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Mr. M.J. Baker mentioned in his contribution that, when considering the bending of I-sections, sufficient statistical data are not available at present to allow realistic calculations to be made on a truly probabilistic basis. This statement is valid to an even greater extent for all the other factors that exert an influence on the safety of structures.

Acting as an expert, I have had to deal, on many occasions, with failures and collapses of steel structures. The causes have always been: negligence on the part of the designer or constructor and more or less serious errors in the application of the principles of technology and of structural design and of the rules of calculation.

Summing up the causes of failures we can distinguish five main reasons for this occurrence:

1. Welding cracks due to inappropriate design and to the use of non-weldable steel and electrodes (brittle fracture), as well as incorrect welding processes.
2. Stability problems, with particular reference to lateral stability and restraint conditions.
3. Fatigue-cracks, which occur more especially in welded joints where there are unfavourable notch-conditions, under heavy traffic loads (i.e., gantry girders).
4. Errors in the assumptions made in regard to the structural system or in carrying out the static calculation and negligence during the making of the drawings.
5. Mistakes made during fabrication and assembling.

These errors and negligences cannot be avoided by statistical methods, but only by:

correct selection of the material
good design work
appropriate fabrication and assembling procedures.

Conscientious supervision during design and construction makes a very effective contribution to the safety problem. I agree that we should also put forward the probabilistic methods as a means of obtaining a more realistic image of the safety problem and of ensuring, finally, the consistent safety of different components and different types of structures, but we should not pretend that we are able, at present, to predict the probability of the collapse of buildings and bridges.

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