DESIGN OF A WORKSHOP IN STEEL

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INTRODUCTION

GENERAL

The need of people to have options in their lifes is the reason for the huge development of tecnology. Steel design of structures is one option the human needed, therefore it has developed it.

Steel has several advantages instead of concrete. These are:

1. A steel structure can be finished earlier than a concrete one.
2. A steel structure costs less than a concrete one.
3. A steel member can be loaded more than aconcrete one of about the same section e.g a skyscraber can not be made of concrete because of the big loadsand the concrete can not resist and withstant it.

Despite thi advantages , steel has one disadvantage. This is

1. Steel has less fire resistance than concrete e.g the twins (skyscrapers in U.S.A) had been collapsed due to the high temperatures generated from the explosion and did not gave adequate time to the people in order to evacuate the building.

STEEL STRUCTURES

Steel frame buildings consist of a skeletal framework which carries all the loads to which the building is subjected. The sections through three comon types of building are:

a) Single-storey lattice roof building (truss)

b) Single-storey rigid portal

c) Medium-rise braced multi-storey builing

These three types cover many of the uses of steel framed buildings such as factories, warehouses, offices e.t.c.

The building frame is made up of separate elements-the beams, columns, trusses and bracing. These must be joined together and the building attached to the foundations. Buildings are three dimensional. These frames must be propped and braced laterally so that they remain in position and carry the loads without buckling. Various methods for analysis and design have been developed over the years. All design is in accordance with the limit state design code BS5950.

STRUCTURAL ELEMENTS

Steel buildings are composed of distinct elements:

1. Beams and girders (carrying lateral loads in bending and shear)
2. Ties (carrying axial loads in tension)
3. Struts, columns, stanchions (carrying axial loads in compression)
4. Trusses (carrying lateral loads, composed of struts and ties)
5. Purlins (carrying roof sheeting)
6. Sheeting rails (supporting wall cladding)
7. Bracing (resist wind loads and stabilize the building)
8. Bases (tramsit the loads from the columns to the foundations)

PORTAL FRAME

The single-storey clear-span building is in constant demand for warehouses, factories and other purposes. The clear internal appearance makes it much more appealing than a trussed roof building. It also requires less maintenance and heating. The portal may be of three pinned, pinned base or fixed base construction.

The pinned-base portal is the most common type adopted because of the greater economy in foundation design over the fixed-base type.

In plane the portal resists the following loads by rigid frame actions. Dead and live loads acting vertically. Wind causing horizontal loads on the walls and generally pressure or uplift loads on the roof slopes.

In the longitudinal direction the building is of simple design and diagonal bracing is provided in the end bays to provide stability and resist wind load on the gable ends and wind friction on sides and roofs.

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