Claims:

What is claimed is:

1. A mooring system, comprising:

a mooring support structure comprising:

a base structure;

a turntable disposed on the base structure, wherein the turntable is configured to at least partially rotate about the base structure;

a post extending from and connected at a first end to the turntable and a second end extending out from the turntable, wherein the post comprises a yoke head connector disposed on a second end thereof; and

a vessel support structure disposed on a vessel floating on a surface of a body of water;

at least one extension arm suspended from the vessel support structure;

a ballast tank connected to the at least one extension arm, the ballast tank configured to move back and forth below the vessel support structure;

a yoke extending from and connected at a first end to the ballast tank, wherein the yoke comprises a yoke head disposed on a second end thereof, wherein the yoke head is connected with the yoke head connector, wherein a length of the post is configured to provide a connection location between the yoke head and the yoke head connector such that when the yoke head is disconnected from the yoke head connector, the yoke head falls from the yoke head connector toward the surface of the body of water without contacting the mooring support structure; and

a first elongated support connected at a first end to the vessel support structure and connected at a second end to the yoke, wherein the elongated support is configured to support the yoke when the yoke head is disconnected from the yoke head connector.

2. The system of claim 1, further comprising an anchor location disposed on the mooring support structure above the turntable and configured to rotate with the turntable and a support member connected at a first end to the anchor location and connected at a second end to the post, wherein the support member is configured to support the post when the yoke head is disconnected from the yoke head connector.

3. The system of claim 1, further comprising a hydraulic cylinder configured to support the post when the yoke head is disconnected from the yoke head connector.

4. The system of claim 1, further comprising a cushion cylinder disposed on the vessel , wherein the first elongated support is routed around at least a portion of the cushion cylinder, and wherein the cushion cylinder is configured to reduce a tension load on the elongated support when the yoke head falls from the yoke head connector toward the surface of the body of water.

5. The system of claim 1, further comprising a cushion cylinder disposed on the vessel , wherein the first elongated support is routed around at least a portion of the cushion cylinder, and wherein the cushion cylinder is configured to slow the fall of the yoke head toward the surface of the body of water by applying a tension to the yoke via the first elongated support.

6. The system of claim 1, further comprising a ballast tank pull-back winch system disposed on the vessel comprising a second elongated support, wherein the second elongated support is connected to the ballast tank and configured to apply a tension on the ballast tank in a direction toward the vessel.

7. The system of claim 1, wherein a longitudinal centerline through the yoke head connector is oriented at an angle not colinear with a longitudinal centerline of the post, and wherein the longitudinal centerline extending from a distal end of the yoke head connector is oriented in a downward direction.

8. The system of claim 1, further comprising a spring line winch system disposed on the vessel comprising at least two third elongated supports, wherein a first end of each third elongated support is connected to the vessel and a second end of each third elongated support is connected to the ballast tank, and wherein the spring line winch system is configured dampen side to side movement of the ballast tank.

9. The system of claim 1, wherein the post comprises a first post and a second post, wherein the yoke head connector comprises a first yoke head connector and a second yoke head connector disposed on the second end of the first and second posts, respectively, wherein the yoke comprises a first yoke head and a second yoke head each connected with the first and second yoke head connectors, respectively.

10. The system of claim 1, further comprising a cushion cylinder; a ballast tank pull-back winch system; and a spring line winch system each disposed on the vessel, wherein:

the first elongated support is routed around at least a portion of the cushion cylinder, and wherein the cushion cylinder is configured to slow the fall of the yoke head toward the surface of the body of water by applying a tension to the yoke via the first elongated support,

the ballast tank pull-back winch system comprises a second elongated support, wherein the second elongated support is connected to the ballast tank and configured to apply a tension on the ballast tank in a direction toward the vessel, and

the spring line winch system comprises at least two third elongated supports, wherein a first end of each third elongated support is connected to the vessel and a second end of each third elongated support is connected to the ballast tank, and wherein the spring line winch system is configured dampen side to side movement of the ballast tank.

11. The system of claim 1, further comprising a buoyancy tank connected to the yoke proximate the second end thereof.

12. A process for disconnecting a vessel floating on a surface of a body of water moored to a mooring support structure, comprising:

disconnecting a yoke head from a yoke head connector, wherein:

the mooring support structure comprises:

a base structure,

a turntable disposed on the base structure, wherein the turntable at least partially rotates about the base structure, and

a post extending from and connected at a first end to the turntable and a second end extending out from the turntable, wherein the post comprises the yoke head connector disposed on a second end thereof,

the vessel comprises:

a vessel support structure disposed on the vessel,

at least one extension arm suspended from the vessel support structure,

a ballast tank connected to the at least one extension arm, the ballast tank configured to move back and forth below the vessel support structure,

a yoke extending from and connected at a first end to the ballast tank, wherein the yoke comprises the yoke head disposed on a second end thereof, and

a first elongated support connected at a first end to the vessel support structure and connected at a second end to the yoke; and

a length of the post provides a connection location between the yoke head and the yoke head connector such that when the yoke head is disconnected from the yoke head connector, the yoke head falls from the yoke head connector toward the surface of the body of water without contacting the mooring support structure; and

maneuvering the vessel away from the mooring support structure.

13. The process of claim 12, further comprising, supporting the yoke with the first elongated support as the yoke head falls toward the surface of the body of water.

14. The process of claim 13, wherein:

a cushion cylinder is disposed on the vessel,

the first elongated support is routed around at least a portion of the cushion cylinder, and

the cushion cylinder slows the fall of the yoke head toward the surface of the body of water by applying a tension to the yoke via the first elongated member.

15. The process of claim 12, further comprising preventing the ballast tank from moving away from the vessel by pulling the ballast tank toward the vessel with a ballast tank pull-back winch system, wherein the ballast tank is connected to the ballast tank pull-back winch system via a second elongated support.

16. The process of claim 12, wherein a thrust is not applied to urge the vessel away from the mooring support structure during the step of disconnecting the yoke head from the yoke head connector.

17. The process of claim 12, wherein a thrust is applied to urge the vessel away from the mooring support structure during the step of disconnecting the yoke head from the yoke head connector.

18. The process of claim 12, wherein a buoyancy tank is connected to the yoke proximate the second end thereof.

19. The process of claim 12, wherein the mooring support structure comprises an anchor location disposed on the mooring support structure above the turntable that is configured to rotate with the turntable, wherein a support member is connected at a first end to the anchor location and connected at a second end to the post, and wherein the support member supports the post when the yoke head is disconnected from the yoke head connector.

20. The process of claim 12, wherein disconnecting the yoke head from the yoke head connector comprises actuating an actuator in communication with the yoke head or the yoke head connector to unlock the yoke head and the yoke head connector from mating engagement with one another.

21. The system of claim 1, further comprising a deck disposed on the base structure between the surface of the water and the turntable disposed on the base structure, wherein the connection location is located outside a perimeter of the deck.

22. The system of claim 1, wherein the turntable comprises a bearing configured to allow the turntable to at least partially rotate about the mooring support structure.

23. The system of claim 1, further comprising a deck disposed on the base structure above the turntable, wherein the deck is configured to at least partially rotate about the base structure with the turntable.