First Aid on Offshore Wind Farms

On the following sides you will find the English translation of the German recommendation "Erste Hilfe in Offshore-Windparks", covering page see figure below:

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Footnotes with * in this translation are only for extra information and do not exist in the German document. In this context, the difficulties of correct translations of German terms in the area of Health and Safety, Rescue Service and Medicine has to be considered in general.

Please note: Only the document published in the German language is valid.

The following English translation is only for the purpose of information.

The German document is available under www.dguv.de/fb-erstehilfe → fachinformationen
First Aid on Offshore Wind Farms
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Offshore wind farm
(Photo: D. Hory, BG Klinikum Hamburg)

Offshore rescue exercise
(Photo: R. Rodegro, ASD BG Bau)
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Introduction

Recent changes in Germany’s energy policy have resulted in offshore wind farms (OWF) being planned, constructed and commissioned in both the North Sea and the Baltic Sea. The rapid and strong growth of this new economic sector now poses new challenges for the companies operating therein, also with respect to occupational health & safety and emergency concepts. According to recent estimates, more than 1,000 people are projected to be directly employed on offshore wind farms - with four to five times as many at peak times - who must all cope with the particular working conditions and surrounding environment.

A large portion of the OWFs within the German Exclusive Economic Zone - EEZ (Ausschließliche Wirtschaftszone - AWZ) are located as far as 125 km off the coast. Work activities on wind turbines or transformer platforms are characterized by a significant degree of physical exertion, including work at great heights and/or in confined spaces, exposure to heat and cold as well as shift work.

In emergency situations, intense physical effort may be demanded of injured/sick persons as well as the first aiders, along with potential exposure to extreme temperatures, smoke and cold water. Because of the great distances between the wind farms and the mainland, as well as the sheer expanse of some wind farms and the difficult conditions encountered while trying to access them, the arrival of rescue services can oftentimes take up to 60 to 90 minutes and even significantly longer in severe weather conditions (storms, low visibility or high seas). This period must be bridged by First Aid measures, the provision of which must be guaranteed by company management. The organization of the First Aid program must take into account the results of the risk assessment. Emergency rescue and medical services must be guaranteed through coordination with rescue organisations and hospitals.

The recommendations herein towards ensuring the provision of First Aid on offshore wind farms are intended to assist company managers in the necessary planning and implementation of measures with respect to the specific offshore conditions.

Legal Framework

The full extent of the German Occupational Health and Safety Act (Arbeitsschutzgesetz, ArbSchG) applies to the range of offshore structures, including the directives based thereon, such as the German Ordinance on Industrial Safety and Health (Betriebssicherheitsverordnung, BetrSichV) and the Ordinance on Hazardous Substances (Gefahrstoffverordnung, GefstoffV).

Furthermore, the corresponding accident prevention regulations set forth by the statutory accident insurance institutions within their respective areas of responsibility are applicable to companies and insured persons. In particular, Regulation 1* of the German Statutory Accident Insurance Association (Deutschen Gesetzlichen Unfallversicherung, DGUV) "Principles of Prevention", which also regulates First Aid at the workplace.

According to Sec. 26 Para. 4, DGUV Regulation 1, the following applies: "If, due to the nature of the enterprise, particularly its use of hazardous substances, it can be expected that measures not covered by general first aider training as described in (2) above will be necessary in the event of an accident, the employer shall ensure that the necessary additional training is provided."

According to Sec. 23 of the German Code of Social Law VII (Sozialgesetzbuch, SGB VII), the responsible accident insurance institution must bear the course costs related to the initial and advanced training of company first aiders. The company concerned must bear the supplemental costs related to the required initial and continuous training and, in particular, those costs related to the advanced training of offshore first aiders.

* An English version of the accident prevention regulation "Principles of Prevention" (DGUV Vorschrift 1) can be found under http://www.dguv.de/de/praevention/vorschriften_regeln/dguv-vorschrift_1/index.jsp
Risk Assessment

A detailed risk assessment is legally prescribed under Sec. 5 of the ArbSchG and Sec. 3 of DGUV Regulation 1 and lies in the responsibility of company management. It is the starting point for all further considerations given to ensure an effective offshore First Aid program. This assessment must take into account the remote distances from the mainland, the occurrence of adverse weather conditions, the large expanse of the OWF and the lengthy rescue times often required in emergencies.

Offshore work activities bear increased accident- and health-related hazards due to the special risks and conditions involved. Special conditions or work tasks, such as diving activities, require a special risk assessment with appropriate measures.

A rescue that requires only a short time on land can involve a significantly longer period needing to be bridged when offshore. These specific conditions must be accounted for in the personnel, material and organizational planning required for the emergency measures foreseen. The significant disadvantages associated with adverse maritime conditions must be minimized as best as possible and within the bounds of reasonableness by corresponding measures. Furthermore, distinctions must be made between the various hazards that can arise during the OWF construction phase or solely during the operational phase, while potential emergency hotspots must be identified, such as on a wind turbine or on a central transformer platform.

In accordance with Sec. 3 of the German Occupational Safety Act (Arbeitssicherheitsgesetz, ASiG), the company physician must be included in the risk assessment and in the organization of the company’s First Aid program. This physician has to advise the company operating offshore regarding the content and scope of the requisite advanced training of first aiders and regarding selection of suitable First Aid training facilities.

Guidance as to implementing a risk assessment can be found in the German Technical Rules for Operating Safety (Technische Regel für Betriebssicherheit, TRBS 1111) “Risk assessment and safety evaluation”, which can be found in its most current version in the DGUV Information 203-007, ”Wind Turbines” (previously BGI 657). It must be adapted to the individual circumstances related to the special demands on the respective offshore operation.

The appropriate degree of measures based on the risk assessment for an OWF can be derived from Table 1 below. It is imperative to take company-specific characteristics into account. Responsibility ultimately lies with the company management. It must ensure the coordination between all participants, especially between the
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The employer must ensure that, in the event of an emergency, the necessary lines of communication are established between external facilities in accordance with Sec. 10 Para. 1 of the ArbSchG. This is of particular importance in the areas of First Aid, emergency medical care, emergency rescue services and firefighting.

All personnel must be able to place an emergency call at all times and from every workstation. Prior to beginning work, it must be ensured that an emergency call can be placed and further measures can be initiated. In an emergency, rescue and aid workers (in-company or external) must be able to quickly respond to and access the scene of the emergency.

The employer is obligated to ensure appropriate transport according to Sec. 24 Para. 3, DGUV Regulation 1, and which may include public resources in specific cases. On the mainland the company has access to public emergency service facilities usually available to provide qualified transport. This is not the case offshore.

Further guidance can be found in Annex 2: Teleconsultation.
Personnel Measures

Occupational medical care and suitability examinations are deemed as primary preventive measures to be implemented by company management for its OWF workers. This is to reduce potential consequential damage due to employee health impairments as well as risk to colleagues and rescue personnel in the event of an avoidable emergency.

In general, the evaluation of injury patterns for offshore vs. onshore accidents recorded to date does not reveal any significant differences. A critical difference, however, is particularly related to the longer "therapy-free interval" for offshore operations (up to approx. 60 – 90 minutes); a period which must be bridged. This should be realized through more and better trained first aiders as well as through more highly qualified rescue service specialists on the OWF.

Company First Aiders

Because of the special offshore risks, all persons performing activities offshore must be trained at least as first aiders in accordance with Sec. 26 DGUV, Regulation 1, or in accordance with other comparable regulations.

Company first aiders are trained laypersons who, as first responders to the scene, take appropriate measures aimed at defending against acute risks to life and health.

These persons may administer First Aid only corresponding to the level of their training. They must always bear in mind that First Aid is not an alternative to medical intervention. In an emergency, they are responsible for taking the necessary and reasonable measures while caring for injured and ill persons within the framework of their initial and further training until these tasks can be assumed by professional rescue service personnel.

Training for company first aiders is provided in a comprehensive First Aid course comprising 9 teaching units (TU) with 1 TU equalling 45 minutes. Participation in regular continuous training, equating to 9 TU biannually or 4.5 TU annually, is mandatory.

Offshore First Aiders

In addition to the above, a certain number of first aiders should be trained as „Offshore First Aiders“. Based on suitable advanced training, offshore first aiders should be able to administer enhanced on-site First Aid in an offshore emergency, throughout the lengthy waiting period or time span until rescue service personnel arrives.

This expanded level of competence afforded the "offshore first aider" builds on the First Aid training already obtained as a company first aider (see above) and comprises:

- additional advanced First Aid training (20 TU),
- additional equipment to be used when administering enhanced First Aid measures and
- the use of Teleconsultation

Annual refresher training (refer to Sec. 1.3 on pg. 13 for more detail) with situation-specific exercises ensure a rapid and targeted response in the rare case of an emergency.
Supplemental safety-related training required for the offshore work environment is a prerequisite for performing tasks as a first aider or an offshore first aider on an OWF.

Specific standards for the initial and further training of first aiders and offshore first aiders, including the relevant harmonised training curriculum, are found in Annex 1: Advanced Training for Offshore First Aiders. A training concept aligned to offshore applications (content and scope of training) is presented herein, as well as recommendations for the selection of suitable training facilities.

The following number of offshore first aiders should be available:

- 2 persons at all times with advanced training as offshore first aiders for small groups (e.g. wind turbine maintenance crew of up to 3 persons).
- For groups of more than 3 persons, at least 2 offshore first aiders should be available for every 10 persons present (proportion: 2 offshore first aiders for every 10 workers).

**Rescue Service Specialists**

At locations where many workers are present, as would be the case on transformer or living quarter platforms, or where an increased level of risk exists (see Table 1), the more highly qualified rescue service specialists should be on hand to administer First Aid. These might include an emergency paramedic, EmPmed (in Germany: Rettungsassistent, RettAss or Notfallsanitäter, NotSan), possessing knowledge relevant to the offshore sector. These persons should be under the supervision of a physician and integrated into the medical quality management system. Depending on the risk assessment for the specific operation, it is recommended that an emergency paramedic (EmPmed / in Germany: RettAss or NotSan) be appointed. These persons can not only assist in the event of work-related accidents, but can also provide emergency care in the event of acute illness on the platforms.

A more detailed explanation of the dispensing and administering of medication at the direction of an emergency-call physician can be found in Annex 4: Emergency Medication for OWF.

In order to maintain the practical competence required of emergency paramedics (EmPmed, in Germany: RettAss/NotSan) in emergency situations, it is strongly advised that these persons serve alternatively on the OWF as well as in a land-based rescue service.

**First Aid Materials and Equipment**

A distinction must be drawn here between the personal or team-related equipment of the First Aid staff as opposed to the stocking of equipment or materials at the location, such as on a wind turbine or on a platform.
Auxiliary equipment for offshore first aiders (team-related):

In order to facilitate First Aid on the OWF, it is recommended that, in addition to their advanced qualifications, offshore first aiders be augmented with the following First Aid materials:

1. Eyewash fluid (closed system ready for use)
2. Automated external defibrillator (AED), splash-proof, with electrocardiograph (ECG) display capable of transferring data to the emergency-call physician
3. Bag valve mask incl. accessories
   - Laryngeal tubes (sizes 4/5)
   - Respiratory mask, e.g. pocket mask
4. Equipment for Teleconsultation
5. Pulse oximeter
6. Tourniquet
7. Analgesics (a more detailed discussion can be found in Annex 4: Emergency Medication for OWF)

Stationary auxiliary equipment for wind turbines

The following equipment is recommended over and above the contents of the company first aid kit according to DIN* 13157:

1. Splint material
2. Cervical immobilizer
3. Blanket
4. Active warming blanket

The possible need to further enhance the on-hand First Aid materials will depend on the risk assessment. It may require special training or practice and must be coordinated with the company physician, the emergency control centre and emergency personnel. Among other considerations, this will influence the organization of the rescue chain as well as the integration of Teleconsultation.

Outfitting transformer or living quarter platforms

In addition to First Aid facilities (refer to Annex 3: First Aid Facilities), the need to provide additional First Aid materials, emergency equipment and pharmaceutical products (e.g. within a platform’s First Aid facilities) will depend on conditions particular to the respective OWF. Further guidance can be found in Annex 4: Emergency Medication for OWF.

Equipment on participating maritime vessels (where applicable)

First Aid facilities and equipment on maritime vessels are already governed by the German Declaration on the Status of Medical Requirements for Maritime Vessels. This should be taken into account or adapted to the circumstances, for example, when transporting offshore personnel by ship or when using large installation vessels.

* Deutsches Institut für Normung (German Institute for Standardization)
Organizational Measures

The company emergency plan is a central component of the offshore rescue chain. This includes a. specification of the notification systems and equipment, as well as the emergency call number and the sequence of bodies to be notified. Suitable communication equipment (e.g. mobile phone, emergency radio, etc.) must be maintained in functioning order. Also refer to Annex 2: Teleconsultation.

Necessary measures to take in an emergency must be coordinated with the body responsible for the OWF and the information made available to rescue service personnel. Employees must be instructed regarding the special requirements associated with offshore operations with respect to emergency calls and rescue measures.

Close coordination between all involved parties is absolutely essential (Fig. 1). In particular, the OWF operator must inform the company rescue service or the external service provider, if applicable, the emergency control centre, the rescue specialists and the emergency-call physician; providing them with detailed information about the emergency call/Teleconsultation, worker initial, advanced and, if applicable, continuous First Aid training, as well as the overall selection of emergency materials and equipment. The operator must ensure that the rescue chain functions smoothly and promptly in an emergency.

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**Fig. 1: „Enhanced Offshore First Aid and Offshore Rescue“ - consultation and coordination**

The arrows depict the paths of coordination between the involved parties.

Abbreviations: EmPmed: Emergency Paramedic  
(in Germany: Rettungsassistent, RettAss or Notfallsanitäter, NotSan)  
FA: First Aider / EmCall Phys: Emergency-Call Physician / CP: Company Physician
Annex 1:

Advanced Training for Offshore First Aiders

1.1 Training Program Requirements

Instructors

Instructors should be authorised according to the German DGUV Principle 304-002 „Education and training for company medical services“.

Furthermore, it is recommended that instructors providing qualified training related to offshore-specific, enhanced First Aid measures should:

- be actively working in an emergency service capacity, at least at the qualification level of an (in Germany) “Rettungssanitäter” * under the supervision of the physician responsible for the course,
- be experienced in planning and conducting scenario-based training,
- possess knowledge of offshore-specific conditions (environment, facilities, rescue concepts),
- possess knowledge of Teleconsultation.

Basic courses addressing OWF-related occupational health and safety subjects from various providers impart to the instructor the necessary theoretical and practical knowledge of personal protective equipment (PPE), rescue and other offshore-specific aspects. Knowledge already acquired in other related topics (e.g. training in high-level rescue) may be deemed equivalent to respective training content. Advanced training for offshore first aiders can also be conducted using the in-house working language (e.g. English).

Training Facilities

Scenario-based training (in an environment comparable to the wind turbine setting or possibly on an OWF workstation) conveys practical relevance. The following exemplary offshore-specific conditions should be considered:

- confined spaces, hatches, elevated outdoor installations, etc. (e.g. wind turbine component or a comparable setting),
- outdoor environmental conditions such as system fouling (e.g. algae growth), rain, snow, frost, icing, extreme temperatures, wind or storm, etc.

Additional Demonstration- and Exercise Materials

1. AED with ECG display and data transfer capability
2. Bag valve mask incl. accessories, laryngeal tubes (sizes. 4/5), pocket mask
3. Equipment for Teleconsultation
4. Pulse oximeter
5. Tourniquet
6. Eyewash fluid
7. Analgesic (exercise samples without active ingredients)

* roughly corresponding to the US “Emergency medical technician” (EMT)
8. Splint material
9. Cervical immobilizer
10. Active warming blanket
11. Training dummy (e.g. for ventilation, laryngeal tubes, AED use, immobilization)
12. Suitable media (e.g. videos)

In coordination between the company and the First Aid training provider, the (type) First Aid materials equivalent to those specifically provided by the company should be used for participant exercises and trainer demonstrations.

Each participant should receive a certificate of participation. The certificate for advanced training as an offshore first aider should be awarded only when the instructor is convinced that the participant has obtained the required knowledge and skills. Courses should be limited to a maximum of 12 participants. The relationship between instructor and participant should be

- 1 to 12 for theoretical training and
- 2 (3 is preferred) to 12 for practical training.

1.2 Content and Scope of Advanced Training Programs

The prerequisite for participation in advanced training as offshore first aider is the completion of a company First Aid training course. Based on training as a company first aider (min. 9 teaching units (TU); also refer to pg. 5), the advanced training model includes an additional 20 TU. Comparable external training courses for first aiders may also be recognized.

The 20 TU requirement for advanced training can be added directly onto a First Aid training course (min. 9 TU / combined min. 29 TU) or synchronised so as to be conducted over a total of 3 days (e.g. 2 x 10 TU and 1 x min. 9 TU = min. 29 TU). If not more than a half year has passed since the initial first aider training sessions or the last continuous first aider training sessions, then advanced training can be completed in 20 teaching units over 2 days (e.g. 2 x 10 TU).

Overall training objectives:
Upon completion of offshore-specific advanced training and in conjunction with regular refresher training, the participant should be able to administer immediate lifesaving and enhanced First Aid measures in the offshore environment, using auxiliary emergency medical equipment and Teleconsultation, while having particular regard for personal-protection.

Training objectives, theoretical and practical content:

1. General response to accidents/emergencies, Offshore rescue, 7.5 TU
In this training unit, participants learn about the
• special aspects of offshore medical emergencies,
• personal hazards associated with emergency situations,
• adequate measures with knowledge of the options available through the offshore rescue chain,
• psychological considerations (colleagues, loneliness, unrelated speciality), as well as the
• principles of Teleconsultation

After this training, participants should be able to
• make proper emergency calls,
• take measures with regard for personal-protection,
• ensure the rescue of injured persons and their removal from the immediate hazard area to the
  nearest safe location,
• communicate clearly in a team setting, as well as
• make use of Teleconsultation

Practical content
Scenario-based training (in an environment comparable to the wind turbine setting or, if possible, on an OWF workstation) (PE1)

Skills for supporting professional emergency services (PE)
Instruction in Teleconsultation and practice in the use of communication media as well as the administering of First Aid measures via Teleconsultation (PE)

2. Establishing contact/Checking vital signs, 1 TU

After this training, participants should be able to
• check vital signs (ABCDE survey),
• determine the circumstances surrounding an accident and detect any symptoms (of illness), as well as
• estimate the correct functioning and informative value of a pulse oximeter

Practical content
Handling a pulse oximeter (PE)

3. Respiratory and circulatory difficulties, 5 TU

After this training, participants should be able to
• perform reanimation with the help of an AED and respiratory aids (resuscitation bag incl. accessories, pocket mask, laryngeal tube)
• recognize the hazards associated with suspension trauma and take appropriate measures.

Practical content

1 (PE) Participant Exercises:
Measures are explained and demonstrated by the instructor, then thoroughly practised by all participants (with particular use of target-group-oriented case studies) with the incorporation of psychological support until a reliable degree of mastery has been obtained. As a rule, the measures practised should encompass an entire sequence and, if applicable, integrate the use of Teleconsultation.
Positioning to facilitate breathing (TD²)
Positioning with suspension trauma (TD)
Practice in bag-mask resuscitation (PE)
Practice in mouth-mask resuscitation (pocket mask)
(PE) Practice in placing the laryngeal tube (PE)
Practice in reanimation with the help of an AED as well as inserting the laryngeal tube (2 care-giver method) (PE)

4. Bone fractures, joint injuries, 3 TU
After this training, participants should be able to
- perform a preliminary structured examination of the patient from head to toe (skull, thorax, upper extremities, abdomen, spinal column, hips, lower extremities),
- take measures to immobilize and
- perform proper axial, pain-relieving positioning

Practical content
Full body examination "body check" while integrating Teleconsultation (PE) Practice using splints and immobilization materials (PE)
Positioning with cranio-cerebral trauma (TD)

5. Life-threatening bleeding, 1 TU
More in-depth study into the relevant topics from the initial company first aider training with the integration of advanced methods.
After this training, participants should be able to
- perform haemostasis according to a prescribed algorithm.

Practical content
Haemostasis using a pressure bandage (PE)
Haemostasis using a tourniquet (PE)
Haemostasis using algorithm-oriented procedures (PE)

6. Thermal injuries, 1 TU
Recapitulation of burn-related topics from the initial company first aider training.
After this training, participants should be able to
- recognize the stages of hypothermia,
- distinguish between heat exhaustion/heat stroke,
- recognize the dangers of hypothermia and take appropriate measures.

Practical content
Methods for maintaining body heat (TD)
Use of active warming blankets (TD)
Cooling measures for heat exhaustion/heat stroke (TD)

² (TD) Trainer Demonstration:
Measures are explained and demonstrated by the instructor and practised, if applicable, by the individual participants.
7. **Eye injuries, 0.5 TU**
Recapitulation of eye-related topics from the initial company first aider training.

**Practical content**
Demonstration of applying bandages and using an eyewash bottle (TD)

8. **Pain management, 1 TU**
After this training, participants should be able to

- estimate pain intensity,
- master the application algorithm for pain management and
- evaluate the effects of emergency medication for a given situation.

**Practical content**
Application algorithm: Application of a numerical rating scale for pain, performance of non-medicinal treatment according to the step-scheme of pain relief, clarification of prerequisites for the application of medicinal pain relief through the emergency-call physician and perform, if applicable (PE)

Practical content should be supplemented at the request of the company physician.

**1.3 Regular Refresher Training**
This training should be carried out annually and should entail a min. 4.5 TU as further training for company first aiders together with an additional min. 4 TU addressing offshore-specific content. These combined further training units for offshore first aiders, therefore, equal a total of 8.5 TU annually. The style of course should emphasize practice-oriented training (predominantly PE) while addressing offshore-specific scenarios therein.

Additional internal training or practice drills addressing the most realistic scenarios and, if applicable, conducted at workstations on a wind turbine are recommended.
Annex 2: Teleconsultation

The term „Teleconsultation“, in the context of administering First Aid, should be seen primarily as guidance, support and assistance provided by an emergency-call physician to the first aider (Fig. 2). The goals of Teleconsultation are to achieve a qualitative improvement in the First Aid provided by first aiders and, in the context of offshore first aiders, to extend the range of potential measures available to them. As such, Teleconsultation should be understood as representing an additional structural element within the existing company rescue service capabilities, aimed at realizing a qualitatively high degree of patient care.

Generally speaking, **with respect to first aiders and offshore first aiders**, their status as laypersons must always be kept in mind. Teleconsultation, which goes beyond the rendering of purely general medical advice, is advised only in emergency situations and where the delays associated with other necessary steps can be avoided, such as for obtaining the immediate input from a medically qualified aid giver.

An essential prerequisite for Teleconsultation is the availability of adequate information and communications technology (ICT). The reliability and durability of the ICT deployed must be assured along with the technical and organisational guarantee of data protection and data security. The availability of bi-directional and reliable audio transmissions (e.g. radio, satellite or IP telephony or mobile phones) is not always sufficient. The possibility for transmitting photos to the consulting physician and the available of reliable, at least unidirectional, real-time video transmissions must be the standard. So the consulting physician will be able to oversee a patient examination while remaining informed about the events transpiring on location. The integration of medical-technical equipment for transmitting and monitoring vital data establishes an essential foundation for the emergency physician in making decisions about necessary actions. Documented instruction as to the use and deployment of information and communications technology should be provided.

Only authorised persons may undertake the processing of personal data. In addition to data protection, medical confidentiality must also be respected. It must be ensured that diagnostic findings and medical treatment are documented and transferred to the physician responsible for follow-on treatment.

Teleconsultation must be conducted by a medical specialist from a related emergency medical field with an additional designation for Emergency Medicine. Furthermore, this person must possess adequate experience as an emergency physician, have actively and regularly participated in rescue services, have successfully completed training in telemedical processes including special instruction in communicating, and have been briefed on the company-specific and rescue-specific conditions related to offshore operations. Involvement in a medical quality management program is recommended. Teleconsultation can essentially be broken down into the following components:

- Providing support for the first aider or offshore first aider in carrying out First Aid measures
- Diagnosing and determining the indication status of the medical measures taken
- Monitoring and supervising the measures taken
- Providing individual as well as psychological support of the first aider or offshore first aider
- Ensuring documentation and evaluation
Teleconsultation with all parties involved by emergency-call physician via telemedicine, offering advice, monitoring and support of enhanced First Aid measures

Teleconsultation should be conducted via a central emergency number using suitable equipment, such as an emergency physician call centre or an emergency control centre. The following basic requirements should be fulfilled by this equipment:

- Short response times must be assured (immediate response upon request for Teleconsultation)
- Communication between all units and institutions participating in the rescue operation must be assured (to air and/or sea rescue units, to the emergency control centre, to the company control centre, to the receiving medical facility, etc.)
• Access to the latest diagnostic / treatment algorithms or procedural instructions in digital form for the most common disease patterns at the emergency-call physician’s workplace

• Access to mission-critical control centre data in support of mission management or an adequate selection of the most suitable receiving hospital

• The recording of conversations must be guaranteed, as well as options for storing forensically sound and MIND3-compatible digital documentation of the emergency-call physician’s consultation

• An uninterrupted power supply must be available to safeguard data transfers

• Access to a redundant work station running in standby mode

• Must be available 24/7 or during all periods of operation

The retention period for conversation protocols must be coordinated with the responsible data protection officer, while the retention period for the documented content of the Teleconsultation (diagnostic findings and treatment) must be at least ten years.

Furthermore, the following requirements should be placed on the communications and transmission systems deployed, which, as a rule, are to be oriented on state-of-the-art technologies (compare the Deutsche Gesellschaft für Anästhesiologie und Intensivmedizin, DGAI / German Society of Anaesthesiology and Intensive Care Medicine structural recommendations from 09 Nov. 2015 „Telemedizin in der prähospitalen Notfallmedizin“ / “The use of telemedicine in the pre-hospital phase of emergency medicine”):

• The availability of a redundant communications media connection as a fall-back (landline or mobile telephone, Internet, etc.)

• Sufficient bandwidth for transmission of instrument and video data

• Secure data transfer with the availability of sufficient data transmission capabilities (for at least 95% of all missions)

• The assurance of fail-safe and data-protected connections

• Data encryption based on state-of-the-art technologies

• The existence of adequate measures to prevent the loss of data

• Data protection compliant data management and long-term data storage

The organizational implementation of Teleconsultation shall be realized in coordination between the company physician, the emergency control centre, the responsible physician for the Teleconsultation service and the responsible physician for the competent company rescue service. In situations where multiple service providers take part in warranting company rescue service capabilities (such as when the ResAsst/RettAss or EmPmed/NotSan and the air rescue unit are employed by two different companies), the medical directors must also be integrated. This presupposes a documented introduction into company operations provided by the operator, as well as the matching of materials to the qualifications of the personnel working on the OWF. Moreover, provisions must be made for regular functional inspections and practice drills.

With regard for the optimal integration of the emergency-call physician and the air and sea logistics, written procedural instructions should be provided to all company rescue service units, the control centre and rescue service personnel, as well as to the emergency-call physician. It should also be ensured that procedural instructions addressing the overall concept, including its medical, technical and organisational components, are set forth in writing, such as for prescribing daily functional checks of the technical equipment.
In this context, it is generally recommended to establish a supervisory function for the telemedical support of emergency missions as a component of the quality management program and for the continuous monitoring of the emergency-call physician service. With respect to the quality management program, a high-quality and comprehensive level of documentation should also be pursued where Teleconsultation is used in order to adapt the company rescue service resources, structures and processes to the actual needs.

The technical and methodical information above is, to the greatest extent, also usable for the telemedical support of emergency paramedics (EmPmed, in Germany: RettAss or NotSan) who serve on offshore wind farms. Because the activities of the EmPmed (RettAss/NotSan), which are not specifically regulated in a standard such as the German Emergency Paramedic Act (Notfallsanitätergesetz, NotSanG), are prescribed, verified and accounted for by a physician ultimately responsible for this group of persons, then coordination between the physician responsible for the Teleconsultation service and the EmPmed (RettAss/NotSan) is imperative, especially if they belong to different institutions. The high levels of qualification required of the EmPmed (RettAss/NotSan) together with the integration of telemedical methods enhance the options for treating and monitoring the patient, even without the physical presence of an emergency physician.
Annex 3: First Aid Facilities

First Aid facilities should be provided whenever a platform is permanently manned. Otherwise, the requirement for separate First Aid facilities should be determined based on the risk assessment. In addition to considering normal proper operations and in the sense of a life cycle approach, special operating conditions, such as assembly, disassembly and maintenance work, must also be considered in the risk assessment. The size of the First Aid facilities must be determined according to proposed furnishings and equipment, with particular focus on whether the platform is to be manned permanently or only for service or maintenance purposes\(^3\). The basis for planning is established by the company’s rescue plan.

The First Aid facilities on permanently manned platforms serve as a general point of reference for health care and treatment. These premises on permanently manned platforms, therefore, should provide a favourable meeting environment and, in consideration of a possible medical usage extending beyond mere emergency care, be equipped accordingly. The distribution of treatment and administrative activities to different facilities is not practical due to a need to safeguard, yet provide rapid access to patient documents. If it is foreseen to carry out administrative activities within the First Aid facilities, then the German Technical Rules for Workplaces „Room dimensions and movement area“ must be considered according to ASR A1.2.

On the basis of state-of-the-art technologies for maritime vessels (compare the German Seeunterkunftsvordnung, SeeUnterkunftsv / Maritime Accommodation Ordinance, addressing crew member accommodations and recreational facilities) and resulting from the directive above, **OWF First Aid facilities should be outfitted with at least the following:**

- an examination couch, accessible from three sides with a freedom of movement of at least 1 metre and equipped with a safety guard to prevent a patient from falling out,
- a durable, state-of-the-art connection between the emergency control centre and the telemedicine call centre,
- a basin for washing hands in the room,
- windows (that can be opened) to the outside,
- a lockable medicine cabinet (with standardized contents to the extent possible),
- a wall bracket or cabinet for the emergency backpacks,
- a sufficiently large tray (for disinfecting and checking the emergency backpacks),
- mounting brackets for the oxygen bottles,
- sufficient lighting and an additional treatment lamp,
- sufficient door width for transporting stretchers.

**Additionally for permanently manned platforms:**

- a writing table with office chair,
- a toilet and shower accessible exclusively from the First Aid room,
- it must be possible to completely isolate the technical room ventilation from the other ventilation systems in the event of quarantine.

\(^3\) Definition from the German BSH (Federal Maritime and Hydrographic Agency): „An offshore station in considered to be manned when its intended use foresees overnight lodging“ (see BSH (2015) Standard Construction – Minimum requirements for the constructive design of offshore structures in the German Exclusive Economic Zone (EEZ)).
First Aid facilities should be located as closely as possible to the helicopter deck while the smooth and safe transport of a lying patient to that location must be guaranteed.

The room should be designed in such a manner that it is not locked during normal operations in order to facilitate access to the First Aid materials in the absence of the rescue assistant.

If the operator’s concept foresees mobile medical assistance being provided to other structures on the OWF, then the transportable storage of medical equipment and pharmaceutical products (e.g. backpack, travel case, etc.) would be advisable.
Annex 4: Emergency Medication for OWF

Starting Point:

Because of the absence of immediate access to physician care, the provision of medical care on offshore structures is significantly different from the common care situation in Germany, where medical assistance and medication are readily available for acute treatment of the population at large.

The particular conditions associated with an OWF platform in the EEZ are very similar to that of a merchant ship. Patient care on maritime vessels has for many decades relied on medical equipment and supplies that are in a continuous state of development, as well as on a system of lay helpers who are professionally supported through radio medical counselling, such as from Medico-Cuxhaven in Germany. For the OWF, Teleconsultation provides a similar degree of support in emergency situations (see Annex 2: Teleconsultation).

As opposed to maritime vessels, however, the OWF is not subject to the general supply bottlenecks often associated with national borders or vast distances to supply points.

An OWF platform within the EEZ may rather

- be integrated into a defined rescue chain,
- rely on predictable response times by professional medical care providers,
- have permanently assigned medical and pharmaceutical service providers and
- receive both regular and short notice care.

For this reason, it is both sensible and possible to store medication on the OWF for emergency purposes.

Procurement and storage of pharmaceutical products and medical equipment

The medical provisions maintained on a platform must conform to

- pharmaceutical legislation and
- medical product legislation.

In view of the situation in the public emergency service sector, the rescue service organization commissioned by the company guarantees the storage of medication in the context of an institutional outpatient clinic (in accordance with Sec.14 Sec. 7 and 8 of the German Apothekengesetz / Pharmacy Act). The service provider or its responsible medical director procures, administers, controls and replenishes the stock of pharmaceutical products with the aid of a pharmacist. The company provides suitable framework conditions for transport and storage. Pharmaceutical products are to be stored in their original packaging according to manufacturer specifications.

If the emergency medical care is based on members of a medical profession, then, depending on their level of training, the selection of medicinal equipment can be expanded by the responsible rescue service organization’s medical director.

If different service providers are deployed for the various medical tasks (emergency rescue, Teleconsultation, etc.), then the company must ensure careful matching of the materials provided to the persons handling them. It is essential that the OWF company physician is integrated into this organisation.
The scope of the equipment must be aligned to the number of persons being cared for and the capabilities/possibilities of the respective on-site medical personnel as per the risk assessment.

In order to warrant the highest degree of standardization, the control and administration of the pharmaceutical products should follow the overall scheme of the pharmacopoeias for maritime vessels („Medical Knowledge for Maritime Vessels“). With respect to this scheme, proven communication procedures between radio medical counsellors and ships have been in place for many decades. So, too, have published guidelines addressing the proper handling and safe use of medical equipment been made available to lay persons.

**The administering of pharmaceutical products by rescue service specialists or offshore first aiders:**

The responsibility for administering medical provisions (procurement, indication status, etc.) on offshore wind farms must remain with the physician.

**Rescue Service Specialists**

In addition to offshore first aiders, rescue service specialists supported by land-based physicians via telemedical or radio medical counselling may also be present on OWF platforms or ships. These specialists possess a higher degree of competence than offshore first aiders with regard to the handling of medication and their side effects. The options available with respect to emergency medication and application forms are thereby expanded. For this reason, in an emergency situation where the physician’s arrival may be considerably delayed, the administering of medication can be indicated by the rescue service specialist. Moreover, telemedical support in an emergency situation facilitates the delegating of medical care functions to rescue service or medical specialists. In such cases, the quality of the telemedical support must be suited to audio- visually and measurably revealing the relevant side effects of the medications administered through the transmission of vital data to the emergency physician call service.

The provisions foreseen for an OWF platform, which is manned by medical assistants/specialists and outfitted with medication and medical products, should be oriented around the following aspects:

- Enhanced medical diagnostic options aimed at improving the basis for decision-making through Teleconsultation or radio medical counselling
- Introduction of therapy and bridging of the time period until a low-risk means of transport of the injured or ill person to the mainland is possible
- Selection of medication from the standpoint that a delay in its administration e.g. due to transport to the mainland, could have adverse effects on health or lead to unsatisfactory therapeutic results
- Capability of the medical specialists to intervene in emergency situations or to deal with acute illnesses, in particular their initial and advanced training with respect to the methods for administering medication
- Beyond emergency situations, there should neither be primary care or therapy of chronic illnesses on the platform, nor care or therapy of persons who are incapable of work

**Offshore First Aiders**

Some scenarios are conceivable, in which a worker is suffering from such severe pain that he or she cannot reasonably be expected to wait for the arrival of an emergency physician (e.g. delays due to severe weather). In such situations, the company physician and the responsible medical director for the rescue service provider
must assess the case on an individual basis, subject to the local conditions as well as the level of training provided by the company to the offshore first aider.

Step-scheme of pain treatment

1) Assessment of pain

The offshore first aider should establish the extent of the individual pain experienced by an injured person after securing their vital functions. For this, the use of the Visual Analogue Scale (VAS 1-10) related to pain intensity is required.

2) Step-scheme of pain therapy for accident victims

The relieving effects of empathy, the preservation of body warmth and encouragement in the treatment of pain are well known. Splinting and cooling complement pain therapy on a physical basis. The last step in pain treatment represents treatment based on the use of medication. An option that relies on the sole use of pain relievers without applying the step-scheme is discarded.

3) Medicated pain treatment within the context of Teleconsultation

In exceptional cases with a pain intensity of VAS >7 (severe pain, such as upon or after applying a tourniquet) and only after the non-medication measures have been exhausted, a medicated pain therapy may be advised once the indication status has been determined and when prescribed by an emergency-call physician. In line with this, only legally approved pharmaceutical analgesics, which are administered in a non-invasive manner and which are not subject to narcotics law, are to be considered for use. At this point in time, a Tramadol solution appears suitable. The selection and dosage of medication will be prescribed by the emergency-call physician. The offshore first aider assists the injured person in taking the medication. The intensity of pain and vital functions must be monitored by the offshore first aider until the patient is transferred to more highly qualified medical personnel or an emergency physician.

Fig. 3: Level scheme for treating pain in accident victims using Teleconsultation.
Annex 5: Participating Institutions

The expertise of the following German institutions has been incorporated into these recommendations:

- Arbeitsgemeinschaft in Norddeutschland tätiger Notärzte – AGNN
- Berufsgenossenschaft der Bauwirtschaft – BG BAU
- Berufsgenossenschaft Energie Textil Elektro Medienprodukte – BG ETEM
- Berufsgenossenschaft Handel und Warenlogistik – BGHW
- Berufsgenossenschaft Holz und Metall – BGHM
- Berufsgenossenschaft Verkehrswirtschaft Post-Logistik Telekommunikation – BG Verkehr
- BG Klinikum Hamburg – Forschungsvorhaben „Rettungskette Offshore Wind“ – ROW
- Bundesamt für Seeschifffahrt und Hydrographie, Ordnung des Meeres – BSH
- Deutsche Gesetzliche Unfallversicherung – DGUV
- DGUV-Projektgruppen: - „Rettung und Erste Hilfe Offshore“ im FB Erste Hilfe (leadership)
  - „Empfehlung zur Umsetzung der ArbStättV auf Offshore-Plattformen“ im FB Holz und Metall/Schiffbau
  - „Windenergieanlagen - Handlungshilfen für den On- und Offshorebereich“ im FB ETEM/Energie
- DRK Kreisverband Ammerland, Westerstede
- EnBW Systeme, Infrastruktur Support GmbH der Energie Baden-Württemberg AG
- Havariekommando, FB 4, Brandbekämpfung und Verletztenversorgung auf See
- Innogy SE, Hamburg
- Johanniter-Unfall-Hilfe e.V., Ortsverband Stedingen
- Lloyd-Apotheke, Bremerhaven
- Offtec-Base GmbH & Co. KG, Enge-Sande
- Siemens AG, Hamburg
- Staatliches Gewerbeaufsichtsamt Oldenburg
- Telemedizinzentrum der Charité - Universitätsmedizin Berlin
- Universitätsklinikum Aachen, Klinik für Anästhesiologie, Medizinische Fakultät der RWTH Aachen
- Verwaltungsberufsgenossenschaft – VBG
- VGB PowerTech e. V., Essen
- Zentralinstitut für Arbeitsmedizin und Maritime Medizin, Universitätsklinikum Hamburg-Eppendorf