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Standard Operating Procedure
for

CNSE Crane Work Permits

REVISION

Rev No.	DCN No.	Change Summary	Release Date	DCN Initiator	Document Owner
3	DCN0861	Added sign posting requirements; updated submittal time to 72 hours to correspond with Work Authorization procedure. Also Added Section 5 Crane Danger Signs to Look for (While Operating or Working Around Cranes)	12-4-12	J. Colavito	R. Segura

Prior revision history, if applicable, is available from the Document Control Office.

1. PURPOSE AND SCOPE

1.1 **Purpose:** The purpose of this procedure is to ensure that all temporary operations that move elevated objects or people at the College of Nanoscale Science and Engineering (CNSE) Albany NanoTech facility are conducted in a safe manner which minimizes the risk of injury or property damage; and in accordance with OSHA's General Industry and Construction Industry Standards listed under 29 CFR 1910 Subpart F and 29 CFR 1926 Subpart N respectively.

1.1.1 Temporary operations that move elevated objects or people shall include the use of a temporary crane or temporary aerial device.

1.1.2 A *temporary crane* is a machine consisting of a rotating superstructure for lifting and lowering a load and moving it horizontally on either rubber tires or crawler treads and is not used at CNSE on a permanent basis.

1.1.3 A *temporary aerial device* is any vehicle-mounted device, telescoping or articulating, or both, which is used to position personnel and is not used at CNSE on a permanent basis. Aerial devices include the following types of vehicle-mounted aerial devices used to elevate personnel to jobsites above ground level: extensible boom platforms, aerial ladders, vertical towers, or a combination of any of the above. Aerial devices may be powered or manually operated; and are deemed to be aerial lifts whether or not they are capable of rotating about a substantially vertical axis.

1.2 **Scope:** Cranes and aerial devices are designed for both general use and for specific purposes. Similar to the automobile industry, crane and aerial device manufacturers produce similar models or types of cranes for the same purpose, often with different sizes of the same model of crane. Each type, model, or size of crane or aerial device manufactured, may have different operating controls and require specialized operator training, individualized inspection criteria, and different preventive maintenance schedules. This information must be given prior to the operation of any temporary crane or aerial device at the CNSE Albany NanoTech facility.

1.2.1 All temporary crane and aerial device operations will require a CNSE Crane Work Permit (permit) (EHS-00040-F1) prior to conducting work.

1.2.2 The permit will be issued by the EHS Department or ERT.

1.2.3 It is the responsibility of the CNSE Host to ensure that the permit is completed prior to the start of work, and that all procedures listed in this procedure and noted on the issued permit are followed by the Contractor and the Crane or Aerial Device Operator.

1.2.4 The permit must be visibly posted in the work area.

1.2.5 The EHS Department will maintain a file of permits issued.

1.2.6 A copy of the completed permit, along with a copy of the site map showing the lift area, restricted areas, and Building Evacuation Areas shall be submitted to the Work Authorization Permit meeting 72 hours prior to the start of the work.

1.2.7 Crane and/or aerial device set-up/demobilization is not allowed before 7:00 AM or after 6:00 PM, unless pre-approved by the EHS Department. Pre-approval will be based on a case by case basis.

2. DEFINITIONS

1) **CNSE Work Sponsor**: Person the work is being performed for – firm and name to be listed on the permit. **This person must be a CNSE employee or tenant employee.**

2) **Contractor Name**: Company/Contractor performing the requested work listed on the permit. Phone number listed on the permit must be a cell phone number or number where 'Contractor' can be reached, not an office number.

3) **Crane Operator**: Person licensed to operate crane listed on permit (which must match the crane on site) who is physically operating the crane.

4) **Permit Requestor**: Person requesting the work listed on the permit. Phone number listed on the permit must be a cell phone number or number where 'Requestor' can be reached, not an office number.

NOTE: CNSE work sponsor, contractor name, crane operator and permit requestor sections must be completed at time of submittal to work authorization permit meeting on both the work authorization permit and the crane sub permit.

3. RESPONSIBILITIES

3.1 It is the responsibility of the contractor to ensure all equipment is in proper operating condition. The equipment should be inspected in accordance with the manufacturer's specification. The EHS Department reserves the right to request pertinent inspection or maintenance records prior to issuing a permit.

3.2 It is the responsibility of the contractor to ensure that the operators are qualified and properly trained. Training as recommended by the

manufacturer is desirable. The EHS Department reserves the right to request written proof of training prior to issuing a permit.

3.3 A certified crane operator may be identified with a visible hard hat decal in order to clearly distinguish that individual from others.

3.4 The crane operator shall designate qualified individuals as signal person, ground person, lift director, and rigger. One person may fill several of these functions.

3.5 The contractor shall ensure the aerial device and crane comply with applicable sections of OSHA's General Industry and Construction Industry Standards listed under 29 CFR 1910 Subpart F and 29 CFR 1926 Subpart N respectively.

4. PROCEDURE

4.1 General Requirements

4.1.1 Any occupied building areas which are beneath the crane work area must be evacuated during the work.

4.1.2 The crane work area must be adequately roped off or secured to prevent unauthorized entry. Only individuals involved in the crane work may enter the area.

4.1.3 Make sure signage is appropriate (to exits, paths of egress, detour, overhead work etc.)

4.1.4 Have flaggers in designated areas, if the road is going to be blocked, and/or post detour signs by the road for truck deliveries to follow alternate route to the loading docks.

4.1.5 Hard hats and safety eyeglasses must be worn within the crane work area. This must be strictly adhered to at all times.

4.1.6 Personnel working inside aerial devices shall ensure that:

- The platform has a guardrail system around its periphery,
- They wear the appropriate personal fall protection system,
- They maintain a firm footing on the platform floor while working thereon,
- Climbing by occupants on the mid-rail or top-rail of the aerial platform is prohibited, and

- The use of planks, ladders, or any other devices on the platform is prohibited.

4.1.7 Obstructions such as roofs, utilities, etc. must be identified prior to work. They should be avoided where possible. Work near power lines must be conducted in accordance with OSHA requirements.

4.1.8 Contractor must ensure that proper areas are roped off and sufficient personnel are on-site to direct traffic.

4.1.9 Security must be notified of crane operations a minimum of 72 hours prior to the start of work.

4.2 **Operational Considerations**

4.2.1 Cranes are carefully designed, tested, and manufactured for safe operation. When used properly they can provide safe reliable service to lift or move loads. Because cranes have the ability to lift heavy loads to great heights, they also have an increased potential for catastrophic accidents, if safe operating practices are not followed.

4.2.2 Crane operators and personnel working with cranes need to be knowledgeable of the capacities and limitations of the crane they will be operating, and specific job site restrictions, such as location of overhead electric power lines, unstable soil, or high wind conditions. Copies of the crane operator's training records must be submitted to the EHS Department prior to the start of work.

4.2.3 Personnel working around crane work operations also need to be aware of hoisting activities or any job restrictions imposed by crane work operations, and ensure job site coordination of such operations.

4.2.4 Job site inspectors therefore should become aware of these issues and, prior to starting an inspection, take time to observe the overall crane work operation with respect to load capacity, site coordination, and any job site restrictions in effect.

4.3 **Safe Operating Precautions**

4.3.1 As stated above, cranes and aerial devices are carefully designed, tested, and manufactured for safe operations.

4.3.2 Accidents can be avoided by careful job planning. The person in charge must have a clear understanding of the work to be performed and consider all potential dangers at the job site. A safety plan must be developed for the job and must be explained to all personnel involved in the lift.

4.3.3 Before operations begin for the day, a walk-around inspection needs to be conducted to ensure that the machine is in proper working condition. Only qualified and properly designated people shall operate the crane or aerial devices.

4.3.4 **Regular** inspections are important, they provide a means of detecting potential hazards or conditions that could contribute to a sequence of events leading to an accident. Safe, reliable, and the economic operation of lifting equipment, cannot be ensured without regular safety inspections and thorough preventive maintenance programs.

4.3.5 A thorough inspection program can forecast maintenance needs or potential equipment failures or malfunctions. The lack of such a program could result in serious deterioration of the equipment which might lead to excessive replacement, or repair charges, as well as an increased potential for accidents.

4.3.6 A copy of the most recent regular documented inspection conducted by the contractor must be submitted to the EHS Department prior to the start of work.

4.3.7 The requirements for helicopter lifting are the same for those specified in this procedure. However, a larger building area may need to be evacuated prior to work.

4.3.8 In the event of an accident or injury, immediately call **EXTENSION 78600** (from an internal phone) for emergency response or dial 518-437-8600 (from a cell phone).

4.3.9 Exceptions to the activities in this procedure may only be made upon approval from the EHS Manager, or their designee.

5. CRANE DANGER SIGNS TO LOOK FOR (While Operating or Working Around Cranes)

1. **Outriggers, Crawler Tracks, or Tires Raised Off the Ground While Operating**
   This is an extremely dangerous condition which indicates the crane is being overloaded and may tip over or collapse. The wrong move in this situation can cause a catastrophe.
2. **Operating Close to Power Lines or Other Dangerous Objects**
   Electrocution due to contact with power lines is the leading cause of crane related fatalities. Detailed federal regulations for proximity to high voltage sources must be strictly enforced. Any potential danger should be pointed out to the crane operator or a supervisor-but never touch the crane at this time.

3. **Riding the Load or Crane Hook**
   This is a serious violation of federal and state safety regulations. Crane structures and cables have far lower strength margins for handling material than what is required for lifting personnel. Workers must never be suspended from a crane boom, unless an approved personnel basket with mandatory safety equipment is used, and lifting procedures are strictly followed.
4. **Visible Structural Damage on the Crane or Rigging**
   There is little or no backup system in the load-supporting components of most cranes. A damaged component can fail completely and without warning, causing the boom or load to fall.
5. **Modifications Made by Adding Extra Counterweight or Holding Down the Rear of the Crane**
   All job-initiated modifications are illegal and may permit overloading the crane. If not approved by the crane manufacturer in writing, these modifications can over stress critical structural components, which could cause failure of the crane.
6. **Crane Operating Near a Trench or Excavation**
   Cranes exert extremely high loads on the soil near the tracks, outriggers, or tires. A crane set up in close proximity to an excavation can cause soil failure, crane turnover, and possible disaster.
7. **The Crane is Noticeably Out of Level While Operating**
   There is no faster way to collapse a crane boom than to impose a side force on the boom.
   Working out of level creates a dynamic side force which means a crane collapse may be imminent.
8. **The Crane's Hoist Line is Not Vertical at All Times During Operation**
   This indicates improper operation. A hoist line which is not vertical obviously indicates that the load is not hanging straight down. Out of plumb loads can cause crane collapse by generating side forces on the boom. In some instances, the crane may tip over, if the load swings.

IMPORTANT: If you see any of these occurring on a jobsite, immediately inform a supervisor!

6. RECORDS

A copy of issued permits, training records, inspection records and any other pertinent documents associated with crane work operations will be kept on file by the EHS Department.