

Claims

1. A method for conducting a subterranean operation, the method comprising:
 - storing, via a rig controller, pre-determined characteristics of a piece of equipment, for supporting the subterranean operation, in a unique data record associated with the piece of equipment;
 - scanning, via one or more sensors, the piece of equipment on a rig;
 - determining, via the rig controller, actual characteristics of the piece of equipment in response to the scanning via the one or more sensors;
 - comparing, via the rig controller, the actual characteristics to the pre-determined characteristics; and
 - verifying whether or not the piece of equipment is an expected piece of equipment needed to support the subterranean operation based on the comparing.
2. The method of claim 1, wherein the piece of equipment is one of a tubular, a tubular stand, a tool, a bottom hole assembly (BHA), or drill floor piece of equipment.
3. The method of claim 1, wherein the unique data record comprises:
 - contact zones of the piece of equipment,
 - non-contact zones of the piece of equipment,
 - center of gravity of the piece of equipment,
 - diameters along the piece of equipment,
 - shapes of the piece of equipment,
 - weight of the piece of equipment,
 - dimensions of the piece of equipment,
 - type of the piece of equipment,
 - usage data of the piece of equipment,
 - degradation parameters of the piece of equipment,
 - manufacturing details of the piece of equipment,
 - longitudinal linearity of the piece of equipment,
 - historical data of the piece of equipment, or
 - combinations thereof.
4. The method of claim 3, wherein the type of the piece of equipment is selected from a group consisting of a tool, a tubular, a tubular stand, a BHA, and drill floor piece of equipment.

5. The method of claim 3, wherein the degradation parameters of the piece of equipment comprise a location of wear, a severity indicator of wear, a type of wear, a location of damage, a severity indicator of damage, a type of damage, hours in service, or combinations thereof.
6. The method of claim 3, wherein the manufacturing details of the piece of equipment comprise materials, life cycles, tolerances, specifications, mechanical properties of the materials, recommended operating conditions, or combinations thereof.
7. The method of claim 3, wherein the non-contact zones are specific zones or areas on the piece of equipment that should not be contacted by rig equipment when the piece of equipment is manipulated by the rig equipment, and wherein the contact zones are specific zones or areas on the piece of equipment that can be contacted by rig equipment when the piece of equipment is manipulated by the rig equipment.
8. The method of claim 7, wherein the rig equipment comprises pipe handlers, drill floor robot, top drive, elevator, iron roughneck, crane, fingerboard, slips, doping bucket, or combinations thereof.
9. The method of claim 3, further comprising calculating an estimated center of gravity of the piece of equipment, comparing the estimated center of gravity to the center of gravity in the unique data record, and initiating corrective action on the rig when the estimated center of gravity is not substantially equal to the center of gravity in the unique data record.
10. The method of claim 3, further comprising calculating an estimated center of gravity of the piece of equipment, the calculating comprising:
 - determining, via the rig controller, the dimensions of the piece of equipment of the piece of equipment including lengths and diameters;
 - determining a volume of material in the piece of equipment based on the dimensions;
 - determining a mass of the piece of equipment based on the volume of material and properties of the material; and
 - calculating the estimated center of gravity of the piece of equipment based on the mass of the piece of equipment and the dimensions.
11. The method of claim 3, further comprising calculating an estimated center of gravity of the piece of equipment, the calculating comprising:
 - determining, via the rig controller, the dimensions of the piece of equipment including lengths and diameters;

manipulating the piece of equipment via rig equipment;
sensing torque and strain of the rig equipment, via sensors on the rig equipment, as the rig equipment manipulates the piece of equipment; and
calculating an estimated center of gravity of the piece of equipment based on the torque and strain of the rig equipment and the dimensions.

12. The method of claim 3, wherein the usage data comprises time the piece of equipment is in operation on the rig, where the piece of equipment is used in the subterranean operation, when the piece of equipment is used in the subterranean operation, how the piece of equipment is used in the subterranean operation, or combinations thereof.

13. The method of claim 3, wherein the historical data comprises the usage data, storage location data, life cycle data, expected end of life data, degradation data, unique identifiers, visible features detected, linearity data, calculated characteristics, torque measurements, revolutions required to thread or unthread a joint, or combinations thereof.

14. The method of claim 3, wherein the longitudinal linearity of the piece of equipment comprises measurements of deviation of the piece of equipment from being parallel to a central longitudinal axis.

15. The method of claim 1, wherein the one or more sensors comprise 2D camera, 3D camera, infrared camera, CCTV camera, X-ray sensor, strain gauge, torque sensor, accelerometer, optical sensor, laser sensor, physical contact sensor, contact sensor with encoder, audio sensor, pressure sensor, temperature sensor, environmental sensor, gas sensor, liquid sensor, or combinations thereof.