THE PLASTIC DESIGN OF A STEEL PORTAL FRAME

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INTRODUCTION

It is estimated (hat 50^ of all constructional steelwork used in the UK is in the primary framework of single-stores buildings. Within this major market sector, the steel portal frame has become the most common structural form in pitched roof buildings, because of its economy and versatility for a wide range of spans. Although (lie use of steel portal frames is well established in the UK. there is no publication which defines best practice in this form of construction.

The guidance in this publication concentrates on the design of single-span portal frames using hot rolled steel I sections, but the general principles also apply to multi-span portals and to the use of fabricated sections.

Industrial buildings have to provide sheltered, fully serviced, fully adaptable spaces in which to work. The structure is essentially a series of columns supporting roof members. The roof members may be beams or trusses or two-way-spanning space frames. Alternatively the structure may be a continuous plane frame primarily supporting the imposed loads by flexure.

Steel is more competitive than concrete for buildings with clear spans up to 18-22 metres and is the only economic solution for longer spans due to the high strength to weight ratio and speed of erection of steel. The primary structural steelwork for an industrial building represents about 15% of the total cost of the building, while the cladding system costs approximately 30% of the total.

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