waterplane area of an offshore platform may increase its stability (e.g., its ability to resist sway (lateral/side-to-side motion) and surge (longitudinal /front-and-back motion) imparted by maritime conditions), increasing the waterplane area of the offshore platform may also increase its susceptibility to heave (e.g., vertical/up-and-down motion).

SUMMARY

[0003a] According to a first aspect of the present invention, there is provided a system, including: a first platform structure configured to be coupled to a seafloor, wherein the first platform structure comprises an upper plate configured to support drilling equipment or production equipment, one or more supports coupled to the upper plate, and a buoyant base coupled to the one or more supports, wherein the one or more supports comprise a covered aperture configured to be exposed to adjustably alter a waterplane area of the first platform structure; a second platform structure comprising an aperture, wherein the second platform structure is configured to provide, via one or more lateral supports disposed between the first platform structure and the second platform structure about the aperture, a lateral force to the first platform structure while allowing for vertical movement between the first platform structure and the second platform structure relative to the seafloor, wherein the second platform structure provides a sufficient waterplane area to maintain the stability of the first platform structure and the second platform structure.

[0003b] According to second aspect of the present invention, there is provided a system, including: a first platform structure of an offshore platform, wherein the first platform structure is configured to receive a lateral force from a second platform structure of the offshore platform when coupled to the second structure via one or more lateral supports disposed between the first platform structure and the second platform structure about an aperture of the second platform structure, wherein the first platform structure is configured to allow for differential movement between the first platform structure and the second platform structure when coupled to the second platform structure, wherein the first platform structure comprises an upper plate, one or more supports coupled to the upper plate, and a buoyant base coupled to the one or more supports, wherein the one or more supports comprise a covered aperture configured to be exposed to adjustably alter a waterplane area of the first platform structure, wherein the second platform structure provides a sufficient waterplane area to maintain the stability of the first platform structure and the second platform structure.

[0003c] According to a third aspect of the present invention, there is provided a tangible, non-transitory computer-readable medium having computer executable code stored thereon, the code comprising instructions to cause a processor to: receive data related to differential movement in a vertical direction with respect to a seafloor between a first platform structure of

an offshore platform and a second platform structure of the offshore platform; determine whether at least one attribute related to the differential movement is within a predetermined threshold; and generate a control signal to control buoyancy of the first platform structure via control of coverage of apertures of the first platform structure or a rate of speed of the differential movement between the first platform structure and the second platform structure based on the determination, wherein the second platform structure provides a sufficient waterplane area to maintain the stability of the first platform structure and the second platform structure.

BRIEF DESCRIPTION OF DRAWINGS

[0004] FIG. 1 illustrates an example of an offshore platform, in accordance with an embodiment;

[0005] FIG. 2 illustrates a top view of a portion of a buoyant base of the offshore platform of FIG. 1, in accordance with an embodiment;

[0006] FIG.3 illustrates a side view of a portion of the offshore platform of FIG. 1, in accordance with an embodiment;

[0007] FIG. 4 illustrates an example of the offshore platform of FIG. 1 experiencing maritime conditions at a first time, in accordance with an embodiment;

[0008] FIG. 5 illustrates an example of the offshore platform of FIG. 1 experiencing maritime conditions at a second time, in accordance with an embodiment;

[0009] FIG. 6 illustrates an example of the offshore platform of FIG. 1 experiencing maritime conditions at a third time, in accordance with an embodiment;

[0010] FIG. 7 illustrates a second example of an offshore platform, in accordance with an embodiment;

[0011] FIG. 8 illustrates a top view of the offshore platform of FIG. 7, in accordance with an embodiment;

[0012] FIG. 9 illustrates an isometric view of the offshore platform of FIG. 7, in accordance with an embodiment;

CLAIMS

1. A system, comprising:

a first platform structure configured to be coupled to a seafloor, wherein the first platform structure comprises an upper plate configured to support drilling equipment or production equipment, one or more supports coupled to the upper plate, and a buoyant base coupled to the one or more supports, wherein the one or more supports comprise a covered aperture configured to be exposed to adjustably alter a waterplane area of the first platform structure;

a second platform structure comprising an aperture, wherein the second platform structure is configured to provide, via one or more lateral supports disposed between the first platform structure and the second platform structure about the aperture, a lateral force to the first platform structure while allowing for vertical movement between the first platform structure and the second platform structure relative to the seafloor, wherein the second platform structure provides a sufficient waterplane area to maintain the stability of the first platform structure and the second platform structure.

2. The system of claim 1, wherein the first platform structure is configured to provide a tension force away from the seafloor to a riser of the system that couples the first platform structure to the seafloor.

3. The system of claim 1, comprising a tensioner coupled to the first platform structure and configured to provide a tension force away from the seafloor to a riser of the system that couples the first platform structure to the seafloor.

4. The system of claim 1, wherein the buoyant base is configured to adjustably alter an amount of air, water, or a combination thereof therein to adjust a buoyancy of the first platform structure.

5. The system of claim 1, wherein the first platform structure and the second platform structure form an offshore platform as the system.

6. A system, comprising:

a first platform structure of an offshore platform, wherein the first platform structure is configured to receive a lateral force from a second platform structure of the offshore platform when coupled to the second platform structure via one or more lateral supports disposed between the first platform structure and the second platform structure about an aperture of the second platform structure, wherein the first platform structure is configured to allow for differential movement between the first platform structure and the second platform structure when coupled to the second platform structure, wherein the first platform structure comprises an upper plate, one or more supports coupled to the upper plate, and a buoyant base coupled to the one or more supports, wherein the one or more supports comprise a covered aperture configured to be exposed to adjustably alter a waterplane area of the first platform structure, wherein the second platform structure provides a sufficient waterplane area to maintain the stability of the first platform structure and the second platform structure.

7. The system of claim 6, wherein the first platform structure is configured to allow for vertical movement relative to a seafloor as the differential movement.

8. The system of claim 6, comprising the one or more lateral supports configured to couple the first platform structure to the second platform structure and convey the lateral force.

9. The system of claim 6, comprising a fastener to couple the first platform structure to the second platform structure.

10. The system of claim 6, comprising a braking element configured to slow a rate of the differential movement between the first platform structure and the second platform structure.

11. The system of claim 6, wherein the second platform structure is configured to circumscribe the first platform structure.

12. The system of claim 6, comprising a post configured to cushion the differential movement between the first platform structure and the second platform structure.

13. A tangible, non-transitory computer-readable medium having computer executable code stored thereon, the code comprising instructions to cause a processor to:

receive data related to differential movement in a vertical direction with respect to a seafloor between a first platform structure of an offshore platform and a second platform structure of the offshore platform;

determine whether at least one attribute related to the differential movement is within a predetermined threshold; and

generate a control signal to control buoyancy of the first platform structure via control of coverage of apertures of the first platform structure or a rate of speed of the differential movement between the first platform structure and the second platform structure based on the determination, wherein the second platform structure provides a sufficient waterplane area to maintain the stability of the first platform structure and the second platform structure.

14. The tangible, non-transitory computer-readable medium of claim 13, wherein the code comprises instructions to generate an indication related to the differential movement for display on a display.

15. The tangible, non-transitory computer-readable medium of claim 14, wherein the code comprises instructions to generate the indication as representative of displacement values between the first platform structure and the second platform structure, trends related to the displacement values, alarms when the displacement levels approach or exceed predetermined levels, or any combination thereof.

16. The non-transitory computer-readable medium of claim 13, wherein the processor is configured to transmit the control signal via a network interface to control of an amount of air, water, or a combination thereof present in a buoyant base of the first platform structure.

17. The non-transitory computer-readable medium of claim 13, wherein the processor is configured to transmit the control signal via a network interface to control an amount of force applied to the first platform structure by a braking element.