

CLAIMS

1. Pile installation system (26, 107, 202) for an offshore foundation construction (2), including a main body (28, 112), a movable part (82, 116) and a first means for attaching the main body (28, 112) to a frame of reference, characterized in that it further includes a second means for attaching the movable part (82, 116) to a pile (22) to be installed, and in that the movable part (82, 116) may be moved, with respect to the main body (28, 112), in translation about the direction of an insertion axis (21).
2. Pile installation system (26, 107, 202) according to claim 1, wherein the movable part (82, 116) may be moved, with respect to the main body (28, 112), in rotation about said insertion axis (21).
3. Pile installation system (26, 107, 202) according to claim 1 or 2, wherein the main body (28, 112) includes a first elongated sleeve (32, 204) extending along the insertion axis (21).
4. Pile installation system (26, 107, 202) according to claim 3, wherein the length of the first elongated sleeve (32, 204) is within a range 5 m to 30 m.
5. Pile installation system (26, 107, 202) according to claim 3 or 4, wherein the first elongated sleeve (32, 204) includes a distal end portion (42), the distal end portion (42) being frustoconical and having a first circular axial end adjacent to the main body (28, 112) and a second circular axial end opposite to the main body (28, 112), the second circular axial end having a larger diameter (d_{42d}) than the diameter (d_{42u}) of the first circular axial end.
6. Pile installation system (26, 107, 202) according to any of claims 1 to 5, wherein the main body (28, 112) includes a second elongated sleeve (34) including a lifting device (81).
7. Pile installation system (202) according to any of claims 1 or 2, including a carousel so configured accommodate at least two piles (22), to pivot the piles (22) about a pivot axis (208) and to supply piles (22) one at a time for installation.

8. Pile installation system (26, 107) according to any of claims 1 to 7, further including a power generation unit (100, 102) and a driving unit (84, 94), the driving unit (84, 94) being intended to use power from the power generation unit (100, 102) to actuate the movable part (82, 116), the power generation unit (100, 102) being intended to be installed on a vessel (98), the driving unit (84, 94) being installed in vicinity of the main body (28, 112).

9. Pile installation system (26, 107) according to claim 8, wherein the power generation unit (100, 102) includes at least one hydraulic pump and/or at least one electric generator.

10. Pile installation system (26, 107) according to any of claims 1 to 9, wherein the driving unit (84, 94) includes at least one hydraulic actuator or at least one electric actuator

11. Pile installation system (26, 107) according to any of claims 1 to 10, further including a transmission unit comprising a driving screw (90) and a ring gear (92).

12. Pile installation system (26, 107) according to any of claims 1 to 11, wherein the second means for attaching includes at least three radially movable chucks (96).

13. Pile installation system (26, 107) according to claim 12, wherein the second means for attaching includes at least one supplementary radially movable chuck (96).

14. Pile installation system (26, 107) according to any of claims 1 to 13, wherein the first means for attaching is intended to attach the main body (28, 112) to a structure (6) or an adapter (12, 108) of the offshore foundation construction (2).

15. Pile installation system (26) according to any of claims 1 to 14, wherein the frame of reference is a template (302).

16. Pile installation system (26, 107) according to any of claims 1 to 15, wherein the first means for attaching includes a rod (60) and a clamping means for attaching the rod (60) to a central sleeve (14) of an adapter (12, 108) of the offshore foundation construction (2).

17. Pile installation system (26, 107) according to claim 16, wherein the main body (28, 112) is mobile in rotation with respect to the

rod (60) about the axis of the rod (61), the first means for attaching further including a pivoting means for actuating the rotation of the main body (28, 112) with respect to axis of the rod (61).

18. Pile installation system (26, 107) according to claim 17, wherein the pivoting means includes a motor (74) and a pinion (76), the rod (60) having outer axial grooves (68) able to cooperate with the pinion (76).

19. Method of installing a pile (22) of an offshore foundation construction (2), including attaching the main body (28, 112) of a pile installation system (26, 107) as set forth in any of claims 1 to 16 to the frame of reference, providing the pile installation system (26, 107) with a pile (22) to be installed, attaching the movable part (82, 116) of the pile installation system (26, 107) to the pile (22) to be installed, and moving the movable part (82, 116), with respect to the main body (28, 112), in translation about the direction of an insertion axis (21).

20. Method according to claim 19, further including moving the movable part (82, 116) with respect to the main body (28, 112) in rotation about said insertion axis (21).

21. Method according to claim 20, wherein the movable part (82, 116) is moved, with respect to the main body (28, 112), simultaneously in translation and in rotation about the insertion axis (21).

22. Method according to any of claims 19 to 21, further including using a template (302) during installation of the pile (22).

23. Method according to Claim 22, wherein the template (302) is used prior to installing the offshore foundation construction (2) or any part (6, 12) of the offshore foundation construction (2).

24. Method according to Claim 23, wherein said part of the offshore foundation construction (2) is at least one adapter (12) or a structure (6).

25. Method according to Claim 22, wherein the template (302) is used together with one or more adapters (12) of the offshore foundation construction (2).

26. Method according to any of Claims 22 and 25, wherein the template (302) is the frame of reference.