

# Krishna Buildestates Private Limited

AN ISO 9001:2008 Certified Company

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## *SAFETY & HEALTH MANUAL*

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# *1.0 Program management*

## *1.1 Program management*

In addition to the following requirements and prior to the start of work the subcontractor shall review, understand, and abide by the regulations set forth by Governmental and Local authorities.

### **1.1. General Requirements**

- 1.1. A. No person shall be required to work in conditions that are dangerous or unsafe to his/ her health
- 1.1. B. Workers are encouraged to ask questions when not familiar with proper safety practices
- 1.1. C. Each subcontractor is required to provide a corporate safety manual as well as a site specific safety manual prior to their start of work
- 1.1. D. Each worker onsite is required to comply with all applicable governmental standards, local, and state regulations.
- 1.1. E. Each worker onsite is required to wear the necessary Personal Protective Equipment for the activity they are performing. At a minimum this includes; hard hat, t-shirt, long pants, reflective vest, and sturdy work boots
- 1.1. F. Each worker onsite is responsible to report unsafe conditions and activities, prevent avoidable accidents, and must work in a safe manner.
- 1.1. G. A copy of this manual shall be kept onsite within the KBE site office at all times
- 1.1. H. All safety related documents including this manual, permits, tool box talks, etc are provided in English. Each subcontractor is responsible to translate for any employee that does not fully understand English.

### **1.2. Badging Program**

- 1.2. A. Each worker's working status must be approved prior to their start of work.
- 1.2. B. KBE to keep a record of the Subcontractor Employee Certificate Form and the identification used for verification

### **1.3. Safety Orientation and Training**

- 1.3. A. KBE shall provide a safety orientation to all workers prior to their start of work.
  - 1.3. A.1. Orientation will include at a minimum:
    - General safety and health requirements
    - Project address
    - Emergency and Evacuation Procedure
    - Directions to nearest emergency care facility
    - Accident reporting policy
    - Procedures for reporting unsafe conditions
    - Project specific requirements/ information
  - 1.3. A.2. Each worker shall receive a copy of the orientation and must sign the acknowledgement form before starting work. A copy of the standard orientation is found here
  - 1.3. A.3. KBE to keep record of each workers acknowledgement form.
- 1.3. B. Workers shall receive training by their employer specific to the activities they will perform onsite. This training must be documented and provided to the KBE Project Superintendent prior to the start of work. Examples of typical certificates of training include: (additional training may be required based on the workers responsibilities)
  - Aerial Lift Training

- Scaffold Erection/ Use Training
- Heavy Equipment Operators
- PTI/ Fork Lift Operators
- Crane Operators
- Confined Space Training
- Steel Erection (subpart R) Training

1.3. C. Workers will receive additional training by their employer whenever their role and/or responsibilities change.

#### **1.4. KBE Project Superintendent**

1.4. A. Is the designated safety officer for the project in his control?

1.4. B. Is responsible for enforcing all safety regulations

1.4. C. Has the authority to stop unsafe work and correct unsafe conditions

1.4. D. Is responsible to administer and document weekly safety talks with the foremen onsite.

1.4. E. Is responsible to ensure and document each foreman conducts a weekly safety talk with his/ her workers

#### **1.5. Emergency Planning**

1.5. A. An emergency plan must be created to ensure worker safety in the event of fire or other emergency. It must be reviewed with all workers onsite and contain at a minimum:

- Means of audible alert indicating an immediate evacuation
- Escape procedures and routes
- Emergency evacuation meeting area
- Worker accounting following an evacuation
- Emergency contact information
- Project address, directions, and closest major intersection
- Directions to nearest emergency care facility

1.1. A. The KBE Project Superintendent and each subcontractor's foreman onsite must have a cellular telephone in order to contact 1-0-1 and to facilitate emergency management

#### **1.6. Emergency Procedures**

1.6. A. In the event of an emergency:

- Call 1-0-0
- Administer First-Aid
- Notify KBE Project Superintendent
- KBE to provide directions to First Responders to the emergency area

1.6. B. In the event of an evacuation:

- The evacuation signal is three short blasts on an air horn repeated for one minute
- Call 1-0-0
- Once an evacuation is signaled, walk to the designated assembly area. Do not run. Do not jump from elevated heights. Leave all tools and personal items behind.
- Each subcontractor's foreman to take attendance and notify KBE of any missing workers and their last known location

- KBE to coordinate with First Responders.
  - Directions within site to the emergency area
  - Last known location of missing workers
  - Known hazards; combustibles, explosives, compressed gas, etc

### 1.7. Safety Inspections

- 1.7. A. KBE Project Superintendent is responsible for inspecting the project for unsafe conditions on a daily basis. Safety violations found must be corrected immediately.
- 1.7. B. KBE Safety Department will perform periodic safety inspections on each project. The results of these inspections will be documented and the Project Superintendent will be responsible to correct safety violations immediately
- 1.7. C. Any hazard found must be abated immediately by the offending subcontractor. If the abatement is not performed in a timely manner, as determined by KBE, KBE will have the abatement completed and forward all associated costs to the offending subcontractor.

### 1.8. Safety Violations

- 1.8. A. Safety violations will not be tolerated. Violations are taken seriously and may lead to written warnings, fines, or permanent removal from the project.
- 1.8. B. Violations are categorized into 3 groups as determined by the KBE Safety Director
  - 1.8. B.1. Other than Serious  
Rs.250 – Rs.500 Fine and/or Violator terminated from project
  - 1.8. B.2. Serious  
Rs.500 – Rs.1, 000 Fine and/or Violator terminated from project
  - 1.8. B.3. Willful or Repeat  
Rs.1, 000- Rs.2,500 Fine and Violator terminated from project
- 1.8. C. In addition to the penalty schedule listed in 1.8.B above; continued disregard of safety regulations may also lead to the employer having to re-train or re-certify individual workers, individual crews, or their entire company. Proof re-training/ re-certification must be forwarded to KBE
- 1.8. D. Any individual that commits a Willful Violation will be permanently removed from the project and may be prohibited from working any other KBE project

### 1.9. Substance Abuse Policy

- 1.9. A. KBE is committed to providing a drug-free and alcohol-free workplace. KBE prohibits the use, manufacture, possession, distribution, or sale of drugs, drug paraphernalia, or alcohol.
- 1.9. B. KBE employees are bound by the requirements of the KBE HR Manual
- 1.9. C. All subcontractors' direct employees and their lower tiered employees must fully comply with KBE's Substance Abuse Policy
- 1.9. D. Subcontractor's direct employees and their lower tiered employees are required to be tested for the following reasons:
  - 1.9. D.1. After an accident that requires off site medical treatment of the individual or others
  - 1.9. D.2. After an accident that results in property damage
  - 1.9. D.3. When there is reasonable suspicion
- 1.9. E. The testing must be done by a recognized testing laboratory
- 1.9. F. A panel screened for drugs equal to DOT requirements is the minimum testing panel that is acceptable
- 1.9. G. The cost for such testing will be the responsibility of the subcontractor whether employed directly or through a lower tier
- 1.9. H. Any positive test will result in the employee being permanently removed from the current project and will not be allowed onto any other KBE projects for a minimum of one year

1.9. I. Any refusal of testing will be treated as a positive test

**1.10. Accident Reporting and Record Keeping**

1.10. A. The KBE Project Superintendent must be notified of any injury immediately. KBE will inspect the area and take statements from any witnesses.

1.10. B. Workers are required to report all injuries no matter how minor they feel they are. Do not leave the site Without reporting an injury.

1.10. C. Any injury thought to be fraudulent will be thoroughly investigated and any accident report confirmed To be falsified will result in permanent removal of the worker from the project and will disqualify him/her from working on future KBE projects.

1.10. D. The KBE Project Superintendent must notify the KBE Safety Department of any serious injury or incident within 1 hour. An incident report must be forwarded to the KBE Safety Department and Risk Manager as soon as possible and no longer than 24 hours after the incident took place.

1.10. E. KBE personnel can find a copy of the incident report here.

1.10. F. Drug and alcohol testing will be performed as outlined in the Substance Abuse Policy

END OF SECTION

## *2. Sanitation*

### **2. Sanitation**

#### **2.1. Housekeeping**

- 2.1. A. Subcontractors are to keep their work area as clean as possible at all times. Regular daily cleaning must be scheduled to maintain safe working conditions.
- 2.1. B. Floors should be kept as dry as possible.
- 2.1. C. Egress routes must be kept clear at all times.
- 2.1. D. If housekeeping is not addressed on a daily basis and/or unsafe conditions are created because of poor housekeeping KBE reserves the right to have the area cleaned at the cost of the responsible subcontractors.
- 2.1. E. Protruding nails should be removed or bent over.
- 2.1. F. Combustibles should be disposed of on a regular basis
- 2.1. G. Sweeping compound must be used whenever sweeping up dry debris
- 2.1. H. Subcontractors cannot use compressed air for cleaning unless the air pressure is regulated to 30PSI or less.

#### **2.2. Drinking Water**

- 2.2. A. Employers shall provide an adequate supply of potable drinking water for their employees.

#### **2.3. Toilets**

- 2.3. A. KBE will provide one (1) chemical toilet for every (10) workers. Except where this obligation is passed onto a subcontractor by contract.
- 2.3. B. Chemical toilets will be serviced once a week.

#### **2.4. Showers/ Changing Rooms**

- 2.4. A. When required the employer will provide showers and changing rooms in accordance with all applicable regulations for their employees.

#### **2.5. Waste Disposal**

- 2.5. A. KBE will provide dumpsters for the removal of waste from the project. Except where this obligation is passed onto a subcontractor by contract.
- 2.5. B. Subcontractors must utilize the appropriate dumpster for the waste they are throwing out or recycling.
- 2.5. C. Subcontractors must provide waste receptacle as necessary to facilitate the removal of waste from the project.
  - 2.5. C.1. These waste receptacles must be emptied as needed to avoid unsanitary conditions

#### **2.6. Smoking**

- 2.6. A. KBE may prohibit smoking onsite at any time
- 2.6. B. Smoking is only allowed in areas designated by KBE
- 2.6. C. Smoking is never allowed inside of buildings once finishes begin

END OF SECTION 2

## *3.0 Hazardous chemicals and communication*

### 3. Hazard Chemicals and Communication

3.1. Each employer shall develop, implement, and maintain a written hazard communication program. The program must include:

3.1. A. Hazardous or Toxic Agent Inventory. A list of the hazardous chemicals must be maintained by the employer and submitted to KBE.

3.1. B. Hazardous Chemicals Labeling.

3.1. B.1. Containers used to store and transport hazardous chemicals around the project site must be appropriately labeled to communicate the physical and health hazards associated with the agent in the containers.

3.1. B.2. If the material is subsequently transferred to another container, that container must be properly labeled.

3.1. C. Material Safety Data Sheet (MSDS)

3.1. C.1. Employers must have an MSDS for each hazardous chemical to be used on file with KBE. KBE to keep these MSDS on file, in the KBE site Office during the project

3.1. C.2. Employers shall use the information contained in the MSDS to design programs to protect their employees

3.1. C.3. MSDS should be readily available to their employees

3.1. C.4. Employees shall not use any chemicals for which an MSDS has not been submitted to KBE

3.1. D. Employee Information and Training.

3.1. D.1. Employers must train each employee that may be exposed to hazardous chemicals prior to their start of work. Exposure may be through inhalation, ingestion, skin absorption, or physical contact.

3.1. D.2. Employers must ensure that their employees are trained initially and then periodically when the use of hazardous chemicals is altered or modified to accommodate changing on-site work procedures. Training shall cover the following topics:

- How to read and use labels and MSDS
- The location of all hazardous chemicals at the projects
- Identification and recognition of hazardous chemicals on the project
- Physical and health hazards of the hazardous or chemicals pertinent to project activities
- Protective measures employees can implement when working with project-specific hazardous chemicals

3.2. Carbon Monoxide (CO)

3.2. A. When employees use internal combustion engines or other CO producing equipment or tools within a fully or partially enclosed area their employer must install CO detectors.

3.3. Lead, Asbestos, and Mold Abatement

3.3. A. No persons shall be allowed to perform lead, asbestos, or mold abatement without expressed written consent by the KBE Safety Director

3.3. B. An Activity Hazard Analysis must be submitted and approved prior to the start of any lead, asbestos, or mold abatement

3.3. C. A pre-construction safety meeting must be held prior to the start of any lead, asbestos, or mold abatement

3.3. D. All individuals involved with abatement of lead, asbestos, or mold will be properly trained

END OF SECTION 3



## 4. Control of hazardous energy

### 4. Control of Hazardous Energy

- 4.1. The employer shall establish a program consisting of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, startup or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative

END OF SECTION 4

## 5. Medical and first-aid requirements

### 5. Medical and First-Aid Requirements

- 5.1. First-aid kits shall conform with the following:
  - 5.1. A. KBE to provide a first-aid kit adequate for the number of their employee's onsite.
  - 5.1. B. Each subcontractor onsite must provide a first-aid kit adequate for the number of their workers onsite
  - 5.1. C. First-aid kits shall be easily accessible to all workers
  - 5.1. D. The contents of each first-aid kit shall be checked weekly to ensure they are complete, in good condition, and have not expired.
- 5.2. A map delineating the best route to the closest emergency medical facility must be posted in a conspicuous location within the KBE Field Office.
- 5.3. Each subcontractor must provide a CPR/ First Aid certified worker. The name and certificate of this worker must be kept on file with KBE.

END OF SECTION 5

## 6. Personal protective equipment / work attire

### 6. Personal Protective Equipment/ Worker Attire

#### 6.1. Minimum PPE/ Attire

6.1. A. The minimum level of PPE and worker attire on all KBE projects are:

- Hard hat
- Short sleeve shirt (Tank tops are not permitted)
- High Visibility Top or Reflective Vest
- Long Pants
- Sturdy work boots

6.1. B. Suitable clothing for the weather conditions should be worn at all times.

6.1. C. Additional PPE may be required based on the task being performed or by site specific requirements.

#### 6.2. Training

6.2. A. The workers employer must train their workers on proper PPE use. This includes but is not limited to donning, removing, adjusting, limitations of useful life, inspection and testing, and proper care including maintenance, storage, and disposal. The worker's employer shall keep record of such training.

6.2. B. If it appears a worker who has been trained does not have the understanding and skill required to properly use the required PPE the employer will re-train to make certain the worker has the appropriate skills.

#### 6.3. Maintenance

6.3. A. Defective or damaged PPE shall not be used and shall be tagged out of service and/or removed from the work site

6.3. B. The employer shall clean, disinfect, and inspect PPE prior to being issued to another worker

6.3. C. When workers provide their own PPE their employer is responsible to assure the adequacy of the protection it is providing

#### 6.4. Hand Protection

6.4.A. Workers involved in activities that subject the hands to injury, in the form of cuts, abrasions, punctures, burns, chemical irritants, toxins, vibration, etc shall select and use hand protection appropriate to the task being performed.

#### 6.5. Leg Protection

6.5. A. Protective leg chaps must be worn by workers who operate chain saws

#### 6.6. Eye and Face Protection

6.6. A. Workers involved with activities that subject the eyes to injury must wear the appropriate eye protection

6.6. A.1. Eye protection must include side protection

6.6. A.2. Workers that wear corrective lens must wear prescription safety glasses, or protective glasses with side shields that fit over corrective lenses

6.6. B. Workers involved with activities that subject the face to injury must wear face protection over the required eye protection

6.6. C. Workers that require protection from radiant energy with moderate reduction of visible light is necessary, including welding, cutting, brazing, and soldering, shall wear eye and face protection suitable to the type of work, providing protection from all angles of direct exposure, and with lenses of the appropriate shade.

#### 6.7. Hearing Protection

6.7. A. Workers involved in activities that subject them to an 8-hour TWA of 90dB or greater must use hearing protection.

- A good rule of thumb if you need to raise your voice above normal levels to be heard in conversation then the level is above 90dB

- 6.7. B. The hearing protection used must be capable of reducing the 8-hour TWA below 90dB
- 6.7. C. Whenever sound levels equal or exceed an 8-hour TWA of 90dB the employer must utilize a hearing conservation program.
- 6.7. D. Exposure to impulsive or impact noise should not exceed 140dB
- 6.7. E. Noise hazard areas shall be marked with caution signs indicating the requirement for hearing protection.

#### 6.8. Head Protection

- 6.8. A. All persons working or visiting any KBE project must wear a hard hat.
- 6.8. B. Hard hats must be worn with the bill facing forward
- 6.8. C. No ball caps or any other headdress that interferes with the fit or the stability of the hard hat can be worn
- 6.8. D. The entire project site excluding field offices are hard hat required areas
- 6.8. E. No activity performed onsite will be considered a non-hard hat activity
- 6.8. F. Drilling holes, modifying the shell, or the suspension of the hard hat is prohibited

#### 6.9. Protective Footwear

- 6.9. A. All persons working or visiting any KBE project must wear sturdy work boots
- 6.9. B. When required by activity safety-toed work boots must be worn.

#### 6.10. High-Visibility Apparel

- 6.10. A. All persons working or visiting any KBE project must wear at a minimum, a high visibility top or reflective vest.
- 6.10. B. When workers are exposed to vehicular or equipment traffic Performance Class 2 high-visibility apparel is required.
- 6.10. C. When workers are exposed to vehicular or equipment traffic in excess 45mph Performance Class 3 high visibility apparel is required.

#### 6.11. Respiratory Protection

- 6.11. A. When worker exposure levels exceed Threshold levels the following hierarchy of controls must be implemented:

- Engineering Controls
- Administrative Exposure Controls
- Use of respirators

- 6.11. B. Written Respiratory Protection Program shall be developed and implemented by employers whenever respirators are used by their workers

#### 6.11. C

- 6.11. C.1. All employees using respirators must be included in the program

- 6.11. C.2. The program administrator must ensure that all respirator users comply with the requirements of the program

- 6.11. C.3. The program shall address the following topics:

- Methods used to identify and evaluate workplace respiratory hazards
- Procedures for selecting respirators for the use in the workplace
- Medical evaluations of employees required to use respirators
- Fit testing procedures for tight-fitting respirators
- Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations
- Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators
- Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere supplying respirators
- Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations
- Training of employees in the proper use of respirators, including putting on and removing them, any limitations of their use and maintenance of

- Procedures for regularly evaluating the effectiveness of the program
- 6.11. C.4. Medical Examination. All workers that are required to use respirators must receive a physical examination by a Board Certified Occupational Medicine Physician. Medical clearance to wear a respirator must include the following:
- Telephone, e-mail, and physical address of the medical facility/ provider
  - Printed name of the licensed, certified health care provider along with his/ her signature
  - The statement of clearances or respiratory limitations only
  - Date of examination and date that clearance expires
  - Additional medical evaluations shall be provided when:
    - An employee reports medical signs or symptoms that are related to the ability to use a respirator
    - A supervisor or the respirator program administrator informs the employer that an employee needs to be reevaluated
    - Information from the respiratory protection program including observations made during the fit testing and program evaluation, indicates a need for worker reevaluation
    - A change occurs in workplace conditions that may result in a substantial increase in the physiological burden placed on the worker
    - It has been two years since the last medical evaluation
- 6.11. C.5. Fit Testing. Before a worker may be required to use any respirator with a negative or positive pressure tight-fitting face piece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used.
- 6.11. C.6. The program administrator shall provide respirator user training annually (or when significant modifications to the program are implemented) to workers using respirators. Annual training shall ensure that each worker using a respirator can demonstrate knowledge of the following topics:
- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator
  - Limitations and capabilities of the respirator
  - How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions
  - How to inspect, put on and remove, and check the seals of the respirator
  - Procedures for maintenance and storage of the respirator
  - How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators
- 6.11. C.7. Record keeping Establish and retain written information regarding medical evaluations, fit testing, and the respirator program, including:
- Records of medical evaluations
  - Fit test records must be maintained until the next fit test is administered. Establish a record of QLFT and QNFT administered to each worker including:
    - Name or identification of the worker tested
    - Type of fit test performed and name of the test administrator
    - Specific make, model, style, and size of respirator tested
    - Date of test
    - Pass fail results for QLFTs or the fit factor and strip chart recording of the test results for QNFTs
  - Retain a written copy of the current respirator program

6.11. D. Full Body Harnesses, Lanyards, Lifelines, Safety Nets

6.11. D.1. See section 14 for all Fall Protection Systems

6.11. E. Live Electrical Protective Equipment

6.11. E.1. No persons shall be allowed to work on live electrical systems without expressed written consent by the KBE Safety Director

6.11. E.2. An Activity Hazard Analysis must be submitted and approved prior to the start of any work on live electrical systems

6.11. E.3. A pre-construction safety meeting must be held prior to the start of any work on live electrical systems

6.11. F. Working Over or Near Water

6.11. F.1. No persons shall be allowed to work over or near water without expressed written consent by the KBE Safety Director

6.11. F.2. An Activity Hazard Analysis must be submitted and approved prior to the start of any work over or near water

6.11. F.3. A pre-construction safety meeting must be held prior to the start of any work over or near water

END OF SECTION 6

# 7. Confined Space

## 7. Confined Space

### 7.1. Confined Space means a space that:

- 7.1. A. Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- 7.1. B. Has limited or restricted means for entry or exit (for example, man holes, sewers, tanks, boilers, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and
- 7.1. C. Is not designed for continuous employee occupancy

7.2. Before entry into Confined Space both a Confined Space Permit must be issued by KBE and a Confined Space Plan must be submitted and approved by KBE

### 7.4. Training and Responsibilities

7.4. A.1. Must have specific training in the use of monitoring equipment, hazard communication, respiratory, permit authorization and termination, hazard recognition, and contacting advanced rescue personnel.

7.4. A.2. Is a person to authorize or be in charge of entry will be trained in and perform assigned duties as follows:

- Ensure that required procedures, practices, and equipment for safe entry are in effect before allowing entry.
- Conduct appropriate atmospheric evaluation of the Confined Space via the use of testing equipment on which he or she has been trained to operate.
- Determine that all requirements of the entry permit have been met before allowing entry.
- Ensure that operations remain consistent with the terms of the entry permit at all times.
- Cancel entry authorization at any time conditions are inconsistent with the guidelines of this procedure.
- Terminate entry authorization upon completion of the work.
- Prohibit unauthorized personnel from entry at all times.

### 7.4. B. Confined Space Attendant

7.4. B.1. Must have been trained in and perform assigned duties as follows:

- Remain stationed outside the Confined Space at all times during entry operations
- Maintain an accurate count of all persons inside Confined Spaces
- Ensure that permits specifically required by certain projects will be used as required
- Recognize potential hazards and monitor conditions to ensure that a safe atmosphere remains
- Maintain continuous communication with authorized entrants
- Authorize evacuation of Confined Spaces when hazardous conditions or permit violations exist
- Prevent entry of unauthorized personnel
- Contact advanced rescue personnel if required

### 7.4. C. Authorized Entrants

7.4. C.1. Employees who work as authorized entrants will be trained in and perform assigned duties as follows:

- Be aware of Confined Space hazards that may be encountered
- Recognize hazard exposure symptoms
- Understand exposure hazards and their results

- Recognize the need and initiate self-evacuation when necessary or when they perceive that danger is present
- Hazard Recognition
- Communication Techniques
- Use of Personal Protection Equipment
- Self-rescue
- Hazard Communication

## 7.5. Confined Space

7.5. A. All Confined Space will be considered Permit Required Confined Space unless:

- 7.5. A.1. The permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated
- 7.5. A.2. If it is necessary to enter the permit space to eliminate hazards, testing and inspection of entry shall be done first. If testing and inspection during that entry demonstrate that the hazards within the permit space have been eliminated, the permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated
- 7.5. A.3. The employer shall document the basis for determining that all hazards in a permit space have been eliminated, through a certification that contains the date, the location of the space, and the signature of the person making the determination. The certification shall be made available to each employee entering the space or to that employee's authorized representative
- 7.5. A.4. If hazards arise within a permit space that has been declassified to a non-permit space, each employee in the space shall exit the space. The employer shall then reevaluate the space and determine whether it must be reclassified as a permit space.

## 7.6. Permit Required Confined Space

7.6. A. All permit required confined space will be identified by all employees through the use of posted danger signs reading "Permit Required Confined Space, DO NOT ENTER"

7.6. B. Employers whose employees must enter permit required confined space must have a program for such entry

7.6. C. Prior to entry of any employee, a Confined Space Plan must be completed and approved by KBE. The plan must identify the following:

- 7.6. C.1. Results of the atmospheric monitoring that tested the confined space for the presence or absence of hydrogen sulfide gas, oxygen, and carbon monoxide
- 7.6. C.2. Approve entry based on testing results or after hazards have been eliminated and the space is retested and found to be acceptable
- 7.6. C.3. The emergency retrieval equipment at the location. E.g. tripod, full body harness, retrieval line, etc
- 7.6. C.4. The use of continuous forced air ventilation during the time work is being performed and at least 30 minutes prior to confined space entry.

7.6. D. Once the Confined Space Plan is approved by KBE the employer's qualified person must complete a Confined Space Permit. The permit will be reviewed and if found acceptable released by KBE. Once approved:

- 7.6. D.1. The completed permit will be posted at the Confined Space entrance and will then become the responsibility of the attendant.



7.6. D.2. Upon completion of the shift or the work (whichever is the first to occur), the attendant will sign the permit to indicate that all entrants have safely exited the Confined Space and return the permit to the Qualified Person for retention

7.6. D.3. Upon placement of the permit, the attendant is responsible for control of the work area and has full authority to cease operations or terminate entry at any time. These actions will be reported to the Qualified Person immediately following their occurrence.

#### 7.7. Rescue Operations

7.7. A. No employee is allowed to make an entry into a confined space for rescue purposes unless properly trained and equipped to do so. If no personnel are authorized for rescue entry, the contractor and/or subcontractor shall secure outside assistance for rescue operations prior to entry into a confined space.

END OF SECTION 7

## 8. Fire Protection and Prevention

### 8. Fire Protection and Prevention

#### 8.1. Fire Prevention.

- 8.1. A. Employers shall ensure their employees comply with all Fire Safety rules and regulations of this project.
- 8.1. B. A temporary or permanent water supply should be made available once combustible materials begin to accumulate.
- 8.1. C. Hot work permits must be pulled for any work involving hot riveting, welding, soldering, brazing, grinding, burning, abrasive cutting or blasting, or any other heat, fire, or spark producing operation.
- 8.1. D. Fire Extinguishers
  - 8.1. D.1. A fire extinguisher, rated not less than 2A, shall be provided for each 3,000SFT of the protected area
  - 8.1. D.2. Travel distance from any point of the protected area to the nearest fire extinguisher shall be no more than 100 feet
  - 8.1. D.3. Any subcontractor performing hot work must provide a fire extinguisher within 25' of the hot work
  - 8.1. D.4. One or more fire extinguishers are required on each level of a multistory building. At least one must be located adjacent to a stairway
  - 8.1. D.5. Fire extinguishers shall be periodically inspected and maintained in compliance with regulations
- 8.1. E. Ignition Hazards
  - 8.1. E.1. Fires and open flame devices shall not be left unattended
  - 8.1. E.2. All sources of ignition shall be prohibited within 50' of operations with potential fire hazard. The area shall be conspicuously marked "No Smoking or Open Flame"
  - 8.1. E.3. Smoking shall be prohibited in all areas where flammable, combustible, or oxidizing materials are stored. "No Smoking or Open Flame" signs shall be posted in all prohibited areas.
  - 8.1. E.4. Electrical wiring and equipment for light, heat, or power purposes shall be installed in compliance with regulations.
  - 8.1. E.5. Locate internal combustion engine powered equipment so that the exhausts are well away from combustible materials
- 8.1. F. Temporary Buildings
  - 8.1. F.1. Should not be erected where it will adversely affect any means of egress
  - 8.1. F.2. When located within another building, temporary buildings must be made of noncombustible construction or construction with a fire resistance of at least 1 hour
  - 8.1. F.3. Shall be located no closer than 10' from another building or structure
- 8.1. G. Open Yard Storage
  - 8.1. G.1. Keep site free of accumulation of unnecessary combustible materials
  - 8.1. G.2. Pile combustible materials in an orderly fashion and no higher than 20'
  - 8.1. G.3. No combustible materials should be stored within 10' of any building
  - 8.1. G.4. A fire extinguisher rated no less than 2A shall be located within 100' of the storage area

#### 8.1. H Indoor Storage

- 8.1. H.1. Storage shall not obstruct means of egress
- 8.1. H.2. Non-compatible materials shall be separated by a 1-hour fire rated barrier
- 8.1. H.3. Storage shall be kept clear of lighting or heating units to avoid combustion of materials
- 8.1. H.4. Clearance of 24" shall be maintained around the path of travel to fire doors. Materials shall not be stored within 36" of fire doors

#### 8.1. I. Flammable and Combustible Liquids (indoors)

- 8.1. I.1. No more than 100Lt shall be stored in a room outside of an approved storage cabinet
- 8.1. I.2. Quantities greater than 100Lt must be stored in an approved cabinet. Quantities shall not exceed 250Lt for flammable or 500Lt for combustible liquids

#### 8.1. J. Flammable and Combustible Liquids (outdoors)

- 8.1. J.1. "No Smoking or Open Flames" signs must be posted at the storage area
- 8.1. J.2. Storage of containers, not more than 250Lt each, shall not exceed 4500Lt in any one pile or area. Piles or groups of containers shall be separated by at least 5' and be a minimum of 20' from any building
- 8.1. J.3. Storage areas shall be graded or an earth dike created to divert spills away from buildings. The area shall be kept clear of weeds, debris, and any unnecessary combustible materials
- 8.1. J.4. Portable tanks shall not be nearer than 20' from any building. Individual tanks exceeding 4500 Lt shall be separated by a 5' clear area
- 8.1. J.5. Within 200' of each portable tank, there shall be a 12' wide access way to permit the approach of fire control apparatus.
- 8.1. J.6. A fire extinguisher must be kept within 25- 75'

#### 8.1. K. Dispensing Flammable Liquids

- 8.1. K.1. Pumping equipment must be listed by a nationally recognized testing laboratory or approved by the agency having jurisdiction
- 8.1. K.2. Dispensing systems shall be electrically bonded and grounded
- 8.1. K.3. Dispense through a closed system
- 8.1. K.4. Transfer from one container to another only if the containers are bonded
- 8.1. K.5. Use only approved safety cans that are correctly labeled with the containers contents
- 8.1. K.6. "No Smoking or Open Flames" signs shall be posted at all refueling stations

#### 8.2. Liquefied Petroleum (LP) Gas

- 8.2. A. Check with local Fire Department prior to LP gas use for any town specific requirements
- 8.2. B. All personnel involved with the storage, handling, installation, and use of LP gas and systems must be properly trained

#### 8.2. D. LP Gas Containers and Storage

- 8.2. D.1. LP Gas Containers and Storage must meet regulations.
- 8.2. D.2. LP Gas containers, valves, connectors, manifold valve assemblies, regulators, and appliances shall be of an approved type
- 8.2. D.3. Welding LP Gas containers is prohibited
- 8.2. D.4. Storage of LP gas containers within the building is prohibited
- 8.2. D.5. Valves on containers having water capacity greater than 50 lbs (nominal 20 lbs LP gas capacity) Shall be protected from damage while in use or storage
- 8.2. D.6. LP gas storage areas must be conspicuously marked with “No Smoking or Open Flames” and emergency contact information.
- 8.2. D.7. A 20 lb B or ABC fire extinguisher must be located within 25’ of all storage areas.
- 8.2. D.8. LP gas containers shall be stored a minimum of 25’ from any building.
- 8.2. D.9. LP gas container storage area must be protected.
- 8.2. D.10. LP gas containers should always be upright and properly secured
- 8.2. D.11. Bulk LP gas containers must be a minimum of 25’ from any building
- 8.2. D.12. Bulk LP gas containers must be protected

END OF SECTION 8

## 9. Safety Signs, tags, labels, Signals, and barricades

### 9. Safety Signs, Tags, Labels, Signals, and Barricades

#### 9.1. Signs, Tags, and Labels

- 9.1. A Always obey posted safety signs, tags, and labels
- 9.1. B. Signs, tags, and labels shall be provided to give adequate warning and caution of hazards. They are provided to instruct and direct workers and the public.
- 9.1. C. All warning systems shall be visible at all times when the hazard or problem exists.
- 9.1. D. All employees shall be informed as to the meaning of various signs, tags, and labels.
- 9.1. E. Danger signs shall be used only where an immediate hazard exists
- 9.1. F. Caution signs shall be used only to warn against potential hazards or to caution against unsafe practices
- 9.1. G. Exit signs shall be conspicuously posted to provide direction to nearest exit
- 9.1. H. Accident prevention tags shall be used as temporary means of warning workers of defective tools and equipment.

#### 9.2. Signals

- 9.2. A. Flaggers. Signaling by flaggers and the use of flaggers, including warning garments shall be worn by flaggers
- 9.2. B. Crane and hoist signals.
- 9.2. C. In addition to standard PPE requirements flag and signal persons must also wear a class 2 reflective vest
- 9.2. D. Only one person is allowed to signal the equipment/ crane operator
- 9.2. E. Hand signals can only be used when the distance between the signal person and the operator is less than 100'

#### 9.3. Barricades

- 9.3. A. Barricades for protection of employees shall be setup around the site as required by KBE Safety Supervisor
- 9.3. B. Yellow caution tape indicates caution must be used when approaching, entering, or working within the designated area
- 9.3. C. Red danger tape requires authorization to enter the designated area. Anyone that enters this area without prior approval will be subject to disciplinary action including fines or removal from the project
- 9.3. D. Caution or danger tape should not be used in lieu of physical barricades for floor or wall openings, permanent guardrails, or for use as a warning line system

END OF SECTION 9

# 10. Material handling, rigging, use, Storage, and disposal

## 10. Material Handling, Rigging, Use, Storage, and Disposal

### 10.1. Material Handling

- 10.1. A. Employers shall train their employees in proper lifting techniques
- 10.1. B. Always wear the appropriate PPE for the material being handled
- 10.1. C. Material handling devices (dollies, hand truck, etc) shall be used whenever possible
- 10.1. D. Materials shall not be moved over or suspended above workers.

### 10.2. Material Rigging

- 10.2. A. The worker responsible for rigging must be qualified in rigging equipment and materials, equipment inspections, safe operating procedures, the principles of safe rigging, environmental hazards, and rigging and handling the load.
- 10.2. B. Workers must inspect all rigging equipment to ensure it is safe
- 10.2. C. Tag lines must be used to control loads hoisted by equipment
- 10.2. D. Defective rigging shall be removed from service
- 10.2. E. Rigging equipment must be affixed with the manufacturer's prescribed safe working load
- 10.2. F. Rigging equipment shall never be loaded in excess of the manufacturer's prescribed safe working load
- 10.2. G. Chains that show excess wear and tear in excess shall be removed from service
- 10.2. J. Slings shall be padded or protected from sharp edges
- 10.2. K. Damaged or deformed rigging hardware shall be removed from service

### 10.3. Material Storage

- 10.3. A. All material in bags, containers, bundles, or stored in tiers, shall be stacked, blocked, interlocked, and limited in height so that it is stable and secured against sliding, falling, or collapse
- 10.3. B. Always store material on solid level surfaces
- 10.3. C. Maximum safe load limits of floors must be checked before storing material or equipment on elevated floors
- 10.3. D. Never store material within an aisle way
- 10.3. E. Materials shall not be stored on scaffolds or runways, except materials that are needed for immediate use
- 10.3. F. Non-compatible material shall be segregated in storage
- 10.3. G. Material shall not be stored within 6' of any floor or wall opening
- 10.3. H. Light or loose material shall not be stored on any roof unless secured

#### 10.3. I. Brick and Block Storage

- Brick stacks shall not be more than 7' high
- When loose brick stacks reach 4' in height it shall be tapered back 2" for every foot above the 4' level
- Block stacks higher than 6' must be tapered back ½ a block per tier above the 6' level

#### 10.3. J. Bagged Material Storage

- Bagged material shall be stacked by stepping back the layers and cross-keying the bags at least every 10 bags high

#### 10.3. K. Lumber Storage

- Lumber shall be stacked on level and solidly supported sills
- Lumber shall be stacked as to be stable and self supporting

- Lumber piles shall not exceed 20' in height or 16' high for manually handled lumber
- Reusable lumber shall have nails withdrawn before it is stacked or stored
- Lumber shall not be stored within 10' of any building

#### 10.3. L. Reinforcing Steel, Poles, Pipes and Structural Steel Storage

- Reinforcing steel, poles, and pipes shall be stored in orderly piles away from walkways and roadways
- Reinforcing steel, poles, and pipes shall be stacked and blocked to avoid spreading and tilting
- Structural steel shall be securely piled to prevent members sliding off or the pile toppling over

#### 10.4. Material Disposal

- 10.4. A. Whenever material is dropped more than 20' to any point lying outside the exterior walls of a building an enclosed chute is required
- 10.4. B. Whenever debris is dropped through holes in the floor without the use of an enclosed chute barricades no less than 42" high and not less than 6' back from the edge of the opening must be used. Signs warning of falling material must be posted
- 10.4. C. All scrap lumber, waste material, and rubbish shall be removed from the immediate work area and placed into the appropriate dumpster, as the work progresses
- 10.4. D. All solvent waste, oily rags, and flammable liquids shall be kept in subcontractor provided, fire resistant covered containers until removed from the work site.

END OF SECTION 10

# 11. Hand and power tool

## 11. Hand and Power Tools

- 11.1. All hand and power tools shall be maintained in a safe condition
- 11.2. When power operated tools are designed to accommodate guards, they shall be equipped with such guards
- 11.3. All reciprocating, rotating, or moving parts must be guarded
- 11.4. The appropriate PPE must be worn when the employee is exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases.
- 11.5. Tools cannot be modified in any way
- 11.6. All tools shall be used with the correct guards, safety switches, shields, or other attachment as required by the manufacturer

### 11.7. Electric Powered Tools

- 11.7. A. Electric power operated tools shall be of the approved double-insulated type or grounded
- 11.7. B. The use of electric cords for hoisting or lowering tools shall not be permitted
- 11.7. C. All hand-held powered planers, sanders, grinders with wheels 2-inch diameter or less, routers, planers, laminate trimmers, nibblers, shears, scroll saws, and jigsaws with blade shanks one-fourth of an inch wide or less may be equipped with only a positive "on-off" control
- 11.7. D. All hand-held powered drills, tappers, fastener drivers, horizontal, vertical, and angle grinders with wheels greater than 2 inches in diameter, disc sanders, belt sanders, reciprocating saws, saber saws, and other similar operating powered tools shall be equipped with a momentary contact "on-off" control and may have a lock-on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on
- 11.7. E. All other hand-held powered tools, such as circular saws, chain saws, and percussion tools without positive accessory holding means, shall be equipped with a constant pressure switch that will shut off the power when the pressure is released

### 11.8. Pneumatic Powered Tools

- 11.8. A. Pneumatic powered tools shall be secured to the hose or whip by positive means to prevent the tool from becoming accidentally disconnected
- 11.8. B. Safety clips or retainers shall be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled
- 11.8. C. All pneumatically driven nailers, staplers, etc with automatic fastener feed shall have a safety device on the muzzle to prevent the ejection of fasteners unless the muzzle is in contact with the work surface
- 11.8. D. All pneumatic power tool hoses, pipes, valves, filters, and other fittings must be used within the manufacturer's safe operating pressure
- 11.8. E. The use of pneumatic hoses for hoisting or lowering tools shall not be permitted
- 11.8. F. Airless spray guns that atomize paints and fluids at high pressures shall be equipped with automatic or visible manual safety devices which prevent pulling of the trigger
- 11.8. G. Abrasive blast cleaning nozzles shall be equipped with an operating valve which must be held open manually

### 11.9. Fuel Powered Tools

- 11.9. A. Fuel powered tools shall be stopped while being fueled, serviced, or maintained, and fuel shall be transported,



handled, and stored safely.

11.9. B. When fuel powered tools are used in enclosed spaces; all applicable requirements for concentration of toxic gases and the use of PPE are required.

#### 11.10. Hydraulic Powered Tools

11.10. A. The fluid used in hydraulic powered tools shall be fire-resistant fluids as per manufacturers guidelines.

11.10. B. All hydraulic power tool hoses, pipes, valves, filters, and other fittings must be used within the manufacturer's safe operating pressure

#### 11.11. Powder Actuated Tools

11.11. A. Employers must train employees before they are allowed to use powder actuated tools

11.11. B. Each powder actuated tool shall be inspected and tested in accordance with the manufacturer's recommended procedure

11.11. C. Any powder actuated tool found not in proper working order shall be immediately removed from service

11.11. D. PPE must be worn in accordance with KBE safety manual.

11.11. E. Powder actuated tools shall not be loaded until just prior to the intended fire time.

11.11. F. Neither loaded nor empty powder actuated tools shall be pointed at any employees.

11.11. G. Loaded powder actuated tools shall not be left unattended

11.11. H. Powder actuated tools and charges must be secured when not in use

11.11. I. Fasteners shall not be driven into very hard or very brittle material

11.11. J. Never fire a fastener into materials that are easily penetrated without using proper backup to avoid creating a flying hazard

11.11. K. Powder actuated tools shall not be used in explosive or flammable atmospheres

#### 11.12. Grinding and Abrasive Machinery

11.12. A. Grinding machines shall be equipped with safety guards.

11.12. B. A Hot Work Permit is required prior to the start of any grinding or use of abrasive machinery

11.12. C. Safety guards shall be so mounted as to maintain proper alignment with the wheel, and the guard and its fastenings shall be of sufficient strength to retain fragments of the wheel in case of accidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 180 deg.

11.12. D. Wheels and drivers must show their rated RPM. The RPM rating of the wheel must be equal to or greater than the driver on which it is used

11.12. E. Do not side grind on a wheel unless it is specifically designed for that purpose

11.12. F. Newly mounted wheels must be run at operating speed for at least one minute with the guard in place prior to grinding. Do not stand in front of the wheel during this time

11.12. G. Always wear proper eye protection when grinding or when working in close proximity to grinding operations

11.12. H. Inspect all blades, bits, and wheels before each use. Check for cracks, deformities, excessive wear, and that they are clear of remaining debris from prior operations.

#### 11.13. Woodworking Tools

- 11.13. A. The proper PPE should be worn while using woodworking tools.
- 11.13. B. All fixed power driven woodworking tools shall be provided with a disconnect switch that can either be locked or tagged in the off position.
- 11.13. C. The operating speed shall be etched or otherwise permanently marked on all circular saws over 20 inches in diameter or operating at over 10,000 peripheral feet per minute. Any saw so marked shall not be operated at a speed other than that marked on the blade. When a marked saw is retensioned for a different speed, the marking shall be corrected to show the new speed.
- 11.13. D. Automatic feeding devices shall be installed on machines whenever the nature of the work will permit. Feeder attachments shall have the feed rolls or other moving parts covered or guarded so as to protect the operator from hazardous points
- 11.13. E. All portable, power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

END OF SECTION 11

## 12. Welding and cutting

### 12. Welding and Cutting

12.1. Employers shall instruct employees in the safe means of arc welding and cutting

12.2. All welding and cutting equipment must be inspected before each work shift.

12.3. Hot Work Permits are required prior to the start of any welding or cutting operation.

#### 12.4. Transportation, moving, and storing compressed gas cylinder

12.4. A. Valve protection caps shall be in place and secured

12.4. B. When cylinders are hoisted, they shall be secured on a cradle, sling board, and pallet.

12.4. C. Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck, or permitted to strike each other violently.

12.4. D. Cylinders should always be kept in the vertical position

12.4. E. Valve protection caps shall not be used for lifting cylinders

12.4. F. When work is finished, when cylinders are empty, or when cylinders are moved at any time, the cylinder valve shall be closed.

12.4. G. Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials, a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour

12.4. H. Inside of buildings, cylinders shall be stored in a well-protected, well-ventilated, dry location, at least 20 feet from highly combustible materials such as oil or excelsior.

12.4. I. Cylinders whether full or empty, shall not be used as rollers or supports.

12.4. J. Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.

12.4. K. Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag, or flame will not reach them. When this is impractical, fire resistant shields shall be provided.

12.4. L. No damaged or defective cylinder shall be used.

12.4. M. If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the work area.

12.4. N. Mark empty cylinders "EMPTY" or "MT"

#### 12.5. Hoses

12.5. A. Fuel gas hose and oxygen hose shall be easily distinguishable from each other. A single hose having more than one gas passage shall not be used.

12.5. B. All hose in use, carrying acetylene, oxygen, natural or manufactured fuel gas, or any gas or substance shall be inspected at the beginning of each working shift. Defective hose shall be removed from service.

12.5. C. Hoses which has been subject to flashback, or which shows evidence of severe wear or damage, shall be tested to twice the normal pressure to which it is subject, but in no case less than 300 p.s.i. Defective hose, or hose in doubtful condition, shall not be used

12.5. D. Hose couplings shall be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion.

12.5. E. Hoses, cables, and other equipment shall be kept clear of passageways, ladders and stairs.

#### 12.6. Torches

12.6. A. Clogged torch tip openings shall be cleaned with suitable cleaning wires, drills, or other devices designed for such purpose.

12.6. B. Torches shall be inspected at the beginning of each working shift for leaking shutoff valves, hose couplings, and tip connections. Defective torches shall not be used.

12.6. C. Torches shall be lighted by friction lighters or other approved devices, and not by matches or from hot work.

12.6. D. Oxygen and fuel gas pressure regulators, including their related gauges, shall be in proper working order while in use.

12.6. E. Oxygen cylinders and fittings shall be kept free from and away from oil or grease.

#### 12.7. Manual Electrode Holders

12.7. A. Only manual electrode holders which are specifically designed for arc welding and cutting, and are of a capacity capable of safely handling the maximum rated current required by the electrodes, shall be used.

12.7. B. Any current-carrying parts passing through the portion of the holder which the arc welder or cutter grips in his hand, and the outer surfaces of the jaws of the holder, shall be fully insulated against the maximum voltage encountered to ground.

#### 12.8. Welding Cables and Connectors

12.8. A. All arc welding and cutting cables shall be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the arc welder or cutter is working.

12.8. B. Only cables free from repair or splices for a minimum distance of 10 feet from the cable end to which the electrode holder is connected shall be used.

12.8. C. Cables in need of repair shall not be used.

#### 12.9. Ground Returns and Machine Grounding

12.9. A. A ground return cable shall have a safe current carrying capacity equal to or exceeding the specified maximum output capacity of the arc welding or cutting unit which it services.

12.9. B. Pipelines containing gases or flammable liquids, or conduits containing electrical circuits, shall not be used as a ground return.

12.9. C. All ground connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.

#### 12.10. Operating Instructions

12.10. A. When equipment is left unattended it should be made safe and turned off.

12.10. B. Hot electrode holders shall not be dipped in water.

12.10. C. Any faulty or defective equipment shall be reported to the supervisor.

#### 12.11. Shielding

12.11. A. Whenever practicable, all arc welding and cutting operations shall be shielded by noncombustible or flameproof screens which will protect employees and other persons working in the vicinity from the direct rays of the arc.

#### 12.12. Fire Prevention

12.12. A. All the fire hazards should be removed from the immediate area or positive means shall be taken to confine the heat, sparks, and slag, and to protect the immovable fire hazards from them.

12.12. B. No welding, cutting, or heating shall be done where the application of flammable paints or the presence of other flammable compounds, or heavy dust concentrations creates a hazard.

12.12. C. Fire extinguishing equipment shall be within 25' of the work area and shall be maintained in a state of readiness for instant use.

12.12. D. When working near openings, shafts, mechanical chases, etc where the possibility of sparks or heat transfer is possible a fire watch in that additional area is required

#### 12.13. Ventilation

12.13. A. When general ventilation is not sufficient, mechanical ventilation must be used.

12.13. B. Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work.

12.13. C. Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air

12.13. D. Other employees exposed to the same atmosphere as the welders or burners shall be protected in the same manner as the welder or burner by the subcontractor creating the hazard

#### 12.14. Welding, cutting, or heating of toxic metals or preservative coatings

12.14. A. No persons shall be allowed to weld, cut, or heat toxic metals or preservative coatings without expressed written consent by the KBE Safety Director

12.14. B. An Activity Hazard Analysis must be submitted and approved prior to the start of welding, cutting, or heating toxic metals or preservative coatings

12.14. C. A pre-construction safety meeting must be held prior to the start of any welding, cutting, or heating toxic metals or preservative coatings

END OF SECTION 12

# 13. Electrical

## 13. Electrical

### 13.1. Examination, Installation, and use of equipment

13.1. A. The employer shall ensure that electrical equipment is free from recognized hazards that are likely to cause death or serious physical harm to employees. Safety of equipment shall be determined on the basis of the following considerations:

- Suitability for installation and use in conformity with the provisions of this subpart. Suitability of equipment for an identified purpose may be evidenced by listing, labeling, or certification for that identified purpose
- Mechanical strength and durability, including, for parts designed to enclose and protect other equipment, the adequacy of the protection thus provided
- Electrical insulation
- Heating effects under conditions of use
- Arcing effects
- Classification by type, size, voltage, current capacity, specific use
- Other factors which contribute to the practical safeguarding of employees using or likely to come in contact with the equipment

### 13.2. Guarding

13.2. A. Live parts of electric equipment operating at 50 volts or more shall be guarded against accidental contact by cabinets or other forms of enclosures, or by any of the following means

- By location in a room, vault, or similar enclosure that is accessible only to qualified persons
- By partitions or screens so arranged that only qualified persons will have access to the space within reach of the live parts.
- By location on a balcony, gallery, or platform so elevated and arranged as to exclude unqualified persons
- By elevation of 8 feet (2.44 m) or more above the floor or other working surface and so installed as to exclude unqualified persons
- In locations where electric equipment would be exposed to physical damage, enclosures or guards shall be so arranged and of such strength as to prevent such damage
- Entrances to rooms and other guarded locations containing exposed live parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter

### 13.3. Grounding

13.3. A. All non-current carrying parts of electrical equipment must be grounded or have an approved double- insulated setup

13.3. B. The employer shall use ground fault circuit interrupters

13.3.C. Each cord set, attachment cap, plug and receptacle of cord sets, and any equipment connected by cord and plug, except cord sets and receptacles which are fixed and not exposed to damage, shall be visually inspected before each day's use for external defects, such as deformed or missing pins or insulation damage, and for indications of possible internal damage. Equipment found damaged or defective shall be tagged out of service until repaired by a licensed electrician

#### 13.4. Ground-Fault Circuit Interrupters

13.4. A. All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground-fault circuit interrupters for personnel protection.

13.4. B. Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated more than 5kW need to be protected with ground-fault circuit interrupters.

13.4. C. Each employer is responsible to test and document that, each receptacle and attachment cap or plug in their charge is in proper working order, before its initial use, after any incident where damage to GFCI protection is possible, and at an interval no greater than every three months

13.4. D. Defective (missing ground pins, exposed internal conductors, etc) electrical tools, extension cords, etc shall be immediately destroyed by cutting off the male end of the cord.

#### 13.5. Temporary Wiring

13.5. A. Feeders shall originate in a distribution center. The conductors shall be run as multiconductor cord or cable assemblies or within raceways; or, where not subject to physical damage, they may be run as open conductors on insulators not more than 10 feet apart

13.5. B. Branch circuits shall originate in a power outlet or panel board. Conductors shall be run as multi conductor cord or cable assemblies or open conductors, or shall be run in raceways. All conductors shall be protected by overcurrent devices at their amp city. Runs of open conductors shall be located where the conductors will not be subject to physical damage, and the conductors shall be fastened at intervals not exceeding 10 feet. No branch-circuit conductors shall be laid on the floor. Each branch circuit that supplies receptacles or fixed equipment shall contain a separate equipment grounding conductor if the branch circuit is run as open conductors

13.5. C. Receptacles shall be of the grounding type. Unless installed in a complete metallic raceway, each branch circuit shall contain a separate equipment grounding conductor, and all receptacles shall be electrically connected to the grounding conductor. Receptacles for uses other than temporary lighting shall not be installed on branch circuits which supply temporary lighting. Receptacles shall not be connected to the same ungrounded conductor of multi wire circuits which supply temporary lighting

13.5. D. Disconnecting switches or plug connectors shall be installed to permit the disconnection of all ungrounded conductors of each temporary circuit

13.5. E. All lamps for general illumination shall be protected from accidental contact or breakage. Metal-case sockets shall be grounded

13.5. F. Temporary lights shall not be suspended by their electric cords unless cords and lights are designed for this means of suspension

13.5. G. Portable electric lighting used in wet and/or other conductive locations, as for example, drums, tanks, and vessels, shall be operated at 12 volts or less. However, 120-volt lights may be used if protected by a ground-fault circuit interrupter

13.5. H. A box shall be used wherever a change is made to a raceway system or a cable system which is metal clad or metal sheathed

- 13.5. I. Flexible cords and cables shall be protected from damage. Sharp corners and projections shall be avoided. Flexible cords and cables may pass through doorways or other pinch points, if protection is provided to avoid damage
- 13.5. J. Extension cord sets used with portable electric tools, appliances, temporary, and portable lighting shall be of three-wire type and shall be designed for hard or extra-hard usage.

### 13.6. Protection of Employees

- 13.6. A. No employer shall permit an employee to work in such proximity to any part of an electric power circuit that the employee could contact the electric power circuit in the course of work, unless the employee is protected against electric shock by deenergizing the circuit and grounding it or by guarding it effectively by insulation or other means
- 13.6. B. In work areas where the exact location of underground electric power lines is unknown, employees using jackhammers, bars, or other hand tools which may contact a line shall be provided with insulated protective gloves
- 13.6. C. Before work is begun the employer shall ascertain by inquiry or direct observation, or by instruments, whether any part of an energized electric power circuit, exposed or concealed, is so located that the performance of the work may bring any person, tool, or machine into physical or electrical contact with the electric power circuit. The employer shall post and maintain proper warning signs where such a circuit exists. The employer shall advise employees of the location of such lines, the hazards involved, and the protective measures to be taken
- 13.6. D. Barriers or other means of guarding shall be provided to ensure that workspace for electrical equipment will not be used as a passageway during periods when energized parts of electrical equipment are exposed
- 13.6. E. Working spaces, walkways, and similar locations shall be kept clear of cords so as not to create a hazard to employees
- 13.6. F. In existing installations, no changes in circuit protection shall be made to increase the load in excess of the load rating of the circuit wiring
- 13.6. G. When fuses are installed or removed with one or both terminals energized; special tools insulated for the voltage shall be used
- 13.6. H. Worn or frayed electric cords or cables shall not be used
- 13.6. I. Extension cords shall not be fastened with staples, hung from nails, or suspended by wire

### 13.7. Lock Out/ Tag Out

- 13.7. A. Controls that are to be deactivated during the course of work on energized or deenergized equipment or circuits shall be tagged
- 13.7. B. Equipment or circuits that are deenergized shall be rendered inoperative and shall have tags attached at all points where such equipment or circuits can be energized
- 13.7. C. Tags shall be placed to identify plainly the equipment or circuits being worked on

### 13.8. Live Line Work

- 13.8. A. No persons shall be allowed to work on live lines without expressed written consent by the KBE Safety Director
- 13.8. B. An Activity Hazard Analysis must be submitted and approved prior to the start of any live line work
- 13.8. C. A pre-construction safety meeting must be held prior to the start of any live line work

END OF SECTION 13



# 14.Scaffolding and work platforms

## 14. Scaffolding and Work Platforms

### 14.1. Training for Use

14.1. A. The employer shall have each employee who performs work while on a scaffold trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards. The training shall include the following areas, as applicable:

- The nature of any electrical hazards, fall hazards and falling object hazards in the work area
- The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems being used
- The proper use of the scaffold, and the proper handling of materials on the scaffold
- The maximum intended load and the load-carrying capacities of the scaffolds used

### 14.2. Training for Erecting, Disassembling, Moving, Operating, Repairing, Maintaining, and Inspecting

14.2. A. The employer shall have each employee who is involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold trained by a competent person to recognize any hazards associated with the work in question. The training shall include the following topics, as applicable:

- The nature of scaffold hazards
- The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold in question
- The design criteria, maximum intended load-carrying capacity and intended use of the scaffold

14.2. B. When the employer has reason to believe that an employee lacks the skill or understanding needed for safe work involving the erection, use or dismantling of scaffolds, the employer shall retrain each such employee so that the requisite proficiency is regained. Retraining is required in at least the following situations:

- Where changes at the worksite present a hazard about which an employee has not been previously trained
- Where changes in the types of scaffolds, fall protection, falling object protection, or other equipment present a hazard about which an employee has not been previously trained
- Where inadequacies in an affected employee's work involving scaffolds indicate that the employee has not retained the requisite proficiency

### 14.3. Capacity

14.3.A. Each scaffold and scaffold component shall be capable of supporting, without failure, its own weight and at least 4 times the maximum intended load applied or transmitted to it.

14.3. B. Direct connections to roofs and floors, and counterweights used to balance adjustable suspension scaffolds, shall be capable of resisting at least 4 times the tipping moment imposed by the scaffold operating at the rated load of the hoist, or 1.5 (minimum) times the tipping moment imposed by the Scaffold operating at the stall load of the hoist, whichever is greater

14.3.C. Each suspension rope, including connecting hardware, used on non-adjustable suspension scaffolds shall be capable of supporting, without failure, at least 6 times the maximum intended load applied or transmitted to that rope

14.3. D. Each suspension rope, including connecting hardware, used on adjustable suspension scaffolds shall be capable of supporting, without failure, at least 6 times the maximum intended load applied or transmitted to that rope with the scaffold operating at either the rated load of the hoist, or 2 (minimum) times the stall load of the hoist, whichever is greater

14.3. E. The stall load of any scaffold hoist shall not exceed 3 times its rated load

14.3. F. Scaffolds shall be designed by a qualified person and shall be constructed and loaded in accordance with that design.

#### 14.4. Scaffold Platform Construction

14.4. A. Each platform on all working levels of scaffolds shall be fully planked or decked between the front uprights and the guardrail supports as follows

14.4. B. Each platform unit (e.g., scaffold plank, fabricated plank, fabricated deck, or fabricated platform) shall be installed so that the space between adjacent units and the space between the platform and the uprights is no more than 1 inch wide, except where the employer can demonstrate that a wider space is necessary (for example, to fit around uprights when side brackets are used to extend the width of the platform)

14.4. C. Each scaffold platform and walkway shall be at least 18 inches wide

14.4. D. The front edge of all platforms shall not be more than 14 inches from the face of the work, unless guardrail systems are erected along the front edge and/or personal fall arrest systems are used

14.4. E. Each end of a platform, unless cleated or otherwise restrained by hooks or equivalent means, shall extend over the centerline of its support at least 6 inches and by no more than 12 inches.

14.4. F. On scaffolds where scaffold planks are abutted to create a long platform, each abutted end shall rest on a separate support surface. This provision does not preclude the use of common support members, such as “T” sections, to support abutting planks, or hook on platforms designed to rest on common supports.

14.4. G. On scaffolds where platforms are overlapped to create a long platform, the overlap shall occur only over supports, and shall not be less than 12 inches unless the platforms are nailed together or otherwise restrained to prevent movement.

14.4. H. At all points of a scaffold where the platform changes direction, such as turning a corner, any platform that rests on a bearer at an angle other than a right angle shall be laid first, and platforms which rest at right angles over the same bearer shall be laid second, on top of the first platform

14.4. I. Wood platforms shall not be covered with opaque finishes, except that platform edges may be covered or marked for identification. Platforms may be coated periodically with wood preservatives, fire-retardant finishes, and slip-resistant finishes; however, the coating may not obscure the top or bottom wood surfaces

14.4. J. Scaffold components manufactured by different manufacturers shall not be intermixed unless the components fit together without force and the scaffold’s structural integrity is maintained by the user.

14.4. K. Scaffold components made of dissimilar metals shall not be used together unless a competent person has determined that galvanic action will not reduce the strength of any component to a level below that required

#### 14.5. Supported Scaffolds

14.5.A. Supported scaffolds with a height to base width (including outrigger supports, if used) ratio of more than four to one (4:1) shall be restrained from tipping by guying, tying, bracing, or equivalent means, as follows:

- Guys, ties, and braces shall be installed at locations where horizontal members support both inner and outer legs
- Guys, ties, and braces shall be installed according to the scaffold manufacturer’s recommendations or at the closest horizontal member to the 4:1 height and be repeated vertically at locations of horizontal members every 20 feet or less thereafter for scaffolds 3 feet wide or less, and every 26 feet or less thereafter for scaffolds greater than 3 feet wide. The top guy, tie or brace of completed scaffolds shall be placed no further than the 4:1 height from the top. Such guys, ties and braces shall be installed at each end of the scaffold and at horizontal intervals not to exceed 30 feet.
- Ties, guys, braces, or outriggers shall be used to prevent the tipping of supported scaffolds in all circumstances where an eccentric load, such as a cantilevered work platform, is applied or is transmitted to the scaffold

- Supported scaffold poles, legs, posts, frames, and uprights shall bear on base plates and mud sills  
(With a minimum 2 nails) or other adequate firm foundation
- Footings shall be level, sound, rigid, and capable of supporting the loaded scaffold without settling or displacement
- Unstable objects shall not be used to support scaffolds or platform units
- Unstable objects shall not be used as working platforms
- Front-end loaders and similar pieces of equipment shall not be used to support scaffold platforms
- Fork-lifts shall not be used to support scaffold platforms

#### 14.6. Suspension Scaffolds

14.6. A. No persons shall be allowed to work on a suspension scaffold without expressed written consent by the KBE Safety Director

14.6. B. An Activity Hazard Analysis must be submitted and approved prior to the start of any work on a suspension scaffold

14.6. C. A pre-construction safety meeting must be held prior to the start of any work on a suspension scaffold

#### 14.7. Access for Use

14.7. A. Portable ladders, hook-on ladders, attachable ladders, stair towers (scaffold stairways/towers), stairway-type ladders (such as ladder stands), ramps, walkways, integral prefabricated scaffold access, etc must be provided for any scaffold platform more than 2' above or below the access point

14.7. B. Cross braces are not to be used as a means of access.

#### 14.8. Access for Erecting or Dismantling

14.8. A. The employer shall provide safe means of access for each employee erecting or dismantling a scaffold where the provision of safe access is feasible and does not create a greater hazard. The employer shall have a competent person determine whether it is feasible or would pose a greater hazard to provide, and have employees use a safe means of access. This determination shall be based on site conditions and the type of scaffold being erected or dismantled

14.8. B. A ladder shall be installed as soon as scaffold erection has progressed to a point that permits safe installation and use

14.8. C. Cross braces on tubular welded frame scaffolds shall not be used as a means of access or egress

#### 14.9. Use

14.9. A. Scaffolds and scaffold components shall not be loaded by personnel, material, and equipment in excess of their maximum intended loads or rated capacities, whichever is less

14.9. B. The use of shore or lean-to scaffolds is prohibited

14.9. C. Scaffolds and scaffold components shall be inspected for visible defects by a competent person, of each employer using the scaffold, before each work shift, and after any occurrence which could affect a scaffold's structural integrity. A KBE Scaffold Inspection Check List must be completed and submitted to KBE Depending on the out come of the inspection the scaffold must be tagged "green" Approved for Use or "red" Do Not Use.

14.9. D. Green tagged" scaffold is approved to be occupied by employees and to be loaded with materials as determined by the competent person

14.9. E. "Red tagged" scaffolds are not suitable for employee occupation or material loading.

- 14.9. F. Any part of a scaffold damaged or weakened such that its strength is less than that required by paragraph (a) of this section shall be immediately repaired or replaced, braced to meet those provisions, or removed from service until repaired
- 14.9. G. Stationary scaffolds shall not be moved horizontally while employees are on them
- 14.9. H. Suitable clearance between scaffolds and power lines shall be maintained at all times.
- 14.9. I. Scaffolds shall be erected, moved, dismantled, or altered only under the supervision and direction of a competent person qualified in scaffold erection, moving, dismantling or alteration. Such activities shall be performed only by experienced and trained employees selected for such work by the competent person
- 14.9. J. Employees shall be prohibited from working on scaffolds covered with snow, ice, or other slippery material except as necessary for removal of such materials
- 14.9. K. Where swinging loads are being hoisted onto or near scaffolds such that the loads might contact the scaffold, tag lines or equivalent measures to control the loads shall be used
- 14.9. L. Work on or from scaffolds is prohibited during storms or high winds
- 14.9. M. Debris shall not be allowed to accumulate on platforms
- 14.9. N. Makeshift devices, such as but not limited to boxes, barrels, bricks, and CMU shall not be used on top of scaffold platforms to increase the working level height of employees
- 14.9. O. Ladders shall not be used on scaffolds to increase the working level height of employees
- 14.9. P. Platforms shall not deflect more than 1/60 of the span when loaded

#### 14.10 Fall Protection

- 14.10.A. Each employee on a scaffold more than 10 feet (or less as required by contract ) above a lower level shall be protected from falling to that lower level by a guard rail system or fall arrest system or both if specifically required for the type of scaffold being used
- 14.10. B. Each employee performing overhand bricklaying operations from a supported scaffold shall be protected from falling from all open sides and ends of the scaffold, except at the side next to the wall being laid.
- 14.10. C. The employer shall have a competent person determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds. Employers are required to provide fall protection for employees erecting or dismantling supported scaffolds where the installation and use of such protection is feasible and does not create a greater hazard

#### 14.10. D. Guard Rail System

- Top edge height of top rail shall be 42" +/- 3"
- Top rail shall be capable of withstanding a 200lb force in any outward or downward direction
- Midrails shall be installed at a height midway between the top edge of the guardrail system and the walking/working level
- Midrails must be capable of withstanding a 150lb force in any outward or downward direction
- Toe boards must be installed at the edge of the walking/ working level
- Toe boards must be capable of withstanding a 50lb force in any outward or downward direction

#### 14.11. Falling Object Protection

- 14.11.A. In addition to wearing hardhats each employee on a scaffold shall be provided with additional protection from falling hand tools, debris, and other small objects through the installation of toe boards, screens, or guardrail systems, or through the erection of debris nets, catch platforms, or canopy structures that contain or deflect the falling objects.

- 14.11.B. When the falling objects are too large, heavy or massive to be contained or deflected by any of the Above-listed measures, the employer shall place such potential falling objects away from the edge of the surface from which they could fall and shall secure those materials as necessary to prevent their falling
- 14.11. C.The area below the scaffold to which objects can fall shall be barricaded, and employees shall not be permitted to enter the hazard area
- 14.11. D. A toe board shall be erected along the edge of platforms more than 10 feet above lower levels for a distance sufficient to protect employees below
- 14.11. E. When required paneling or screening shall be used in conjunction with toe boards to protect employees or the public

#### 14.12. Tube and Coupler Scaffold

- 14.12. A. When platforms are being moved to the next level, the existing platform shall be left undisturbed until the new bearers have been set in place and braced prior to receiving the new platforms
- 14.12.B. Transverse bracing forming an “X” across the width of the scaffold shall be installed at the scaffold ends and at least at every third set of posts horizontally (measured from only one end) and every fourth runner vertically. Bracing shall extend diagonally from the inner or outer posts or runners upward to the next outer or inner posts or runners. Building ties shall be installed at the bearer levels between the transverse bracing
- 14.12. C. On straight run scaffolds, longitudinal bracing across the inner and outer rows of posts shall be installed diagonally in both directions, and shall extend from the base of the end posts upward to the top of the scaffold at approximately a 45 degree angle. On scaffolds whose length is greater than their height, such bracing shall be repeated beginning at least at every fifth post. On scaffolds whose length is less than their height, such bracing shall be installed from the base of the end posts upward to the opposite end posts, and then in alternating directions until reaching the top of the scaffold. Bracing shall be installed as close as possible to the intersection of the bearer and post or runner and post
- 14.12. D. Where conditions preclude the attachment of bracing to posts, bracing shall be attached to the runners as close to the post as possible
- 14.12. E. Bearers shall be installed transversely between posts, and when coupled to the posts, shall have the inboard coupler bear directly on the runner coupler. When the bearers are coupled to the runners, the couplers shall be as close to the posts as possible
- 14.12. F. Bearers shall extend beyond the posts and runners, and shall provide full contact with the coupler
- 14.12. G. Runners shall be installed along the length of the scaffold, located on both the inside and outside posts at level heights
- 14.12. H. Couplers shall be of a structural metal, such as drop-forged steel, malleable iron, or structural grade aluminum. The use of gray cast iron is prohibited
- 14.12.I. Tube and coupler scaffolds over 125 feet in height shall be designed by a registered professional engineer, and shall be constructed and loaded in accordance with such design.

#### 14.13. Fabricated Frame Scaffold (Tubular Welded Frame Scaffolds)

- 14.13. A. When moving platforms to the next level, the existing platform shall be left undisturbed until the new end frames have been set in place and braced prior to receiving the new platforms
- 14.13. B. Frames and panels shall be braced by cross, horizontal, or diagonal braces, or combination thereof, which secure vertical members together laterally. The cross braces shall be of such length as will automatically square and align vertical members so that the erected scaffold is always plumb, level, and square. All brace connections shall be secured
- 14.13. C. Frames and panels shall be joined together vertically by coupling or stacking pins or equivalent means

14.13. D. Where uplift can occur which would displace scaffold end frames or panels, the frames or panels shall be locked together vertically by pins or equivalent means

14.13. E.Brackets used to support cantilevered loads shall:

- Be seated with side-brackets parallel to the frames and end-brackets at 90 degrees to the frames
- Be seated with side-brackets parallel to the frames and end-brackets at 90 degrees to the frames
- Not be bent or twisted from these positions
- Be used only to support personnel, unless the scaffold has been designed for other loads by a qualified engineer and built to withstand the tipping forces caused by those other loads being placed on the bracket-supported section of the scaffold
- Scaffolds over 125 feet in height above their base plates shall be designed by a registered professional engineer, and shall be constructed and loaded in accordance with such design

#### 14.14. Manually Propelled Mobile Scaffolds

14.14. A.When free standing mobile scaffolds are used; the height shall not exceed four times the minimum base dimension

14.14. B. Scaffold casters and wheels shall be locked when occupied and not in motion

14.14. C.Manual force used to move the scaffold shall be applied as close to the base as practicable, but not more than 5 feet above the supporting surface

14.14. D. Scaffolds shall be stabilized to prevent tipping during movement

14.14. E.Employees shall not be allowed to ride on scaffolds unless the following conditions exist

- The surface on which the scaffold is being moved is within 3 degrees of level, and free of pits, holes, and obstructions
- The height to base width ratio of the scaffold during movement is two to one or less.
- Outrigger frames, when used, are installed on both sides of the scaffold
- A guard rail system has been installed
- Before a scaffold is moved, each employee on the scaffold shall be made aware of the move

14.14. F. No employee is on any part of the scaffold which extends outward beyond the wheels, casters, or other supports

#### 14.15. Stilts

14.15. A.Stilts may only be used when a guardrail system provides fall protection that has been increased in height by an amount equal to the height of the stilts being used by the employee. The employer will be responsible for the cost for any additional guard rails needed to meet this requirement.

14.15. B. An employee may wear stilts only on large area scaffolds

14.15. C.Surfaces on which stilts are used shall be flat and free of pits, holes, and obstructions, such as debris and extension cords, as well as any other

14.15. D.Stilts shall be properly maintained. Any alteration of the original equipment shall be approved by the manufacturer

#### 14.16.Aerial Lifts (Boom Lifts, Scissor Lifts, Bucket Trucks, etc)

14.16. A.Prior to the use of any aerial lift the employer must provide their employees training on the proper operation, inspection, and maintenance of each type of aerial lift they will be required to use.

14.16. B. Aerial lifts shall not be modified in any way unless the manufacturer has been certified by the manufacturer in writing

14.16. C. Lift controls shall be tested each day prior to use to determine that such controls are in safe working condition

- 14.16. D. Tying off to an adjacent pole, structure, or equipment while working from an aerial lift shall not be permitted
- 14.16. E. Employees shall always stand firmly on the floor of the basket, and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position
- 14.16. F. A full body harness and lanyard must be attached when working in the basket of a boom lift or bucket truck and when required in the basket of a scissor lift
- 14.16. G. Boom and basket load limits specified by the manufacturer shall not be exceeded. This includes personnel, tools, equipment, and materials.
- 14.16. H. The brakes shall be set and when outriggers are used, they shall be positioned on pads or a solid surface. Wheel chocks shall be installed before using an aerial lift on an incline, provided they can be safely installed
- 14.16. I. An aerial lift truck shall not be moved when the boom is elevated in a working position with men in the basket, except for equipment which is specifically designed for this type of operation
- 14.16. J. Articulating boom and extensible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for overriding the upper controls. Controls shall be plainly marked as to their function. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency
- 14.16. K. Before moving an aerial lift for travel, the boom(s) shall be inspected to see that it is properly cradled and outriggers are in stowed position

END OF SECTION 14



# 15. Fall Protection

## 15. Fall protection

- 15.1. Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.
- 15.2. The only exceptions to the fall exposure limits are as follows. These exceptions may be removed by project specific requirements
- Steel Erectors= 15'
  - Steel Connectors 30' (Fall Protection must be available for use above 15')
  - Workers on Scaffold= 10'
  - Roofers (Low-Slope) with WLS and Monitor= No restriction
  - Roofers (Low-Slope) without WLS and/or Monitor= No exception to 6' fall rule
  - Roofers (Steep Roofs)= No exception to 6' fall rule

## 15.3. Training

- 15.3. A. The employer shall provide a training program for each employee who might be exposed to fall hazards. The program shall enable each employee to recognize the hazards of falling and shall train each employee in the procedures to be followed in order to minimize these hazards
- 15.3. B. The employer shall assure that each employee has been trained, as necessary, by a competent person qualified in the following areas
- The nature of fall hazards in the work area
  - The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used
  - The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used
  - The role of each employee in the safety monitoring system when this system is used
  - The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs
  - The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection
  - The role of employees in fall protection plans
- 15.3. C. The employer shall verify compliance by preparing a written certification record. The written certification record shall contain the name or other identity of the employee trained, the date(s) of the training, and the signature of the person who conducted the training or the signature of the employer.
- 15.3. D. When the employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by paragraph (a) of this section, the employer shall retrain each such employee. Circumstances where retraining is required include, but are not limited to, situations where:
- Changes in the workplace render previous training obsolete
  - Changes in the types of fall protection systems or equipment to be used render previous training obsolete
  - Inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill

## 15.4. Fall Protection Plan

- 15.4. A. A Fall Protection Plan is required prior to the start of any leading edge work (metal decking, roofing work using a safety monitor) where conventional fall protection systems (guard rails, personal fall arrest, safety nets) cannot be used.



- 15.4. B. The fall protection plan shall be prepared by a qualified person and developed specifically for the project
- 15.4. C. A copy of the fall protection plan with all approved changes shall be maintained at the job site
- 15.4. D. The implementation of the fall protection plan shall be under the supervision of a competent person
- 15.4. E. The fall protection plan shall document the reasons why the uses of conventional fall protection systems are infeasible or why their use would create a greater hazard
- 15.4. F. The fall protection plan shall include a written discussion of other measures that will be taken to reduce or eliminate the fall hazard for workers who cannot be provided with protection from the conventional fall protection systems.
- 15.4. G. The fall protection plan shall identify each location where conventional fall protection methods cannot be used. These locations shall then be classified as controlled access zones
- 15.4. H. Where no other alternative measure has been implemented, the employer shall implement a safety monitoring system
- 15.4. I. The fall protection plan must include a statement which provides the name or other method of identification for each employee who is designated to work in controlled access zones. No other employees may enter controlled access zones
- 15.4. J. In the event an employee falls, or some other related, serious incident occurs, (e.g., a near miss) the employer shall investigate the circumstances of the fall or other incident to determine if the fall protection plan needs to be changed (e.g. new practices, procedures, or training) and shall implement those changes to prevent similar types of falls or incidents

#### 15.5. Fall Protection Systems

##### 15.5. A. Guard Rail Systems

- 15.5. A.1. A guard rail system includes a top rail, one of the following: a midrail (or a screen, mesh, or intermediate members), and a toe board
- 15.5. A.2. Top rail top height shall be 42" +/- 3"
- 15.5. A.3. Top rail shall be capable of withstanding a 200lb force in any outward or downward direction
- 15.5. A.4. Midrails when used shall be installed at a height midway between the top edges of the guardrail System and the walking/working level;
- 15.5. A.5. Screens and mesh, when used, shall extend from the top rail to the walking/working level and along the entire opening between top rail supports
- 15.5. A.6. Intermediate members, when used between posts, shall be not more than 19 inches apart
- 15.5. A.7. Midrails, screens, mesh, and intermediate members must be capable of withstanding a 150lb force in any outward or downward direction
- 15.5. A.8. Toe boards must be installed at the edge of the walking/ working level
- 15.5. A.9. Toe boards must be capable of withstanding a 50lb force in any outward or downward direction

#### 15.5. B. Safety Net Systems

- 15.5. B.1. No persons shall be allowed to install or use a safety net without expressed written consent by the KBE Safety Director
- 15.5. B.2. An Activity Hazard Analysis must be submitted and approved prior to the installation or use a safety net
- 15.5. B.3. A pre-construction safety meeting must be held prior to the installation or use a safety net

## 15.5. C. Personal Fall Arrest Systems

### 15.5. C.1. Body belts are not allowed for use as fall protection

### 15.5. C.3. Dee-Rings

- Dee-rings and snap hooks shall have a minimum tensile strength of 2000Kgs
- Snap hooks shall be a locking type designed and used to prevent disengagement of the snap hook by the contact of the snap hook keeper by the connected member

### 15.5. C.4. Life Lines

- Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two
- Lanyards and vertical lifelines shall have a minimum breaking strength of 2,000 Kgs
- When vertical lifelines are used, each employee shall be attached to a separate lifeline
- During the construction of elevator shafts, two employees may be attached to the same lifeline in the hoist way, provided both employees are working atop a false car that is equipped with guardrails; the strength of the lifeline is 4,000Kgs pounds (2,000 Kgs per employee attached); and all other criteria for lifelines have been met
- Lifelines shall be protected against being cut or abraded
- Self-retracting lifelines and lanyards which automatically limit free fall distance to 2 feet or less shall be capable of sustaining a minimum tensile load of 1,500 Kgs applied to the device with the Lifeline or lanyard in the fully extended position
- Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet or less, rip stitch lanyards, and tearing and deforming lanyards shall be capable of sustaining a minimum tensile load of 2,000 Kgs applied to the device with the lifeline or lanyard in the fully extended position
- Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses shall be made from synthetic fibers

### 15.5. C.5. Anchorage Points

- Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 2,000 Kgs per employee attached, or shall be designed, installed, and used as follows
- As part of a complete personal fall arrest system which maintains a safety factor of at least two
- Under the supervision of a qualified person

### 15.5. C.6. Personal Fall Arrest Systems

- limit maximum arresting force on an employee to 750 Kgs when used with a body harness
- be rigged such that an employee can neither free fall more than 6 feet, nor contact any lower level
- bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet
- have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet, or the free fall distance permitted by the system, whichever is less
- Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a competent person to be undamaged and suitable for reuse
- The employer shall provide for prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves

- Personal fall arrest systems shall be inspected prior to each use for wear, damage and other deterioration, and defective components shall be removed from service
- Personal fall arrest systems shall not be attached to guardrail systems, nor shall they be attached to hoists except as specified in other subparts of this Part

#### 15.5. C.7. Fall Restraint System

- A properly utilized fall restraint systems in lieu of fall arrest systems when the restraint system is rigged in such a way that the employee cannot get to the fall hazard.
- At minimum, fall restraint systems have the capacity to withstand at least 1,500 Kgs of force or twice the maximum expected force that is needed to restrain the person from exposure to the fall hazard. In determining this force, consideration should be given to site-specific factors such as the force generated by a person walking, leaning, or sliding down the work surface

#### 15.5. C.8. Positioning Device Systems

- Positioning devices shall be rigged such that an employee cannot free fall more than 2 feet
- Positioning devices shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 1,500 Kgs (13.3 kN), whichever is greater

#### 15.5. C.9. Warning Line Systems (WLS)

- WLS can only be used on low slope roofs or floors
- WLS for roofing work only must be 6' from any unprotected edge
- Roofing work between the WLS and any unprotected edge requires a Monitor System or other fall Protection
- WLS for all other non-roofing work must be 15' from any unprotected edge
- Non-roofing work between the WLS and any unprotected edge requires Fall Protection. A Monitor System is not allowed.
- Points of access, materials handling areas, storage areas, and hoisting areas shall be connected to the work area by an access path formed by two warning lines
- Warning lines shall consist of ropes, wires, or chains and supporting stanchions erected as follows
  - o The rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is no less than 34 inches from the walking/working surface and its highest point is no more than 39 inches from the walking/working surface
  - o After being erected, with the rope, wire, or chain attached, stanchions shall be capable of resisting, without tipping over, a force of at least 7Kgs applied horizontally against the stanchion, 30 inches above the walking/working surface, perpendicular to the warning line, and in the direction of the floor, roof, or platform edge
  - o The rope, wire, or chain shall have a minimum tensile strength of 200 Kgs, and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions
  - o The line 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

#### 15.5. C.10. Controlled Access Zones

- When used to control access to areas where leading edge and other operations are taking place the controlled access zone shall be defined by a control line or by any other means that restricts access
- When control lines are used, they shall be erected not less than 6 feet nor more than 25 feet from the unprotected or leading edge, except when erecting precast concrete members
- When erecting precast concrete members, the control line shall be erected not less than 6 feet nor more than 60 feet or half the length of the member being erected, whichever is less, from the leading edge

- The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge
- The control line shall be connected on each side to a guardrail system or wall
- When used to control access to areas where overhand bricklaying and related work are taking place:
  - o The controlled access zone shall be defined by a control line erected not less than 10 feet nor more than 15 feet from the working edge
  - o The control line shall extend for a distance sufficient for the controlled access zone to enclose all employees performing overhand bricklaying and related work at the working edge and shall be approximately parallel to the working edge
  - o Additional control lines shall be erected at each end to enclose the controlled access zone
  - o Only employees engaged in overhand bricklaying or related work shall be permitted in the controlled access zone
- Control lines shall consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:
  - o Each line shall be flagged or otherwise clearly marked at not more than 6-foot intervals with high-visibility material
  - o Each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches from the walking/working surface and its highest point is not more than 45 inches (50 inches when overhand bricklaying operations are being performed) from the walking/ working surface
  - o Each line shall have a minimum breaking strength of 100 Kgs
    - o On floors and roofs where guardrail systems are not in place prior to the beginning of overhand bricklaying operations, controlled access zones shall be enlarged, as necessary, to enclose all points of access, material handling areas, and storage areas
    - o On floors and roofs where guardrail systems are in place, but need to be removed to allow overhand bricklaying work or leading edge work to take place, only that portion of the guardrail necessary to accomplish that day's work shall be removed

#### 15.5. C.11. Safety Monitoring Systems

- The safety monitor shall be competent to recognize fall hazards
    - The safety monitor shall warn the employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner
    - The safety monitor shall be on the same walking/working surface and within visual sighting distance of the employee being monitored
  - The safety monitor shall be close enough to communicate orally with the employee
    - The safety monitor shall not have other responsibilities which could take the monitor's attention from the monitoring function
    - Mechanical equipment shall not be used or stored in areas where safety monitoring systems are being used to monitor employees engaged in roofing operations on low-slope roofs
  - No employee, other than an employee engaged in roofing work [on low-sloped roofs] or an employee Covered by a fall protection plan, shall be allowed in an area where an employee is being protected by a safety monitoring system
- Each employee working in a controlled access zone shall be directed to comply promptly with fall hazard warnings from safety monitors

#### 15.5. C.12. Covers

- Every floor hole into which persons cannot accidentally walk shall be protected by a cover that leaves no openings

- more than 1 inch wide. The cover shall be securely held in place to prevent tools or materials from falling through
- All covers shall be color coded or they shall be marked with the word “HOLE” or “COVER” to provide warning of the hazard
- Covers located in roadways and vehicular aisles shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover
- All other covers shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time
- All covers shall be secured when installed so as to prevent accidental displacement by the wind, equipment, or employees

#### 15.6. Loading Areas

15.6.A. Each employee in a loading area shall be protected from falling 6 feet or more to lower levels by guardrail systems or personal fall arrest systems. If guardrail systems, or chain, gate, or guardrail, or portions thereof, are removed to facilitate the loading operation (e.g., during landing of materials), that employee shall be protected from fall hazards by a personal fall arrest system.

#### 15.7. Floor or Wall Openings

- 15.7. A. Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) more than 6 feet above lower levels, by personal fall arrest systems, covers, or guardrail systems erected around such holes
- 15.7. B. Each employee on a walking/working surface shall be protected from tripping in or stepping into or through holes (including skylights) by covers
- 15.7. C. Each employee on a walking/working surface shall be protected from objects falling through holes (Including skylights) by covers

15.8. Each employee on the face of formwork or reinforcing steel shall be protected from falling 6 feet or more to lower levels by personal fall arrest systems, safety net systems, or positioning device systems

15.9. Each employee on ramps, runways, and other walkways shall be protected from falling 6 feet or more to lower levels by guardrail systems.

#### 15.10. Excavations

- 15.10. A. Each employee at the edge of an excavation 6 feet or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier
- 15.10. B. Each employee at the edge of a well, pit, shaft, and similar excavation 6 feet or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers

#### 15.11. Masonry

- 15.11. A. Except as otherwise below, each employee performing overhand bricklaying and related work 6 feet or more above lower levels, shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or shall work in a controlled access zone
- 15.11. B. Each employee reaching more than 10 inches below the level of the walking/working surface on which they are working, shall be protected from falling by a guardrail system, safety net system, or personal fall arrest system

#### 15.12. Roofers

- 15.12. A. Roofing activities on low-slope roofs, with unprotected sides and edges 6 feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal 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 warning line system and safety monitoring system. Or, on roofs 50-feet or less in width, the use of a safety monitoring system alone [i.e. without the warning line system] is permitted
- 15.12. B. Each employee on a steep roof with unprotected sides and edges 6 feet or more above lower levels shall be protected from falling by guardrail systems with toe boards, safety net systems, or personal fall arrest systems

#### 15.13. Precast Concrete Erection

- 15.13. A. Each employee engaged in the erection of precast concrete members (including, but not limited to the erection of wall panels, columns, beams, and floor and roof “tees”) and related operations such as grouting of precast concrete members, who is 6 feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, or personal fall arrest systems

#### 15.14. Falling Object Protection

- 15.14. A. When an employee is exposed to falling objects; the employer shall have each employee wear a hard hat and shall implement one of the following measures
- Every floor hole into which persons cannot accidentally walk (on account of fixed machinery, equipment, or walls) shall be protected by a cover that leaves no openings more than 1 inch wide. The cover shall be securely held in place to prevent tools or materials from falling through
  - Barricade the area to which objects could fall, prohibit employees from entering the barricaded area, and keep objects that may fall far enough away from the edge of a higher level so that those objects would not go over the edge if they were accidentally displaced
  - Erect toe boards, screens, or guardrail systems to prevent objects from falling from higher levels
  - Toe boards shall be capable of withstanding, without failure, a force of at least 50 pounds applied in any downward or outward direction at any point along the toe board
  - Toe boards shall be a minimum of 3 1/2 inches in vertical height from their top edge to the level of the walking/working surface. They shall have not more than 1/4 inch clearance above the walking/ working surface. They shall be solid or have openings not over 1 inch in greatest dimension
  - Where tools, equipment, or materials are piled higher than the top edge of a toe board, paneling or screening shall be erected from the walking/working surface or toe board to the top of a guardrail system’s top rail or midrail, for a distance sufficient to protect employees below
  - Guardrail systems, when used as falling object protection, shall have all openings small enough to prevent passage of potential falling objects
  - During overhand bricklaying work:
    - o No materials or equipment except masonry and mortar shall be stored within 4 feet of the working edge
    - o Excess mortar, broken or scattered masonry units, and all other materials and debris shall be kept clear from the work area by removal at regular intervals
  - During roofing work:
    - o Materials and equipment shall not be stored within 6 feet of a roof edge unless guardrails are erected at the edge
    - o Materials which are piled, grouped, or stacked near a roof edge shall be stable and self- supporting
    - o Canopies, when used as falling object protection, shall be strong enough to prevent collapse and to prevent penetration by any objects which may fall onto the canopy

## 16. Helicopter, hoist, elevators, and conveyors

### 16. Helicopters, Hoists, Elevators, and Conveyors

#### 16.1. Helicopters

- 16.1. A. No site shall be allowed to use a helicopter without expressed written consent by the KBE Safety Director
- 16.1. C. An Activity Hazard Analysis must be submitted and approved prior to the use of a helicopter
- 16.1. D. A pre-construction safety meeting must be held prior to the use of a helicopter

#### 16.2. Material Hoists, Personnel Hoists, and Elevators

- 16.2. A. The employer shall comply with the manufacturer's specifications and limitations applicable to the operation of all hoists and elevators. Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a professional engineer competent in the field
- 16.2. B. Rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be posted on cars and platforms
- 16.2. C. Wire rope shall be removed from service when any of the following conditions exists
  - In hoisting ropes, six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay
  - Abrasion, scrubbing, flattening, or peening, causing loss of more than one-third of the original diameter of the outside wires
  - Evidence of any heat damage resulting from a torch or any damage caused by contact with electrical wires
  - Reduction from nominal diameter of more than three sixty-fourths inch for diameters up to and including three-fourths inch; one-sixteenth inch for diameters seven-eighths to 1 1/8 inches; and three thirty-seconds inch for diameters 1 1/4 to 1 1/2 inches
- 16.2. D. Hoisting ropes shall be installed in accordance with the wire rope manufacturers' recommendations
- 16.2. E. The installation of live booms on hoists is prohibited
- 16.2. F. The use of endless belt-type manlifts on construction shall be prohibited

#### 16.2. G. Material Hoist

- 16.2. G.1. Operating rules shall be established and posted at the operator's station of the hoist. Such rules shall include signal system and allowable line speed for various loads. Rules and notices shall be posted on the car frame or crosshead in a conspicuous location, including the statement "No Riders Allowed".
- 16.2. G.2.  
No person shall be allowed to ride on material hoists except for the purposes of inspection and maintenance
- 16.2. G.3. All entrances of the hoist ways shall be protected by substantial gates or bars which shall guard the full width of the landing entrance. All hoist way entrance bars and gates shall be painted with diagonal contrasting colors, such as black and yellow stripes
- 16.2. G.4. Bars shall be not less than 2- by 4-inch wooden bars or the equivalent, located 2 feet from the hoist way line. Bars shall be located not less than 36 inches nor more than 42 inches above the floor
- 16.2. G.5. Gates or bars protecting the entrances to hoist ways shall be equipped with a latching device



- 16.2. G.6. Overhead protective covering of 2-inch planking, 3/4-inch plywood, or other solid material of equivalent strength, shall be provided on the top of every material hoist cage or platform
- 16.2. G.7. The operator's station of a hoisting machine shall be provided with overhead protection equivalent to tight planking not less than 2 inches thick. The support for the overhead protection shall be of equal strength
- 16.2. G.8. Hoist towers may be used with or without an enclosure on all sides. However, whichever alternative is chosen, the following applicable conditions shall be met:
- When a hoist tower is enclosed, it shall be enclosed on all sides for its entire height with a screen enclosure of 1/2-inch mesh, No. 18 gauge wire or equivalent, except for landing access
  - When a hoist tower is not enclosed, the hoist platform or car shall be totally enclosed (caged) on all sides for the full height between the floor and the overhead protective covering with 1/2-inch mesh of No. 14 gauge wire or equivalent. The hoist platform enclosure shall include the required gates for loading and unloading. A 6-foot high enclosure shall be provided on the unused sides of the hoist tower at ground level
  - Car arresting devices shall be installed to function in case of rope failure
  - All material hoist towers shall be designed by a licensed professional engineer

#### 16.2. H. personnel Hoists

- 16.2. H.1. Hoist towers outside the structure shall be enclosed for the full height on the side or sides used for entrance and exit to the structure. At the lowest landing, the enclosure on the sides not used for exit or entrance to the structure shall be enclosed to a height of at least 10 feet. Other sides of the tower adjacent to floors or scaffold platforms shall be enclosed to a height of 10 feet above the level of such floors or scaffolds
- 16.2. H.2. Towers inside of structures shall be enclosed on all four sides throughout the full height
- 16.2. H.3. Towers shall be anchored to the structure at intervals not exceeding 25 feet. In addition to tie-ins, a series of guys shall be installed. Where tie-ins are not practical the tower shall be anchored by means of guys made of wire rope at least one-half inch in diameter, securely fastened to anchorage to ensure stability
- 16.2. H.4. Hoist way doors or gates shall be not less than 6 feet 6 inches high and shall be provided with mechanical locks which cannot be operated from the landing side, and shall be accessible only to persons on the car
- 16.2. H.5. Cars shall be permanently enclosed on all sides and the top, except sides used for entrance and exit which have car gates or doors
- 16.2. H.6. A door or gate shall be provided at each entrance to the car which shall protect the full width and height of the car entrance opening
- 16.2. H.7. Overhead protective covering of 2-inch planking, 3/4-inch plywood or other solid material or equivalent strength shall be provided on the top of every personnel hoist
- 16.2. H.8. Doors or gates shall be provided with electric contacts which do not allow movement of the hoist when door or gate is open
- 16.2. H.9. Safeties shall be capable of stopping and holding the car and rated load when traveling at governor tripping speed
- 16.2. H.10. Cars shall be provided with a capacity and data plate secured in a conspicuous place on the car or crosshead
- 16.2. H.11. Internal combustion engines shall not be permitted for direct drive
- 16.2. H.12. Normal and final terminal stopping devices shall be provided
- 16.2. H.13. An emergency stop switch shall be provided in the car and marked "Stop."
- 16.2. H.14. Ropes
- The minimum number of hoisting ropes used shall be three for traction hoists and two for drum-type hoists
  - The minimum diameter of hoisting and counterweight wire ropes shall be 1/2-inch



- 16.2. H.16. Following assembly and erection of hoists and before being put in service, an inspection and test of all functions and safety devices shall be made under the supervision of a competent person. A similar inspection and test is required following major alteration of an existing installation. All hoists shall be inspected and tested at not more than 3-month intervals. The employer shall prepare a certification record which includes the date the inspection and test of all functions and safety devices was performed; the signature of the person who performed the inspection and test; and a serial number, or other identifier, for the hoist that was inspected and tested. The most recent certification record shall be maintained on file
- 16.2. H.17. Personnel hoists used in bridge tower construction shall be approved by a registered professional engineer and erected under the supervision of a qualified engineer competent in this field
- 16.2. H.19. When a hoist tower is not enclosed, the hoist platform or car shall be totally enclosed (caged) on all sides for the full height between the floor and the overhead protective covering with 3/4- inch mesh of No. 14 gauge wire or equivalent. The hoist platform enclosure shall include the required gates for loading and unloading
- 16.2. H.20. These hoists shall be inspected and maintained on a weekly basis. Whenever the hoisting equipment is exposed to winds exceeding 50 Km per hour it shall be inspected and put in operable condition before reuse
- 16.2. H.21. Wire rope shall be taken out of service when any of the following conditions exist:
- In running ropes, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay
  - Wear of one-third the original diameter of outside individual wires. Kinking, crushing, bird caging or any other damage resulting in distortion of the rope structure
  - Evidence of any heat damage from any cause
  - Reductions from nominal diameter of more than three-sixty-fourths inch for diameters to and including three-fourths inch, one-sixteenth inch for diameters seven-eighths inch to 1 1/8 inches inclusive, three-thirty-seconds inch for diameters 1 1/4 to 1 1/2 inches inclusive
  - In standing ropes, more than two broken wires in one lay in sections beyond end connections or more than one broken wire at an end connection

#### 16.2. K. Conveyors

- 16.2. K.1. Means for stopping the motor or engine shall be provided at the operator's station. Conveyor systems shall be equipped with an audible warning signal to be sounded immediately before starting up the conveyor
- 16.2. K.2. If the operator's station is at a remote point, similar provisions for stopping the motor or engine shall be provided at the motor or engine location
- 16.2. K.3. Emergency stop switches shall be arranged so that the conveyor cannot be started again until the actuating stop switch has been reset to running or "on" position
- 16.2. K.4. Screw conveyors shall be guarded to prevent employee contact with turning flights
- 16.2. K.5. Where a conveyor passes over work areas, aisles, or thoroughfares, suitable guards shall be provided to protect employees required to work below the conveyors
- 16.2. K.6. All crossovers, aisles, and passageways shall be conspicuously marked by suitable signs
- 16.2. K.7. Conveyors shall be locked out or otherwise rendered inoperable, and tagged out with a "Do Not Operate" tag during repairs and when operation is hazardous to employees performing maintenance work

END OF SECTION 16

# 17. Motor vehicles, mechanized equipment, and marine operations

## 17. Motor Vehicles, Mechanized Equipment, and Marine Operations

- 17.1. All vehicles and equipment must be in safe working condition and meet all governmental regulations.
- 17.2. All vehicles and equipment in use shall be checked at the beginning of each shift 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: service brakes, including trailer brake connections; parking system (hand brake); emergency stopping system (brakes); tires; horn; steering mechanism; coupling devices; seat belts; operating controls; and safety devices. All defects shall be corrected before the vehicle is placed in service. These requirements also apply to equipment such as lights, reflectors, windshield wipers, defrosters, fire extinguishers, etc., where such equipment is necessary
- 17.3. All heavy equipment, earthmoving equipment, PIT's, aerial lifts, etc shall be equipped with a back up alarm distinguishable from the surrounding noise level

### 17.4. Equipment

- 17.4. A. All equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, shall have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, to identify the location of the equipment
- 17.4. B. All cab glass shall be safety glass, or equivalent, that introduces no visible distortion affecting the safe operation of any machine
- 17.4. C. All equipment covered by this subpart shall comply with the following requirements when working or being moved in the vicinity of power lines or energized transmitters, except where electrical distribution and transmission lines have been deenergized and visibly grounded at point of work or where insulating barriers, not a part of or an attachment to the equipment or machinery, have been erected to prevent physical contact with the lines:
  - 17.4. C.1. For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet
  - 17.4. C.2. For lines rated over 50 kV, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kV over 50 kV, or twice the length of the line insulator, but never less than 10 feet
  - 17.4. C.3. In transit with no load and boom lowered, the equipment clearance shall be a minimum of 4 feet for voltages less than 50 kV, and 10 feet for voltages over 50 kV, up to and including 345 kV, and 16 feet for voltages up to and including 750 kV
  - 17.4. C.4. A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means
  - 17.4. C.5. Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.

### 17.5. Motor Vehicles

- 17.5. A. Seat belts and anchorages shall be installed in all motor vehicles
- 17.5. B. All vehicles shall have a service brake system, an emergency brake system, and a parking brake system. These systems may use common components, and shall be maintained in operable condition

- 17.5. C. Whenever visibility conditions warrant additional light, all vehicles, or combinations of vehicles, in use shall be equipped with at least two headlights and two taillights in operable condition
- 17.5. D. All vehicles, or combination of vehicles, shall have brake lights in operable condition regardless of light conditions
- 17.5. E. No employer shall use any motor vehicle equipment having an obstructed view to the rear unless the vehicle has a reverse signal alarm audible above the surrounding noise level or when an observer signals that it is safe to do so
- 17.5. F. All haulage vehicles, whose pay load is loaded by means of cranes, power shovels, loaders, or similar equipment, shall have a cab shield and/or canopy adequate to protect the operator from shifting or falling materials
- 17.5. G. Vehicles used to transport employees shall have seats firmly secured and adequate for the number of employees to be carried and tools shall be secured when transported in the same compartment as employees
- 17.5. H. Mud flaps may be used in lieu of fenders whenever motor vehicle equipment is not designed for fenders

#### 17.6. Earthmoving Equipment

- 17.6. A. These rules apply to the following types of earthmoving equipment: scrapers, loaders, crawler or wheel tractors, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment.
- 17.6. B. Seat belts shall be provided on all equipment and used by the operator.
- 17.6. C. No employer shall move or cause to be moved construction equipment or vehicles upon any access roadway or grade unless the access roadway or grade is constructed and maintained to accommodate safely the movement of the equipment and vehicles involved
- 17.6. D. All bidirectional machines, such as rollers, compactors, front-end loaders, bulldozers, and similar equipment, shall be equipped with a back up alarm distinguishable from the surrounding noise level, which shall operate when the machine is moving in either direction.
- 17.6. E. No employer shall permit earthmoving or compacting equipment which has an obstructed view to the rear to be used in reverse gear unless the equipment has in operation a reverse signal alarm distinguishable from the surrounding noise level or an employee signals that it is safe to do so

#### 17.7. Powered Industrial Trucks (PIT)

- 17.7. A. Only trained and certified employees are allowed to operate PIT's
- 17.7. B. The operator must wear a seatbelt at all times
- 17.7. C. Lift trucks, stackers, etc., shall have the rated capacity clearly posted on the vehicle so as to be clearly visible to the operator. When auxiliary removable counterweights are provided by the manufacturer, corresponding alternate rated capacities also shall be clearly shown on the vehicle. These ratings shall not be exceeded
- 17.7. D. No modifications or additions which affect the capacity or safe operation of the equipment shall be made without the manufacturer's written approval. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly. In no case shall the original safety factor of the equipment be reduced
- 17.7. E. If a load is lifted by two or more trucks working in unison, the proportion of the total load carried by any one truck shall not exceed its capacity
- 17.7. F. Steering or spinner knobs shall not be attached to the steering wheel unless the steering mechanism is of a type that prevents road reactions from causing the steering hand wheel to spin. The steering knob shall be mounted within the periphery of the wheel
- 17.7. G. Unauthorized personnel shall not be permitted to ride on powered industrial trucks.

17.7. J.PIT's shall not be used as personnel platforms without expressed written consent of the KBE Safety Director

17.7. K.PIT's shall not be used when the operator's field of vision is obstructed, unless a spotter is used.

#### 17.8. Pile Driving Equipment

17.8. A. Overhead protection, which will not obscure the vision of the operator, shall be provided

17.8. C. A blocking device, capable of safely supporting the weight of the hammer, shall be provided for placement in the leads under the hammer at all times while employees are working under the hammer

17.8. D. Safety chains, or equivalent means, shall be provided for each hose connection to prevent the line from thrashing around in case the coupling becomes disconnected

17.8. E. All employees shall be kept clear when piling is being hoisted into the leads

17.8. F. When piles are being driven in an excavated pit, the walls of the pit shall be sloped to the angle of repose or sheet-piled and braced

17.8. G. When steel tube piles are being "blown out", employees shall be kept well beyond the range of falling materials

17.8. H. When it is necessary to cut off the tops of driven piles, pile driving operations shall be suspended except where the cutting operations are located at least twice the length of the longest pile from the driver

17.8. I. When driving jacked piles, all access pits shall be provided with ladders and bullheaded curbs to prevent material from falling into the pit

#### 17.9. Site Clearing Equipment

17.9. A. Employees engaged in site clearing shall be protected from hazards of irritant and toxic plants and suitably instructed in the first aid treatment available

17.9. C. All equipment used in site clearing operations shall be equipped with rollover guards and rider-operated equipment shall be equipped with an overhead and rear canopy guard

#### 17.10. Marine Operations and Equipment

17.10. A. Marine operations and equipment use cannot begin without expressed written consent by the KBE Safety Director

17.10. B. An Activity Hazard Analysis must be submitted and approved prior to the start any marine operation and equipment use

17.10. C. A pre-construction safety meeting must be held prior to the start of any marine operation and equipment use

END OF SECTION 17

# 18. Excavations

18.1. All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees

## 18.2. Underground Installations

18.2. A. The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation

18.2. B. Utility companies or owners shall be contacted within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation

18.2. C. When excavation operations approach the estimated location of underground installations; the exact location of the installations shall be determined by safe and acceptable means

18.2. D. While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees

## 18.3. Access, Egress, and Overhead Protection

18.3. A. Means of egress from trench excavations. A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees

18.3. B. Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design

18.3. C. Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflective or high-visibility material

18.3. D. No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped with overhead protection

18.3. E. When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation

18.3. F. Walkways shall be provided where employees or equipment are required or permitted to cross over excavations. Guardrails shall be provided where walkways are 6 feet or more above lower levels.

#### 18.4. Hazardous Atmospheres

18.4. A. To prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply:

- The atmospheres in excavations shall be tested by the employer before employees enter excavations greater than 4 feet in depth and whenever there is the possibility of a hazardous atmosphere exists or could reasonably be expected to exist, such as landfills and areas where hazardous materials are stored nearby.

- Adequate precautions shall be taken to prevent employee from exposure to oxygen deficiency

(Atmospheres containing less than 19.5 percent oxygen)

- Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas
- When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe

#### 18.5. Emergency Rescue Equipment

18.5. A. Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use

18.5. B. Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation

#### 18.6. Protection from hazards associated with water accumulation

18.6. A. Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline

18.6. B. If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation

18.6. C. If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person prior to being occupied

#### 18.7. Stability of adjacent structures

18.7. A. Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees

18.7. B. Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:

18.7. B.1. A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or

18.7. B.2. The excavation is in stable rock; or

18.7. B.3. A registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or

18.7. B.4. A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees

18.7. C.Sidewalks, pavements and appurtenant structure shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures

#### 18.8. Protection of employees from loose rock or soil

18.8. A.Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection

18.8. B. Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary

#### 18.9. Inspections

18.9. A.Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated

#### 18.10. Protection of employees in excavations

18.10. A.Each employee in an excavation shall be protected from cave-ins by an adequate protective system except when:

- Each employee in an excavation shall be protected from cave-ins by an adequate protective system, or
- Excavations are less than 5 feet in depth and examination of the ground by a competent person provides no indication of a potential cave-in

18.10. B.Protective systems shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system

#### 18.11. Sloping and Benching

18.11. A.Design of sloping and benching systems. The slopes and configurations of sloping and benching systems shall be selected and constructed by the employer or his designee and shall be in accordance with the following:

- Stable Rock = Vertical (90°)
- Type A Soil = ¾: 1 (53°)
- Type B Soil = 1:1 (45°)
- Type C Soil = 1 ½: 1 (34°)

18.11. B. Soil type is assumed to be Type C unless the following criteria are met:

18.11. B.2.The use of tabulated data which identifies the registered professional engineer, who approved the data, shall be approved by KBE, and maintained at the jobsite during construction of the protective system;

8.11. B.3. As designed by a registered professional engineer

#### 18.12. Support Systems, Shield Systems, and other Protective Systems

18.12. A.Designs of support systems, shield systems, and other protective systems shall be selected and constructed by the employer or his designee and shall be in accordance with:



- 18.12. A.1.Designs Using Manufacturer's Tabulated Data; or
- 18.12. A.2.Design by a registered professional engineer

18.12. B. Material and Equipment

- 18.12. B.1.Materials and equipment used for protective systems shall be free from damage or defects that might impair their proper function
- 18.12. B.2.Manufactured materials and equipment used for protective systems shall be used and Maintained in a manner that is consistent with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards
- 18.12. B.3.When material or equipment that is used for protective systems is damaged, a competent person shall examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from Service, and shall be evaluated and approved by a registered professional engineer before being returned to service.

18.12. C. Installation and Removal of Support

- 18.12. C.1.Members of support systems shall be securely connected together to prevent sliding, falling, kick outs, or other predictable failure
- 18.12. C.2.Support systems shall be installed and removed in a manner that protects employees from cave- ins, structural collapses, or from being struck by members of the support system
- 18.12. C.3.Individual members of support systems or shields shall not be subjected to loads exceeding those which those members were designed to withstand
- 18.12. C.4.Before temporary removal of individual members begins; additional precautions shall be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system
- 18.12. C.5.Removal shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation
- 18.12. C.6.Backfilling shall progress together with the removal of support systems from excavations
- 18.12. C.7.Excavation of material to a level no greater than 2 feet below the bottom of the members of a support system or shield shall be permitted, but only if the system is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system
- 18.12. C.8.Installation of a support system shall be closely coordinated with the excavation of trenches
- 18.12. C.9.Sloping and benching systems. Employees shall not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment
- 18.12. C.10.Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads
- 18.12. C.11.Employees shall be protected from the hazard of cave-ins when entering or exiting the areas protected by shields
- 18.12. C.12.Employees shall not be allowed in shields when shields are being installed, removed, or moved vertically

END OF SECTION 18



# 19. Concrete and masonry construction

## 19. Concrete and Masonry Construction

### 19.1. General Requirements

19.1. A. No construction loads shall be placed on a concrete structure or portion of a concrete structure unless the employer determines, based on information received from a person who is qualified in structural design, that the structure or portion of the structure is capable of supporting the loads

19.1. B. All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the hazard of impalement

19.1. C. Post-tensioning operations

- 19.1. C.1. No employee (except those essential to the post-tensioning operations) shall be permitted to be behind the jack during tensioning operations
- 19.1. C.2. Signs and barriers shall be erected to limit employee access to the post-tensioning area during tensioning operations

19.1. D. Concrete Buckets

- 19.1. D.1. No employee shall be permitted to ride concrete buckets
- 19.1. D.2. Elevated concrete buckets shall be routed so that no employee, except those immediately involved in the work, are exposed to the hazards associated with falling concrete buckets

19.1. E. No employee shall be permitted to apply a cement, sand, and water mixture through a pneumatic hose unless the employee is wearing protective head and face equipment

### 19.2. Equipment

19.2. A. Concrete mixers with one cubic yard or larger loading skips shall be equipped with the following

- 19.2. A.1. A mechanical device to clear the skip of materials; and
- 19.2. A.2. Guardrails installed on each side of the skip

19.2. B. Powered and rotating type concrete troweling machines that are manually guided shall be equipped with a control switch that will automatically shut off the power whenever the hands of the operator are removed from the equipment handles

19.2. C. Concrete buggy handles shall not extend beyond the wheels on either side of the buggy

19.2. D. Concrete pumping systems

- 19.2. D.1. Concrete pumping systems using discharge pipes shall be provided with pipe supports designed for 100 percent overload
- 19.2. D.2. Compressed air hoses used on concrete pumping system shall be provided with positive fail-safe joint connectors to prevent separation of sections when pressurized

19.2. E. Concrete buckets

19.2. E.1. Concrete buckets equipped with hydraulic or pneumatic gates shall have positive safety latches or similar safety devices installed to prevent premature or accidental dumping

19.2. E.2. Concrete buckets shall be designed to prevent concrete from hanging up on top and the sides

19.2. F. Sections of termite and similar concrete conveyances shall be secured with wire rope (or equivalent materials) in addition to the regular couplings or connections.

19.2. G. Bull float handles used where they might contact energized electrical conductors, shall be constructed of nonconductive material or insulated with a nonconductive sheath that's electrical and mechanical characteristics provide the equivalent protection of a handle constructed of nonconductive material

## 19.2. H. Masonry Saws

- 19.2. H.1. Shall not be used without the use of water to control dust
- 19.2. H.2. Shall never be left on while unattended
- 19.2. H.3. shall be guarded with a semicircular enclosure over the blade
- 19.2. H.4. A method for retaining blade fragments shall be incorporated in the design of the semicircular enclosure

## 19.3. Cast-In-Place Concrete

19.3. A. Formwork shall be designed, fabricated, erected, and supported, braced and maintained so that it will be capable of supporting without failure all vertical and lateral loads that may reasonably be anticipated to be applied to the formwork. Formwork which is designed, fabricated, erected, supported, braced and maintained.

19.3. B. Drawings or plans, including all revisions, for the jack layout, formwork (including shoring equipment), working decks, and scaffolds, shall be available at the jobsite

### 19.3. C. Shoring and reshoring

- 19.3. C.1. All Shoring equipment (including equipment used in reshoring operations) shall be inspected prior to erection to determine that the equipment meets the requirements specified in the formwork drawings
- 19.3. C.2. Shoring equipment found to be damaged shall not be used for shoring
- 19.3. C.3. Erected shoring equipment shall be inspected immediately prior to, during, and immediately after concrete placement
- 19.3. C.4. Shoring equipment that is found to be damaged or weakened after erection shall be immediately reinforced
- 19.3. C.5. The sills for shoring shall be sound, rigid, and capable of carrying the maximum intended load
- 19.3. C.6. All base plates, shore heads, extension devices, and adjustment screws shall be in firm contact, and secured when necessary, with the foundation and the form

19.3. C.7. Whenever single post shores are used one on top of another (tiered) the subcontractor responsible shall have the shoring designed by a professional engineer.

### 19.3. D. Vertical Slip Forms

- 19.3. D.1. No persons shall be allowed to work with vertical slip forms without written consent by the KBE Safety Director
- 19.3. D.2. An Activity Hazard Analysis must be submitted and approved prior to the start of any concrete work with vertical slip forms
- 19.3. D.3. A pre-construction safety meeting must be held prior to the start of any concrete work with vertical slip forms

### 19.3. E. Reinforcing steel

- 19.3. E.1. Reinforcing steel for walls, piers, columns, and similar vertical structures shall be adequately supported to prevent overturning and to prevent collapse
- 19.3. E.2. Subcontractors shall take measures to prevent unrolled wire mesh from recoiling. Such measures may include, but are not limited to, securing each end of the roll or turning over the roll

#### 19.3. F. Removal of formwork

19.3. F.1. Forms and shores (except those used for slabs on grade and slip forms) shall not be removed until the employer determines that the concrete has gained sufficient strength to support its weight and superimposed loads. Such determination shall be based on compliance with one of the following:

- 19.3. F.1.1. The plans and specifications stipulate conditions for removal of forms and shores, and such conditions have been followed, or
- 19.3. F.1.2. The concrete has been properly tested with an appropriate standard test method designed to indicate the concrete compressive strength, and the test results indicate that the concrete has gained sufficient strength to support its weight and superimposed loads

19.3. F.2. Reshoring shall not be removed until the concrete being supported has attained adequate strength to support its weight and all loads in place upon it

#### 19.4. Precast Concrete

19.4. A. Precast concrete wall units, structural framing, and tilt-up wall panels shall be adequately supported to prevent overturning and to prevent collapse until permanent connections are completed

19.4. B. Lifting inserts which are embedded or otherwise attached to tilt-up precast concrete members shall be capable of supporting at least two times the maximum intended load applied or transmitted to them

19.4. C. Lifting inserts which are embedded or otherwise attached to precast concrete members, other than the tilt-up members, shall be capable of supporting at least four times the maximum intended load applied or transmitted to them

19.4. D. Lifting hardware shall be capable of supporting at least five times the maximum intended load applied transmitted to the lifting hardware

19.4. E. No employee shall be permitted under precast concrete members being lifted or tilted into position except those employees required for the erection of those members

#### 19.5. Lift-Slab Operations

19.5. B. Lift-slab operations shall be designed and planned by a registered professional engineer who has experience in lift-slab construction.

19.5. C. No persons shall be allowed to perform lift-slab operations without expressed written consent by the KBE Safety Director

19.5. D. An Activity Hazard Analysis must be submitted and approved prior to the start of any lift-slab operation

19.5. E. A pre-construction safety meeting must be held prior to the start of any lift slab operation

#### 19.6. Masonry

19.6. A. A limited access zone shall be established whenever a masonry wall is being constructed. The limited access zone shall conform to the following:

- 19.6. A.1. The limited access zone shall be established prior to the start of construction of the wall
- 19.6. A.2. The limited access zone shall be equal to the height of the wall to reconstructed plus four feet, and shall run the entire length of the wall
- 19.6. A.3. The limited access zone shall be established on the side of the wall which will be unscaffolded
- 19.6. A.4. The limited access zone shall be restricted to entry by employees actively engaged in constructing the wall. No other employees shall be permitted to enter the zone
- 19.6. A.5. For masonry walls 8' or less, the limited access zone shall remain in place until the wall is adequately supported to prevent overturning and to prevent collapse

- 19.6. A.6. All masonry walls over 8' in height shall be adequately braced to prevent overturning and to prevent collapse unless the wall is adequately supported so that it will not overturn or collapse. The bracing shall remain in place until permanent supporting elements of the structure are in place

END OF SECTION

19

## 20. Steel erection

### 20. Steel Erection

#### 20.1. Training

20.1. B. Training required by this section shall be provided by a qualified person

20.1. C. The employer shall train each employee exposed to a fall hazard in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.

20.1. D. At a minimum the training must include:

- The recognition and identification of fall hazards in the work area
- 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
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used
- The procedures to be followed to prevent falls to lower levels and through or into holes and openings in walking/working surfaces and walls; and

20.1. E. In addition to the training required above, the employer shall provide special training to employees engaged in the following activities:

20.1. E.1. The employer shall ensure that each employee who performs multiple lift rigging has been provided training in the following areas:

- The nature of the hazards associated with multiple lifts; and

20.1. E.2. The employer shall ensure that each connector has been provided training in the following areas:

- The nature of the hazards associated with connecting; and

20.1. E.3. Where Controlled Decking Zones are being used; the employer shall assure that each employee has been provided training in the following areas:

- The nature of the hazards associated with work within a controlled decking zone;

#### 20.2. Approval to begin steel erection

20.2. A. Before authorizing the commencement of steel erection, the controlling contractor shall ensure that the steel erector provided with the following written notifications:

20.2. A.1. 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 standard test method of field-cured samples, either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection

20.2. A.2. Any anchor rods (anchor bolts) that have been repaired, replaced or field-modified with the approval of the project structural engineer of record

#### 20.3. Commencement of steel erection

20.3. A. A steel erection contractor shall not erect steel unless it has received written notification from the controlling contractor stating that:

20.3. A.1. 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 standard test method of field-cured samples, either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection; and

20.3. A.2. Any anchor rods (anchor bolts) that have been repaired, replaced or field-modified with the approval of the project structural engineer of record

#### 20.4. Site layout

20.4. A. The controlling contractor shall ensure that the following is provided and maintained:

20.4.A.1. 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

20.4. A.2. 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

#### 20.5. Pre-planning of overhead hoisting operations

20.5. A. All hoisting operations in steel erection shall be pre-planned to ensure that hoisting and rigging requirements, as stated below, are met

#### 20.7. Fall Protection

20.7.A. Except for connectors, whose requirements are stated below, each employee engaged in a steel erection activity who is on a walking/working surface with an unprotected side or edge more than 15 feet 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

20.7. B. 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

20.7. C. Connectors and employees working in controlled decking zones shall be protected from fall hazards stated below

##### 20.7. D. Connectors

20.7. D.1. Each connector shall:

- Be protected as stated above from fall hazards of more than two stories or 30 feet above a lower level, whichever is less
- Have completed Subpart R training
- Be provided, at heights over 15 and up to 30 feet 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 protected from fall hazards by guardrail systems or safety net systems

##### 20.7. E. Controlled Decking Zone (CDZ)

20.7. E.1. A controlled decking zone may be established in that area of the structure over 15 and up to 30 feet above a lower level where metal decking is initially being installed and forms the leading edge of a work area. In each CDZ, the following shall apply:

- Each employee working at the leading edge in a CDZ shall be protected from fall hazards of more than two stories or 30 feet, whichever is less
- Access to a CDZ shall be limited to only those employees engaged in leading edge work
- The boundaries of a CDZ shall be designated and clearly marked. The CDZ shall not be more than 90 feet wide and 90 feet deep from any leading edge. The CDZ shall be marked by the use of control lines or the equivalent.
- Each employee working in a CDZ shall have completed CDZ training
- Unsecured decking in a CDZ shall not exceed 3,000 square feet
- Safety deck attachments shall be performed in the CDZ from the leading edge back to the control line and shall have at least two attachments for each metal decking panel
- Final deck attachments and installation of shear connectors shall not be performed in the CDZ

#### 20.7. F. Custody of fall protection

20.7. F.1. 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:

- Has directed the steel erector to leave the fall protection in place; and
- Has inspected and accepted control and responsibility of the fall protection prior to authorizing persons other than steel erectors to work in the area

#### 20.8. Crane Inspection

20.8. A. Cranes being used in steel erection activities shall be visually inspected prior to each shift by a competent person; the inspection shall include observation for deficiencies during operation. This inspection shall meet the manufacturer's requirements.

20.8. 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

20.8. C. A KBE Crane Use Permit must be completed by the operator and executed by KBE personnel at least on a daily basis and whenever the load or location changes.

#### 20.9. Rigging

20.9. A. A qualified rigger (a rigger who is also a qualified person) shall inspect the rigging prior to each shift.

20.9. B. The headache ball, hook or load shall not be used to transport personnel except when the crane or derrick is used to hoist employees on a personnel platform when work under the Subpart R is being conducted and:

- With expressed written consent by the KBE Safety Director; and
- An Activity Hazard Analysis must be submitted and approved prior to the start of work; and
- A pre-construction safety meeting must be held prior to the start of work

20.9. C. Safety latches on hooks shall not be deactivated or made inoperable

#### 20.10. Falling Object Protection

20.10. A. All materials, equipment, and tools, which are not in use while aloft, shall be secured against accidental displacement.

20.10. B. The controlling contractor shall bar other construction processes below steel erection unless overhead protection for the employees below is provided

#### 20.11. Working under Loads

20.11. A. Routes for suspended loads shall be pre-planned to ensure that no employee is required to work directly below a suspended load except for:

- Employees engaged in the initial connection of the steel; or
- Employees necessary for the hooking or unhooking of the load

20.11. B. When working under suspended loads, the following criteria shall be met:

20.11. B.1. Materials being hoisted shall be rigged to prevent unintentional displacement

20.11. B.2. Hooks with self-closing safety latches or their equivalent shall be used to prevent components from slipping out of the hook;

20.11. B.3. All loads shall be rigged by a qualified rigger

## 20.12. Multiple Lift Rigging Procedures

20.12. A. A multiple lift shall only be performed if the following criteria are met:

20.12. A.1. A multiple lift rigging assembly is used;

20.12. A.2. A maximum of five members are hoisted per lift;

20.12. A.3. Only beams and similar structural members are lifted; and

20.12. A.5. No crane is permitted to be used for a multiple lift where such use is contrary to the manufacturer's specifications and limitations

20.12. B. Components of the multiple lift rigging assembly shall be specifically designed and assembled with a maximum capacity for total assembly and for each individual attachment point. This capacity, certified

By the manufacturer or a qualified rigger, shall be based on the manufacturer's specifications with a 5 to 1 safety factor for all components

20.12. C. The total load shall not exceed:

20.12. C.1. The rated capacity of the hoisting equipment specified in the hoisting equipment load charts

20.12. C.2. The rigging capacity specified in the rigging rating chart

20.12. D. The multiple lift rigging assembly shall be rigged with members:

- Attached at their center of gravity and maintained reasonably level;
- Rigged from top down; and
- Rigged at least 7 feet apart

20.12. E. The members on the multiple lift rigging assembly shall be set from the bottom up

20.12. F. Controlled load lowering shall be used whenever the load is over the connectors

## 20.13. Structural Steel Assembly

20.13. A. Structural stability shall be maintained at all times during the erection process

20.13. B. The following additional requirements shall apply for multi-story structures:

20.13. B.1. The permanent floors shall be installed as the erection of structural member's progresses, and there shall be not more than eight stories between the erection floor and the upper-most permanent floor, except where the structural integrity is maintained as a result of the design

20.13. B.2. At no time shall there be more than four floors or 48 feet, 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

20.13. B.3. A fully planked or decked floor or nets shall be maintained within two stories or 30 feet, whichever is less, directly under any erection work being performed

20.13. C. Walking/ Working Surfaces

20.13. C.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

20.13. C.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. Shear connector shall not be installed from within a controlled decking zone (CDZ)



#### 20.13. D. Plumbing-Up

- 20.13. D.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
- 20.13. D.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
- 20.13. D.3. Plumbing-up equipment shall be removed only with the approval of a competent person.

#### 20.13. E. Metal Decking

##### 20.13. E.1. Hoisting, landing and placing of metal decking bundles

- 20.13. E.1.1. Bundle packaging and strapping shall not be used for hoisting unless specifically designed for that purpose
- 20.13. E.1.2. 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
- 20.13. E.1.4. 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
- 20.13. E.1.5. At the end of the shift or when environmental or jobsite conditions require, metal decking shall be secured against displacement

##### 20.13. E.2. Metal decking Roof and Floor Holes and Openings

- 20.13. E.2.1. Framed metal deck openings shall have structural members turned down to allow continuous deck installation except where not allowed by structural design constraints or constructability
- 20.13. E.2.2. 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 (such as elevator shafts, stair wells, etc.) employees shall be protected in accordance with the open web steel joist section below
- 20.13. E.2.3. 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 which meets the strength requirements of openings found below, or shall be immediately covered

##### 20.13. E.3. Covering Roof and Floor Openings

- 20.13. E.3.1. 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
- 20.13. E.3.2. All covers shall be secured when installed to prevent accidental displacement by the wind, equipment or employees
- 20.13. E.3.3. 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
- 20.13. E.3.4. 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 stated above
- 20.13. E.3.5. 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

##### 20.13. E.4. Installation of Metal Decking

- 20.13. E.4.1. Metal decking shall be laid tightly and immediately secured upon placement to prevent accidental movement or displacement
- 20.13. E.4.2. During initial placement, metal decking panels shall be placed to ensure full support by structural members

20.13. E.4.3. A derrick floor shall be fully decked and/or planked and the steel member connections completed to support the intended floor loading

20.13. E.4.4. 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

#### 20.14. Column Anchorage

20.14. A. All columns shall be anchored by a minimum of 4 anchor rods (anchor bolts)

20.14. B. 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 150 Kgs located 18 inches from the extreme outer face of the column in each direction at the top of the column shaft

20.14. C. Columns shall be set on level finished floors, pre-grouted leveling plates, leveling nuts, or shim packs which are adequate to transfer the construction loads

20.14. D. All columns shall be evaluated by a competent person to determine whether guying or bracing is needed; if guying or bracing is needed, it shall be installed

#### 20.15. Beams and Columns

20.15. 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 when used as diagonal bracing as stated below

20.15. 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

20.15. C. 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

20.15. D. 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.

20.15. E. 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

20.15. F. Each column splice shall be designed to resist a minimum eccentric gravity load of 300 pounds located 18 inches from the extreme outer face of the column in each direction at the top of the column shaft

20.15. G. The perimeter columns must extend a minimum of 48 inches above the finished floor to permit installation of perimeter safety cables prior to erection of the next tier, except where constructability does not allow.

20.15. H. The perimeter columns must have holes or other devices in or attached to perimeter columns at 42-45 inches above the finished floor and the midpoint between the finished floor and the top cable to permit installation of perimeter safety cables, except where constructability does not allow.

#### 20.16. Open Web Steel Joists

20.16. A. Except as provided 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:

- 20.16. A.1. A vertical stabilizer plate shall be provided on each column for steel joists. The plate shall be a minimum of 6 inch by 6 inch and shall extend at least 3 inches below the bottom chord of the joist with a 13/16 inch hole to provide an attachment point for guying or plumbing cables
- 20.16. A.2. The bottom chords of steel joists at columns shall be stabilized to prevent rotation during erection
- 20.16. A.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
- 20.16. B. Where constructability does not allow a steel joist to be installed at the column an alternate means of stabilizing joists shall be installed on both sides near the column and shall:
  - 20.16. B.1. Provide stability equivalent to the requirement stated above
  - 20.16. B.2. Be designed by a qualified person
  - 20.16. B.3. Be shop installed; and
  - 20.16. B.4. Be included in the erection drawings
- 20.16. C. Hoisting cables shall not be released until the seat at each end of the steel joist is field-bolted and the joist is stabilized
- 20.16. D. Where steel joists at or near columns span 60 feet 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
- 20.16. E. A steel joist or steel joist girder shall not be placed on any support structure unless such structure is stabilized
- 20.16. F. When steel joist(s) are landed on a structure, they shall be secured to prevent unintentional displacement prior to installation
- 20.16. 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
- 20.16. H. Field-Bolted Joists
  - 20.16. H.1. Except for steel joists that have been pre-assembled into panels, connections of individual steel joists to steel structures in bays of 40 feet or more shall be fabricated to allow for field bolting during erection
  - 20.16. H.2. These connections shall be field-bolted unless constructability does not allow
  - 20.16. H.3. 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
  - 20.16. H.4. A bridging terminus point shall be established before bridging is installed.
- 20.16. I. Attachment of Steel Joists and Steel Joist Girders
  - 20.16. I.1. Each end of "K" series steel joists shall be attached to the support structure with a minimum of two 1/8-inch (3 mm) fillet welds 1 inch long or with two 1/2-inch (13 mm) bolts, or the equivalent
  - 20.16. I.2. Each end of "LH" and "DLH" series steel joists and steel joist girders shall be attached to the support structure with a minimum of two 1/4-inch fillet welds 2 inches long, or with two 3/4-inch bolts, or the equivalent
  - 20.16. I.3. Except as stated 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
  - 20.16. I.4. 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
- 20.16. J. Erection of Steel Joists
  - 20.16. J.1. Both sides of the seat of one end of each steel joist that requires bridging under Tables A and B shall be attached to the support structure before hoisting cables are released
  - 20.16. J.2. For joists over 60 feet, both ends of the joist shall be attached as required and all provisions are met before the hoisting cables are released
  - 20.16. J.3. On steel joists that do not require erection bridging, only one employee shall be allowed on the joist until all bridging is installed and anchored

20.16. J.5. When permanent bridging terminus points cannot be used during erection, additional temporary bridging terminus points are required to provide stability. See

#### 20.16. K. Erection Bridging

20.16. K.1. Where the span of the steel joist is equal to or greater than 40' the span the following shall apply:

- A row of bolted diagonal erection bridging shall be installed near the midspan of the steel joist
- Hoisting cables shall not be released until this bolted diagonal erection bridging is installed and anchored; and
- No more than one employee shall be allowed on these spans until all other bridging is installed and anchored

20.16. K.2. Where the span of the steel joist is over 60 feet through 100 feet, the following shall apply:

- All rows of bridging shall be bolted diagonal bridging
- Two rows of bolted diagonal erection bridging shall be installed near the third points of the steel joist
- Hoisting cables shall not be released until this bolted diagonal erection bridging is installed and anchored; and
- No more than two employees shall be allowed on these spans until all other bridging is installed and anchored

20.16. K.3. Where the span of the steel joist is over 100 feet through 144 feet, the following shall apply

- All rows of bridging shall be bolted diagonal bridging
- Hoisting cables shall not be released until all bridging is installed and anchored; and
- No more than two employees shall be allowed on these spans until all bridging is installed and anchored

20.16. K.4. Where any steel joist that spans more than 60' 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

20.16. K.5. When bolted diagonal erection bridging is required by this section, the following shall apply:

20.16. K.5.1. The bridging shall be indicated on the erection drawing

20.16. K.5.2. The erection drawing shall be the exclusive indicator of the proper placement of this bridging

20.16. K.5.3. Shop-installed bridging clips, or functional equivalents, shall be used where the bridging bolts to the steel joists

20.16. K.5.4. 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

20.16. K.5.5. Bridging attachments shall not protrude above the top chord of the steel joist

#### 20.16. L. Landing and Placing Loads

20.16. L.1. 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

20.16. L.2. Except as stated below, no construction loads are allowed on the steel joists until all bridging is installed and anchored and all joist-bearing ends are attached

20.16. L.3. The weight of a bundle of joist bridging shall not exceed a total of 1,000 pounds. 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 foot of the secured end

20.16. L.4. 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:

- 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
- The bundle of decking is placed on a minimum of three steel joists
- The joists supporting the bundle of decking are attached at both ends

- At least one row of bridging is installed and anchored
- The total weight of the bundle of decking does not exceed 4,000 pounds; and
- Placement of the bundle of decking shall be in accordance as previously stated
- The edge of the construction load shall be placed within 1 foot of the bearing surface of the joist end

#### 20.17. Systems-Engineered Metal Buildings

- 20.17. B. Each structural column shall be anchored by a minimum of four anchor rods (anchor bolts)
- 20.17. C. Rigid frames shall have 50 percent 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
- 20.17. D. Construction loads shall not be placed on any structural steel framework unless such framework is safely bolted, welded or otherwise adequately secured
- 20.17. E. 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
- 20.17. F. Both ends of all steel joists or cold-formed joists shall be fully bolted and/or welded to the support structure before:
- 20.17. F.1. Releasing the hoisting cables
  - 20.17. F.2. Allowing an employee on the joists; or
  - 20.17. F.3. Allowing any construction loads on the joists
- 20.17. G. 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
- 20.17. H. 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
- 20.17. I. Construction loads may be placed only within a zone that is within 8 feet of the center-line of the primary support member

END OF SECTION 20

## 21. Underground construction, caissons, cofferdams, and compressed Air Environments

### 21. Underground Construction, Caissons, Cofferdams, and Compressed Air Environments

21.1. Prior to the start of work on or in any underground construction (underground tunnels, shafts, chambers, and passageways), caissons, cofferdams, and compressed air environments the following must take place

21.1. A. Expressed written consent by the KBE Safety Director must be received

21.1. B. An Activity Hazard Analysis must be submitted and approved

21.1. C. A pre-construction safety meeting must be held

END OF SECTION 21

# 22. Demolition

## 22.1. Preparatory Operations

- 22.1. A. Prior to permitting employees to start demolition operations, an engineering survey shall be made, by a competent person, of the structure to determine the condition of the framing, floors, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked. The employer shall have in writing evidence that such a survey has been performed
- 22.1. B. When employees are required to work within a structure to be demolished which has been damaged by fire, flood, explosion, or other cause, the walls or floor shall be shored or braced
- 22.1. C. All electric, gas, water, steam, sewer, and other service lines shall be shut off, capped, or otherwise controlled, outside the building line before demolition work is started. In each case, any utility company which is involved shall be notified in advance
- 22.1. D. If it is necessary to maintain any power, water or other utilities during demolition, such lines shall be temporarily relocated, as necessary, and protected
- 22.1. E. It shall also be determined if any type of hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous substances have been used in any pipes, tanks, or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started
- 22.1. F. Where a hazard exists from fragmentation of glass, such hazards shall be removed
- 22.1. G. Where a hazard exists to employees falling through wall openings, the opening shall be protected to a height of approximately 42 inches
- 22.1. H. When debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped shall be completely enclosed with barricades not less than 42 inches high and not less than 6 feet back from the projected edge of the opening above. Signs, warning of the hazard of falling materials, shall be posted at each level. Removal shall not be permitted in this lower area until debris handling ceases above
- 22.1.I. All floor openings, not used as material drops, shall be covered over with material substantial enough to support the weight of any load which may be imposed. Such material shall be properly secured to prevent its accidental movement
- 22.1.J. Except for the cutting of holes in floors for chutes, holes through which to drop materials, preparation of storage space, and similar necessary preparatory work, the demolition of exterior walls and floor construction shall begin at the top of the structure and proceed downward. Each story of exterior wall and floor construction shall be removed and dropped into the storage space before commencing the removal of exterior walls and floors in the story next below
- 22.1. K. Employee entrances to multistory structures being demolished shall be completely protected by sidewalk sheds or canopies, or both, providing protection from the face of the building for a minimum of 8 feet. All such canopies shall be at least 2 feet wider than the building entrances or openings (1 foot wider on each side thereof), and shall be capable of sustaining a load of 75 Kgs per square foot

## 22.2. Stairs, passageways, and ladders

- 22.2. A. Only those stairways, passageways, and ladders, designated as means of access to the structure of a building, shall be used. Other access ways shall be entirely closed at all times
- 22.2. B. All stairs, passageways, ladders and incidental equipment thereto, which are covered by this section, shall be periodically inspected and maintained in a clean safe condition
- 22.2. C. In a multistory building, when a stairwell is being used, it shall be properly illuminated by either natural or artificial means, and completely and substantially covered over at a point not less than two floors below the floor on which work is being performed, and access to the floor where the work is in progress shall be through a properly lighted, protected, and separate passageway

## 22.3. Chutes

- 22.3. A. No material shall be dropped to any point lying outside the exterior walls of the structure unless the area is effectively protected
- 22.3. B. All materials chutes or sections thereof, at an angle of more than 45 deg. from the horizontal, shall be entirely enclosed,

except for openings equipped with closures at or about floor level for the insertion of materials. The openings shall not exceed 48 inches in height measured along the wall of the chute. At all stories below the top floor, such openings shall be kept closed when not in use

22.3. C. A substantial gate shall be installed in each chute at or near the discharge end. A competent employee shall be assigned to control the operation of the gate, and the backing and loading of trucks

22.3. D. When operations are not in progress, the area surrounding the discharge end of a chute shall be securely closed off

22.3. E. Any chute opening, into which workmen dump debris, shall be protected by a substantial guardrail approximately 42 inches above the floor or other surface on which the men stand to dump the material. Any space between the chute and the edge of openings in the floors through which it passes shall be solidly covered over

22.3. F. Where the material is dumped from mechanical equipment or wheelbarrows, a securely attached toeboard or bumper, not less than 4 inches thick and 6 inches high, shall be provided at each chute opening

22.3. G. Chutes shall be designed and constructed of such strength as to eliminate failure due to impact of materials or debris loaded therein

#### 22.4. Removal of Materials Through Floor Openings

22.4. A. Any openings cut in a floor for the disposal of materials shall be no larger in size than 25 percent of the aggregate of the total floor area, unless the lateral supports of the removed flooring remain in place. Floors weakened or otherwise made unsafe by demolition operations shall be shored to carry safely the intended imposed load from demolition operations

#### 22.5. Removal of walls, masonry sections, and chimneys

22.5. A. Masonry walls, or other sections of masonry, shall not be permitted to fall upon the floors of the building in such masses as to exceed the safe carrying capacities of the floors

22.5. B. No wall section, which is more than one story in height, shall be permitted to stand alone without lateral bracing, unless such wall was originally designed and constructed to stand without such lateral support, and is in a condition safe enough to be self-supporting. All walls shall be left in a stable condition at the end of each shift

22.5. C. Employees shall not be permitted to work on the top of a wall when weather conditions constitute a hazard

22.5. D. Structural or load-supporting members on any floor shall not be cut or removed until all stories above such a floor have been demolished and removed. This provision shall not prohibit the cutting of floor beams for the disposal of materials or for the installation of equipment.

22.5. E. Floor openings within 10 feet of any wall being demolished shall be planked solid, except when employees are kept out of the area below

22.5. F. In buildings of "skeleton-steel" construction, the steel framing may be left in place during the demolition of masonry. Where this is done, all steel beams, girders, and similar structural supports shall be cleared

of all loose material as the masonry demolition progresses downward

22.5. G. Walkways or ladders shall be provided to enable employees to safely reach or leave any scaffold or wall

22.5. H. Walls, which serve as retaining walls to support earth or adjoining structures, shall not be demolished until such earth has been properly braced or adjoining structures have been properly underpinned

22.5. I. Walls, which are to serve as retaining walls against which debris will be piled, shall not be so used unless capable of safely supporting the imposed load

#### 22.6. Manual Removal of Floors

22.6. A. Openings cut in a floor shall extend the full span of the arch between supports

22.6. B. Before demolishing any floor arch, debris and other material shall be removed from such arch and other adjacent floor area. Planks not less than 2 inches by 10 inches in cross section, full size undressed, shall be provided for, and shall be used by



employees to stand on while breaking down floor arches between beams. Such planks shall be so located as to provide a safe support for the workmen should the arch between the beams collapse. The open space between planks shall not exceed 16 inches

22.6.C.Safe walkways, not less than 18 inches wide, formed of planks not less than 2 inches thick if wood, or of equivalent strength if metal, shall be provided and used by workmen when necessary to enable them to reach any point without walking upon exposed beams

22.6. D. Stringers of ample strength shall be installed to support the flooring planks, and the ends of such stringers shall be supported by floor beams or girders, and not by floor arches alone

22.6. E.Planks shall be laid together over solid bearings with the ends overlapping at least 1 foot

22.6. F. When floor arches are being removed, employees shall not be allowed in the area directly underneath, and such an area shall be barricaded to prevent access to it

22.6. G.Demolition of floor arches shall not be started until they, and the surrounding floor area for a distance of 20 feet, have been cleared of debris and any other unnecessary materials

#### 22.7. Removal of walls, floors, and material with equipment

22.7. A.Mechanical equipment shall not be used on floors or working surfaces unless such floors or surfaces are of sufficient strength to support the imposed load.

22.7. B.Floor openings shall have curbs or stop-logs to prevent equipment from running over the edge

#### 22.8. Storage

22.8. A.The storage of waste material and debris on any floor shall not exceed the allowable floor loads

22.8. B.In buildings having wooden floor construction, the flooring boards may be removed from not more than one floor above grade to provide storage space for debris, provided falling material is not permitted to endanger the stability of the structure

22.8. C.When wood floor beams serve to brace interior walls or free-standing exterior walls, such beams shall be left in place until other equivalent support can be installed to replace them

22.8. D. Floor arches, to an elevation of not more than 25 feet above grade, may be removed to provide storage area for debris: Provided, that such removal does not endanger the stability of the structure

22.8. E.Storage space into which material is dumped shall be blocked off, except for openings necessary for the removal of material. Such openings shall be kept closed at all times when material is not being removed

#### 22.9. Removal of steel construction

22.9. A. When floor arches have been removed, planking shall be provided for the workers engaged in razing the steel framing

22.9. C. Steel construction shall be dismantled column length by column length, and tier by tier (columns may be in two-story lengths)

22.9. D. Any structural member being dismembered shall not be overstressed

#### 22.10. Mechanical Demolition

22.10. A.No workers shall be permitted in any area, which can be adversely affected by demolition operations.

Only those workers necessary for the performance of the operations shall be permitted in this area at any other time

22.10. B.The weight of the demolition ball shall not exceed 50 percent of the crane's rated load, based on the length of the boom and the maximum angle of operation at which the demolition ball will be used, or it shall not exceed 25 percent of the nominal breaking strength of the line by which it is suspended, whichever results in a lesser value

22.10. C. The crane boom and load line shall be as short as possible

22.10. D. The ball shall be attached to the load line with a swivel-type connection to prevent twisting of the load line, and shall be attached by positive means in such manner that the weight cannot become accidentally disconnected

22.10. E. When pulling over walls or portions thereof, all steel members affected shall have been previously cut free

22.10. F.All roof cornices or other such ornamental stonework shall be removed prior to pulling walls over

22.10. G. During demolition, continuing inspections by a competent person shall be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, or walls, or loosened material. No employee shall be permitted to work where such hazards exist until they are corrected by shoring, bracing, or other effective means

22.11. Selective Demolition by Explosives

22.11. A.1. No persons shall be allowed to perform selective demolition by explosives without written consent by the KBE Safety Director

22.11. A.2. An Activity Hazard Analysis must be submitted and approved prior to the start of any selective demolition by explosives

22.11. A.3. A pre-construction safety meeting must be held prior to the start of any selective demolition by explosives

END OF SECTION 22

## 23. Blasting and the use of explosives

### 23. Blasting and the Use of Explosives

23.1. A. No persons shall be allowed to perform work involving blasting and the use of explosives without written consent by the KBE Safety Director

23.1. B. An Activity Hazard Analysis must be submitted and approved prior to the start of any work involving blasting and the use of explosives

23.1. C. A pre-blast safety meeting must be held prior to the start of any work involving blasting and the use of explosives

END OF SECTION 23

## 24. Power transmission and distribution

### 24. Power Transmission and Distribution

24.2. No persons shall be allowed to perform power transmission and distribution work without written consent by the KBE Safety Director

24.3. An Activity Hazard Analysis must be submitted and approved prior to the start of any power transmission and distribution work

24.4. A pre-construction safety meeting must be held prior to the start of any power transmission and distribution work

END OF SECTION 24

## 25. Stairs and ladders

### 25.1. General Requirements

25.1. A. A stairway or ladder shall be provided at all personnel points of access where there is a change in elevation of 19 inches or more, and no ramp, runway, sloped embankment, or personnel hoist is provided

25.1. B. Employees shall not use any spiral stairways that will not be a permanent part of the structure on which construction work is being performed

25.1. C. A double-cleated ladder or two or more separate ladders shall be provided when ladders are the only mean of access or exit from a working area for 25 or more employees, or when a ladder is to serve simultaneous two-way traffic

25.1. D. When a building or structure has only one point of access between levels, that point of access shall be kept clear to permit free passage of employees. When work must be performed or equipment must

be used such that free passage at that point of access is restricted, a second point of access shall be provided and used

25.1. E. When a building or structure has two or more points of access between levels, at least one point of access shall be kept clear to permit free passage of employees

25.1. F. Employers shall provide and install all stairway and ladder fall protection systems required by this subpart and shall comply with all other pertinent requirements of this subpart before employees begin the work that necessitates the installation and use of stairways, ladders, and their respective fall protection systems

### 25.3. Temporary Use of Stairs and

25.3. A. Prior to filling metal pans with concrete, stairs can be temporarily used for foot traffic only when fitted with wood or other solid material the full width and depth of and at least to the top edge of each pan. Such temporary treads and landings shall be replaced when worn below the level of the top edge of the pan

25.3. B. Stairs under construction that do not meet fall protection requirements cannot be used for access or emergency egress

25.3. C. Stairways having four or more risers or rising more than 30 inches, whichever is less shall be equipped with:

- 25.3. C.1. At least one handrail; and
- 25.3. C.2. One stair rail system along each unprotected side or edge

25.3. D. Slippery conditions on stairways shall be eliminated before the stairways are used to reach other levels

25.3. E. All parts of stairways shall be free of hazardous projections, such as protruding nails

### 25.4. Stair Construction

25.4. A. Except for authorized personnel directly involved in the stairway construction, foot traffic is prohibited on stairways with pan stairs where the treads and/or landings are to be filled with concrete or other material.

25.4. B. Only authorized personnel wearing personal fall protection tied off to an approved anchorage point are allowed on stairs that do not meet fall protection requirements

### 25.5. Ladders

25.5. B. Ladders shall be inspected by a competent person for visible defects on a periodic basis and after any occurrence that could affect their safe use

25.5. C. Extension ladders used for access to an upper landing surface shall extend at least 3 feet above the upper landing surface be secured at its top to a rigid support that will not deflect.

25.5. D. If the ladder cannot extend past the landing surface by 3' a grasping device, such as a grabrail, shall be provided

to assist employees in mounting and dismounting the ladder.

25.5. E.Ladders shall be maintained free of oil, grease, and other slipping hazards

25.5. F. Ladders shall not be loaded beyond the maximum intended load for which they were built, nor beyond their manufacturer's rated capacity

25.5. G.Ladders shall be used only for the purpose for which they were designed

25.5. H. The base of an extension ladders must be set away from the building 1'-0" for every 4'-0" of length to the upper support. Do not climb on or off an extension ladder from the side

25.5. I.Do not work in a manner that forces your center of gravity past the siderails of any type of ladder

25.5. J.Wood job-made ladders with spliced side rails shall be used at an angle such that the horizontal distance is one-eighth the working length of the ladder

25.5. K.Ladders shall be used only on stable and level surfaces.

25.5. L.Do not set up a ladder on slippery surfaces

25.5. M. Ladders placed in any location where they can be displaced by workplace activities or traffic, such as in passageways, doorways, or driveways, shall be secured to prevent accidental displacement, or a barricade shall be used to keep the activities or traffic away from the ladder

25.5. N. The area around the top and bottom of ladders shall be kept clear

25.5. O. The top of a non-self-supporting ladder shall be placed with the two rails supported equally unless it is equipped with a single support attachment

25.5.P. Ladders shall not be moved, shifted, or extended while occupied

25.5.Q. Ladders shall have nonconductive siderails if they are used where the employee or the ladder could contact exposed energized electrical equipment

25.5. R.The top and top step of a stepladder shall not be used as a step

25.5. S.Cross-bracing on the rear section of stepladders shall not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections

25.5. T.Portable ladders with structural defects shall be tagged with "Do Not Use" or similar language, and  
Shall be withdrawn from service until repaired

25.5. U. When ascending or descending a ladder, the user shall face the ladder

25.5. V.Each employee shall use at least one hand to grasp the ladder when progressing up and/or down the ladder

25.5. W. An employee shall not carry any object or load that could cause the employee to lose balance and fall

END OF SECTION 25

## 26. Commercial diving operations

### 26. Commercial Diving Operations

26.2. No persons shall be allowed to perform a commercial diving operation without written consent by the KBE Safety Director.

26.3. An Activity Hazard Analysis must be submitted and approved prior to the start of any commercial diving operation

26.4. A pre-construction safety meeting must be held prior to the start of any commercial diving operation

END OF SECTION 26

## 27. Toxic and hazardous Substances

### 27. Toxic and Hazardous Substances

27.1. Work involving toxic and hazardous substances shall be conducted in accordance with industry standards and best practices.

27.2. No persons shall be allowed to perform any work involving toxic and hazardous substances without written consent by the KBE Safety Director

27.3. An Activity Hazard Analysis must be submitted and approved prior to the start of any work involving toxic and hazardous substances

27.4. A pre-construction safety meeting must be held prior to the start of any work involving toxic and hazardous substance

END OF SECTION 27