CLAIMS:

1. A composite wheel comprising:

a spoke portion;

a shaped preform component for the spoke portion comprising an elongate body configured to be located in a spoke of a composite wheel; and

a mass addition,

wherein the shaped preform component is formed from a cured composite fibre material having a compressibility of < 2% volumetric under moulding conditions of 50 bar hydrostatic pressure and a temperature of 60 to 150 °C,

and wherein the density of the cured composite fibre material is selected to form a counterbalance mass for the mass addition to the composite wheel.

2. The composite wheel according to claim 1, wherein the mass addition comprises a valve, preferably a tyre pressure monitoring valve.

3. The composite wheel according to claim 1 or 2, wherein the compressibility of the shaped preform component is < 1% volumetric under moulding conditions of 50 bar hydrostatic pressure.

4. The composite wheel according to claim 1, 2 or 3, wherein the shaped preform component has a density of between 0.3 to 3 g/cm^3, preferably between 0.4 to 2 g/cm^3 and more preferably from 0.5 to 1.5 g/cm^3.

5. The composite wheel according to any preceding claim, wherein the shaped preform component has at least one of:

- Tensile Strength between 20 and 80 MPa, preferably from 20 and 60 MPa; or
- Stiffness from 1.5 to 30 GPa, preferably 10 to 25 GPa.

6. The composite wheel according to any preceding claim, wherein the surface of the shaped preform component has a roughened surface having a roughness of at least Ra = 0.2 μm.

7. The composite wheel according to claim 6, wherein the roughened surface comprises a chemically etched surface, or a mechanically abraded surface.

8. The composite wheel according to any preceding claim, wherein the shaped preform component is formed from: at least one layer of non-woven, isotropic or anisotropic fibres; an isotropic fibre arrangement; an orthotropic fibre arrangement; fillers; glass microspheres; ceramic microspheres; barium sulfate; hydrophobic fumed silica; epoxy resin/hardener; phenolic resin; milled carbon fibre; comminuted carbon fibre, or a combination thereof.

9. The composite wheel according to claim 8, wherein the glass microsphere comprise hollow microspheres.

10. The composite wheel according to any preceding claim, wherein the shaped preform component is formed from:

(i) a mixture of resin, milled carbon fibre and hollow glass microspheres;
(ii) a mixture of resin, comminuted carbon fibre and hollow glass microspheres;
(iii) a mixture of resin, and hollow glass microspheres;
(iv) a mixture of resin and milled carbon fibres;
(v) a mixture of resin and comminuted carbon fibres;
(vi) a mixture of resin, milled carbon fibre and solid ceramic microspheres;
(vii) a mixture of resin, comminuted carbon fibre and solid ceramic microspheres;
(viii) a mixture of resin and solid ceramic microspheres; or
(ix) resin only.

11. The composite wheel according to claim 10, wherein the resin comprises a mixture of resin and resin hardener.

12. The composite wheel according to any one of claims 8 to 11, wherein the shaped preform component further includes 1 to 5 wt%, preferably 1 to 2 wt% hydrophobic fumed silica.

13. The composite wheel according to any one of claims 8 to 12, wherein the milled carbon fibres have a length of <500 micron length, preferably less than 100 micron.

14. The composite wheel according to any preceding claim, further comprising a curable matrix material enveloping the comprising components of the shaped preform component.

15. The composite wheel according to claim 14, wherein the matrix material comprises a resin based on unsaturated polyester, polyurethane, polyvinyl ester, epoxy, thermoplastics, or combinations thereof.

16. The composite wheel according to any preceding claim, having thermal properties designed to match the thermal properties of the overall composite material of the spoke portion of a composite wheel that the shaped preform component is configured to be included therein.

17. The composite wheel according to any preceding claim, wherein shaped preform component comprises an incomplete or under-cured preform.

18. The composite wheel according to any preceding claim, comprising a cuboid body.

19. The composite wheel according to claim 18, comprising at least two arms extending laterally outwardly of one end of the elongate body.

20. The composite wheel according to claim 18 or 19, comprising at least one L-shaped end extending axially outwardly of one end of the elongate body.

21. The composite wheel according to any preceding claim, including at least one of the following features:

fibre ply retention formations;

guide lines to visually indicate the location that the edges of a ply should be located; or

holding/manipulation formations for optimising handling of the shaped preform component.

22. The composite wheel according to any preceding claim, wherein the shaped preform component is integrally formed with the composite wheel.

23. A method of forming a spoke portion of a composite fibre wheel, comprising:

locating a shaped preform component in the spoke portion of the fibre layup of a spoke portion of a composite wheel in a position suitable to balance a mass addition about the central axis of the spoke portion of the composite wheel; and

laying up composite fibre elements around the shaped preform component thereby forming the pre-moulded structure of the spoke portion of a composite fibre wheel,

wherein the shaped preform component is an elongate body formed from a cured composite fibre material having a compressibility of < 2% volumetric under moulding conditions of 50 bar hydrostatic pressure and a temperature of 60 to 150 °C.

24. A method according to claim 23, comprising a composite fibre wheel according to claims 1 to 22.

25. A method according to claim 23 or 24, further including the steps of:

providing a matrix material in contact with pre-moulded structure of the spoke portion; and

curing the spoke portion.

26. A method according to claim 23, 24 or 25, wherein the method further includes the steps of:

concurrently providing a matrix material in contact with each rim portion and the spoke portion of the wheel; and

co-curing the rim portion and the spoke portion of the wheel.

27. A method according to any one of claims 23 to 26, wherein the fibres elements of the fibre layup of the spoke portion of the composite wheel comprise carbon fibres.

28. A method according to any one of claims 23 to 27, wherein the fibre elements are provided as at least one of prepregs, semi-pregs, woven or non-woven fabrics, mats, preforms, pre-consolidated pre-forms, individual or groups of fibres, tows, or tow-pregs.

29. A method according to any one of claims 23 to 28, wherein the fibre elements are provided as at least one fabric sheet, preferably a multi-axial fabric.