

# TENAQUIP

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*OCCUPATIONAL HEALTH AND SAFETY*

**PRESENTS...**

# OBJECTS AT HEIGHTS TRAINING



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OCCUPATIONAL HEALTH AND SAFETY



**OBJECTS AT HEIGHTS**  
**// AWARENESS AND SOLUTIONS**

# AGENDA

- » Introduction
- » Course Objectives
- » Safety at Heights Overview
- » Risk Awareness
- » Costs
- » Controls and Best Practice
- » Summary





# O@H TRAINING

## LEVELS OF COMPETENCY

### PROGRAM MANAGER & TRAINER

Understands how to build and implement O@H policies

### COMPETENT PERSON

Understands how to identify O@H hazards and solutions

### EQUIPMENT INSTALLER

Understands how to inspect and install O@H systems

### AUTHORIZED USER & INSPECTOR

Understands how to select, use, and inspect O@H equipment

### BASIC AWARENESS

Understands O@H fundamentals



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# O@H TRAINING

*\*Refresher requirements –  
2 years for each level*

## LEARNING MODULES

O@H TRAINING COURSE* (COMPETENCIES)	BASIC AWARENESS (1 HR)	EQUIPMENT SELECTION AND USE (2 HRS)	EQUIPMENT INSPECTION (1 HR)	EQUIPMENT INSTALLER (4 HRS)	PROGRAM POLICY AND SITE INSPECTION (4 HRS)
BASIC AWARENESS (1 HR)	X				
AUTHORIZED USER AND INSPECTOR (4 HRS)	X	X	X		
EQUIPMENT INSTALLER (6 HRS)	X		X	X	
COMPETENT PERSON (1 DAY // 8 HRS)	X	X	X	X	
PROGRAM MANAGER AND TRAINER (1.5 DAYS // 12 HRS)	X	X	X	X	X



# COURSE OBJECTIVES

- » O@H Basic Awareness participants should
  1. Have a general knowledge of Objects at Heights risks including dropped objects, housekeeping and equipment transport.
  2. Have a basic sense for how to position Objects at Heights in a safety at heights program.
  3. Gain awareness of industry conditions including injury statistics, regulations and affected applications.
  4. Be introduced to the Hierarchy of Controls (HOC), best practices within it and solutions to mitigate risks.



# SAFETY AT HEIGHTS OVERVIEW



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# SAFETY AT HEIGHTS HIERARCHY





# Workers at Heights

## Fall Protection Solutions

Passive Systems

Active Systems:  
ABC's

## Other PPE Solutions

Hand Protection

Head & Eye Protection

Temperature Control

## Access Solutions

Ladders

Lifts

Rope Access

# Objects at Heights



## Dropped Objects Solutions

## Housekeeping Solutions

## Equipment Transport Solutions

Passive Systems

Active Systems:  
3T's

Cord Org.

Tool Org.

Gear Org.

Carrying

Hoisting



# AWARENESS IS KEY



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# RISK AWARENESS

## DROPPED OBJECTS

- » Defining Dropped Objects
  - » Any object/item that falls from its previous position
  - » Typically considers workers {themselves} as separate category (fall protection)
  - » Can be large or small:
    - » Tools
    - » PPE
    - » Equipment
    - » Structure
    - » Other loose items



# RISK AWARENESS

## DROPPED OBJECTS

- » Static Dropped Objects
  - » Any object that falls from a stationary position under its own weight
- » Dynamic Dropped Objects
  - » Any object that falls as a result of a secondary force such as being struck by another object or involved in a collision

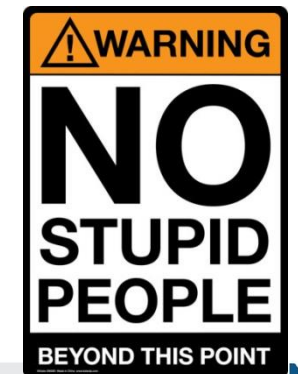




# RISK AWARENESS

## DROPPED OBJECTS

- » Dropped Object Causes
  - » Elements:
    - » Environmental (wind, rain, snow, sea motion)
    - » Corrosion or other deterioration
    - » Vibration
    - » Body effects (sweaty or numb hands, fatigue)
  - » Worker or Equipment Generated:
    - » Tripping or colliding
    - » Poor housekeeping
    - » Not following procedures
    - » Miscalculations and poor design
    - » Missed or inadequate inspections
    - » Homemade tools and equipment



# RISK AWARENESS

## HOUSEKEEPING

- » Poor housekeeping
  - » Unorganized // unclean workplace
  - » Unnecessary movement and time at height
  - » Cords laying across walkways, platforms, etc.
  - » Foreign material concerns



# RISK AWARENESS

## EQUIPMENT TRANSPORTATION

- » Improper equipment transport
  - » Not maintaining 3 points of contact
  - » Overloading a climber
    - » Physical toll on body
    - » Exceeding fall protection capacity
  - » Overflowing containers
  - » Using improper rated containers



# COSTS OF NOT TAKING ACTION:

1. Injury or Fatality
2. Damage
3. Lost Productivity



# COSTS

## INJURY OR FATALITY

- » Dropped Objects
  - » Struck by falling object (worker or bystander)
  - » Falls from height
    - » Gut reaction trying to catch falling object
    - » Tool pulling worker down with it if tethered improperly
- » Poor housekeeping and transport
  - » Slips, trips and falls (same level or from height)
  - » Sprains and strains
  - » Struck by falling objects





# COSTS

IN THE EVENT OF FATALITY

 **ASSOCIATION OF WORKERS' COMPENSATION BOARD OF CANADA**

**8,916 INJURIES FROM BEING STRUCK BY A FALLING OBJECT IN 2014** [8,609 IN 2013] 

 **24 FATALITIES OCCURED IN 2014**

**REPRESENTS 2.6% OF ALL FATALITIES**

2.6%



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# COSTS

## INJURY OR FATALITY

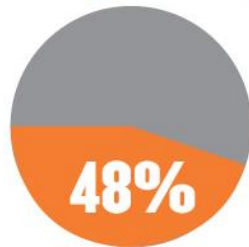


IN THE U.S IN 2014 THERE WERE  
**498 FATALITIES**

FROM BEING STRUCK BY AN OBJECT OR EQUIPMENT  
[509 IN 2013]



**240 WERE CAUSED BY  
A FALLING OBJECT** [245 IN 2013]



REPRESENTS 48%  
OF ALL STRUCK BY  
FATALITIES



REPRESENTS 5%  
OF ALL WORKPLACE  
FATALITIES

\*BUREAU OF LABOR STATISTICS



# COSTS

## INJURY OR FATALITY

2014 **NONFATAL** OCCUPATIONAL INJURIES IN THE U.S. PRIVATE SECTOR 



**42,400** STRUCK BY  
FALLING OBJECT OR EQUIPMENT

REPRESENTS 4.6%  
OF ALL WORKPLACE  
INJURIES



**A TOP TEN  
NONFATAL INJURY**

\*BUREAU OF LABOR STATISTICS



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# COSTS

## INJURY OR FATALITY

**AVERAGE COST FOR A  
MEDICALLY CONSULTED INJURY:**

**\$ 4 2 , 0 0 0**

**AVERAGE COST FOR A  
FATAL ACCIDENT:**

**\$1.45M** PER  
FATALITY

**240 FATALITIES [IN 2014] X \$1.45M =**

**\$348 MILLION**

**NOT ALL INDIRECT COSTS INCLUDED. \* NATIONAL SAFETY COUNCIL INJURY FACTS 2015 EDITION**



# COSTS

## DAMAGE

- » Dropped objects can cause damage to...
  - » The Dropped Item Itself
  - » An Object Below
  - » The Structure Being Worked On
  - » Equipment From Foreign Objects
  - » The Environment





# COSTS

## LOST PRODUCTIVITY

- » Lost productivity can result from...
  - » Work stoppage to investigate a near miss
  - » Descending back down to retrieve a job essential tool and climbing back up to complete task



# WHO IS AT RISK

## AERIAL APPLICATIONS

- » Utilities
- » Telecommunications
- » Construction
- » Wind Energy
- » Oil & Gas
- » Mining
- » Electricians/Service Techs
- » Transportation



# WHO IS AT RISK

## NON-AERIAL APPLICATIONS

- » Nuclear
- » Manufacturing
- » Food Processing
- » Transportation (Aviation)
- » Underwater MRO
- » Oil & Gas
- » Mining
- » Construction



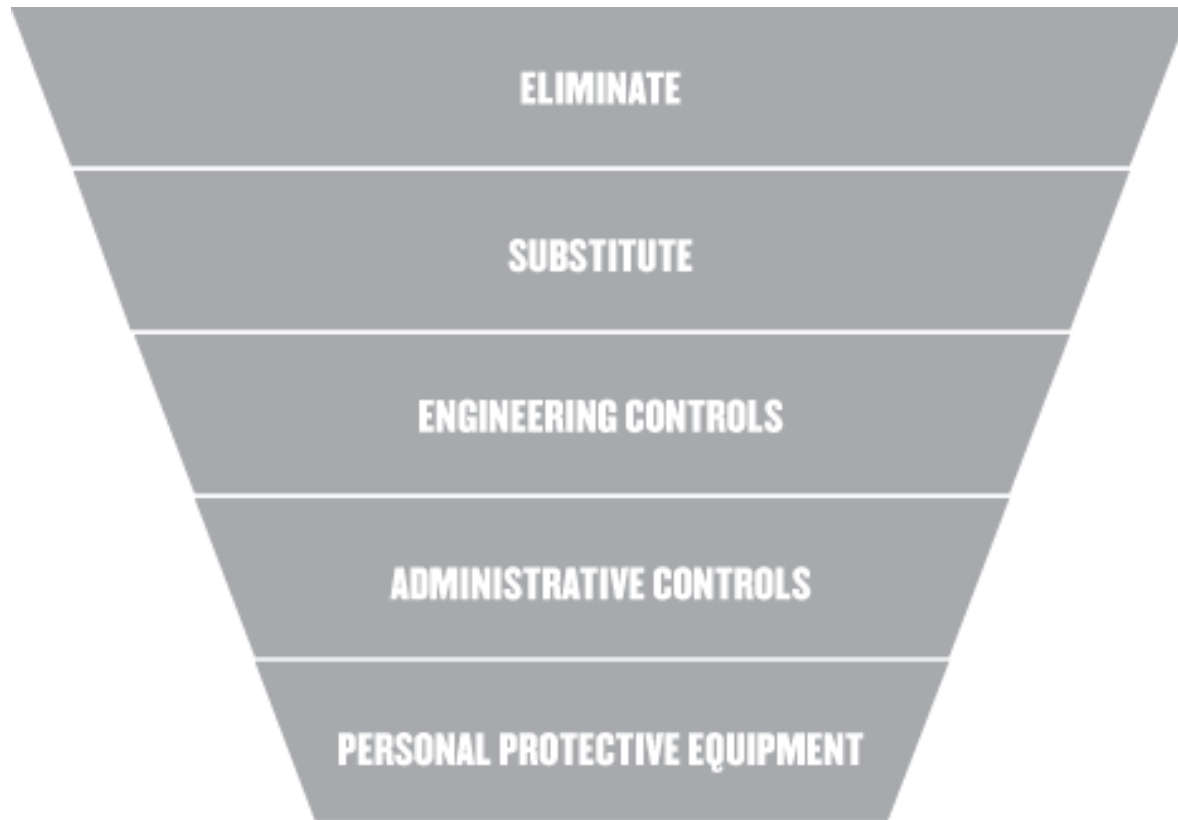
# CONTROLS & BEST PRACTICE



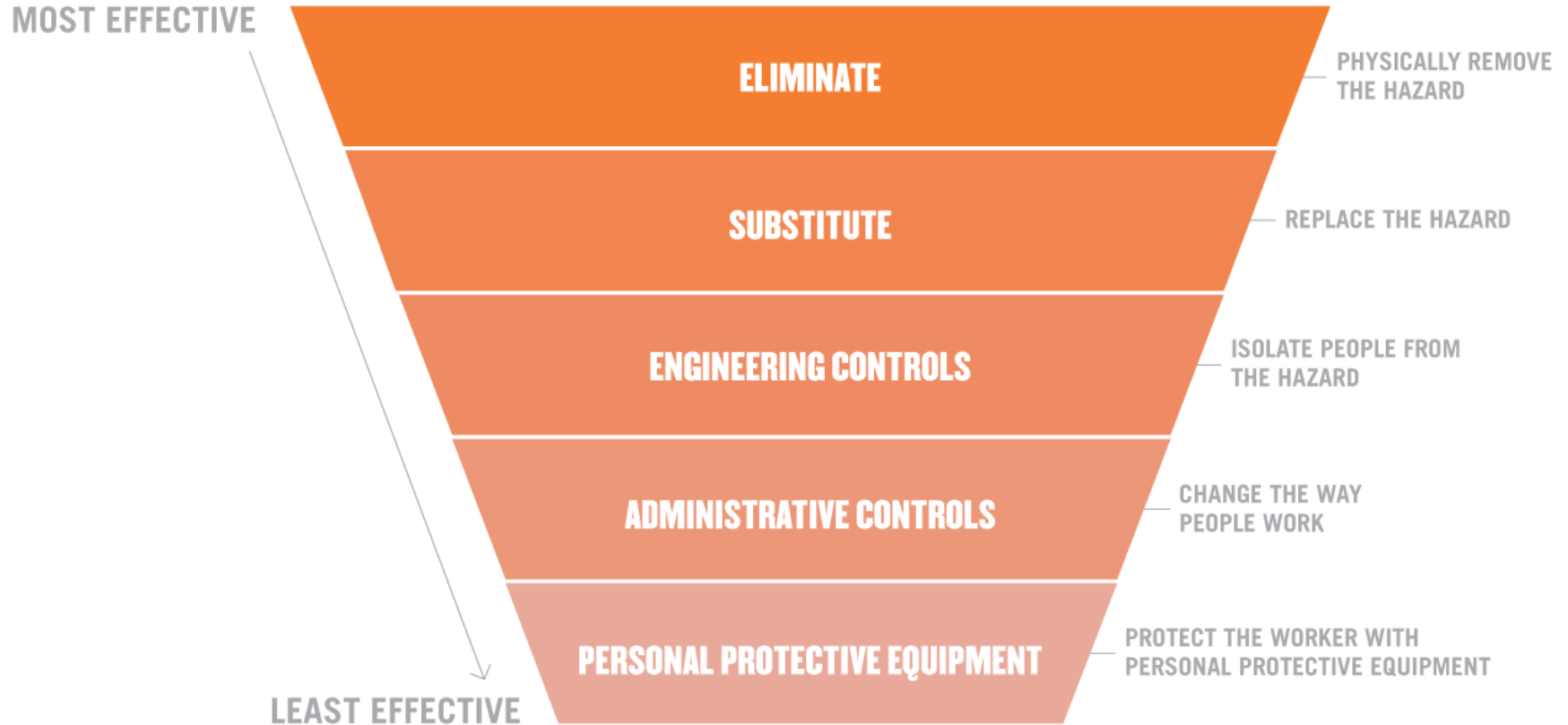
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# O@H HIERARCHY OF CONTROLS (HOC)

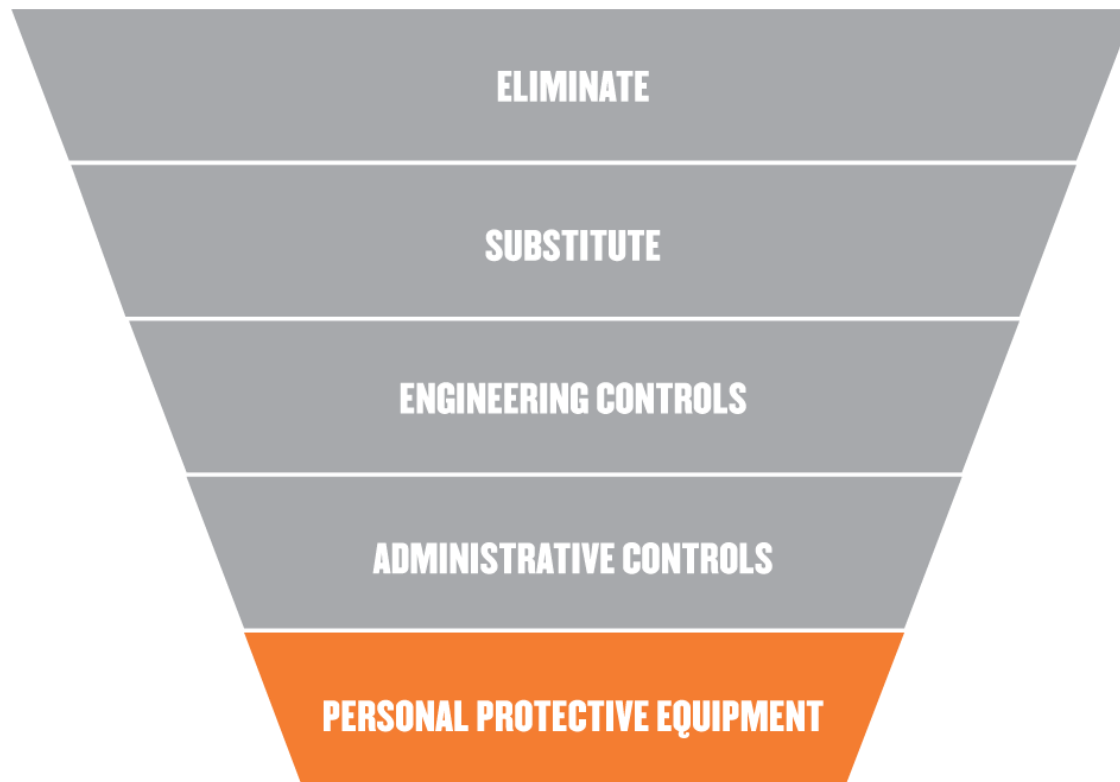


# HOC OVERVIEW





# O@H HIERARCHY OF CONTROLS



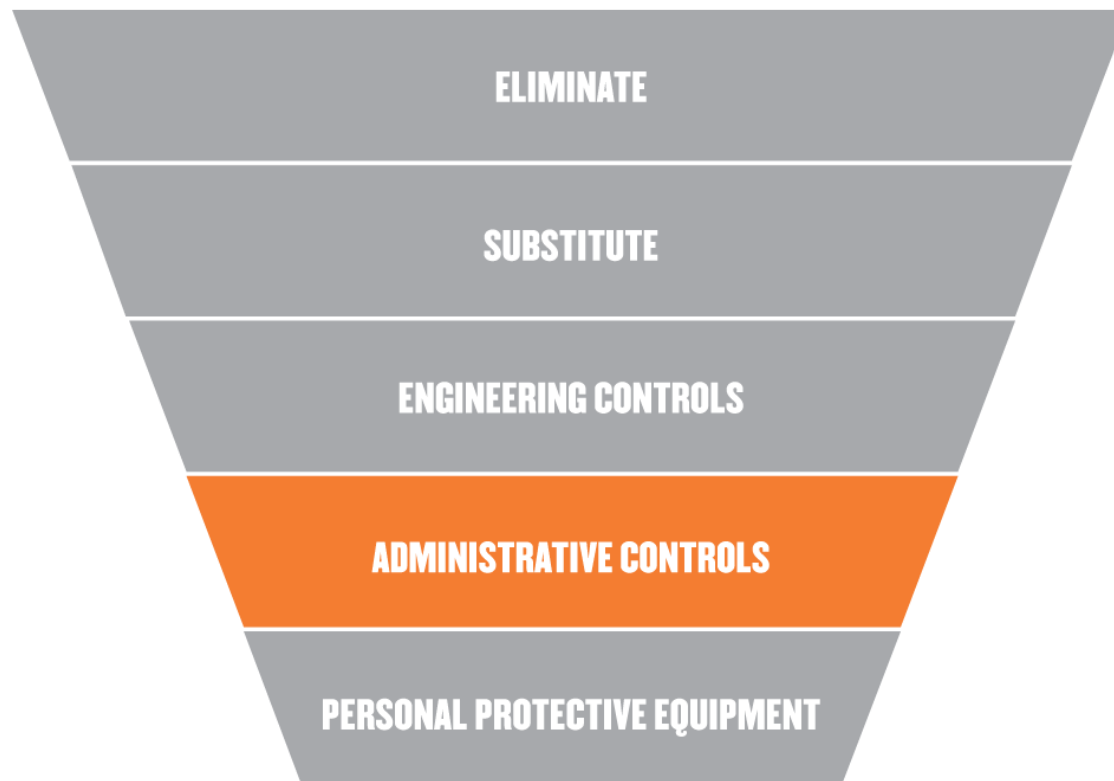
# HIERARCHY OF CONTROLS

## PERSONAL PROTECTIVE EQUIPMENT {PPE}

- » O@H Definition
  - » Secondary Protection Solutions
  - » Protects/covers the worker or deflects an object after it has fallen
- » Examples:
  - » Hard Hats, Steel Toe Boots, Eyewear, Hand Protection



# O@H HIERARCHY OF CONTROLS



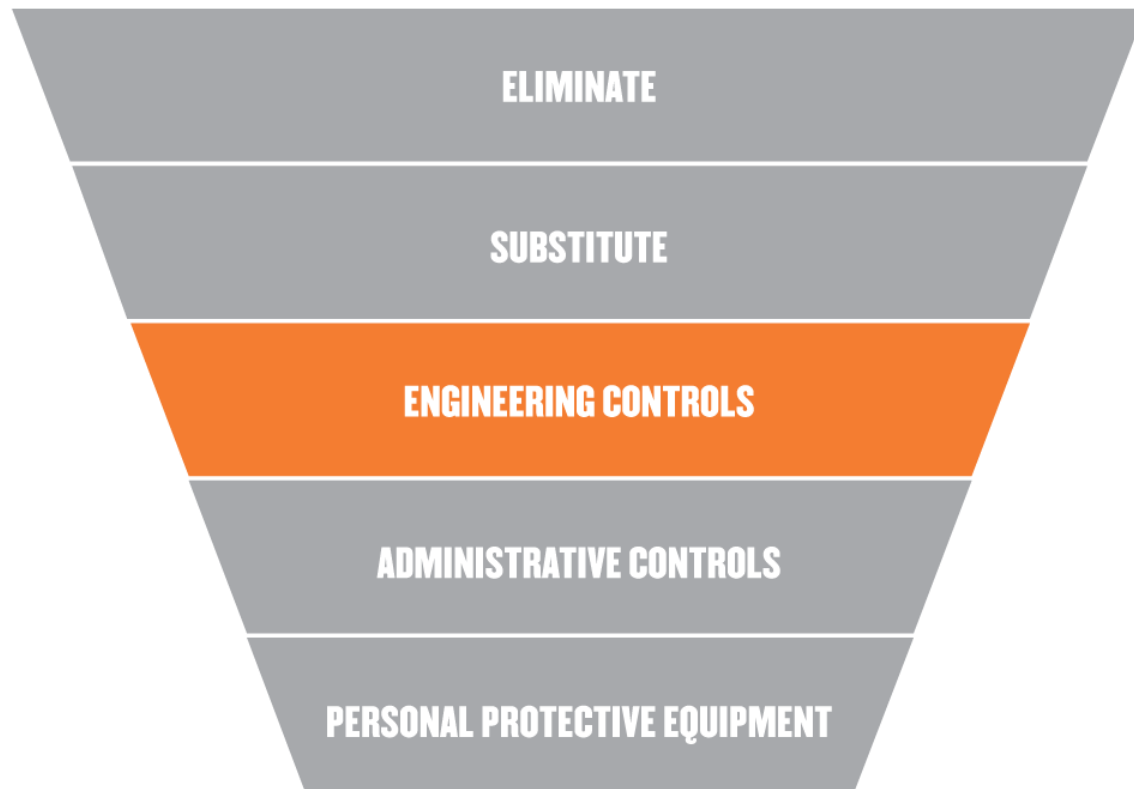
# HIERARCHY OF CONTROLS

## ADMINISTRATIVE CONTROLS

- » O@H Definition
  - » Changing the behavior of individuals
- » Awareness & Communication
  - » Signs, Stickers, Barricade Tape
  - » Tool Box Talks
  - » Training, Training, Training!
- » Policies & Procedures
  - » Checklists (Pre, During, Post Job)
  - » “Red Areas” or “Drop Zones”
  - » Hoisting vs Carrying Procedures



# O@H HIERARCHY OF CONTROLS



# HIERARCHY OF CONTROLS

## ENGINEERING CONTROLS

- » O@H Definition
  - » Aims to prevent the object from falling (keeps them from happening)
- » Two types
  - » Passive Engineering Controls
    - » Does not require active participation from the worker
  - » Active Engineering Controls
    - » Requires active participation from the worker

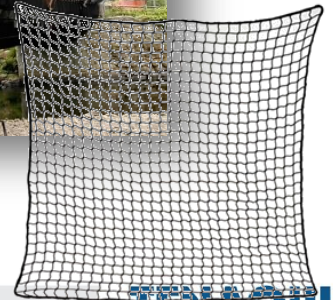




# HIERARCHY OF CONTROLS

## ENGINEERING CONTROLS

- » Passive Engineering Controls
  - » Toe Boards, Netting, Guarding, Barricading, Secondary Retention



# HIERARCHY OF CONTROLS

## ENGINEERING CONTROLS

- » Active Engineering Controls
  - » Connectors, Lanyards, Topped Containers



# WHAT DO THE REGULATORS SAY?



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# REGULATIONS

- » US: OSHA
  - » Scaffolds: 1926.451(h) – “falling object protection”
  - » Fall Protection: 1926.501(c) – "Protection from falling objects"
  - » Steel Erection: 1926.759(a) – “Securing loose items aloft”
  - » General Duty Clause
  
- » CAN: Canada OH&S Regulations
  - » National regulation mentions risk in 3 specific applications
  - » *“Protect Your Head!”* article: “Hard hats are the only piece of equipment that can protect you against these risks.” – NOT TRUE!



\*USA Department of Labor – OSHA 1926: [www.osha.gov](http://www.osha.gov)

\*Govt of Canada: [www.labour.gc.ca](http://www.labour.gc.ca)

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# DROPS

- » DROPS: Dropped Objects Prevention Scheme
  - » Focused on preventing dropped objects in the Oil & Gas industry
  - » Work to spread awareness, create best practices, and promote safety
  - » Over 130 members worldwide
  - » Ergodyne is a proud member
  - » [www.dropsonline.org](http://www.dropsonline.org)









# SOLUTIONS

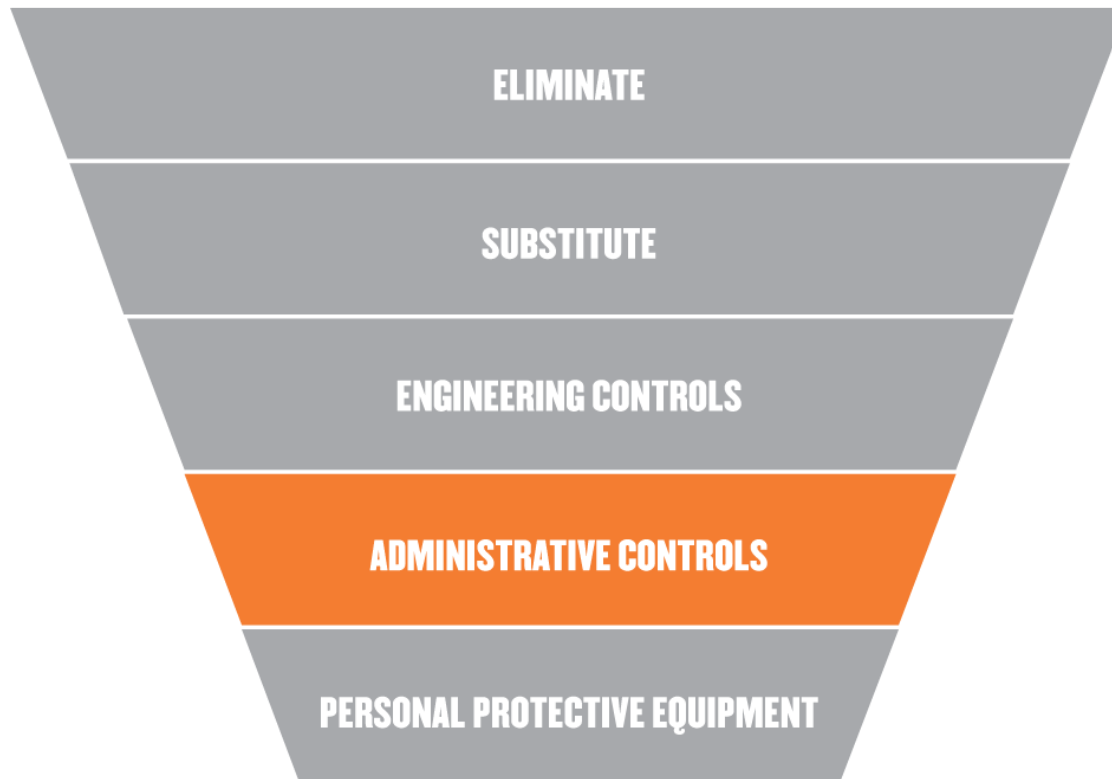


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# HIERARCHY OF CONTROLS

## OBJECTS AT HEIGHTS SOLUTIONS



# ADMINISTRATIVE CONTROLS

## AWARENESS & EDUCATIONAL MATERIALS

BROUGHT TO YOU BY

# TENACIOUS UNIVERSITY



### ergodyne DROPS FREE ZONE™ TOOL TETHERING SYSTEM

**TOOL TYPES:**



**TRAPPING**  
 Trapping refers to retrofitting a connection point onto a tool. Most tools do not come with a secure attachment point built into the tool. In these situations, a secure attachment point must be created.



**TETHERING**  
 Once all tools have a connection point, the appropriate tethering solution can be selected.



**TOPPING**  
 Workers use transport equipment to lighten by carrying or holding. There are a variety of rigging solutions available to safely transport.



**COMMON TOOLS:**


**Objects at Heights, While Falling, Struck, and Gravity Falls.**

With the exception of Chuck Norris, hurricanes and hailfalls, there's little more dangerous than a plummeting object. Unfortunately, most tools don't come with wings, so when you have a better grip type of jaw and not a full vest, the tool and equipment you rely on can quickly turn into plummeting little (or big) bombs of destruction.

After safety gags became our standard fall protection in the past, objects at heights became a planning has been an afterthought or not even a thought. Today, regulators and professionals acknowledge the serious, life-threatening risks of falling objects and are instituting rules to ensure proper preparations are followed in the workplace.

**Ready Check**

Objects at heights safety involves too many unattended, unorganized objects in a serial position and objects in transit to be an ideal job site.

(1) unattended, unorganized objects

In 2012, there were 252 fatalities from being struck by a falling object or equipment in the United States which accounted for 1% of all work place fatalities. \*\* Dropped objects are a serious concern that can put a workforce at risk and result in lost productivity, whether in the worker's hand or left on the work surface, a dangerous dropped object situation can happen without notice. The result can range from inconvenience to production to the serious injury or death.

Other negative results of dropped objects include the cost of damaged equipment whether it is the dropped object itself or an object it impacts before. Calculate this: a worker drops a 3.5, 200 lb air alignment device 60 meters into the head of a brand new container P-250. Houston, you've got an expensive and unnecessary problem on your hands.

But even if the damage or injury occurs from a dropped tool, a worker can lose hours of productivity by retrieving a missing critical tool, wasting time and money for the company.

Additionally, when tools are kept in unorganized, uncontrolled or un-secure containers or, conversely, not kept in containers at all, there is a much higher likelihood of those objects falling at heights. Pulling a wrench from the bottom of a pile, a job of a corner lift that projects a bag of bolts, or an accident look of a loose tool off one ledge are all examples of the unpredictability of this situation.

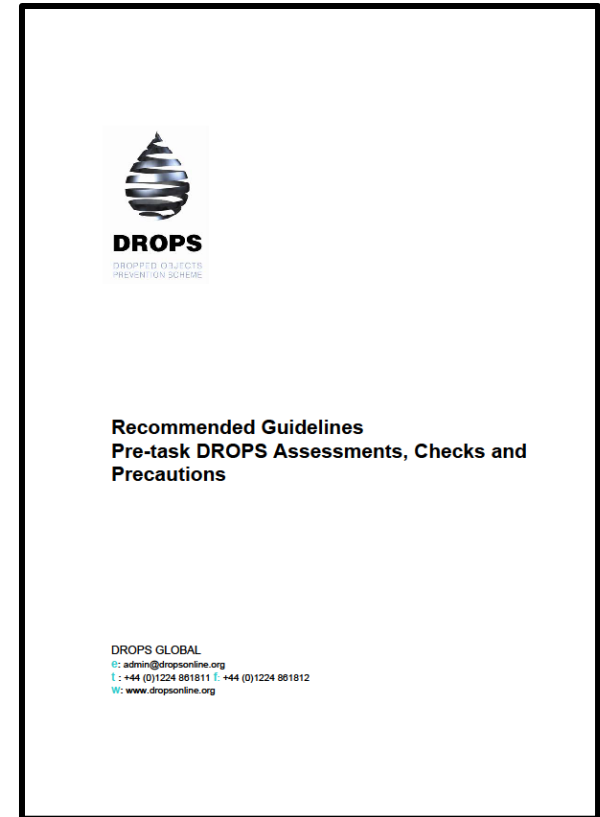
There is also a need for special attention to control, repair and those that may be another cross workplace. All of these situations create a heightened risk of worker injury and risks associated with time and movement from scurrying around to locate them.



# ADMINISTRATIVE CONTROLS

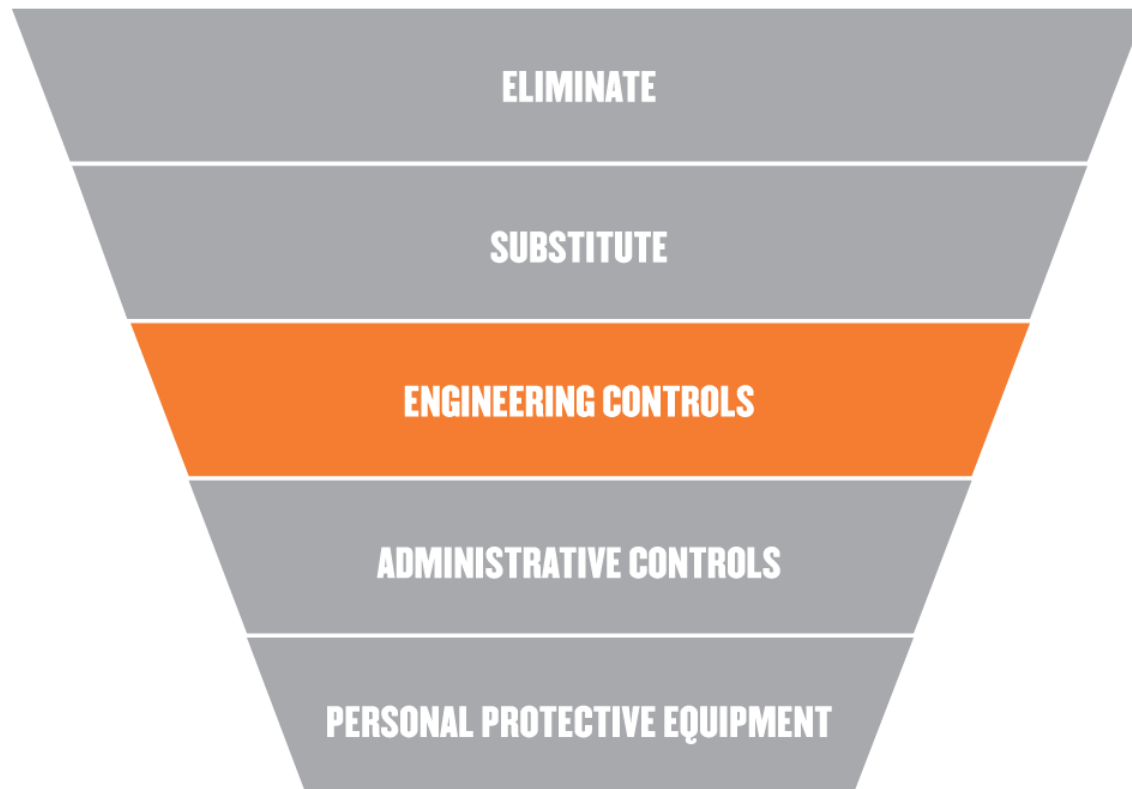
## POLICIES & PROCEDURES: DROPS GUIDELINES

- » Pre-task Assessments, Checks and Precautions:
  - » Static and Dynamic Dropped Objects Controls
  - » Task Planning
  - » Before Starting Work
  - » Working at Height
  - » Tasks Involving Loading or Lifting
  - » Lift Plans and Collision Checklist Examples



# HIERARCHY OF CONTROLS

## OBJECTS AT HEIGHTS SOLUTIONS



# ENGINEERING CONTROLS

## ACTIVE SOLUTIONS: THE 3 T's OF O@H SAFETY

### » Trapped

- » Captures a connection point on tools that do not have one built in.

### » Tethered

- » Prevents object from falling by securing to a worker or other anchor point.

### » Topped

- » Cover buckets, pouches, and other containers to avoid spilling their contents.







// TRAPPED

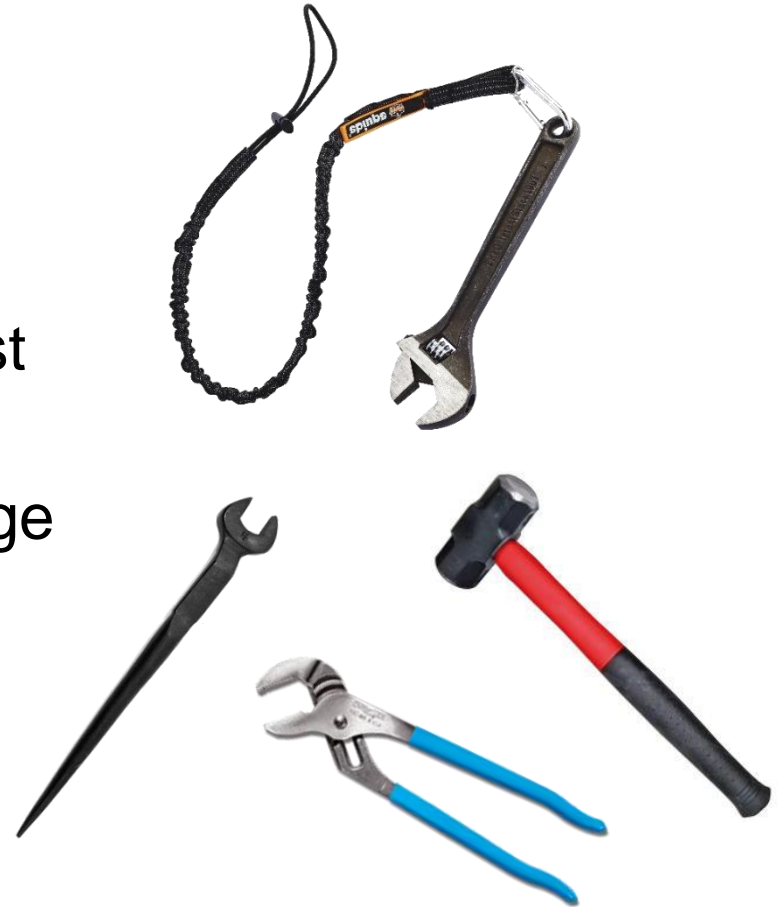


# THE ISSUE

## A LACK OF BUILT-IN CONNECTION POINTS

### » Overview

- » Most tools lack convenient connection points.
- » Attaching a lanyard is the most challenging part of tethering.
- » Until tool manufacturers change designs, retrofit solutions are needed.



# THE SOLUTION

## A COMPLETE TETHERING SYSTEM

### ONE STEP TOOL TRAPS



### TWO STEP TOOL TRAPS







**// TETHERED**

# THE ISSUE

## CHOOSING THE RIGHT TOOL LANYARD

### » Factors

#### 1. Capacity

Weight of tool vs. capacity of solution

#### 2. Connectors

Type, material, and function of connection needed for tool and anchor point.

#### 3. Body

Material and style of lanyard.



# TETHERED

- » Tool Lanyards
  - » Know the type of lanyard needed to do the job.







//TOPPED



# THE ISSUE

## HOW TO TRANSPORT EQUIPMENT TO HEIGHTS

### » Factors

#### 1. Capacity

Weight of the equipment being transported or contained.

#### 2. Type of Equipment

Characteristics of equipment being transported or contained.

#### 3. Transportation

How the equipment will be carried or hoisted.

#### 4. Container Materials

Connectors, handles, body, and other components.





# TOPPED

- » Carrying
  - » Pouches & Bags
  - » Avoid spilling contents when bending, twisting, or reaching

**5518**



**5538**



**5725**

# TOPPED

- » Hoisting
  - » Buckets & bags
  - » Secure contents if container tips over or catches while in transit

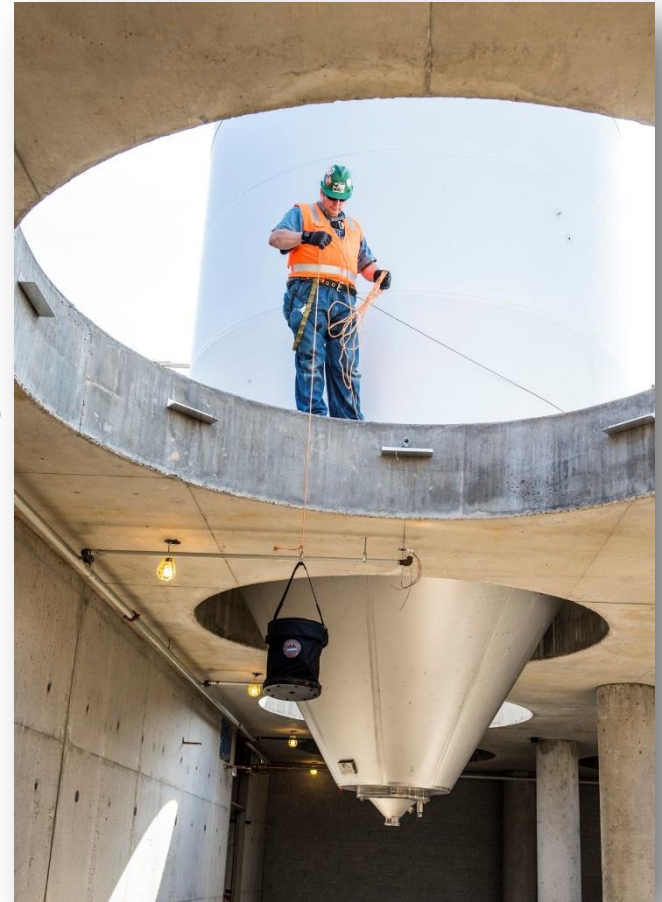
**5760T**



**5653T**



**5843**



# TESTED & TAGGED

## RECOMMENDED GUIDELINES FOR O@H EQUIPMENT

- » All solutions are third party certified
- » Stringently tested using a safety factor
  - » Tool Lanyards = 2:1 (dynamic) dropped multiple times
  - » Bags and Buckets = 4:1 (static) held for length of time
- » Why safety factors?
  - » Individuals know their weight but likely guess their equipment's
  - » High potential for misuse
- » All equipment marked with certified capacity information





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WORK GEAR  
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# squids<sup>®</sup>

MODEL# 3130S

MAXIMUM WORKING CAPACITY  
**2 LBS / 0.90 KG** 

ALWAYS USE WITH PROPER PERSONAL PROTECTIVE EQUIPMENT

WARNING: Inspect before every use. Do not use if there is any wear.  
Do not use around moving parts. Do not use lanyard at full tension.



# ONE FINAL CONSIDERATION

Your primary prevention to dropped objects...



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# ...YOUR GRIP!

- » Hand Protection
  - » Choose a glove with ample grip and dexterity
  - » Consider the elements being worked in (hot/cold temps)
  - » Consider the materials being worked with (grease, oil, etc.)
  - » Consider the other hand protection risks on the job



**921**



**712**



# LET'S REVIEW...



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# SUMMARY

- » Objects at Heights Safety should be a part of every safety at heights plan: secure people and objects!
- » Objects at Heights Plans should have drop prevention, housekeeping, and safe transport practices in place for increased safety.
- » Use the hierarchy of controls by implementing Engineering Controls (PREVENTION) in addition to Administration Controls and PPE Controls (PROTECTION).
- » Remember the 3 T's: Trapped, Tethered, and Topped.
- » Make sure your equipment is Tested and Tagged by the manufacturer.



FOR MORE INFORMATION ON  
ERGODYNE AND/OR FOR MORE  
OBJECTS AT HEIGHTS RESOURCES,  
EMAIL [ORDERS@ERGODYNE.COM](mailto:ORDERS@ERGODYNE.COM) OR  
VISIT [WWW.ERGODYNE.COM](http://WWW.ERGODYNE.COM).



A low-angle photograph of a worker on a radio tower against a clear blue sky. The worker is wearing a hard hat, safety harness, and work clothes, and is positioned near a large white antenna. The tower's metal lattice structure is visible on the left side of the frame.

# THANK YOU!!



## OBJECTS AT HEIGHTS // AWARENESS AND SOLUTIONS