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 the pile installation system (26, 107, 202) 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 a direction of an insertion axis (21),

wherein the frame of reference is a template (302), and

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).

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 first elongated sleeve (32, 204) has a length of 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 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 carrousel so configured to 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) configured to use power from the power generation unit (100, 102) to actuate the movable part (82, 116), the power generation unit (100, 102) configured 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 8 and 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 configured 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, 107) according to claim 1, wherein the main body (28, 112) is mobile in rotation with respect to the rod (60) about an 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 the axis of the rod (61).

16. Pile installation system (26, 107) according to claim 15, 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).

17. Method of installing a pile (22) of an offshore foundation construction (2), including attaching the main body (28, 112) of the pile installation system

(26, 107) as set forth in any of claims 1 to 16 to a template (302), providing the pile installation system (26, 107) with the 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 a direction of an insertion axis (21).

18. Method according to claim 17, further including moving the movable part (82, 116) with respect to the main body (28, 112) in rotation about said insertion axis (21).

19. Method according to claim 18, 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).

20. Method according to claim 17, 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).

21. Method according to claim 20, wherein said part of the offshore foundation construction (2) is at least one adapter (12) or a structure (6).

22. Method according to claim 21, wherein the template (302) is used together with one or more adapters (12) of the offshore foundation construction (2).