

[0009] According to one embodiment, ~~an apparatus includes a first and second electrical tensioner mechanically coupled to a drilling riser via a first and a second wire of a plurality of wires and electrically coupled to a direct current (DC) power distribution bus. The apparatus may also include an energy storage system and a power dissipater, both of which are also coupled to the DC power distribution bus. The apparatus may further include a hydro-pneumatic tensioner mechanically coupled to the drilling riser via a third wire of the plurality of wires. Further, the apparatus may include a controller configured to measure the tension and speed delivered by both the electrical and hydro-pneumatic tensioner. The controller may also be configured to determine the tension for the first and second electrical tensioners based, in part, on the riser load and the measured tension of the hydro-pneumatic tensioner. The controller may be configured to distribute tension to the first and second electrical tensioners, and to control the first and second electrical tensioners to adjust the length of the first and second wires~~ an aspect of the present invention, there is provided an apparatus comprising a direct current (DC) power distribution bus; a drilling riser; a plurality of wires coupled to the drilling riser; a first and second electrical tensioner coupled to the drilling riser via a first and a second wire of the plurality of wires and coupled to the power distribution bus; and a controller configured to distribute tension to the first and second electrical tensioners; and to control the first and second electrical tensioners to adjust a tension of the first and second wires.

[0010] The electrical tensioner within the apparatus may include a motor configured to act as a motor or a generator and an energy inverter. The energy inverter may be coupled to the motor and also to the DC power distribution bus. The electrical tensioner may further include a gear box coupled to the motor and include a winch. The winch may be coupled to the gearbox and may be coupled to the drilling riser via the drilling riser wire. The energy inverter within the electrical tensioner may invert AC energy to DC energy or DC energy to AC energy. The controller may be further configured to regulate the torque and power flow in a plurality of energy inverters.

[0011] Energy management may be improved on a vessel through the use of energy storage system. For example, energy may be stored in the storage system when the electric tensioner operates as a generator to regenerate energy in the half wave motion of the vessel; and vice versa.

[0012] According to another aspect of the present invention, there is provided Aa method comprising for controlling a tension of a riser tensioning system includes measuring a tension delivered by a tensioner; ~~The method may also include determining a tension for a plurality of electrical tensioners based, in part, on the measured tension;~~ ~~The method may further include distributing the determined tension to the plurality of electrical tensioners;~~ ~~The method may also include controlling the plurality of electrical~~

tensioners based, in part, on the determined tension.

[0012a] The method for controlling a tension of a riser tensioning system that includes distributing the determined tension to the plurality of electrical tensioners may be useful in stabilizing a riser in a drilling vessel.

[0013] In an embodiment, the delivered tension that is measured may be the tension of a hydro-pneumatic tensioner or an electrical tensioner. In such an embodiment, the tensioning system may be a riser hybrid tensioning system, which is a riser tensioning system that integrates an electrical tensioning system with hydro-pneumatic tensioners.

[0014] The foregoing has outlined rather broadly the features and technical advantages of the present disclosure in order that the detailed description of the disclosure that follows may be better understood. Additional features and advantages of the disclosure will be described hereinafter which form the subject of the claims of the disclosure. It should be appreciated by those skilled in the art that the conception and specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present disclosure. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the disclosure as set forth in the appended claims. The novel features which are believed to be characteristic of the disclosure, both as to its organization and method of operation, together with further objects and advantages will be better understood from the following description when considered in connection with the accompanying figures. It is to be expressly understood, however, that each of the figures is provided for the purpose of illustration and description only and is not intended as a definition of the limits of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] For a more complete understanding of the disclosed system and methods, reference is now made to the following descriptions taken in conjunction with the accompanying drawings.

[0016] FIGURE 1A is a block diagram illustrating a top view of a riser electrical tensioning system according to one embodiment of the disclosure.