

## RULES FOR DEMOLITION

### PURPOSE

Safeguarding our workers, adjacent properties, and utilities is a continuous process that begins in project planning and design phase and runs through documentation of as-built conditions. This chapter establishes a process to be followed by all divisions and sections when confronted with demolition as a phase of work. Demolition activities can range from dismantling a building, to remodeling an area within a building, to removing an experimental structure.

It is the intent of this chapter to provide guidance regarding actions needed for any demolition activity when operating under FESHM [7010](#) ES&H Program for Construction - Fixed Price, FESHM 7011 ES&H Program for Construction - Time & Materials Activities (other than fixed price), FESHM [7020](#) Subcontractor Safety - Other Than Construction or FESHM [2060](#) Hazard Analysis for Fermilab Employees. This chapter is not a primer on how to do demolition safely. Standards to follow when performing demolition can be found in the Code of Federal Regulations 29 CFR 1926 Subpart T.

Appendix A is a flow chart that can be used as a guide when planning demolition work.

### POLICY

It is recognized that demolition projects can consist of multiple work tasks that can be hazardous in nature. Premature structure collapse, utility location and hazardous materials are some of the most important elements to be considered during the design phase of all proposed work that involves demolition. It is also recognized that a demolition project can be as complex as the wrecking of a multiple story building or as straight forward as the remodeling of an office. To properly plan a demolition activity, an engineering survey must be performed to provide the persons responsible for the demolition the opportunity to evaluate the job in its entirety. The scope of the engineering survey will depend on the nature of the demolition project. There must be written evidence an engineering survey has been performed. Depending on the nature of the demolition project, written evidence can vary from contract drawings and technical specifications to a job hazard analysis.

All electric, gas, water, steam, sewer, and other services lines shall be shut off, capped, or otherwise controlled, at or outside the building or demolition area before work is started. All workers shall be informed of the location of any existing or relocated

utilities. If it is necessary to maintain any power, water, or other utilities during demolition, such lines shall be temporarily relocated as necessary and/or protected. The location of all overhead power sources shall also be determined, as they can prove especially hazardous during any machine demolition.

Procurement documents will clearly spell out Fermilab's expectations and requirements regarding demolition activities. Consideration will be given to selection of subcontractors based in part on qualifications to safely perform demolition work.

## **DEFINITIONS**

**Demolition** - The dismantling, razing, or wrecking of any fixed building or structure or any part thereof. Accordingly, demolition applies not only to dismantling, razing or wrecking activities, but to activities involving rehabilitation or remodeling including those where no removal of load supporting structural members takes place.

**Decontamination and Decommissioning File (D&D File)** - The D&D File is a permanent file maintained by the ESH Section identifying the location and nature of contamination in all structures and underground enclosures. See FESHM Chapter [8070](#).

**Competent Person**- One who is capable of identifying 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.

**Construction Coordinator (CC)**- A person specifically assigned to oversee the work of a fixed-price construction subcontract for conformance to the subcontract documents. Construction Coordinators are primarily furnished by the FESS Engineering Group, which is at times supported by outside A/E personnel under FESS direction.

**Project Engineer/Project Coordinator** - A person assigned the responsibility for assembly of complete design documents for the purpose of bidding and/or construction.

**Task Manager (TM)** - A division/section-designated individual specifically assigned to oversee and direct a work activity. Usually this term applies to individuals directing Time & Material (T&M) subcontractors.

**Landlord** - The division/section responsible for the space.

## **DUTIES AND RESPONSIBILITIES**

In addition to the duties and responsibilities listed in FESHM Chapters [7010](#), 7011, and [7020](#) the following are duties and responsibilities specific to this chapter.

The Project Engineer/Coordinator (FESHM [7010](#)) is responsible for:

- Coordinate completion of the engineering survey
- Coordinate identification of existing utilities
- Coordinate identification of waste reduction-FESHM Chapter [8022](#)
- Incorporate the engineering survey into the design drawings
- Incorporated utility information into the design drawings
- Modify the design as appropriate to prevent premature collapse and utility damage
- Incorporate subcontractor requirements into the contract documents

Task Manager (FESHM 7011)

- Coordinate completion of the engineering survey
- Coordinate identification of existing utilities
- Coordinate identification of waste reduction-FESHM Chapter [8022](#)
- Incorporate the engineering survey into the design drawings
- Incorporate utility information into the design drawings/job planning documents
- Modify the design as appropriate to prevent premature collapse and utility damage

D/S Landlord

- Using the D&D File and any other means necessary, determine any contamination and hazardous materials in the structure to be demolished.

## **PROCEDURES**

### **Design Phase**

To ensure that environmental impacts of proposed actions are considered early in the decision-making process, Fermilab shall conduct necessary NEPA reviews in the initial phase of the activity planning process. Refer to FESHM Chapter [8060](#).

This chapter requires that an engineering survey of the structure be conducted by a competent person. The purpose of the survey is to determine the condition of the framing, floors, and walls so that measures can be taken, if necessary, to prevent the premature collapse of any portion of the structure. When indicated as advisable, any adjacent structure(s) should also be similarly checked. Appendix B - Demolition Engineering Survey Checklist can be used as a guideline when a survey is performed.

Utility location is one of the most important elements of the pre-job planning. All electric, gas, water, steam, sewer, and other services lines should be shut off, capped, or otherwise controlled, at or outside the building before demolition work is started. If it

is necessary to maintain any power, water, or other utilities during demolition, such lines shall be temporarily relocated as necessary and/or protected. The location of all overhead power sources should also be determined, as they can prove especially hazardous during any machine demolition.

The design team will use all reasonable means of identifying existing utilities:

- Existing utility maps
- Previous design and as-built documents
- JULIE locating of utilities
- On site physical review
- Corporate knowledge

The design team will incorporate all known utility information into design and construction drawings.

The landlord is responsible for determining whether radiological contaminated material, asbestos, lead, or any other hazardous materials, chemicals, or gases are present at the site to be demolished. The landlord shall review the Decontamination and Commissioning File (D&D File) of the structure, building or site to identify any known contaminants. When the presence of any such substance is apparent or suspected, testing and removal or purging shall be performed and the hazard eliminated prior to demolition.

The design team will follow FESHM Chapter [8022](#) Waste Minimization and Pollution Prevention Awareness Program to identify any demolition material that can be recycled, reused, or reduced. Disposal of demolition debris must be compliance with FESHM Chapters [8021](#) and [8023](#), as applicable. Debris shall not be disposed on site unless specifically authorized in the contract documents and approved by the D/S Environmental Officer in consultation with the ES&H Section.

Depending on the nature of the demolition project, contract documents may include the following:

- Identify appropriate qualifications for subcontractors on projects regarding demolition activities. These will include past safety performance indicators along with minimal qualifications for the site superintendent as outlined in FESHM [7010](#) and 7011.
- Clearly define the subcontractor's responsibility to protect and/or support adjacent structures and utilities during demolition activities.
- Preparatory meetings before the start of each new phase of demolition activities.

### **Procurement Phase**

Depending on the nature of the demolition project, the following may be required:

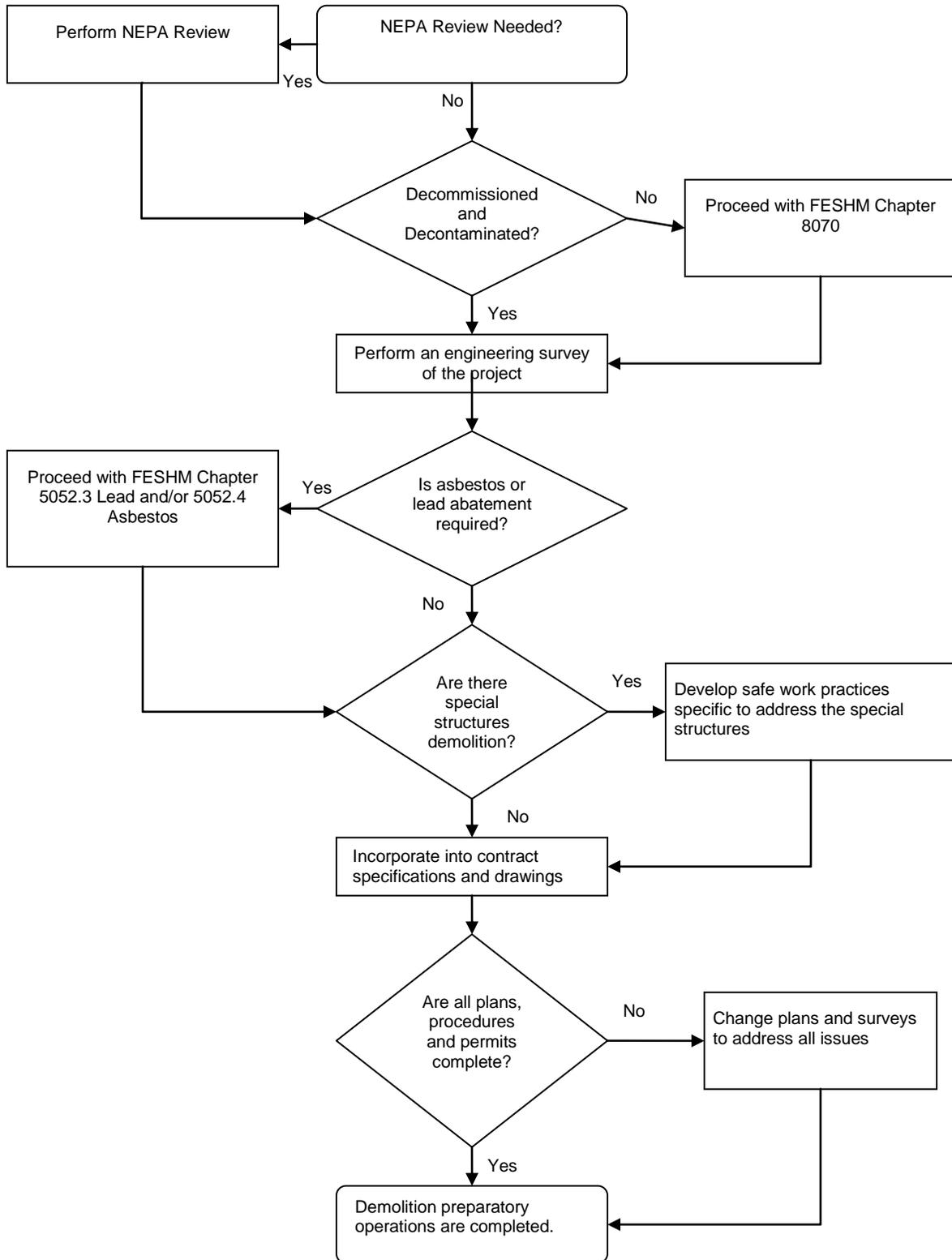
- A pre-bid meeting including discussion of requirements for demolition.
- Safety qualifications and qualifications of site superintendent if/as required in Exhibit A will be considered in the subcontractor selection.
- Pre-construction meetings including discussion of requirements for demolition activities.
- A demolition plan from the subcontractor including the means and method of demolition, site security from unauthorized access, and an emergency plan addressing fires, cave-ins, and evacuation procedures.

## **Construction Phase**

### **Demolition Activities**

- The TM/CC is to attend and take pro-active role in preparatory meeting with subcontractor superintendent and competent person prior to the beginning of any demolition activity. Suggested agenda items include:
  - Review permits, HA, LOTO, disablements
  - Review shop drawings, materials on hand
  - Discuss routing of existing utilities / interferences
  - Confirm extent of demolition
  - Establish stop points (inspections)
  - Establish schedule for any further meetings
- All electric, gas, water, steam, sewer, and other services lines should be shut off, capped, and LOTO procedures implemented at or outside the building before demolition work is started. The subcontractor must verify with the TM/CC that all utilities have been abandoned and or LOTO procedures are in place.
- When utilities and other services in the area of the demolition cannot be de-energized or depressurized, the following procedures apply:
  - A special preparatory meeting must be held to review the known utility information, discuss the means and methods to be utilized, identify associated hazards, and develop an HA. Meeting attendees will include:
    - TM/CC
    - Superintendent
    - Competent Person
    - Subcontractor safety representative
    - ESH
- TM/CC presence is strongly recommended at the demolition site when:
  - Demolition activity first begins or enters a new phase.
  - Demolition activities are near energized electrical cable.
  - Demolition activities are near existing structures.

DEMOLITION FLOW CHART



## DEMOLITION ENGINEERING SURVEY CHECKLIST

### PROJECT INFORMATION

Project Name	
Project Location	
Contractor Name	

### DESCRIPTION OF STRUCTURE TO BE REMOVED

Location of Work on Project		
Name of Structure		
Date of Original Construction		
Original Function		
Work to be Performed		
Structural Frame Material		
Foundation Material		
Wall Materials		
Floor Materials/ Floor Loading Design - psf		
Equipment to be Deployed on Floors		
Length of Structure		
Width of Structure		
Height of Structure	Maximum =	Average =
Depth of Basement		
Stacks or Chimneys	YES	NO
Tanks or Vessels	YES	NO
Underground Tanks	YES	NO
Electrical Towers	YES	NO

### SCOPE OF WORK

<b>Roof</b> Describe construction & materials	
<b>Structural Frame</b> Describe construction & materials	

<b>Foundation</b> Describe construction & materials	
<b>Floors</b> Describe construction & materials	
<b>Basement Excavation</b> Describe construction & materials	
<b>Stacks or Chimneys</b> Describe construction & materials	
<b>Elevated Water Tanks</b> Describe construction & materials & location	
<b>Combustible Materials</b> Describe construction & materials & location	
<b>Tanks and Vessels</b> Describe construction & materials & location	
<b>Underground Tanks</b> Describe construction & materials & location	
<b>Transformers</b> Describe construction & materials & location	
<b>Electrical Towers</b> Describe construction & materials & location	
<b>Utility Disconnection / Relocation</b> Describe utilities & action to be taken	
<b>Other Significant Items</b> Describe construction & materials & location	
<b>Other Significant Items</b> Describe construction & materials & location	
<b>Other Significant Items</b> Describe construction & materials & location	

## **METHODS TO BE IMPLEMENTED**

### **Sequence for Environmental Remediation**

<b>1<sup>st</sup> Area</b> Type and remediation methods	
<b>2<sup>nd</sup> Area</b> Type and remediation methods	
<b>3<sup>rd</sup> Area</b>	

Type and remediation methods	
<b>4<sup>th</sup> Area</b> Type and remediation methods	
<b>5<sup>th</sup> Area</b> Type and remediation methods	
<b>6<sup>th</sup> Area</b> Type and remediation methods	

**Sequence for Structural Removal**

<b>1<sup>st</sup> Structure</b> Type and removal methods	
<b>2<sup>nd</sup> Structure</b> Type and removal methods	
<b>3<sup>rd</sup> Structure</b> Type and removal methods	
<b>4<sup>th</sup> Structure</b> Type and removal methods	
<b>5<sup>th</sup> Structure</b> Type and removal methods	
<b>6<sup>th</sup> Structure</b> Type and removal methods	

**KNOWN STRUCTURAL HAZARDS**

<b>Known Physical Damage</b>	
<b>Known Structural Failures</b>	
<b>Structural Alterations</b>	
<b>Fire Damage</b>	
<b>Unusual Structural Conditions</b>	
<b>Pre-stressed Concrete Locations</b>	
<b>Post Tensioned Concrete w/o Grouted Tendons</b>	
<b>Post Tensioned Concrete w/ Grouted Tendons</b>	

**STRUCTURES TO BE PRESERVED** (Describe structure, conditions and location)

<b>Stacks and Chimneys</b>	
<b>Aerial Electrical Systems</b>	
<b>Electrical Conduits</b>	
<b>Transformers</b>	

<b>Underground Electrical Ducts</b>	
<b>Manholes</b>	
<b>Underground Vaults</b>	
<b>Underground Piping</b>	
<b>Underground Storage Tank</b>	
<b>Adjacent Structures</b>	
<b>Combustible Materials</b>	
<b>Oxygen Lines</b>	
<b>Natural Gas Lines</b>	
<b>Water Lines</b>	
<b>Telephone / Communication Lines</b>	
<b>Other Utilities</b>	
<b>Utilities to be Maintained Until Completion of Removal Work</b>	

**TEMPORARY STRUCTURAL MEASURES**

<b>Soil Retention Required</b>	
<b>Planned Measures to Prevent Failure</b>	
<b>Planned Shoring of Floors and Roof</b>	
<b>Planned Shoring or Bracing of Walls</b>	

**HAZARDOUS CONDITIONS**

<b>Combustible Materials</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Explosion Hazards</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Toxic Substances</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Radioactive Materials</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Oxygen Deficiency</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Toxic or Explosive Gases</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Lead Exposures</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Silica Exposures</b>	<b>YES</b>	<b>NO</b>	
Location			

<b>Asbestos Exposures</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Wall / Floor Openings</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Fall Hazards Created</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Process Piping &amp; Tanks</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Energized Electrical Equip.</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Excavation &amp; Trenches</b>	<b>YES</b>	<b>NO</b>	
Location			
<b>Confined Spaces</b>	<b>YES</b>	<b>NO</b>	
Location			

<b>Form Completed By:</b>	<b>Date:</b>
<b>Signature:</b>	
<b>Department:</b>	<b>Ext:</b> <b>Email:</b>