



## The Middelgrunden wind case

# Safety and logistic in offshore multi-use operations

*Speaker: Hans Christian Soerensen, PhD*

*Co-author: Julia Fernández Chozas, PhD*



This Project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement no 862915

26/01/2022

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# Middelgrunden Offshore Wind 40MW

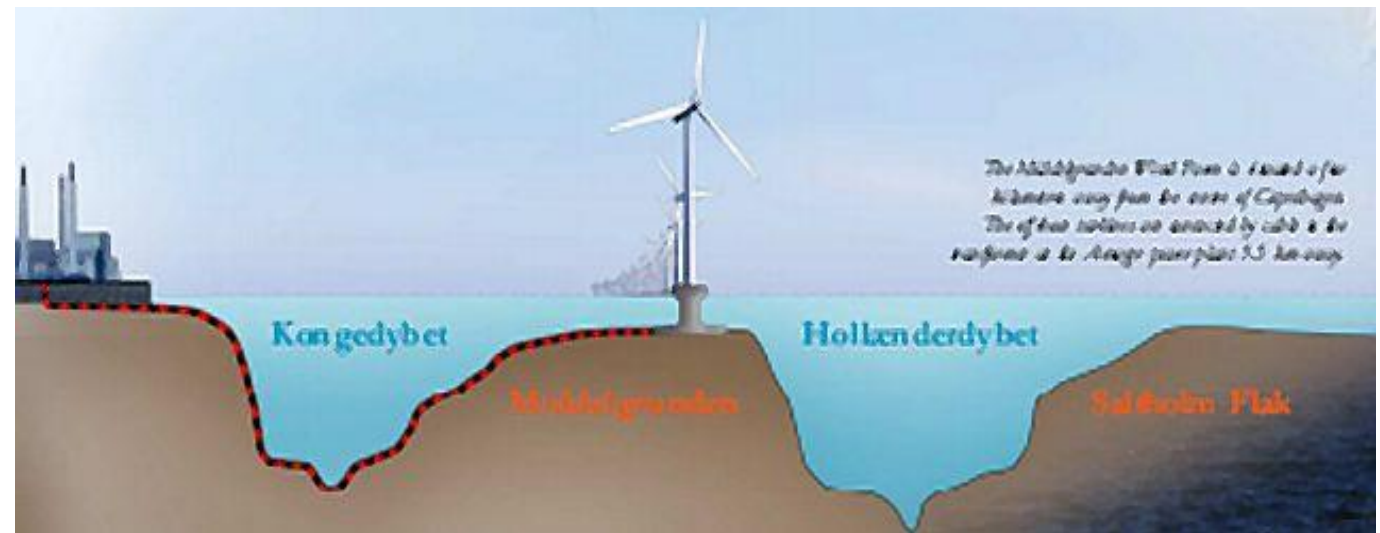
## Basic information

- Situated just 3.5 km's off the harbor in Copenhagen, Denmark.
- Established 2000 as the largest offshore wind farm in the World.
- Delivering 3% of power to Copenhagen.
- Two owners each 50%:
  - ❖ HOFOR (Copenhagen Municipality) and
  - ❖ A Cooperative with 8,550 members



## Danish Pilot:

## Combining offshore wind and tourism





# Safety rules – entering the turbine



- Standard boat with access directly to the platform – fixed bridge with rails.
- RIB boat with access from the sea level and a ladder outside the foundation – safety suit depending on water temperature; life jacket compulsory.

*Rules: Danish Maritime Authority*

*With a large boat for 30 people a stair has been installed to give easy and safe access.*



# Safety rules – entering the Nacelle

- Stop production
- How to use the ladders – depends on type of turbine (one section or more)
- Lightning closer than 70 km.
- Risk is dependent of “rail protection” at the Nacelle.



*Rules: Does not exist. Own safety instruction to be signed by all visitors when climbing the turbine.*

*Rules are very difficult to find as the standard rules are covering service people entering the turbine during production and equipped with safety equipment and having followed a safety course.*

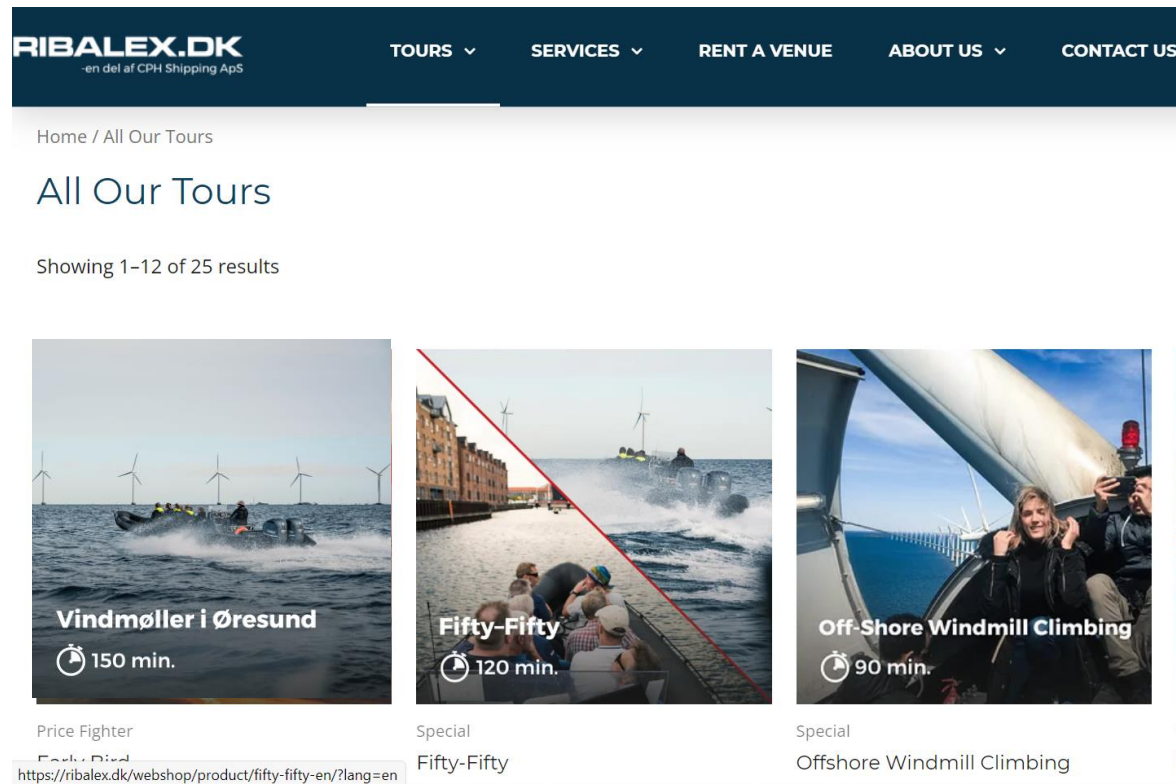




# Safety rules – lesson learned

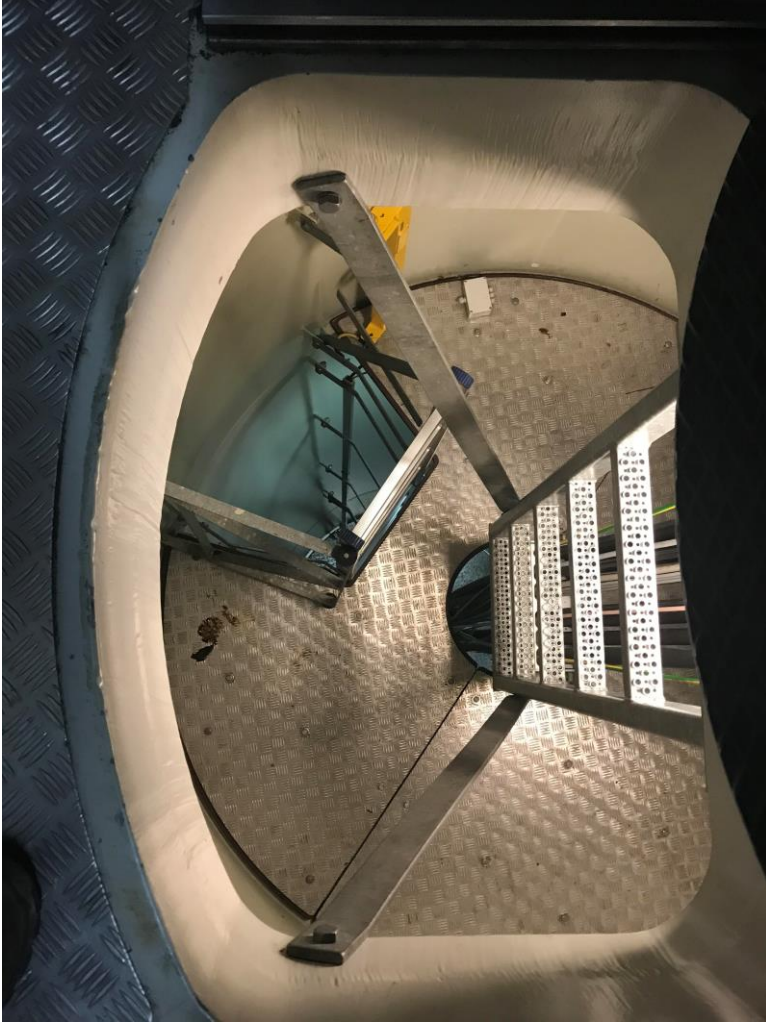


The RIB is more sensitive to the weather; increase of wind during the visit can result in difficulties to reentering the RIB. We had to wait 1 hour for help.

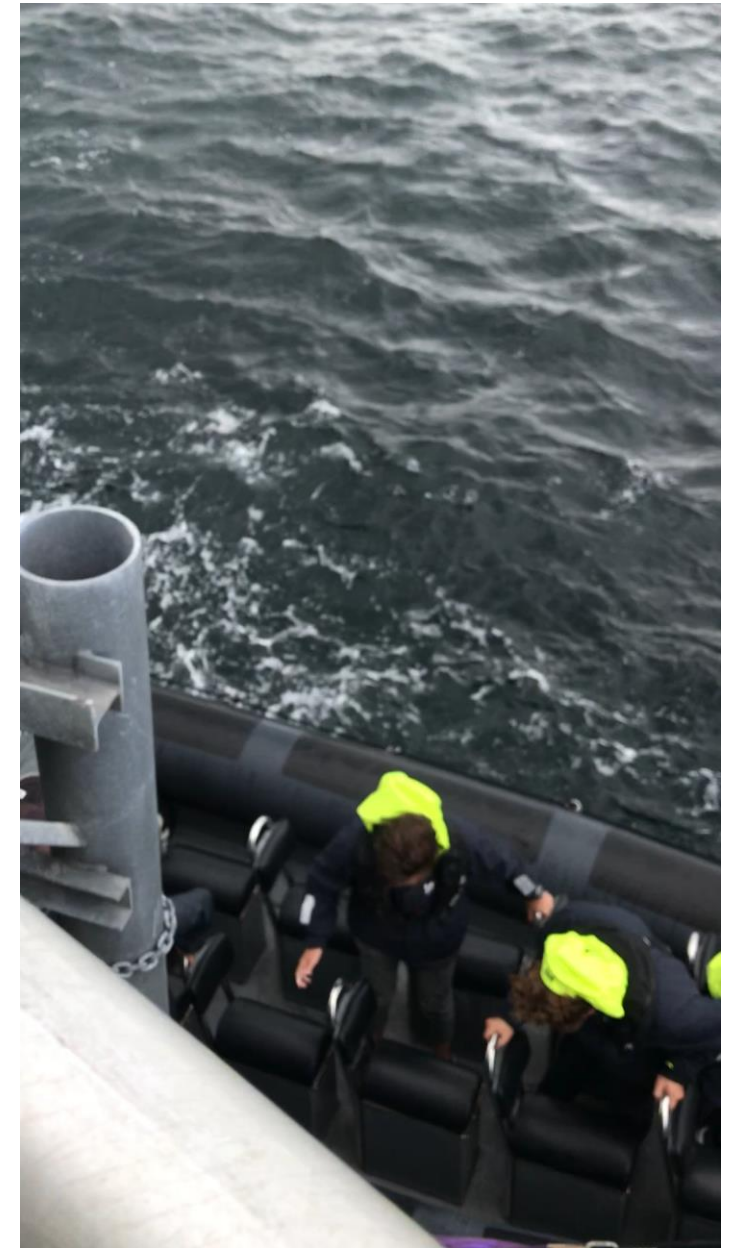


More boat companies results in better advertising (own web pages)

# Risk on persons



- Falling or break/twist a leg.
- Slide in spilled oil.
- Get squeezed hands when a wave move the boat.
- .....





# Insurance

**Signature Statement visits Middelgrundens wind turbines, 2021 -**

The trip out to the mills and the climb up in them is both a physical challenge and an experience out of the ordinary, but it is also a practical and security challenge. Therefore, it is essential that all guests read this statement carefully and agree to these conditions and precautions. Persons under 18 may participate if accompanied by a parent who must stand as a signatory below.

This statement is part of the COOP's emergency plan.

When ascending the mill requires that:

- I am not under the influence of alcohol, medicine, or drugs,
- I do not suffer from claustrophobia or fear of heights,
- I do not suffer from circulatory disturbances, dizziness, epilepsy, etc. and that,
- I am in good physical shape and not have significantly reduced mobility.

I must pay attention to the markings that are set up in different parts of the mill and respect the instructions given by the guides and staff. At the ladder's in turbines applies that there may be only one person at each section, a maximum of three people on each floor (there are 11 floors ) and a maximum of 18 people up in the nacelle – if not more accepted by the guide.

To ensure a steady flow of guests in the mill, it is important that the fastest guests climb up first, but waiting to study the interior of the tower until they are on their way back down. Generally, you must give way to the guests coming down, except if you get a different message from the guides.

Secure loose objects such as mobile phone, camera, video , etc. to be carried in a pocket or small bag with zipper . It is recommended to take rings or to take work gloves while climbing on ladders. Gloves are usually provided by the guide.

When passing from the vessel to the turbine foundation, both hands to be free, and the instructions of the guild and the ship's crew must be strictly followed. When needed safety vests are provided.

Because of risk of dirt and grease in the boat and wind turbines, it is recommended that you wear practical clothes and shoes with rigid non-slip soles. In addition, you should bring a rain jacket (if weather forecast gives risk of rain), a bottle of water and some fruit or chocolate.

In addition to these formal measures, we hope that all guests will positively contribute to the event by being patient in the event of delay and by showing respect for the other guests, so we all have a good experience with us home .

I certify by my signature that I agree with the above conditions and to the whole event takes place at your own risk and that there cannot be any liability claim against Middelgrundens Wind Coop or SPOK ApS in relation to the destruction or theft of clothing or personal items .

Date:

Name & signature:

Name &amp; signature

[illegible]

Office: +45 3536 0219

CVR-#: 25 04 21 82

www.spok.dk  
E-mail: [consult@spok.dk](mailto:consult@spok.dk)

Mobile: +45 2811 0219

E-mail: [consult@spok.dk](mailto:consult@spok.dk)

**SPOK ApS**

Frederiksborggade 1 – 4tv  
DK-1360 Copenhagen K

- Insurance must be obtained by the company operating the tourist tours as part of their normal insurance for guide activities, - only by the turbine owner if they guide the tours by own employees.
- Safety rules is a must and must be signed by all participants.



# Risk of financial loss



- Insurance for “damage” to the wind turbine caused by the visits is not covered.
- A typical “damage”: the guide forgets to reset from manual control to remote control.
- The damage: potential loss of production and extra cost of sending a person out to do the resetting.

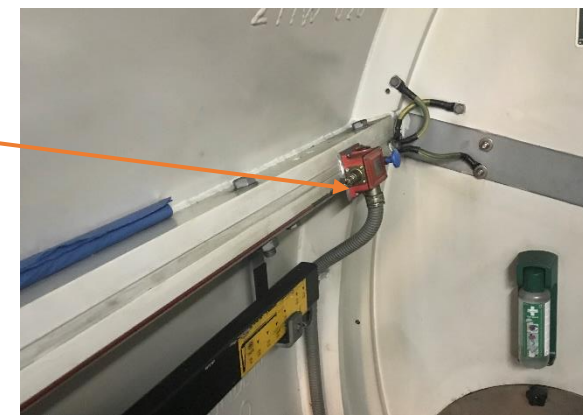




# Safety and logistic – training

New guides must follow a training course focusing on:

- How to stop/start the production
- Instruction about safety
- How to open the Nacelle
- How to reset after activating the emergency stop
- Etc.





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Thank you for your attention



**consult@spok.dk**

**julia.fernandez.chozas@gmail.com**