CLAIMS

1. A method for forming a vehicle reinforcing member, the method comprising:

conforming a planar body of fibre reinforced material (CFRM) to a shape of a shape defining member, ~~the shape defining member being tapered in a longitudinal direction of the shape defining member,~~ the material comprising continuous fibres in a synthetic matrix and the ~~tapered~~ shape defining member defining an ~~tapered~~ internal volume of a closed cross-section portion of the vehicle reinforcing member;

bonding a first edge portion of the CFRM body to a second edge portion of the CFRM body thereby to form, around the shape defining member, the closed cross-section portion of the vehicle reinforcing member; and

overmoulding a shell onto the vehicle reinforcing member and a further vehicle reinforcing member to integrally connected the shell and CFRM body, while keeping the shape defining member in the closed-cross-section portion.

2. A method according to claim 1,

wherein the method is for forming a tapered vehicle reinforcing member.

3. A method according to claim 1 or 2,

wherein the shape defining member is tapered in a longitudinal direction of the shape defining member,

4. A method according to any one of claims 1 to 3,

wherein the shape defining member defines a tapered internal volume of the closed cross-section portion of the vehicle reinforcing member.

5~~2~~. A method according to any one of claims 1 to 4, further comprising:

at least partially curing the conformed CFRM body; and

withdrawing the shape defining member from the internal volume of the closed cross-section portion of the vehicle reinforcing member.

63. A method according to any one of claims 1 to ~~or~~ 52, wherein conforming the CFRM body comprises contacting a first mould member with the CFRM body and bringing the first mould member and shape defining member together, with the CFRM body therebetween, to at least partially conform the CFRM to a shape of the shape defining member.

74. The method of claim 63, wherein the first mould member comprises a surface disposed at an incline to a vertical direction wherein the step of contacting the first mould member with the CFRM body comprises loading the CFRM body onto the inclined surface.

85. A method according to claim 63 or 74, wherein the first mould member comprises a concave section shaped to cooperate with the shape of the shape defining member, and wherein bringing the first mould member and shape defining member together comprises positioning the CFRM body between the concave section and shape defining member.

96. The method of claim 85, further comprising positioning the CFRM body such that the first and second edge portions protrude outside of the concave section.

107. The method of claim 96, wherein bonding the first edge portion to the second edge portion comprises contacting the CFRM body with a second mould member and third mould

member respectively to bring one of the first edge portion and second edge portion against the shape defining member, the second and third edge portion overlapping each other.

11~~8~~. The method of claim 10~~7~~, wherein the third mould member is heated.

12~~9~~. The method of claim 11~~8~~, wherein the third mould member is heated to a bonding temperature of the CFRM.

13~~0~~. The method of any one of claims 10~~7~~ to 12~~9~~, wherein the second mould member and third mould member are attached to a reciprocating device, the reciprocating device bringing sequentially the second mould member into contact with the CFRM body, then removing the second mould member from contact with the CFRM body while bringing the third mould member into contact with the CFRM body.

~~11. The method of any preceding claim, further comprising adhesively bonding a metal fixture to the CFRM body, the metal fixture enabling the vehicle reinforcing member to be attached to another structure.~~

14~~2~~. The method of any one of claims 11~~8~~ to 13~~0~~, wherein vehicle reinforcing member is elongated in a longitudinal direction and the method further comprises withdrawing the second mould member in the longitudinal direction of the vehicle reinforcing member.

15~~3~~. The method of any preceding claim, wherein the bonding step comprises bonding the first edge portion and the second edge portion by fusion.

16~~4~~. The method of any one of claims 1~~2~~ to 15~~3~~, further comprising controlling a temperature of the shape defining member thereby to control a rate of curing of the vehicle reinforcing member.

17~~5~~. The method of claim 16~~4~~, wherein the step of controlling the temperature of the shape defining member comprising passing coolant and/or radiant through one or more channels in

the shape defining member to control a temperature of the shape defining member and thereby control a temperature of the CFRM body.

18~~6~~. A vehicle reinforcing member manufactured using the method of any preceding claim, the vehicle reinforcing member comprising a closed cross-section portion and a seam joining the first and second edge sections.

19~~17~~. A method of manufacturing a reinforcing structural member of a vehicle seat, the vehicle seat comprising a seat portion and a seatback connected to the seat portion by a tilt adjustment mechanism, the tilt adjustment mechanism comprising two movably connected tilt adjustment members moveable relative to each other to allow tilt adjustment of the seatback relative to the seat portion, one of the two tilt adjustment members being on each of the seat portion and seatback, the method comprising:

forming a vehicle reinforcing member of a seat element using the method of any one of claims 1 to 17~~5~~, the seat element being one of the seat portion and seatback; and

attaching one of the two tilt adjustment members to the vehicle reinforcing member for connecting the vehicle reinforcing member to the other of the two tilt adjustment members and thereby to connect the seat portion and seatback.

~~18. The method of claim 17, wherein the attaching step is performed using adhesive bonding.~~

20~~19~~. The method of claim 19~~17 or 18~~, wherein the seat element is the seatback, the tilt adjustment mechanism comprises a hinge mechanism on each of two opposed sides of the seatback, one of the hinge mechanisms comprising the tilt adjustment members and the other hinge mechanism also comprising two movably connected tilt adjustment members moveable relative to each other to allow tilt adjustment of the seatback relative to the seat portion, the method comprising:

forming the~~a~~ further vehicle reinforcing member in accordance with the method of any one of claims 1 to 17~~5~~, the vehicle reinforcing member and further vehicle reinforcing member each comprising a tilt adjustment member from the respective hinge mechanism and extending

along the two opposed sides of the seatback from the respective hinge mechanism to a point further away from the respective hinge mechanism; and

overmoulding the shell onto the vehicle reinforcing member and further vehicle reinforcing member, to integrally connected the shell, vehicle reinforcing member and further vehicle reinforcing member.

2~~1~~0. A vehicle seat comprising:

a seat portion;

a seatback;

a tilt adjustment mechanism connecting the seatback to the seat portion, the tilt adjustment mechanism comprising two movably connected tilt adjustment members moveable relative to each other to allow tilt adjustment of the seatback relative to the seat portion, one of the two tilt adjustment members being on each of the seat portion and seatback,

wherein a seat element, the seat element being one of the seatback and seat portion, comprises at least one vehicle reinforcing member formed using the method of any one of claims 1 to 1~~7~~5, the at least one vehicle reinforcing member comprising one of the tilt adjustment members movably connected to the other tilt adjustment member thereby to connect the seat portion and seatback.

2~~2~~1. A vehicle seat according to claim 2~~1~~0, wherein the seat element comprises two vehicle reinforcing members extending along opposite sides of the seat element from the tilt adjustment mechanism to a point further away from the tilt adjustment mechanism.

2~~3~~2. A vehicle seat according to claim 2~~2~~1, wherein the tilt adjustment mechanism comprises two hinge mechanisms, one hinge mechanism being on each of the opposite sides of the seat element, the tilt adjustment members forming part of one of the two hinge mechanisms, the other hinge mechanism also comprising two movably connected tilt adjustment members moveable relative to each other to allow tilt adjustment of the seatback relative to the seat portion, and wherein each vehicle reinforcing member comprises one of the two tilt adjustment members of the respective hinge.

2~~4~~3. A vehicle seat according to any one of claims 2~~1~~0 to 2~~3~~2, wherein a cross-section of the closed cross-section portion of each vehicle reinforcing members is a substantially elliptical.

254. A system for fabricating a vehicle reinforcing member comprising:

a shape defining member~~, the shape defining member being tapered in a longitudinal direction of the shape defining member and~~ defining an internal volume of a closed cross-section portion of the vehicle reinforcing member, the vehicle reinforcing member formed, in use, from a planar body of continuous fibre reinforced material (CFRM) comprising continuous fibres in a synthetic matrix;

a first mould member, the first mould member and ~~tapered~~ shape defining member being configured to be brought together to with the CFRM body therebetween, to form a closed cross-section portion from the CFRM body, the closed cross-section portion being formed around the ~~tapered~~ shape defining member;

a bonding device movably mounted to the first mould member and movable towards the shape defining member in use to bond a first edge portion and a second edge portion of the CFRM body together to form the vehicle reinforcing member; and

an overmoulding mould for use in overmoulding a shell onto the vehicle reinforcing member and a further vehicle reinforcing member to integrally connected the shell and CFRM body, while keeping the tapered shape defining member in the closed-cross-section portion.

26. A system according to claim 25,

wherein the system is for fabricating a tapered vehicle reinforcing member.

27. A system according to claim 25 or 26,

wherein the shape defining member is tapered in a longitudinal direction of the shape defining member,

28. A system according to any one of claims 25 to 27,

wherein the shape defining member defines a tapered internal volume of the closed cross-section portion of the vehicle reinforcing member.

29~~25~~. The system of any one of claims 2~~5~~4 to 28, further comprising a second mould member movably mounted to the first mould member and movable, in use, to bring the second mould member into contact with the CFRM body to bring a first edge portion of the CFRM body into conformity with the shape defining member.

30~~26~~. The system of claim 29~~25~~, further comprising a third mould member, the second mould member and third mould member being mounted to a reciprocating device attached to the first mould member, the reciprocating device in use bringing the second mould member into contact with the first edge portion, then removing the second mould member from contact with the first edge portion and bringing the third mould member into contact with a second edge portion of the CFRM body to bond the second edge portion to the first edge portion.