16-10. Checklists and Forms.

a. ENG Form 6203, Crane Standard Lift Plan (SLP) (non-mandatory) (https://www.publications.usace.army.mil/LinkClick.aspx?fileticket=qZwLLyJg_bA%3d&tabid=16438&portalid=76&mid=43543) (16-10.a)

b. ENG Form 6209, Certificate of Compliance (CoC) for Load Handling Equipment (LHE) and Rigging (mandatory) (https://www.publications.usace.army.mil/LinkClick.aspx?fileticket=kzvU4YyG1yU%3d&tabid=16438&portalid=76&mid=43543) (16-10.b)

c. ENG Form 6213, Load-Handling Equipment Crane Operation Critical Lift Plan (non-mandatory) (https://www.publications.usace.army.mil/LinkClick.aspx?fileticket=cdmeuIZKLQI%3d&tabid=16438&portalid=76&mid=43543) (16-10.c)

Chapter 17
Demolition, Renovation, and Re-Occupancy

17-1. References.

a. ANSI/ASSP A10.6, Safety and Health Program Requirements for Demolition Operations (https://webstore.ansi.org/) (17-1.a)

b. ISO 10262, Earth-Moving Machinery – Hydraulic Excavators – Laboratory Tests and Performance Requirements for Operator Protective Guards (https://www.iso.org/standards.html) (17-1.b)

c. Society of Automotive Engineers (SAE) J1356, Minimum Performance Criteria for Falling Object Guards for Excavators (https://www.sae.org/standards/) (17-1.c)

d. UFGS 01 33 00, Submittal Procedures (https://wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs) (17-1.d)

e. UFGS 02 41 00, Demolition and Deconstruction (https://wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs) (17-1.e)

f. 29 CFR 1926.850, Preparatory Operations (https://www.govinfo.gov/content/pkg/CFR-2019-title29-vol8/pdf/CFR-2019-title29-vol8-sec1926-850.pdf) (17-1.f)

17-2. Definitions.

a. Competent Person (CP). See paragraphs 1-2 or 2-2, as applicable. (17-2.a)

b. Mechanical Demolition. Structural demolition involving the use of one or more pieces of heavy machinery, to include hydraulic excavators with various attachments, front end loaders (tracked or rubber-tired), cranes, bulldozers, etc. (17-2.b)

c. Qualified Person (QP). See paragraphs 1-2 or 2-2, as applicable. (17-2.c)

d. Registered Professional Engineer (RPE). See paragraphs 1-2 or 2-2, as applicable. (17-2.d)

e. Shoring and Bracing. Temporary support of a building, structure, or trench to provide stability during demolition to decrease the danger of collapse and protect property, workers, and the public. (17-2.e)

f. Soft Demolition. Removal of non-structural parts during renovation activities of a facility or systems within a structure. This includes removal of doors, windows, lay-in tile ceilings, fixtures, interior equipment, lighting, HVAC system components, floor covering, etc. (17-2.f)

g. Structural Demolition. The removal of a structural part of a facility carried out during full structural demolition or renovation activities. This includes buildings, load bearing structures, bridges, chimneys, etc. (17-2.g)

h. Universal Waste. Hazardous wastes that are widely produced by households and many different types of businesses. Universal wastes include televisions, computers, and other electronic devices as well as batteries, fluorescent lamps, mercury thermostats, and other mercury containing equipment, among others. (17-2.h)

17-3. Personnel Required Qualification/Training.

a. All employees engaged in demolition or renovation activities must be instructed in the Demolition Plan so that they can conduct their work activities in a safe manner (see para 17-7). (17-3.a)

b. Load Handling Equipment (LHE) Operators. LHE Operators must be trained and qualified according to chapter 16. (17-3.b)

c. Lead inspectors conducting surveys must meet the training requirements according to paragraph 6-3. (17-3.c)

d. Asbestos inspectors conducting surveys must meet the training requirements according to paragraph 6-3. (17-3.d)

17-4. Roles and Responsibilities.

a. The facility owner is responsible for identifying and field verifying the disconnects to de-energize electrical components and electrical service lines. The

owner must provide written confirmation to the USACE supervisor/KO or COR and the workers performing the work that the equipment and circuits have been de-energized prior to anyone performing work on or near them. (See chapters 11 and 12) (17-4.a)

b. If the project includes fire suppression systems, the owner must provide written confirmation or verification to the USACE supervisor/KO or COR that the Chemical Fire Suppression (CFS) system has been de-activated and that the chemical has been removed from the system, prior to the start of the renovation or demolition process. If the CFS system is found to be active after demolition has begun, immediately cease work and notify the USACE supervisor/KO or COR. Do not abate or remove the CFS system or components without approval by the USACE supervisor or acceptance by KO or COR. (17-4.b)

c. Provide the USACE supervisor/KO or COR with an engineering drawing (for example, site plan, utility plan) that indicates the location of all service lines and the means for their control. (17-4.c)

(1) Confirm that the disconnection or de-energizing has been performed prior to the start of the demolition process.

(2) De-energized electrical service must be secured via a LOTO method and field verified according to the requirements of chapter 12.

17-5. Inspection Requirements.
A CP must conduct inspections throughout demolition to detect hazards resulting from weakened or deteriorated floors, walls, or loosened material. No employee may work where such hazards exist until they are corrected by shoring, bracing, or other means. The frequency of inspections will be identified in the Demolition Plan.

17-6. Activity Hazard Analysis (AHA) Requirements.
Develop AHAs according to paragraphs 1-6 or 2-6, as applicable.

17-7. Minimum Plan Requirements.
Demolition Plan. Demolition Plans are required for all structural or soft demolition activities. The Demolition Plan must be developed and approved by the USACE supervisor or accepted by KO or COR prior to work. The plan will be based on the engineering, lead, and asbestos surveys and must detail procedures for safe dismantling and removal of all building components and debris.

a. Structural Demolition Plans must be developed by an RPE. (17-7.a)

b. Soft Demolition Plans may be developed by a QP in lieu of an RPE. (17-7.b)

c. Plans must include the following: (17-7.c)

(1) Detailed description of the activity being performed.

(2) Description of anticipated hazards or concerns and the control measures that will be implemented to control to an acceptable level.

(3) Assignment of personnel and their roles and responsibilities. Include necessary information/documentation to support qualification/training of such persons. (See para 17-3).

(4) Inspection frequency and oversight methods to ensure adherence to the plan.

(5) Schedule.

(6) Description of work methods and equipment to be used.

(7) Site preparation.

(8) Waste Management Plan to include ACM/Other Regulated Material (ORM) Abatement Plan (see para 17-8.i).

(9) Site Restoration Plan.

(10) Surveys (see para 17-8.b).

(11) Means of access (see para 17-8.c).

(12) Other requirements specified in the contract/task order.

17-8. General Requirements.

a. Perform demolition and renovation activities according to ANSI/ASSP A10.6. (17-8.a)

b. Surveys. Prepare the following surveys prior to initiating demolition or renovation activities and include them in the Demolition Plan. (17-8.b)

(1) Lead, Asbestos, and Other Regulated Material (ORM) Surveys. Surveys must be performed by trained and licensed inspectors according to chapter 6. Ensure applicable OSHA and EPA requirements for surveys are followed (see para 17-3). See also the additional lead and asbestos requirements in chapter 6.

(2) Engineering Survey. A RPE must perform an engineering survey of the structure to be demolished and any adjacent structures where employees or property may be exposed to determine the following:

(a) Structure layout.

(b) The condition of the framing, floors, and walls.

(c) The possibility of unplanned collapse of any portion of the structure.

(d) The existence of other demolition hazards.

(e) If any hazardous building materials, hazardous chemicals, gases, explosives, flammable materials, or dangerous substances have been used in any building construction, pipes, tanks, or other equipment on the property.

(e-1) When such hazards are identified, conduct testing to determine the type and concentration of the hazardous substance. Provide the test results to the USACE supervisor/KO or COR and the contractor's designated authority.

(e-2) Control or eliminate such hazards before demolition is started.

(e-3) If HAZMAT are found on the project site or location after demolition started, immediately cease work and notify the USACE supervisor/KO or COR. Do not abate or remove the HAZMAT without USACE supervisor approval or KO or COR acceptance.

Note. An engineering survey is not required for soft demolition activities as long as no load-bearing structure will be removed or demolished.

c. Demolition Preparatory Actions. (17-8.c)

(1) All ACM and ORMs must be removed from structures according to all federal and state laws before renovation/demolition begins.

Note. For the context of this chapter, ORM refers to any other regulated HAZMAT not otherwise specifically called out by name within the text of this chapter.

(2) When employees work within a structure to be demolished that has been damaged by fire, flood, explosion, or other cause, the walls and/or floor must be shored or braced according to the engineering survey and Demolition Plan (see paras 17-7 and 17-8.a).

(3) Electric, gas, water, steam, sewer, and other service lines affected as a result of project work must be shut off, capped, or otherwise controlled inside and outside the building line before demolition is started.

(a) In each case, notify the responsible utility companies in advance of the termination.

(b) If it is necessary to maintain any power, water, or other utilities during renovation, temporarily relocate and protect such lines.

(4) If the project includes the abandonment or demolition of existing gas lines, ensure that the existing lines are accurately located and the procedures for removal,

installation, or relocation of lines are accomplished according to the applicable requirements of 29 CFR 1926.850.

(5) Evaluate and control potential hazards from fragmentation of glass inside and outside of the demolition site.

(6) Protect employee entrances to multistory structures with sidewalk sheds, canopies, or both.

(a) Provide protection for a minimum distance of 8 feet (2.4 m) from the face of the building.

(b) All canopies must be at least 2 feet (0.6 m) wider than the building entrances or openings (1 foot (0.3 m) wider on each side) and must support a load of 150 psi (1,034.2 kPa).

(7) Identify the designated means of access and the no-entry access points in the Demolition Plan. Close, barricade, and install appropriate signage at all no-entry access points. Install appropriate signage at all access points.

(a) Only use the stairways, passageways, and ladders that are specifically designated as means of access to the structure.

(b) Cover stairwells to protect workers from falling debris at a point no less than two floors below the floor on which work is being performed.

(c) Provide access to floors where work is in progress through a separate, lighted, and protected passageway.

(8) Dust Control. Take protective measures to control the accumulation and migration of dust and dirt during demolition activities. This includes preventative steps to limit the spread of dust and debris to occupied portions of a building and to avoid the creation of a nuisance or hazardous dust in the surrounding area.

d. Demolition. (17-8.d)

(1) Ensure dust generated from demolition activities is adequately controlled according to applicable requirements.

Note. Regulatory requirements for the control of dust generated during demolition operations can arise from local, county, state, and federal ordinances, codes and/or regulations. Work closely with local and state environmental regulator, as well as with any office that issues a demolition permit (if in an area where such permits are required), to ensure the requirements for the control of dust that exist are met.

(2) Demolition or removal of a facility may also include appurtenances to the primary structure. These appurtenances might include fences, parking areas and associated lights, roadways and access from roadways, sidewalks and stairs associated with access., pads, patios, and paved lay-down areas, utilities, underground and above ground storage tanks, poles, and interior and exterior equipment associated with the facility.

(3) Before structural demolition can begin, abatement of lead, asbestos, and ORM must be completed.

(4) Once structural demolition has begun, personnel must not work inside the structure.

(5) Do not permit masonry walls, or sections of masonry, to fall upon the floors of the building in such masses as to exceed the safe carrying capacities of the floors.

(6) Wall sections that are more than 6 feet (1.8 m) in height must be laterally braced unless the wall was designed and constructed to stand without any lateral support and is self-supporting. Do not leave wall sections left standing without lateral bracing any longer than necessary for removal of adjacent debris interfering with demolition of the wall.

(7) Do not work on top of walls when weather constitutes a hazard.

(8) Do not cut or remove structural or load-supporting members on a floor until all stories above the floor have been demolished and removed. If necessary, floor beams may be cut for material disposal or equipment installation provided the structural bracing and other requirements of this chapter are followed.

(9) Plank solid floor openings within 10 feet (3 m) of any wall being demolished, except when employees are kept out of the area below.

(10) In buildings of skeleton-steel construction, the steel framing may be left in place during the demolition of masonry. Clear all steel beams, girders, and structural supports of loose material as the masonry demolition progresses downward.

(11) Do not demolish walls that serve as retaining walls to support earth or adjoining structures until the earth is braced or adjoining structures are underpinned.

(12) Do not use walls to retain debris unless capable of safely supporting the imposed load.

e. Floor Removal. (17-8.e)

(1) Before demolishing any floor, remove debris and other materials from the immediate work location and other adjacent floor areas.

(2) While breaking down floor areas between beams and joists, employees must work upon planks that are not less than 2 inches x 10 inches (5 cm x 25.4 cm) in actual cross section.

(a) Locate the planks to provide a safe support for personnel should the joists between the beams collapse.

(b) Do not exceed 16 inches (40.6 cm) straddle space between planks.

(c) Provide walkways that are at least 18 inches (45.7 cm) wide formed of wood planks that are at least 2 inches (5 cm) thick, or of equivalent strength, to be used by personnel to reach points so they do not walk upon exposed beams.

(d) Support flooring planks with stringers. Support the ends of the stringers with the floor beams or girders.

(e) Lay the planks together over solid bearings with the ends overlapping at least 1 foot (0.6 m).

(3) Do not allow workers in the area directly underneath the area where a floor is being removed. Barricade these areas to prevent access and post signs to warn of the hazard.

f. Steel Removal. (17-8.f)

(1) When any portion of a floor has been removed, provide planking to support the workers razing or dismantling the steel framing~~.~~

(2) Dismantle skeleton-steel construction column-by-column and tier-by-tier. Columns may be in two-story lengths.

(3) Do not overstress any structural member during dismemberment.

g. Mechanical Demolition. (17-8.g)

(1) All mechanical equipment used on a project must meet the applicable requirements of this manual and OSHA regulations.

(2) Install top and front guards on excavators directly involved in demolition of free-standing buildings or structures that are higher than the top of the excavator cab according to SAE J1356 or ISO 10262 Level II standards.

(3) No one may occupy an area where mechanical demolition is being performed unless they are necessary for the performance of the operations.

(4) Use dust abatement measures to suppress dust during demolition.

(5) Use respiratory protection as necessary to protect personnel from respiratory hazards, including equipment operators (see chapter 5).

(6) A wrecking ball may only be used if approved by the USACE supervisor or accepted by the KO or COR. If a wrecking ball is approved/accepted for a demolition, the following must be adhered to:

(a) The weight of the wrecking ball must not exceed 50% of the crane's rated load, based on the length of the boom and the maximum angle of operation, or 25% of the nominal breaking strength of the suspension load line, whichever is less.

(b) The crane boom and load line must be as short as possible.

(c) The ball must be attached to the load line with a swivel-type connection to prevent twisting of the load line and must be attached by positive means so that the weight cannot be accidentally disconnected.

(7) Do not use mechanical equipment on floors or on working surfaces unless they have sufficient strength to support the loads.

h. Work Progression. (17-8.h)

(1) Begin demolition of floors and exterior walls at the top of the structure and proceed downward, except when cutting holes in floors for chutes or holes through which to drop materials, creating storage space, or performing similar preparatory work.

(2) Remove each story of exterior wall and floor construction and move it into the storage space before working on the next story below.

(3) Do not allow walls or sections of masonry to fall upon the floors in such masses that exceed the safe carrying capacities of the floors.

i. Debris Removal, Disposal, and Waste Management. (17-8.i)

(1) Construct and use chutes used for debris removal according to chapter 14. Install a guardrail system according to chapter 21 completely around chute openings at the working level that personnel stand to dump material. Cover any space between the chute and the edge of openings in the floors through which it passes.

(2) When debris is dropped without chutes through openings in the floors, enclose the openings with a guardrail system according to chapter 21. Enclose the area onto which the material is dropped with a guardrail system located at least 6 feet (1.8 m) back from the projected edge of the opening above.

(a) Post warning signs that address the hazard of falling materials at each side of the debris opening on each floor.

(b) Do not remove debris from an area until all debris removal and handling cease on the upper floors.

(3) Enclose all material chutes, or sections thereof, at an angle of more than 45° from the horizontal, except for openings equipped with closures at or about floor level for the insertion of materials.

(a) Openings must not exceed 48 inches (121.9 cm) in height measured along the wall of the chute.

(b) Close and secure all openings, except for the top opening, when not in use.

(4) Install a substantial gate inside each chute at or near the discharge end. A CP must control the operation of the gate and the backing and loading of trucks.

(5) Close off the area near the discharge end of a chute except during loading operations.

(6) Where material is dumped from mechanical equipment or wheelbarrows, attach a toe board or bumper, not less than 4 inches (10.2 cm) thick and 6 inches (15.2 cm) high, at each chute opening.

(7) Design and construct chutes with enough strength and durability to eliminate failures resulting from the impact of the falling materials and debris.

(8) Do not exceed the allowable floor load when storing materials, universal waste, and debris on any floor of a structure.

(9) In buildings having wood floor construction, only remove floor joists from one floor above grade to create a storage space for debris, provided falling material is not permitted to endanger the stability of the structure.

(a) When wood floor beams serve to brace interior walls or freestanding exterior walls, leave the beams in place until other support can be installed to replace them.

(b) Floor arches located no higher than 25 feet (7.6 m) above grade may be removed to create a storage area for debris, as long as their removal does not endanger the stability of the structure.

(c) Block off all storage spaces where materials are dumped into them. Keep these areas closed except when removing the materials.

(d) Install curbs or stop logs around all floor openings to prevent equipment from running over the edge.