



The diagrams which follow demonstrate that a designer has to arrange the materials of the core (web of a beam) to give the best configuration to absorb all the stress created when the structure is loaded, if the quantity and type of material used is to be kept to a minimum consistent with maximum performance.

In Fig. 1 the beam of section a-b is loaded by P. The neutral axis is at x.

The Equilibrium diagram Fig 2 shows how the bending stress is zero at x and progresses to a maximum at a (compression) or b (tension).

One can see from these two simple diagrams how a very thin section can have difficulty in maintaining continuity of deformation.

Fig. 3a. This shows a rectangular rubber block held so that it is a cantilever. A line e-e' is marked on the face of the unstressed form.

In Fig. 3b it is seen that the block is deformed by a force P. As a result of the bending forces, tension in the top surface causes it to stretch, and compression in the bottom surface causes it to contract, while the length of the neutral axis x remains constant. Thus e-e' originally vertical becomes f-f'. Also shown is the line h-h' which represents the warping which has to take place before e-e' can become f-f'. As there is no shear stress in the outer fibres of the block, and as there is no change in the length of the neutral axis x, then the points h-h' remain normal to the upper and lower surfaces as is seen at both h-f and h'-f'. The value of the horizontal shear stress is represented by the angle of warp on the line h-h' where it crosses the neutral axis. It is therefore seen to be zero at the outer surfaces, and maximum at the neutral axis x.

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## Letters to the Editor

From Mr. Richard Pilbrow

Dear Sir,

It was cordial of you to describe me in your last edition's "Product News" as "an innovative thinker if ever there was one". This was with reference to the developments in remote control, pan, tilt and focus of luminaires. In fact, for the sake of historical accuracy, you might like to know that we did more than "think" about the installation of such equipment at the National Theatre during the planning period in 1969/70.

The lighting control systems, "Lightboard", installed in both the Olivier and Lyttelton theatres have a remote control section that controls, via a multiplex ring circuit throughout the whole theatre, the remote control of pan tilt and focus lanterns, slide change and focus, and colour change. The action of any of these functions may be recorded on any lighting cue. Further, twelve remote control units were built for the Olivier Theatre, commissioned and installed. These lanterns are modified Pattern 243's that were mechanised by Pani of Vienna with the control system being built by Rank Strand. The remote control section of the board is at the far right hand end. I still harbour the belief that, in years to come, this section, controlling the remote movement of luminaires, will be gradually promoted to a central position alongside the prime playbacks of the lighting control systems of the future.

Yours faithfully

RICHARD PILBROW  
Chairman  
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