operating state, an immediate change to this operating state will be performed.

To describe the error handling the following concepts are used:

- detection of errors
- logging of errors
- reaction to errors
- restarts after errors

Detection of errors

Both hub- and nacelle processor are scanning the sensors to detect errors. The errors are sorted by the error handler, so that one error only is passed at a time, and possible following errors are sorted out. Only errors that will cause a lower operation state than the actual operation state, will pass.

There is one exception to the rule, errors in RCC will always be logged.

Logging of errors

The error handling stores errors in an operating log and in an alarm log.

Reaction to errors

The reaction to errors is one of the following:

- Decrease to PAUSE
- Decrease to STOP
- Decrease to EMERGENCY

Restart after errors

There will not be any ascending in activity, before the error has been receipted. The way of getting the receipt can be as follows:

- Some errors may be reset automatically, if the external conditions are OK.
- Some errors may be reset from the Remote control. If the operator finds it acceptable to start up the turbine, he can reset the error.
- Some errors are so vital that it cannot be permitted to reset them automatically or from remote control. To ensure that there is a person at the turbine to inspect it, these errors have to be reset at the operating panel inside the turbine.

Some faults can be reset automatically. Automatic restart can occur in four different ways:

- AutoSht: automatic restart after 1 min. (P14.46).
- AutoLng: automatic restart after 10 min. (14.45).
- AutoNoCntSht: automatic restart after 1 min. (P14.46) where no registration in the autorestart queue is made.
- AutoNoCntLng: automatic restart after 10 min. (P14.45) where no registration in the autorestart queue is made.

If a computer error occurs, the computer will make a total reset. A total reset can also be made by the WATCH DOG.

Log messages

Until now there has been a general description of the error handling in the VMP-controller. A complete list of all messages and errors is to be found in "Error and log list".

ANNEX 3 Instruction and Log Journal for Rescue and Descent Device RG 10 TYPE A

Should a fire in the lower part of the turbine prevent safe rescue by use of ladder, descent must be made on the outside of the tower, using a rescue- and descent device (RG type A). This device is attached to the fixing point of the nacelle crane and allows a person to lower himself to the ground at a controllable rate of descent or to evacuate a person not being able to do so himself/herself (at a low haul-down speed). The safety equipment should only be used by instructed personnel. The device has to be placed so that the hand wheel can rotate freely.

- The device must only be used with rope delivered by the producer.
- Place and secure the device safely, preferably above the person who is going to be lowered to the ground. The strength of anchorage point must be at least 1000 kg.
- Always open the brakes air vents before use.
- Always hang the rope out without any kinks. Use an edge protector on sharp edges.
- The rate of descent is regulated automatically.
- The device must be stored in clean and dry conditions. The rope must always be stored out of sunlight
- Protect each of the device's components from oil and fats.

User inspection and maintenance:

The rescue- and descent device must be checked after every unpacking/use, by visual as well as mechanical inspection.

Visual inspection:

All ropes is examined and must not have:

- Ruptures
- Holes on the rope stocking
- Knots
- Deformation
- Kinks

Metal components must not be:

- Corroded
- Deformed
- Flawed
- Without functional ability
- With other defects

Mechanical check:

After approved visual inspection the effect of the brake mechanism is checked by pulling the rope forwards and backwards through the brake unit. The device is operational while resistance occurs when pulling the rope.

Storage:

The rescue and descent device has to be stored in a dry and clean condition, protected from light and high temperatures in a storage box. The brake vents must be closed when the descent device is stored.

The device is packed by pulling the rope through the brake unit on one end of the rope with the snap hook hanging approx. 30 cm from the brake unit.

Packing:

Inspection is carried out and the equipment is packed as follows:

1. The long end of the rope is stuffed into the bag with the attachment snap hook first.
2. The rope is stuffed into the bag on top of snap hook. After 10 rope stuffings press the rope with your hand, then stuff the rope 10 times and press the rope with your hand again. Repeat until the entire rope has been packed into the bag.
3. Finally place the RG 10 type A rescue- and descent device on top of the rope.
4. Sign the log book and close the bag.

Authorised inspection:

After each use/practice the device must be inspected by the user. At least once a year the device must be inspected by an authorised person. The inspection must be documented in a log journal.

ANNEX 4 Fire Drill Contractor Vessel

FIRE DRILL Contractor

--- Continuous Sounding of "General Alarm" ---

All Contractor's crew members have designated tasks to be fulfilled in case of fire.
All passengers on Contractor vessel other than Contractor crew members are to muster at liferaft station.

Fire in engine room:

Doors and fire flaps inside and outside the engine room are to be kept closed.

Walkie-talkies dedicated channel (92)

Import rules:

Note: prevention is more rewarding than fire fighting

- On hearing a fire alarm, put on protective clothes (E.g. cotton overall, boots) NEVER wear NYLON/POLYESTER
- On sighting a fire, raise the alarm immediately (!) and THEN.....
 - "Starting" fire: fighting to be undertaken at once, by means of locally available equipment (KNOW YOUR SHIP)
 - "Blazing" fire: extent to be contained as much as possible (removing inflammable material, isolating from air supply etc.), until assistance has arrived on the scene.
- Fire fighting:
- In confined space, DO NOT open the door, until FiFi-outfit is ready for use.
- Do NOT WORK SOLELY on your own, without notification.

ANNEX 5 Boat Drill/ Abandon Ship, Contractor Vessel

BOAT DRILL/ ABANDON SHIP

.....--- 7 Short/ 1 Long blasts---
(on ship's horn, or "General Alarm")

All Contractor crew members have designated tasks to be fulfilled in case of fire.

All passengers on Contractor vessel other than Contractor crew members are to muster at lifeboat/-raft station and follow the directions of the crew.

Boatdrill

All passengers must respond and muster at proper lifeboat/life raft station with life vests or immersion suits (warmly dressed and proper footwear).

Launching lifeboat/-raft on order of Master only!

Abandon Ship

1. After launching lifeboat/-raft (proper use of painter line!!) final check on complement, supplies to be taken, safety wear, then boarding:
 - a. jumping from boat deck in/on liferaft or
 - b. descending rope ladder, into lifeboat
 - c. embarking from main deck/ lowest deck
2. Lifeboat/ -raft to move clear from ship as soon as possible toward safe distance, by drifting, paddling, towing
3. Available instructions in boat/raft to be followed in order to maximise comfort, survival chances.
4. To ensure "EPIRB.", floating outside boat/raft (its line attached), is in transmitting mode.
5. "SART's." to be operated, when searching / rescue vessels expected to be in vicinity.

Man over board (MOB)

- "Marking" buoy (smoke/light signal) to be thrown into direction MOB.
- To raise alarm / notify duty officer on bridge.

ANNEX 6 Emergency Landing Procedures

The following procedure has been established for an emergency landing:

- At a given command ('BRACE-BRACE-BRACE') the brace position is taken (upper body bent over, hands clasped behind the neck, feet as much as possible under the seat).
- Remain in this position until the helicopter has landed or come to a standstill.
- Evacuate the helicopter at the instructions of the helicopter crew.

The following procedure has been established for an emergency landing on water:

- At a given command ('BRACE-BRACE-BRACE') the brace position is taken (upper body bent over, hands clasped behind the neck, feet as much as possible under the seat).
- Remain in this position until the helicopter has landed.
- The door is opened either by a member of the crew or by a passenger.
- The lifeboat is thrown into the water and inflated.
- Enter the lifeboat and activate the life vest. Do not activate the life vest while still inside of the helicopter.

ANNEX 7 First aid kit

The first aid kit should at the least contain the following:

Cut Treatment	Adhesive tapes and adhesive bandages
	Roll gauze and pads
	Compress bandages to stop bleeding e.g. Bloodstopper
	Antiseptics and cut cleaners
	Gloves
	Scissors
	Tweezers
Burn Treatment	Hydrogel dressings/burn spray
Eye Injuries	Eye washes
	Magnet for removing metal particles
	Eye ointments and drops
Contusions	Cold packs
General wellness	Pain relief

The required contents of an approved first aid kit are listed in the instruction provided with the kit.

Each unit carton must be in an intact waterproof package. If it is not, it must be replaced with a waterproof unit from a supplier or approved first aid kits. Standard cellophane-wrapped unit cartons are not waterproof. Any dated medications in the kit must be replaced annually if their expiration date has passed.

ANNEX 8 Emergency Telephone List

Compiled by an emergency committee consisting of a safety inspector and the person/service engineer responsible for carrying out the work in question. The responsibility of this emergency committee will be to co-ordinate actions and communication in case of an emergency situation.

ANNEX 9 Voice Procedure for Hoisting

HOISTING DOWN

Pilot:	Cabin has control.
HHO crew member:	Cabin has control.
	Forward 10...and right 10...(count down).
	(Check altitude and speed control)
	On top – Steady.
	Backward.....
	Oscar going out.
	Hoisting out the Oscar.
	Oscar on deck.
	Oscar detached.
	Hoisting in 3, 2, 1.
	Move left and backward 10.
Pilot:	Visual.
HHO crew member:	All secured in cabin.
	Closing cabin door. Pilot has control.
Pilot:	Pilot has control.

HOISTING UP

Pilot:	Cabin has control.
HHO crew member:	Cabin has control.
	Forward 10... and right 10...(count down).
	(Check altitude and speed control)
	On top – Steady.
	Backward.....
	Oscar has the cable.
	Oscar attached.
	Hoisting in the Oscar.
	Move left and backward 10.
	Oscar is free of obstacles.
Pilot:	Visual.
HHO crew member:	Hoisting in 3, 2, 1.
	Oscar is in the cabin.
	Oscar detached and secure in the cabin.
	Closing the cabin door. Pilot has control.
Pilot:	Pilot has control.

ANNEX10 List of Abbreviations and Definitions

Abbreviations	
BSI	British Standards Institute
FRC	Fast Rescue boat
HAZOPS	
HV	High Voltage
IALA	International Association of Lighthouse Authorities
IMDG	International Maritime Dangerous Goods Code
IMO	International Maritime Organisation
MIC	Man In Charge
MOB	Man Over Board
OIM	Operation Installation Manager
PMS	Planned Maintenance Systems
RMA	Radio Medical Advice
SCC	Safety Checklist Contractors
SOLAS	Safety Of Life At Sea
VCA	Veiligheids Checklist Aannemers (SCC)
VCMS	Vestas Conditioning Monitoring Systems
VHF	Very High Frequency
Definitions	
Accident	Any event which caused injury or illness to personnel and/or damage to the environment and assets.
Incident	Any unwanted event or dangerous situation which caused or could have caused injury or illness to personnel and/or damage to the environment and assets.
Hazid	Hazard Identification – Identifying the possible effects of events arising from a piece of equipment, system or plant as a whole.
Hazop	Hazard and Operability – identifying and documenting hazard and operability problems that could arise within a process unit during normal or abnormal operations

ANNEX 11 Survival kit for offshore turbine

Amount	Item	Description	Inspection
1	EPIRB (FCC Class S-Satellite) Electronic Position Indicating Radio Beacons		Each EPIRB must be tested monthly using the integrated test circuit and output indicator to determine that it is operative, and by checking the battery expiration date. EPIRB batteries must be replaced when their expiration date has passed
1	Life buoy with retrieving line	Used for man over board situations.	Check condition annually
10.000kJ/ person	Emergency Provisions and utensils if necessary (e.g. can opener)	One ration consists of 10.000kJ (2400 Calories) of approved emergency provisions.	Canned emergency provisions can be checked only by visual examination of the condition of the container. Emergency provisions in vacuum packed flexible pouches should have packaging material tightly compressed against the contents. Loose contents indicate a loss of the vacuum seal, and such pouches should be replaced. Non-vacuum packed pouches should be squeezed to check for air leakage. Approved emergency provisions are marked with a packing date, and some may have an expiration date. All packages past their expiration date should be replaced annually. Packages without an expiration date should be replaced if they are more than five years old.

1	First aid kit	See further appendix "First aid kit"	The required contents of an approved first aid kit are listed in the instruction provided with the kit. These contents may vary depending upon the age of the kit and the manufacturer. Each unit carton must be in an intact waterproof package. If it is not, it must be replaced with a waterproof unit from a supplier or approved first aid kits. Standard cellophane-wrapped unit cartons are not waterproof. Any dated medications in the kit must be replaced annually if their expiration date has passed.
2	Flashlight	The flashlight must be Type I or type III constructed and marked in accordance with ASTM F1014. Three spare batteries and two spare bulbs, stored in a watertight container, must be provided for each flashlight.	Flashlight batteries must be replaced at annually, unless they are marked with an expiration date. Batteries with an expiration date must be replaced if their expiration date has passed.
1 or 2	Knife	The knife must be of the non-folding type with a buoyant handle.	
4	Flare-Rocket Parachute Flare	Rocket parachute flares to SOLAR standards.	Approved flares are marked with an expiration date. All flares past their expiration date must be replaced annually.
6	Flare-Hand red flare	Hand red flares to SOLAS standards.	Approved flares are marked with an expiration date. All flares past their expiration date must be replaced annually.
10% x number of persons, 2 minimum (SOLAS requirement)	Thermal protective aid (TPA)	LAND/Shark from Corporate Air Parts XTG laminate are bulkier than metallized Mylar emergency "Space" blankets but are warmer.	

1.5 liters per person	Water	Up to one third of the required water may be replaced by desalting apparatus capable of producing an equal amount of fresh water in 2 days.	Canned water should be checked for vacuum by the "slap test". Any clicking sound is evidence of an acceptable vacuum. Doubtful cans can be checked by opening some of them. If a hiss is heard consistently as these cans are opened, the rest of the doubtful cans may be accepted, and only the open cans replaced. Water in flexible pouches should be checked by squeezing the pouch. Any leaking water or air is cause for rejection. All approved water containers are marked with a packing date, and some may have an expiration date. All containers past their expiration date should be replaced annually. Containers without an expiration date should be replaced if they are more than five years old.
	Survival manual	Manual should be substantially in compliance with IMO Resolution	

