CLAIMS

1. A hybrid composite structure for stiffness and damping comprising

(a) a primary member as an interface, optimised for bending stiffness, being a hollow cylindrical or square structure allowing the insertion of the secondary member therein, having a hollow cavity and a cross section designed to surround a second interface within the hollow cavity; wherein the material for the primary member is aluminium, carbon steel, stainless steel, a reinforced steel composite, or any combination thereof;

(b) a secondary member as the second interface, optimised to provide stiffness for the primary member in primary torsion and in bending, being made from high modulus carbon fiber material and being positioned within the hollow cavity of the primary member, wherein the secondary member is formed from 4 carbon fiber plates or quadrants, wherein the primary member allows the insertion of the secondary member therein; and

(c) a holding member to secure the secondary member to the primary member in such a way that a relative motion between the primary member and the secondary member is available to dissipate energy formed from an external oscillating load.

2. The hybrid composite structure for stiffness and damping as set forth in Claim 1, wherein the material for the primary member provides good machinability to achieve geometrical accuracy and precision in the mounting surfaces thereof.

3. The hybrid composite structure for stiffness and damping as set forth in Claim 1, wherein the energy is being dissipated via friction between the interfaces such as between the primary member and the secondary member, or the secondary member in the course of torsional or bending vibrations, where torsional deformation and sliding of the quadrant or plates allows for energy dissipation.

4. The hybrid composite structure for stiffness and damping as set forth in Claim 1, wherein the secondary member is made from a material which is of lightweight and of high modulus and is able to be manufactured as a single or sandwich material.

5. The hybrid composite structure for stiffness and damping as set forth in Claim 1, wherein the secondary member is enclosed or encompassed by the primary member.

6. The hybrid composite structure for stiffness and damping as set forth in Claim 1, wherein the material for the secondary member is selected from the group consisting

of carbon fiber composite, glass fiber composite, aramid composite, flax composite or any combination of material thereof.

7. The hybrid composite structure for stiffness and damping as set forth in Claim 1, wherein the securing of the secondary member to the primary member is bonded at the outer portion of the secondary member by the holding member.