

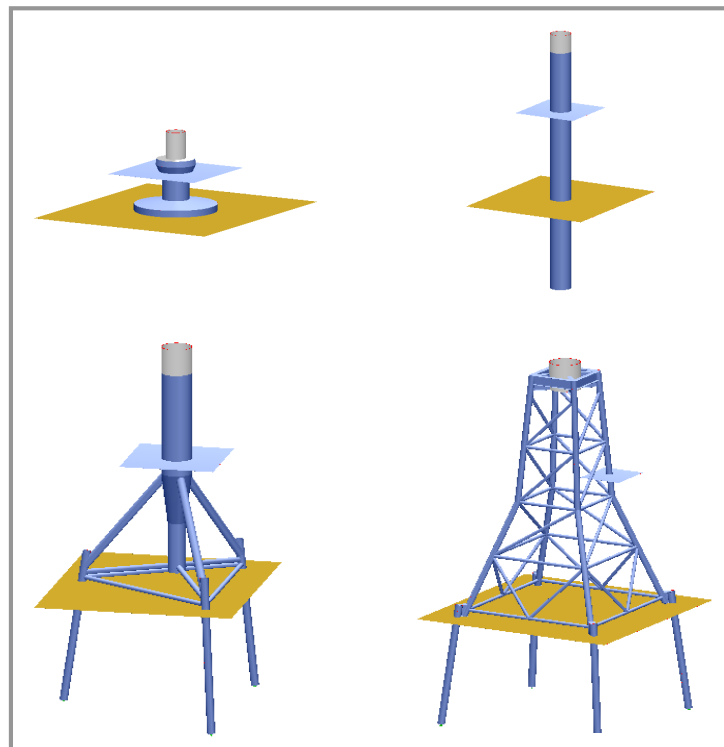
## References

**Project:** Borkum Riffgrund (I) Offshore Wind Farm, Germany  
Foundations – Tender Design

**Period:** 2005

**Client:** Aarsleff - Bilfinger Berger  
Joint Venture

**Short Description:** IMS - in joint venture with COWI Danmark - assisted the Aarsleff - Bilfinger Berger Joint Venture with tender design of at least piled gravity foundations for 77 wind turbines located 40 km of the German North Sea Coast. The rated production capacity of the wind turbine farm is about 250 - 320 MW for turbine sizes 3 - 5 MW, respectively. The wind turbines are to be founded at 23m - 29m water depth CD (LAT). COWI-IMS carried out developments of several foundation concepts as steel monopiles (2 designs), steel tripods (2 designs), concrete gravity structures (2 designs, one with additional piles) and piled concrete tripod structures (2 designs). During tender design several structural designs, geotechnical designs, design of scour protection and appurtenances, an evaluation of installation procedures with related impacts on the structure are executed.



**Typical support structures for offshore wind turbines**