CLAIMS

What is claimed is:

1. A marine hydrocarbon operations structure comprising:

a caisson body having a top surface which defines an opening;

a shaft positioned within the opening, the shaft has an external surface and an interior, the shaft having an engagement member positioned on the external surface of the shaft;

a lower jack house system constructed and arranged to change the vertical position of the shaft through interaction with the engagement member; and

an operations platform supported by the shaft.

2. The structure of claim 1 further comprising:

a jack-up leg positioned within the interior of the shaft; and

an upper jack house system mechanically coupled to the jack-up leg and constructed and arranged to change the vertical position of the jack-up leg,

wherein the platform is supported by the jack-up leg.

3. The structure of claim 2, wherein the upper jack house system is affixed to the external surface of the shaft.

4. The structure as in any one of the preceding claims further comprising a base structure having a lower surface and a support surface, the lower surface is constructed and arranged to engage a seabed, the support surface is constructed and arranged to engage a bottom portion of the caisson body.

5. The structure of claim 5, wherein the support surface is recessed from an upper surfaced of the base structure.

6. The structure as in any one of the preceding claims, wherein the engagement member is a rack member having a plurality of rack teeth.

7. The structure of claim 6, wherein the upper jack house system comprises at least one pinion gear having a plurality of pinion teeth constructed and arranged to matingly engage the rack teeth.

8. The structure of claim 6 or 7, wherein the upper jack house system comprises a chock member having a plurality of chock teeth constructed and arranged to conform to the rack teeth.

9. The structure of claim 8, wherein the upper jack house system comprises an actuator mechanically coupled to the chock member, the actuator is constructed and arranged to move the chock member between a first position and a second position.

10. The structure as in any one of claims 7, 8, or 9, wherein the pinion gears are constructed and arranged to be driven by an electric drive mechanism.

11. The structure as in any one of the preceding claims, wherein the caisson body is a gravity based structure.

12. The structure as in any one of the preceding claims, wherein the lower jack house system is attached to the top surface of the caisson body.

13. The structure as in any one of the preceding claims, wherein the caisson body and shaft are constructed and arranged to resist ice loads.

14. The structure as in any one of the preceding claims, wherein the hydrocarbon operations comprises drilling, the platform supports a drilling derrick which is operatively connected to a drilling riser, a first portion of the drilling riser is positioned within the interior of the shaft.

15. The structure as in any one of the preceding claims further comprising:

at least one foundation member positioned within the caisson; and

means associated with each foundation member for vertically moving the associated foundation member into the seabed.

16. The structure of claim 15, wherein the means for vertically moving the associated foundation member into the seabed is at least one jack house system.

17. The structure of claim 15, wherein the means for vertically moving the associated foundation member into the seabed is a suction caisson system comprising a pump and control umbilical.

18. The structure of claim 17, wherein a portion of the control umbilical is located within the shaft.

19. The structure as in any one of claims 15, 16, 17, or 18 further comprising a guiding sleeve positioned radially outward from foundation member.

20. A method for installing mobile drilling structure comprising:

providing the mobile drilling structure which comprises a caisson body having a top surface which defines an opening, the caisson body houses a plurality of ballast tanks, a shaft positioned within the opening, the shaft having an engagement member positioned on the external surface of the shaft, a lower jack house system constructed and arranged to change the vertical position of the shaft through interaction with the engagement member, and a drilling platform supported by the shaft;

delivering the mobile drilling structure to a drill site;

adding water to the ballast tank;

operating the lower jack house system to raise the shaft;

engaging a bottom of the caisson body to a seabed.

21. The method of claim 20, wherein the mobile drilling structure further comprises a jack-up leg positioned within the interior of the shaft and an upper jack house system mechanically coupled to the jack-up leg and constructed and arranged to change the vertical position of the jack-up leg, wherein the platform is supported by the jack-up leg.

22. The method of claim 21 further comprising operating the upper jack house to raise platform to a clearance height.

23. The method as in any one of the preceding claims further comprising installing a drilling riser that is operatively connected to a drilling derrick on the platform, wherein a portion of the drilling riser is positioned within the shaft.

24. The method as in any one of the preceding claims, wherein the mobile drilling structure further comprises at least one foundation member positioned within the caisson.

25. The method of claim 24 further comprising lowering the at least one foundation member into the seabed.

26. The method of claim 25, wherein the at least one foundation member is lowered into the seabed through operation of a jack house system mechanically coupled to the foundation member.

27. The method of claim 25, wherein the at least one foundation member is lowered into the seabed through operation of a suction caisson system comprising a pump and a control umbilical.

28. The method of claim 27, wherein the suction caisson system further comprises a guidance sleeve positioned radially outward of the foundation member.

29. The method of claim 28 further comprising filling an annulus between the foundation member and the guidance sleeve with a first material.

30. The method of claim 29, wherein the first material is sand.

31. The method of claim 29 or 30 further comprising removing the first material from the annulus and raising the foundation member out of the seabed.

CLAIMS

1. A marine hydrocarbon operations structure comprising: a caisson body having a top surface which defines an opening, the caisson body is constructed and arranged to be positioned proximate a seabed; a shaft positioned within the opening, the shaft has an external surface and an interior, the shaft having an engagement member positioned on the external surface of the shaft; a lower jack house system constructed and arranged to change the vertical position of the shaft through interaction with the engagement member; and an operations platform supported by the shaft.

2. The structure of claim 1 further comprising: a jack-up leg positioned within the interior of the shaft; and an upper jack house system mechanically coupled to the jack-up leg and constructed and arranged to change the vertical position of the jack-up leg, wherein the platform is supported by the jack-up leg.

3. The structure of claim 2, wherein the upper jack house system is affixed to the external surface of the shaft.

4. The structure of claim 1 further comprising a base structure having a lower surface and a support surface, the lower surface is constructed and arranged to engage the seabed, the support surface is constructed and arranged to engage a bottom portion of the caisson body.

5. The structure of claim 4, wherein the support surface is recessed from an upper surface of the base structure.

6. The structure of claim 2, wherein the engagement member is a rack member having a plurality of rack teeth.

7. The structure of claim 6, wherein the upper jack house system comprises at least one pinion gear having a plurality of pinion teeth constructed and arranged to matingly engage the rack teeth.

8. The structure of claim 7, wherein the upper jack house system comprises a chock member having a plurality of chock teeth constructed and arranged to conform to the rack teeth.

9. The structure of claim 8, wherein the upper jack house system comprises an actuator mechanically coupled to the chock member, the actuator is constructed and arranged to move the chock member between a first position and a second position.

10. The structure of claim 7, wherein the at least one pinion gear is constructed and arranged to be driven by an electric drive mechanism.

11. The structure of claim 1, wherein the caisson body is a gravity based structure.

12. The structure of claim 1, wherein the lower jack house system is attached to the top surface of the caisson body.

13. The structure of claim 1, wherein the caisson body and shaft are constructed and arranged to resist ice loads.

14. The structure of claim 1, wherein the hydrocarbon operations comprises drilling, the platform supports a drilling derrick which is operatively connected to a drilling riser, a first portion of the drilling riser is positioned within the interior of the shaft.

15. The structure of claim 1 further comprising: at least one foundation member positioned within the caisson; and means associated with each foundation member for vertically moving the associated foundation member into the seabed.

16. The structure of claim 15, wherein the means for vertically moving the associated foundation member into the seabed is at least one jack house system.

17. The structure of claim 15, wherein the means for vertically moving the associated foundation member into the seabed is a suction caisson system comprising a pump and control umbilical.

18. The structure of claim 17, wherein a portion of the control umbilical is located within the shaft.

19. The structure of claim 15 further comprising a guiding sleeve positioned radially outward from foundation member.

20. A method for installing a mobile drilling structure comprising: providing the mobile drilling structure which comprises a caisson body having a top surface which defines an opening, the caisson body houses a plurality of ballast tanks, a shaft positioned within the opening, the shaft having an engagement member positioned on the external surface of the shaft, a lower jack house system constructed and arranged to change the vertical position of the shaft through interaction with the engagement member, and a drilling platform supported by the shaft; delivering the mobile drilling structure to a drill site; adding water to at least one of the plurality of ballast tanks; operating the lower jack house system to raise the shaft; engaging a bottom of the caisson body to a seabed.

21. The method of claim 20, wherein the mobile drilling structure further comprises a jack-up leg positioned within the interior of the shaft and an upper jack house system mechanically coupled to the jack-up leg and constructed and arranged to change the vertical position of the jack-up leg, wherein the platform is supported by the jack-up leg.

22. The method of claim 21 further comprising operating the upper jack house to raise platform to a clearance height.

23. The method of claim 20 further comprising installing a drilling riser that is operatively connected to a drilling derrick on the platform, wherein a portion of the drilling riser is positioned within the shaft.

24. The method of claim 20, wherein the mobile drilling structure further comprises at least one foundation member positioned within the caisson.

25. The method of claim 24 further comprising lowering the at least one foundation member into the seabed.

26. The method of claim 25, wherein the at least one foundation member is lowered into the seabed through operation of a jack house system mechanically coupled to the foundation member.

27. The method of claim 24, wherein the at least one foundation member is lowered into the seabed through operation of a suction caisson system comprising a pump and a control umbilical.

28. The method of claim 27, wherein the suction caisson system further comprises a guidance sleeve positioned radially outward of the foundation member.

29. The method of claim 28 further comprising filling an annulus between the foundation member and the guidance sleeve with a first material.

30. The method of claim 29, wherein the first material is sand.

31. The method of claim 29 further comprising removing the first material from the annulus and raising the foundation member out of the seabed.

32. A marine hydrocarbon operations structure comprising: an operations platform; a caisson body having a top surface which defines an opening and a bottom constructed and arranged to engage a seabed; a shaft positioned within the opening extending between the caisson body and the operations platform, the shaft has an external surface and an interior, the shaft having an engagement member positioned on the external surface of the shaft; and a lower jack house system constructed and arranged to change the vertical position of the shaft through interaction with the engagement member.

33. A marine hydrocarbon operations structure comprising: an operations platform; a caisson body having a top surface which defines an opening; a base structure having a lower surface and a support surface, the lower surface is constructed and arranged to engage a seabed, the support surface is constructed and arranged to engage a bottom portion of the caisson body; a shaft positioned within the opening extending between the caisson body and the operations platform, the shaft has an external surface and an interior, the shaft having an engagement member positioned on the external surface of the shaft; and a lower jack house system constructed and arranged to change the vertical position of the shaft through interaction with the engagement member.