cantilever system increase. To increase the capacity of the cantilever system, the beams can be formed from a stronger material and/or the beam structure can be increased so that the beams are larger and heavier. However, stronger materials can significantly add to the cost of the cantilever system, and increasing the size and weight of the cantilever system requires substantial modifications to the hull and legs of the rig that are needed to support the cantilever system.

[0005] Therefore, there is a need for a new and improved cantilever system and method of use.

SUMMARY OF THE INVENTION

[0006] In one embodiment, a cantilever system for a rig comprises a hull and a beam movably coupled to the hull. A first end of the beam is extendable over an edge of the hull while a second end of the beam is positioned on the hull. An extension member is coupled to the second end of the beam such that the extension member increases the longitudinal length of the beam. A hold-down member is spaced apart from a support member to increase a maximum load that the beam supports without reducing a maximum reach of the beam from the edge of the hull, wherein the hold-down member is configured to apply a reactive force to the extension member in a direction toward the hull when the first end of the beam is extended over the edge of the hull.

[0007] In one embodiment, a method of increasing a load capacity of a cantilever system that is supported by a hull of a rig comprises extending a portion of a beam of the cantilever system over an edge of the hull and coupling an extension member to an end of the beam while the portion of the beam is extended over the edge of the hull. The method further comprises applying a reactive force to the extension member in a direction toward the hull using a hold-down member when the portion of the beam is extended over the edge of the hull, such that the hold-down member is coupled to the extension member. The method further comprises increasing a spacing

between the hold-down member and a support member to increase a maximum load that the beam supports without reducing a maximum reach of the beam from the edge of the hull.

[0008] In one embodiment, a method of increasing a load capacity of a cantilever system that is supported by a hull of a rig comprises providing a beam that is movably coupled to the hull such that a portion of the beam is extendable over an edge of the hull; providing an extension member for connection to the beam to thereby increase an overall length of the beam, wherein the beam has a maximum reach that it may be extended from the edge of the hull when the extension member is coupled to the beam; providing a hold-down member to secure the beam and the extension member to the hull; providing a support member to support the beam on the hull; and increasing a spacing between the hold-down member and the support member to thereby increase a maximum load that the beam supports when extended to its maximum reach.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] So that the manner in which the above recited features of the invention can be understood in detail, a more particular description of the invention, briefly summarized above, may be had by reference to embodiments, some of which are illustrated in the appended drawings. It is to be noted, however, that the appended drawings illustrate only typical embodiments of this invention and are therefore not to be considered limiting of its scope, for the invention may admit to other equally effective embodiments.

[0010] Figure 1 illustrates a rig having a cantilever system in a stowed position according to one embodiment.

[0011] Figures 2A and 2B illustrate a side view of a cantilever system in an extended position.

[0012] Figures 3A illustrates the cantilever system shown in Figure 2A.

cantilever system increase. To increase the capacity of the cantilever system, the beams can be formed from a stronger material and/or the beam structure can be increased so that the beams are larger and heavier. However, stronger materials can significantly add to the cost of the cantilever system, and increasing the size and weight of the cantilever system requires substantial modifications to the hull and legs of the rig that are needed to support the cantilever system.

[0005] Therefore, there is a need for a new and improved cantilever system and method of use.

SUMMARY OF THE INVENTION

[0006] In one embodiment, a cantilever system for a rig comprises a hull and a beam movably coupled to the hull. A first end of the beam is extendable over an edge of the hull while a second end of the beam is positioned on the hull. The cantilever system further comprises a hold-down member that is spaced from a support member to support the beam. The hold-down member is positioned at a predetermined distance X_3 from the support member greater than a distance X_1 to the support member such that when the beam is fully extended with the second end of the beam disposed at the predetermined distance X_3 from the support member, a maximum load that the beam supports is increased relative to a second maximum load that the beam supports when fully extended from the distance X_1 but a maximum reach of the first end of the beam from the edge of the hull is reduced relative to a second maximum reach of the first end of the beam from the edge of the hull when fully extended from the distance X_1. The beam is secured to the hull by a plate member of the hold-down member that extends below a surface of the hull. The cantilever system further comprises an extension member coupled to the second end of the beam to increase the length of the beam. When the beam is fully extended with the extension member being disposed above the hold-down member at the predetermined distance X_3, the maximum reach of the first end of the beam from the edge of the hull is increased to the second maximum reach of the first end of the beam from the edge of the hull.

[0007] In one embodiment, a method of increasing a load capacity of a cantilever system that is supported by a hull of a rig is disclosed. The method comprises coupling a hold-down member and a support member to the hull for supporting a beam of the cantilever system. A first end of the beam is

extendable over an edge of the hull while a second end of the beam is positioned on the hull. The method further comprises spacing the hold-down member from the support member a predetermined distance X_3 greater than a distance X_1 to the support member such that when the beam is fully extended with the second end of the beam disposed at the predetermined distance X_3 from the support member, a maximum load that the beam supports is increased relative to a second maximum load that the beam supports when fully extended from the distance X_1 but a maximum reach of the first end of the beam from the edge of the hull is reduced relative to a second maximum reach of the first end of the beam from the edge of the hull when fully extended from the distance X_1. The beam is secured to the hull by a plate member of the hold-down member that extends below a surface of the hull. The method further comprises coupling an extension member to the second end of the beam to increase the length of the beam. When the beam is fully extended with the extension member being disposed above the hold-down member at the predetermined distance X_3, the maximum reach of the first end of the beam from the edge of the hull is increased to the second maximum reach of the first end of the beam from the edge of the hull.

[0008]

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] So that the manner in which the above recited features of the invention can be understood in detail, a more particular description of the invention, briefly summarized above, may be had by reference to embodiments, some of which are illustrated in the appended drawings. It is to be noted, however, that the appended drawings illustrate only typical embodiments of this invention and are therefore not to be considered limiting of its scope, for the invention may admit to other equally effective embodiments.

[0010] Figure 1 illustrates a rig having a cantilever system in a stowed position according to one embodiment.

[0011] Figures 2A and 2B illustrate a side view of a cantilever system in an extended position.

[0012] Figures 3A illustrates the cantilever system shown in Figure 2A.

1. A cantilever system for a rig, comprising:

a hull;

a beam movably coupled to the hull, wherein a first end of the beam is extendable over an edge of the hull while a second end of the beam is positioned on the hull;

a hold-down member that is spaced from a support member to support the beam, wherein the hold-down member is positioned at a predetermined distance from the support member such that when the beam is fully extended, a maximum load that the beam supports is increased but a maximum reach of the beam is reduced, and wherein the beam is secured to the hull by a plate member of the hold-down member that extends below a surface of the hull; and

an extension member coupled to the second end of the beam to increase the length of the beam, wherein when the beam is fully extended with the extension member, the maximum reach of the beam is increased.

2. The system of claim 1, wherein the hold-down member comprises a second support member configured to apply a reactive force to the beam in a direction toward the hull when the first end of the beam is extended over the edge of the hull.

3. The system of claim 1, wherein at least one of the hold-down member and the support member is integral with the hull.

4. The system of claim 1, further comprising a second hold-down member that is positioned between the support member and the hold-down member.

5. The system of claim 4, wherein the second hold-down member comprises a second support member configured to apply a force to the beam in a direction toward the hull when the first end of the beam is extended over the edge of the hull.

6. The system of claim 1, wherein the support member is disposed adjacent the edge of the hull, and wherein the hold down member is positioned the predetermined distance from the support member in a direction away from the edge of the hull.

7. The system of claim 1, wherein the hold-down member and the support are pre-installed in the hull.

8. The system of claim 1, wherein the hold-down member is coupled to the extension member and the hull after the extension member is coupled to the second end of the beam.

9. The system of claim 1, further comprising a plurality of legs configured to support the hull, wherein the hull is moveable relative to the legs.

10. The system of claim 1, further comprising a second hold-down member positioned between the support member and the hold-down member that is coupled to the extension member, wherein the second hold-down member is configured to apply a force to the beam in a direction toward the hull when the first end of the beam is extended over the edge of the hull, and wherein the second hold-down member is coupled to the second end of the beam adjacent to a connection between the extension member and the second end of the beam when the first end of the beam is extended over the edge of the hull.

11. A method of increasing a load capacity of a cantilever system that is supported by a hull of a rig, comprising:

coupling a hold-down member and a support member to the hull for supporting a beam of the cantilever system, wherein a first end of the beam is extendable over an edge of the hull while a second end of the beam is positioned on the hull;

spacing the hold-down member from the support member a predetermined distance such that when the beam is fully extended, a maximum load that the beam supports is increased but a maximum reach of the beam is reduced, wherein the beam

is secured to the hull by a plate member of the hold-down member that extends below a surface of the hull; and

coupling an extension member to the second end of the beam to increase the length of the beam, wherein when the beam is fully extended with the extension member, the maximum reach of the beam is increased.

12. The method of claim 11, wherein the hold-down member is configured to apply a reactive force to the beam, via a second support member, in a direction toward the hull when the first end of the beam is extended over the edge of the hull.

13. The method of claim 11, wherein at least one of the hold-down member and the support member is integral with the hull.

14. The method of claim 11, further comprising coupling a second hold-down member to the hull between the support member and the hold-down member.

15. The method of claim 14, wherein the second hold-down member is configured to apply a force to the beam, via a second support member, in a direction toward the hull when the first end of the beam is extended over the edge of the hull.

16. The method of claim 11, wherein the support member is disposed adjacent the edge of the hull, and wherein the hold down member is positioned the predetermined distance from the support member in a direction away from the edge of the hull.

17. The method of claim 11, wherein the hold-down member and the support are pre-installed in the hull.

18. The method of claim 11, wherein the hold-down member is coupled to the extension member and the hull after the extension member is coupled to the second end of the beam.

19. The method of claim 11, further comprising extending a plurality of legs of the rig into a sea floor, and raising the hull relative to the legs.

20. The method of claim 11, further comprising securing a second hold-down member to the beam at a position between the support member and the hold-down member that is coupled to the extension member, and applying a force to the beam in a direction toward the hull using the second-hold down member when the first end of the beam is extended over the edge of the hull, wherein the second hold-down member is coupled to the second end of the beam adjacent to a connection between the extension member and the second end of the beam.

1. A cantilever system for a rig, comprising:

a hull;

a beam movably coupled to the hull, wherein a first end of the beam is extendable over an edge of the hull while a second end of the beam is positioned on the hull;

a hold-down member that is spaced from a support member to support the beam, wherein the hold-down member is positioned at a predetermined distance X_3 from the support member greater than a distance X_1 to the support member such that when the beam is fully extended with the second end of the beam disposed at the predetermined distance X_3 from the support member, a maximum load that the beam supports is increased relative to a second maximum load that the beam supports when fully extended from the distance X_1 but a maximum reach of the first end of the beam from the edge of the hull is reduced relative to a second maximum reach of the first end of the beam from the edge of the hull when fully extended from the distance X_1, and wherein the beam is secured to the hull by a plate member of the hold-down member that extends below a surface of the hull; and

an extension member coupled to the second end of the beam to increase the length of the beam, wherein when the beam is fully extended with the extension member being disposed above the hold-down member at the predetermined distance X_3, the maximum reach of the first end of the beam from the edge of the hull is increased to the second maximum reach of the first end of the beam from the edge of the hull.

2. The system of claim 1, wherein the hold-down member comprises a second support member configured to apply a reactive force to the beam in a direction toward the hull when the first end of the beam is extended over the edge of the hull.

3. The system of claim 1, wherein at least one of the hold-down member and the support member is integral with the hull.

4. The system of claim 1, further comprising a second hold-down member that is positioned between the support member and the hold-down member.

5. The system of claim 4, wherein the second hold-down member comprises a second support member configured to apply a force to the beam in a direction toward the hull when the first end of the beam is extended over the edge of the hull.

6. The system of claim 1, wherein the support member is disposed adjacent the edge of the hull, and wherein the hold down member is positioned the predetermined distance from the support member in a direction away from the edge of the hull.

7. The system of claim 1, wherein the hold-down member and the support are pre-installed in the hull.

8. The system of claim 1, wherein the hold-down member is coupled to the extension member and the hull after the extension member is coupled to the second end of the beam.

9. The system of claim 1, further comprising a plurality of legs configured to support the hull, wherein the hull is moveable relative to the legs.

10. The system of claim 1, further comprising a second hold-down member positioned between the support member and the hold-down member that is coupled to the extension member, wherein the second hold-down member is configured to apply a force to the beam in a direction toward the hull when the first end of the beam is extended over the edge of the hull, and wherein the second hold-down member is coupled to the second end of the beam adjacent to a connection between the extension member and the second end of the beam when the first end of the beam is extended over the edge of the hull.

11. A method of increasing a load capacity of a cantilever system that is supported by a hull of a rig, comprising:

coupling a hold-down member and a support member to the hull for supporting a beam of the cantilever system, wherein a first end of the beam is extendable over an edge of the hull while a second end of the beam is positioned on the hull;

spacing the hold-down member from the support member a predetermined distance X_3 greater than a distance X_1 to the support member such that when the beam is fully extended with the second end of the beam disposed at the predetermined distance X_3 from the support member, a maximum load that the beam supports is increased relative to a second maximum load that the beam supports when fully extended from the distance X_1 but a maximum reach of the first end of the beam from the edge of the hull is reduced relative to a second maximum reach of the first end of the beam from the edge of the hull when fully extended from the distance X_1, wherein the beam is secured to the hull by a plate member of the hold-down member that extends below a surface of the hull; and

coupling an extension member to the second end of the beam to increase the length of the beam, wherein when the beam is fully extended with the extension member being disposed above the hold-down member at the predetermined distance X_3, the maximum reach of the first end of the beam from the edge of the hull is increased to the second maximum reach of the first end of the beam from the edge of the hull.

12. The method of claim 11, wherein the hold-down member is configured to apply a reactive force to the beam, via a second support member, in a direction toward the hull when the first end of the beam is extended over the edge of the hull.

13. The method of claim 11, wherein at least one of the hold-down member and the support member is integral with the hull.

14. The method of claim 11, further comprising coupling a second hold-down member to the hull between the support member and the hold-down member.

15. The method of claim 14, wherein the second hold-down member is configured to apply a force to the beam, via a second support member, in a direction toward the hull when the first end of the beam is extended over the edge of the hull.

16. The method of claim 11, wherein the support member is disposed adjacent the edge of the hull, and wherein the hold down member is positioned the predetermined distance from the support member in a direction away from the edge of the hull.

17. The method of claim 11, wherein the hold-down member and the support are pre-installed in the hull.

18. The method of claim 11, wherein the hold-down member is coupled to the extension member and the hull after the extension member is coupled to the second end of the beam.

19. The method of claim 11, further comprising extending a plurality of legs of the rig into a sea floor, and raising the hull relative to the legs.

20. The method of claim 11, further comprising securing a second hold-down member to the beam at a position between the support member and the hold-down member that is coupled to the extension member, and applying a force to the beam in a direction toward the hull using the second-hold down member when the first end of the beam is extended over the edge of the hull, wherein the second hold-down member is coupled to the second end of the beam adjacent to a connection between the extension member and the second end of the beam.