

Demolition of steel manufacturing plant



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Introduction

This report is to outline the demolition of an existing steel manufacturing plant between Sheffield and Rotherham, all buildings on the 'brownfield' site will be demolished. The client is a major internet mail order retailer who requires a handling and distribution warehouse on the site. The report will show potential hazards that may be found on the site and precautionary measures are needed. This will involve removing the existing buildings found on the site and that adequate provisions are made to assure the local authority that any potential hazardous are removed safely and correctly from the site.

The report will also contain a specification of a suitable foundation answer for the new building, and a suitable frame solution. There will be a solution for the cladding system, a method of construction for the concrete floor slab for the new building. The building will have a gross area of 13, 000m² which will incorporate high bay racking which will be used for storage of the retail products. Within the design a 600m² office accommodation is required on site for the staff to operate the facility. The new building will be as close as possible to the boundary to allow space for vehicular access to and from the site.

Demolition

Under section 80 of the 1980 Building Act anyone intending to carry out demolition is required to notify the council. This outline Method Statement and all detailed Method Statements produced will be in accordance with BS 6187.

Site personnel

Contracts manager

Safety advisor

Full Time Site Manager

Demolition Site Supervisor Co-ordinator

Demolition operatives

Plant operators

Working Hours

The standard working hours for a construction company are 07. 30 – 17. 30 Monday – Friday. Weekend working is only arranged as necessary and by agreement with both the client and Local Authority.

It is understood that restrictions on site working hours are as detailed below, and therefore conclude that the standard hours of work fall within the prescribed timings;

Weekdays – 7. 00 – 19. 00

Saturdays – 9. 00 – 12. 00

Sundays and Bank Holidays – No Work

Ground Site Survey

Level and water depth were inspected in this survey, as this will cause difficulties in the design of the foundation and retaining structure if there is a

water table. However, from the survey it can be assumed that ground water table is not present.

A Type 3 Full Access Sampling Identification Survey

(Demolition/Refurbishment Surveys),

should be carried out to locate and describe, as far as it is practicable, all asbestos containing materials (ACMs) in the building and may involve some destructive inspection, to gain access to all areas in the building, some may be difficult to reach or are hidden from sight. A full sampling program is undertaken to identify possibly ACMs and estimates of the volume and surface area of ACMs.

Services

Services are known to exist in the bordering footpaths/roads and enter the site. All services to the buildings to be demolished are to be disconnected at or beyond the site boundary prior to works commencing. The local gas and electricity suppliers will be informed for the proposed working period with the client and all statutory undertakers are to ensure that all services are identified and isolated or their positions marked as required.

It is recommended that a CAT scan should be carried out before commencing of the works to locate the possibility of rouge services within the site area.

If there are any services within the site which are to remain live, they will need to be assessed and protected as necessary. Carefully controlled hand excavated trial pits will be carried out as necessary to prove and verify exact location and nature of recorded services.

Soft Strip

A soft internal strip of the building must firstly undertaken before the main demolition the buildings are removed. All areas will be inspected prior to the works commencing. Soft strip of all flammable materials will be undertaken. The soft strip will normally undertake with hand tools. During the soft strip all operatives will be advised to be vigilant for hazardous substances or materials. Any hazardous substances or materials found shall be brought to the attention of the site supervisor who will asses these and arrange for the appropriate action to be undertaken.

All necessary PPE will be provided and worn during the soft strip. Access to the roof should be limited to lowest possible practical necessity. Mechanical and demolition will be carried out where it is safe to do, as it is always the preferred method. Soft strip material arising will be disposed of via suitable skips with record maintained regarding identification and disposal. Any materials that can be re-cycled or re-used will separate from the general waste. The Manual Handling Operations Regulations 1992 (as amended) set no specific requirements such as weight limits (ref). Although it sets out no limit common sense should prevail that when lifting heavier items it should be done in teams.

Movements on and off site are to be fully supervised by the ground operative at all times. Damping down measures in the form of a hand held water spray system may be adopted should the need arise. All runoff water from the suppression operations is to be channelled to the nearest low point of the building footprint. The basements are to act as soakaways for the runoff water. The constant monitoring of dust will be carried out and all necessary

suppression will be implemented as determined by the site supervisor. All materials are to be removed to licensed disposal points via sheeted transport with full documentation being supplied upon completion of the works.

Hard Demolition

There are two main methods of demolition which are available for this type of demolition works to be carried out, they are piecemeal and deliberate explosive collapse. Piecemeal demolition involves the process of using cranes and other equipment to dismantle the building, it is a more controlled method of demolition which allows for any materials which can be salvaged and re-used within the project. However, it may take longer to complete the necessary works which could in turn delay the project.

Demolition of buildings or structure by hand-held tools such as electric or pneumatic breakers, sometimes as a preliminary to using other methods, should be carried out, where practicable, in the reverse order to the original construction sequence. Lifting appliances may be necessary to hold larger structural members during cutting and for lowering severed structural members and other debris. Chutes may be used to discharge debris into a vehicle or hopper. Foundations would normally be grubbed up by excavation machines.

When any part of a building is being demolished by a balling machine, pusher arm or similar equipment, only the machine operator and banksman should be allowed close to the working area. The cabs of all machines should be strong enough to protect the operator against the fall of debris. In

particular, the windscreen and rooflight should be of shatterproof material and guarded by a grille of steel bars or a substantial mesh.

The deliberate collapse of the whole or part of a building or structure requires particularly high standards of planning, supervisions and execution, and careful consideration of its effect on other parts of the structure or on adjacent buildings or structures. A surrounding clear area and exclusion zone are required to protect both personnel and property from the fall of the structure itself and debris which may be thrown up by the impact.

The collapse is usually achieved either by removing key structural elements (e. g. with explosive charges) or by wire rope pulling at a high level to overturn the structure. The possible modes of failure must be studied to ensure that the method selected will produce the required pattern of collapse. If the operation is not successful, the remaining structure may be extremely dangerous for the completion of the demolition.

It is therefore, recommended that the most appropriate way of dismantling the building will be through the piecemeal method of demolition. This will be the most cost effective way of dismantling the buildings. It also ensures that all of the materials that are removed can go through the re-use and re-cycle waste management system.

Once the activities involved in the demolition take place, the tools and equipment required to carry out the work can be defined, these will include cranes of various types, transport equipment, bolting equipment, welding equipment including cables, guns and drying ovens, electric generators, hydraulic jacks, measuring equipment and miscellaneous equipments. The <https://assignbuster.com/demolition-of-steel-manufacturing-plant/>

heaviest or highest element to be dismantled, or the part which requires the greatest lifting capacity (radius-weight) determines the minimum crane capacity to be used.

The first stage of the hard demolition stage is to removal of the roof system. The roof system consists of steel corrugated sheeting and in order to remove the material scaffolding will need to be erected, any work carried out manually on the roof will have to have fall arrest systems in place. The next stage will be the removal of the existing cladding system on the walls of the building. This will again removed manually and may also involve the use crane machinery to safely remove the material away from the building.

Subsequently the steel frame will be dismantled with the steel frame roof trusses needing to be removed first. This will involve the use carnage machinery which will be operated by a qualified Slinger with a valid CSCS card, at all times when the crane is being operated it must supervised by the site supervisor. After the trusses have been removed the steel stanchions can be removed, they must first be securely attached the crane and then the bolts can be removed manually from the foundations. All the steel removed will be salvaged and under the waste plan it will sold to a scrap yard.

Lastly the concrete ground floor will be broken up and removed. The concrete will need to be grubbed first, this concrete will then be used as part of the base course for the new building foundations. This will be achieved by the use of a mobile crusher to convert the concrete into base course. This process will involve large amounts dust produced and a high degree of noise,

this will be covered in section 2 of the report which will include all of the safety considerations and PPE's to be worn during the demolition stage.

Hazardous materials

Identification and removal of asbestos containing materials (ACM's) will be carried out prior to our commencement on site. However, given the age of the structures it is envisaged that some ACM's will remain undetected until the soft strip and main demolition works are progressed. Site Managers, Supervisors and Operatives will be briefed in this regard and a process is to be established between K D C, the client and his asbestos surveyor to minimise the potential hazard of any asbestos discovered during the works and also the potential delay to the contract.

Other hazards have been identified in terms of lead paint, oil containing excessive levels of PCB's and also refrigerant from Air Conditioning systems.

Samples of paint will be taken as required in order to assess any lead content if needed. In the event this registers positive, respirators with the appropriate filters will be issued.

Oils will be sampled at the earliest opportunity and drained and disposed of through a licensed undertaker.

Air conditioning units and associated pipe work will be de-gassed by a specialist contractor at the earliest opportunity.

Arsenic is one of the likely contaminants which may be found from the ground site survey, if found in this instance then Approved Document Part C Section 2. 3 of Building Regulations should be followed.

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Personal protective equipment

All site personnel will be issued with standard personal protective equipment. Each operative will have general protection issued by the Site Supervisor dependent upon the work in hand. Safety wear will comprise of the following:

Hard hats, ear and eye defenders, nasal protection against high volume of dust, dermal protection to exposed vulnerable areas and footwear against risk of penetration and impact, high visibility vests/jackets.

Site perimeter

Warning notices and restricted area notices will be positioned at vantage points.

The permanent working area is to be protected and scaffold in accordance with the client's requirements prior to main demolition works commencing. Solid barriers will be in place to all site boundaries through the provision of either timber hoarding, solid 'heras' type fencing or utilisation of existing boundary walls. The inner perimeter of the working area is to receive a further block and mesh hoarding as necessary to demark active demolition zones or protected services.

Elevations which front public rights of way will have sentries in attendance when needed. During plant demolition the management of pedestrians and traffic will be implemented by the contractor jointly with the client/County Council/Local Highways Authority.

Access and egress to the workface will be via designated routes. These will be agreed and implemented by our site supervisor. The existing road system
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is to be followed in accordance with the traffic management scheme to be adopted. All plant will be delivered to site by road going low loader, with no plant movements carried out on existing roadway to ensure that the road surface and also existing below ground sewers/drainage is not damaged through displacement.

Workforce protection

Areas of risk directly beneath the demolition area will be cordoned off and clearly segregated from third parties. Barriers are to be erected complete with warning signs.

All temporary barriers and signs etc. will be constantly checked and maintained before and during each working day by the Site Supervisors.

All areas of safety will be constantly evaluated with attention to detail being given the utmost concern at all times.

Any secondary lighting required within the site will be the responsibility of, and provided by, the contractor in a safe and secure manner. The positioning of any lights will be in liaison with the client. The position of any lighting will be such that there is no risk imported to the adjacent operational properties.

Dust & noise reduction strategy

Noise levels will be monitored during the course of the works. It is accepted that noise cannot be eliminated entirely, but reasonable steps will be taken to reduce any adverse effects of noise generated by the works. Previous works of this nature have been carried out and have had noise assessments produced. A table summary of these results is shown below for reference.

The nature of the works and type of structures will allow controlled sectional

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removal of structural elements using remotely operated plant. The nature and capability of the plant proposed to be used is such that all operations will be carried out with the minimum of noise and emissions generated on the site. All of the contractors Plant and Machinery should have engines compliant with emission regulations EU Stage 3. In addition all exhaust gases are mixed with intake air to reduce particle matter and Nitrogen emissions.

The location of all plant and machinery, specifically crushing plant, will be positioned as far as is reasonably practicable from sensitive receptors, specifically members of the public and adjacent residential properties. As a matter of course all plant and machinery will have the engines turned off when idling.

Anticipated noise levels

Activity	Noise produced at site	Noise produced at source boundary
Demolition	93db(A)	80db(A)
Breaking slabs	103db(A)	85db(A)
Crushing	89db(A)	75db(A)

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Suitable Foundation Solution

Before deciding on a suitable foundation solution a frame proposal for the building must be provided. A large span steel portal will be used for the design of the building with a cladding system attached to this frame. It can be determined from this that the best solution for the foundation would be a pad foundation.

The columns of steel framework transfer their load to the foundation by means of the base plates. The foundation bolts constitutes the unifying element between foundation and framework. In cases where the columns transfer compressive stress only, the bolts are used to locate the column correctly.

The office space provided will require separate foundations, this is since it will be a cavity wall construction. Therefore, a strip foundation solution is required to spread the load from the walls uniformly. The depth of the strip foundation should be at least 0.75m according NHBC 2008 Standards Section 4.4, with the foundation spread having to be at least the width of the wall, when building on rock at 2m depth.

When carrying pit excavations for the foundations it is important to ensure there is an earth support barrier. This can be achieved with the use of steel interlocking sheeting around the pit.

Suitable Frame Proposal

The most appropriate solution for the frame proposal will be multi-span large frame steel portals, a large span portal frame can span from 15m to 60m.

Spacing between the frames can from 6m to 12m with the roof pitch having a low pitch between 15° to 18°. Within the design it should incorporate high bay racking. Therefore, it is advised the portal frame should include lattice members made for lateral support, which will be required particularly in the instance of longer span frames.

Multi-span portal frames are suitable for wide buildings and are economical in material usage and labour contribution. An example of the multi-span steel portal frame has been provided.