

**Atkin Chambers** Barristers

**An Introduction to design risk and  
design responsibility**

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# Design and risk

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- There is a risk of failure with any design.
- A design that is in accordance with relevant standards may fail.
- Complex structures that are subject to naturally occurring loads such as wind are typically designed using a probabilistic approach.
- This involves the selection of (a) an acceptable probability of failure and (b) a “design life”.
- Design life in this context means the lifetime of the structure which the design assumes.

# Risk allocation

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- Risk allocation is a matter for contract.
- The risk of failure where the design meets relevant standards may be allocated to the employer or the contractor.
- The risk of failure where the failure is due to adherence to the employer's plans or specification may be passed to the contract via a transfer of responsibility for the design to the contractor.

# Contracts of double obligation

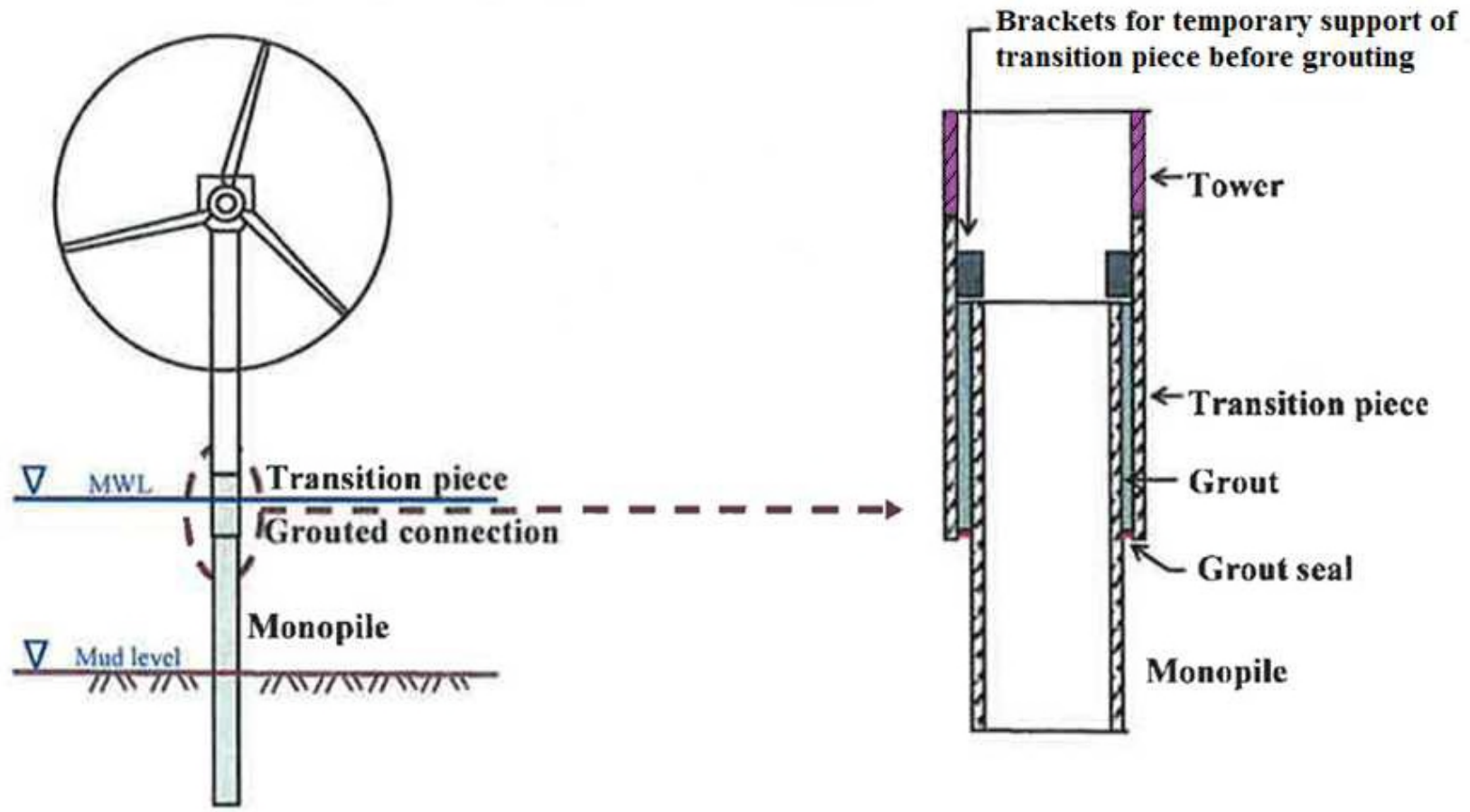
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- Some construction contracts impose on the contractor obligations both (a) to comply with particular specifications and standards and (b) to achieve a particular result.
- In such contracts there is a risk that compliance with the requirement with **how** the work is to be done will not necessarily bring about the intended result.
- A warranty to achieve the intended result allocates that risk to the contractor.
- Such a warranty normally comes at a price but it may make a project more attractive to funders or subsequent purchasers.
- The warranty may deter a design and build contractor from adopting the most economical design.

## E.ON and MT Højgaard

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- E.ON (Employer) and MT Højgaard (Contractor - MTH)
- Contract for the design, fabrication and installation of foundations for 60 wind turbines for the Robin Rigg offshore wind farm in the Solway Firth.
- Each turbine has a monopile (MP): a cylindrical steel pile driven into the sea-bed. Located on top of this is the transition piece (TP), also a steel cylinder, which fits over the top of the monopile and is grouted into place. The generator sits atop this structure.
- The dispute concerned the failure of the grouted connection between the MP and the TP.



# The problem

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- The grouted connection was designed to comply with the international standard for the design of offshore wind turbines produced by Det Norske Veritas, DNV-OS-J101.
- DNV-OS-J101 contained an error. The value attributed to a variable in the parametric equation used for the design of the grouted connection was underestimated by a factor of about 10.
- The installation works were completed in Feb 2009. In April 2010 the grouted connections started to fail.
- Remedial costs were agreed to be €26.25 million.

## The issues before the Court

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- E.ON argued MTH liable for the failure of grouted connections:
  - (1) under the terms of the contract MTH warranted that the wind turbine foundations would have a service life of 20 years;  
  
alternatively,
  - (2) MTH failed to exercise reasonable skill and care in carrying out the design of the grouted connection and in particular in relying wholly upon J101 and failing to demonstrate or verify its design by obtaining its own test data.



# The Contract

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- **Clause 8.1 of the Contract Conditions**
- MTH shall, in accordance with this Agreement, design, manufacture, test deliver and install and complete the Works:
  - (i) with due care and diligence expected of appropriately qualified and experienced designers, engineers and constructors (as the case may be).
  - (iv) in a professional manner ... in accordance with ... Good Industry Practice.
  - (viii) so that the Works, when completed, comply with the requirements of the Agreement.
  - (x) so that each item of Plant and the Works as a whole **shall be fit for its purpose as determined in accordance with the Specification using Good Industry Practice.**
  - (xv) so that the design of the Works and the Works when completed by the Contractor shall be wholly in accordance with this Agreement and shall satisfy any performance specifications or requirements of the Employer as set out in this Agreement.

## **The Technical Requirements (TR) *(part of the Employer's Requirements)***

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“The Works elements shall be designed for a minimum site specific design life of 20 years without major retrofits or refurbishments”

“The design of the foundations shall ensure a lifetime of 20 years in every aspect without planned replacement.”

“All parts of the Works...shall be designed for a minimum service life 20 years.”

“The design of the structures...shall ensure a lifetime of 20 years in every respect without planned replacement.”

# The potential warranty

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- TR 3.2.2.2 (2) :

“The design of the foundations shall ensure a **lifetime of 20 years** in every aspect without planned replacement..”

- TR paragraph 3b.5.1 and 3b.5.6 :

“The design of the structures addressed by this Design Basis shall ensure a **lifetime of 20 years** in every aspect without planned replacement.” and “All parts of the Works, except wear parts and consumables shall be designed for a **minimum service life 20 years.**”

# The litigation

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- TCC held that MTH had warranted the foundations for a 20 year service life and MTH's design was not fit for purpose.
- The Court of Appeal held that the contract did not contain a warranty for a 20 year service life.
- The Supreme Court granted E.ON permission to appeal.
- The Supreme Court's judgment is awaited.



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