

5.5 DEMOLITION TECHNIQUES

General

Preliminary investigation

Demolition is a highly skilled and dangerous activity in terms of damage to life and property and there are certain basic factors to consider before a contract is placed: The demolition contractor should have ample experience of the type of work to be offered; Fully comprehensive insurance against all risks must be maintained at all times;

An experienced supervisor should be continuously in charge of the work;

The contract price should include all safety precautions included in the relevant building regulations;

The completion date should be realistic, avoiding and need to take risks to achieve the date.

Preliminary Considerations

Demolition operations are the subject of strict legal control – there is a substantial body of legislation and a great deal of case law relating to such operations. There may also be some regulations which impose additional restrictions: for example, action against nuisance such as noise and dust.

The BSI Code of Practice for Demolition BS 6187 exerts further influence, in that if the Demolition contractor does not observe the recommendation of the Code, this may well influence a Court's decision as to his liability in any legal proceedings.

General Site Provisions

- A. Plant and Equipment: Must only be operated by skilled operators and must be regularly serviced.
- B. Protective Clothing: Buildings where chemicals have been stored or where asbestos, lead paint, dust or fumes may be present will require specialized protective clothing, e.g. Respirators, helmets, goggles, footwear, gloves, etc. Projecting nails, pieces of metal, etc.

resulting from demolition can cause accidents.

C. **Shoring and Underpinning:** The demolition contractor has a legal obligation to show technical competence when carrying out the work. When removing sections of the building which could have leave other parts unsafe, adequate temporary supports and shoring etc. must be provided.

D. **Working Areas:** These will need to be well signposted and clear warnings given that demolition work is in progress. This may include the necessity for some kind of lighting.

E. **Debris:** Sections of the building must not be overloaded with debris either on suspended floors or against party walls.

F. **Weather Conditions:** These can affect safety. Strong winds or drifting snow against unsafe walls. Suspended floors etc. which are unpropped may lead to collapse.

G. **Flooding:** The build-up of water can sometimes be hazardous.

H. **Overhead Cables:** A crane heights etc. must be checked against the height of any surrounding overhead cables to avoid damage and cutting off supplies etc.

I. **Scaffolding and Hoarding:** These must be constructed and illuminated to the relevant building regulations.

J. **Security:** The demolition site and any partially demolished buildings must be properly secured against entry.

K. **Dust:** Should be kept to a minimum by spraying with water when necessary.

L. **Noise:** Suppressors and silencers, particularly on compressors etc., should be used to keep noise levels to a minimum.

Supervision of Demolition work

A method statement showing how the demolition work is to be carried out should be prepared and the contractors should appoint a “competent person” to supervise the demolition work.

Demolition Processes

As an intrinsic part of the construction process, efficient demolition of structures is an important factors deserving careful consideration in the evolution of any

redevelopment project. Modern emphasis is on reduction of construction periods to ensure economic redevelopment, coupled with increasing town centre regenerating calling for careful demolition on constructed and restricted site, have resulted in more consideration being given to demolition as part of the process of construction and redevelopment than was typical in previous times.

Developing a Demolition Strategy

The strategy will need to take into account the method of construction used for the original building and its proximity to other buildings, structures and the general public. These factors, together with location, the cost and availability of tipping and disposal and the desirability and economics of reuse, must be taken into account in the development of an appropriate strategy for the demolition of a structure.

Building Information

Information on buildings in terms of “as built” drawings and structural details may often be unavailable or unreliable, and consequently some investigative site and desk work may be necessary, both to ascertain the way in which the building was originally constructed, and to identify the stresses and strains which exist within it.

In order to plan the most efficient method of demolition, it is important to have a full understanding of the method of construction and the stress patterns imposed upon the building. Failure to do so may result in risks to the safety of both those involved in the demolition and those in close proximity to the site.

Selecting Appropriate Techniques

Major factors to be considered in selecting an appropriate techniques include:-
Safety of personnel and public

Working Methods Legislation applicable Insurance Cover

Preliminary Aspects Prior to Site Demolition Work

Considerations should be given to:

Conducting a site and building survey, with a structural bias;

The examination of drawings and details of existing construction where available;

The preparation of details and drawings from site survey activities where no such information is available;

Establishing previous use of premises, especially with regard to flammable substances or substances hazardous to health or safety;

Programming the sequence of demolition work; The preparation of a Method

Statement. **Method statement**

A detailed health and safety method statement, produced before work starts, is essential for safe working. It should include a full risk assessment, identify problems and their solutions, and form a reference for the site supervision.

The method statement should be easy to understand, agreed by and known to all levels of management and supervision, and should include such matters as:-

The sequence and method of demolition or dismantling of the building or structure with details of personnel access, working platforms and machinery requirements;

Details and design of any temporary supporting structures to be used during the demolition process; Specific details of any pre-weakening on structures which are to be pulled down or demolished with explosives;

Arrangements for the protection of personnel and the public and the exclusion of unauthorized persons, with details of areas outside the site boundaries that may occasionally need to be controlled to improve safety during critical aspects of the work;

Details of the removal or making safe of electrical, gas and other services and drains;

Details of the temporary services available or required for the contractor's use;

Details of the methods for detailing with flammable materials and gases which may have been retained or deposited as residue in process machinery, pipework or storage;

Details of methods to establish the presence of hidden or other substances that may be hazardous to health, the methods to be used for their disposal, and any necessary

protective equipment; Arrangements for the control of site transport used for the removal of demolition debris.

Demolition Methods

In many circumstances, buildings and structures should be demolished in the reverse order to their erection; although where partial demolition is involved, a more careful evaluation of the nature of the effects of the demolition is necessary.

Normally, the demolition contractor is able to adopt a method of work which:- Gradually reduces the height of the building; or

Arranges the deliberate controlled collapse of the building or structure so that work can be completed at ground level.

Demolition Technique Selection

The choice of demolition technique will depend on the nature of the building or structure and its environment. Risks to the public, operatives involved in the demolition process and adjacent structures and buildings should be considered.

Demolition techniques may be categorized as;- Piecemeal demolition, using **hand-held** tools.

Demolition Sequence

Demolition sequence shall be determined according to actual site conditions, restraints, the building layout, the structural layout and its construction.

In general, the following sequence shall apply:

- a) All cantilevered structures, canopies, verandahs and features attached to the external walls shall first be demolished prior to demolition of main building and its internal structures on each floor;
- b) When demolishing the roof structure, all lift machine rooms and water tanks at high level shall be demolished in “top down” sequence to the main roof level.
- c) Demolition of the floor slabs shall begin at mid span and work towards the supporting beams;

d) Floor beams shall be demolished in the order as follows:

- 1) Cantilevered beams;
- 2) Secondary beams; then
- 3) Main beams.

In the case when structural stability of beams is affected, e.g., due to loss of restraints affected beams shall be propped prior to loss of support or restraint;

- e) Non-load bearing walls shall be removed prior to demolition of load bearing walls;
- f) Columns and load bearing walls shall be demolished after removal of beams on top;

If site conditions permit, the first floor slab directly above the ground floor may be demolished by machine sitting on ground level and mounted with demolition accessories.