

Showcase Webinar Series

Positive, Negative, and Unintended Consequences of Using Visual Aid Technologies: Mobile, Tower, and Overhead Cranes

Presenter: Chris Machut, Founder & Chief
Technology Officer
Netarus

Host: Jonah Hobson
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TRAINING SOLUTIONS



Chris Machut

- Chief Technology Officer, Netarus
- BS, Computer Engineering Virginia Tech



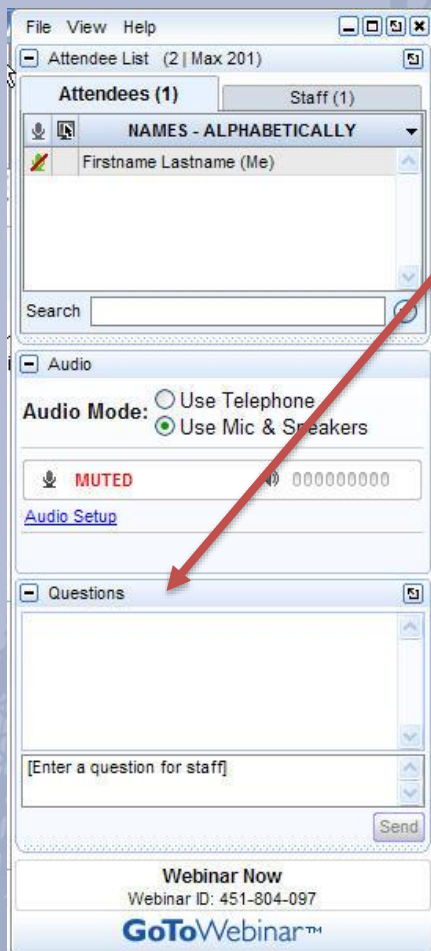
Netarus specializes in developing rugged situational awareness platforms systems - HoistCam, TugCam and ThreeSixtyCam. From tugs to cargo ships to vehicles, Netarus engineers and manufacturers weatherproof and marine-grade situational awareness platforms based on rugged camera, video and DVR solutions. For the last decade, Netarus creates innovative technology solutions by integrating and developing systems for construction, industrial, transportation and marine industries.



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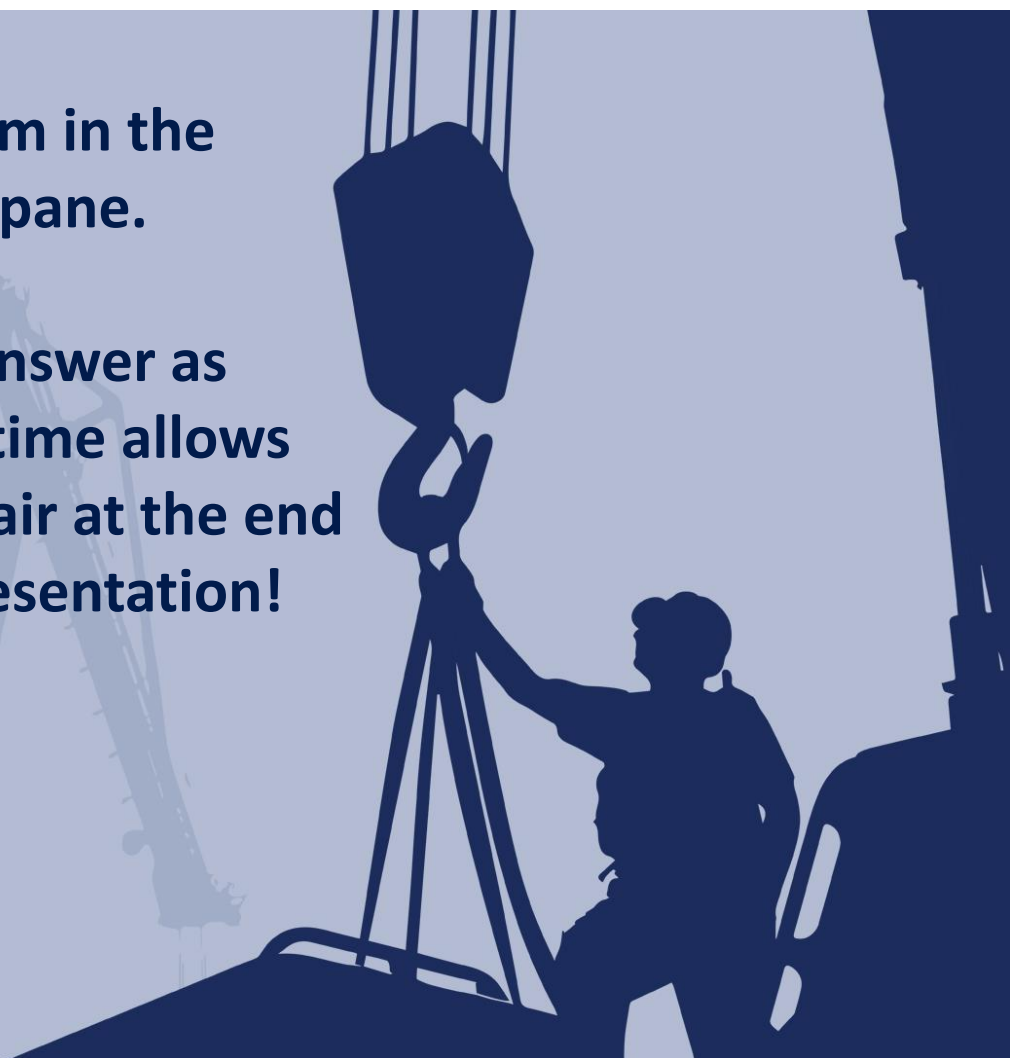
Cranes • Rigging • Lift Planning • Engineering

Questions?



Enter them in the question pane.

We will answer as many as time allows over the air at the end of the presentation!



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Cranes • Rigging • Lift Planning • Engineering



POSITIVE, NEGATIVE, AND UNINTENDED
CONSEQUENCES OF
USING VISUAL AID TECHNOLOGIES
MOBILE, TOWER, AND OVERHEAD **CRANES**

Chris Machut
Chief Technology Officer

Metarus

ITI Showcase Webinar Series
February 22, 2017



Rapidly Deployable Situational Awareness



Construction - Marine - Industrial - Transportation

Metarus



Construction - Marine - Industrial - Transportation

AGENDA

The background of the slide is a grayscale photograph of a port. Several large gantry cranes are visible, extending from the shore into the water. In the foreground, a large cargo ship is docked at a pier. The water is calm, and the sky is overcast. The overall scene is industrial and maritime.

**Situational
Awareness**

**Visual Aid
Technologies**

**Pros, Cons, and
Unintended
Consequences**

Applications

SITUATIONAL AWARENESS

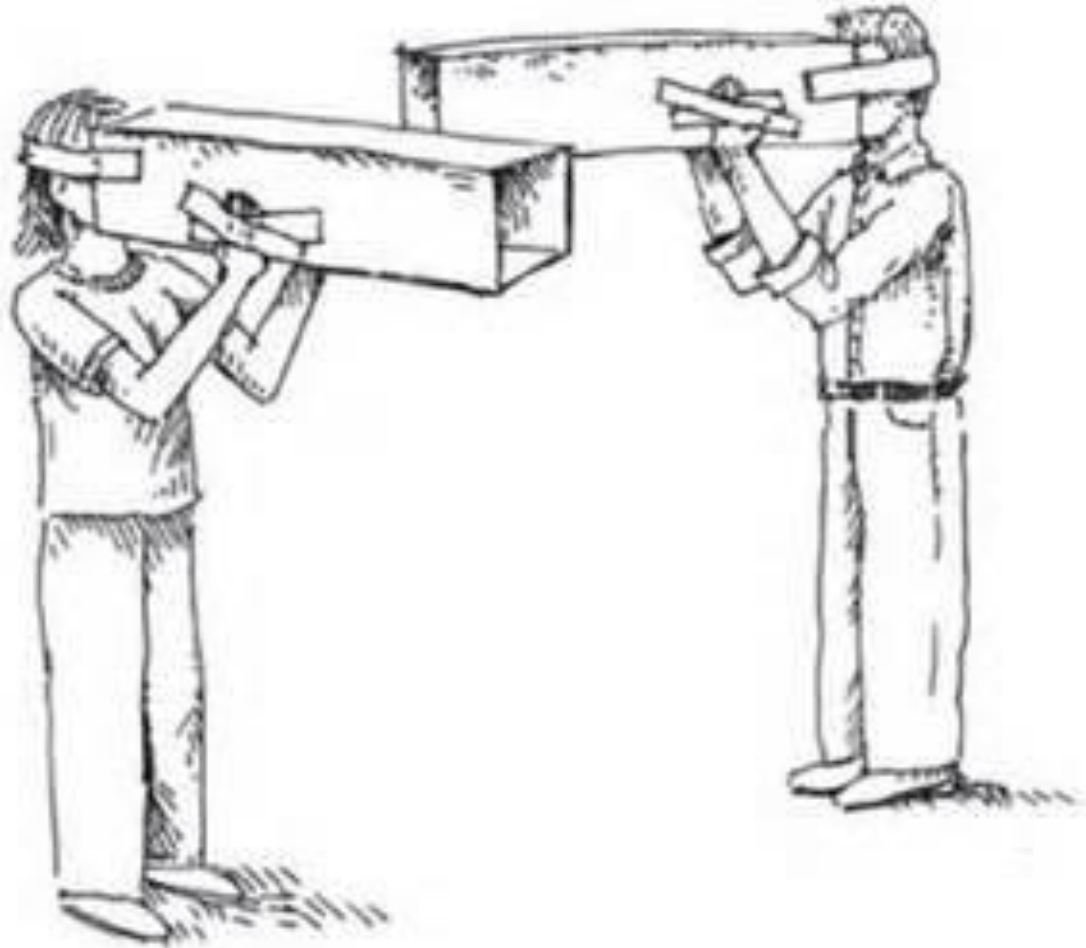


**Visual Aid
Technologies**

**Pros, Cons, and
Unintended
Consequences**

Applications

SITUATIONAL AWARENESS



WHAT IS GOING ON AROUND ME?



“**Situational Awareness** is the *ability to identify*, process, and comprehend the critical elements of information about *what is happening* in the *environment* with *regards to* *operation*.”

Experience

Crane operator

Inputs

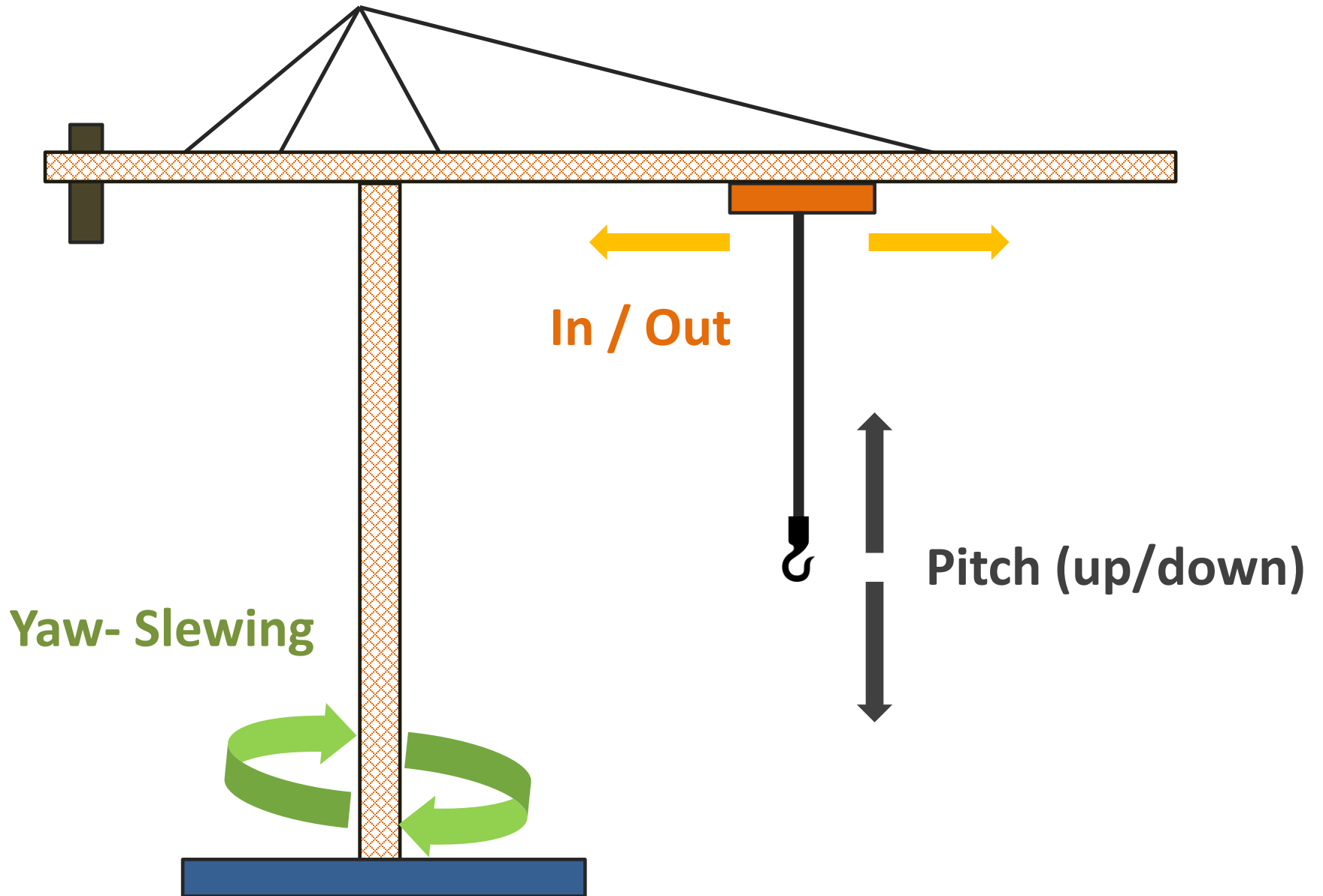
*Information
available*

Communication

Crew tasks

Certificate





SITUATIONAL AWARENESS (SA)

- ✓ Levels of Awareness
 - ✓ Correct Levels
- ✓ Losing SA
- ✓ Barriers to SA
- ✓ How to Maintain SA
- ✓ Human Errors
- ✓ Time Critical Tasks
- ✓ SA Aids

■ Levels of Awareness

- Unaware
- Relaxed
- Heightened Alertness
- High Alert
- Freeze

■ USAF had the OODA Loop

■ Others



CORRECT LEVEL – CRANE OPERATION

■ **Never!**

In service



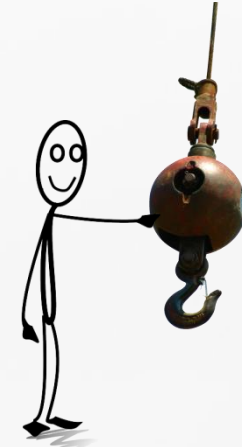
UNAWARE

■ *Waiting...* ■ *Placing boom in position...*



RELAXED

■ *Placing boom in position...*



HEIGHTENED

■ *Pick the Load...*



HEIGHTENED

■ *Load is landed...*

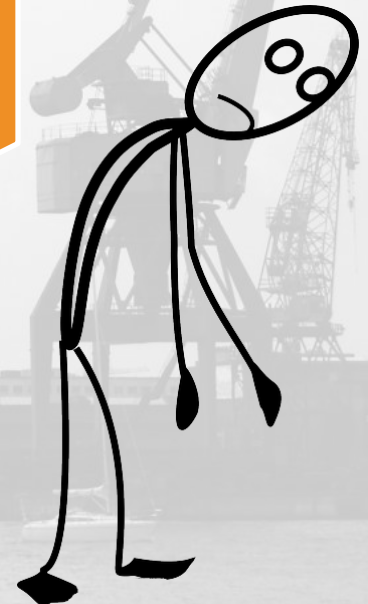


■ *Waiting...*



RELAXED

LOSING SITUATIONAL AWARENESS??



BARRIERS

TO

SITUATIONAL AWARENESS



HOW TO MAINTAIN SITUATIONAL AWARENESS ?



Continually Assess

Communicate

Demonstrate

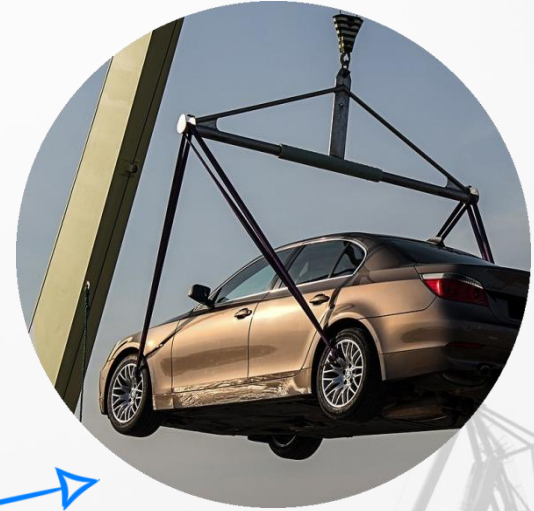
Information

HUMAN ERROR





Training



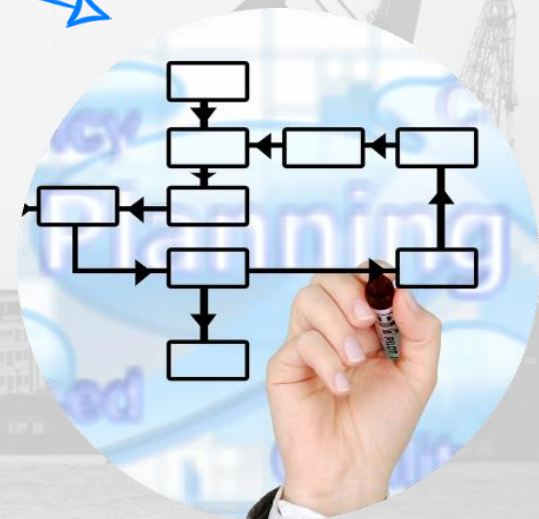
Experience

IMPROVE SITUATIONAL AWARENESS

*Appropriate
Sensor Input*

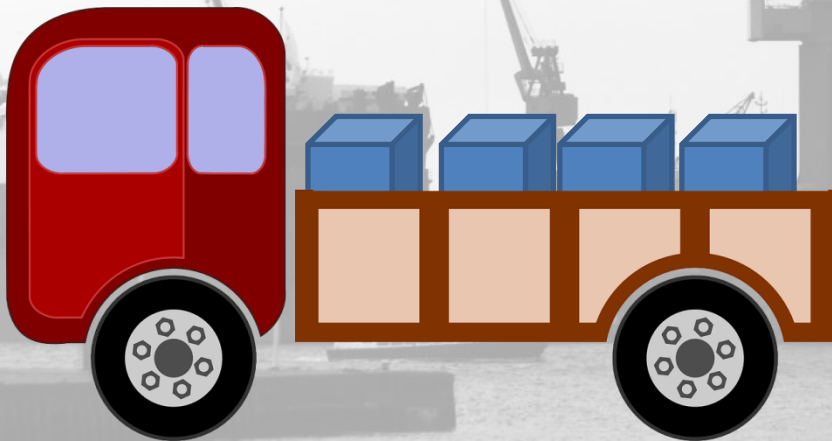


*Review and add
technologies that
provide relevant
data/information*



TIME CRITICAL TASKS

Standard



Non-Standard



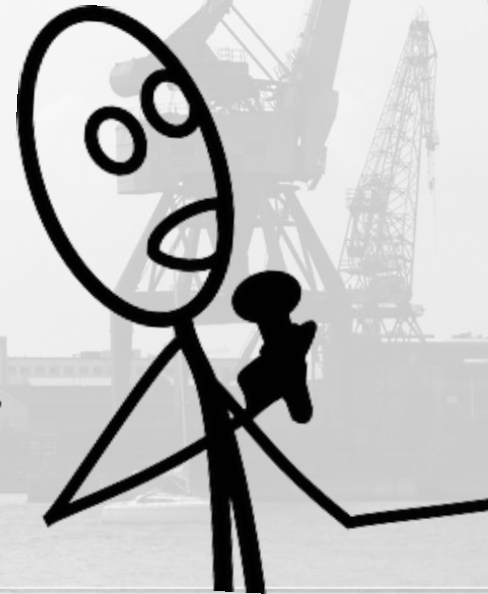
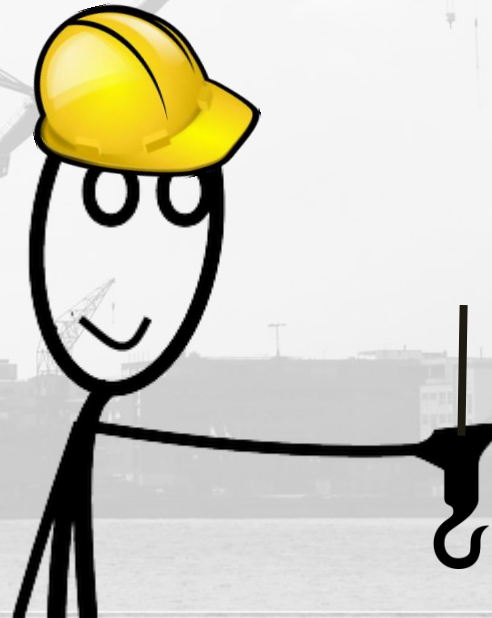
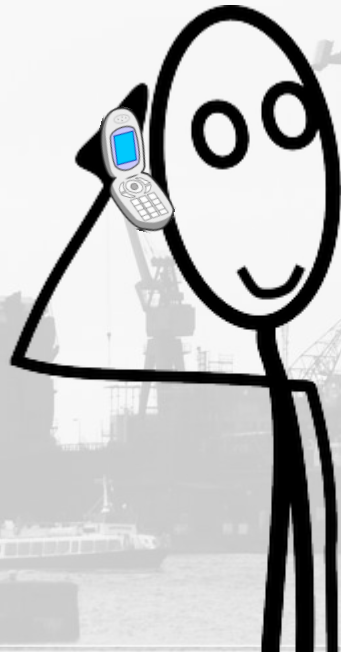
EVERYONE AND EVERYTHING ON THE JOB SITE, AFFECTS CRANE SITUATIONAL AWARENESS!

Operator

Safety Personal

Job Site Personal

Management



SITUATIONAL AWARENESS



**Visual Aid
Technologies**

**Pros, Cons, and
Unintended
Consequences**

Applications

VISUAL AID TECHNOLOGIES

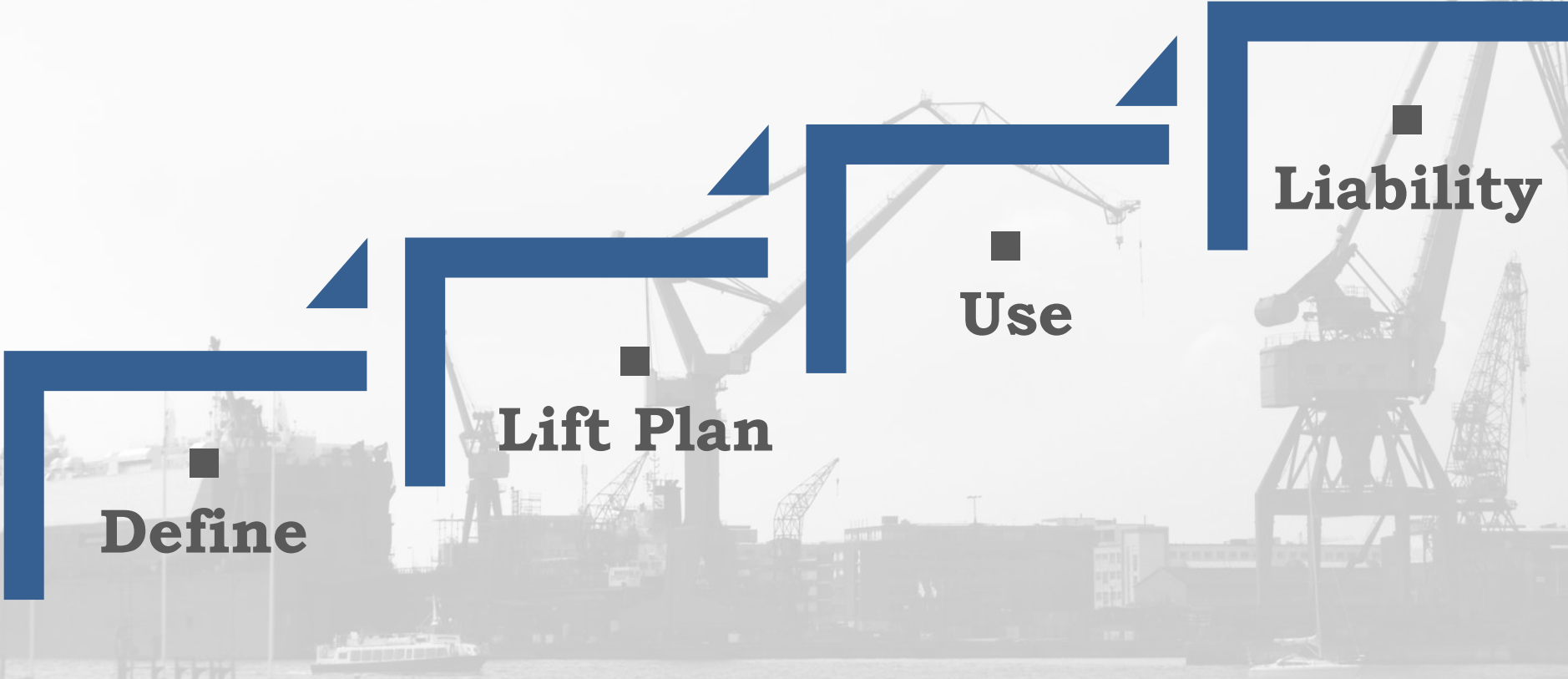
Situational
Awareness



Pros, Cons, and
Unintended
Consequences

Applications

VISUAL AID TECHNOLOGIES



■
Define

■
Lift Plan

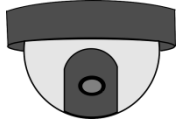
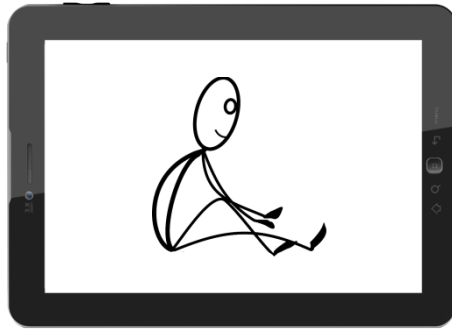
■
Use

■
Liability

VISUAL AID TECHNOLOGIES



VISUAL AID TECHNOLOGIES



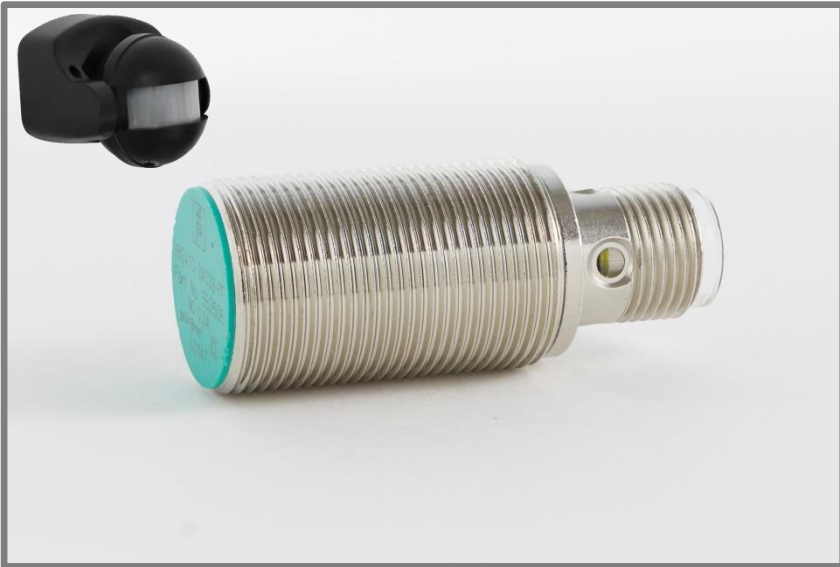
Extends the vision of the user into an area he/she cannot see from their current vantage point

VISUAL AID TECHNOLOGIES



SITUATIONAL AWARENESS - AIDS

Sensors

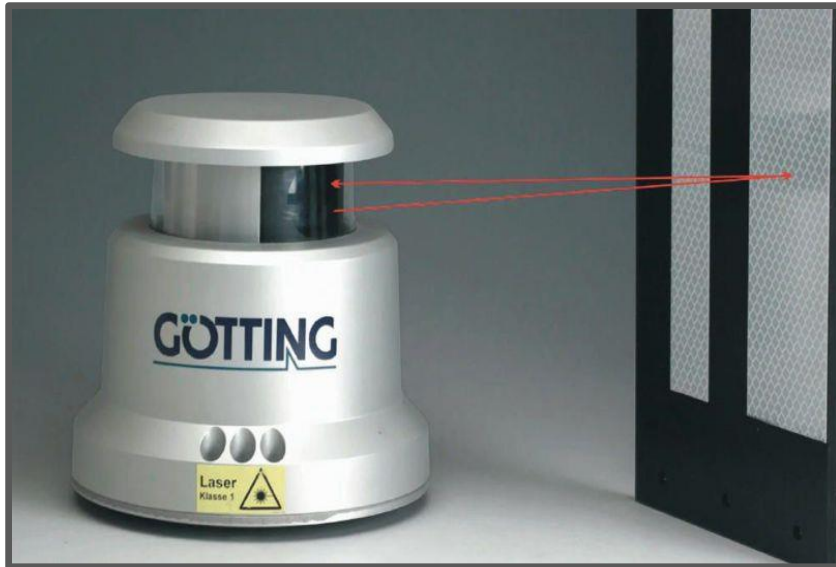


Cameras

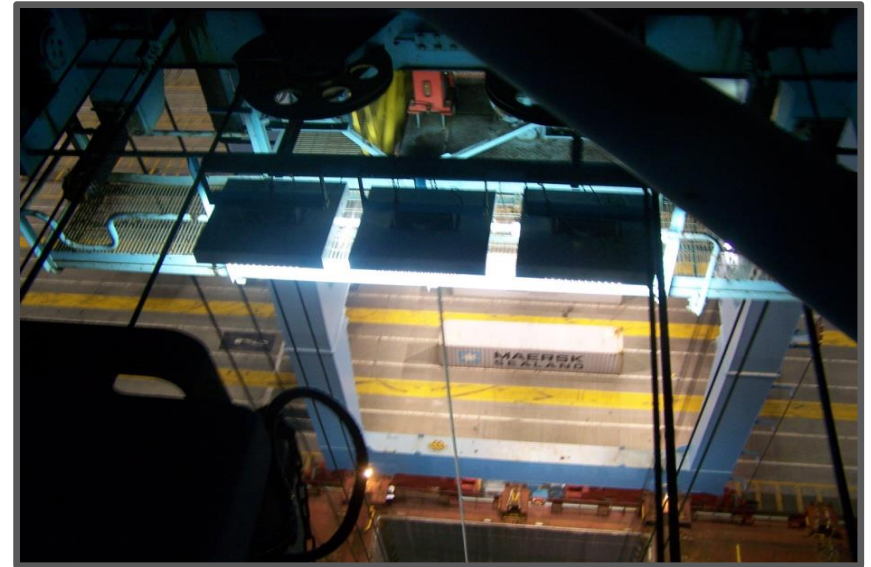


SITUATIONAL AWARENESS - AIDS

Lasers






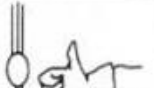
















Lighting



SITUATIONAL AWARENESS - AIDS

Hand Communication

 Main Hoist	 Auxiliary Hoist	 Hoist Load	 Hoist Load Slowly	 Stop
 Raise Boom	 Raise Boom & Lower Load	 Lower Load	 Lower Load Slowly	 Emergency Stop
 Lower Boom	 Lower Boom & Raise Load	 Swing Boom	 Swing Boom Slowly	 Travel (mobile eqpt)
 Retract Boom 2 hands	 Retract Boom 1 hand	 Extend Boom 2 hands	 Extend Boom 1 hand	 Dog Everything

Radios



SITUATIONAL AWARENESS - AIDS

Anti Collision Systems



Anti 2 Block Device



SITUATIONAL AWARENESS - AIDS

Load Sensing Device



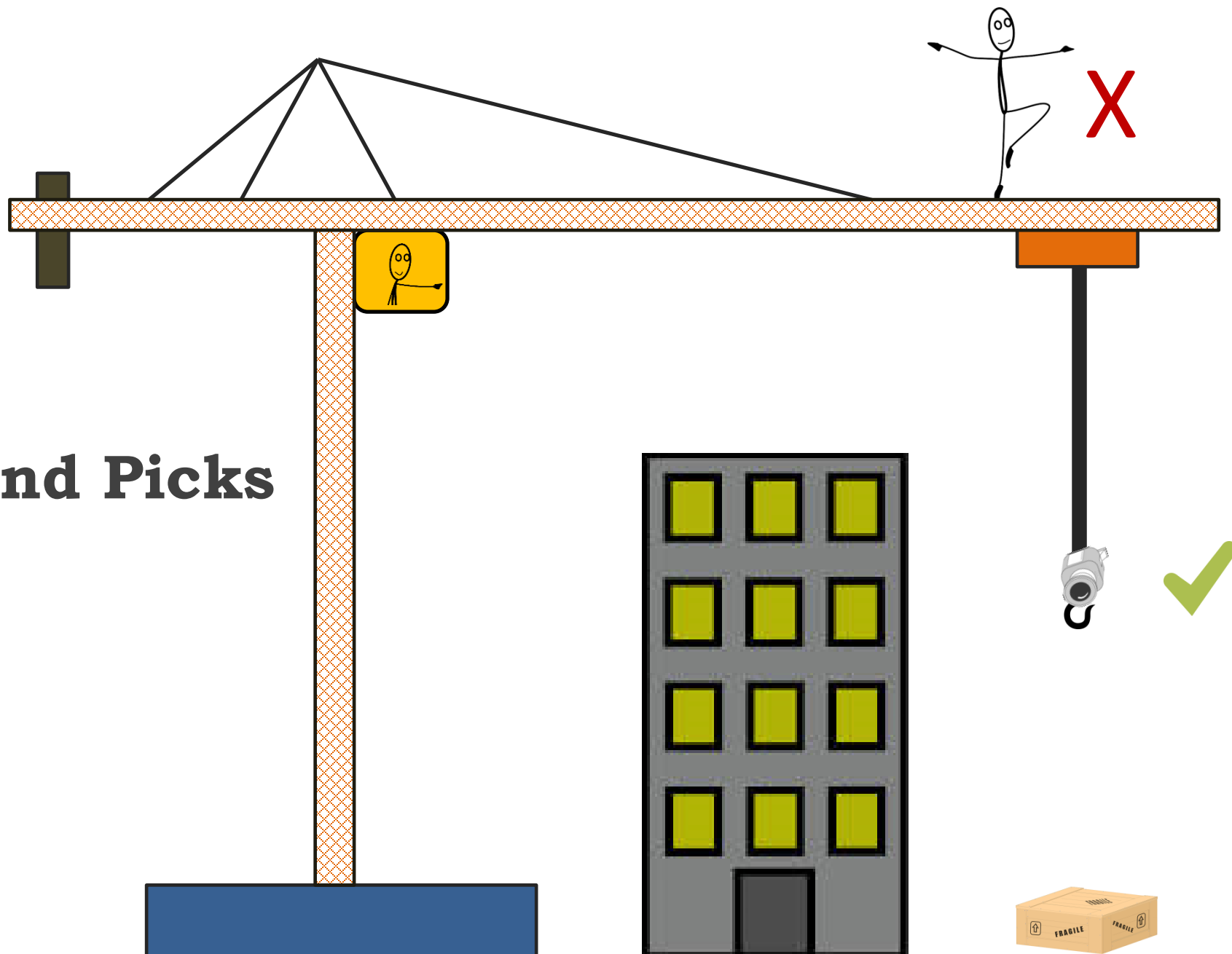
Back up camera/alarms



VISUAL AID TECHNOLOGIES

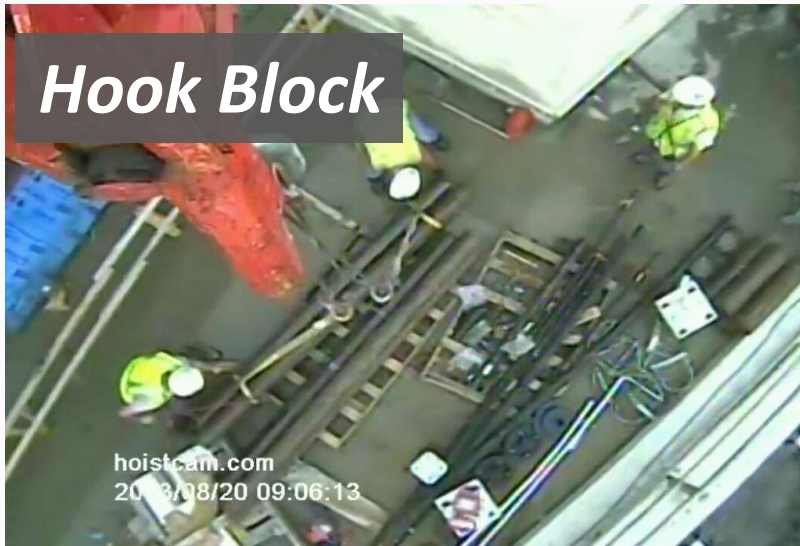


Blind Picks



VISUAL AID TECHNOLOGIES

Camera Systems



Site

VISUAL AID TECHNOLOGIES

■ Lift Plan

- List of picks
- Included in the daily inspection
- Use VAT as required
- Shut crane down for evening



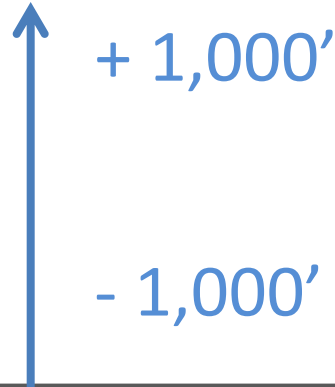
VISUAL AID TECHNOLOGIES

- Power source
- Installation time
- Wired versus Wireless
- Wired – install more costly and time consuming
- Wireless – recharging batteries
- Recording options



VISUAL AID TECHNOLOGIES

■ Height of equipment



■ Type of equipment

- fork lifts
- excavator
- paving equipment
- tower cranes
- lattice cranes
- telescopic boom cranes
- concrete pumps
- etc.

■ Types of Cameras



day



night



thermal

■ Durability



temperature



water ingress protection



ruggedness

VISUAL

AID

TECHNOLOGIES

- ✓ Always practice standard operational and safety practices
- ✓ Verify placement and orientation
- ✓ Visual Aid or Assist

VISUAL AID TECHNOLOGIES

Situational
Awareness



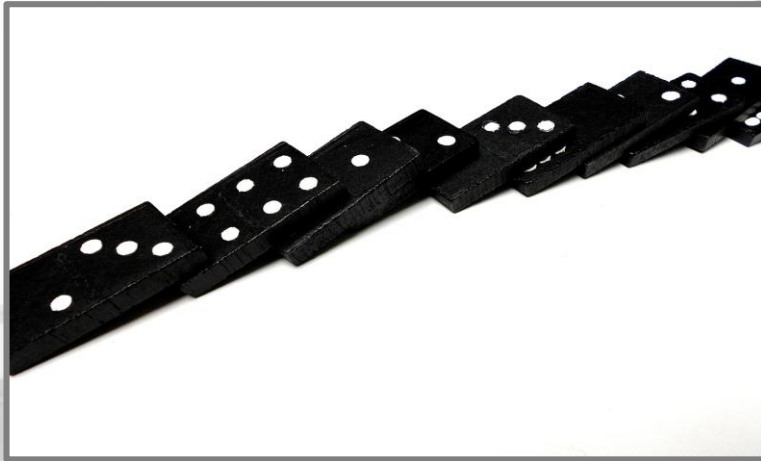
Pros, Cons, and
Unintended
Consequences

Applications

PROS, CONS, AND UNINTENDED CONSEQUENCES

Situational Awareness

Visual Aid Technologies

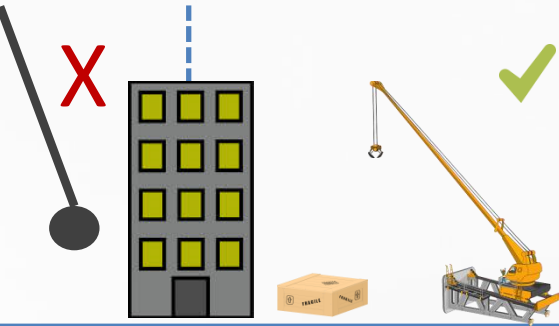


Applications

PROS (BENEFITS)

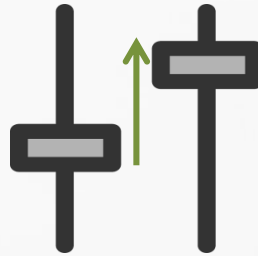
■ **Eliminate!**

Blind lifts or maneuvers



■ **Increase!**

Productivity



■ **Positioning!**

Hook block



■ **Load alignment**



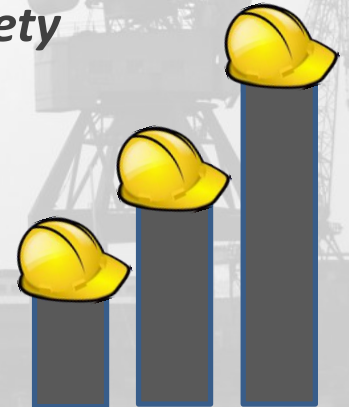
■ **Visually confirming!**

*Load size
Rigging
Signaling and personnel*



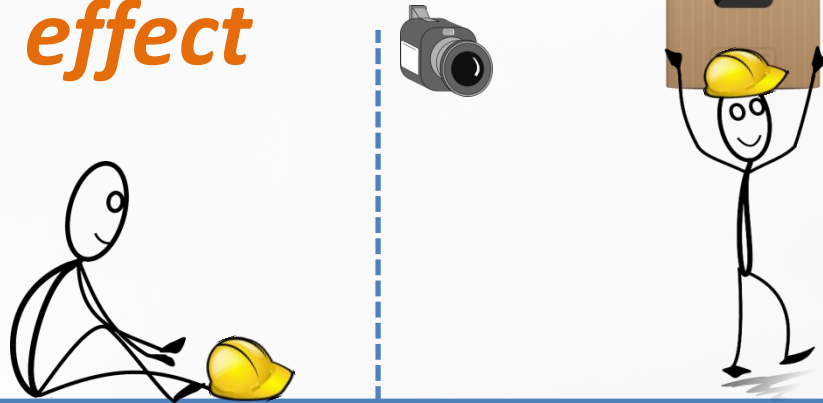
■ **Increase!**

Safety

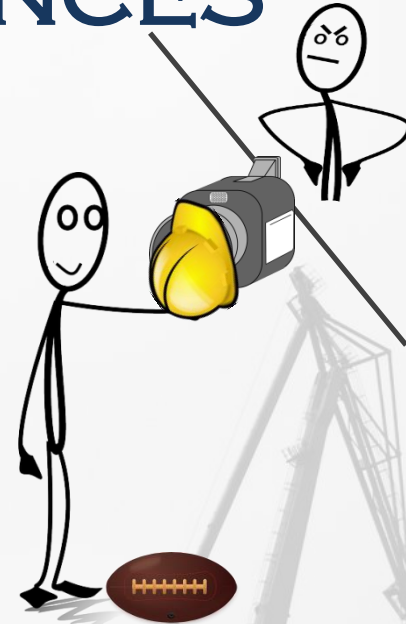


UNINTENDED CONSEQUENCES

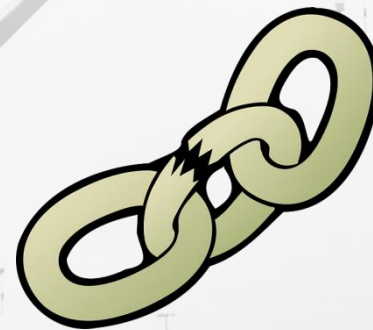
■ Hawthorne effect



■ Big brother Watching



■ Interpret cameras as invasion of privacy and lack of trust



■ Operator perceived liability

■ ***Distraction***

To operator if not properly trained



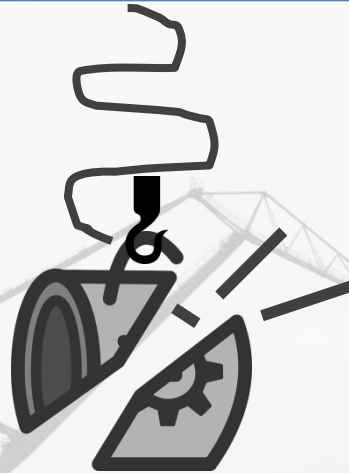
CONS

(DISADVANTAGES)

■ ***Install time and availability of equipment***



■ ***Micro positioning***
Depth perception



■ ***Incorrectly installed or configured***



■ ***Extreme conditions***



PROS, CONS, AND UNINTENDED CONSEQUENCES

**Situational
Awareness**

**Visual Aid
Technologies**



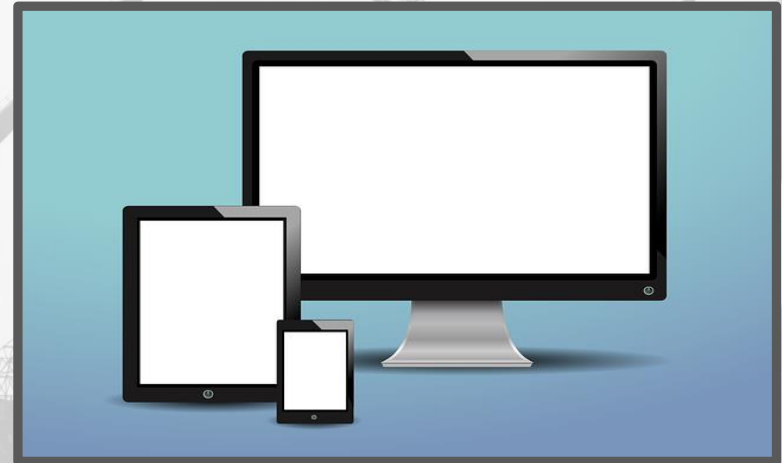
Applications

APPLICATIONS

**Situational
Awareness**

**Visual Aid
Technologies**

**Pros, Cons, and
Unintended
Consequences**





APPLICATIONS



APPLICATIONS



APPLICATIONS



APPLICATIONS



APPLICATIONS



APPLICATIONS

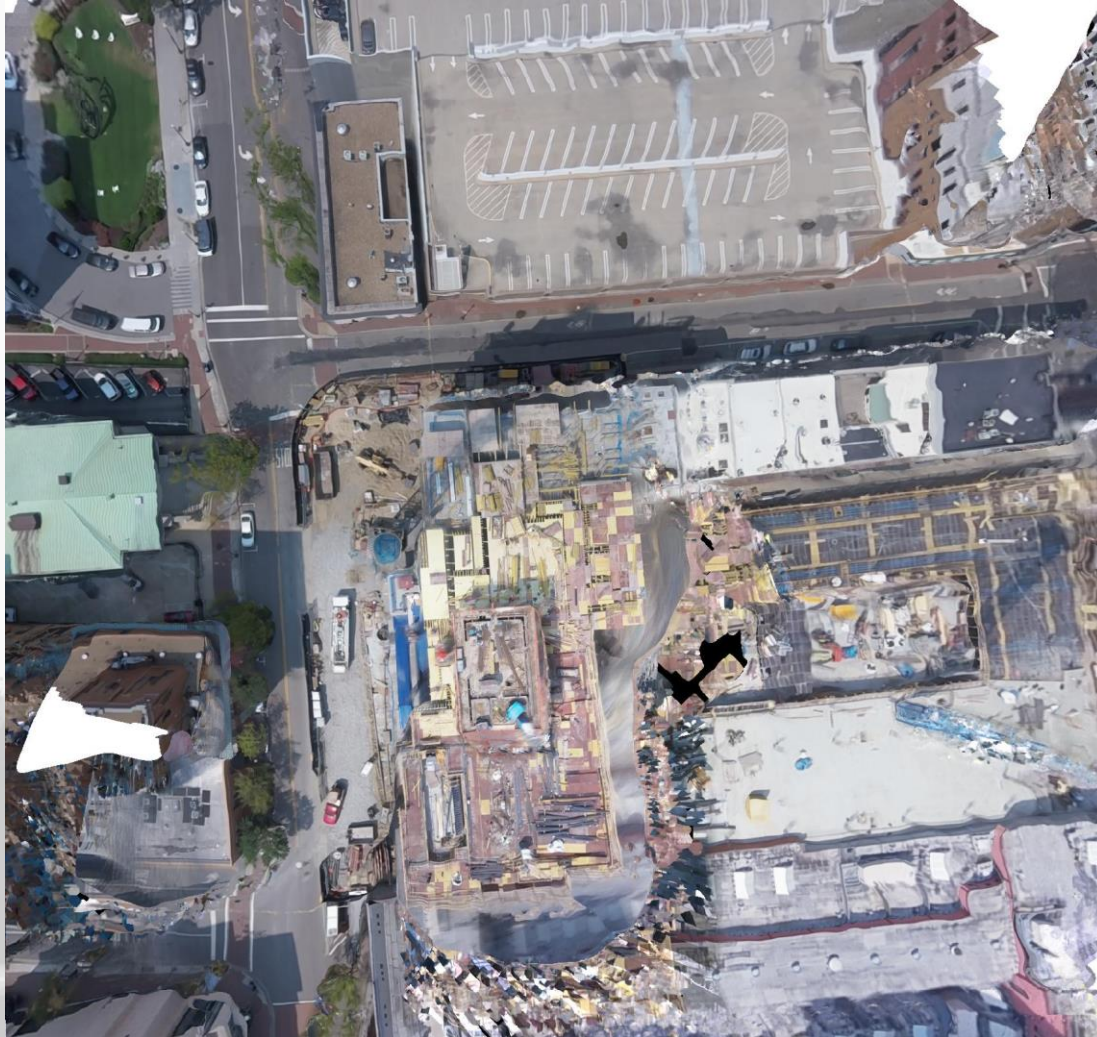
Supervisors – remote video access via computer / tablet / phone

The screenshot displays the HoistCam Director software interface. At the top, there is a menu bar with 'File', 'View', and 'Settings'. Below it is a toolbar with icons for 'Map', 'Video', 'Track', 'Record', and 'Other'. The main window is divided into several sections:

- Left Panel:** A tree view under 'Monitor Center(1/1)' showing a hierarchy of devices: 02262 (with a green checkmark) containing CH1, CH2, CH3, and CH4; and 02264 containing CH1, CH2, CH3, and CH4.
- Map:** A Google Map of the Eastern United States with a red pin on Norfolk, Virginia. The 'HoistCam Director' logo is overlaid on the map.
- Right Panel:** A vertical stack of four video feeds labeled 1, 2, 3, and 4. Feed 1 shows a worker in a yellow safety vest. Feed 2 shows a worker in a red safety vest. Feed 3 is a blue screen with a play button and the text '02262 - CH3 HoistCam™'. Feed 4 shows a close-up of a hoist mechanism.
- Bottom Panel:** A status and data table. It shows 'Monitor:1', 'Online:1', 'Alarm:1', 'Offline:0', and 'Idling:0'. Below this is a table with columns: Device, Positioning Time, Position, Speed, and Alarm. The data row shows: Device: 02262, Positioning Time: 2014-06-19 23:56:45, Position: Invalid, Speed: 0.62 mp/h(North), Alarm: HDDNot Exist,SD CardNot E.
- Bottom Status Bar:** Displays 'Running: 00:00:08', 'Number of alarms on storage media:1', 'Online:1 / number of set loss:0 / Arrears:0 / Total:1', 'line rate:100.00% / Loss rate:0.00%'. Navigation controls for the video feeds are also present.

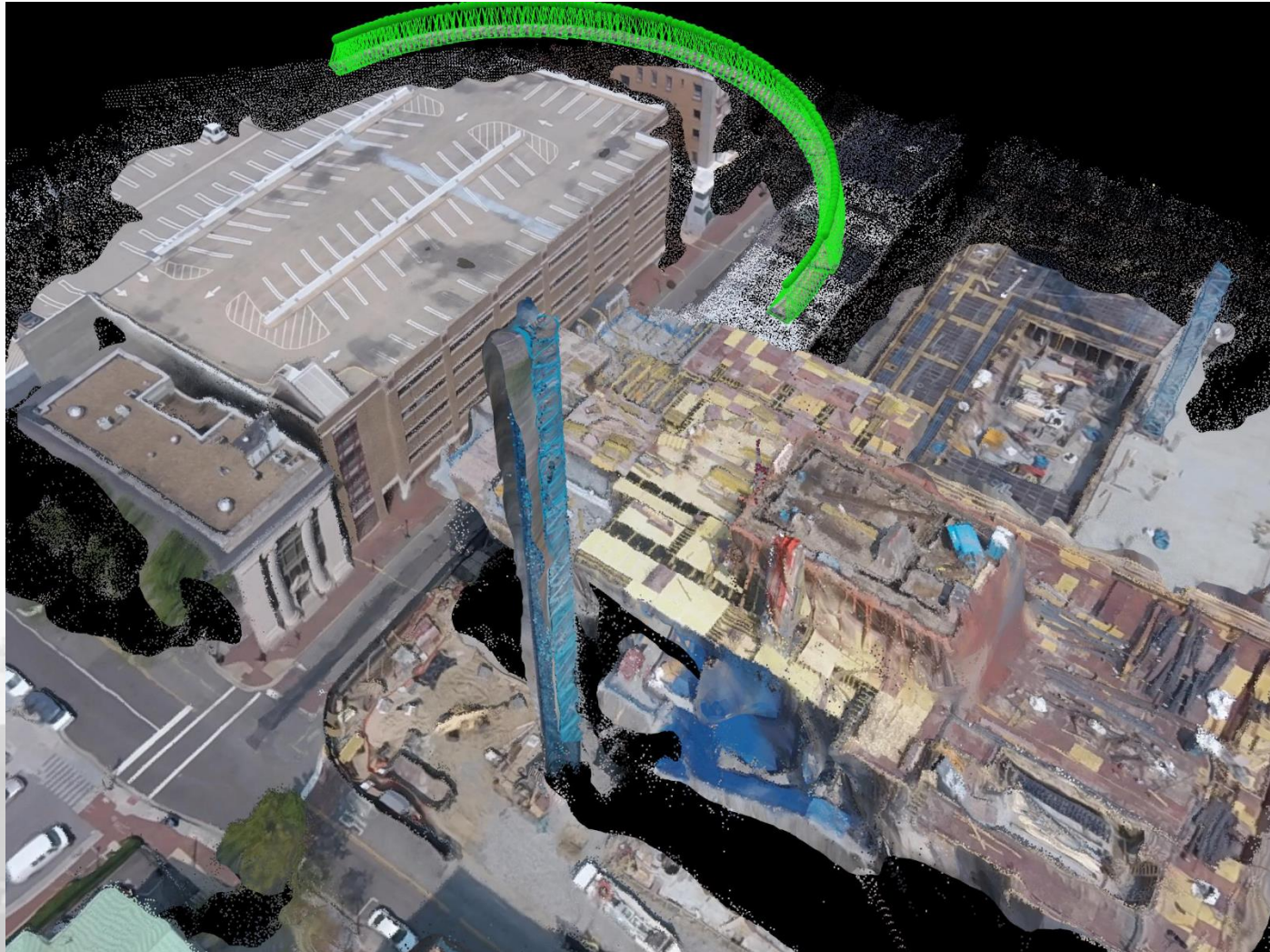
APPLICATIONS

*Analysis: Orthomosaics, 3D Point Clouds
Digital Surface Maps*



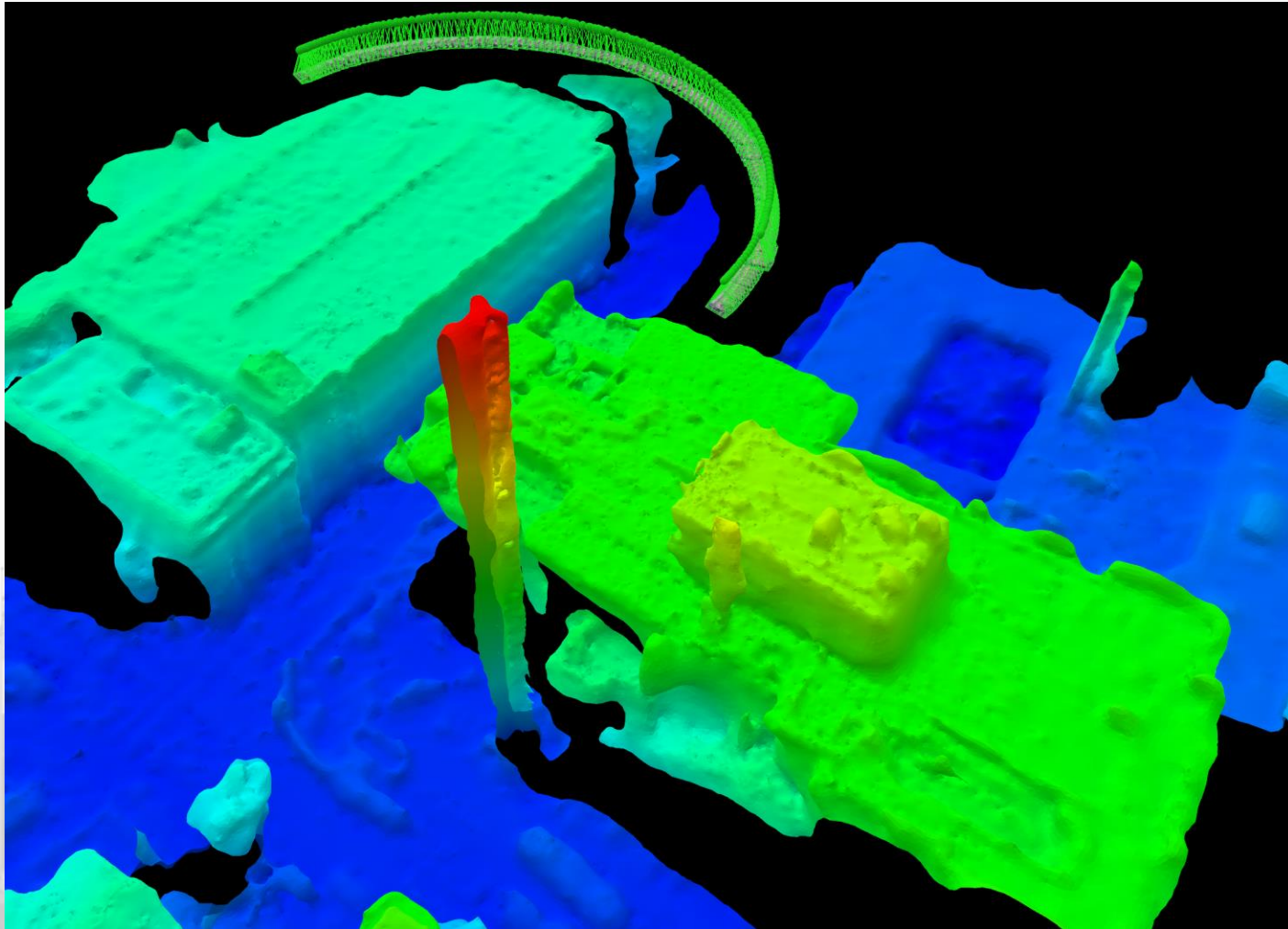
APPLICATIONS

*Analysis: Orthomosaics, 3D Point Clouds
Digital Surface Maps*



APPLICATIONS

*Analysis: Orthomosaics, 3D Point Clouds
Digital Surface Maps*

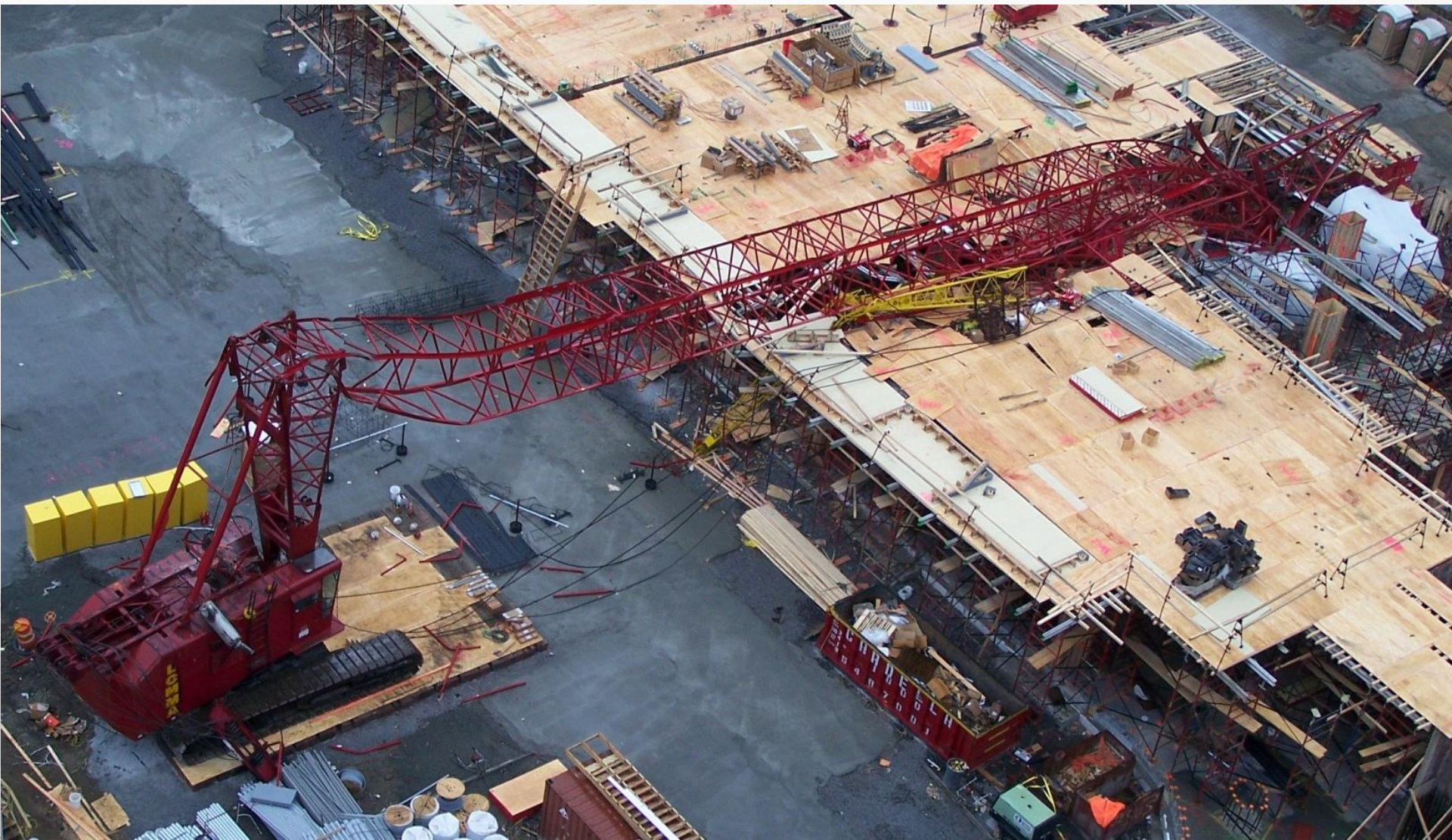


HOISTCAM OPTIONS

1. Wireless Encryption
2. Repeater
3. DVR
4. Winch Camera
5. Job Site Overview Camera
6. Ignition Protection Rating (SAE J1171)
7. Remote/Internet Enabled Systems
8. Power - 12VDC, 24VDC, 110VAC, 220VAC



EXAMPLE WHERE VAT MAY HAVE HELPED



EXAMPLE WHERE VAT MAY HAVE HELPED

New Standards For
Blind / Distant Lifts?



Q&A Time

Situational Awareness – Mobile
Equipment and You

Questions?

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Gold Hall

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Experience (Sliver Lot 3)**

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