

sections the inequality of stress disappears with two rivets, but it is more and more pronounced as the number is increased above three. The end rivets would, with the assumed relative plate sections, be equally stressed and rivets on opposite sides of the centre of the connection and equidistant from the centre would be equally stressed.

The second erroneous assumption is that the faulty matching of holes and the imperfect fitting of rivets to the walls of the holes in themselves influence the distribution of stress among the rivets of the connection. This is based on the further assumption that rivets under ordinary working loads resist by shear, which has been conclusively disproved by many able investigators, among whom are Considère, Bach, Dupuy, and Van der Kolk. A concise paper describing the results obtained by the last two authorities was read before this Society by Professor J. T. Nicholson, a few years ago, and further reference need not be made to the matter other than to say that experimental enquiry all goes to show that within ordinary working loads rivets resist entirely by tension in the shaft which grips the assembled plates together and never come into shear until the safe working load has become exceeded, when a more or less sudden slipping of the assembled plates occurs. It is evident, therefore, that slight mis-matching of holes, which, has heretofore been considered sufficient to vitiate any theoretical calculation of the distribution of stress among the rivets of a connection, can have little effect. It is only when the mis-matching is great enough to produce sensible differences of sectional area of the rivets, thus causing differences in their gripping power, that theoretical calculations would be offset. Of course, in all good work the mis-matching would not be great enough to produce this effect to any extent, and in the case of drilled and reamed work it would not happen at all.

With these facts before us, we can enter upon the derivation of a method of calculating the distribution of stress in riveted connections with a feeling that the calculated stresses will, in general, agree pretty closely with the actual ones. The normal tendency is for this agreement, and the nearer the workmanship approaches perfection, the nearer will the agreement be to complete realization. The theory which will be developed can be applied to any joint, given certain experimental quantities, of which more will be said. These quantities have as yet been determined for only one form of connection, the multiple-riveted butt-jointed with two cover plates.