CLAIMS

What is claimed is:

1. A torque-limiting coupler comprising:

a first end configured to mate to a first receiver coaxially located in a first component configured to rotate;

a second end configured to mate to a second receiver coaxially located in a second component configured to rotate; and

a neck region between the first and second ends, configured to experience higher shear stresses than the first and second ends when toque is applied.

2. The coupler of Claim 1 wherein the first end includes a spline fitting.

3. The coupler of Claim 2 wherein the spline fitting conforms to the AND20000 mounting convention.

4. The coupler of Claim 1 wherein the second end includes at least one cam lobe.

5. The coupler of Claim 1 wherein the second end includes two opposing cams.

6. The coupler of Claim 1 further comprising a band of material surrounding at least a portion of the second end, the band of material having a softer durometer than the material of the second end.

7. The coupler of Claim 6 wherein the band of material is a rubber ring.

8. The coupler of Claim 7 wherein the rubber is Viton.

9. The coupler of Claim 1 wherein the neck region includes a portion with a smaller cross-sectional area than either the first end or the second end.

10. The couple of Claim 9 wherein the portion with the smaller cross-sectional area has a smaller outer diameter than either the first end or the second end.

11. The coupler of Claim 9 wherein the portion with the smaller cross-sectional area includes a bore.

12. A method of coupling two components configured to rotate, the method comprising:

coupling a first end of a torque-limiting coupler to a first receiver coaxially located in a first component ;

coupling a second receiver coaxially to a second component; and

coupling a second end of the torque-limiting coupler to the second receiver in a manner such that a neck region between the first and second ends of the torque-limiting coupler experiences higher shear stresses than the first and second components when a torque is applied.

13. The method of Claim 12 wherein the first end includes a spline fitting.

14. The method of Claim 13 wherein the spline fitting conforms to the AND20000 mounting convention.

15. The method of Claim 12 wherein the second end includes at least one cam lobe.

16. The method of Claim 12 wherein the second end includes two opposing cams.

17. The method of Claim 12 further comprising surrounding at least a portion of the second end with a band of material having a softer durometer than the material of the second end.

18. The method of Claim 17 wherein the band of material is a rubber ring.

19. The method of Claim 18 wherein the rubber is Viton.

20. The method of Claim 12 further comprising adjusting the neck region to have a portion with a smaller cross-sectional area than either the first end or the second end.

21. The couple of Claim 20 wherein the portion with the smaller cross-sectional area has a smaller outer diameter than either the first end or the second end.

22. The method of Claim 20 wherein the portion with the smaller cross-sectional area includes a bore.

23. A system for transmitting torque, the system comprising:

a first rotating component having a first axially-centered receiver port including splines;

a second rotating component having a second axially-centered receiver port, the second receiver port having a perimeter profile with varying distances from the axis of rotation; and

a torque-limiting coupler having a first end with splines configured to be inserted into and mating with the splines included on the first receiver port on the first rotating component, and a second end with a profile corresponding to the perimeter profile of the second receiver port and configured to be inserted into the second receiver port, the first and second ends coupled to a neck region

configured to experience higher shear loads than the first and second ends when torque is applied.

24. The system of Claim 23 wherein the splines conform to the AND20000 mounting convention.

25. The system of Claim 23 wherein the profile of the second end includes a cam lobe.

26. The system of Claim 23 further comprising a band of material surrounding at least a portion of the second end, the band of material having a softer durometer than the material of the second end.

27. The coupler of Claim 26 wherein the band of material is a rubber ring.

28. The coupler of Claim 27 wherein the rubber is Viton.

29. The coupler of Claim 23 wherein the neck region includes a portion with a smaller cross-sectional area than either the first end or the second end.

30. The couple of Claim 29 wherein the portion with the smaller cross-sectional area has a smaller outer diameter than either the first end or the second end.

31. The coupler of Claim 29 wherein the portion with the smaller cross-sectional area includes a bore.

32. A method of manufacturing a torque-limiting coupler, the method comprising:

providing a first end of the torque-limiting coupler;

providing a second end of the torque-limiting coupler;

adjusting the depth of an axial bore from the first end of the torque-limiting coupler toward a neck region of the torque limiting coupler located between the first and second ends of the torque limiting coupler; and

adjusting the outer diameter of the neck region of the torque-limiting coupler, the depth of the axial bore and the outer diameter of the neck region being selectable such that the neck region experiences higher shear stresses than the first and second ends when toque is applied.

33. The method of Claim 32 wherein the torque-limiting coupler is manufactured using a computer numerical control (CNC) lathe process.

34. The method of Claim 32 wherein the torque-limiting coupler is manufactured using a screw machine process.

35. The method of Claim 32 where adjusting the depth of the axial bore and adjusting the outer diameter of the neck region calibrates a breaking torque of the torque-limiting coupler to within one foot-pound of a desired torque.

CLAIMS

What is claimed

1. A two component torque-limiting coupler consisting of:

a first component having a first end that is configured to coaxially mate to a receiver said receiver configured to rotate;

a second component configured to mate to the first component and configured to rotate;

a neck region positioned mesially within the first component, configured to automatically experience higher shear stresses than either end of the first component and second components when torque is applied;

the first component further consisting of a bore; and

wherein a band of material surrounds at least a portion of the first-component's second end, the band of material having softer durometer than the material of the second component.

2. The coupler of Claim 1 wherein the first component includes a spline fitting at the first end.

3. The coupler of Claim 2 wherein the spline fitting conforms to an external mounting.

4. The coupler of Claim 1 wherein the first-component's second end includes at least one cam lobe.

5. The coupler of Claim 1 wherein the first-component's second end includes two opposing cams.

6. The coupler of Claim 5 wherein the band of material is a rubber ring.

7. The coupler of Claim 1 wherein the neck region includes a portion with a smaller cross-sectional area than either ends of the first component or the second component.

8. The coupler of Claim 7 wherein the neck region portion with the smaller cross-sectional area has smaller outer diameter than either ends of the first component or the second component.

9. A two component system for transmitting torque, the system consisting essentially of;

a two component torque-limiting coupler;

wherein a first component is a rotating component having an axially-centered receiver including splines on a first end and having a second proximal end;

a second component is a rotating component having a second axially-centered receiver port, the second receiver port having a perimeter profile with varying distance from the axis of rotation;

wherein the first component's second proximal end has a profile corresponding to the perimeter profile of the second component's receiver port and configured to be inserted into the second component's receiver port;

wherein the first component's mesial has a neck region configured to experience higher shear loads than either end of the first component and second component when torque is applied;

a bore on the spline end of the first component; and

wherein the system further consistis of a band of material surrounding at least a portion of the first-component's second end, the band of material having a softer durometer than the material of the second component.

10. The system of Claim 9 wherein the first component's first end splines conforms to an engine accessory case mounting.

11. The system of Claim 9 wherein the profile of the first-component's second end component includes a cam lobe.

12. The system of Claim 9 wherein the band of material is a rubber ring.

13. The system of Claim 9 wherein the neck region includes a portion with a smaller cross-sectional area than either ends of the first component or the second component.

14. The system of Claim 12 wherein the neck region portion with the smaller cross-sectional area has a smaller outer diameter than either ends of the first component or the second component.