WHAT IS CLAIMED IS:

1. A method of reinforcing a beam-column joint in a load bearing structure with high strength fibrous sheets carrying a curable polymer, the beam-column joint comprising a column, a beam section extending outwardly from a perimeter of the column along a longitudinal axis of the beam section, the beam section including vertically oriented beam faces on opposite sides of the beam section, and a horizontally oriented soffit surface on an underside of the beam, the column including a soffit-adjacent surface adjoining the soffit surface at a juncture, the method comprising:

applying a first fibrous sheet to one of the vertically oriented beam faces, the first fibrous sheet having a majority of fibers arranged at a first angle skew to the longitudinal axis of the beam section; and

applying a second fibrous sheet to said one vertically oriented beam face over the first fibrous sheet, the second fibrous sheet having a majority of fibers arranged at a second angle skew to the longitudinal axis of the beam section, the second angle being different from the first angle whereby the first and second fibrous sheets reinforce the beam section against shear cracks.

2. A method as set forth in claim 1 wherein the second angle is generally equal in magnitude but opposite in direction to the first angle.

3. A method as set forth in claim 2 wherein the first angle is one of 45° and -45° and the second angle is the other of 45° and -45°.

4. A method of reinforcing a beam-column joint in a load bearing structure with high strength fibrous sheets carrying a curable polymer, the beam-column joint comprising a column, a first beam section extending outwardly from a perimeter of the column along a longitudinal axis of the first beam section, the first beam section including vertically oriented beam faces on opposite sides of the first beam section, and a horizontally oriented soffit surface on an underside of the

first beam section, a second beam section extending outwardly from the perimeter of the column along a longitudinal axis of the second beam section, the column including a soffit-adjacent surface adjoining the soffit surfaces of the first beam section at a juncture, the method comprising:

(a) applying a first fibrous sheet to a length of the soffit surface, the juncture, and a length of the soffit-adjacent surface;

(b) wrapping a second fibrous sheet around a first length of the column;

(c) wrapping a third fibrous sheet around a second length of the column, the second length being different that the first length;

(d) applying a fourth fibrous sheet to a first length of the vertically oriented beam face, wherein a majority of fibers of the fourth fibrous sheet are arranged in a shear angle orientation skew to the longitudinal axis of the first beam section;

(e) applying a fifth fibrous sheet to a second length of the vertically oriented beam face, the second length of the vertically oriented beam face being at least as great as the first length of the first beam section, wherein a majority of fibers of the fifth fibrous sheet are arranged in a shear angle orientation skew to the longitudinal axis of the first beam section;

(f) applying a sixth fibrous sheet to a third length of the vertically oriented beam face, the third length of the vertically oriented beam face being at least as great as the second length of the first beam section;

(g) wrapping a seventh fibrous sheet as at least a U-wrap around a length of the first beam section; and,

(h) installing a first row of fiber anchors along the first beam section.

5. The method of claim 4 wherein said length of the soffit surface to which the first fibrous sheet is applied is at least 500 mm from the juncture and wherein said length of the soffit-adjacent surface to which the first fibrous sheet is applied is at least 500mm from the juncture.

6. The method of claim 4 wherein said first length of the column around which the second fibrous sheet is wrapped is at least 500mm from the juncture.

7. The method of claim 4 wherein said second length of the column around which the third fibrous sheet is wrapped equals the entire column.

8. The method of claim 4 wherein said first length of the vertically oriented beam face to which the fourth fibrous sheet is applied is at least 500mm.

9. The method of claim 4 wherein said second length of the vertically oriented beam face to which the fifth fibrous sheet is applied is at least 1000mm in the first beam direction.

10. The method of claim 4 wherein said third length of the vertically oriented beam face to which the sixth fibrous sheet is applied is at least 1000mm.

11. The method of claim 4 wherein the first row of fiber anchors is the only row of anchors in the first beam section.

12. The method of claim 4 wherein the first row of fiber anchors include a first, second, and third fiber anchor, the first, second, and third fiber anchors each installed about 100mm from the top edge of the first beam section, the first fiber anchor being laterally spaced apart from the juncture by at least about 100mm, the second fiber anchor being laterally spaced apart from the first fiber anchor by at least about 400mm, and the third fiber anchor being laterally spaced apart from the second fiber anchor by at least about 400mm and laterally spaced apart from the first fiber anchor by at least about 800mm.

13. The method of claim 4 wherein the first, second, third, sixth and seventh fibrous sheets include glass fibers, and the fourth and fifth fibrous sheets include carbon fibers.

14. The method of claim 4 wherein each of the fibrous sheets is impregnated with a curable polymer.

15. The method of claim 4 further comprising filling the juncture with an epoxy filler.

16. The method of claim 15 wherein filling the juncture includes applying the epoxy filler to form a radius of curvature of the epoxy filler of at least 25mm.

17. The method of claim 4 wherein the second and third sheets each comprise overlapping ends, the overlapping ends comprising overlap sections having a generally uniform widths.

18. The method of claim 17 wherein the widths of the overlap sections comprise lengths of at least 150mm.

19. The method of claim 4 wherein the beam-column joint comprises a concentric beam-column joint.

20. The method of claim 4 wherein the beam-column joint comprises an eccentric beam-column joint.

21. The method of claim 4 wherein the second beam section includes vertically oriented beam faces on opposite sides of the second beam section, and a horizontally oriented soffit surface on an underside of the second beam section, and wherein the method further comprises performing steps (a) and (d)-(g) for the second beam section and column.

WHAT IS CLAIMED IS:

1. A method of reinforcing a beam-column joint in a load bearing structure with high strength fibrous sheets carrying a curable polymer, the beam-column joint comprising a column, a first beam section extending outwardly from a perimeter of the column along a longitudinal axis of the first beam section, the first beam section including vertically oriented beam faces on opposite sides of the first beam section, and a horizontally oriented soffit surface on an underside of the first beam section, a second beam section extending outwardly from the perimeter of the column along a longitudinal axis of the second beam section, the column including a soffit-adjacent surface adjoining the soffit surfaces of the first beam section at a juncture, the method comprising:

(a) applying a first fibrous sheet to a length of the soffit surface, the juncture, and a length of the soffit-adjacent surface;

(b) wrapping a second fibrous sheet around a first length of the column extending down from the juncture;

(c) wrapping a third fibrous sheet around a second length of the column extending down from the juncture, the second length being longer than the first length;

(d) applying a fourth fibrous sheet to a first length of the vertically oriented beam face, wherein a majority of fibers of the fourth fibrous sheet are arranged in a shear angle orientation skew to the longitudinal axis of the first beam section;

(e) applying a fifth fibrous sheet to a second length of the vertically oriented beam face, the second length of the vertically oriented beam face being at least as great as the first length of the first beam section, wherein a majority of fibers of the fifth fibrous sheet are arranged in a shear angle orientation skew to the longitudinal axis of the first beam section;

(f) applying a sixth fibrous sheet to a third length of the vertically oriented beam face, the third length of the vertically oriented beam face being at least as great as the second length of the first beam section;

(g) wrapping a seventh fibrous sheet as at least a U-wrap around a length of the first beam section; and,

(h) installing a first row of fiber anchors along the first beam section.

2. The method of claim 1 wherein said length of the soffit surface to which the first fibrous sheet is applied is at least 500 mm from the juncture and wherein said length of the soffit-adjacent surface to which the first fibrous sheet is applied is at least 500mm from the juncture.

3. The method of claim 1 wherein said first length of the column around which the second fibrous sheet is wrapped is at least 500mm from the juncture.

4. The method of claim 1 wherein said second length of the column around which the third fibrous sheet is wrapped equals the entire column.

5. The method of claim 1 wherein said first length of the vertically oriented beam face to which the fourth fibrous sheet is applied is at least 500mm.

6. The method of claim 1 wherein said second length of the vertically oriented beam face to which the fifth fibrous sheet is applied is at least 1000mm in the first beam direction.

7. The method of claim 1 wherein said third length of the vertically oriented beam face to which the sixth fibrous sheet is applied is at least 1000mm.

8. The method of claim 1 wherein the first row of fiber anchors is the only row of anchors in the first beam section.

9. The method of claim 1 wherein the first row of fiber anchors include a first, second, and third fiber anchor, the first, second, and third fiber anchors each installed about 100mm from the top edge of the first beam section, the first fiber anchor being laterally spaced apart from the juncture by at least about 100mm, the second fiber anchor being laterally spaced apart from the first fiber anchor by at least about 400mm, and the third fiber anchor being laterally spaced apart from the second fiber anchor by at least about 400mm and laterally spaced apart from the first fiber anchor by at least about 800mm.

10. The method of claim 1 wherein the first, second, third, sixth and seventh fibrous sheets include glass fibers, and the fourth and fifth fibrous sheets include carbon fibers.

11. The method of claim 1 wherein each of the fibrous sheets is impregnated with a curable polymer.

12. The method of claim 1 further comprising filling the juncture with an epoxy filler.

13. The method of claim 12 wherein filling the juncture includes applying the epoxy filler to form a radius of curvature of the epoxy filler of at least 25mm.

14. The method of claim 1 wherein the second and third sheets each comprise overlapping ends, the overlapping ends comprising overlap sections having a generally uniform widths.

15. The method of claim 14 wherein the widths of the overlap sections comprise lengths of at least 150mm.

16. The method of claim 1 wherein the beam-column joint comprises a concentric beam-column joint.

17. The method of claim 1 wherein the beam-column joint comprises an eccentric beam-column joint.

18. The method of claim 1 wherein the second beam section includes vertically oriented beam faces on opposite sides of the second beam section, and a horizontally oriented soffit surface on an underside of the second beam section, and wherein the method further comprises performing steps (a) and (d)-(g) for the second beam section and column.