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## A STRUCTURAL BUILDING ELEMENT

This invention relates to structural building elements such as beams, joists, bearers and the like.

In many parts of a building a structural element is required to extend across a span and support other building components. The desirable qualities of such elements include the required strength to support the associated load, an ability to resist twisting, and the lightest possible weight. In non-timber buildings this role has largely been filled by the I-beam or RSJ as it is commonly known. Whilst the RSJ is excellent in many applications it is very heavy in the sizes required for many spans and does not resist twisting particularly over large spans. This makes the RSJ less than ideal for many applications particularly where relatively light loadings and long spans are involved such as in industrial shed roofing.

It is an object of this invention to provide an improved structural building element.

Accordingly, this invention provides a structural building element comprising two parallel and spaced apart hollow rectangular flanges joined by a continuous longitudinally extending web, said web being formed by a plurality of linear segments arranged in a repeating sequence to respectively extend along said flanges adjacent one longitudinal edge, across said flanges, along said flanges adjacent an opposite longitudinal edge, and across said flanges.

Preferably, the segments extending across the flange extend diagonally to the longitudinal direction.

In one form of the invention, the web is joined to the flanges at intervals along its length. In the case of a metal structural element this can be achieved by spot welding. In another form of the invention at least the parallel segments extending along the longitudinal edges are continuously joined to the adjacent portions of the flanges.

Preferably, the flanges are of the same dimensions. In the preferred steel form the flanges are formed from rectangular hollow section (RHS) stock.

Two embodiments of the invention will now be described, by way of example only, with

reference to the accompanying drawings in which:

Figure 1 is an elevation of part of a structural building element according to a first embodiment of this invention;

Figure 2 is a plan view of the building element shown in Figure 1;

5 Figure 3 is an end view of the building element shown in Figure 1;

Figure 4 is an isometric view of the building element shown in Figure 1;

Figure 5 is a sectional view along the line V-V of Figure 1;

Figure 6 is an elevation of part of a structural building element according to a second embodiment of this invention;

10 Figure 7 is a plan view of the building element shown in Figure 6;

Figure 8 is an end view of the building element shown in Figure 6;

Figure 9 is an isometric view of the building element shown in Figure 6; and

Figure 10 is a sectional view along the line X-X of Figure 6.

15 Figures 1 to 5 show a first embodiment of the building element according to this invention. The building element 1 is formed by two spaced apart parallel flanges 2,3 joined by a longitudinally extending web 4. Flanges 2,3 are formed from stock RHS and web 4 is pressed from suitably cut steel sheet. Web 4 is made up of a plurality of linear segments 5,6,7,8 arranged in a repeating sequence. A first segment 5 extends along the flanges 2,3 closely adjacent  
20 longitudinal edges 9,10. The next segment 6 extends across the flanges 2,3 diagonally at approximately 45 degrees to the longitudinal extent of the building element 1. Segment 7 extends along the flanges 2,3 closely adjacent the opposite longitudinal edges 11,12. It will be apparent that the segments 5 and 7 are parallel. Final segment 8 extends across the flanges 2,3 diagonally at approximately 45 degrees to the longitudinal extent of the building element 1. The  
25 sequence then repeats along the length of the building element. The web 4 is joined to the flanges 2,3 by welding. In some applications it is sufficient to spot weld the web 4 to the flanges 2,3 at intervals. In other applications, where greater strength is required, the entire length of the web 4 can be welded to the adjacent portions of the flanges 2,3.

The second embodiment of the invention shown in Figures 6 to 10 is identical to the first  
30 embodiment described above except that the proportions of the flanges 2,3 to the web 4 are varied. The same reference numerals have been used to identify corresponding features.

The structural building element according to this invention has been found to have exceptional strength and rigidity for its weight compared to alternative products. It is currently thought that this is a result of the parallel segments adjacent the edges of the flanges effectively forming extensions of the parallel wall sections of the rectangular flanges and the resistance to twisting  
5 provided by the diagonally extending segments.

The foregoing describes only some possible embodiments of the invention and modifications can be made without departing from the scope of the invention. For example, the building elements described above as being made from steel can equally be made for other suitable  
10 materials such as plastics depending upon the application.



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The claims

1. A structural building element comprising two parallel and spaced apart hollow rectangular flanges joined by a continuous longitudinally extending web, said web being formed  
5 by a plurality of linear segments arranged in a repeating sequence to respectively extend along said flanges adjacent one longitudinal edge, across said flanges, along said flanges adjacent an opposite longitudinal edge, and across said flanges.
2. A structural building element as claimed in claim 1 wherein the segments extending  
10 across the flange extend diagonally to the longitudinal direction.
3. A structural building element as claimed in claim 1 or claim 2 wherein the web is joined to the flanges at intervals along its length.
- 15 4. A structural building element as claimed in claim 1 or claim 2 wherein at least the segments extending along the longitudinal edges are continuously joined to the adjacent portions of the flanges.
5. A structural building element as claimed in any one of claims 1 to 4 wherein the flanges  
20 are of the same dimensions.
6. A structural building element as claimed in any one of claims 1 to 5 wherein the flanges are formed from rectangular hollow section steel stock and the web is formed from folded steel plate.  
25
7. A structural building element substantially as herein described with reference to Figures 1 to 5 or Figures 6 to 10 of the accompanying drawings.

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