

Construction Site Material Exercise

Lydia Liu
Group 5. Most durable/ Least maintenance
Steel

FACT FILE

169-183 Regent Street, London
Main client: Crown Estate
Architect: Allford Hall Monaghan Morris
Main contractor: Mace
Structural engineer: Waterman
Steelwork contractor: Severfield
Steel tonnage: 1,800t



1. Element- Steel frame



2. What material was used

Steel grid, irregular frame of 10-20m internal spans of steel

3. How was the material sourced/ what fabrication processes were needed to get it in the shape it is now

Steel is fabricated in a factory in England into components. It is then erected on site into a complete assembly.

It is generally obtained from rolling mills and stockists in the form of I sections, channels, hollow sections, angles or plate. These have to be cut to length, drilled and welded as necessary ready for assembly, and in most cases some protective treatment will be applied against corrosion.

Erection- Once the pieces have been fabricated they are transported to site and connected together to make the framework which forms the 'skeleton' of the building.

4. Material Properties

Steel derives its mechanical properties from a combination of chemical composition, heat treatment and manufacturing processes.

While the major constituent of steel is iron, the addition of very small quantities of other elements can have a marked effect upon the properties of the steel. The strength of steel can be increased by the addition of alloys such as manganese, niobium and vanadium.

Yield Strength

Yield strength reduces with increasing plate or section thickness (thinner material is worked more than thick material and working increases the strength).

Toughness

If the steel is insufficiently tough, the 'crack' can propagate rapidly, without plastic deformation and result in a 'brittle fracture'. The risk of brittle fracture increases with thickness, tensile stress, stress raisers and at colder temperatures.

Weldability: All structural steels are essentially weldable.

Durability

A further important property is that of corrosion prevention. Although special corrosion resistant steels are available these are not normally used in building construction. The exception to this is weathering steel .

The most common means of providing corrosion protection to construction steel is by painting or galvanizing. The type and degree of coating protection required depends on the degree of exposure, location, design life, etc. In many cases, under internal dry situations no corrosion protection coatings are required other than appropriate fire protection. Detailed information on the corrosion protection of structural steel is available.