

PURPOSE/APPLICATION

To provide guidance for managing the hazards associated with objects falling from heights or falling while working at heights. Even small objects can cause injury or damage if dropped from height, this SWP will outline different strategies which can be implemented to mitigate the hazard.

Implementation of CPES’s Hazard Identification Assessment and Control (HIAC) methodology is critical for identifying the potential hazard of dropped objects. This can be completed using a hazard assessment/job task hazard analysis (SF-S-56 Pre-Job Plan/SSSP) or task specific HIAC.

PPE

- CPES minimum requirements
- Specialized as identified in HIAC
- Fall protection equipment as determined by HIAC

TRAINING

- Fall protection training (where applicable)
- CPES’s Drops Presentation

HAZARDS & CONCERNS

- Gravity (falls, falling objects)
- Working at heights
- Overhead equipment



PRECAUTIONS HIAC

Most commonly, CPES encounters two situations which will require mitigation of the risks associated with dropped objects:

1. Line of Fire – When work is conducted at height and workers, equipment or facilities below could be in the direct path of a potentially dropped object
2. Lifting Activities – Lifting activities often require moving materials and equipment overhead, this creates the potential for dropped objects. Lifting activities include the use of cranes, pickers, forklifts and, hoists

CPES’s HIAC process will be used to identify site-specific hazards where the risks of drops exists and to evaluate and implement the most appropriate control methods to mitigate the risk.

As with all hazard assessments, the hierarchy of controls should be considered when evaluating the best strategy for mitigating the hazard associated with dropped objects. While controls such as tool lanyards often comes to mind, these rely on individuals to use them correctly and consistently. Other drop control strategies which rely less on the individual and are generally preferred by CPES:

- **Elimination:** This removes or reduces the requirement to complete the work at heights, by moving the work on the ground or pre-assembling material etc. whenever possible is the most effective control

April 18, 2018

DROPPED OBJECT HAZARD MANAGEMENT

- **Engineering:** These controls generally stay in place and do not rely on the user to implement them, they can include the use of netting or snow fence, toe boards, fully enclosed scaffolding, handrails, barricades around the work area, etc.
- **Administrative:** These controls consist of mainly site practices and policies such as setting up drop zones, flagging off areas and keeping workers out of areas where a dropped object could injure them
- **PPE:** These controls are generally considered the last line of defense, while tool lanyards and other drop specific equipment can be effective in preventing an item from falling at all, they rely on workers to use them effectively. These systems should be used in addition to other types of controls in situations where the additional protection they offer is required

See the Drop Prevention Systems section for more details about different methods that are available. A combination of multiple types of controls are often required, reach out to your Supervisor or HSE Representative if you need more information.

GENERAL DROPPED OBJECT HAZARD MANAGEMENT

THE DO's

- DO** Assess the potential to avoid performing the work at height prior to beginning; can the work be completed on the ground, can pieces be pre-assembled etc.
- DO** Flag off the area and set up overhead work signs (a drop zone) when working at heights if there is a chance that workers may enter the area below the work
- DO** Select the appropriate color flagging for the hazard, always use red flagging if there is a chance that material or tools could fall
- DO** Tag ribbon with a contact name and number or other means of contacting the person (where appropriate), especially if there are multiple contractors on site or it isn't clear who is performing the work
- DO** Consider access when setting up a drop zone, where possible make sure that workers still have a way to get in and out of work areas. If you need to block off stairs or ladders coordinate with other workers on site
- DO** Speak up at daily tailgate meetings, and let workers know when there will be work at heights or lifts which may require areas to be flagged off
- DO** Maintain an orderly work area. Extra tools, material, and waste should be transported back to ground level as soon as possible. Anything left at heights can become a potential hazard
- DO** Secure any material that must be left at heights. Changes in the wind, other workers in the area or the startup of equipment could all result in material left at heights falling if it is unsecured
- DO** Maintain 100% tie-off of tools (where tool securement is required). This includes tethering the tool between workers when passing it. Prior to handing off, the receiving employee should connect their tether to the tool after positive connection has been completed, the passing employee may disconnect their tether from the tool
- DO** Inspect all securement systems prior to use, worn or damaged items should be replaced
- DO** Consider deflection when setting up a drop zone, if a dropped item could bounce off something you will likely need a larger area than if it will fall straight down
- DO** Factor in the height of the work to be performed, the higher the material the larger the drop zone will need to be

April 18, 2018

DROPPED OBJECT HAZARD MANAGEMENT

THE DON'Ts

- DON'T** Stack tools or equipment higher than the edge of toe boards, screening, or paneling. Stacking material too high can allow it to fall over the edge if is bumped or blown by the wind
- DON'T** Store tools or material within four feet of the leading edge (wherever possible). All stacked materials should be stable and self-supporting
- DON'T** Overload or improvise tool attachment devices. Remember a dropped item can shock load the attachment causing it to fail. Always work within the manufacturer's specifications for the device
- DON'T** Modify tools when attaching securement. Welding onto, or cutting holes into tools or material can have unintended consequences, always use securement designed for that purpose
- DON'T** Forget to remove drop zones when work is complete. If workers become accustomed to these being left in place, they can become complacent increasing the chance of someone entering the area

DROP PREVENTION SYSTEMS

Exclusion Zones (Drop Zones)

An area with potential to be impacted by drop hazards form work in progress above. These exclusion zones should be visually identified with red danger tape or barricades to prevent unauthorized entry. Signage or tags stating the hazard and who to contact for information should be posted at the zone (as required). It is important to recognize that exclusion zones are used for several other reasons (e.g., NDT, pressure testing, etc.), this is what makes tagging the area important.

When setting up exclusion zones it is important to consider deflection. Deflection of dropped objects is a common occurrence and may result in incidents if workers are not aware of how far a dropped object can deflect. Deflection of a static (see definitions section) dropped object can be up to twice the distance that an object falls. The likelihood of a deflection depends on several factors, including the size and shape of the dropped object, type of surface impacted, number or density of potential impact surfaces (e.g., one scaffolding beam located below verses 20 to 30 pipes, beams and other structures located below), etc. As a result, the likelihood of a deflection may be very high in some worksites and low in others.

Exclusion zones are CPES's preferred primary control method for dropped objects. In some instances, the exclusion zone may need to be too large, or the hazard level deemed too high (such as working over operating equipment), or site policies may require the use of additional controls. In these cases, controls such as netting, tool tethers, etc. may be used in conjunction with or instead of the exclusion zone to manage the hazard.

Toe Boards

Toe boards are a critical control on elevated work platforms, walkways, etc. During construction of platforms or raised work prior to toe board installation, or where they must be removed, additional controls must be implemented (e.g., avoiding storing material, temporary toe boards, etc.). Toe boards on scaffolding will be installed as required under SWP 56 Scaffolds and Temporary Platforms, legislative, or client requirements.

Safety Netting

In applications where the utilization of safety nets has been deemed necessary, nets should be designed with specific sized webbing approved by the manufacturer for use based on the specific task, location and type of tools/materials being used. Forged steel safety hooks or shackles will be used to fasten the net to its supports. Nets should be installed as closely below the work in progress as is deemed practicable, but never more than 9.1 meters (30' below).

Safety nets must be hung, maintained, and tested in accordance with the manufacturer's instructions, applicable legislation, and client or prime contractor requirements. Nets designed for use to prevent

falling objects shall not be used as fall protection for human beings. These nets may be deployed below fall protection nets in these cases. When falling object nets are used alone, signs will be posted informing employees that fall protection is still required in work areas above netting.

Guardrail Systems

If guardrail systems are to be engaged as a secondary drop system (where being implemented for tools and material rather than workers), they will be inspected to ensure any openings are not large enough for tools or materials to pass through. It is recommended they be enclosed with a small mesh netting or screen to prevent materials from passing through.

Mobile Elevated Work Platforms

Mobile elevated work platforms should be selected to include toe boards around the perimeter of the interior to prevent work materials and tools from falling or deflecting outside of the work platform. In some cases, fire blanket or snow fence will need to be installed inside the basket to prevent material falling from the basket.

DIRECT DROP PREVENTION SYSTEMS (TOOL SECUREMENT)

Task or project hazard assessments or site-specific requirements may dictate the need for a secondary method of drop prevention. These systems connect workers with the tools or materials being used at height.

Tool Attachment Points

Prior to selecting a tool lanyard, a proper attachment point must be established on the tool. If a tool has a built-in connection point placed by the manufacturer for the purpose of drop prevention, this step is not required. Load rating of the attachment point should be appropriate for the tool's weight. Do not modify tools (unless permitted by OEM) to accept attachment points (i.e. welding pieces) or use non load rated methods (i.e. tape or twine).

Examples of **CORRECT** tool attachment:



Examples of **INCORRECT** tool attachment:



****Note: Tools must not be modified for lanyards unless permitted under OEM****

Tool Lanyards/Tethers

After establishing an adequate attachment point on a tool, a proper tool tether will then need to be selected which has an appropriate load rating for the tool to be tethered.

Examples of tether/lanyard selections:



Tool Buckets

For the safe transportation of tools and materials up or down from heights, tool buckets or bags are the preferred option. Tool bags manufactured with a closure system should be used where a primary drop system is not available or where it is dictated by hazard assessments or site requirements.

Examples of tool buckets with closure systems:



April 18, 2018

DROPPED OBJECT HAZARD MANAGEMENT

Tool Holsters and Pouches

For some tools and objects, a tool holster or tool pouch may be appropriate. Tools used in these holsters should weigh less than or equal to the manufacturer stated load-rating.

Examples of holstered tools:



Tool Belts

Tools which have been tethered must be connected to an appropriate anchor point. For many small tools, connecting to the worker is the best option. This is recommended for tools weighing less than 5 lbs. D-Rings on fall protection harnesses which have been designated by the manufacturer for use as a tool connection point (usually on the front straps of the harness) or tool belts are also good options.

Examples of tool tethering:



Wristbands

Another acceptable option for tethering to the human body is with the use of a wristband. Wristbands must not be utilized with tools over 5 lbs.

Examples of tethered tools utilizing wristbands:



DEFINITIONS

Drop Hazard

Any tool, material or object that has an opportunity to fall from elevation to a lower level causing potential for damage to property or injury.

Anchorage

A secure point of attachment for tethers, tools and transport buckets with closure systems which is independent of an anchorage used for fall protection for personnel.

Static Load

Maximum Static Load, or Tensile Strength, refers to the maximum load an object can withstand before failing. This measurement does not account for drop distance or velocity.

Dynamic Load

Maximum Dynamic Load refers to the load an object can withstand without failing when dropped from a specified drop distance. Maximum Dynamic Load is usually much less than Maximum Static Load due to the dramatic increase in force caused by the velocity of a falling object.

Primary and Secondary Drop Prevention Systems

Primary drop prevention systems cover direct methods to prevent dropped objects and can include tool attachment points, tool lanyards, tool holsters, and more. Secondary drop prevention systems are indirect methods that help protect workers and other people from being injured from a potential falling object. This includes things like safety nettings, toe boards and limited access zones that restrict traffic to hazardous areas of the job site.



SAFE WORK PRACTICE

SWP-85

April 18, 2018

DROPPED OBJECT HAZARD MANAGEMENT

REFERENCE / ADDITIONAL INFORMATION

Energy Safety Canada Dropped Objects Guidelines:

<https://www.energysafetycanada.com/Standards/Programs/Dropped-Objects>

Dropped Objects Prevention Scheme Global Resource Centre:

<https://www.dropsonline.org/>

3M Dropped object prevention planning article: https://safetytownsquare.3mcanada.ca/articles/dropped-object-prevention-planning#_ftn1

SWP 34 Crane Hoists and Lifting Devices

SWP 56 Scaffolds and Temporary Platforms

COP 6 Fall Protection

REGULATIONS

Alberta:

OHS Code – Part 22 Safeguards

Saskatchewan:

Part IX Safeguards, Storage, Warning Signs and Signals

British Columbia:

OHS Regulation Part 13: Ladders, Scaffolds and Temporary Work Platforms

Manitoba:

Part 28 Scaffolds and Other Elevated Work Platforms

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