Summary of Changes to EM-385-1-1

Sections 24, 26, 31 and 32 incurred no significant changes.
Appendix C has been replaced in its entirety (with the exception of the title).
Appendix D has been replaced in its entirety (with the exception of the title).
There are no changes to Appendix E.
Appendix Q is a total compilation of definitions previously included at the end of each section.
Appendix R is a Metric Conversion Table.
Appendix S is now a list of References and Resources.
A glossary and index are included as end documents.

Summary of changes to EM 385-1-1/Section 1

Section	Paragraph	Old	New
Intro			• Expands applicability to Naval Facilities Engineering contracts (NAVFAC) • Adds references: 30 CFR 56 and DODI 6055.3
	4.c. (1-4) (added)		• Includes website locations • Waivers removed - variances authorized
01		All references to Safety	• Now referred to as Safety and Occupational Health
			• Employee shares responsibility for wearing safety and health equipment, reporting unsafe conditions/activities, working in a safe manner
01.A	01.A.05	01.A.05	• Worksites with non-English speaking workers shall have a person(s), fluent in the language(s) spoken and English, on site when work is being performed, to translate as needed.
	01.A.06	01.A.06	• The Contractor shall erect and maintain a safety and health bulletin board in an area commonly accessed by workers. The bulletin board shall be maintained current, in clear view of onsite workers; and protected against the elements and unauthorized removal. It shall contain at least the following safety and health information: a. Map denoting the route to the nearest emergency care facility. b. Emergency phone numbers. c. Copy of the most up-to-date

			accident prevention plan (APP) shall be mounted on or adjacent to the bulletin board or state the location, which will be accessible on the site by all workers. d. Copy of current activity hazard analysis/analyses (AHA) shall be mounted on or adjacent to the bulletin board or state the location, which will be accessible on the site by all workers. e. Occupational Safety and Health Administration (OSHA) Form 300A shall be posted in accordance with OSHA requirements and mounted on or adjacent to the bulletin board or state the location, which will be accessible on the site by all workers. f. Copy of Safety and Occupational Health deficiency tracking log shall be mounted on or adjacent to the bulletin board or state the location where it will be accessible by all workers upon request. (See content in 01.A.12.d.) g. Safety and Health promotional posters. h. Date of last lost workday injury. i. OSHA Safety and Health Poster.
	01.A.07	01.A.07	• USACE Project Managers (PMs) shall ensure that a

			safety and occupational health plan is developed, in accordance with the Safety and Occupational Health Reference Document contained in the USACE Business Manual, and incorporated into each Project Management Plan (PMP)/Program Management Plan (PrgMP).
	01.A.08	01.A.08	• USACE Project Delivery Teams (PDTs) will develop the safety and occupational health plan to be incorporated in the PMP and are responsible for assuring that safety and occupational health requirements are properly addressed and executed throughout the life cycle of each project.
	01.A.09.b.	01.A.09.b	• The project safety and health plan shall address applicable items listed in Appendix A in addition to the USACE Command's safety and occupational health program requirements.
	01.A.10. a., b. and c.	01.A.10.a and b.	• A position hazard analysis (PHA) shall be prepared, updated as necessary, and documented by the supervisor of each USACE position as warranted by the hazards associated with the position's tasks. A generic PHA may be used for groups of employees performing repetitive office/administrative tasks where the primary hazards are ergonomic, lighting, light lifting and carrying, and indoor air quality. > ***See Figure 1-1 for an outline of a PHA.***

			a. The GDA, using the advice of the safety and occupational health office, shall determine the need for analysis for each position within his or her area of responsibility. b. In developing the analysis for a particular position, supervisors should draw upon the knowledge and experience of employees in that position and the safety and occupational health office. c. Supervisors will review the contents of PHAs with employees upon initial assignment to a position, and at least annually or whenever there is a significant change of hazards.
	01.A.11	01.A.11	• Before initiation of work at the job site, an APP with appropriate appendices (e.g., SSHP for hazardous waste site cleanup operations, Lead Compliance Plan when working with lead, Asbestos Hazard Abatement Plan when working with asbestos) -- written in English by the Prime Contractor for the specific work and hazards of the contract and implementing in detail the pertinent requirements of this manual -- will be reviewed and found acceptable by the GDA. APPs shall be developed and submitted by the Contractor in the formats provided in Appendix A of this manual. The Contractor shall address each of the elements or subelements in the outline contained in Appendix A in

			the order that they are provided in the manual. If by the nature of the work an item is not applicable, the Contractor will so state and provide a justification for why that element/sub-element is not applicable. > ***See Appendix A.*** a. The plan will be developed by qualified personnel and will be signed in accordance with Appendix A.1. The Contractor shall be responsible for documenting the qualified person's credentials. b. On contract operations, the Contractor's plan will be job specific and will include work to be performed by subcontractors and measures to be taken by the Contractor to control hazards associated with materials, services, or equipment provided by suppliers.
	Figure 1-1	01.A.09	• PHA format (New)
	01.A.12 (new)		• Inspections
	01.A.12.a (new)		a. The APP or the USACE Project Safety and Health Plan shall provide for frequent safety inspections, conducted by competent persons, of the work sites, material, and equipment to ensure compliance with the plan and this manual.
	01.A.12.b (new)	01.A.08.c	b. In addition to the requirements of subparagraph a. Contractor quality control (QC) personnel - as part of their QC responsibilities - shall conduct and document daily safety and occupational health inspections in their daily QC

			logs.
	01.A.12.c (new)		c. Identified safety and health issues and deficiencies, and the actions, timetable, and responsibility for correcting the deficiencies, shall be recorded in inspection reports. Follow-up inspections to ensure correction of any identified deficiencies shall be conducted and documented in a like manner.
	01.A.12.d (new)		d. The Contractor shall establish a safety and occupational health deficiency tracking system that lists and monitors the status of safety and health deficiencies in chronological order. The list will be posted on the project safety bulletin board, will be updated daily, and will provide the following information: (1) Date deficiency identified. (2) Description of deficiency (3) Name of person responsible for correcting deficiency. (4) Projected resolution date (5) Date actually resolved.
	01.A.12.e (new)		e. The Contractor will immediately notify the GDA of any OSHA or other regulatory agency inspection and provide him/her an opportunity to accompany the Contractor on the inspection. (The inspection will not be delayed due to non-availability of the GDA.) The Contractor shall provide the GDA a copy of any citations or reports issued by the inspector and any corrective action responses to the citation(s) or report(s).

	Figure 1-2	Figure 1-1	• Includes explicit instructions for AHA not previously required
	01.A.13 (new)		• Before beginning each work activity involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or sub-contractor is to perform the work, the Contractor(s) performing that work activity shall prepare an AHA. > ***See Figure 1-2 for an outline of an AHA.***
	01.A.13.a (new)		a. AHAs will define the activities being performed and identify the sequences of work, the specific hazards anticipated, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk.
	01.A.13.b (new)		b. Work will not begin until the AHA for the work activity has been accepted by the GDA and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.
	01.A.13.c (new)		c. The names of the competent/qualified person(s) required for a particular activity (i.e., excavations, scaffolding, fall protections, other activities as specified by OSHA and this manual) will be identified and included in the AHA. Proof of their competency/ qualification

			must be submitted to the GDA for acceptance prior to the start of that work activity.
	01.A.13.d (new)		d. The AHA will be reviewed and modified as necessary to address changing site conditions, operations, or change of competent/qualified person(s). (1) If more than one competent/qualified person will be used on the AHA activity, a list of names shall be submitted as an attachment to the AHA. Those listed shall be competent/qualified for the type of work involved in the AHA and familiar with current site safety issues. (2) If a new competent/qualified person (not on the original list) is added, the list shall be updated (an administrative action not requiring an updated AHA). The new person shall acknowledge in writing that he/she has reviewed the AHA and is familiar with current site safety issues.
	01.A.14 (new)		• An AHA shall be prepared and documented for each USACE activity as warranted by the hazards associated with the activity. Generally, an AHA shall be prepared for all field operations. a. The GDA, using the advice of the safety and occupational

			health office, shall determine the need for an AHA for each activity within their area of responsibility. b. In developing the AHA for a particular activity, USACE supervisors should draw upon the knowledge and experience of employees in that activity and the safety and occupational health office. c. The Government will use this process to assess and manage the risk associated with the project.
	01.A.15 (new)		• To assure compliance with this manual, the Contractor may be required to prepare for review specific safety and occupational health submittal items. These submittal items may be specifically required by this manual or may be identified in the contract or by the Contracting Officer's Representative (COR). All safety and occupational health submittal items shall be written in English and provided by the Contractor to the GDA.
	01.A.16 (new)		• The COR or his/her esignated representative may immediately stop work when an employee is deemed to be in imminent danger of serious injury or loss of life. > ***See Federal Acquisition Regulation (FAR) Clause 52.236-13(d).***
	01.A.17 (new)		• The Contractor shall employ a competent person at each project to function as the Site Safety and Health Officer (SSHO). The SSHO will manage the Contractor’s APP.

			(This may be a collateral duty responsibility unless specified differently in the contract.) > ***See Appendix A, paragraphs 4 and 7.*** The person(s), as a minimum, must have completed the 10-hour OSHA Construction safety class or an equivalent course applicable to the work to be performed and given by qualified instructors. Such training shall have been within the last three (3) years. An SSHO shall be on-duty at all times when work is being performed and shall be responsible for enforcing and implementing the Contractor's Safety and Health Program in accordance with the accepted APP.
	01.A.18 (new)		• The Prime Contractor is responsible for assuring subcontractor compliance with the safety and occupational health requirements contained in this manual.
01.B			
	01.B.01	01.B.01	• A qualified person(s) shall conduct all training required by this manual.
	01.B.02	01.B.02	• Employees shall be provided safety and health indoctrination prior to the start of work and continuing safety and health training to enable them to perform their work in a safe manner. Employee indoctrinations will be documented in writing by date, name, and content.
	01.B.03.a.- g.	01.B.03 (replaced)	• Indoctrination and training shall be based on the safety and health program of the Contractor or Government

			agency, as applicable, and shall include but not be limited to: a. Requirements and responsibilities for accident prevention and maintaining safe and healthful work environments; b. General safety and health policies and procedures and pertinent provisions of this manual; c. Employee and supervisor responsibilities for reporting all accidents; d. Provisions for medical facilities and emergency response and procedures for obtaining medical treatment or emergency assistance; e. Procedures for reporting and correcting unsafe conditions or practices; f. Job hazards and the means to control/eliminate those hazards, including applicable position and/or activity hazard analyses; and g. Specific training as required by this manual.
	01.B.04 (new)	01.B.04 (replaced)	• All visitors to USACE Government or Contractor controlled sites hosting hazardous conditions will be briefed by a qualified person on the hazards to be expected on the site and the safety and health controls required (i.e., hard hat, foot protection, etc.). The person-in-charge of the site will assure that all visitors entering the site are properly protected and are wearing or provided with the appropriate personal protective equipment

			(PPE). Site personnel should maintain a stock of common PPE (i.e., hard hats, eye protection, ear plugs, reflective vests, etc.) for use by visitors. The site manager will provide an escort for all visitors while on site. A visitor sign-in log will be maintained on site.
	01.B.05 (new)		• Safety meetings shall be conducted to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent safety and health training and motivation. a. Meetings shall be conducted at least once a month for all supervisors on the project location and at least once a week by supervisors or foremen for all workers. b. Meetings shall be documented, including the date, attendance, subjects discussed, and names of individual(s) who conducted the meeting. Documentation shall be maintained and copies furnished to the GDA on request. c. The GDA will be informed of all scheduled meetings in advance and be invited to attend.
	01.B.06 (new)	01.B.04	• A hazard communication

			program shall be implemented in accordance with 29 Code of Federal Regulations (CFR) 1910.1200 or 1926.59. a. The written hazard communication program shall address, as a minimum, the following: training (to include potential safety and health effects from exposure), labeling, current inventory of hazardous chemicals on site, and the location and use of Material Safety Data Sheets (MSDSs). b. When hazardous substances are brought onto the job site, all employees potentially exposed to the substance will be advised of information in the MSDS for the substance. c. A copy of the MSDS for each hazardous substance at the project will be maintained in an inventory, will be provided to the GDA, and will be made available to all potentially exposed employees. For emergency response purposes, each entry in the inventory shall include the approximate quantities (e.g., liters, kilograms, gallons, pounds) that will be on site at any given time. In addition, a site map will be attached to the inventory showing where inventoried

			hazardous substances are stored. The inventory and the site map will be updated as frequently as necessary to ensure accuracy. > ***The inventory and site map shall be integrated into requirements of this Section and 06.B.01.***
	01.B.07 (new)		• Emergency situations. a. The employer shall provide training in handling emergency situations that may arise in the activities or use of equipment on the project. b. All persons who may have occasion to use emergency and rescue or lifesaving equipment shall be familiarized with the location of the equipment, trained in the proper use of the equipment and its capabilities and limitations, and medically qualified for its use.
01.C			
	01.C.02	01.C.02	• (Added). Contractors shall enforce the drug -free workplace requirements specified in Appendix A as part of their APP. ***See Appendix A.***
	01.C.04.a	01.C.04.a	• a. Operators of equipment, such as hoisting equipment and draglines, mobile construction equipment, electrical power systems, hydropower plants, industrial manufacturing systems, hydraulically operated equipment, powered vessels, and boats, shall not be permitted to exceed 12 hours

			of duty time in any 24-hour period, including time worked at another occupation. A minimum of 8 consecutive hours will be provided for rest in each 24-hour period.
	01.C.04.b	01.C.04.b	b. Operators of motor vehicles, while on duty, shall not operate vehicles for a continuous period of more than 10 hours in any 24-hour period; nor shall any employees, while on duty, operate motor vehicles after being in a duty status for more than 12 hours during any 24-hour period. A minimum of 8 consecutive hours will be provided for rest in each 24-hour period.
01.D			
	01.D.01.a	01.D.01.a	a. Employees are responsible for reporting all injuries or occupationally related illnesses as soon as possible to their employer or immediate supervisor.
	01.D.02 (added)	01.D.02	• An accident that appears to have any of the consequences listed below shall be immediately reported to the GDA. These accidents will be investigated in depth to identify all causes and to recommend hazard control measures. The GDA shall immediately notify the Safety and Occupational Health Office of all serious accidents and follow-up with official accidents reports as prescribed by regulation. > ***Contractors are responsible for notifying OSHA when one or more of their employees are seriously injured.***

			a. Fatal injury. b. Permanent totally disabling injury. c. Permanent partial disabling injury. d. Three or more persons admitted to a hospital, or e. Property damage in an amount specified by USACE current accident reporting regulations.
	01.D.03	01.D.03	• Except for rescue and emergency measures, the accident scene shall not be disturbed until it has been released by the investigating official. The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. The Contractor must assist and cooperate fully with the GDA conducting the Government investigation(s) of the accident.
	01.D.05	01.D.05 (replaced)	• In addition to any other applicable requirements of this section on contract operations, the Prime Contractor shall: a. Maintain records of all exposure and accident experience incidental to the work (this includes exposure and accident experience of the Prime Contractor and subcontractors and, as a minimum, these records shall include exposure work hours and a log of occupational injuries and illnesses - OSHA Form 300 or equivalent as prescribed by 29 CFR 1904; provide a current copy of

			OSHA Form 300 or equivalent to the GDA upon request; b. Maintain health hazard assessment documentation and employee exposure monitoring to chemical, biological, and physical agents as required by Section 06. Provide this information to employees who are characterized by these assessments and exposure monitoring in accordance with OSHA requirements. Immediately notify the GDA of any exposure in excess of the limits specified in Section 06 and the hazard control measures that has been taken to reduce or eliminate such exposures. c. Submit project work hours to the COR monthly on the form provided by the COR. Work hours include all hours on the project where an employee is in an on-duty pay status.
01.E			
	01.E.01.b	01.E.01.b	b. On-site emergency planning shall be integrated with off-site emergency support. (Documentation of specific on-site emergency services shall be made. This can include written agreements, memorandum for record, telephone conversation logs, etc. The emergency services provider should be offered an on-site orientation of the project and associated hazards.)
	01.E.06	01.E.06	Employees working alone in a remote location or away from other workers shall be

			provided an effective means of emergency communications. This means of communication could include a cellular phone, two-way radios, hard-line telephones or other acceptable means. The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the area/environment. An employee check-in/check-out communication procedure shall be developed to assure employee safety.
01.F (new)			
	01.F.01		• EMERGENCY RECOVERY OPERATIONS. In addition to the other pertinent parts of this manual, Civil Emergency Recovery Operations shall be conducted in accordance with Appendix B for both USACE and Contractor activities.

Summary of changes to EM 385-1-1/Section 2

Section	Paragraph	Old	New
02.A			
	02.A.01 (new)		• **GENERAL REQUIREMENTS.** Employers shall establish and maintain basic sanitation provisions for all employees in all places of employment as specified in the following paragraphs.
02.B			
	02.B.01	02.A.01	a. Drinking water shall be provided at continental United States (CONUS) fixed facilities according to the requirements of the Safe Drinking Water Act, as amended, and all applicable Federal, State, and local regulations. Refer to the most current version of 40 CFR 141 and 40 CFR 143, for updates to the national drinking water regulations. Refer to individual State and local regulations, as applicable, for updates in those regulations. CONUS facilities classified as suppliers of water-- (1) Must comply with substantive and procedural requirements pursuant to 40 CFR 141; (2) Must meet any State and local regulations that are more stringent than the Federal regulations; and (3) Shall ensure that the sanitary control and surveillance of water supplies and that the chlorination and fluoridation are conducted according with applicable

			guidelines. b. Drinking water at military outside continental United States (OCONUS) fixed facilities shall be provided in compliance with country-specific Final Governing Standards (FGS) or, in the absence of FGS, the National Primary Drinking Water Regulations (NPDWR) as outlined in the Overseas Environmental Baseline Guidance Document (OEBGD) (Department of Defense Instruction (DODI) 4715.5-G). In addition, the sanitary control and surveillance of water supplies and the chlorination and fluoridation shall be conducted according to applicable Department of Defense (DOD) Component guidelines, or if more stringent, the host nation requirements. c. Drinking water for field activities shall be provided according to the procedures defined in Army Regulation (AR) 700-136; Field Manual (FM) 10-52; FM 21-10/Marine Corps Reference Publication (MCRP) 4-11.1D; and Technical Bulletin, Medical (TB MED) 577. d. Drinking water on all Army floating vessels is provided according to 40 CFR 141 and chapter 6 of Navy Medical (NAVMED) P-5010-010-LP-207-1300.
	02.B.02	02.A.02	
	02.B.03	02.A.03	

	02.B.04	02.A.04	Portable drinking water dispensers shall be designed, constructed, and serviced to ensure sanitary conditions; shall be capable of being closed; and shall have a tap. Containers shall be clearly marked as **"DRINKING WATER"** and shall not be used for other purposes. Water shall not be dipped from containers.
	02.B.05	02.A.05	
	02.B.06	02.A.06	
	02.B.07	02.A.07	• Nonpotable water. a. Outlets dispensing nonpotable water will be conspicuously posted **"CAUTION - WATER UNSAFE FOR DRINKING, WASHING, OR COOKING." (Outlets dispensing nonpotable water at Corps Dumping Stations within campgrounds may, in lieu of this requirement, be posted in accordance with USACE's Engineering Pamphlet (EP) 310-1-6A and EP 310- 1-6B.)** b. Cross-connection - open or potential - between a system furnishing potable water and a system furnishing nonpotable water is prohibited.
02.C		02.B	
	02.C.01	02.B.01	
	02.C.02	02.B.02	• Each toilet facility shall be equipped with a toilet seat and toilet seat cover. Each toilet facility - except those specifically designed and designated for females - shall be equipped with a metal, plastic, or porcelain urinal trough. All shall be provided with an adequate supply of

			toilet paper and a holder for each seat.
	02.C.03	02.B.03	
	02.C.04	02.B.04	• Adequate ventilation shall be provided and all windows and vents screened; seat boxes shall be vented to the outside (minimum vent size 4 inches (in) (10.1 centimeters (cm)) inside diameter) with vent intake located 1 in (2.5 cm) below the seat.
	02.C.05	02.B.05	
	Figure 2-1 (new)		
	Figure 2-2 (new)		
	02.C.06	02.B.06	
	02.C.07	02.B.07	
	02.C.08	02.B.08	
02.D		02.C	
	02.D.01	02.C.01	• Washing facilities shall be provided at toilet facilities and as needed to maintain healthful and sanitary conditions. Washing facilities for persons engaged in the application of paints, coatings, herbicides, insecticides, or other operations where contaminants may be harmful shall be at or near the work site and shall be adequate for removal of the harmful substance.
	02.D.02	02.C.02	• Each washing facility shall be maintained in a sanitary condition and provided with water (either hot and cold running water or tepid running water), soap, and individual means of drying. However, where it is not practical to provide running water, hand sanitizers may be used as a substitute.

02.E		02.D	
02.F		02.E	
02.G.		02.F	

Summary of changes to EM 385-1-1/Section 5

Section	Paragraph	Old	New
05.A			
	05.A.01.a	05.A.01.a	a. Based on hazard evaluations (conducted by supervisors), employers shall select, and have each affected employee use, PPE that will protect the employee from hazards. > ***See also 06.A.02.***
	05.A.01.d (added)		d. The employer will make all reasonable efforts to accommodate employees with religious beliefs that may conflict with the PPE requirements contained within this manual. However, when reasonable efforts to accommodate the employee's religious beliefs do not provide the necessary safe working environment (without PPE), then the employer shall require the employee to use the appropriate PPE or the employee will not be allowed to work in the area where he/she will be exposed to the hazard requiring protection.
	05.A.03.b	05.A.03.b	b. When the employer has reason to believe that any affected employee who has been trained does not have the understanding and skill required for the use of the PPE, the employer shall assure the employee receives the necessary retraining to acquire the appropriate skills.
	05.A.05.a	05.A.05.a	a. Defective or damaged equipment shall not be used. It shall be tagged as out of service and locked-up or immediately removed from the work site to prevent use.
	05.A.07.a	05.A.07.a	a. Employees shall wear clothing suitable for the weather and work conditions: the minimum for fieldwork (i.e., construction sites,

			industrial operations and maintenance activities, emergency operations, regulatory inspections, etc.) shall be short sleeve shirt, long pants (excessively long or baggy pants are prohibited), and leather or other protective work shoes or boots.
	05.A.07.b	05.A.07.b	b. Protective equipment shall be of heat/fire/chemical/electrical resistive material when conditions require protection against such hazards.
	05.A.08.b. (added)		b. USACE and Contractor personnel shall, as a minimum, wear safety-toed footwear meeting ANSI Z41 while working on construction sites unless it can be demonstrated by a PHA/AHA to the GDA satisfaction that a different type of foot protection is required.
	05.A.08.e (added)	05.A.08.d (replaced)	e. Personnel participating in wild land fire management activities shall wear leather lace-up boots with slip-resistant soles, such as a hard rubber lug-type or tractor tread, a top height of 8 in (20.3 cm) or more, and without steel toes. Soles should not be made of composition rubber or plastic, which have low melting points.
	05.A.10	05.A.10	• Persons involved in activities that subject the hands to injury (e.g., cuts, abrasions, punctures, burns, chemical irritants, toxins, vibration, and forces that can restrict blood flow) shall select and use hand protection appropriate for the hazard in accordance with ANSI/International Safety Equipment Association (ISEA) 105.
	05.A.11	05.A.11	• Persons exposed to vehicular or

			equipment traffic, including signal persons, spotters, or inspectors, shall wear high visibility apparel meeting ANSI/ISEA 107 Class 3 requirements.
		05.A.12 and 05.A.13 (removed)	
	05.A.12 (added)		• Protective leg chaps shall be worn by workers who operate chain saws. Protective leg chaps must meet the specifications in American Society for Testing and Materials (ASTM) Standard F1897.
	05.B.07	05.B.07	• Glare-resistant glasses that comply with ANSI Z80.3 with an ultraviolet A-region (UVA) and ultraviolet B-region (UVB) 99% filtration shall be worn when conditions require protection against glare.
	Table 5-2 (added)		REQUIRED SHADES FOR FILTER LENSES AND GLASSES IN WELDING, CUTTING, BRAZING, AND SOLDERING
	05.C.02	05.C.02	• When personnel are subjected to sound-pressure levels exceeding the limits specified in Table 5-3, feasible engineering or administrative controls shall be used. When such controls fail to reduce sound-pressure levels within the specified limit, PPE shall be selected, evaluated, provided, and used in accordance with the hearing conservation program. Hearing protection provided must be capable of attenuating worker noise exposure below an 8-hour TWA of 85 dB(A). In cases where hearing protection devices do not provide sufficient attenuation to reduce

			the worker noise exposure level below 85 dB(A), administrative control of exposure will be necessary. In determining the attenuation value of a given hearing protector, subtract 7 dB(A) from the Noise Reduction Rating (NRR). This corrected NRR can then be subtracted from the individual worker's noise environment in order to assess the adequacy of the protector, or see Appendix A to 29 CFR 1910.95.
	05.C.06	05.C.06	• Ear insert devices to include disposable, preformed, or custom molded earplugs shall be fitted to the exposed individual by an individual trained in such fitting and able to recognize the difference between a good and a poor fit: plain cotton is not an acceptable protective device.
	05.D.01	05.D.01	• All persons working in or visiting hard-hat areas shall be provided with and required to wear Type I or Type II, Class G (General - low voltage electrical protection) or Class E (Electrical – high voltage electrical protection) headgear. For emergency response operations and other activities with greater need for side impact protection, Type II head protection is recommended. >***See Appendix B.***
	05.D.02.c	05.D.02.c	c. Protective headgear worn near electric lines and equipment shall be Class E.
	05.D.02.d (added)		d. No ball caps, knit caps, or other headdress shall be worn under the hard hat that could interfere with the fit or stability of the hard hat unless approved by the manufacturer.
	05.D.05.a	05.D.05.a	a. White in color and marked with a

			1-in (2.5-cm) band of red reflective material placed along the base of the crown with a 5 in (12.7 cm) break in front. A red Corps of Engineers castle insignia, meeting specifications of Engineering Regulation (ER) 385-1-6, will be centered at the front of the hat with the base of the insignia approximately 3/4 in (1.9 cm) above the base of the crown. Personnel may place their name above the insignia and their organization title below the insignia: the rank of military personnel should precede their name. An American Flag insignia may be worn on the back of the hard hat.
	05.D.05.e (added)		e. Chin straps will be worn when wearers are subject to high wind conditions and/or working on elevated structures.
05.E. (replaced)			
05.F			
	05.F.01 (new)	05.F.01 (replaced)	
	05.F.02 (new)	05.F.02 (replaced)	
	05.F.03.e (added)		e. Harness lanyards shall not be looped back over or through a large object and then attached back to themselves unless permitted by the manufacturer.
	05.G	05.H	Electrical Protective Equipment
	05.G.01	05.H.01	
	05.G.02	05.H.02	Employees may use rubber gloves, sleeves, blankets, covers, and line hose only when required by special conditions for work on energized facilities. Rubber goods provided to protect employees who work on energized facilities must meet ASTM specifications. Electrical workers' rubber

			insulating protective equipment shall be visually inspected for damage and defects prior to each use.
	Table 5-4 (replaced)		
	05.G.03	05.H.03	• Electric flash protection shall be provided for any person who enters the flash protection zone ***(See 11.A.06)***. They must wear flame-resistant clothing and PPE, based on the incident exposure associated with the specific task. Refer to NFPA 70E for specific Hazard Risk Classifications and clothing/equipment requirements. ***> Synthetic clothing such as acetate, nylon, polyester, rayon, either alone or in blends with cotton, are prohibited in the flash protection zone.*** a. Employees must wear protective eye equipment whenever there is a danger from electric arcs, flashes, flying objects, or electrical explosion. b. Employees must wear flame-resistant clothing whenever they may be exposed to an electric flash. If used, flash suits and their closure design must permit easy and rapid removal. The entire flash suit, including the window, must have energy absorbing characteristics suitable for arc-flash-exposure. Use clothing and equipment to maximize worker protection. Clothing and equipment required by the degree of electrical hazard exposure can be worn alone or be integrated with normal apparel. Protective clothing and equipment must cover associated parts of the body and all normal apparel that is not flash-flame resistant, while

			allowing movement and visibility. > ***Do not wear synthetic materials that can melt next to skin.*** c. Employees must wear rubber-insulating gloves where there is a danger of hand or arm injury from electric shock or arc-flash burns due to contact with energized parts. Gloves made from layers of flame-resistant material provide the highest level of protection. Leather glove protectors should be worn over voltage-rated rubber gloves. d. Dielectric overshoes are required where electrically insulated footwear is used for protection against step and touch potential. e. Table 3-3.9.1 of Part II of NFPA 70E should be used to determine the Hazard/Risk category associated with each task. Once the Hazard/Risk category has been determined, refer to Table 3-3.9.1 of Part II of NFPA 70E to determine the requirements for protective clothing or other PPE.
	05.G.04	05.H.03	• An air test shall be performed on electrical workers' rubber insulating gloves before each use.
	05.G.05	05.H.04	
	05.G.06	05.H.05	
	05.G.07	05.H.06	
	05.G.08	05.H.07	
	05.H	05.I	
	05.H.01	05.I.01	• Type III, Type V work vests, or better U.S. Coast Guard (USCG)-approved International Orange personal floatation device (PFD) equipped with a USCG-approved automatically activated light (lights on Type III and Type V PFDs are not required on projects

			performed exclusively during daylight hours) and reflective tape shall be provided to and properly worn (zipped, tied, latched, etc., in closed fashion) by all persons in the following circumstances (inflatable PFDs will not be worn by workers on USACE sites): > ***See Figure 5 -1.***
	Figure 5-1 (added)		
	05.H.01.b	05.I.01.b	b. On structures or equipment (including heavy operating equipment that is not secured to the structure) extending over or next to water except where guardrails, personal fall protection system, or safety nets are provided for employees;
	05.H.03	05.I.03 (replaced)	
	05.H.04	05.I.04 (replaced)	
	05.I	05.J (replaced)	
		Definitions (removed)	

Summary of changes to EM 385-1-1/Section 7

Section	Paragraph	Old	New
	07.A.02 (added)	07.A.02 (replaced)	• Office lighting shall be in accordance with ANSI/ Illuminating Engineering Society of North America (IESNA) RP-1.
	07.A.03 (added)		• Roadway lighting shall be in accordance with ANSI/IESNA RP-8.
	07.A.04 (added)		• Marine lighting shall be in accordance with ANSI/IESNA RP-12.
	07.A.05	07.A.02	• Means of egress
	07.A.06 (added)		• Lamps and fixtures will be guarded and secured to preclude injury to personnel. Open fluorescent fixtures will be provided with wire guards, lenses, tube guards and locks, or safety sockets that require force in the horizontal axis to remove the lamp.

Summary of changes to EM 385-1-1/Section 8

Section	Paragraph	Old	New
	08.A.04	08.A.04 (replaced)	• Signs, Tags, Placards, Labels, and Piping Systems shall be in accordance with the following standards: a. ANSI/IEEE C95.2. b. ANSI Z136.1. c. ANSI Z535.1. d. ANSI Z535.2. e. ANSI Z535.5. f. 29 CFR 1910.145. g. DOT Federal Highway Administration's, *Manual on Uniform Traffic Control Devices for Streets and Highways* h. ANSI/American Society of Mechanical Engineers (ASME) A13.1.
	08.A.05	08.A.05 (replaced)	• The type of sign or tag used in a particular situation shall be appropriate for the degree of hazard or intent of message. > ***See Figure 8-1 for Sign and Tag Signal Word Headings. See Figure 8-2 for Example Tag Layout. See Figure 8-3 for Example Sign Layout. See Table 8-1 for Accident Prevention Sign Requirements.*** a. **DANGER SIGNS:** Danger signs must conform to the following requirements: (1) Danger signs will be used only when the circumstances indicate an imminently hazardous situation that, if not avoided, **will** result in death or serious injury, (2) Danger signs must have the signal word "**DANGER**" in white letters placed at the top of

			a rectangular safety red background placed at the top of the sign. The safety alert symbol shall precede the signal word. The base of symbol shall be on the same horizontal level as the base of the letters of the signal word – the height equaling or exceeding the signal word height. > ***See Figure 8-1.*** Alternative: As an alternative, danger signs may have "**DANGER**" in white letters on a safety red oval background with a white border on a black rectangular field. This distinctive panel shall appear in the uppermost portion of the sign. No other signal word or symbol shall be used within this distinctive shape and color arrangement. (3) The message panel shall be in black on a white background or white letters on a black background and the symbol/pictorial panel, if used, shall be square with a black safety red, or black and safety red symbol on a white back background. b. **WARNING SIGNS:** Warning signs must conform to the following requirements: (1) Warning signs may be used only when the circumstances indicate a potentially hazardous situation that, if not

			avoided, **could** result in death or serious injury. (2) Warning signs must have the signal word "**WARNING**" in black letters on a rectangular orange background placed at the top of the sign. The safety alert symbol shall precede the signal word. The base of symbol shall be on the same horizontal level as the base of the letters of the signal word – the height equaling or exceeding the signal word height. > ***See Figure 8-1.*** Alternative: As an alternative, warning signs may have the signal word "**WARNING**" in black letters within a safety orange truncated diamond on a black rectangular background. The distinctive panel shall be located at the uppermost portion of the sign. No other word or symbol shall be used within this distinctive shape or color arrangement. (3) The message panel should be in black letters on a white background or white letters on a black background. The message may, as an alternative, be in black letters on a safety orange background. The symbol/pictorial panel, if used, shall be square with a black symbol n a white background. The symbol panel used as an alternative may be square

			with a black symbol on an orange background. c. **CAUTION SIGNS:** Caution signs must conform the to following requirements: (1) Caution signs may be used only when circumstances indicate a potentially hazardous situation that, if not avoided, **may** result in a minor or moderate injury. It may also be used to alert against unsafe practices that may result in property damage. (2) Caution signs should have the signal word "**CAUTION**" in black letters on a rectangular yellow background placed at the top of the sign. The safety alert symbol shall precede the signal word if the hazard is a potential personal injury hazard. (The alert symbol is not used when the situation is used to indicate property damage, only accidents.) The base of symbol shall be on the same horizontal level as the base of the letters of the signal word – the height equaling or exceeding the signal word height. > ***See Figure 8-1.*** Alternative: As an alternative, caution signs may have the signal word "**CAUTION**" in safety yellow letters within a black rectangular background, and this distinctive panel shall be located in the uppermost portion of the sign. No other signal word or symbol shall be used with this distinctive color or signal shape arrangement.

			(3) The message panel should be in black letters on a white background or white letters on a black background. The message may, as an alternative, be in black letters on a safety yellow background. The symbol/pictorial panel, if used, shall be square with a black symbol on a white background. As an alternative, it may be square with a black symbol on a safety yellow background. d. **NOTICE SIGNS:** Notice signs should conform to the following requirements: (1) Notice signs may be used to indicate a statement of company policy directly or indirectly related to the safety of personnel or protection of property. The signal word SHOULD NOT be associated directly with a hazard or hazardous situation and shall not be used in place of "DANGER," "WARNING," or "CAUTION." (2) Notice signs shall have the signal word "**NOTICE**" in white italic letters on a safety blue background on a rectangular field and this distinctive panel shall be located in the uppermost portion of the visual alerting device. No other signal word or symbol shall be used within this

			distinctive shape and color arrangement. (3) The message shall be in safety blue or black letters on a white background. The symbol/pictorial panel, if used, shall be square with a safety blue or black symbol on a white background. e. **GENERAL SAFETY SIGNS**: General safety signs should conform to the following requirements: (1) General safety signs may be used to indicate general instructions relative to safe work practices, remind of proper safety procedures, and indicate the location of safety equipment. (2) They may have the signal words "**SAFETY FIRST**," "**BE CAREFUL**," "**THINK**," "**SAFETY INSTRUCTIONS**," etc. in white letters on a safety green background on a rectangular field, and this distinctive panel shall appear in the uppermost portion of this sign. (3) The message panel shall be in safety green or black letters on a white background and the symbol/pictorial panel, if used, shall be square with a safety green or black symbol on a white background. f. **FIRE SAFETY SIGNS:** Fire

			safety signs should conform to the following requirements: (1) Fire safety signs may be used to indicate the location of emergency firefighting equipment (2) These signs do NOT have a signal word. (3) The message panel shall be in safety red letters on a white background in either a square or rectangular field and the symbol/pictorial panel, if used, shall be safety red on white or white on safety red. g. **DIRECTIONAL ARROW SIGNS**: Directional arrow flow signs should conform to the following requirements: (1) Directional arrow signs may be used to indicate the direction to emergency equipment, safety equipment, and other locations important to safety. (2) The arrow symbol shall be in white on a black or colored background on a rectangular field and this distinctive symbol shall appear in the uppermost portion of the visual alerting device when used by itself or in conjunction with general safety or fire safety signs. h. Color coding shall be in accordance with Table 8-2. i. Piping systems shall be identified: it is recommended that the identification of

			piping systems (including pipes, fittings, valves, and pipe coverings) be in accordance with Table 8-3. j. The RF radiation hazard-warning symbol specified in Figure 8-4 shall be used in the identification of RF radiation hazards. k. Laser caution and warning signs shall be in accordance with ANSI Z136.1. ***See Figure 8-5 and 8-6 for examples.*** l. Ionizing radiation warning signs, labels, and signals shall contain the symbol show in Figure 8-7. m. Vehicles or equipment that, by design, move at 25 miles per hour (mph) (1.1 meters per second (m/s)) or less on public roads shall display the slow-moving vehicle emblem specified in Figure 8-8.
	08.B	08.B (replaced in it's entirety)	• SIGNAL SYSTEMS, PERSONNEL AND PROCEDURES
	08.B.01 (new)		• A standard signal system shall be used on all operations. a. Hand signals for crane operations shall conform to ANSI/ASME B30 series. > ***See Figure 8-10.*** b. Traffic flagging procedures shall be in accordance with the DOT Federal Highway Administration's "*Manual on Uniform Traffic Control Devices for Streets and Highways*."

			c. For Marine signals, see Section 19. d. For helicopter hand signals, see Figure 8-11.
	08.B.02 (new)		• Standard hand signals shall be posted at the operator's position, signal control points, and other points as necessary to inform those concerned.
	08.B.03 (new)		• Manual (hand) signals may be used when the distance between the operator and signal person is not more than 100 ft (30.4 m). Radio, telephone, or a visual and audible electrically operated system shall be used when the distance between operator and signal person is more than 100 ft (30.4 m) or when they cannot see each other.
	08.B.04 (new)		• A signal person shall be provided when the point of operation (includes area of load travel and area immediately surrounding the load placement) is not in full view of the vehicle, machine, or equipment operator; when vehicles are backed more than 100 ft (30.4 m); when terrain is hazardous; or when two or more vehicles are backing in the same area.
	08.B.05 (new)		• A flag person or other controls shall be provided when operations or equipment on or next to a highway create a traffic hazard. An exception shall be made only when an adequate mechanical signaling or control device is provided for safe direction of the operation.
	08.B.06 (new)		• Where manual (hand) signals are used, only one person shall be designated to give signals to the operator. This signal person shall be located to see the load and be

			clearly visible to the operator at all times.
	08.B.07 (new)		• Flag signaling shall be accomplished by use of red flags at least 18 in (45.7 cm) square or sign paddles. In periods of darkness, red lights shall be used.
	08.B.08 (new)		• High visibility vests shall be worn by flag and signal persons. > ***See Section 5.A.11.***
	08.B.09 (new)		• Signal systems shall be protected against unauthorized use, breakage, weather, or interference: any malfunction shall be cause to stop all work.
	08.B.10 (new)		• Only persons who are competent and qualified by experience and/or training with the operations being directed shall be used as signal persons.
	08.B.11 (new)		• Signal persons shall back one vehicle at a time. While under control of a signal person, the driver shall not back or maneuver until directed, and the driver shall stop when visual contact with the signal person is lost.
	08.B.12 (new)		• The signal person shall have a warning device of clear range and penetrating sound to warn persons when the load is coming in so they have time to get in the clear.
	08.C (added)		• TRAFFIC CONTROL
	08.C.01 (new)		• Traffic control shall be accomplished in accordance with DOT Federal Highway administration's "*Manual on Uniform Traffic Control Devices for Streets and Highways.*"
	08.C.02 (new)		• The Contractor shall conduct his/her operations in such a manner as to offer the least possible obstruction to the safe and satisfactory movement of traffic over the existing roads during the life of the contract.

	08.C.03 (new)		• The Contractor shall be responsible for providing, erecting, maintaining, and removal of all traffic signs, barricades, and other traffic control devices necessary for maintenance of traffic.
	08.C.04 (new)		• All barricades, warning signs, lights, temporary signals, other devices, flagmen, and signaling devices shall meet or exceed the minimum requirements of the local DOT requirements.
	08.C.05 (new)		• Prior to the commencement of construction operations the Contractor shall submit for acceptance the complete details of the proposed traffic control plan for the maintenance of traffic and access through the construction area.
	08.C.06 (new)		• The Contractor shall coordinate with the GDA and obtain approval from local authorities prior to closing or restricting any roads.
	08.C.07 (new)		• Barricades, danger, warning and detour signs, as required, shall be erected before any roads are closed.
	08.D (added)		• HAUL ROADS
	08.D.01 (new)		• Access/haul roads shall be designed in accordance with current engineering criteria. Prior to construction, the Contractor shall provide the GDA with a copy of the plan for review and acceptance. Work on the haul road shall not commence until the GDA has accepted the plan. The plan shall address the following items: a. Equipment usage, traffic density, and hours of operation; b. Road layout and widths, horizontal and vertical curve data,

			and sight distances; c. Sign and signalperson requirements, road markings, and traffic control devices; d. Drainage controls; e. Points of contact between vehicles and the public, and safety controls at these points of contact; f. Maintenance requirements, including roadway hardness and smoothness and dust control; and g. Hazards adjacent to the road such as bodies of water, steep embankments, etc.
	08.D.02 (new)		• No employer shall move, or cause to be moved, any equipment or vehicle upon an access or haul road unless the roadway is constructed and maintained to safely accommodate the movement of the equipment or vehicle involved.
	08.D.03 (new)		• When road levels are above working levels, berms, barricades, or curbs shall be constructed to prevent vehicles overrunning the edge or end of embankment. Berms/curbs shall be constructed to one-half the diameter of the tires of the largest piece of equipment using the roadway.
	08.D.04 (new)		• Roadways shall have a crown and ditches for drainage. Water shall be intercepted before reaching a switch back or large fill and be led off.
	08.D.05 (new)		• Haul roads shall be constructed to widths suitable for safe operation of the equipment at the travel speeds proposed by the Contractor and accepted by the GDA.
	08.D.06 (new)		• All roads, including haul roads, shall be posted with maximum speed limits.
	08.D.07 (new)		• An adequate number of turn-outs

			shall be provided on single lane roads haul roads with two-way traffic. When turn-outs are not practical, the Contractor shall provide a traffic control system to prevent accidents.
	08.D.08 (new)		• Whenever possible, use a right-hand traffic pattern on two-way haul roads.
	08.D.09 (new)		• Curves. a. All curves shall have open sight line and as great a radius as practical. b. Vehicle speed shall be limited on curves so that vehicles can be stopped within one-half the visible distance of the roadway. c. The design of horizontal curves shall consider vehicle speed, roadway width and surfacing, and super elevation.
	08.D.10 (new)		• Grades. a. When necessary, based on grade and machine and load weight, machines shall be equipped with retarders to assist in controlling downgrade descent. b. Truck haul roads should be kept to less than a10% grade. There should be no more than 400 ft (121.9 m) of grade exceeding 10%. c. The maximum allowable grade shall not exceed 12%.
	08.D.11 (new)		• Lighting shall be provided as necessary.
	08.D.12 (new)		Traffic control lights, barricades, road markings, signs, and signal persons for the safe movement of traffic shall be provided in accordance with the DOT Federal Highway Administration's "*Manual on Uniform Traffic Control Devices*" and this

			Section.
	08.D.13 (new)		• Roadway hardness, smoothness, and dust control shall be used to maintain the safety of the roadway.
	08.D.14 (new)		• All roads shall be maintained in a safe condition and eliminate or control dust, ice, and similar hazards.
	08.D.15 (new)		• The deposition of mud and or other debris on public roads shall be minimized to the extent possible and in accordance with local requirements.
	Figures 8.1 - 8.11 (new)		

Summary of changes to EM 385-1-1/Section 10

Section	Paragraph	Old	New
10.A			
	10.A.01	10.A.01	• Welders, cutters, and their supervisor shall be trained in the safe operation of their equipment, safe welding/cutting practices, and welding/cutting respiratory and fire protection. ***AIHA publication "Welding Health and Safety: A Field Guide for OEHS Professionals" is recommended.***
	10.A.04	10.A.04	• Workers, watchers, and the public shall be shielded from welding rays, flashes, sparks, molten metal, and slag.

Summary of changes to EM 385-1-1/Section 11

Section	Paragraph	Old	New
	11.A.01.c	11.A.01.c	c. Electrical work shall be performed by qualified personnel with verifiable credentials who are familiar with applicable code requirements. > ***See definition of qualified person (electrical) in Appendix Q.***
	11.A.02.b	11.A.02.b	b. Whenever possible, all equipment and circuits to be worked on shall be de-energized before work is started and personnel protected by clearance procedures, lockout/tagout, and grounding. On each machine operated by electric motors, positive means shall be provided for rendering such controls or devices inoperative while repairs or adjustments are being made to the machines they control. > ***See Section 12.***
	11.A.03.a (added)	11.A.03.b,c,d,e change numbering only	a. For construction sites, all flexible cords shall be inspected by the user of the cord at least daily.
	11.A.04	11.A.04	• When it is necessary to work on energized lines or equipment, rubber gloves and other protective equipment or hotline tools meeting the provisions of ANSI and ASTM standards shall be used. For work on energized equipment only tools insulated for the voltage shall be used. > ***See Section 05.G.***
	11.A.05 (added)	11.A.05	• Whenever it is necessary to work o n energized parts greater than 50 volts to ground, a risk/hazard analysis will be conducted in accordance with NFPA 70E, Part II, Appendix D.
	11.A.06 (added)	11.A.06	• An electrical arc flash hazard analysis shall be conducted in accordance with the NEC (NFPA

			70E, Part II, Chapter 2-1) to determine the flash hazard protection boundary before a person approaches any exposed electrical conductor or circuit part that has not been placed in an electrically safe work condition.
	11.A.07 (added)	11.A.07	• For systems that are 600 volts and below, the flash protection boundary shall be 4 ft (1.2 m), based upon the product of clearing times of 6 cycles (0.1 second) and available bolted fault current of 50 kiloamp (kA) or any combination not exceeding 300 kA cycles (5000 ampere seconds). For clearing times and bolted fault currents other than 300 kA cycles (5000 ampere seconds), or under engineering supervision, the flash protection boundary shall alternatively be permitted to be calculated in accordance with the following general formula. [ ] 2 / 1 65 . 2 *t MVA D bf c* ´ ´ = or [ ] 2 / 1 53 *t MVA Dc* ´ ´ = Where: MVAbf = bolted fault megavolts-amperes (MVA) available at the point involved MVA = the MVA rating of the transformer. For transformers with MVA ratings below 0.75 MVA, multiply the transformer MVA rating by 1.25 t = time or arc exposure in seconds
	11.A.08	11.A.05	• At least two persons shall be assigned to work together in the following situations: a. Work on energized overhead lines. b. Work at substations/power plants where wiring is congested. c. Work-involving handling energized conductors or

			apparatus. • One person shall be trained to recognize situations that are dangerously close to live conductors or performance of unsafe electrical acts. This person shall be delegated to watch the movements of the other(s) doing the work so that he/she can warn them if they get dangerously close to live conductors or perform other unsafe acts. He/she can also assist in case of an accident.
	11.A.09	11.A.06	• Switch boxes, receptacle boxes, metal cabinets, enclosures around equipment, and temporary power lines shall be marked to indicate the maximum operating voltage.
	11.A.10	11.A.07	• Insulation mats or platforms of substantial construction and providing good footing shall be placed on floors and on the frames of equipment having exposed live parts so that the operator or persons in the vicinity cannot touch such parts unless standing on the mats, platforms, or insulated floors.
	11.A.11	11.A.08	• Suitable barriers or other means shall be provided to ensure that workspace for electrical equipment cannot be used as a passageway when energized parts of electrical equipment are exposed.
	11.A.12	11.A.09	• When fuses are installed or removed with one or both terminals energized, special tools insulated for the voltage shall be used.
	11.A.13	11.A.11	• Attachment plugs and receptacles. a. Plugs and receptacles shall be kept out of water unless of an approved submersible type. b. Attachment plugs for use in work areas shall be

			constructed so that they will endure rough use and shall be equipped with a cord grip to prevent strain on the terminal screws. c. Attachment plugs and other connectors supplying equipment at more than 300 volts shall be skirted or otherwise designed so that arcs will be confined. d. When a National Electrical Manufacturers Association (NEMA) standard configuration exists for a particular voltage, amperage, frequency, or type of current, the NEMA standard plug and receptacle shall be used.
	11.A.14	11.A.12	• Portable hand lamps. a. Portable hand lamps shall be of molded composition or another type approved for the purpose. b. Metal-shell, paper-lined lamp holders shall not be used. c. Hand lamps shall be equipped with a handle and with a substantial guard over the bulb. The guard shall be attached to the lamp holder or the handle.
	11.B.01.e	11.B.01.e	e. Enclosures containing overcurrent protective devices shall be provided with lockable, close-fitting doors. At least 36 in (91.4 cm) of clearance must be maintained around all sides of the enclosure. On vessels or floating plant where the 36 in (91.4 cm) clearance is not feasible, sufficient clearance for fully opening the door and/or servicing the electrical enclosure shall be maintained.
	11.B.03.b	11.B.03.b	b. Switches shall be of the externally operable type mounted in an enclosure listed for the intended

			use and installed to minimize the danger of accidental operation.
	11.C.01.b	11.C.01.b	b. Portable Generators. The frame of portable generators shall not be required to be grounded and shall be permitted to serve as the grounding electrode for a system supplied by the generator under the following conditions: (1) The generator supplies ONLY equipment mounted on the generator, cord-and-plug-connected equipment through receptacles mounted on the generator, or both; and (2) The non-current-carrying metal parts of the equipment and the equipment grounding conductor terminals of the receptacles are bonded to the generator frame.
	11.C.01.c (new)		c. Vehicle -Mounted Generators. The frame of a vehicle shall be permitted to serve as the grounding electrode for a system supplied by a generator located on the vehicle under the following conditions: (1) The frame of the generator is bonded to the vehicle frame, and (2) The generator supplies only equipment located on the vehicle or cord-and-plug-connected equipment through receptacles mounted on the vehicle, or both equipment located on the vehicle and cord-and-plug-connected equipment through receptacles mounted on the vehicle or on the generator, and (3) The non-concurrent-carrying metal parts of equipment and the equipment grounding conductor terminals of the

			receptacles are bonded to the generator frame, and (4) The system complies with all other provisions of NEC 250.
	11.C.01.d (new)		d. A system that is required to be grounded by NEC 250.30 shall be bonded to the generator frame where the generator is a component of a separately derived system.
	11.C.01.e	11.C.01.c	
	11.C.01.f	11.C.01.d	
	11.C.05.f.(3) (new)		(3) The request for the exception, the AHA, and the assured grounding program plan must be submitted and accepted by the GDA prior to implementing the program.
	11.D.02.a	11.D.02.a	a. Temporary electrical distribution systems and devices shall be checked and found acceptable for polarity, ground continuity, and ground resistance before initial use and before use after modification. GFCI shall be tested monthly.
	11.D.06.b	11.D.06.b	b. Unless designed for suspension, temporary lights shall not be suspended by their electric wire.
	11.D.06.c	11.D.06.c	c. Exposed empty light sockets and broken bulbs shall be replaced immediately.
	Table 11-1	Table 11-3	Replaced
	11.E.06 (new)		• Standard emergency communication procedures shall be established and rehearsed to assure rapid emergency shutdown for all work being conducted on overhead power lines.
	11.E.07	11.E.06	
	11.E.08	11.E.07	
	11.E.09	11.E.08	
	11.F.03.c	11.F.03.c	c. Facilities for quick drenching of the eyes and body shall be provided for emergency use within 25 ft (7.6 m) of battery handling areas. >***See Section***

			06.B.02.b.(3). PPE shall be used as prescribed in Section 5.
	11.F.04.d (new)		d. Prior to charging batteries, the electrolyte level shall be checked and adjusted to the proper level if necessary.
	Table 11-2	Table 11-4	Replaced
	Table 11-3	Table 11-5	Replaced
	11.H.10.a	11.H.10.a	a. When working near energized lines or equipment, aerial lift trucks shall be grounded or barricaded and considered as energized equipment, or the aerial lift truck shall be insulated for the work being performed. Table11-3 will be legibly printed on a plate of durable non-conductive material and shall be mounted on the bucket or its vicinity so as to be visible to the operator of the boom.
	11.J.04	11.J.04	• Only qualified employees shall perform work on or adjacent to energized control panels.

Summary of changes to EM 385-1-1/Section 12

Section	Paragraph	Old	New
	12.A.06.a.(2)	12.A.6.a.(2)	(2) The use of tagout devices will provide full personnel protection (as defined in Appendix Q).

Summary of changes to EM 385-1-1/Section 13

Section	Paragraph	Old	New
	13.A.03.a	13.A.03.a	a. Power tools designed to accommodate guards shall be equipped with such guards. All guards must be functional.
	13.A.15 (added)		• The electrical power control shall be provided on each machine/power tool to make it possible for the operator to cut off the power for the machine/power tool without leaving the point of operation.
	13.A.16 (added)		• Where injury to the operator may result if motors were to restart after power failures, provisions shall be made to prevent machines/power tools from automatically restarting upon restoration of power.
	13.A.17 (added)		• Floor- and bench-mounted power tools shall be anchored or securely clamped to a firm foundation. Anchoring or securing shall be sufficient to withstand lateral or vertical movement.
	13.C.01 (added)		• All woodworking machinery shall be operated and maintained in accordance with ANSI 01.1.
	13.C.02-10	13.C.01-09	Renumbered to reflect change in 13.C.01 (added).

Summary of changes to EM 385-1-1/Section 16

Section	Paragraph	Old	New
	16.A.01	16.A.01	• Before any machinery or mechanized equipment is placed in use, it shall be inspected and tested in accordance with the manufacturer's recommendations and requirements of this manual and shall be certified in writing by a competent person to meet the manufacturer's recommendations and requirements of this manual. Subsequent reinspections will be conducted at least annually thereafter. All safety deficiencies noted during the inspection shall be corrected prior to the equipment being placed in service at the project. If at anytime the machinery or mechanized equipment is removed and subsequently returned to the project (other than equipment removed for routine off-site operations as part of the project), it shall be reinspected and recertified prior to use.
	16.A.01.a	16.A.01.a	a. The Contractor shall keep records of tests and inspections. These records shall be made available in a timely manner upon request of the GDA and , when submitted, shall become part of the official project file.
	16.A.01.b	16.A.01.b	b. The Contractor shall provide the GDA ample notice in advance of any equipment entering the site so that he/she may observe the Contractor's inspection process and so that spot checks may be conducted.
	16.A.03.a	16.A.03.a	a. A tag indicating that the equipment shall not be operated, and that the tag shall not be removed, shall be placed in a conspicuous location

			on the equipment. >***See Section 8.*** Where required, lockout procedures shall be used. > ***See Section 12.***
	16.A.06	16.A.06	• Inspections or determinations of road and shoulder conditions and structures shall be made in advance to assure that clearances and load capacities are safe for the passage or placing of any machinery or equipment.
	16.A.22	16.A.21	• All powered-industrial trucks shall meet the requirements of design, construction, stability, inspection, testing, maintenance, and operation defined in ANSI/ASME B56.1.
	16.A.23	16.A.22	• All powered-industrial trucks, lift trucks, stackers, and similar equipment shall have the rated capacity posted on the vehicle so as to be clearly visible to the operator. When the manufacturer provides auxiliary removable counterweights, corresponding alternate rated capacities also shall be clearly shown on the vehicle. The ratings shall not be exceeded.
	16.A.24	16.A.23	• Only trained and authorized operators shall be permitted to operate a powered-industrial truck. Training must be both classroom and practical operation of the same type of truck the student uses on the job. Training shall be provided in accordance with OSHA Standard 29 CFR 1910.178. The employer must certify that the operator has been trained and evaluated as required by the standard. The certification shall include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s)

			performing the training or evaluation. Refresher training shall be provided as indicated by the standard.
	16.A.25 (new)		• When a powered-industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, and brakes shall be set. Wheels shall be blocked if the truck is parked on an incline.
	16.A.26 (new)		• An overhead guard shall be used as protection against falling objects. It should be noted that an overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load.
	16.A.27 (new)		• Dock board or bridge plates shall be properly secured before they are driven over. Dock board or bridge plates shall be driven over carefully and slowly and their rated capacity shall never be exceeded.
	16.A.28 (new)		• Under all travel conditions the powered-industrial truck shall be operated at a speed that will permit it to be brought to a stop in a safe manner.
	16.A.29 (new)		• On all grades the load and load engaging means shall be tilted back if applicable, and raised only as far as necessary to clear the road surface.
	16.A.30 (new)		• When ascending or descending grades in excess of 10%, loaded powered-industrial trucks shall be driven with the load upgrade.
	16.A.31	16.A.23	
	16.A.32	16.A.24	
	16.A.33	16.A.25	

	16.A.34	16.A.26	
	16.A.35	16.A.27	
	16.B.12.d	16.B.12.d	d. The operating authority shall furnish proof from the manufacturer or certification from a licensed engineer that the ROPS complies with SAE Standards J167, J1040, J1042, J1084, and J1194, as applicable.
	16.C.01	16.C.01	• Unless otherwise specified, the requirements of this Section are applicable to all cranes and derricks of the types listed in Table 16-1.
	16.C.02	16.C.02	• Every crane shall have the following documents with them (in the cab) at all times they are to be operated:
	16.C.02.b	16.C.02.b	b. A copy of the load-rating chart for the crane/derrick in use (separate or included in the operating manual), which shall include:
	16.C.02.c (new)		c. A durable load chart with legible letters and figures shall be fixed at a location visible to the operator while seated at the control station.
	16.C.02.d	16.C.02.c	
	16.C.03.b	16.C.03.b	b. The operator shall not leave the controls while a load is suspended.
	16.C.03.c (new)		c. Before leaving the crane unattended, the operator shall: (1) Land any load, bucket, lifting magnet, or other device; (2) Disengage the master clutch; (3) Set travel, swing, boom brakes, and other locking devices; (4) Put the controls in the off or neutral position; (5) Secure the crane against accidental travel; and (6) Stop the engine. Exception: When crane operation is frequently interrupted during a shift and the operator must leave

			the crane. Under these circumstances, the engine may remain running and the following conditions (including those in paragraphs (1) thru (5)) shall apply: (a) The operator shall be situated where unauthorized entry of the crane can be observed; and (b) The crane shall be located within an area protected from unauthorized entry.
	16.C.03.d	16.C.03.c	
	16.C.03.e	16.C.03.d	
	16.C.03.f (new)		f. Except for critical lifts, when these duties will be carried out by the lift supervisor, the rigger shall ensure that: (1) The crane is level and, where necessary, blocked; (2) The load is well secured and balanced in the sling or lifting device before it is lifted more than a few inches; (3) The lift and swing path is clear of obstructions and adequate clearance is maintained from electrical sources; and (4) All persons are clear of the swing radius of the counterweight.
	16.C.03.g	16.C.03.e	
	16.C.04.a	16.C.04.a	a. Only qualified, designated persons may operate cranes or derricks. Only those operators qualified to operate a particular type of crane or derrick may operate that type of machinery: proof of qualification shall be in writing. In addition to fully qualified crane operators, the following personnel may be designated to operate cranes under limited conditions:

			(1) Trainees under the direct supervision of the designated operator of the crane; (2) Maintenance personnel who have completed all operator trainee qualification requirements. Operation is limited only to those functions necessary to perform maintenance or verify performance of a crane; and (3) Inspectors who have completed all operator trainee qualification requirements. Operation is limited only to functions necessary to accomplish inspection.
	16.C.05.a.(1)		(1) All operators, Government or Contractor, shall be instructed in and qualified for each type of crane or derrick he/she is to operate.
	16.C.05.a.(2)		(2) Qualification for all crane/derrick operators shall be by written (or oral) and practical operating examination unless the operator is licensed by a State or city licensing agency for the particular type of crane or derrick. (Qualification for crane or derrick operators shall be valid for no longer than 5 years from the date of issuance. Prior to re-issuance of qualification, crane/derrick operators must have attended at least 8 hours of crane/derrick safety training; passed an operational examination; and pass a physical examination within 2 years.) >***See Appendix G.***
	16.C.05.a.(3)		(3) As a minimum, the qualifying examination procedures in Appendix G shall be followed for all crane/derrick operators. When the crane manufacturer recommends operator qualifying

			examination procedures, those procedures shall be in addition to the requirements of Appendix G.
	16.C.05.b		b. All crane/derrick operators shall meet the physical qualifications listed in Appendix G. Physical examinations for operators are required to be conducted at least biennially and any time thereafter if indicated by a medical condition that may impact on the safe operation of a crane/derrick. Written proof, signed by a physician stating that the crane/derrick operator has had a physical examination and meets the medical requirements set forth in Appendix G, shall be submitted to the GDA for acceptance prior to allowing a crane/derrick operator to operate a crane/derrick.
	16.C.05.c		c. USACE crane and derrick operators (not Contractor) shall complete a crane operators' course (that is at least 24 hours in length) that covers general crane operation and safety. Yearly thereafter, operators shall complete an 8-hour refresher course covering safe operation of the type of crane or derrick they operate.
	16.C.06	16.C.06 (replaced)	Crane and Derrick Design and Construction Standards. a. Cranes and derricks shall be designed and constructed in accordance with the applicable ANSI/ASME standards in effect at the time of initial construction listed in Table 16-1, and the additional requirements of this manual, whichever is more stringent. b. Modification of existing cranes and derricks shall be

			performed in accordance with the current ANSI/ASME standards. It is not the intent of this manual to require immediate retrofitting of existing equipment.
	16.C.07	16.C.07	• Cranes and derricks shall be operated, inspected, tested and maintained in accordance with the manufacturer's operating manual for the crane and the applicable ANSI/ASME codes or OSHA requirements, whichever is more stringent.
	16.C.09.b (new)		b. Overhead and gantry cranes clearances shall be in accordance with the Crane Manufacturer's Association of America (CMAA) 70.
	16.C.09.c	16.C.09.b	c. All other cranes. (1) Adequate clearance shall be maintained between moving and rotating structures of the crane and fixed objects to allow the passage of employees without harm. The minimum adequate clearance is 16 in (40.6 cm). (2) Accessible areas within the swing radius of the rear of the crane's rotating superstructure, either permanently or temporarily mounted, shall be barricaded to prevent an employee from being struck or crushed by the crane.
	16.C.10	16.C.10	• Hoisting ropes shall be installed in accordance with ANSI/ASME standards and the equipment manufacturer's recommendations. a. Overhead and gantry cranes shall have at least two full wraps of cable on the drums of hoisting equipment at all times. b. All other cranes shall have at

			least three full wraps (not layers) of cable on the drums of hoisting equipment at all times. c. The drum end of the rope shall be anchored to the drum by an arrangement specified by the crane or rope manufacturer.
	16.C.12 - Inspections	16.C.12 - Inspections (replaced)	a. Inspections of cranes and derricks shall be in accordance with applicable ANSI/ASME standards, OSHA regulations, and the manufacturer's eecommendations. b. A qualified person shall conduct inspections that cover, at the minimum, the items listed in Appendix H. c. The Contractor shall notify the GDA at least 24 hours prior to any inspections/tests so that the GDA may be available to observe the inspection/test. There are basically five types of inspections: (1) Initial inspection. Before initial use, a qualified person shall inspect all new and altered cranes to ensure compliance with all applicable sta ndards. (2) Functional test inspection. Before every operation (at the beginning of each shift) of the crane, the operator or designated person shall conduct start-up (pre-operational) inspections as follows: (a) Overhead and gantry cranes. A visual a nd audible examination of the crane shall be conducted. Items to be functionally tested are the controls and the upper limit.

			Documentation of the test shall be noted in the operator's log. (b) All other cranes and derricks. If checklists are used for start-up (pre-operational) inspections, a copy of the checklist shall be maintained at the project site. If checklists are not used, the operator or designated person shall indicate the successful completion of the inspection (in accordance with the manufacturer's recommendations) in the operator's log (3) Frequent inspection. A frequent inspection is a visual and audible examination of the crane. The crane operator or designated person shall conduct a frequent inspection as follows: (a) Normal service – Monthly (b) Heavy service – Weekly to monthly (c) Severe service – Daily to weekly (4) Periodic inspection. A periodic inspection is a visual and audible examination of the crane. The crane operator or designated person shall conduct a periodic inspection as follows: (a) Normal service – Yearly (b) Heavy service – Yearly (c) Severe service – Quarterly (5) Inspection of cranes not in regular use. (a) Infrequent service cranes that have been idle for a period of 1 month or more, but less than 1 year,

			shall be inspected in accordance with 16.C.12c(3). (b) Infrequent service cranes that have been idle for a period of 1 year or more shall be inspected in accordance with 16.C.05c(4). Infrequent service cranes that are exposed to adverse environmental conditions shall be inspected more frequently, as determined by the GDA or the Contractor with the concurrence of GDA.
	16.C.13	16.C.13	• Testing. > ***See also 16.D.06a.*** a. A qualified person shall conduct performance tests in accordance with ANSI/ASME, OSHA, and the manufacturer's recommendations. At the minimum, performance testing shall meet the requirements listed in Appendix I. Test loads shall not be less than 110% of the anticipated load and shall not exceed 100% of the manufacturer's load rating capacity chart at the configuration of the test, except for manufacturer testing of new cranes, which shall be conducted in accordance with the ANSI/ASME standards B30.1 through B30.17 as appropriate for the crane. b. Performance testing after the replacement of wire rope is not required. c. Written reports of the performance test, showing test procedures and confirming the adequacy of repairs or alterations, shall be maintained with the crane or derrick or at the on-site project office.

			(1) Operational performance test. Operational tests shall be conducted in accordance with Appendix I: (a) Before initial use of a crane(s) in which a load bearing (excluding the rope) or load controlling part or component, brake, travel component, or clutch have been altered, replaced, or repaired; (b) Every time a crane(s) is reconfigured or reassembled after disassembly (to include booms); (c) Every time a crane is brought onto a USACE project; and (d) Every year. > ***Under conditions (a) and (b), a selective operational performance test (testing only those components that have or may have been affected by the alteration, replacement, repair, reconfiguration, or reassembly) may be performed.*** (2) Load performance test. Load performance tests shall be conducted in accordance with Appendix I: (a) Before initial use of cranes in which a load bearing (excluding the rope) or load controlling part or component, brake, travel component, or clutch have been altered, replaced, or repaired; (b) Every time the crane is reconfigured or reassembled after

			disassembly (to include booms); and (c) Every 4 years. > ***Under conditions (a) and (b), a selective operational performance test (testing only those components that have or may have been affected by the alteration, replacement, repair, reconfiguration, or reassembly) may be performed. When the load performance test of a powerhouse indoor overhead crane would pose unacceptable risk to generators, the District Commander may waive this requirement.***
	16.C.14	16.C.14	• The manufacturer's specifications and limitations applicable to the operation of any crane or derrick shall be followed. At no time shall a crane or derrick be loaded in excess of the manufacturer's rating, except overhead and gantry cranes in accordance with ANSI/ASME B30.2 when overrated loads shall not exceed 125% of rated load for test purposes or planned engineered lifts for overhead and gantry cranes. > ***See 16.C.18.***
	16.C.17	16.C.17	• Whenever a slack line condition occurs, the proper seating of the rope in the sheaves and on the drum shall be checked prior to further operations.
	16.C.18	16.C.18	• Before making a critical lift, a qualified person shall prepare a critical lift plan. (The qualified person preparing the plan may be the crane operator, lift supervisor, or the rigger). The crane operator, lift supervisor, and rigger shall

			participate in the preparation. The plan shall be documented and a copy shall be provided to the GDA. The plan shall be reviewed and signed by all personnel involved with the lift.
	16.C.19.a	16.C.19.a	a. Cranes/derricks shall not be operated when wind speeds at the site attain the maximum wind velocity recommendations of the manufacturer. Projects shall have adequate means for monitoring local weather conditions, including a wind-indicating device.
	16.C.20.a	16.C.20.a	a. Maintenance and repairs shall be conducted in accordance with the manufacturer's procedures and precautions in accordance with the applicable ANSI/ASME standard.
	16.C.20.b	16.C.20.b	b. Replacement parts or repairs shall have at least the original design facto r; replacement parts for load bearing and other critical parts shall be obtained from the original equipment manufacturer (OEM) or be recertified in accordance with 16.C.14.a.
	16.C.21		• All cranes and derricks, shall be equipped with an anti-two blocking (A2B) device that will disengage the function that is causing the two -blocking or an A2B damage prevention feature. They shall be tested and certified functional by a competent person prior to operating the crane/derrick. > ***Floating cranes may use an A2B alarm system in lieu of a disengaging device unless they are hoisting personnel. Cranes and derricks used in duty cycle operations are exempt from the requirements for A2Bdevices. Duty cycle cranes performing occasional***

			lifts shall comply with the procedures in 16.D.05b.(1), (2), and (3).
	16.C.22		• All cranes shall be equipped with a fire extinguisher with a basic minimum rating of 10-B:C.
	16.D.08.b	16.D.08.b	b. When removing pins or bolts from a boom, workers shall stay out from under the boom. Sections shall be blocked or otherwise secured to prevent them from falling, when necessary.
	16.D.09.a	16.D.09.a	a. When the load to be handled and/or the operating radius require the use of outriggers, or anytime when outriggers are used, outriggers shall be fully extended to the appropriate setting indicated by the load chart. The outriggers will be deployed so that the weight o f the machine is totally removed from the wheels at every setting (except locomotive cranes).
	16.F	16.F (replaced)	**16.F FLOATING CRANES, FLOATING DERRICKS, CRANE BARGES, AND AUXILIARY SHIPBOARD MOUNTED CRANES**
	16.F.01	16.F.01	• Construction. Although all other pertinent parts of this manual apply to this Section, the requirements contained herein are specifically focused on floating cranes/derricks, crane barges, and auxiliary shipboard cranes.
	16.F.02	16.F.02	• The equipment on floating cranes/derricks, crane barges, and auxiliary shipboard cranes shall be designed and constructed in accordance with the applicable following standards: a. ANSI/ASME B30.8 . b. American Bureau of Shipping (ABS), *Guide for Certification of Cranes.*

			c. ANSI/American Petroleum Institute (API) Specification 2C. d. SAE Report J1366.
	16.F.03	16.F.03	• During lifting operations, the stability of the floating crane/derrick or vessel with an auxiliary shipboard crane shall meet the USCG requirements for "Lifting" set forth in 46 CFR 173.005 through 46 CFR 173.025.
	16.F.04	16.F.04	• The load rating of a floating crane/derrick shall be the maximum working loads at various radii as determined by the manufacturer or qualified person considering list and trim for each installation. The load rating shall specifically reflect the: design standard; machine trim; machine list; and dynamic/environmental loadings anticipated for the operational envelope of the floating crane/derrick or auxiliary shipboard crane. A Naval Architectural Analysis shall be performed to determine these parameters that shall be used in generating the load rating. a. The load rating is dependent upon the structural competence of the crane or derrick, rope strength, hoist capacity, structural attachment to the floating platform, and stability and freeboard of the floating platform. b. When deck loads are to be carried while lifting, the situation shall be analyzed for modified ratings. c. When mounted on barges or pontoons, the rated loads and radii of land cranes and derricks shall be modified as recommended by the

			manufacturer or qualified person. The modification shall be evaluated by the qualified person specific to the floating platform mounting the crane. d. Load charts shall be generated based on the crane load rating for floating service. In addition, the load charts for floating service shall comply with the specific standard it was designed to (See Table 16-1) and clearly explain the floating platform and dynamic/environmental parameters that apply to the load chart. The load chart should, at a minimum, identify the following: (1) Naval Architect Notes: (a) Draft limits (with deck cargo considered), (b) Vessel motion limits, (c) Vessel and crane list/trim limits, and (d) Vessel condition (e.g., dry bilges, watertight integrity, etc.). (i) Crane manufacturer Notes, or reference to them. (ii) Safe Working Load Chart with: aa. Mode of operation, bb. Environmental limits, cc. Capacity (net or gross), dd. Load, boom elevation, radius (with list/trim considered), and ee. Crane configuration, such as: • Boom length, • Amount of counterweight, • Parts of wire, and • Block size. e. All crane manufacturer capacity

			tables should include the boom elevation in degrees from the horizon at each noted capacity. Additionally, the capacity should be clearly defined (i.e., net or gross).
	16.F.05	16.F.05	• Stability - operating list or trim. Unless the crane or derrick manufacturer recommends a lesser value, operating list or trim shall comply with standards selected from those set forth in Table 16-1. The following shall be the maximum allowable list or trim (if ANSI B30.8 is selected): a. Cranes, designed for barge or pontoon mounting, rated at 25 tons (22,680 kg) capacity or less shall have a maximum allowable list or trim of 5º. b. Cranes, designed for barge or pontoon mounting, rated at 25 tons (22,680 kg) capacity or more shall have a maximum allowable list or trim of 7º, although 5º is recommended. c. Derricks, designed for barge or pontoon mounting, rated at any capacity shall have a maximum allowable list or trim of 10º. d. Land cranes and derricks mounted on barges or pontoons shall have a maximum allowable list or trim of 5º or the maximum allowed by the crane manufacturer.
	16.F.06	16.F.03	• Stability - design load conditions. All floating cranes and derricks shall comply with the requirements of 46 CFR 173.005 through 173.025. a. Cranes or derricks designed for barge o r pontoon mounting shall be stable in accordance with standards selected from Table 16-1. The following shall be the minimum

			allowable freeboard if ANSI B30.8 is selected: (1) Rated load, 60-mph (26.8-m/s) wind, 2-ft (0.6-m) minimum freeboard; (2) Rated load plus 25%, 60-mph (26.8-m/s) wind, 1-ft (0.3-m) minimum freeboard; (3) High boom, no load, 60-mph (26.8-m/s) wind, 2-ft (0.6-m) minimum freeboard; (4) For backward stability of the boom - high boom, no load, full back list (least stable condition), 90-mph (40.2-m/s) wind. b. Land cranes and derricks mounted on barges or pontoons: (1) Barge- or pontoon-mounted land cranes require modified ratings due to increased loading from list, trim, wave action, and wind. This rating will be different for each size of pontoon or barge used. Therefore, the load rating of barge- or pontoon-mounted land cranes and derricks shall not exceed that recommended by the manufacturer for the particular barge or pontoon under the expected environmental conditions. (2) All deck surfaces of the pontoon or barge shall be above the water. (3) The entire bottom area of the barge or pontoon shall be submerged.

			(4) Provide tie-downs for derricks to transmit the loading to the barge or pontoon. (5) Cranes shall be blocked and secured to prevent shifting.
	16.F.07	16.F.05	
	16.F.07.c	16.F.07.c	c. Work shall be halted when environmental conditions exceed those delineated on the load chart.
	16.F.08	16.F.06	• Truck- and crawler-cranes shall be attached to the barge or pontoon by means of a tie-down system with some slack. Movement during lift operations is not permitted.
	16.F.09 (new)		• When loads approach the maximum rating of the crane or derrick, the person responsible for the job shall ascertain that the weight of the load has been determined within +/- 10% before it is lifted.
	16.F.10 (new)		• Means shall be provided for the operator to visually determine the list and trim of the barge or pontoon, as well as machinery list and trim in rotating crane cabs.
	16.F.11 (new)		• Principal walking surfaces shall be of a skid-resistant type.
	16.F.12 (new)		• Boom stops shall be provided to resist the boom fall backwards.
	16.F.13 (new)		• A boom angle indicator readable from the operator's station shall be provided on all floating cranes.
	16.F.14 (new)		• All floating cranes/derricks and shipboard auxiliary cranes shall be fitted with load limiting devices (LLDs) or load indicating devices (LID) or LMI that meet all the requirements of 29 CFR 1918.66(f). This requirement shall become effective 1 year from the effective date of this manual. a. Duty cycle operations are

			exempt from these requirements. b. Duty cycle cranes performing occasional non-critical lifts shall comply with the following: (1) Total weight of load and rigging is known or calculated; (2) Load chart is reviewed for weight and planned radius; (3) Informal pre-lift meeting is held between all personnel directly involved (operator, rigger, etc.) to review the conditions present for that lift (environmental, configuration, etc.)
	16.F.15 (new)		• All floating cranes/derricks and crane barges shall be equipped with wind speed and direction indicating devices within clear view of the operator's station.
	16.F.16 (new)		• Operational guidance. a. Operators shall monitor the wire lead from the boom tip carefully to ensure that limits on off-lead and side-lead identified in the load chart are not exceeded. b. Operators shall monitor environmental criteria for compliance with the criteria set forth in the load chart. c. Operators should be aware that safety devices such as LLD(s) and LMI(s) do not offer protection against loads generated by relative motions between a floating crane and a fixed object to be lifted. d. Whenever practical, crane use during buoy tending shall be limited to lifting the freely suspended buoy clear of the water

			onto the vessel. e. Bilges shall be kept as dry as possible to eliminate the adverse effect of free surface (sloshing liquid).
	16.F.17 (new)		• All lifts must be planned to avoid procedures that could result in configurations where the operator cannot maintain safe control of the lift. (A plan, in this case, might be a quick discussion with the deck crew, and a verification of the proposed operation.) Lifts shall reflect floating operational parameters such as: anticipated values for wire leads unknown load for extractions, and upper limits on crane force.
	16.F.18 (new)		• Anchor handling barge. a. Vessels meeting the definition of anchor handling barge (see Appendix Q), shall be required to comply with only Sections 16.A01 through 16.A.04; 16.C.02, 16.C.08, 16.C.12, 16.C.13, 16.C.14; 16.F.04, 16.F.16 (ANSI/ASME does not apply to anchor barges), and the following: (1) All deck surfaces of the pontoon or barge shall be above the water. (2) Means for limiting the applied load, such as mechanical means or marking the draft of the barge corresponding to the rated load, shall be provided. Calculations shall be available and the barge shall be tested to verify rated load. (3) A ratchet and pawl shall be provided for releasing the load from the hoisting machinery brake. (4) An operating manual/procedure shall be available for use by the

			operator. The operator shall be trained in the anchor handling barge systems operation. b. If additional external load is superimposed above that which can be hoisted with the onboard hoisting machinery, then a chain stopper shall be used to remove the external load from the A-frame and hoist machinery. c. An anchor handling barge may be used for anchor handling low lifting of loads such as anchor buoys/weights, dredge pipe, submerged pipeline, pontoons, and other loads provided they do not exceed the load rating of the anchor barge. If used for any other lifting application, the work platform will be considered a floating derrick and all other requirements of Section 16 apply.
	16.K.05.b	16.K.05.b	b. Prior to initial use on a USACE project, and monthly thereafter, a periodic inspection shall be conducted by a qualified person. Periodic inspections shall cover those items specified by the manufacturer. At the minimum, periodic inspections shall cover all sheaves, racks and pinions, guy ties, bolt connections, miscellaneous clamps, braces, and similar parts.
	16.K.08.d.	16.K.08.d	d. A barricade shall be provided at the open ends of each landing. The barricade shall extend a minimum distance of 6 ft (1.8 m) laterally along the outer edge of the landing from each side of the hoist way, shall extend from the floor a distance of at least 3 ft (0.9 m), and shall be of #19 US gauge wire or the equivalent, with openings not exceeding 0.5 in

			(1.2 cm).
	16.K.08.e (new)		e. All hoist way entrances shall be protected by substantial gates or bars that shall guard the full width of the landing entrance. Gates shall be not less than 66 in (167.6 cm) in height, with a maximum under clearance of 2 in (5 cm), and shall be located not more than 4 in (10.1 cm) from the hoist way line. Gates of grille, lattice, or other open work shall have openings of not more than 2 in (5 cm).
	16.K.08.f	16.K.08.e	
	16.L.11.b	16.L.11.b	b. When pulling piling, cranes shall be equipped with LID devices and the booms shall not be raised more than 60° above the horizontal. (This requirement does not apply to vibrating - type pulling devices.)

Summary of changes to EM 385-1-1/Section 17

No significant changes to operations/processes in Section 17 were noted.

Summary of changes to EM 385-1-1/Section 18

Section	Paragraph	Old	New
	18.A.01	18.A.01	• Every person operating a motor vehicle shall possess, at all times while operating such vehicle, a license/permit valid for the equipment being operated. The operator must present the license/permit to the GDA upon request. Failure to do so may result in the immediate shutdown of the vehicle involved and removal of the operator from the project.
	18.A.02.b	18.A.02.b	b. Before initial use, vehicles not otherwise inspected by State or local authorities, shall be inspected by a qualified mechanic and found in safe operating condition. The inspection shall be documented in writing and available for inspection on the work site. >***This is a one-time inspection.***
	18.A.02.e	18.A.02.e	e. Prior to each use, but not more often than daily, vehicles shall be checked by the operator to assure that the following parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use:
	18.A.06.a	18.A.06.a	a. An operable speedometer;
	18.A.06.b	18.A.06.b	b. An operable fuel gage;
	18.A.06.c.	18.A.06.c	c. An operable audible warning device (horn) in operating condition;
	18.A.11.a	18.A.11.a	a. One red flag not less than 12 square inches (in2) (77.4 square centimeter (cm2)) with standard and three reflective markers that shall be available for immediate use in case of emergency stops.
	18.B.01 (replaced)		a. Operators of USACE motor vehicles/equipment or USACE

			employees using their vehicles on official business, either on or off USACE projects, and operators of Contractor motor vehicles/equipment being used on USACE projects may only use cellular telephones with hands-free devices while the vehicle is in motion. Prior to using a hand - held cellular phone, drivers shall find a safe place to bring their vehicle to a stop. This requirement does NOT preclude passenger(s) from using cellular phones while the vehicle is in motion. The use of headphones and earphones is prohibited while operating a motor vehicle/equipment. b. Operators of USACE motor vehicles shall not eat, drink, or smoke while the vehicle is in motion. >***See AR 385-55.***
	18.B.02	18.B.02	• The principles of defensive driving shall be practiced. Operators of Army motor vehicles shall receive Defensive Driving Training every 4 years.
	18.B.15	18.B.14	• When backing or maneuvering, operators will take the applicable precautions outlined in 08.B.04. If a signal person or spotter is not used, operators will walk behind their vehicle to view the area for possible hazards before backing their vehicle.
	18.B.17.c	18.B.15.c	c. The load on every vehicle shall be distributed, chocked, tied down, or secured. Loads shall be covered when there is a hazard of flying/falling dirt, rock, debris, or material. End gates shall not be removed without implementing a positive means to prevent material from falling out of the back of the vehicle and may be done only

			with the acceptance of the GDA.
	18.C.05	18.C.05	• All vehicles transporting personnel during cold or inclement weather shall be enclosed. Passengers shall be protected from inclement weather elements.
	18.D.01	18.D.01	• Every ATV operator shall have completed a nationally-recognized accredited ATV training course (such as provided by the Specialty Vehicles Institute of America or in-house resources that have been certified as trainers by an accredited organization) prior to operation of the vehicle. The operator must pass an operating skills test prior to being allowed to operate an ATV . Proof of completion of this training shall be made available to the GDA upon request.
	18.D.03	18.D.03	• Gloves and an approved motorcycle helmet with full-face shield or goggles shall be worn at all times while operating a Class I ATV.
	18.D.04	18.D.04	• ATVs shall be used only off-road (no paved road use unless allowed by the manufacturer).
	18.D.05	18.D.05	• ATVs shall be driven during daylight hours (unless properly equipped with lights for night use).
	18.D.08	18.D.08	• All ATVs shall be equipped with a warning signal device (horn), tail lights, and stop lights.
	18.D.09 (new)		• A copy of the operators manual will be kept on the vehicle and protected from the elements (if practicable).
	18.D.10		• Tires shall be inflated to the pressures recommended by the manufacturer.
	18.D.11		• ATVs will be equipped with mufflers.

	18.D.12		• All ATVs shall be equipped with spark arresters.
	18.D.13		• All Class II ATVs shall be equipped with ROPS.

Summary of changes to EM 385-1-1/Section 19

Section	Paragraph	Old	New
	19.A.01.b	19.A.01.b	b. All dredges and quarter boats not subject to USCG inspection and certification or not having a current ABS classification shall be inspected in the working mode annually by a marine surveyor accredited by the National Association of Marine Surveyors (NAMS) or the Society of Accredited Marine Surveyors (SAMS) and having at least 5 years experience in commercial marine plant and equipment. All other plant shall be inspected before it is placed in use and at least annually by a qualified person. The inspection shall be documented, a copy of the most recent inspection report shall be posted in a public area on board the vessel, and a copy shall be furnished to the GDA upon request. The inspection shall be appropriate for the intended use of the plant and shall, as a minimum, evaluate structural condition and compliance with NFPA 302.
	19.A.01.c	19.A.01.b	c. Periodic inspections and tests shall assure that a safe operating condition is maintained.
	19.A.01.d	19.A.01.d	d. Records of inspections shall be maintained at the site and shall be available to the GDA.
	19.A.01.e	19.A.01.e	e. Floating plant found in an unsafe condition shall be taken out of service and its use prohibited until unsafe conditions have been corrected.
	19.A.02.b(1)	19.A.02.b(1)	(1) The vessel is inspected and certified by USCG in accordance with EP 1130-2-500, Appendix L,
	19.A.02.d	19.A.02.d	d. Government operators of floating

			plant that does not meet the criteria of 19.A.02b(1), above, shall be licensed and certified in accordance with the requirements of ER 385-1-91. A qualified individual designated as the USACE Command's marine licensing official will perform licensing and certification.
	19.A.02.e (added)		e. Individuals shall not be scheduled to work more than 12 hours in any 24-hour period. Work schedules should consider fatigue factors and optimize continuous periods available for uninterrupted sleep. The employee is responsible for reporting to work properly rested and fit for duty. (1) All personnel shall be scheduled to receive a minimum of 8 hours rest in any 24-hour period. When quarters are provided immediately adjacent to or aboard the work site, these hours of rest may be divided into no more than two periods, one of which must be at least 6 continuous hours in length. All cases exclude travel time. (2) Rest periods may be interrupted in case of emergency, drill, or other overriding operational necessity. (3) Due to events listed in paragraph (2), the total minimum daily 8 hours of rest may be reduced to not less than 6 consecutive hours as long as no reduction extends beyond 2 days and not less than 56 hours of rest are provided in each 7-day period.

	19.A.03.a(6) (added		(6) Method for securing equipment if not moved.
	19.A.03.d	19.A.03.d	d. USCG approved PFD (types I, II, III, or V) shall be worn by all personnel on decks exposed to severe weather, regardless of other safety devices used. Inflatable PFDs will not be worn by workers on USACE sites.
	19.A.03.g	19.A.03.g	g. The floating plant shall be capable of withstanding whatever sea conditions may be experienced in the work area during the time period the work is being performed. The generally accepted terminology for that capability is (1) "seaworthiness," (2) good "seakeeping" qualities.
	19.A.04.a	19.A.04.a	a. Plans shall be prepared for response to marine emergencies such as fire, sinking, flooding, severe weather, man overboard, hazardous materiel incidents, etc. (Fire: USCG-approved fire plans meet this requirement.) > ***See 01.E.***
	19.A.05.b	19.A.05.b	b. Axes or other emergency cutting equipment shall be sharp and provided in accessible positions on all towing vessels for use such as freeing lines. On other floating plant (such as work barges, and floating cranes) emergency cutting equipment shall be provided in accessible positions.
	19.A.05.h (added)		h. For floating plant with internal combustion engines, marine quality listed CO monitors shall be installed and maintained in all enclosed occupied spaces (crew quarters, pilot houses, etc.).
	19.A.05.m	19.A.05.m (replaced)	m. Circuits with GFCI protection shall be provided in grounded 120, 208 or 240 volt systems in toilet/shower spaces, galley, machinery spaces, weather deck,

			exterior, or within 3 ft (0.9 m) of any sinks. (1) Cord connected equipment used in any of the above areas shall be connected to a GFCI outlet. (2) Portable GFCI units connected to ungrounded systems DO NOT provide ground-fault protection and shall not be used. (3) Ground-fault protected receptacles shall be conspicuously marked **"GFCI PROTECTED"**.
	19.A.05.o (added)		o. All winch gears shall be properly guarded. > ***See 16.B.03.***
	19.A.06		• Fuel systems and fuel transfers. The provisions of the Oil Pollution Act of 1990, as amended, shall apply to floating plant operations as applicable.
	19.A.06.h		h. All decks, overheads, and bulkheads, serving as fuel oil tank boundaries shall indicate the tank boundary with contrasting paint and be labeled **"FUEL OIL TANK-NO HOT WORK"**.
	19.A.07.h	19.A.07.h	h. Guardrails, bulwarks, or taut cable guard lines shall be provided for deck openings, elevated surfaces, and similar locations where persons may fall or slip from them. (1) On USCG inspected vessels, guardrails and taut cable guard lines shall comply with the USCG requirements set forth in 46 CFR 45.92.25-5. The guardrails shall be 39 in (99 cm) in height with two mid rails (if not solid). The first being 9 in (22.8 cm) above the deck and the second 24 in (60.9 cm) above the deck.

			(2) For uninspected vessels and other marine plant, the guardrails and guardlines shall meet the requirements of Section 21.B. (3) In those areas where it is not practical or safe to install guardrails, personnel working on unguarded platforms, catwalks, decks and other surfaces at heights greater than 6 ft (1.8 m) above hard surfaces such as adjacent decks or ground level shall be provided with and wear appropriate personal fall protection systems. (The guardrail requirement does not apply to anchor barges or work deck areas on crane barges where the installation of guardrails would present a safety hazard.)
	19.A.07.i. (added)		i. Safeguards such as barriers, curbs, or other structures shall be provided to prevent front-end loaders, bulldozers, trucks, backhoes, track hoes, and similar operating equipment on floating equipment from falling into the water. > ***See also 16.F.06.***
	19.A.07.j	19.A.07.i	
	19.A.07.k	19.A.07.j	
	19.A.07.l	19.A.07.k	
	19.A.07.m	19.A.07.l	
	19.A.07.n (added)		n. Provisions shall be made to protect persons being transported by water from the elements.
	19.A.07.o (added)		o. Plant fleeting areas will be designated in which all idle plant shall be moored. Suc h areas shall have warning buoys, signs, and lights in prominent locations.
	19.A.07.p (added)		p. The Contractor, or for Government conducted operations, the GDA shall provide information to the

			local USCG Office identifying the marine activity and hazards.
	19.A.07.q (added)		q. Open or pelican hooks may be used for lifting anchor buoys.
	19.A.10.f (new)		f. For launches, motorboats (survey boats), and skiffs having deck mounted internal combustion engines (such as generators, jigger pumps) and not equipped with fans, shall locate exhaust piping away from personnel spaces to minimize CO infiltration in the work space.
	19.A.10.g	19.A.10.f	
	19.A.11	19.A.11	• The most current, pertinent information published by the USCG regarding aids to navigation shall be maintained aboard selfpropelled vessels 26 ft (7.9 m) or more in length.
	19.B.01.e (added)		e. Vertical and inclined ladders shall comply with ASTM F1166
	19.B.02.a	19.B.02.a	a. Safe means for boarding or leaving a floating plant shall be provided and guarded to prevent persons from falling or slipping thereon. (Walking on rip-rap should be avoided where practical.)
	19.B.03.a	19.B.03.a	a. Vertical access shall be provided between various decks by means of stairs or permanent inclined ladders installed in accordance with ASTM F1166-95a.
	19.B.03.d (added)		d. Vessel loads shall be limited so that access and passageways in use will remain above the waterline. Decks and passageways shall not be used for access if submerged or subject to constant breaking waves, except in an emergency.
	19.B.04.a	19.B.04.a	a. All vessels, except those easily boarded from the water, shall be equipped with: (1) At least one portable or permanent ladder of sufficient

			length to allow a person to self-rescue by boarding the ladder from the water, and (2) Other methods or means designed to assist in the rescue of an incapacitated person overboard.
	19.C.02.c (added)		c. Launches, motorboats and skiffs less than 20 ft (6 m) in length shall meet 33 CFR 183 requiring level floatation after flooding or swamping.
	19.C.02.d (added)		d. All open cabin launches or motorboats shall be equipped with “kill (dead man) switches”.
	19.C.03.b	19.C.03.b	b. All launches and motorboats having gasoline or liquid petroleum gas power plants or equipment in cabins, compartments, or confined spaces shall be equipped with a built-in automatic CO2 fire extinguishing system meeting the requirements of 46 CFR 25.30-15.
	19.C.04 (added)		• Float Plans. Float plans containing the following information shall be prepared by the operator of a launch or motorboat when engaged in surveying, patrolling, or inspection activities that are remote and are expected to take longer than 4 hours or when the operator is traveling alone. The plan shall be filed with the boat operator’s supervisor. a. Vessel information (make/model or local identifier). b. Personnel on-board. c. Activity to be performed. d. Expected time of departure, route, and time of return. e. Means of communication (adequate means of communication shall be

			provided).
	19.C.05 (added)		• All motorboat operators shall complete and document the following training: a. A boating safety course meeting the criteria of the USCG Auxiliary, National Association of Safe Boating Law Administrators (NASBLA), or equivalent; and b. Motorboat handling training, based on the type of boats they will operate, provided by qualified instructors (in-house or other). Operators must pass a written and operational test c. Current USCG licensed personnel are exempt from the boating safety training, but they shall complete the written exam and operational test.
	19.D.03.a	19.D.03.a	a. Submerged pipeline and any anchor securing the pipeline shall rest on the channel bottom where a pipeline crosses a navigation channel. The depth of the submerged pipeline will be provided to the USCG for publication.
	19.D.03.a(2) (added)		(2) Submerged pipelines shall be marked in accordance with local USCG requirements and as approved by the GDA. (a) Unless otherwise specified by the USCG, submerged pipelines are considered to require special marks and shall have a USCG-approved flashing yellow light. (b) Indicators, such as signs or buoys, that state **"DANGER SUBMERGED PIPELINE"** will be placed at the beginning and end of the

			pipeline. In addition, indicators are required beginning in areas which reduce the charted depth by more than 10%, and, as a minimum, every 1000 ft (304.8 m) to clearly warn of the pipeline length and course. (c) If barges or other vessels are used to anchor the beginning and/or end of the submerged pipeline, they shall be lighted in accordance with 33 CFR 88.13. (d) Within a navigation channel, each end of the pipeline shall be identified with a regulatory marker buoy. (e) Lengths of submerged pipeline located outside of the navigation channel, which reduce the charted depth by more than 10 percent, will be identified with high visibility buoys marked with 360 degree visibility retro-reflective tape, such as orange neoprene buoys, placed at an interval not to exceed 500 ft (152.4 m) to clearly show the pipeline length and course.
	19.D.03.b	19.D.03.b	b. Floating pipeline is any pipeline that is not anchored on the channel bottom. Floating pipeline, including rubber discharge hoses, shall be clearly marked in accordance with 33 CFR 88.15.
	19.D.09 (added)		• Dredge disposal sites. a. Drinking water. An adequate supply of drinking water shall be provided at all dredge disposal sites. Cool water shall be provided during hot weather. Portable drinking dispensers shall comply with Section 2 of this manual.

			b. Toilet facilities. Toilet facilities shall be provided in accordance with and meet the requirements of Section 2 of this manual. c. Medical and first-aid requirements. All disposal area watchmen shall be certified in first aid and CPR in accordance with 03.A.02. At least one 16-unit first-aid kit complying with ANSI Z308.1 shall be provided onsite at all times. The first-aid kit shall be protected from the environment.
	19.E (new)		**19.E SCOWS AND BARGES** 19.E.01 Scows dumping in open ocean waters should be equipped with remote opening devices to preclude the transfer of personnel between the vessels. 19.E.02 A safe means for transferring personnel between the towing vessels and scow shall be provided in accordance with 19.B.02. 19.E.03 The Contractor shall identify general and site-specific adverse weather and sea conditions (e.g., currents) under which the towing of scows or cargo barges is prohibited. 19.E.04 All barges and scows shall comply with 46 CFR 174.010 through 174.020 for intact stability of deck cargo barges. 19.E.05 Personal fall protection devices or other fall protection listed in 21.A.15 shall be used on all scows and open barges to prevent personnel transiting between the stern and bow of the vessel from falling into the hopper or falling off the side of the vessel to structures (e.g., dock, vessels) located 6 ft (1.8 m) or more below.
	19.F	19.E	

Summary of changes to EM 385-1-1/Section 20

Section	Paragraph	Old	New
	20.D.03.b	20.D.03.b	b. Cylinders containing the same gas shall be stored in a segregated group. Empty cylinders shall be labeled as empty and stored in the same manner.

Summary of changes to EM 385-1-1/Section 21

Section	Paragraph	Old	New
	21.A.09	21.A.09	• The design and construction or selection of planking and platform for means of access shall be based upon either the number of persons for which they are rated or the uniform load distribution to which they will be subjected, whichever is the more restrictive, in accordance with Tables 21-1 and 21-2:
	Table 21-1 (new)		
	Table 21-2 (new)		
	Table 21-3 (new)		
	21.A.15.a	21.A.15.a	a. Employees exposed to fall hazards shall be protected by standard guardrail, catch platforms, temporary floors, safety nets, personal fall protection devices, or the equivalent, in the following situations:
	21.A.15.a(1)	21.A.15.a(1)	(1) On accessways (excluding ladders), work platforms, or walking/working surfaces from which they may fall 6 ft (1.8 m) or more;
	21.A.15.a.(4) (added)		(4) On installing or removing sheet pile, h-piles, cofferdams, or other interlocking materials from which they may fall 6 ft (1.8 m) or more.
	21.A.16.a(6) (new)		(6) Rescue equipment and procedures.
	21.B.02.d (new)		d. Toe boards shall withstand without failure a force of 50 lbs (23 kg) applied in any outward or downward direction at any point along the toe board.
	21.B.08.f (new)		f. The height of stair rails shall be not more than 34 in (86.3 cm) nor less than 30 in (76.2 cm) from the upper surface of the top rail to

			surface of tread in line with face of riser at forward edge of tread.

Summary of changes to EM 385-1-1/Section 22

Section	Paragraph	Old	New
Spl Note			ANSI A10.8 is the standard referred to in all of the text as the new standard for this section of EM385-1-1.
22.B	22.B.01.a	22.B.01.a	a. Scaffolds and their components shall meet the requirements contained in ANSI A10.8 and be capable of supporting without failure at least 4 times the maximum anticipated load.
22.C	22.C.04.a	22.C.04.a	a. Tube and coupler scaffolds shall have posts, runners, and bracing of nominal 2-in (5-cm) (outside diameter) steel tubing or pipe: other structural metals, when used, must be designed to carry an equivalent load. The size of bearers (outside diameter) and the spacing of posts shall meet the requirements contained in ANSI 10A.10.8.
22.E	22.E.15.b	22.E.15.b	b. Full-body harnesses shall be attached by lanyard to a lifeline, trolley line, or scaffold structural member. However, when overhead obstructions or additional platform levels are part of a single-point or two-point adjustable suspension scaffold, then lifelines shall not be used.
	22.F.01 (new)		• Crane supported work platforms shall be used only when the erection, use, and dismantling of conventional means of reaching a work site, such as a personnel hoist, ladder, stairway, or scaffold would be more hazardous or is not possible because of structural design or work site conditions. The person responsible for the lift shall perform an AHA and attest to the need for the operation in writing. The responsible person

			shall sign the AHA and submit it to the GDA for acceptance. Personnel shall not be hoisted until the GDA has accepted the AHA. (Crane supported work platforms may be used for routine access of employees to underground construction via a shaft.)
	22.F.05 (new)	22.F.04	• Work platform use. a. A competent supervisor shall observe the operations while personnel are working from crane supported work platforms. b. The number of employees occupying the work platform shall not exceed the number required for the work being performed. c. Work platforms shall be used only for employees and their tools and materials necessary for the work. Work platforms shall not be used as material hoists when not hoisting personnel. d. Materials and tools for use during a personnel lift shall be secured to prevent displacement and shall be evenly distributed within the platform while it is suspended.
	22.F.06	22.F.05	• All cranes shall comply with the applicable requirements in Sections 16.
	22.F.07 (new)		• Operational Criteria. a. Hoisting of the personnel platform shall be in a slow, controlled, cautious manner with no sudden movements. b. Load lines shall be capable of supporting, without failure, at least 7 times the maximum intended load, except where rotation resistant rope is used the lines shall be capable of supporting, without failure, at least 10 times the maximum intended load.

			The required design factor is achieved by taking the current safety factor of 3.5 and applying the 50% de-rating of the crane capacity. c. The crane shall be uniformly level within 1% of level grade and located on firm footing. Cranes equipped with outriggers shall have them all fully deployed to load chart criteria following manufacturer's specifications, as far as practical, when hoisting personnel. EM 385-1-1 3 Nov 03 458 d. The total weight of the loaded personnel platform and related rigging shall not exceed 50% of the rated capacity for the radius and configuration of the crane or derrick. e. Only cranes with power-operated up and down boom hoists and load lines shall be used to support work platforms. T he use of machines having live booms is prohibited. Platforms shall be lowered under power and not by the brake. f. Only cranes with an A2B device that prevents contact between the load block or overhaul ball and the boom tip, or a system that deactivates the hoisting action before damage occurs shall be used. g. Cranes with variable angle booms shall be equipped with boom angle indicators readily visible to the operator. h. Cranes with telescoping booms shall be equipped with a device to indicate clearly to the operator, at all times, the boom’s

			extended length, or an accurate determination of the load radius to be used during the lift shall be made prior to hoisting personnel. i. The load line of the hoist drum shall have a system or device on the power train, other than the load hoist brake, that regulates the lowering rate of speed of the hoist mechanism (controlled lowering): free fall is prohibited.
	22.F.08 (new)		• Proof Testing. a. Prior to hoisting employees on a crane suspended work platform, and after any report or modification, the platform and rigging shall be proof tested to 125% of the platform's rated capacity by holding it in a suspended position for 5 minutes with the proof test load evenly distributed on the platform (this may be done concurrently with the trial lift). b. After proof testing, a competent person shall inspect the platform and rigging.
	22.F.09 (new)		Trial Meeting, Lift and Inspection. a. Prior to every trial lift, the crane or derrick operator, signal person, employees to be lifted, and the competent person shall attend a pre-lift meeting to review the applicable parts of this manual, the AHA, and the details of this particular lift. b. A trial lift with the unoccupied work platform loaded at least to the anticipated lift weight shall be made from the ground level, or any other location where employees will enter the platform, to each location at which the

			work platform is to be hoisted and positioned. c. The trial lift shall be made immediately prior to placing personnel on the platform and shall be repeated prior to hoisting employees after the crane is moved and set up at new location or returned to a previously used location, and when the lift route is changed unless the competent person determines that the route change is not significant. d. The competent person shall determine that all systems, controls, and safety devices are activated and functioning properly; that no interferences exist; and that all configurations necessary to reach those work locations will allow the operator to remain under the 50% limit of the crane's rated capacity. e. Materials and tools to be used during the actual lift may be loaded in the platform (evenly distributed and secured) for the trial lift. f. After the trial lift and just prior to hoisting employees, the platform shall be hoisted a few inches and inspected to ensure that it is secure and properly balanced. g. A visual inspection of the crane, derrick, rigging, work platform, and the crane or derrick support base shall be conducted by a competent person immediately after the trial lift to determine whether the testing has exposed any defect or produced any adverse effect upon any component or structure. h. Any defects found during inspections shall be corrected before hoisting personnel.

			i. If the load rope goes slack, the hoisting system shall be reinspected to ensure that all ropes are properly seated on drums and sheaves.
	22.F.10 (new)		• Work Practices. a. Before employees enter or exit a hoisted personnel platform that is not landed, the platform shall be secured to the structure, unless securing to the structure creates an unsafe condition. b. The rated load capacity of the platform shall not be exceeded. c. The number of employees occupying the work platform shall not exceed the number required for the work being performed. d. Work platforms shall be used only for employees and their tools and materials necessary for the work; work platforms shall not be used as material hoists when not hoisting personnel. e. Materials and tools for use during a personnel lift shall be secured to prevent displacement and shall be evenly distributed within the platform while it is suspended. f. Employees (except a designated signal personal) shall keep all parts of the body inside the platform during raising, lowering, and positioning. g. A competent person shall observe the operations while personnel are working from the crane supported work platform. h. Hoisting of employees shall be discontinued upon indication of any dangerous weather conditions or other impending danger. i. Employees being hoisted shall remain in the continuous sight of, and in direct contact

			communication with, the crane operator, competent person, and signal person. In situations where it this not possible, direct communication by radio shall be maintained at all times. The crane operator shall bring all operations to an immediate stop if radio communications are lost. j. Taglines shall be used to help control the work platform unless the competent person determines that their use would present a greater hazard. k. The crane or derrick operator shall remain at the controls at all times with the engine crane running whenever the platform is occupied.
	22.F.11 (new)		• Personal Fall Protection a. Except when working over water, all employees occupying the work platform shall wear a properly anchored personal fall protection system. Depending of the type of work to be done and the height of the work platform above a lower surface, all workers shall wear either a full-body harness fall arrest system or a body-belt fall restraint system. The competent person onsite will assess each situation and determine which system would best fit the current work requirement. Particular attention should be paid to anchor points and capacities. b. When working over water, PFD, lifesaving equipment, and safety skiffs meeting the requirements of this manual shall be used.
	22.F.12 (new)		• Employees shall not be hoisted unless the following conditions are determined to exist: a. The load test and proof test requirements are satisfied,

			b. Hoist ropes are free of kinks, c. Multiple part lines are not twisted around one another, d. The primary attachment is centered over the platform, and e. The hoisting system is inspected if the load rope is slack to ensure all ropes are properly seated on drums and in sheaves.
	22.F.13 (new)		• Traveling. a. Hoisting of personnel while the crane is traveling is prohibited, except for: (1) Portal, tower, and locomotive cranes; or (2) Where it is demonstrated and documented that there is no less hazardous way to perform the work. b. If the requirements of 22.F.13a are satisfied, the following safeguards shall be implemented while cranes travel with hoisted personnel: (1) Crane travel shall be restricted to a fixed track or runway, (2) Travel shall be limited to the load radius of the boom used during the lift, (3) The boom must be parallel to the direction of travel, (4) A completed trial run shall be performed to test the route of travel before employees are allowed to occupy the platform (this trial run may be performed when the trial lift required by this manual is performed).
22.G			• Several new diagrams have been included for clarification.
	Table 22-4 (new)		• New table that describes minimum dimensions for horse scaffold members.
22.I	22.I.02	22.I.02	• Pump jack brackets, braces, and accessories shall be fabricated

			from metal plates and angles and installed in accordance with the manufacturer's recommendations. Installation and operational manuals shall be available upon request of the GDA.
22.K	22.K.06.c	22.K.06.c	c. A harness and lanyard, or deceleration device of length or design with a suitable height anchorage such that any fall over the platform edge shall not cause impact with the ground, shall be worn by a worker when working from the basket of a vehicle mounted aerial lift.
22.L (new)			• Mast Climbing Work Platform
	22.L.01		• An inspection will be performed prior to erecting the work platform. a. An overhead inspection will be done to ensure that the work platform will not come in contact with any obstructions while moving up or down the mast. Special attention will be given to high voltage conductors. b. An inspection of the ground will be done to ensure that there are no obstacles around the work platform and in the path of travel such as holes, drop-offs, debris, ditches, or soft fill. c. Daily maintenance and inspections will be performed and documented. Copies will be maintained on the job site.
	22.L.02 (new)		• Only a designated operator will use the platform.
	22.L.03 (new)		• The platform will not be raised on uneven or sloped surfaces unless outriggers are used to level the platform and the ground is suitable to support the load.
	22.L.04 (new)		• Platforms will not be raised without outriggers extended and

			locked in proper operating position. The unit will be leveled before raising the platform. ***NOTE: Not all Mast Climbing Work Platforms are designed with freestanding capability. Check the machine and manual to see if the machine being operated has a freestanding height.***
	22.L.05 (new)		• The platform must be lowered when moved, and must be set up and leveled each time before it is elevated.
	22.L.06 (new)		• A mast climbing work platform, with platform elevated or personnel on the platform, will not be driven. The manufacturer's instructions will be referred to when moving a mast climbing work platform to determine the safe mast height for ground conditions, ground slope, and overhead obstructions.
	22.L.07 (new)		• Mast climbing work platforms will be properly tied to the building (or structure) within the manufacturer's recommended guidelines unless it is designed to be freestanding.
	22.L.08 (new)		• Mast climbing work platforms will not be moved unless everyone on the platform is aware of the direction the platform is being moved.
	22.L.09 (new)		• No ladders or structures of any kind will be used to increase the size or working height of platform.
	22.L.10 (new)		• Climbing of braces and guardrails is prohibited.
	22.L.11 (new)		• The work platform will not be raised in windy or gusty conditions. The operation manual will be followed to determine maximum in-service wind speed

			conditions. A copy of the operation manual will be available on the job site.
	22.L.12 (new)		• Platforms will not be altered or modified in any way. Changing the configuration may change load capacity, freestanding height, and tie frequency. Mechanical, hydraulic, or electrical changes may adversely affect operation of this machine.
	22.L.13 (new)		• A competent person will perform daily maintenance and inspections.
	22.L.14 (new)		• Training. Personnel will be trained before using and/or operating mast climbing work platforms. Each user and operator will: a. Read and understand all cautions and danger warnings on the machine and in the operator's manual b. Have a solid working understanding of the controls. c. Understand the hazards associated with the use of mast climbing work platforms. d. Ensure that only authorized personnel use the platform.
	22.L.15 (new)		• A damaged or malfunctioning machine will not be used. Operation of damaged equipment shall be discontinued until the unit is repaired.

Summary of changes to EM 385-1-1/Section 23

Section	Paragraph	Old	New
23.A	23.A.01.a (1) & (2)	23.A.01.a (1)(2) & (3)	(1) An engineering survey (by a Registered Professional Engineer) of the structure to determine the structure layout, the condition of the framing, floors, walls, the possibility of unplanned collapse of any portion of the structure (any adjacent structure where employees or property may be exposed shall be similarly checked), and the existence of other potential or real demolition hazards. (2) A demolition plan - by a Registered Professional Engineer and based on the engineering and lead and asbestos surveys - for the safe dismantling and removal of all building components and debris.

Summary of changes to EM 385-1-1/Section 25

No changes to Section 24

Section	Paragraph	Old	New
25A	25.A.01.a	25.A.01.a	• Planning. a. Prior to opening an excavation, underground installations (e.g., sewer, communication lines, water, fuel, electric lines) shall be located and protected from damage or displacement. Utility companies and other responsible authorities shall be contacted to locate and mark the locations and, if they so desire, direct or assist with protecting the underground installations. When required, the Contractor shall obtain a "Digging Permit" (excavation permit) from Base Civil Engineers or other authority having jurisdiction prior the initiation of any excavation work. Requests for the permits will be processed through the GDA.
	25.A.02.a	25.A.02.a	a. When persons will be in or around an excavation, a competent person shall inspect the excavation, the adjacent areas, and protective systems daily, as needed throughout the work shifts, and after every rainstorm or other hazard-increasing occurrence.
	25.A.03.f (new)		f. Shoring shall be used for unstable soil or depths >5 ft (>1.5 m) unless benching, lay-back, or other acceptable plan is implemented by the Contractor.
	25.A.11	25.A.11	• Employees shall wear a harness with lifeline securely attached when entering excavations classified as confined spaces or that otherwise present potential for emergency rescue. > ***See 5.F.***

25.C	25.C.01	25.C.01	• Sloping or benching of the ground shall be in accordance with one of the systems outlined in a through c below: > ***See Figure 25-1 for Examples from 29 CFR 1926, Subpart P, Appendix B.***
25.D	25.D.03 Figures 25-1, 25-2 and 25-3 (new)		• Installation and removal of support systems. > ***See Examples of Support Systems at Figures 25-2 and 25-3.***

Summary of changes to EM 385-1-1/Section 27

No changes to Section 26

Section	Paragraph	Old	New
27	27.E. (Replaced in it's entirety)	27.E	
	27.E.01		• Prior to beginning the erection of any structural steel, a steel erection plan shall be submitted to the GDA for review and acceptance.
	27.E.02		• Steel erection activities include: a. Hoisting, laying out, placing, connecting, welding, burning, guying, bracing, bolting, plumbing, and rigging structural steel, steel joists and metal buildings; b. Installing metal decking, curtain walls, window walls, siding systems, miscellaneous metals, ornamental iron, and similar materials; and c. Moving point-to-point while performing these activities.
	27.E.03		• The following activities are covered by this Section when they occur during and are a part of steel erection activities: rigging, hoisting, laying out, placing, connecting, guying, bracing, dismantling, burning, welding, bolting, grinding, sealing, caulking, and all related activities for construction, alteration and/or repair of materials and assemblies such as structural steel; ferrous metals and alloys; non-ferrous metals and alloys; glass; plastics and synthetic composite materials; structural metal framing and related bracing and assemblies; anchoring devices; structural cabling; cable stays; permanent and temporary bents

			and towers; false work for temporary supports of permanent steel members; stone and other non-precast concrete architectural materials mounted on steel frames; safety systems for steel erection; steel and metal joists; metal decking and raceway systems and accessories; metal roofing and accessories; metal siding; bridge flooring; cold formed steel framing; elevator beams; grillage; shelf racks; multi-purpose supports; crane rails and accessories; miscellaneous, architectural and ornamental metals and metal work; ladders; railings; handrails; fences and gates; gratings; trench covers; floor plates; castings; sheet metal fabrications; metal panels and panel wall systems; louvers; column covers; enclosures and pockets; stairs; perforated metals; ornamental iron work, expansion control including bridge expansion joint assemblies; slide bearings; hydraulic structures; fascias; soffit panels; penthouse enclosures; skylights; joint fillers; gaskets; sealants and seals; doors; windows; hardware; detention/security equipment and doors, windows and hardware; conveying systems; building specialties; building equipment; machinery and plant equipment, furnishings and special construction.
	27.E.04		• Written notifications. Before authorizing the commencement of steel erection, the controlling Contractor shall ensure that the steel erector is provided with the following written notifications:

			a. The concrete in the footings, piers, and walls and the mortar in the masonry piers and walls has attained, on the basis of an appropriate ASTM standard test method of field-cured samples, either 75% of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection. b. Any repairs, replacements, and modifications to the anchor bolts were conducted in accordance with contract specifications and/or the design engineer. c. A steel erection Contractor shall not erect steel unless it has received written notification that the concrete in the footings, piers and walls or the mortar in the masonry piers and walls has attained, on the basis of an appropriate ASTM standard test method of field-cured samples, either 75% of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection. d. Both Contractors will keep a copy of this written notification on-site.
	27.E.05		• Site layout. The controlling Contractor shall ensure that the following is provided and maintained: a. Adequate access roads into and through the site for the safe delivery and movement of derricks, cranes, trucks, other necessary equipment, and the

			material to be erected; and means and methods for pedestrian and vehicular control. Exception: This requirement does not apply to roads outside of the construction site. b. A firm, properly graded, drained area readily accessible to the work with adequate space for the safe storage of materials and the safe operation of the erector's equipment. c. Pre-planning of overhead hoisting operations. All hoisting operations in steel erection shall be pre-planned.
	27.E.06		• Site-specific erection plan. Where employers elect, due to conditions specific to the site, to develop alternate means and methods that provide employee protection, a site-specific erection plan shall be developed by a qualified person and be available at the work site.
	27.E.07		• Hoisting and rigging. All the applicable requirements of Sections 15 and 16 apply to this Section.
	27.E.08		• Visual inspection of cranes. A competent person shall visually inspect cranes being used in steel erection activities prior to each shift. The inspection shall include observation for deficiencies during operation. At a minimum, this inspection shall include the following: a. All control mechanisms for maladjustments; b. Control and drive mechanism for excessive wear of components and contamination by lubricants, water, or other foreign matter; c. Safety devices including, but not limited to, boom angle indicators, boom stops, boom

			kick out devices, A2B devices, and LMI where required; d. Air, hydraulic, and other pressurized lines for deterioration or leakage, particularly those that flex in normal operation; e. Hooks and latches for deformation, chemical damage, cracks, or wear; f. Wire rope reeving for compliance with hoisting equipment manufacturer's specifications; g. Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, or moisture accumulation; h. Hydraulic system for proper fluid level; i. Tires for proper inflation and condition; j. Ground conditions around the hoisting equipment for proper support, including ground settling under and around outriggers, ground water accumulation, or similar conditions; k. The hoisting equipment for level position; and l. The hoisting equipment for level position after each move and setup.
	27.E.09		• Deficiencies. If any deficiency is identified, an immediate determination shall be made by the competent person as to whether the deficiency constitutes a hazard. a. If the deficiency is determined to constitute a hazard, the hoisting equipment shall be removed from service until the deficiency has been

			corrected. b. The operator shall be responsible for those operations under the operator's direct control. Whenever there is any doubt as to safety, the operator shall have the authority to stop and refuse to handle loads until safety has been assured.
	27.E.10		• A qualified rigger (a rigger who is also a qualified person) shall inspect the rigging prior to each shift.
	27.E.11		• The headache ball, hook, or load shall not be used to transport personnel.
	27.E.12		• Cranes or derricks may be used to hoist employees on a personnel platform when all applicable provisions of 22.F have been met.
	27.E.13		• Safety latches on hooks shall not be deactivated or made inoperable.
	27.E.14		• Structural stability. a. Structural stability shall be maintained at all times during the erection process. b. The following additional requirements shall apply for multistory structures: (1) The permanent floors shall be installed as the erection of structural members progresses, and there shall be not more than eight stories between the erection floor and the uppermost permanent floor, except where the structural integrity is maintained as a result of the design. (2) At no time shall there be more than four floors or 48 ft (14.6 m), whichever

			is less, of unfinished bolting or welding above the foundation or uppermost permanently secured floor, except where the structural integrity is maintained as a result of the design. (3) A fully planked or decked floor or nets shall be maintained within two stories or 30 ft (9.1 m), whichever is less, directly under any erection work being performed.
	27.E.15		• Walking/working surfaces. a. Shear connectors and other similar devices. (1) Tripping hazards. Shear connectors (such as headed steel studs, steel bars, or steel lugs), reinforcing bars, deformed anchors or threaded studs shall not be attached to the top flanges of beams, joists, or beam attachments so that they project vertically from or horizontally across the top flange of the member until after the metal decking, or other walking/working surface, has been installed. (2) Installation of shear connectors on composite floors, roofs, and bridge decks. When shear connectors are used in construction of composite floors, roofs, and bridge decks, employees shall lay out and install the shear connectors after the metal decking has been installed, using the metal

			decking as a working platform. b. Slip resistance of metal decking. c. Slip resistance of skeletal structural steel. Workers shall not be permitted to walk the top surface of any structural steel member that has been coated with paint or similar material unless documentation or certification that the coating has achieved a minimum average slip resistance of 0.50 when measured with an English XL tribometer or equivalent tester on a wetted surface at a testing laboratory is provided. Such documentation or certification shall be based on the appropriate ASTM standard test method conducted by a laboratory capable of performing the test. The results shall be available at the site and to the steel erector. d. Plumbing-up. (1) When deemed necessary by a competent person, plumbing-up equipment shall be installed in conjunction with the steel erection process to ensure the stability of the structure. (2) When used, plumbing-up equipment shall be in place and properly installed before the structure is loaded with construction material such as loads of joists, bundles of decking, or bundles of bridging.

			(3) Plumbing-up equipment shall be removed only with the approval of a competent person. e. Metal decking - Hoisting, landing, and placing of metal decking bundles. (1) Bundle packaging and strapping shall not be used for hoisting unless specifically designed for that purpose. (2) If loose items such as dunnage, flashing, or other materials are placed on the top of metal decking bundles to be hoisted, such items shall be secured to the bundles. (3) Bundles of metal decking on joists shall be landed in accordance with 27.E.29. (4) Metal decking bundles shall be landed on framing members so that enough support is provided to allow the bundles to be unbanded without dislodging the bundles from the supports. (5) At the end of the shift or when environmental or jobsite conditions require, metal decking shall be secured against displacement. (6) Roof and floor holes and openings. Metal decking at roof and floor holes and openings shall be installed as follows: (a) Framed metal deck openings shall have structural members turned down to allow continuous deck

			installation except where not allowed by structural design constraints or constructibility. (b) Roof and floor holes and openings shall be decked over. Where large size, configuration, or other structural design does not allow openings to be decked over, employees shall be protected from falls. (c) Metal decking holes and openings shall not be cut until immediately prior to being permanently filled with the equipment or structure needed or intended to fulfill its specific use and that meets the strength requirements of 27.E.16, or shall be immediately covered.
	27.E.16		• Covering roof and floor openings. a. Covers for roof and floor openings shall be capable of supporting, without failure, twice the weight of the employees, equipment, and materials that may be imposed on the cover at any one time. b. All covers shall be secured when installed to prevent accidental displacement by the wind, equipment, or employees. c. All covers shall be painted with high-visibility paint or shall be marked with the word **"HOLE"** or **"COVER"** to provide warning of the

			hazard. d. Smoke dome or skylight fixtures that have been installed, are not considered covers for the purpose of this Section unless they meet the strength requirements of 27.E.16a and 27.H.09. e. Decking gaps around columns. Wire mesh, exterior plywood, or equivalent, shall be installed around columns where planks or metal decking do not fit tightly. The materials used must be of sufficient strength to provide fall protection for personnel and prevent objects from falling through.
	27.E.17		• Installation of metal decking a. Metal decking shall be laid tightly and immediately secured upon placement to prevent accidental movement or displacement. b. During initial placement metal-decking panels shall be placed to ensure full support by structural members.
	27.E.18		• Derrick floors. a. A derrick floor shall be fully decked and/or planked and the steel member connections completed to support the intended floor loading. b. Temporary loads placed on a derrick floor shall be distributed over the underlying support members so as to prevent local overloading of the deck material.
	27.E.19		• Column anchorage a. General requirements for erection stability. (1) All columns shall be

			anchored by a minimum of four anchor rods (anchor bolts). (2) Each column anchor rod (anchor bolt) assembly, including the column-to-base plate weld and the column foundation, shall be designed to resist a minimum eccentric gravity load of 300 lbs (136.2 kg) located 18 in (45.7 cm) from the extreme outer face of the column in each direction at the top of the column shaft. (3) Columns shall be set on level finished floors, pre-grouted leveling plates, leveling nuts, or shim packs that are adequate to transfer the construction loads. (4) All columns shall be evaluated by a competent person todetermine whether guying or bracing is needed; if guying or bracing is needed, it shall be installed. b. Repair, replacement or field modification of anchor rods (anchor bolts). (1) Anchor rods (anchor bolts) shall not be repaired, replaced, or field-modified without the approval of the project structural engineer of record. (2) Prior to the erection of a column, the controlling Contractor shall provide written notification to the steel erector if there has been any repair,

			replacement, or modification of the anchor rods (anchor bolts) of that column.
	27.E.20		• Beams and columns a. During the final placing of solid web structural members, the load shall not be released from the hoisting line until the members are secured with at least two bolts per connection (of the same size and strength as shown in the erection drawings) drawn up wrench-tight or the equivalent as specified by the project structural engineer of record, except as specified in 27.E.21. b. A competent person shall determine if more than two bolts are necessary to ensure the stability of cantilevered members; if additional bolts are needed, they shall be installed.
	27.E.21		• Diagonal bracing. Solid web structural members used as diagonal bracing shall be secured by at least one bolt per connection drawn up wrench-tight or the equivalent as specified by the project structural engineer of record.
	27.E.22		• Double connections a. Double connections at columns and/or at beam webs over a column. When two structural members on opposite sides of a column web, or a beam web over a column, are connected sharing common connection holes, at least one bolt with its wrench-tight nut shall remain connected to the first member unless a shop-attached or field-attached seat or

			equivalent connection device is supplied with the member to secure the first member and prevent the column from being displaced. b. If a seat or equivalent device is used, the seat (or device) shall be designed to support the load during the double connection process. It shall be adequately bolted or welded to both a supporting member and the first member before the nuts on the shared bolts are removed to make the double connection.
	27.E.23		• Column splices. Each column splice shall be designed to resist a minimum eccentric gravity load of 300 lbs (136.2 kg) located 18 in (45.7 cm) from the extreme outer face of the column in each direction at the top of the column shaft.
	27.E.24		• Perimeter columns. Perimeter columns shall not be erected unless: a. The perimeter columns extend a minimum of 48 in (121.9 cm) above the finished floor to permit installation of perimeter safety cables prior to erection of the next tier, except where constructibility does not allow. b. The perimeter columns have holes or other devices in or attached to perimeter columns at 42-45 in (106.6-114.3 cm) above the finished floor and the midpoint between the finished floor and the top cable to permit installation of perimeter safety cables except where constructibility does not allow.

	27.E.25		• Open web steel joists. a. Except as provided in paragraph (b)(2) below, where steel joists are used and columns are not framed in at least two directions with solid web structural steel members, a steel joist shall be field-bolted at the column to provide lateral stability to the column during erection. For the installation of this joist: (1) A vertical stabilizer plate shall be provided on each column for steel joists. The plate shall be a minimum of 6 in by 6 in (15.2 cm by 15.2 cm) and shall extend at least 3 in (7.6 cm) below the bottom chord of the joist with a 13/16-in (2.1-cm) hole to provide an attachment point for guying or plumbing cables. (2) The bottom chords of steel joists at columns shall be stabilized to prevent rotation during erection. (3) Hoisting cables shall not be released until the seat at each end of the steel joist is field-bolted, and each end of the bottom chord is restrained by the column stabilizer plate. b. Where constructibility does not allow a steel joist to be installed at the column: (1) An alternate means of stabilizing joists shall be installed on both sides near the column and shall: (a) Provide stability equivalent to paragraph a(1) above,

			(b) Be designed by a qualified person, (c) Be shop installed, and (d) Be included in the erection drawings. (2) Hoisting cables shall not be eleased until the seat at each end of the steel joist is field-bolted and the joist is stabilized. c. Where steel joists at or near columns span 60 ft (18.3 m) or less, the joist shall be designed with sufficient strength to allow one employee to release the hoisting cable without the need for erection bridging. d. Where steel joists at or near columns span more than 60 ft (18.3 m), the joists shall be set in tandem with all bridging installed unless an alternative method of erection, which provides equivalent stability to the steel joist, is designed by a qualified person and is included in the site-specific erection plan. e. A steel joist or steel joist girder shall not be placed on any support structure unless such structure is stabilized. f. When steel joist(s) are landed on a structure, they shall be secured to prevent unintentional displacement prior to installation. g. No modification that affects the strength of a steel joist or steel joist girder shall be made without the approval of the project structural engineer of record. h. Field-bolted joists. (1) Except for steel joists that

			have been pre-assembled into panels, connections of individual steel joists to steel structures in bays of 40 ft (12.1 m) or more shall be fabricated to allow for field bolting during erection. (2) These connections shall be field-bolted unless constructibility does not allow. i. Steel joists and steel joist girders shall not be used as anchorage points for a fall arrest system unless written approval to do so is obtained from a qualified person. j. A bridging terminus point shall be established before bridging is installed.
	27.E.26		• Attachment of steel joists and steel joist girders. a. Each end of "K" series steel joists shall be attached to the support structure with a minimum of two 1/8-in (0.3-cm) fillet welds 1 in (2.5 cm) long or with two 1/2-in (1.2-cm) bolts, or the equivalent. b. Each end of "LH" and "DLH" series steel joists and steel joist girders shall be attached to the support structure with a minimum of two1/4-inch (0.6-cm) fillet welds 2 in (5 cm) long, or with two 3/4-in (1.9-cm) bolts, or the equivalent. c. Except as provided in paragraph d below, each steel joist shall be attached to the support structure, at least at one end on both sides of the seat, immediately upon placement in the final erection position and before additional

			joists are placed. d. Panels that have been pre-assembled from steel joists with bridging shall be attached to the structure at each corner before the hoisting cables are released.
	27.E.27		• Erection of steel joists. a. Both sides of the seat of one end of each steel joist that requires bridging under Tables 27-1 and 27-2 shall be attached to the support structure before hoisting cables are released. b. For joists over 60 ft (18.2 m), both ends of the joist shall be attached as specified in 27.E.26 and the provisions of 27.E.28 are met before the hoisting cables are released. c. On steel joists that do not require erection bridging under Tables 27-1 and 27-2, only one employee shall be allowed on the joist until all bridging is installed and anchored. d. Employees shall not be allowed on steel joists where the span of the steel joist is equal to or greater than the span shown in Tables 27-1 and 27-2 in accordance with 27.E.28. e. When permanent bridging terminus points cannot be used during erection, additional temporary bridging terminus points are required to provide stability.
	27.E.28		• Erection bridging. a. Where the span of the steel joist is equal to or greater than the span shown in Tables 27-1 and 27-2, the following shall apply:

			(1) A row of bolted diagonal erection bridging shall be installed near the mid-span of the steel joist, (2) Hoisting cables shall not be released until this bolted diagonal erection bridging is installed and anchored, and (3) No more than one employee shall be allowed on these spans until all other bridging is installed and anchored. b. Where the span of the steel joist is over 60 ft (18.2 m) through 100 ft (30.4 m), the following shall apply: (1) All rows of bridging shall be bolted diagonal bridging, (2) Two rows of bolted diagonal erection bridging shall be installed near the third points of the steel joist, (3) Hoisting cables shall not be released until this bolted diagonal erection bridging is installed and anchored, and (4) No more than two employees shall be allowed on these spans until all other bridging is installed and anchored. c. Where the span of the steel joist is over 100 ft (30.4 m) through 144 ft (43.9 m), the following shall apply: (1) All rows of bridging shall be bolted diagonal bridging, (2) Hoisting cables shall not be released until all bridging is installed and

			anchored, and (3) No more than two employees shall be allowed on these spans until all bridging is installed and anchored. d. For steel members spanning over 144 ft (43.9 m), the erection methods used shall be in accordance with 27.E.20 through 27.E.24. e. Where any steel joist specified in paragraphs b above and 27.E.29a, b, and c is a bottom chord-bearing joist, a row of bolted diagonal bridging shall be provided near the support(s). This bridging shall be installed and anchored before the hoisting cable(s) is released. f. When bolted diagonal erection bridging is required by this section, the following shall apply: (1) The bridging shall be indicated on the erection drawing; (2) The erection drawing shall be the exclusive indicator of the proper placement of this bridging; (3) Shop-installed bridging clips, or functional equivalents, shall be used where the bridging bolts to the steel joists; (4) When two pieces of bridging are attached to the steel joist by a common bolt, the nut that secures the first piece of bridging shall not be removed from the bolt for the attachment of the second; and

			(5) Bridging attachments shall not protrude above the top chord of the steel joist.
	27.E.29		• Landing and placing loads. a. During the construction period, the employer placing a load on steel joists shall ensure that the load is distributed so as not to exceed the carrying capacity of any steel joist. b. Except for paragraph d below, no construction loads are allowed on the steel joists until all bridging is installed and anchored and all joist-bearing ends are attached. c. The weight of a bundle of joist bridging shall not exceed a total of 1,000 lbs (454 kg). A bundle of joist bridging shall be placed on a minimum of three steel joists that are secured at one end. The edge of the bridging bundle shall be positioned within 1 ft (0.3 m) of the secured end. d. No bundle of decking may be placed on steel joists until all bridging has been installed and anchored and all joist bearing ends attached, unless all of the following conditions are met: (1) The employer has first determined from a qualified person and documented in a site-specific erection plan that the structure or portion of the structure is capable of supporting the load, (2) The bundle of decking is placed on a minimum of three steel joists, (3) The joists supporting the bundle of decking are

			attached at both ends, (4) At least one row of bridging is installed and anchored, (5) The total weight of the bundle of decking does not exceed 4,000 lbs (1816 kg), and (6) Placement of the bundle of decking shall follow paragraph e below. e. The edge of the construction load shall be placed within 1 ft (0.3 m) of the bearing surface of the joist end.
	27.F (new)		**SYSTEMS-ENGINEERED METAL BUILDINGS**
	27.F.01		• All of the requirements of the previous section apply to the erection of systems-engineered metal except 27.E.19 (column anchorage) and 27.E.25 (open web steel joists). a. Each structural column shall be anchored by a minimum of four anchor rods (anchor bolts). b. Rigid frames shall have 50% of their bolts or the number of bolts specified by the manufacturer (whichever is greater) installed and tightened on both sides of the web adjacent to each flange before the hoisting equipment is released. c. Construction loads shall not be placed on any structural steel framework unless such framework is safely bolted, welded, or otherwise adequately secured. d. In girt and eave strut-to-frame connections, when girts or eave struts share common connection holes, at least one

			bolt with its wrench-tight nut shall remain connected to the first member unless a manufacturer-supplied, field-attached seat or similar connection device is present to secure the first member so that the girt or eave strut is always secured against displacement. (1) Releasing the hoisting cables, (2) Allowing an employee on the joists, or (3) Allowing any construction loads on the joists. e. Purlins and girts shall not be used as an anchorage point for a fall arrest system unless written approval is obtained from a qualified person. f. Purlins may only be used as a walking/working surface when installing safety systems, after all permanent bridging has been installed and fall protection is provided. g. Construction loads may be placed only within a zone that is within 8 ft (2.4 m) of the centerline of the primary support member. h. Both ends of all steel joists or cold-formed joists shall be fully bolted and/or welded to the support structure before:
	27.F.02		• Falling object protection. a. Securing loose items aloft. All materials, equipment, and tools, which are not in use while aloft, shall be secured against accidental displacement. b. Protection from falling objects other than materials being

			hoisted. The controlling Contractor shall bar other construction processes below steel erection unless overhead protection for the employees below is provided.
	27.F.03		• Fall protection. a. Each employee engaged in a steel erection activity who is on a walking/working surface with an unprotected side or edge more than 6 ft (1.8 m) above a lower level shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems, or fall restraint systems. b. Perimeter safety cables. On multi-story structures, perimeter safety cables shall be installed at the final interior and exterior perimeters of the floors as soon as the metal decking has been installed.
	27.F.04		• Each connector shall: a. Be protected, in accordance with 27.F.03, from fall hazards of more than 6 feet (1.8 m) above a lower level. b. Have completed connector training in accordance with 27.F.10 and 27.F.11 c. Be provided, at heights over 6 ft (1.8 m) above a lower level, with a personal fall arrest system, positioning device system or fall restraint system and wear the equipment necessary to be able to be tied off; or be provided with other means of protection from fall hazards in accordance with Sections 5 and 21.
	27.F.05		• Controlled decking zones (CDZ) are not permitted.
	27.F.06		• Guardrail systems, safety net

			systems, personal fall arrest systems, positioning device systems, and their components shall conform to Sections 5 and 21.
	27.F.07		• Fall arrest system components shall be used in fall restraint systems and shall conform to the requirements in this manual.
	27.F.08		• Perimeter safety cables shall meet the criteria for guardrail systems.
	27.F.09		• Custody of fall protection. Fall protection provided by the steel erector shall remain in the area where steel erection activity has been completed, to be used by other trades, only if the controlling Contractor or its authorized representative: a. Has directed the steel erector to leave the fall protection in place, and b. Has inspected and accepted control and responsibility of the fall protection prior to authorizing persons other than steel erectors to work in the area.
	27.F.10		• Training personnel. Training required by this Section shall be provided by a qualified person(s).
	27.F.11		• Fall hazard training. The employer shall provide a training program for all employees exposed to fall hazards. The program shall include training and instruction in the following areas: a. The recognition and identification of fall hazards in the work area; b. The use and operation of guardrail systems (including perimeter safety cable systems), personal fall arrest systems, positioning device

			systems, fall restraint systems, safety net systems, and other protection to be used; c. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used; d. The procedures to be followed to prevent falls to lower levels and through or into holes and openings in walking/working surfaces and walls to meet requirements of 27.E.
	27.F.12		• Special training programs. In addition to the training required above, the employer shall provide special training to employees engaged in connector procedures. The employer shall ensure that each connector has been provided training in the following areas: a. The nature of the hazards associated with connecting; and b. The establishment, access, and proper connecting techniques.
	27.H (new)		• ROOFING
	27.H.01		Before work begins, a competent person shall complete a daily inspection of each job site. This individual, designated by management, shall be capable of identifying existing predictable hazards and has the authority to take prompt corrective action to eliminate them. Hazards shall be eliminated by engineering and if this cannot be accomplished, guarding to isolate the hazard from the exposed employees shall be implemented. In no case shall warnings or instructions be used as a substitute for elimination of hazards by engineering means or guarding.
	27.H.02		• Prior to the start of work, a

			structural analysis of the roof shall be conducted by a qualified person to assure that the load capacity of the rood deck will not be exceeded.
	27.H.03		• Where the work presents a potential hazard to the public, the Contractor shall set up barricades with proper postings to alert public to the hazards. Visible signs and barricades for the information, protection, and safety of the public shall be provided and properly maintained. They shall be set up in accordance with ANSI D6.1. Applicable statutes and local regulations shall be examined and the more restrictive requirements shall be followed.
	27.H.04		• Work on the roof shall be halted during severe weather such as strong winds, electrical storms, icing conditions, heavy rain, or snow as soon as practical.
	27.H.05		• The employer shall establish emergency plans and fire prevention plans. All employees shall be trained in accordance with these plans.
	27.H.06		• Roof openings and holes shall be provided with covers or guardrail systems on all exposed sides.
	27.H.07		• Roofing material, such as roofing membrane, insulation or felts, covering or partly covering openings or holes, shall be immediately cut out. No hole or opening shall be left unattended unless covered.
	27.H.08		• All covers for openings shall be provided with a sign stating **“Danger Roof Opening---Do Not Remove.”** The message on the sign shall state that there is an opening beneath the cover and

			that the cover is not to be removed without specific authorization of the competent person. The sign shall be visible from all sides of the cover and shall comply with provisions of danger signs as specified in ANSI Z535.2-1991, “C”.
	27.H.09		• Skylights warning lines, screens or covers, shall guard skylights, together with guardrails. Skylight screens are acceptable if they are of such construction and mounting that they are capable of withstanding a static load of at least 250 lb (113.4 kg) applied perpendicularly at any one area on the screen. They shall also be of sufficient construction and mounting that when a load of 250 lb (113.4 kg) or more falls against the screen, the glass or lens below will not break. The construction shall be of grillwork with openings not more than 4 in (10.1 cm) long or of slats with openings not more than 2 in (5 cm) wide with an unrestricted length.
	27.H.10		• Fall protection requirements. a. In the construction, maintenance, repair, and demolition, of roofs, fall protection systems shall be provided which will prevent personnel from slipping and falling from the roof and prevent personnel on lower levels from being struck by falling objects. > ***See Section 21*** b. Employees engaged in the construction, maintenance, or repair of built-up roofing (but not construction of the roof deck) on low-slope roofs with unprotected sides and edges 6

			ft (1.8 m) or more above lower levels, shall be protected from falling by guardrail systems, safety net systems, personnel fall arrest systems, or a combination of warning line system and guardrail system, warning line system and safety net system, or warning line system and personal fall arrest system, or a warning line system and a safety monitoring system. Or on roofs 50 ft (15.2 m) or less in width, the use of a safety monitoring system alone without a warning line system is permitted. > **Each of the above systems is presented in their order of hierarchy and shall be considered as such in their application. A competent person shall evaluate each situation and determine which level of protection is necessary beginning with the use of guardrails. The competent person shall develop a fall protection plan and submit it to the GDA for review and acceptance prior to the start of work.** c. Steep sloped roofs with unprotected sides and edges 6 ft(1.8 m) or more above a lower surface shall be protected from falling by guardrail systems with toe boards, safety net systems, or personal fall arrest systems.
	27.H.11		• On all roofs greater than 16 ft (4.8 m) in height, a hoisting device, stairways, or progressive platforms shall be furnished for supplying materials and

			equipment.
	27.H.12		• Roofing materials and accessories that could be moved by the wind, including metal roofing panels, which are on the roof and unattached, shall be secured when wind speeds are greater than, or are anticipated to exceed, 10 mph (16.1 km/h).
	27.H.13		• Level, guarded platforms shall be provided at the landing area on the roof.
	27.H.14		• Crawling boards. a. Crawling boards shall be not less than 10 in (25.4 cm) wide and 1 in (2.5 cm) thick, having cleats 1 in x 1-1/2 in (2.5 cm x 3.8 cm). b. Cleats shall be equal in length to the width of the board and spaced at equal intervals not to exceed 24 in (60.9 cm). c. Nails shall be driven through and clinched on the underside. d. Crawling boards shall be secured and extend from the ridge pole to the eaves when used with roof construction, repairs, or maintenance. e. A firmly fastened lifeline of at least 3/4 in (1.9 cm) diameter rope, or equivalent, shall be strung beside each crawling board for a handhold.
	27.H.15		• Roofing brackets. a. Roofing brackets shall be secured by nailing in addition to the pointed metal projections. b. When it is impractical to nail brackets, rope supports shall be used. When rope supports are used, they shall consist of firstgrade manila rope, 3/4 in (1.9 cm) diameter or equivalent.

	27.H.16		• When their use is permitted, warning line systems shall comply with the following: a. Warning lines shall be erected around all sides of the work area. (1) When mechanical equipment is not being used, the warning line shall be erected not less than 6 ft (1.8 m) from the roof edge. (2) When mechanical equipment is being used, the warning line shall be erected not less than 6 ft (1.8 m) from the roof edge that is parallel to the direction of mechanical equipment operation and not less than 10 ft (3.0 m) from the roof edge that is perpendicular to the direction of mechanical equipment operation. b. Warning lines shall consist of ropes, wires, or chains, and supporting stanchions erected as follows: (1) The rope, wire, or chain shall be flagged at not more than 6 ft (1.8 m) intervals with high visibility material. (2) The rope, chain, or wire shall be rigged and supported in such a way that its lowest point (including sag) is no less than 34 in (86.4 cm) from the roof surface and its highest point no more than 39 in (99 cm) from the roof surface. (3) After being erected, with the rope, wire, or chain attached, stanchions shall be capable of resisting, without tipping over, a

			force of at least 16 lb (7.3 kg) applied horizontally against the stanchion 30 in (76.2 cm) above the walking/working surface, perpendicular to the warning line, and in the direction of the roof, floor, or platform edge. (4) The rope, wire, or chain shall have a minimum tensile strength of 500 lb (226.8 kg), and after being attached to the stanchions shall be capable of supporting, without breaking, the loads applied to the stanchions (as described in (3) above). (5) The lines shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over. (6) No employee shall be allowed in the area between a roof edge and a warning line unless the employee is performing work in that area and is protected by a motion stopping safety (MSS) system. (7) Mechanical equipment on roofs shall be used or stored only in areas where employees are protected by a warning line, guardrail, or personnel fall arrest system. c. Access paths shall be erected as follows:

			(1) Points of access, materials handling areas, and storage areas shall be connected to the work area by a clear access path formed by two warning lines. (2) When the path to a point of access is not in use, a rope, wire, or chain, equal in strength and height to the warning line, shall be placed across the path at the point where the path intersects the warning line erected around the work area, or the path shall be offset such that a person cannot walk directly into the work area.
	27.H.17		• Employees working in a roof-edge materials handling or storage area located on a roof having a slope less than or equal to 4 vertical to 12 horizontal and with edges 6 ft (1.8 m) or more above lower levels shall be protected by the use of a guardrail, safety net, or personal fall arrest system along all unprotected roof sides and edges of the area. a. When guardrails are used at hoisting areas, a minimum of 4 ft (1.2 m) of guardrail shall be erected on each side of the access point through which materials are hoisted. b. A chain or gate shall be placed across the opening between the guardrail sections when hoisting operations are not taking place. c. When guardrails are used at bitumen pipe outlets, a minimum of 4 ft (1.2 m) of

			guardrail shall be erected on each side of the pipe. d. When personal fall arrest systems are used, they shall not be attached to the hoist. e. When personal fall arrest systems are used, they shall be rigged to allow the movement of employees only as far as the roof edge. f. Materials may not be stored within 6 ft (1.8 m) of the roof edge unless guardrails are erected at the roof edge. g. Materials that are to be piled, stacked, or grouped shall be stable and self-supporting.

Summary of changes to EM 385-1-1/Section 28

Section	Paragraph	Old	New
28			**HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE (HAZWOPER)**
28.A			**GENERAL**
	28.A.01		• This Section applies to: a. Hazardous waste site cleanup operations performed under the Comprehensive Environmental Response, Compensation, Liability Act (CERCLA) or RCRA as specified by OSHA in 29 CFR 1910.120 and 29 CFR 1926.65 (a) (1) (i), (ii) and (iii) (e.g., site investigations, remedial action construction, treatment process operation, and maintenance at: Formerly Used Defense Sites (FUDS) projects, Installation Restoration Program (IRP) projects, Base Realignment and Closure (BRAC) projects, Formerly Used Sites Remedial Action Program (FUSRAP) projects, U.S. Environmental Protection Agency (EPA) Superfund projects, and hazardous waste site cleanup operations performed under the civil works program). b. Facilities or construction projects holding RCRA Treatment Storage and Disposal (TSD) permits as specified by OSHA in 29 CFR 1910.120 and 29 CFR 1926.65 (a) (1) (iv). c. Facilities or construction projects where emergency

			response as specified by OSHA in 29 CFR 1910.120 and 29 CFR 1926.65 (a) (1) (v) may be required.
	28.A.02		• Hazardous Waste Cleanup Operations. a. SSHP. Hazardous waste site cleanup operations require development and implementation of a SSHP that shall be attached to the APP as an appendix (APP/SSHP). The APP/SSHP shall address all occupational safety and health hazards associated with site cleanup operations. All contracted work on the cleanup projects shall be performed in compliance with the SSHP as well as the overall APP. Cleanup operations performed by in-house (Government) personnel do not require development of an APP, but shall be performed in compliance with local district safety and health policies for in-house activities and shall comply with the SSHP. Changes and modifications to the SSHP are permitted and shall be made in writing with the knowledge and concurrence of the safety and health manager (SHM) and accepted by the GDA. b. The SSHP shall cover the elements listed in (1) through (14) in project specific detail. SSHP elements adequately covered elsewhere in the APP need not be duplicated. (1) Site description and contamination characterization. The

			SSHP shall provide a description of the contamination with the exposure potential to adversely affect safety and occupational health and likely to be encountered by the on-site work activities. (2) Hazard/Risk analysis. An AHA shall be developed for each task/operation to be performed. The AHA shall comply with the requirements in 01.A.13. The AHA shall account for all hazards (classic safety, chemical, physical, biological, ionizing radiation) likely to be encountered while performing the work. (3) Staff organization, qualifications, and responsibilities. The following personnel are required for implementation of safety and occupational health requirements at cleanup operations. (a) SHM. The SHM must be a Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP), or Certified Health Physicist (CHP), dependent upon the contaminant-related hazards on the project (CIH for occupational health hazards, CSP for safety hazards, and CHP for ionizing radiation hazards). The

			SHM shall have 3 years of experience managing safety and occupational health at hazardous waste site cleanup operations. The SHM shall enlist the support of safety and occupational health professionals with appropriate education and experience when working on sites with multiple (chemical, safety, ionizing radiation) hazards. The SHM is responsible for the following actions: (i) Develop, maintain, and oversee implementation of the SSHP. (ii) Visit the project as needed to audit the effectiveness of the SSHP. (iii) Remain available for project emergencies. (iv) Develop modifications to the SSHP as needed. (v) Evaluate occupational exposure monitoring/air sampling data and adjust SSHP requirements as necessary. (vi) Serve as a QC staff member. (vii) Approve the

			SSHP by signature. (b) Site safety and health officer (SSHO). The SSHO shall have 1 year of experience implementing safety and occupational health procedures at cleanup operations, and have the training and experience to conduct exposure monitoring/air sampling and select/adjust protective equipment use. The SSHO shall have the authority and is responsible for the following actions: (i) Be present during cleanup operations to implement the SSHP. (ii) Inspect site activities to identify safety and occupational health deficiencies and correct them. (iii) Coordinate changes/modifications to the SSHP with the SHM, site superintendent, and contracting officer. (iv) Conduct project specific training. (4) Training. Personnel shall comply with the following general and project specific training requirements: (a) General training. General training requirements apply to project personnel exposed to ontaminantrelated health and safety

			hazards. General training must comply with the following requirements: (i) 40-hour off-site hazardous waste site instruction. Off-site instruction must comply with the 40-hour training requirements in OSHA standards 29 CFR 1910.120 and 29 CFR 1926.65. (ii) 8-hour annual refresher training. Refresher training must comply with the requirements in OSHA standards 29 CFR 1910.120 and 29 CFR 1926.65. USACE employees must comply with local district hazardous waste refresher training policies. (iii) 3 days of field experience under the direct supervision of a trained, experienced supervisor. (b) Supervisory training. On-site supervisors must comply with the 8-hour supervisory training requirements in OSHA standards 29 CFR 1910.120 and 29 CFR 1926.65. (c) Project-specific training.

			The following project-specific training shall be provided to workers before onsite work begins: (i) Training specific to other sections of this manual or OSHA standards in 29 CFR 1910 and 29 CFR 1926 that are applicable to site work and operations. (ii) Training covering each element in the SSHP. (5) PPE. PPE used to protect workers from site-related hazards (construction safety and health and contaminant related) shall comply with requirements specified in Section 5. (6) Medical surveillance. All personnel performing on-site work that will result in exposure to contaminant-related health and safety hazards shall be enrolled in a medical surveillance program that complies with OSHA standards 29 CFR 1910.120 (f) and 29 CFR 1926.65 (f). Certification of medical surveillance program participation shall be appended to the SSHP. The certification shall include: employee name, date of last examination, and name of examining physician(s). The required written physician's opinion shall be made available upon request to the GDA. All medical records shall be

			maintained in accordance with 29 CFR 1910.1020. USACE employees must comply with USACE medical surveillance policies. (7) Exposure monitoring/Air sampling program. Exposure monitoring and air sampling shall be performed to evaluate effectiveness of prescribed PPE and to evaluate worker exposure to site-related contaminants and hazardous substances used in the cleanup process. Project-specific exposure monitoring/air sampling requirements shall comply with requirements specified Section 6. (8) Heat and cold stress. The procedures and practices for protecting workers from heat and cold stress shall comply with the requirements 06.J. (9) Standard operating safety procedures, engineering controls, and work practices. Safety and occupational health procedures, engineering controls and work practices shall be addressed for the following as appropriate: (a) Site rules/prohibitions (buddy system, eating/drinking/ smoking restrictions, etc.). (b) Work permit requirements (radioactive work,

			excavation, hot work, confined space, etc.). (c) Material handling procedures (soil, liquid, radioactive materials, spill contingency). (d) Drum/container/tank handling (opening, sampling, overpacking, draining, pumping, purging, inerting, cleaning, excavation and removal, disassembly and disposal, spill contingency. (e) Comprehensive AHA of treatment technologies employed at the site. (10) Site control measures. Work zones shall be established so that on-site activities do not spread contamination. The site shall be set up so that there is a clearly defined exclusion zone (EZ) and a clearly defined support zone (SZ) with a contamination reduction zone (CRZ) as a transition between the EZ and SZ. (11) Personal hygiene and decontamination. A personal hygiene and decontamination station shall be set up in the CRZ for personnel to remove contaminated PPE and to wash when exiting the EZ. (12) Equipment decontamination. An equipment decontamination station

			shall be set up in the CRZ for equipment to be decontaminated when exiting the EZ. (13) Emergency equipment and first aid. The equipment and personnel required for first aid and CPR shall comply with the requirements in Section 3. Emergency equipment required to be on-site shall have the capacity to respond to project-specific emergencies. Site emergencies may require (but should not be limited to) PPE and equipment to control fires, leaks and spills, or chemical (contaminant or treatment process) exposure. (14) Emergency response and contingency procedures. An ERP shall be developed that addresses the following emergency response and contingency procedures: (a) Pre-emergency planning. An agreement shall be established between the Contractor (or the GDA for inhouse work), local emergency responders, and the servicing emergency medical facility that specifies the responsibilities of on-site personnel, emergency response personnel, and the emergency medical

			facility in the event of an on-site emergency. (b) Personnel and lines of authority for emergency situations. (c) Criteria and procedures for emergency recognition and site evacuation (e.g., emergency alarm systems, evacuation routes and reporting locations, site security). (d) Decontamination and medical treatment of injured personnel. (e) A route map to emergency medical facilities and phone numbers for emergency responders. (f) Criteria for alerting the local community responders. c. Should any unforeseen hazard become evident during the performance of work, the SSHO shall bring such hazard information to the attention of the SHM and the GDA (both verbally and in writing) for resolution as soon as possible. In the interim, necessary action shall be taken to reestablish and maintain safe working conditions.
	28.A.03		• RCRA TSD facilities. Requirements specified in 29 CFR 1910.120 and 29 CFR 1926.65(p), and the terms of the facility RCRA permit shall be complied with for operations at TSD facilities.
	28.A.04		• Facility or construction project emergency response. Facilities or construction projects using,

			storing, or handling hazardous substances and whose employees will be engaged in emergency response operations shall comply with 29 CFR 1910.120 (q) and 29 CFR 1926.65 (q) (a) (1) (v) when a hazardous substance release may result in exposure causing adverse affects on the health or safety of employees. Facilities/construction projects that will evacuate their employees from the danger area when an emergency occurs, and that do not permit any of their employees to assist in handling the emergency, are exempt from this requirement if they provide an emergency action plan in accordance with 29 CFR 1910.38(a) and 29 CFR 1926.35. a. If applicable, the facility/construction site manager shall develop and implement an ERP that addresses the following items: (1) Operations. Identify the operations requiring the use of hazardous substances. (2) Pre-emergency planning with local emergency responders. Describe emergency response agreements, including roles and responsibilities, made with local emergency responders for hazardous material response, fire, rescue, emergency medical care, and security and law enforcement. (3) Personnel roles, lines of authority, training, and communication. Describe

			key personnel roles, command structure/lines of authority and communications requirements for responding to construction site or facility specific hazardous substance releases. (4) Emergency recognition and prevention. Explain the likely emergency scenarios for the construction project or facility, and explain how employees can expect to identify and recognize emergency scenarios. (5) Safe distances and places of refuge. Select safe places of refuge to be used in emergency situations, identify these locations in the ERP, and require employees to report to selected places of refuge during emergencies. (6) Site security and control. Describe how the facility will be secured and describe access to the site controlled during emergencies. (7) Evacuation routes and procedures. Describe and map out the evacuation routes to safe places of refuge and any special safety and health procedures employees must follow while evacuating the facility. (8) Decontamination. Develop and describe plans and procedures for decontaminating

			personnel if/when they come in contact with leaking hazardous substances. (9) Emergency medical treatment and first aid. Explain how emergency medical treatment and first aid will be provided in the event of a hazardous substance spill. (10) Emergency alerting and response procedures. Describe how personnel will be alerted in the event of a hazardous substance spill, and describe how facility personnel must response after emergency alerting procedures are initiated. (11) Critique of response and follow-up. Describe how lessons learned from emergency response will be documented and used to improve future emergency response actions. (12) PPE and emergency equipment. Describe the PPE and emergency equipment to be made available and how it is to be used by employees for evacuation. Describe the PPE and emergency response equipment that will be available for use by response personnel at the facility. (13) ERT. Designate a facility-specific ERT. Describe the team's emergency responsibilities. Describe

			the team's responsibilities for interacting with local emergency response providers (i.e., where the facility team's responsibilities end and the local response providers begin). b. Personnel training requirements. At a minimum, ERT personnel at the facility or construction project shall be trained to the "First Responder Operations Levels" specified in 29 CFR 1910.120 (q)(6)(ii). Response above and beyond defensive requires additional training and highly qualified supervision under 29 CFR 1910.120(q) and 29 CFR 1926.65(q) and must be specified on a project specific basis. c. ERT responsibilities. The ERT shall, at a minimum, respond in a defensive manner to hazardous substance releases at the facility or construction project using the equipment and procedures specified in the ERP for defensive response. The ERT shall only provide response services beyond defensive if qualified and only according the procedures specified in the facility or construction project-specific ERP.

Summary of changes to EM 385-1-1/Section 29

Section	Paragraph	Old	New
29	29.A.01.b.(2)	29.A.01.b.(2)	(2) Delineate the Contractor's requirements for handling, transportation, and storage of explosives; employee training programs; loading procedures; safety signals; danger area clearance; methods for securing the site; vibration and damage control; post-blast inspection and misfire procedures; provisions for disposal of explosives, blasting agents, and associated material; and post-blast ventilation requirements.
	29.A.02	29.A.02	The transporting, handling, storage, and use of explosives, blasting agents, and blasting equipment shall be directed and supervised by a person of proven experience and ability in blasting operations in accordance with ANSI A10.7; 29 CFR 1910.109; 29 CFR 1926, Subpart U; 27 CFR 555; the manufacturers, the Institute of Makers of Explosives (IME), and, where applicable, DOD explosives safety standards. > ***See 26.J.***
	29.A.19	29.A.19	Mechanized equipment (including drills) shall not be operated within 50 ft (15.2 m) of a loaded hole. *(EXCEPTION: Mechanized equipment may be permitted to operate within 50 ft (15.2 m) of a loaded hole when placing blasting mats or back covering.)*
	29.B.07	29.B.07	Explosives shall not be exposed to sparking metal during transportation. When steel or part steel bodies are used, non-sparking cushioning materials shall separate the containers of explosives from the metal.
	29.B.08	29.B.08	No spark-producing tools, carbides, oils, matches, firearms, electric

			storage batteries, flammable substances, acids, or oxidizing or corrosive compounds shall be carried in the bed or body of any vehicle transporting explosive materials.
	29.B.09	29.B.09	Vehicles transporting explosive materials shall be equipped with one or more fire extinguishers having a rating of 10-B:C and placed at strategic points. a. The extinguishers shall be of a type listed by a nationally- recognized testing laboratory and shall be ready for use. b. The driver will be trained in the use of the extinguisher.
	29.B.10	29.B.10	A vehicle containing explosive materials shall not be taken into a garage or repair shop, parked in congested areas, or stored at any time in a public garage or similar building.
	29.F.02.c	29.F.02.c	c. All drilling necessary to neutralize misfires must be done under the supervision of a competent person who has a working knowledge of the explosive materials involved and is familiar with the conditions under which the misfired holes were drilled, loaded, primed, and initiated, and is familiar with the drilling equipment capabilities that will be used during the neutralization.
	29.G.05	29.G.05	Whenever the possibility exists that a leading wire might be thrown onto a live power source by the force of the explosion, care shall be taken to see that the total length of wires is kept too short to contact the source or that the wires are securely anchored to the ground. Alternatively, de-energize the live power until it is certain during the post blast inspection that the lines have not

			crossed. If these requirements cannot be met, a non-electric system shall be used.
	29.I.01	29.I.01	Immediately after blast has been fired, the firing line shall be disconnected from the blasting machine or power source. Power switches shall be locked open. Atmospheres in confined areas shall be tested and/or ventilated after blast.

Summary of changes to EM 385-1-1/Section 30

No changes to Sections 31 and 32.

Section	Paragraph	Old	New
30			
	30.A.01	30.A.01	All contract diving operations shall be performed in accordance with this manual. Any failure to meet the requirements of this Section will be cause for rejection or cessation of operations. Unless otherwise delegated in this section, requests for variance to the requirements of this section must be submitted in writing to and approved by the HQUSACE Safety and Occupational Health Office.
	30.A.02	30.A.02	The USACE Command, at their discretion, may elect to implement and enforce more conservative diving requirements than stated herein, but under no circumstances will the operational requirements be less than specified in this Section.
	30.A.03	30.A.03	Diving shall not be used as a work method if the work objective can be more safely and efficiently accomplished by another means (e.g., using remote controlled television systems in lieu of divers).
	30.A.04	30.A.04	Surface-supplied air (SSA) shall be used whenever possible in accordance with the practical constraints of diving operations. All working dives requiring communications between the divers and topside to direct crane load movements, etc., shall be performed in SSA mode. A tender/diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or

			physically confining spaces..
	30.A.05	30.A.05	Live boating will not be used without prior specific acceptance by the District Diving Coordinator (DDC).
	30.A.06	30.A..06	Training documentation shall be in compliance with 29 CFR 1910.410 and shall show that the dive team members have successfully completed training to the appropriate level (e.g., SSA divers certificate, surface supplied mixed-gas diver certificate). Such training shall: a. Be from a commercial diving school within a particular State, military school, Federal school (e.g., USACE), or an Association of Commercial Diving Educators (ACDE) accredited school, or b. Meet the requirements contained in ANSI/ACDE-01.
	30.A.07	30.A.07	Any employed diver/team member may substitute a training certificate with a valid “Association of Diving Contractors (ADC) Commercial Diver Certification Card” for the appropriate training level.
	30.A.08	30.A.08	Contractors shall provide evidence that each dive team member has training and experience consistent with the performance requirements of the scope of work. As a minimum, each team member shall have at least 1 year of commercial experience in the applicable position; divers shall have completed at least four (4) working dives with similar decompression techniques as in the contract, using the particular diving techniques and equipment to be used under the contract. Divers shall demonstrate that at least one (1) of the four (4) qualification dives was performed in the last 6 months prior to the contract award date.
	30.A.09	30.A.09	Each dive team member shall have current certification in CPR, first aid,

			and use of emergency oxygen systems. Evidence of this will be a photocopy of the certificates.
	30.A.10	30.A.10	The Contractor shall submit certification, signed by a licensed physician, stating that each diver has been medically examined within the previous 12 months and has been determined fit and approved to dive. The dive medical examination will be repeated every 12 months with verification submitted to the DDC.
	30.A.11	30.A.11	Divers will wait at least 12 hours before flying after any dive: this interval should be extended to 24 hours following multiple days of repetitive dives.
	30.A.12	30.A.12	Contract diving operations will be monitored and/or inspected by USACE employees who are certified as divers, diving supervisors, or diving inspectors through USACE sponsored training courses; however, use of trained monitors/inspectors with other credentials will be considered on a case-by-case basis and approved in writing by the DDC.
	30.A.13	30.A.13	When diving at altitudes of 1000 ft (304.8 m) or more of elevation above sea level, Contractors shall use appropriate high altitude decompression tables that compensate for the increased elevation.
	30.A.14	30.A.14	The following submittals are required for all diving operations. Additional submittals may be required depending on the scope of the diving operation. All submittals will be made to the Contracting Officer and will be reviewed and found acceptable by the DDC prior to start of diving operations. a. Contractor's Safe Practices Manual. > **See 30.A.16** b. Dive Operations Plan(s). > **See**

			30.A.17 c. AHA. > **See 30.A.18** d. Emergency Management Plan. > **See 30.A.19** e. Dive Personnel Qualifications. > **See 30.A.06, 07 & 08**
	30.A.15	30.A.15	A diving operations plan, AHA, and emergency management plan will be developed for each separate diving operation. These documents will be submitted to the DDC and the Safety and Occupational Health Office Diving Safety Representative for review and found acceptable prior to commencement of diving operations and be at the diving location at all times. Each of these documents will become a part of the project file. Penetration diving, contaminated environment diving, dives outside the no decompression limits, and in areas where differential pressure entrapment hazards exist, will be specifically addressed in each document when they are anticipated as part of the diving operation.
	30.A.16	30.A.16	Safe practices manual. Contractors shall develop and maintain a safe practices manual that encompasses the Contractor's entire diving program. The safe practices manual shall be available at all times to the Government representative and all dive team members at each diving location. The safe practices manual shall include, as a minimum, the following: a. Safety procedures and checklists; b. Assignments and responsibilities of dive team members; c. Equipment certifications, procedures, and inspection checklists; d. Emergency procedures for fire, equipment failure, adverse weather conditions, and medical

			illness or injury; e. Requirements for inspections; f. A complete copy of OSHA, 29 CFR 1910, Subpart T, and the Contractor's proposed method of complying with each of its pertinent parts; g. U.S. Navy Standard Air Decompression Table; h. A sample of the diving log sheets to be used under the contract; i. A sample of the repetitive dive worksheets or equivalent (dive profile method) to be used under the contract; j. U.S. Navy Table of No-Decompression Limits and Repetitive Group Designation for No-Decompression Air Dives; k. U.S. Navy Residual Nitrogen Timetables for Repetitive Air Dives; l. An outline of the medical qualifications required for divers to be employed under the contract. As a minimum, each diver shall meet the certification requirements specified in 29 CFR 1910, Subpart T; and m. An outline of administrative and recordkeeping procedures.
	30.A.17	30.A.17	Dive Operations Plan. As a minimum the plan will contain the following: a. Name of Contractor (and diving subcontractor if applicable); b. Contract number; c. Date of dive plan submission; d. Name of diving supervisor preparing the dive plan; e. Names and duties of dive team members, including diving supervisor; f. List of diving equipment to be used; g. Type of diving platform to be used;

			h. Detailed description of the mission; i. Date(s), time(s), duration, and location of operation; j. Diving mode used (SCUBA, SSA, and snorkeling) including a description of the backup air supply, as required; k. Nature of work to be performed by the divers, including tools used and materials to be handled or installed; l. Surface and underwater conditions, to include visibility, temperature, currents, etc. Thermal protection will be considered as appropriate; m. Maximum single dive bottom time for the planned depth of dive for each diver. Altitude adjustments to dive tables will be calculated for dives made at altitudes of 1000 ft (304.8 m) or more above sea level. > **See Appendix O**; n. Name of each person directly involved in topside assistance/support to the dive team (i.e., crane operator, lock operator, etc.); o. Means of direct communication between the dive site and the Contractor's project office, the contracting officer, and the lockmaster/USACE project manager; NOTE: The dive plan will include the following statement: **"If for any reason the dive plan is altered in mission, depth, personnel, or equipment, the DDC will be contacted in order to review and accept the alteration prior to actual operation."**
	30.A.18	30.A.18	An AHA represents the dive team's best effort to anticipate and mitigate or prevent the adverse effects of equipment failure, extreme

			weather/environmental conditions, or other hazardous/unexpected situations. Each AHA will be job specific and address each phase of work, to include the hazards associated with flying after diving. Lockout/tagout procedures and procedures for dealing with differential pressures will be included if appropriate. Some dives may be sufficiently complex to warrant several separate analyses. The AHA will be covered in detail at the pre-dive conference. If safe clearance procedures are required for the diving operation, the diving supervisor will walk through the clearances to assure they are in place and redundant where possible prior to the commencement of the diving operation. A copy of any clearances/permits to be issued to deal with identified hazards will be attached to the AHA.
	30.A.19	30.A.19	Emergency management plan. An emergency management plan will be prepared for each dive. The minimum content of the plan will be as follows: a. Location and phone number of nearest operational recompression chamber if not located at the dive site; b. Location and phone number(s) of nearest hospital(s); c. Location and phone number of nearest USCG Rescue Coordination Center, where appropriate; d. Description of an emergency victim transport plan including phone numbers of appropriate emergency transport services; e. Procedures and phone numbers or other means of communications to activate emergency services at the facility where the work is being performed;

			f. Procedure to deal with entrapped or fouled diver including fouled umbilical (suction and entanglement/debris); g. Actions upon loss of vital support equipment; h. Actions upon loss of gas supply; i. Action upon loss of communication; j. Lost diver plan; k. Injured diver plan; l. Actions upon discovery of fire; m. Diver blow up/over rapid ascent to surface; n. Diver loss of consciousness; and o. Injury/illness of member of surface crew with diver in the water.
	30.A.20	30.A.20	Prior to each dive, and at the scene of the dive, a Pre-Dive Conference shall be held with all members of the dive team and a representative of the Contractor with sufficient authority to implement any requirements made by the USACE diving inspector or coordinator.
	30.A.21	30.A.21	Prior to each dive, the entire dive team will be briefed in detail on the following (as a minimum): a. Description of mission and location, including drawings and/or photographs pertinent to the mission and equipment and materials that are to be installed as part of the mission; b. Description of diving apparatus/equipment and craft to be used; c. Maximum working depth with estimated bottom times and water temperatures; d. Names and duties of personnel on the team (when possible, incorporate at least one person on the dive that has previously performed the same or similar

			mission); e. Discussion of AHA; and f. Emergency procedures.
	30.A.22	30.A.22	Upon completion of each diving operation or at the conclusion of each day, a dive team debriefing shall be conducted by the contractor dive supervisor. At the debriefing divers are advised of the location of the nearest recompression chamber (if not located on site) and cautioned on the limitations of their post dive activities including repetitive dives and flying.
	30.A.23	30.A.23	If for any reason the dive mission is altered, the Contracting Officer shall be contacted by the dive inspector or the dive supervisor and a revised dive plan will be reviewed and accepted by the DDC prior to continuing the operation. This review may be conducted electronically and confirmed in writing after completion of the dive operation.
	30.A.24	30.A.24	All diving activities shall be conducted with full knowledge and close coordination with the Contracting Officer and the local Government representative such as the lockmaster/project manager, etc. Divers shall not enter the water or move from prescribed location without the authorization of the contracting officer and the local Government representative.
	30.A.25	30.A.25	For each diver and dive, the following dive log information, as a minimum, shall be recorded and maintained at the dive location: a. Full name, b. Date and location of dive, c. Maximum depth and bottom time, d. Surface interval between dives, e. Breathing medium and type of equipment used, f. Group classification at the

			beginning and end of each interval, g. Water and ambient air temperature, h. Depth(s) and duration(s) of any decompression stops, and i. Date and time of last previous dive.
	30.A.26	30.A.26	For each dive in which decompression sickness and/or pulmonary barotraumas is suspected or symptoms are evident, the following information shall be recorded and maintained: a. Descriptions of signs and symptoms (including depth and time of onset); b. Description and results of treatment; and c. Name, address, and phone number of attending physician.
	30.A.27	30.A.27	Prior to the dive, the contractor shall assure, as a minimum, the following pre-dive checks are performed: a. Breathing air tanks contain significant air supply to perform the required work (i.e., standby air tanks are on site and full to the capacity). A pressure reading shall be taken to ensure that no less than 90% of tank capacity of breathing air is contained; b. All diving equipment shall be checked for proper function prior to diver entry; c. All necessary safety equipment specified herein is on site and functioning properly; d. Lockout/tagout procedures are followed; e. When applicable, crane signals are reviewed and radio communication with the crane operator is functioning properly; f. When applicable, welding or cutting procedures are clearly reviewed, the proper welder polarity is set, and precautions

			have been taken to ensure that electrocution will not occur; g. When applicable, blasting procedures are clearly reviewed and precautions have been taken to ensure unplanned/unscheduled blasts will not occur; and h. A pre-dive briefing shall be given that includes, but is not limited to, the accident management plan, AHA, equipment checklist, diving logs, diving conditions, and diving procedures.
	30.A.28	30.A.28	Copies of the dive logs shall be submitted to the DDC after completion of the dive operation.

Summary of changes to EM 385-1-1, Appendix A

Section	Paragraph	Old	New
Appendix A			
	1.a.	1.a.	SIGNATURE SHEET. Title, signature, and phone number of the following: a. Plan preparer (qualified person such as corporate safety staff person, QC).
	2.e.	2.e.	e. Contractor accident experience (provide information such as experience modification rate (EMR), OSHA 300 Forms, corporate safety trend analyses); and
	3.	3.	STATEMENT OF SAFETY AND HEALTH POLICY. Provide a copy of your current corporate/company Safety and Health Policy Statement. NOTE: In addition to the corporate/company policy statement, your corporate/company safety program may provide a significant portion of the information required by the APP.
	6.c.	6.c.	c. Identify requirements for emergency response training. **> See paragraph 12.b. below for a list of requirements that may require emergency response training.**
	7.a.	7.a.	a. Who will conduct safety inspections (e.g., PM, safety professional, QC, supervisors, employees), proof of inspector's training/qualifications , when inspections will be conducted, how the inspections will be recorded, deficiency tracking system, follow-up procedures, etc. The names of competent and/or qualified person(s) and proof of competency/ qualification to meet specific OSHA competent/qualified person(s) requirements must be attached.

	10.	10.	MEDICAL SUPPORT. Outline on-site medical support and offsite medical arrangements including rescue and medical duties for those employees who are to perform them, and the name(s) of onsite Contractor personnel trained in first aid and CPR.
	11.	11.	PERSONAL PROTECTIVE EQUIPMENT. Outline procedures (who, when, how) for conducting hazard assessments and written certifications for use of PPE. Outline procedures to be followed to assure the proper use, selection, and maintenance of personal protective and life saving equipment (e.g., protective footwear, protective gloves, hard hats, safety glasses, hearing protection, body harnesses, lanyards).
	12.b.	12.b.	b. Emergency response plans: (1) Procedures and tests (01.E.01) (2) Spill plans (01.E.01, 06.A.02) (3) Firefighting plan (01.E.01, 19.A.04) (4) Posting of emergency telephone numbers (01.E.05) (5) Wild land fire prevention plan (09.K.01) (6) Man overboard/abandon ship (19.A.04)
	12.c.	12.c.	c. Hazard communication program (01.B.06). Provide the location of MSDS, records of Contractor employee training, and inventory of hazardous materials (including approximate quantities and a site map) that will be brought onto Government project by the Contractor and subcontractor.
	12.s.	12.s.	s. Jacking plan (lift) slab plans (27.D.01)
	12.t.	12.t.	t. Safety and health plan and SSHP (for HTRW work, an SSHP must be submitted and shall contain all

			information required by the APP - two documents are not required (28.A.02)
	12.x.	12.x.	x. Fall protection plan (Section 21)
	12.y.	12.y.	y. Steel erection plan (27.E.01)
	12.z.	12.z.	z. Night operations lighting plan (16.C.19.d)
	12.aa.	12.aa.	aa. Site sanitation plan (Section 02)
	12.bb.	12.bb.	bb. Fire Prevention Plan (09.A.01)
	13.	13.	**CONTRACTOR INFORMATION.** The Contractor shall provide information on how they will meet the requirements of applicable Sections of this manual in the APP. As a minimum, excavations, scaffolding, medical and first-aid requirements, sanitation, PPE, fire prevention, machinery and mechanized equipment, electrical safety, public safety requirements; and chemical, physical agent, and biological occupational exposure prevention requirements shall be addressed as applicable.
	14.	14.	**SITE-SPECIFIC HAZARDS AND CONTROLS.** Detailed site specific hazards and controls shall be provided in the AHA for each activity of the operation.

Summary of changes to EM 385-1-1, Appendix B

Section	Paragraph	Old	New
Appendix B			
	1.	1.	SAFETY AND HEALTH REQUIREMENTS.
	1.a.		a. During emergency operations and recovery assistance activities, it is extremely important that safety and health requirements are implemented. Personnel often perform unusual, difficult, hazardous tasks while in a challenging environment, and these conditions increase the risk of accident. Additionally, resources are in short supply, and the loss of any resource to an accident indicates poor management. The safety and occupational health of USACE employees, Contractors, and members of the public exposed to USACE activities will be a primary concern during all USACE emergency operations and recovery assistance. Safety and Occupational Health Offices shall provide the necessary input to their Emergency Management counterparts to ensure that planning for safety and health concerns (including risk and hazard analysis) is addressed prior to, during, and following disasters and disaster response.
	1.b.		b. Safety and occupational health program requirements shall be included in all Government and contract operations. FAR Clause 52.236-13 shall be included in contracts and memoranda of agreement/understanding (MOAs/MOUs) for emergency operations and recovery assistance.
	3.	4.	STAFFING**.** Safety and Occupational Health Offices in the Geographic District experiencing the disaster will be temporarily staffed with additional safety, industrial hygiene, and medical personnel as necessary to ensure a

			comprehensive safety and occupational health program is administered for all emergency operations and recovery assistance activities. This is usually accomplished by use of safety and occupational health functional planning and response team. The Geographic District shall establish an emergency operations safety office (minimum staffing to include a safety manager and administrative support person) dedicated totally to emergency operations. Each area office established for emergency operations shall have a minimum of one safety professional. a. Medical personnel shall provide medical assistance, assessments, and advice to USACE management and employees. b. Safety and health personnel shall: manage safety and health aspects of emergency operations and recovery assistance activities; provide advice on safety and health issues; provide safety and health technical oversight for USACE employees, and quality assurance for Contractor employees. c. Prime Contractors for emergency recovery operations are required to have as a minimum a full-time, qualified safety professional on-site. Qualifications of the safety professional shall be provided to the GDA. Additional Contractor personnel may be required as determined by the GDA.
	4.	5.	QUALIFICATIONS OF GOVERNMENT EMPLOYEES. a. All Government employees reporting for emergency recovery operations shall be medically fit to perform assigned duties for extended hours and endure the additional stress related to this type of work. Prior to assignment to deployment teams and prior to voluntary deployment assignments, the GDA shall ensure employees are medically screened and/or examined by a licensed physician.

			(1) The medical screening and/or examination will provide the basis for a determination of fitness for deployment. (2) Medical screening and/or examination procedures shall be developed by a licensed physician and shall be in accordance with 5 CFR 339. (3) The medical screening and/or examination shall fully consider the employee's current medical status to include the use of prescription and non-prescription maintenance medications, use of medical appliances, deployment job duties and physical capacities required, use of PPE (such as respirators), extended work hours, potential adverse living and environmental factors, anticipated availability of medical resources at the deployment site in case of emergency, immunizations required, and other factors determined appropriate by the physician. b. Medical documentation shall be on applicable medical screening and/or medical history and medical examination forms and shall be maintained in accordance with 5 CFR 293 and Privacy Act requirements. c. Physicians shall provide the GDA with recommendations regarding employee deploy ability status to include the length of medical certification (1 year, 2 years, etc.). d. Employees with know pre-existing non-work related medical conditions such as uncontrolled diabetes, heart or lung problems, back conditions, or hypertension should not deploy to emergency operations sites unless specific medical clearance is provided by their personal physician(s)

			indicating their current medical condition will not jeopardize their health or their ability to fully perform their duty assignments at deployment sites. e. Employees may be returned to their duty station if during the course of duty they experience health problems that may endanger their well-being. f. Employees shall be notified that pharmacies and medical services may be limited at the emergency operations site.
	5.	6.	MOBILIZATION OF USACE PERSONNEL. Prior to departing their duty station for emergency operations and recovery assistance activities, USACE personnel will be provided: a. PPE (e.g., head, eye, hearing, foot protection, and PFDs) appropriate for the hazards of the field activities that they will perform, and b. Immunizations appropriate for their field exposure (follow-up immunizations will be the responsibility of each employee's home duty station).
	8.	9.	DUTY SCHEDULE. a. For operations lasting longer than 2 weeks, USACE employees should not work in excess of 84 hours per week. The duty hours an employee would be required to work during emergency operations would normally be 12 hours per day, 7 days a week. Employees shall be provided the opportunity for 24 hours of rest after working 14 days and 48 hours of rest after working 21 days. Employees shall be required to take at least 24 hours off for rest after a continuous 29-day period of work and shall be required to take at least 24 hours every 2 weeks thereafter. Supervisors shall monitor employees for signs of stress-related health problems and seek medical assistance as appropriate.

	9.b.	10.b.	b. Trucks hauling debris on public highways shall have physical barriers (tail gates or chain link fencing and covers) to preclude debris from falling from the truck. Reverse alarms shall be provided; the need for rollover warning devices shall be considered for long-bed end-dump trucks. Sideboards shall not be added to trucks to increase their capacity unless specific design specifications are provided to Contractors as part of the scope of work. Single or double boards added to trailers designed for normal operation with the additional boards are permitted.
	9.c.	10.c	c. Prior to operation, Contractors shall develop written safe operating procedures for each brush chipper, shredder, and/or grinder. SOPs shall incorporate the manufacturer's recommendations for safe operation of the chipper as well as the use of EZ and fire prevention efforts. Operations and maintenance manuals for chippers, grinders, and shredders shall be kept on-site. A minimum 200 ft (61.0 m) pedestrian EZ is required during operation of chippers, shredders, and grinders unless documentation or actual practice indicates otherwise. The public shall be kept a minimum of 300 ft (91.4 m) from all chipper operations. Signs shall be placed at 200 ft (61.0 m) indicating flying debris hazards and that pedestrians are prohibited. (1) Unprotected personnel shall not enter the EZ while the chipper is in operation. Front-end loaders and knuckle booms working in debris reductions areas or feeding grinders, shredders, chippers, or burn pits shall have completely enclosed cabs. Protection shall include heavy metal grating of sufficient strength to protect the

			operators from logs, limbs, and woods or other debris thrown from grinders. (2) Whenever chipper operations are shut down for any significant length of time (e.g., overnight or when the chipper will be left unattended), equipment walls, crevice drums, cutter heads and hammers, and drive mechanisms shall be cleared of all combustible materials by blowing, washing, and wetting down. Any material contaminated by leakage of hydraulic fluids, oils, or fuel shall be immediately removed. Leakage shall be minimized through preventive maintenance. Because piles of chipped wood are susceptible to spontaneous combustion, fire controls such as segregation, separation, and adequate water supply shall be used.
	9.e. (new)		e. Loaders, track-hoes, and other construction equipment in debris reduction areas shall have lights in the front and back in order to work at night.
	9.f. (new)		f. All articulating grapple (knuckle truck) boom operator stations shall have seat belts that shall be worn by the operator. Access ladders shall be a minimum of 12 in (30.5 cm) width with 16 in (40.6 cm) recommended.
	10.b.7 (new)		***and*** (7) Two-way radios shall be used whenever visual contact between flaggers is not achieved.
	11.	12.	AIR CURTAIN INCINERATOR OPERATIONS AND DEBRIS PILES. a. The design of air curtain operations shall provide for efficient burning of materials. b. Equipment operators feeding and emptying ash from air curtain

			operations shall, whenever possible, position themselves outside smoke plumes. However, if this is not possible, they will be assured adequate breathing air: filtered air, supplied air, and/or air conditioning in a protected environment. If engineering controls are not immediately available, open equipment may be used if workers are provided with SARs. Workers requiring respirators shall be enrolled in the respiratory protection program in accordance with Section 5. The Contractor shall sample for particulate, CO, heat and specifics of the waste to assure workers are adequately protected through respiratory protection. c. Adequate supplies of water or fire extinguishers shall be readily available and fire watches shall be used. d. Air curtain operations shall not be located directly adjacent to debris piles (as a rule of thumb, minimum separation should be 100 ft (30.5 m)). The size of debris piles shall be limited to preclude their overturning. e. There shall be a 1 ft (0.3 m) high warning barrier the length of the charging side of the pit to warn equipment operators. It should be constructed of incombustible material. f. No hazardous or containerized ignitable material shall be dumped into the pit. g. Pits must be constructed out of highly compactable material that will hold its shape (see m below). h. Water table elevation will govern if pit is constructed above or below grade. i. For disaster situations, opacity requirements shall be set at 15% for 50 minutes out of an hour, and not to exceed 40% opacity for the remaining 10 minutes. A 30-minute start-up time with a minimum of 40% opacity shall be allowed. j. Particulate emissions must meet State

			and EPA standards for burning operations. k. At least 100 ft (30.5 m) is required between the debris piles and the burn area. At least 1000 ft (304.8 m) is required between the debris piles and the nearest building. At least 1100 ft (335.3 m) is required between the burn pit and the nearest building. l. The burn should be extinguished approximately 2 hours before anticipated removal of the ash mound. The ash mound should be removed before it reaches 2 ft (0.6 m) below the lip of the burn pit. m. The burn pits should be made of limestone or equal material, and be reinforced with earth anchors, wire mesh, or other items in order to support the weight of loaders. The edges of the pit should be checked for integrity on regular basis to prevent unexpected cave-ins or collapse. There should be an impervious layer of clay or limestone on the bottom of the pit to attempt to seal the ash from the aquifer. This should be replaced if scraped by dozers. n. The ends of the pits should be sealed with dirt or material to a height of 4 ft (1.2 m). o. A 12 in (30.5 cm) soil seal should be placed on the lip of the burn pit to seal the blower nozzle. The nozzle should be 3 in (7.6 cm) to 6 in (15.2 m) from the end of the pit. p. A 12 in (30.5 cm) soil seal should be placed on the lip of the burn pit to seal the blower nozzle. The nozzle should be 3 in (7.6 cm) to 6 in (15.2 cm) from the end of the pit. q. The length of the pit should be no longer than the length of the blower system and the pit should be loaded uniformly along the length. r. The Contractor is responsible for

			ensuring the public is protected from burn operations. Signs, fences, and other measures can be used depending on site conditions. s. The Contractor is responsible for dust control while handling ash. t. Eye washes shall be provided at all burn and grinding operations. > ***See Section 06.*** u. Debris piles shall not be located within 100 ft (30.5 m) of transmission towers or piled directly under transmission lines. v. For night operations, adequate lighting (5 fc (53.8 lx)) shall be provided in areas surrounding the pits and grinders. w. Signs shall be posted at entrances to disposal areas indicating "**AUTHORIZED PERSONNEL ONLY**". x. The Contractor shall notify the local fire department and arrange for fire suppression support in case of fire beyond the Contractor's firefighting capability. y. A sign shall be posted at the edge of the 100 ft (30.5 m) setback from burn pits warning unauthorized personnel to keep out. z. All personnel working in debris reduction areas shall wear safety shoes.
	15.c	16.c.	c. The Geographic District will report accident experience during emergency operations and recovery assistance activities by ENGLink as part of the after action report. This information, as well a information regarding unsatisfactory safety and health performance and/or unresolved safety and health problems, will be periodically reported to Division.