Netherlands Enterprise Agency

Webinar Scour and Scour Mitigation
November 10, 2017

Questions: from the audience
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Question:
Regarding the use of rocks as a scour protection. Are there benefits of using a single grading rock protection over a double grading system?

Answer:
That depends on the selected foundation type, location and hydrodynamic climate. Both systems have their benefits and challenges. If you apply a single grading then all scour protection requirements (i.e. external stability, internal stability and flexibility) should be incorporated in one rock grading. These requirements are contradictory to some extent. After all, you need larger rocks to guarantee external stability under design loads, while you need smaller pore sizes and thus smaller rocks to guarantee internal stability. Both requirements on rock size need to be present in one grading. A single grading might therefore result in a larger required layer thickness, because more deformation is expected under storm conditions and the potential for winnowing might be larger. This means that the total volume of scour protection material can increase, which can still pay off when the offshore installation is less complicated or faster, e.g. when the total scour protection can be installed with the use of a single (fall pipe) vessel and in a single installation campaign.

Because of the compromise between external and internal stability, it is recommended for a single grading to consider whether some winnowing (i.e. suction removal of sediment through the rock layer) can be acceptable, because this would relax the requirements on the smaller rock sizes and/or the minimum required layer thickness. Furthermore, note that for the "Monitor & React"-strategy a single grading solution is preferred, because multi-layered scour protection systems are difficult to install on an uneven seabed. At the same time the hydraulic loads and the winnowing potential are both smaller, because the scour protection is installed in a sheltered position inside the scour hole.

In summary, a double grading is best-proven, provides largest safety and can even consist of a smaller total rock volume, but installation can be more expensive and complex. Especially, if the armour rocks are so big, that they have to be installed after the installation of the foundation, the installation costs of a double grading can be larger compared to a single grading.

Question:
Is there any link where we can read the details on the consortium of scour protection design ?

Answer:
see https://topsectorenergie.nl/tki-wind-op-zee/rd-projecten/haspro-jip-handbook-scour-protection-methods for the information provided on the website of TKI wind op Zee. For more information you can also contact Tim Raaijmakers (tim.raaijmakers@deltares.nl).

Please note that we organize an Open Offshore Wind Event at Deltares on 22 November 2017 in which we discuss amongst other the JIP HaSPro project. More information on this is found at https://www.deltares.nl/en/events/deltares-open-offshore-wind-event/.