

# ARE YOU IN THE "LINE OF FIRE?"

Dropped Objects Activity Package



SETTING THE STANDARD IN OIL AND GAS SAFETY

ENERGY  
SAFETY  
CANADA



## DROPPED OBJECTS – ARE YOU IN THE “LINE OF FIRE?” INJURY REDUCTION CAMPAIGN

You are in the line of fire when you are at risk of coming into contact with a force your body cannot endure.

Dropped object awareness is:



### Stored Energy

Contact with stored energy  
Includes pressure releases



### Striking Hazards

Struck by or striking against an object  
Includes dropped objects



### Crushing Hazards

Caught in, on or between an object  
Includes hand injuries



## LINE OF FIRE - LIFE SAVING RULE

- This overview includes materials that relate to the Line of Fire Life Saving Rule and some that do not. The Life Saving Rule focuses on body positioning.
- This rule indicates:
  - **Keep yourself and others out of the line of fire**
  - I position myself to avoid:
    - Moving objects
    - Vehicles
    - Pressure releases
    - Dropped objects
  - I establish and obey barriers and exclusion zones
  - I take action to secure loose objects and report potential dropped objects





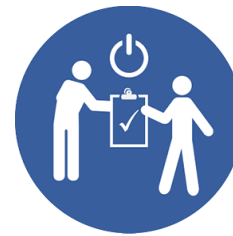
## RELATED LIFE SAVING RULES



**FIT FOR DURY**



**WORKING AT  
HEIGHT**



**BYPASSING  
SAFETY  
CONTROLS**



**SAFE  
MECHANICAL  
LIFTING**

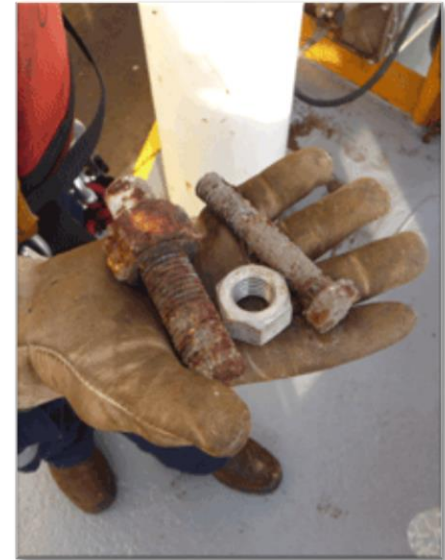


## WHAT IS A DROPPED OBJECT?

Any object with the potential to cause death, injury, equipment or environmental damage that falls from its previous static position, either under its own weight, or as a result of applied energy.

When referring to dropped objects, we need to consider:

- Operations conducted at height.
- Hand tools being used at heights.
- Equipment mounted at a height that, following contact, vibration or environmental conditions could fall, e.g. piping, lights, cameras, rigging gear etc.
- Snow, ice, dirt and rocks.
- Personnel working on or directly below an elevated work site.
- Lifting operations.





## DID YOU KNOW?

---

Dropped objects is one of the top categories of potentially serious incidents (PSI) in the oil and gas industry.

A PSI is any event where a reasonable and informed person would determine that under slightly different circumstances, there would be a high likelihood for serious injury to a person.\*

Drops objects prevention is about safe behaviors and safe conditions:

- Safe behaviours means your personal actions, such as following the Life Saving Rules.
- Safe conditions relates to assets and managing those assets and any risks.

[\\*ESC PSI Guideline](#)



## EXAMPLE

---

Insert your company example here:





## EXCLUSION ZONES – NO-GO ZONES

Establishing and adhering to exclusion zones is critical for managing line of fire in relation to dropped objects. For more information see the Best Practice from [DropsOnline.org](https://www.dropsonline.org).







## DROPPED OBJECT CALCULATOR

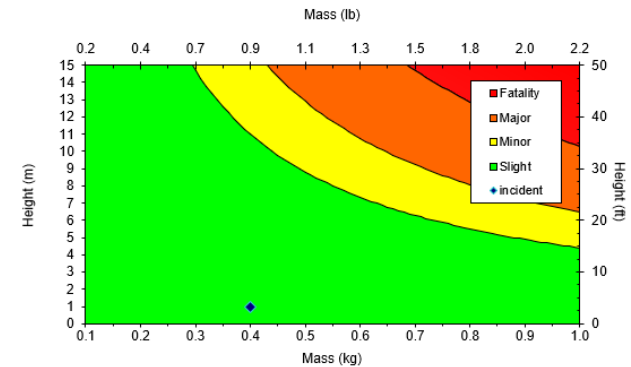
The Dropped Object Calculator\* provides a common benchmark in the classification of the potential consequences of a dropped object.

A simple rule of thumb for potential dropped objects is:

The **heavier** the object, the **more severe** the consequences, the **further it falls**, the **more severe** the consequences.



Outcome Calculator		
Height	1	m
Mass	0.4	kg
Outcome	Slight	



[\\*https://www.dropsonline.org/resources-and-guidance/drops-calculator/e-drops-calculator/](https://www.dropsonline.org/resources-and-guidance/drops-calculator/e-drops-calculator/)



## EXAMPLE OF A DROPPED OBJECT

Your hard hat is designed to withstand 95 joules of energy. If a 9 kg wrench is dropped 2 m (6 ft) before it hits a worker's hard hat, how serious an injury could we expect?

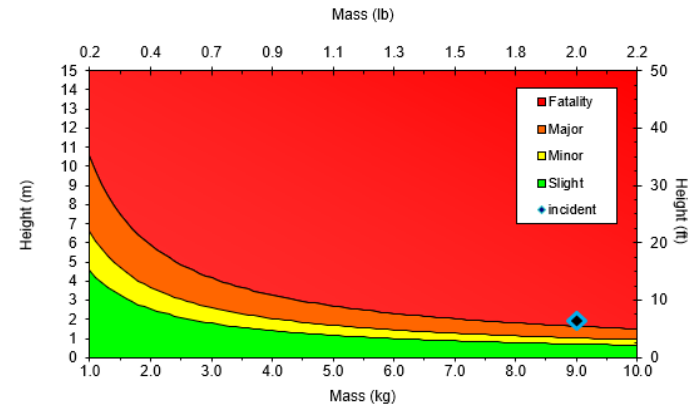


That is 176 joules of energy.

Enough energy to kill you, even with a hard hat



Outcome Calculator	
Height	2 m
Mass	9 kg
Outcome	Fatality





## TOP CAUSES OF DROPPED OBJECTS

Safety alerts and incident reports show these recurring causes continue to result in dropped objects:

1. Inadequate risk assessment - failure to identify dropped object hazards.
2. Inadequately stored or secured tools and equipment - no lanyards or tethers being used.
3. Inadequate procedures - bad planning and no management of change.
4. Failed fixtures and fittings - corrosion, vibration, poor design, and selection or improper installation.
5. Poor housekeeping - pre-existing hazards from previous tasks.
6. Environmental factors - wind, sea motion, ice, snow, and extreme conditions.
7. Human factors - body positioning, fit for duty, operator error.
8. Collisions and snagging - lifting, travelling equipment, tag lines, and service loops.
9. Inadequate inspection, repair and maintenance - ignoring unsafe conditions.
10. Redundant, neglected and homemade tools and equipment - should be eliminated.



## PREVENTION

---

Everyone has a responsibility to prevent dropped objects through:

- **Observation and intervention** - being aware of the hazard, associated risks, and prepared to stop work if conditions or actions are unsafe.
- **Reporting** - recording all potential and actual incidents in accordance with company policy.
- **Elimination** - the removal of potential dropped object hazards if it is safe to do so, ensuring all loose items are cleared from the work site before and after each task.
- **Control** - ensuring all items of structure, equipment, and tools are securely fastened or tied off, especially when using tools and equipment at height.
- **Design and procurement** - informed selection and availability of tools, materials and resources.
- **Inspection** - regular and periodic work site inspections of all high-risk items, particularly loads prior to lifting or transportation.



## SOME SITUATIONS TO THINK ABOUT

How secure are overhead items such as:

- Light fixtures
- Rigging equipment, like sheaves
- Items on storage racks
- Snow, ice, dirt and rocks
- Workers using hand tools
- Workers handling, removing or installing equipment
- Items in your pockets or PPE (gas detector, etc.) when working above others?

Has an exclusion zone or no-go zone been established and is it adhered to?





## TOOL TETHERS AND OTHER SECUREMENTS

Use tethers and container equipment designed to stop a drop, such as equipment in conformance with the American National Standards for Dropped Object Prevention Solutions (ANSI 121-2018).

This standard covers the following:

- Anchor attachments
- Tool attachments
- Tool tethers
- Containers



Information on this standard can be found at [ANSI](#).

DropsOnline.org has excellent guideline on the safe use of tools and equipment at height.

This guide covers a variety of topics such as:

- Lanyard and attachment points
- Tool attachments
- Power tools
- Tool storage



This guide can be found at [DropsOnline.org](#).





## LEARNING FROM THE BEST

Astronauts must prevent dropped objects. A dropped object becomes a satellite that can be moving 28,000 km/hr. Regardless of mass, an object moving at that speed can damage or kill. Discuss as a group the challenges that an astronaut would face in preventing dropped objects.



Photo from NASA



## WHERE COULD DROPPED OBJECTS IMPACT YOU?

---

Think of your work and discuss the following questions as a group:

- Look up, what is above you and how confident are you that it can't fall?
- Have exclusion zones been established and are they adequate?
- Do we need to better plan our work to avoid line of fire in relation to simultaneous operations?
- Do you have access to equipment tethers and lanyards?
- Do you understand how to select, inspect and use equipment tethers and lanyards?



## WHAT CAN EACH OF US DO?

- Free falling objects are in a state of acceleration.
- The kinetic energy gained by a dropped object is transferred to its target.

# REMEMBER

this...



can turn into this. . . . .



Let's work together and. . . .  
eliminate dropped objects!