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Project Demolition Procedure



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Project Demolition Procedure

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Project Demolition Procedure

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Project Demolition Procedure

1.0 PURPOSE

The purpose of this procedure is to control and provide guidance for the Planning and Management of demolition works. The procedure is intended for Mechanical Demolition only i.e. manual or equipment demolition. The use of any kind of explosives for demolition is strictly prohibited without the authorization of the Governing Saudi Arabian Authority.

2.0 SCOPE

The scope of this procedure applies to all works performed under all Government Construction Contracts executed throughout the Kingdom of Saudi Arabia.

3.0 DEFINITIONS

Definitions	Description
Competent	One who can identify existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them
Governing Saudi Arabian Authority	For this procedure is defined as the Saudi Ministry of Interior, Saudi General Directorate of Civil Defense, the Ministry of Municipal and Rural Affairs, and any other governmental entity that is concerned with the licenses of such business.
Hazardous Waste	Hazardous waste is a type of waste [defined as substances which have been discarded or neglected and which cannot be put to good or beneficial direct use] with characteristics that render them hazardous to man's health and to the environment. They can be toxic, highly reactive, flammable, explosive, corrosive, infectious or radioactive in nature. (Note: definition as per Royal Decree No.7/M/8903 dated 21 Rabi' II 1401 H (25 February 1981), General Environmental Rules and Regulations, Environmental Protection Standards)
Non-Hazardous Waste	Materials [defined as substances which have been discarded or neglected and which cannot be put to good or beneficial direct use] which do not pose any danger to the environment or public health if its disposal is effected in a safe and scientific way
Skip	A portable device, in which a material is stored, transported, disposed of, or otherwise handled.
Site Stockpiling	Localized temporarily storing of non-hazardous construction waste before transportation for reuse or disposal
SIMCONS	Simultaneous Construction Activities – Interface between work groups or potential adjacent interaction.
OSHA	Occupational Safety and Health Administration
HSSE	Health, Safety, Security and Environment
JHA	Job Hazard Analysis
PPE	Personal Protective Equipment
WMS	Work Method Statements
STARRT	Safe Task Analysis and Risk Reduction Talk
FOPS	Falling Object Protection Structure

4.0 REFERENCES

- OSHA 29CFR 1926 Subpart T Demolition
- OSHA 29CFR 1926 Subpart W Rollover Protective Structures; Overhead Protection
- OI decree 12/2/U/5/DF dated 24 Rabi II 1421 H (26/July/2000)
- EPM-KSS-PR-000006 Project Barricades and Signs Procedure.
- EPM-KSS-PR-000018 Project Crane and Lifting Operation Procedure
- EPM-KSS-PR-000033 Project Scaffolding Control Management Procedure
- EPM-KSH-PR-000009 Project Asbestos Management



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- EPM-KSE-PR-000002 Project Waste Management
- EPM-KSJ-PR-000001 Project Site Work Security Procedure

5.0 RESPONSIBILITIES

5.1 Project Manager

The Project Manager is responsible for ensuring the resources and arrangements are available for the implementation and management of this procedure.

5.2 Site Manager

The Site Manager shall be responsible for overall management of the site and for ensuring that all construction activities are completed in accordance with Project specifications and drawings including the clearance of all construction related items.

5.3 Site Construction Manager

The Site Construction Manager is responsible for providing adequate resources, people, equipment, and training are made available and for requiring that the provisions of this Procedure are properly implemented.

5.4 Site HSSE Manager

The Site HSSE (Health, Safety, Security and Environment) Manager is responsible for:

- Developing and maintaining this Procedure, as required.
- Delegating members of the HSSE Department to monitor Contractors compliance with the requirements of this Procedure in their assigned areas.
- Delegating HSSE members to participate in the Risk Assessment sessions/process.
- Assessing the Project's compliance with the requirements of this Procedure.

5.5 Contractor Superintendent

Contractor Superintendents are responsible for the following:

- Reviewing Contractor's WMSs and JHAs prior to beginning work.
- Confirming that adequate barriers and control measures are identified on JHAs and in place for work to safely proceed.
- Participating in STARRT meetings with Contractors
- Ensuring SIMCONS are being managed by coordinating site activities with Subcontractors to minimize exposure and control work areas that require special controls or protective measures as identified in Safe Work Method Statements and JHAs.

5.6 Responsible Supervisors

Responsible Supervisors are responsible for the following:

- Providing Contractor Superintendent and Contractor HSSE Advisor with WMSs and JHAs prior to commencement of work for review.
- Facilitating or confirming the review of WMSs and JHAs with crew members prior to beginning work.
- Implementing the controls identified on WMSs, JHAs, and STARRT documents.
- Conducting STARRT prior to beginning work activities.
- Confirming that safety related information regarding hazards is communicated to affected personnel.
- Confirm that identified risk mitigations/controls as identified on WMS, JHAs and STARRT documents are in place prior to task being undertaken and during the work activities.



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5.7 Project Personnel

Project personnel are responsible for the following:

- Participate in the hazard identification and control processes (JHA development and review, STARRT, personal risk assessment).
- Communicate concerns regarding hazards of the activity, as applicable, to the applicable Supervisor.
- Ensure tasks are undertaken as detailed in JHA.

6.0 RISK ASSESSMENT

An integral aspect of the work planning process when it comes to Demolition Works, is the performance of a proper Risk Assessment. The Risk Assessment must be conducted at the Planning Stage to identify the hazard risks and determine control measures.

The Risk Assessments that shall be conducted at the Planning Stage are as follows:

- Project Risk Assessment.
- Work Method Statements (WMS)
- Job Hazard Analysis (JHA).
- Safety Task Analysis and Risk Reduction Talk (STARRT).

It is imperative that prior to beginning any work activity, a STARRT briefing shall occur to discuss the contents of the WMS/JHA which includes mitigations for any other hazards noted by the crew at the jobsite. The discussion shall also include job steps, expected hazards associated with the activity, and the mitigation and protection methods that shall be implemented to prevent incidents.

If circumstances change by way of the environment, other work crews are in the area, additional hazards are now present, change of methodology of the task etc..... another STARRT briefing shall occur.

The Hierarchy of control shall be used to reduce the likelihood of an incident occurring.

- **Elimination** (Remove the Hazard)
- **Substitution/Isolation** (Replacing material, process or hazard with a lower risk one/ separate people from the hazard (such as suitable guarding, distance, etc.)
- **Engineering Controls** (Redesign or replacement of plant and equipment)
- **Administration Controls** (Procedures, training, signage)
- **PPE - PERSONAL PROTECTIVE EQUIPMENT**

No work is to commence until the above has been implemented and signed by the relevant Supervisor in charge.

7.0 KEY RISKS

All demolitions, dismantling and structural alteration, must be carefully planned and carried out in a way that prevents danger by practitioners with the relevant skills, knowledge and experience. Key issues are:

- Falls from height.
- Injury from falling materials.
- Uncontrolled collapse.
- Risks from connected services.
- Traffic management.
- Hazardous materials.
- Noise and vibration.
- Fire.
- Worker involvement.



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A systematic approach to demolition Projects is a team effort between many people, who all have responsibilities:

- Contractors must appoint organizations that have the relevant skills, knowledge and experience and where organizations, the organizational capability, and are adequately resourced.
- Contractors, with the help of the principal designer must provide those who need it with pre-construction information that can reasonably be obtained. A range of surveys and reports will be needed - for example, to check for presence of asbestos; structural stability of site and nearby structures; the location of above and below ground live services in the work area; etc. These should be done before work begins and not be left for the principal contractor to organize once the demolition work has started.
- Principal designers must plan, manage, monitor and coordinate health and safety issues in the pre-construction phase (i.e. before demolition starts) to give principal contractors as much information as possible to allow the principal contractor to keep people (site workers and the public) as far as possible from the risks.
- Principal contractors must plan, manage, monitor and coordinate Health and Safety issues during the demolition work.
- Site managers must ensure workers are supervised and are following safe working practice.
- Sub-contractors and site workers must follow the instructions and plans given to them by those in charge of the work and ensure that their colleagues do too.

7.1 Falls from Height

During demolition and dismantling, workers can be injured falling from edges, through openings, fragile surfaces and partially demolished floors.

Contractors have a responsibility to assess, eliminate and control the risks of falls from height through the Risk Assessment Process.

Contractors shall ensure that no person engages in any activity, including design, in relation to working at height, or erecting and dismantling work at height equipment, unless he is competent to do so, or if being trained, is being supervised by a competent person.

No member of the work crew should work at heights if their physical or mental health is impaired (Not fit to work). For example, taking medication that affects his physical abilities (such as over the-counter cold and flu medication that can cause drowsiness).

Contractor shall have equipment available on site to perform rescue of suspended workers. Rescue team shall be trained in its use by the supplier, and thereafter conduct quarterly drills.

A self-retracting lanyard must be used for work at height activities where there is insufficient clearance distance to use a lanyard with shock absorber.

7.2 Injury from Falling Materials

Workers and people passing by can be injured by the premature and uncontrolled collapse of structures, and by flying debris.

A safe system of work is one that keeps people as far as possible from the risks. This may include:

- Establishing exclusion zones and hard-hat areas, clearly marked and with barriers or hoardings if necessary.
- Covered walkways.
- Using Elevated Work Platforms.
- Falling Objects Protective Structure (FOPS) so that drivers are not injured.
- Training and supervising site workers.



7.3 Uncontrolled Collapse

The structural survey should consider:

- The age of the structure.
- Its previous use.
- The type of construction.
- Nearby buildings or structures.
- The weight of removed material or machinery on floors above ground level.

The Work Method Statement for the demolition should identify the sequence required to prevent accidental collapse of the structure.

7.4 Risks from Connected Services

Gas, electricity, water and telecommunication services need to be isolated or disconnected before demolition work begins. If this is not possible, pipes and cables must be labelled clearly, to make sure they are not disturbed.

Utility avoidance tools must be calibrated according to manufacturer recommendations. Not all utilities can be detected with the same equipment, e.g. cable avoidance tools might not detect nonmetallic services. Contractors must use the correct equipment and techniques to identify ALL utilities: As built drawings, Ground penetrating radar, Cable avoidance tools (CAT), trial holes, etc.

Once the approximate location of a service has been identified, where the service is in the vicinity of the planned excavation, trial holes should be dug carefully by hand using round-nosed shovels to establish the exact location and depth of the service. All open excavations or holes must be suitably barricaded.

Mechanical excavators and power tools must not be used within 1m of the indicated line of services. Only hand digging is permitted and worker wearing high voltage hand gloves, and then with round nose shovels only. Care and consideration must also be given to overhead power lines.

Cables and services must never be used as anchorage points, footholds or climbing points.

If a service pipe or cable needs to be moved to allow work to progress, the owner must be consulted beforehand and incorporate in the Method Statement how to execute the job safely.

*Any damage to buried services must be immediately reported.

7.5 Traffic Management

Effective Traffic Management Systems are essential on site, to avoid putting workers at risk of being hit by vehicles turning, slewing, or reversing. Where possible, vision aids and zero tail swing machines should be used.

In Traffic Management Plan, contractor shall protect vehicle routes from hazards such as excavations, edges of structures, fuel and chemical storage areas, soft road edges or areas of differing elevations where vehicles may overturn.

Driver must yield to pedestrians at dedicated crossing points or other areas as indicated by signs.

Special attention shall be paid to areas of differing elevations where vehicles or operating equipment can overturn. Where practicable hard barriers shall be placed to prevent vehicles or equipment getting close to the soft edges or elevation change (i.e.) on haul roads or new roads under construction. On areas where heavy equipment are operating such as back fill areas, measure must be put in place to highlight changes in elevations so as to warn the equipment operators (and / or dump trucks unloading) to keep away. Soft barriers must be at minimum of 2m away from edges.



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All windows are to be free from curtains or other obstructions to ensure that the operator has clear vision at all times.

All vehicles must have an audible and operational reversing alarm. The sound emitted shall be sufficient to be heard over the equipment's operating noise level, and the local working environment – such that it functions as its intended purpose i.e. to warn others.

In congested or pedestrianized areas vehicles must be avoided as reasonably practical. If the use of banks-man (flag-man) is required to control maneuvers, he is to be positioned in front, and off to one side of the vehicle with clear line of sight to the driver. All banks-men are required to have undergone specific training (as well as Redman), to include hand signals, prior to being allowed on site. The flag-man MUST be in a safe position, protected by hard barricades at all times.

No vehicles shall be overloaded that the maximum allowable gross vehicle weight is exceeded.

All loads must be secured according to the nature of the material following manufacturer's guidelines.

Pedestrian routes are to be wide enough to safely accommodate the volume of employees likely to use them during peak times.

Pedestrian routes to be free from obstructions and have safe and even footing.

7.6 Hazardous Materials

Hazardous materials that should to be considered include dust, asbestos and respirable crystalline silica (RCS). There may also be material or contamination on site that has not been cleared, for example:

- Acids from industrial processes
- Paints
- Flammable liquids
- Unidentified drums
- Microbiological hazards (especially in old hospital buildings).

7.7 Noise and Vibration

Frequent exposure to loud noise can permanently damage a person's hearing. Noise can also create a safety risk if it makes it difficult for workers to communicate effectively or stops them hearing warning signals.

Over a period, vibrating hand tools used in demolition can cause hand-arm vibration syndrome (HAVS). Workers exposure to vibration must be managed and reduced as far as possible.

For both Noise and Vibration hazards, risk assessments must be completed to reduce the exposure levels.

7.8 Fire

Fire is a risk where hot work (using any tools that generate spark, flame or heat) is being done. During structural alteration, the fire plan must be kept up to date as the escape routes and fire points may alter. There must be an effective way to raise the alarm.

7.9 Worker Involvement

Everyone involved must to know what precautions are to be taken on site. For this reason, all involved employees involved in the task, are to be involved in the development of risk assessment. The involved workers are often the best people to understand the risks in their workplace.

8.0 GENERAL



8.1 Safety to Public

Throughout the demolition operations, adequate safety shall be maintained in public places adjoining the site. Safety of the public shall be maintained by providing street closures, hoardings, scaffolding and other types of overhead protection, either singly or in combination, in accordance with the requirements of the Regulatory Authority and of this Procedure.

Lighting of public places adjoining the site shall be provided, in accordance with the requirements of the Regulatory Authority, so that obstructions resulting from the demolition operations are clearly visible at all times.

In both the planning and execution of the demolition work, appropriate action shall be taken to prevent demolished materials from falling freely outside of the boundaries of the demolition site.

Where the site adjoins a public thoroughfare, the common boundary between the two shall be fenced and shall be provided with a gantry over footpaths as a structure providing protection to the public from injury from falling rubble only.

Security fencing shall be provided around the perimeter of the demolition site and any additional precautionary measures taken, as may be necessary to prevent unauthorised entry to the site at all times during the demolition period.

Where the demolition site adjoins a public thoroughfare, the common boundary between them shall be fenced for its full length with a hoarding unless the least horizontal distance between the common boundary and the nearest part of the structure is greater than twice the height of the structure. The hoarding shall be constructed of solid materials to a height of not less than 2.4m above the level of the thoroughfare at its junction with the hoarding.

Notices lettered in accordance with EPM-KSS-PR-000006 Project Barricades and Signs Procedure and displaying the words DANGER – DEMOLITION IN PROGRESS, or a similar message, shall be fixed to the fencing at appropriate places to warn the public.

Controls to minimize impact on the Public, this includes but not limited to:

- Noise levels
- Dust generation
- Distance from residential areas.
- Unauthorized access.
- Screening and prevention of flying/falling objects.
- Traffic management to protect workers and members of the public of any impact from the work being carried out.

8.2 Scaffolding

Where required by Regulation, scaffolding shall be heavy duty scaffolding complying with EPM-KSS-PR-000033 Project Scaffolding Control Management Procedure. The scaffolding shall:

- Enclose the work area.
- Be sufficiently strong and impenetrable to withstand the impact of rubble.
- Be properly maintained on a regular basis.

The primary functions of scaffolding for demolition work are:

- The containment of dislodged materials.
- The provision of edge protection of persons performing work.
- The provision of working platforms for persons performing work.

Scaffolding should be designed for the most adverse combination of dead loads, live loads (including impact) and environmental loads (wind, rain).



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Foreseeable factors which effect scaffolding stability used for demolition work are:

- Load imposed by demolished material dislodged onto the scaffold.
- Wind forces acting on containment sheeting on the scaffold face - environmental load.
- Water retention in containment sheeting by capillary attraction - environmental load.
- Progressive removal of building elements affecting the lateral stability of the upper portion of the scaffold.
- Progressive removal of ties and dismantling of scaffold.

All the above factors should be addressed when using scaffolding for demolition work. The control measures that should be implemented for scaffolding for demolition work are:

- Where special duty scaffolding is erected for demolition work, the loadings should be suited to the largest intended load, but not less than 6.6 kN.
- The vertical spacing of scaffold ties may have to be reduced to facilitate the demolition cycle.
- The installation of containment sheeting on the internal face of the scaffold to deflect any material into the building therefore reducing the potential for overload on the scaffold.
- The installation of containment sheeting to a height not more than the upper most tie;
- Allowance should be made for scaffolders to be at the workplace so the scaffold can be dismantled progressively and in line with the demolition work.
- Where a scaffolding system requires end to end jointing of the standards, the resulting tensile forces during strong wind gusts can cause these joints to fail. Consideration of the environmental loads may require "tension splices" or through bolts to be installed at these connections. For example, where containment sheeting is erected on scaffold the wind can catch in the sheeting producing an unknown load on the scaffolding.

8.3 Hazardous Materials and Conditions

Before the commencement of any stripping or demolition, the structure and all parts of the site shall be examined, by competent specialists, to determine, as far as is practicable, the presence of toxic, noxious or explosive materials or conditions, which would be hazardous to the health of the public if disturbed by stripping or demolition.

The nature and location of each hazard shall be recorded and both the record and proposed method of dealing with the hazard shall be included in the demolition work plan. Hazardous materials include asbestos, other fibers, paints, some plastics, and volatile liquids and vapors.

8.4 Worker Safety

Site Managers are to ensure all involved Contractors establish systems and procedures to ensure the safety and welfare of workers involved in the demolition process. This relates to:

- PPE.
- Cutting & Welding.
- Fire Protection.
- First Aid.
- Amenities.
- Electrical Safety.
- Hazardous Substances.
- Working at Heights.
- Asbestos Removal

9.0 INTRODUCTION

Demolition work is defined as "work to demolish or dismantle systematically a building or other structure, or part of a building or other structure, but does not include the systematic dismantling of a part of a building



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or other structure for alteration, maintenance, remodeling or repair". The term always includes the removal of asbestos.

All demolition work is a prescribed activity except domestic houses and their ancillaries (sheds, carports, garages). Asbestos Removal is also a Prescribed Activity.

There are three common methods of demolition:

- **Hand Demolition** or the progressive demolition of a structure by workmen using handheld tools (lifting appliances may be used for lifting and lowering members once they are released).
- **Demolition by Deliberate Collapse** where key structural members are removed causing complete collapse of the whole or part of the structure. This includes **Demolition by explosives**.
- **Mechanical Demolition** or the use of mechanical means to effect demolition of the structure. This usually means use of demolition balls, wire rope pulling or pushing over the structure.

Where the requirement exists to demolish the structure by pulling inwards onto an existing floor, hand demolition is the appropriate method to be selected.

10.0 REQUIREMENTS

10.1 Planning

Demolition work is classified as "specified work **High Risk Construction Work** As such, a *Demolition Work Plan* is to be prepared and documented by the Principal Contractor or Contractor carrying out such work.

Demolition of structures, must follow the mandatory demolition standard. The following shall be included in the work plan.

10.1.1 Work Plan

The work plan shall include, but not be limited to, documentation of the following information:

- The location of the site on which the structure to be demolished stands.
- The overall height of the structure above ground level and the least distance from the structure to each site boundary (all to the nearest 0.5m).
- A brief description of the building (occupancy class), its structural support system and the principal materials of its construction.
- A description of the methods of demolition proposed to be used and the number and types of major items of equipment proposed for implementing these methods.
- A description of the methods proposed for handling and disposal of demolished materials and of hazardous waste.
- A description of the proposed sequence of carrying out the demolition works and an estimate, in days, that it is likely to take to complete all or each stage of the work.
- Details of the proposed hoardings and fencing required and any overhead protection and scaffolding required.

Any other plans, illustrations, or written documents as may be necessary to clearly define or substantiate the proposals made under items (d) to (g).

A written statement by a competent person that, subject to any conditions that may be prescribed in the statement, the proposals contained in the work plan comply with the safety requirements of this standard.

If it is proposed that mobile equipment be driven by operators on a suspended floor, item (d) above shall include the size and weight of each such piece of equipment and item (e) above shall include the proposed method of raising and lowering the equipment and of moving it from floor to floor. Furthermore, the statement in item (i) above shall specify the support to be given to the suspended floor concerned and such other limitations to the operation of the equipment and loading on the floor as may be necessary to maintain the safety of the operators and other site personnel.



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10.1.2 Execution

The work shall be executed, by competent persons, with due regard to safe working practices and in accordance with the approved work plan, a copy of which shall be kept on site.

Site Managers are to monitor the planning process carefully to ensure that all required permits, approvals, licenses, clearances and approvals are obtained and suitable precautions are in place for safety. A checklist sample is provided as Attachment 1 for this purpose.

The competent person must oversee all demolition work, irrespective of the size of task or duration of work.

The construction Project HSSE Plan should contain a detailed safe method of demolition that has been planned by a structural engineer, using latest as-built drawings of the structure to be demolished, including, but not limited to:

- The use of a licensed and competent contractor/subcontractor.
- Obtaining the necessary permits from the Governing Saudi Arabian Authority.
- Qualifications of workers. (e.g. plant operator / safety officer)
- Selection and condition of Equipment to be used. (e.g. use of long reach machines, screen protected cabs)
- Type of construction and materials used in the structure to be demolished to identify.
- The types of material used was used in the structure.
- Potential for presence of hazardous material such as asbestos, lead etc.
- Types and quantities of hazardous materials around or under the structure to be demolished.
- Method of demolition and sequence of Work.
- Communication & co-ordination with utility service providers. (including written confirmation of termination of services)
- Exclusion zones, site access control and methods of access to all levels of the structure to be demolished.
- Overhead protection of walkways and other facilities.
- Fall prevention methods.
- Control of structure during stages of demolition to prevent unplanned collapse, this should be done through a thorough survey and collected data on the structure.
- Controls to manage demolition waste may include but not limited to:
 - o Use of only approved and proper skips.
 - o All waste subcontractors must have applicable permits and business licenses from the governing entity in Saudi Arabia.
 - o Segregation of waste into appropriate categories (e.g., Non-hazardous, hazardous, recyclable).
 - o Response to any emergency (e.g. spills, release of hazardous material)
 - o Site Stockpiling, storage and packaging for transport and disposal off-site.
- Potential fire risks where hot work is taking place. A valid up to date emergency and fire preparedness plan must be in place.

11.0 METHODS OF DEMOLITION

Specific requirements in relation to methods of demolition follow:

11.1 Manual Demolition

Personnel shall be permitted to work only from a safe and serviceable work platform and, unless attached to an approved fall-arrest system, shall not be permitted to work from the top of a wall or partition being demolished.

Where concrete members are being demolished manually, the reinforcement shall not be cut while breaking out of the concrete is in progress.



11.2 Mechanical Demolition from Ground Level

Where mechanical demolition by a steel ball is employed, the clear space in which the equipment is to operate shall have a minimum dimension of 6m or 50% of the height of the building to be demolished, whichever is greater.

The crane shall be selected and used with the boom head not less than 3m above the highest part of the building to be demolished.

An anti-spin device shall be used on the hoist rope in conjunction with the ball attachment equipment. The supporting ropes shall be of such a length or be so restrained that it is not possible for the ball to swing against any structure other than the one to be demolished. Boom luffing for the purpose of swinging the ball shall not be permitted. The hoist rope, anti-spin device, and the attachment of the demolition ball to the hoist rope shall be inspected in accordance with EPM-KSS-PR-000018 Project Crane and Lifting Operation Procedure.

Where demolition is carried out by tractor-mounted equipment operating from ground level care shall be taken to minimize the risk of equipment tilting by ensuring it is operated from firm level ground.

11.3 Mechanical Demolition from above Ground Level

Earthmoving equipment and the like shall not be operated on a suspended floor unless:

- The type, size, weight and usage of the piece of equipment has been specified in the approved work plan.
- It has been demonstrated that the floor can sustain the load of the equipment plus demolished materials, without excessive deformation or collapse, either with or without additional support from below.
- It is raised and lowered in accordance with the Work Plan.
- Adequate and effective communication can be maintained between operator and the demolition supervisor while the equipment is operating.

Where a piece of equipment has been specified in the work plan, another piece of equipment of the same type and usage may be substituted for it, provided that the substituted equipment is neither larger nor heavier than the specified equipment.

Where earthmoving equipment or the like is to be operated on a suspended floor, the operating level shall be supported by propping from at least the floor immediately below and from as many additional floors as may be necessary to distribute the demolition loads safely to the undemolished portions of the structure. Earthmoving equipment shall be moved from ground level to operating level, or vice versa, or from one level to another, by means of appropriate hoisting equipment in accordance with the requirements of the Regulating Authority.

11.4 Induced Collapse Methods

Induced collapse methods of demolition shall not be used unless:

- There is sufficient clear space in the direction of the collapse to ensure that collapsing materials will fall and remain within the confines of the site.
- The area onto which the collapsing materials are likely to fall is:
 - o Sufficiently strong to withstand the impact of the falling materials without itself collapsing.
 - o Kept clear of all site personnel and obstructions at the commencement of and during the collapse.

Where felling by pulling with ropes or chains, the rope or chain shall be of sufficient length so that the horizontal distance from the demolition work to the pulling mechanism is not less than 1.5 times the height from the pulling mechanism to the highest part of the structure to be pulled.



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When pulling is in progress, no person shall be closer to the sides of the rope or chain than 75% of the horizontal distance between the pulling mechanism and the structure being demolished.

12.0 ATTACHMENTS

1. Demolition Checklist



Project Demolition Procedure

Attachment 1 - Demolition Checklist

Note: This list is for **Managers and Supervisors** in the execution of their duties. The Demolisher or Engineer should refer to the AS for a more comprehensive list if required.

1. **Owner's Consent.** Has the owner's consent been obtained? This includes consent from owners of ALL affected properties.
2. **Zones of Demolition.** Have the Zone of Demolition and Clear Zone (mechanical demolition only) been determined?
3. **Permits.** Have the appropriate permits been obtained from:
 - a. Local Government?
 - b. Fire Services?
 - c. Health Department?
 - d. Conservation/Heritage authorities?
 - e. Police?
 - f. Health and Safety Regulatory Authorities?
 - g. Gas/Electricity/Water & Sewerage/Telstra authorities
4. **Insurance.** Has cover been arranged for appropriate public risk and worker's compensation insurance?
5. **Record of Defects.** Has an inspection been made and a record prepared of defects existing in:
 - a. Adjacent Properties?
 - b. Footpaths, Roads and Access Ways?
 - c. Public Utilities and Services?
6. **Noise.** Because of the proximity to sensitive sites, will restricted working hours be needed near hospitals, nursing homes, convention centres, schools, etc.?
7. **Safety Constraints.** Have adequate precautions been taken ensure the safety of:
 - a. The Public?
 - b. Workers?
 - c. Adjacent Properties?
8. **Asbestos.** Has an Asbestos Removal list inspected for and removed all asbestos products?
9. **Fire.** Has enough consideration been given to the control of unexpected fires until assistance from the authorities arrives? Are personnel trained in fire emergency procedures?
10. **Dust and Environmental Controls.** Have adequate controls been put in place to handle these problems?
11. **First Aid and Medical Treatment.** Is this adequate?
12. **Demolition Work Method.** Has the Contractor's Demolition Work Plan been prepared and discussed with all concerned Contractors as required for specified/high risk construction activities?