CLAIMS

1. A deflection absorbing tensioner frame for a platform of an offshore vessel, comprising:

at least one metal beam supporting a tensioner; and

a deflection absorber coupled to the at least one metal beam, the deflection absorber configured to absorb axial, rotational, and lateral deflections in a platform deck coupled to the deflection absorber, wherein the deflection absorber comprises:

a spring configured to absorb the axial deflections in the platform deck;

an elastomeric bearing coupled to the spring, wherein the elastomeric bearing is configured to absorb the lateral deflections in the platform deck; and

a base configured to couple to the platform deck and transmit forces and deflections from the platform deck to the spring, wherein the elastomeric bearing is positioned between an end of the spring and the base.

2. The deflection absorbing tensioner frame of claim 1, wherein the spring comprises at least one of a hydraulic and a pneumatic cylinder with at least one of a gas or metal spring.

3. The deflection absorbing tensioner frame of claim 2, wherein the at least one hydraulic and pneumatic cylinder is coupled to a fluid manifold to control deflection of the metal beam.

4. The deflection absorbing tensioner frame of claim 1, wherein an end of the spring comprises a spring bearing; and the base comprises a spring bearing mating surface coupled to the spring bearing, wherein the spring bearing is configured to absorb the rotational deflections in the platform deck while transferring the lateral deflections to the spring.

5. The deflection absorbing tensioner frame of claim 4, wherein the elastomeric bearing is disposed directly around an outer circumference of the spring to absorb the lateral deflections of the platform deck transferred to the spring through the base.

6. The deflection absorbing tensioner frame of claim 1, wherein the deflection absorber comprises a removable element to provide access to the spring.

7. The deflection absorbing tensioner frame of claim 1, wherein the tensioner comprises a plurality of hydro-pneumatic cylinders, a high pressure accumulator, and a low pressure accumulator.

8. The deflection absorbing tensioner frame of claim 1, wherein the deflection absorber further comprises stops disposed around the elastomeric bearing and an end of the spring to prevent the spring from moving laterally beyond the stops.

9. A system, comprising:

an offshore vessel comprising a platform deck;

a tensioner frame coupled to a riser tensioner and positioned on the platform deck; and

at least one deflection absorber coupled to the tensioner frame and the platform deck, wherein the deflection absorber is configured to absorb axial, rotational, and lateral deflections in the platform deck, wherein the deflection absorber comprises:

a spring configured to absorb the axial deflections in the platform deck;

an elastomeric bearing coupled to the spring, wherein the elastomeric bearing is configured to absorb the lateral deflections in the platform deck; and

a base coupled to the platform deck to transmit forces and deflections from the platform deck to the spring, wherein the elastomeric bearing is positioned between an end of the spring and the base.

10. The system of claim 9, wherein

the tensioner frame comprises a plurality of metal beams; and

the at least one deflection absorber is coupled to at least one of the metal beams.

11. The system of claim 10, wherein

the tensioner frame comprises a rectangular shape; and

the at least one deflection absorber comprises a separate deflection absorber positioned in at least one corner of the tensioner frame.

12. The system of claim 9, wherein the spring comprises at least one of a hydraulic and a pneumatic cylinder with at least one of a gas or metal spring.

13. The system of claim 12, further comprising a fluid manifold and control system coupled to the at least one hydraulic and pneumatic cylinder to control deflection of the tensioner frame with respect to the platform deck.

14. The system of claim 13, wherein the tensioner comprises a tensioner cylinder, a high pressure accumulator coupled to the tensioner cylinder, and a low pressure accumulator coupled to the tensioner cylinder, wherein the deflection absorber and the tensioner cylinder are fluidically coupled via the fluid manifold.

15. The system of claim 9, wherein an end of the spring comprises a spring bearing, wherein the base comprises a spring bearing mating surface coupled to the spring bearing, and wherein the spring bearing is configured to absorb the rotational deflections in the platform deck while transferring the lateral deflections to the spring.

16. The system of claim 15, wherein the elastomeric bearing is disposed directly around an outer circumference of the spring to absorb the lateral deflections of the platform deck transferred to the spring through the base.

17. The system of claim 9, wherein the deflection absorber comprises a removable element to provide access to the spring.

18. The system of claim 9, wherein the tensioner frame is a standalone component that supports only a single riser relative to the deck platform.