# VTCA

CATERPILLAR MACHINE AND WORKPLACE SAFETY INNOVATION

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# Safety Briefing

## Emergency Contacts

- **Fire Emergency**
  *Who will call 911?*

- **Medical Emergency**
  *Who will call 911?*

- **First Aid Responders**
  *Who, where and how to contact?*

## Scenarios and Notables

- **Exits and Fire Extinguishers**
  *Where are the closest located?*

- **Active Shooter**
  *Run – Hide – Fight*

- **Tornados**
  *Where is the shelter-in-place location?*

- **Evacuations**
  *We will congregate at _____*

- **Other Hazards To Mention**

# SAFETY QUOTES

"You don't need to know the whole alphabet of Safety. The A, B, C of it will save you if you follow it: Always Be Careful." – Colorado School of Mines Magazine

"Carefulness costs you nothing. Carelessness may cost you your life." – Safety saying, early 1900's

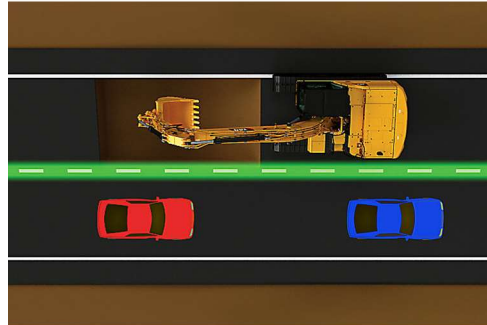"Working safely may get old, but so do those who practice it." – Anon.

# Course Agenda

- **Introductions**

- **Object Detection**

- **E-Fence**

- **CAT Safety**

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# Purpose

- **This Presentation is designed to Provide you with information regarding Caterpillar Machine Object Detection System, E-Fence and Worksite Personal Safety .**

# Importance

- **Machine safety and the safety of the worker is very important for the overall health of your company.**

- **Knowing all available products offer by Caterpillar can put your Company at a advantage.**

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# Object Detection

- **KEY FEATURES:**

- Radar detection integrated into touchscreen display

- Speed sensitive, operator mute functionality

- System warns you when an object is in the critical

- zone behind machine when machine is in neutral

   and reverse.



Touchscreen Display

Rear Object Detection (radar)

U.S. Department of Labor
**MSHA**
Mine Safety & Health Administration

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# Object Detection



## CAT DETECT TECHNOLOGIES

- **Rear Vision Camera**: Standard
  - Integrated in touchscreen display

- **Cat Object Detection**: Optional
  - Radar detection integrated in touchscreen
  - Speed sensitive, operator mute functionality
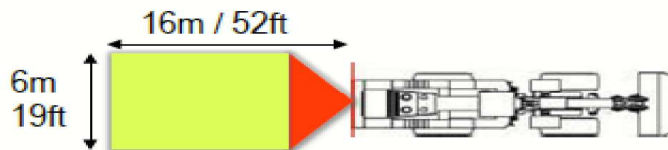  - Warns operators of an object in critical zone behind machine in neutral* & reverse
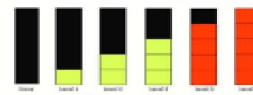
**Coverage Map**

16m / 52ft

6m / 19ft

- *System may not warn operators with enough time to react when objects are detected above 10 km/h (6.2 mph) in reverse. (see Machine OMM)*

**Rear Vision Camera**

**Object Detection Radar**

DETECT

**Cat Object Detection**

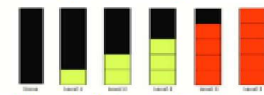Neutral, Park Brake Off*

**Display Integration**

Visual Alerts

**Cat Object Detection**

Transmission in Reverse

**Display Integration**

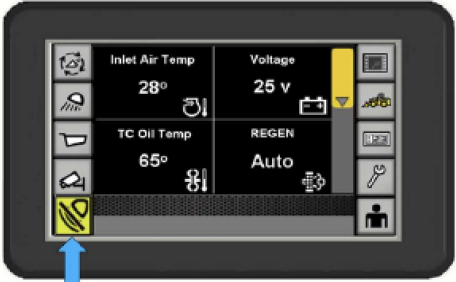Visual & Audible Alerts

# Object Detection

# Object Detection

## CAT OBJECT DETECTION

**DETECT**

### Audible Alarm Snooze Feature

When L3-L5 warning level is active, the audible alarm can be snoozed (silenced, muted) by pressing the Object Detection Status Indicator Icon

Status becomes an active button when the Audible alert is present

Detect status button will snooze (silence, mute) the alarm only when there is an audible alert.
- Machine is in reverse and there is an L3 detection or higher

The status changes to reflect a snoozed alarm.
- The audible alarm will reactivate once the machine gear shift changes to FORWARD and back to REVERSE

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# Object Detection

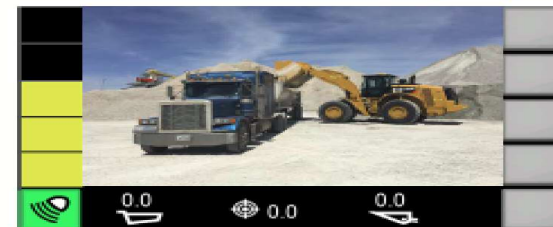## CAT OBJECT DETECTION

DETECT

### Warning Level Definitions
- Object Detection Proximity Bar provides five levels of warning (L1-L5)
- Number of bars indicates the nearness or proximity of an object
- Proximity Bars are shown on reverse camera screen when an L1-L5 warning is present

- **L1, L2**: Only visual indication of an object without an audible alert
- **L3, L4, L5**: Audible alert in addition to a visual indication of an object
  - Audible alert beeps more frequently as the machine gets closer to the object
  - In warning level L5, the audible warning is a continuous beep
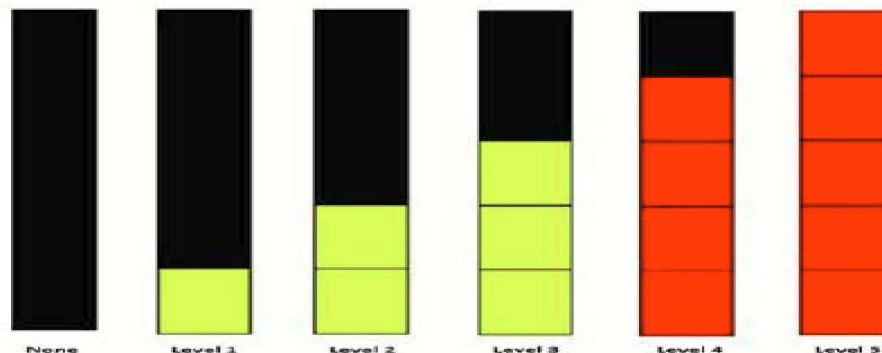
*Example: Machine in reverse, 4 mph*

None   Level 1   Level 2   Level 3   Level 4   Level 5

*Level 3 Warning (Visual and Audible)*
*The object distance for each warning*
*level will change with ground speed*

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# Object Detection

## CAT OBJECT DETECTION

**DETECT**
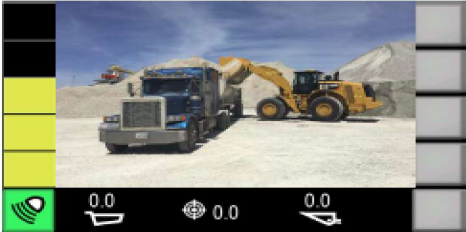
### Speed Sensitive Functionality

- Warning levels change with ground speed for an object at a given distance (examples below)
- Reduces "nuisance / annoyance" alarms, enhancing operator acceptance and awareness
- Speed sensitive functionality exclusive to Caterpillar Object Detection System

*Machine in reverse, 0 mph*

*Machine in reverse, 4 mph*

*Machine in reverse, 6 mph*
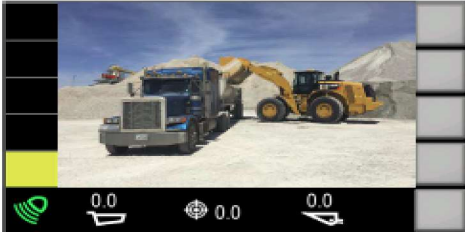
Level 1 Warning (Visual Only)

Level 3 Warning (Visual and Audible)
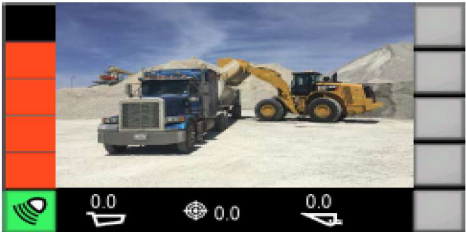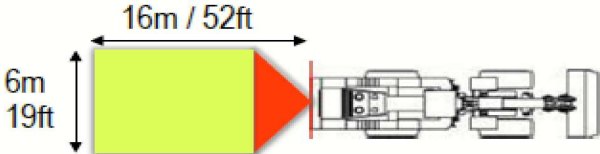
Level 4 Warning (Visual and Audible)

### Coverage Map

- *System may not warn operators with enough time to react when objects are detected above 10 km/h (6.2 mph) in reverse. (see Machine OMM)*

16m / 52ft

6m
19ft

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# Object Detection

# Object Detection
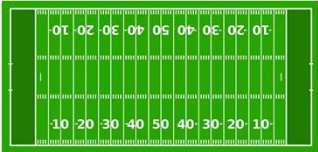
# CAT E - Fence



**2D E-fence**
Automatically constrains machine motion within boundaries by stopping the hydraulic system.

**E-Ceiling**

AVOID:
Power lines
Bridges
Overhead structures

Reduces down time and job site cost

**E-Floor**

AVOID:
Fibre optic cable
Underground utilities

Reduces down time and job site cost (incl fines)

**E-Wall (Swing)**          New

AVOID Swinging into:
Live Traffic
Structures

Reduces down time and job site cost

**E-Wall (Forward)**        New

AVOID:
Structures
Buildings

Reduces down time and job site cost

# CAT E-Fence

# CAT E-Fence

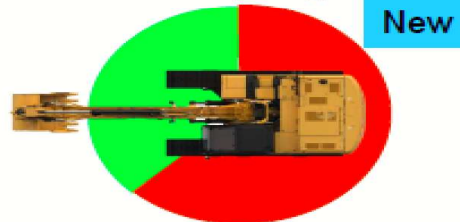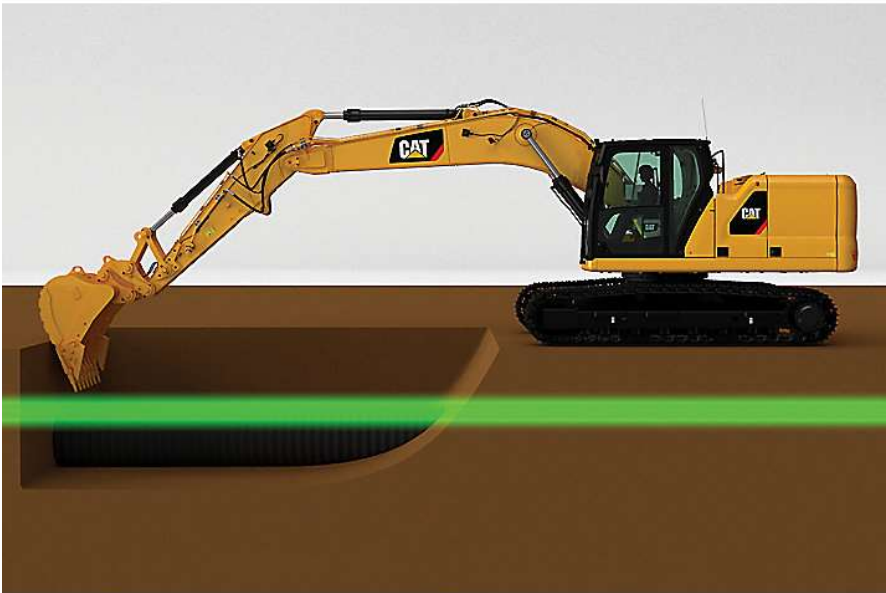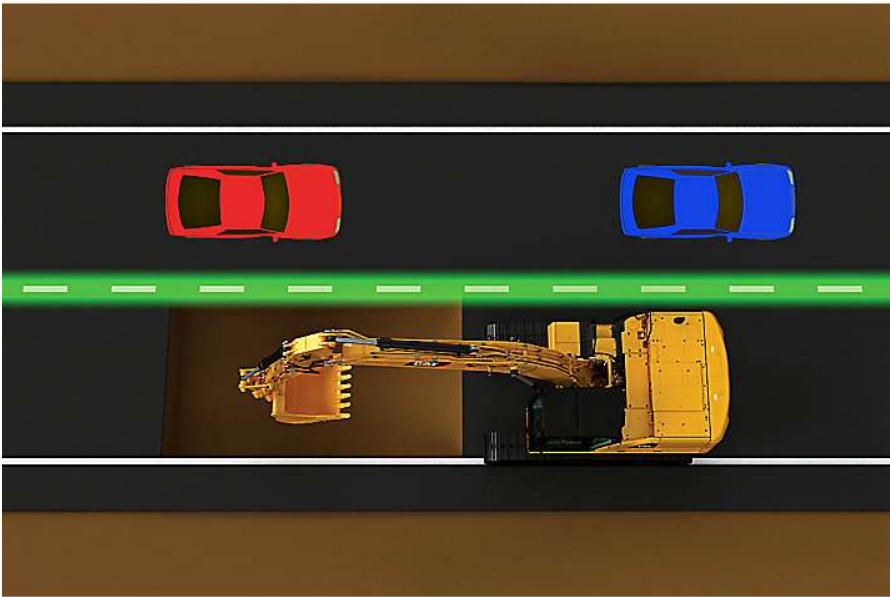**New Lift Assist** safety feature provides real-time payload information on the monitor, ensuring the operator is able to work confidently and safely within the safe working limits of the machine.

Improve worksite safety, enhance productivity and maintain asset value with improved **all-round visibility** on 330/330GC as a result of new right side layout, flat engine hood design, new cab design and standard rearview camera.
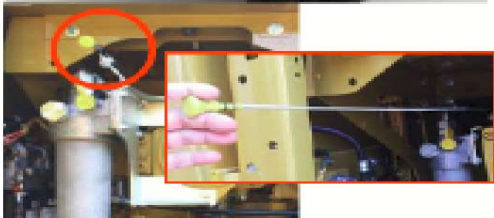
The **new right hand side (RHS) design** with additional steps and handrails for added safety improves upper platform access.

Hazards removed with all daily maintenance at ground level, including **engine oil dipstick**.

Anti-skid plating with countersunk bolts reduces the potential for slippage and trip hazards.

**ROPS cab standard** on all machines (330GC/330) for improved operator safety.

The standard **hydraulic lockout lever** isolates all hydraulic and travel functions in the lowered position.

Ground level **shut-off switch** stops all fuel to the engine when activated and shuts down the machine.

A **battery disconnect switch** helps to deter theft by isolating the battery and enhances safety when servicing the machine.

**New E-Fence** safety feature automatically constrains machine motion within operator defined boundaries for 330. E-fence avoids hazards, reducing jobsite accidents.

E-Ceiling

E-Floor

E-Wall (Swing)

E-Wall (Forward)

Optional **360 degree surround view** with **object detection** camera on 330 provides bird's eye view of the machine, increasing productivity and safety by allowing the operator to easily visualize objects and personnel around the machine in a single view.

**Integrated hydraulic tank cap and breather** eliminates risk of opening the tank without the pressure being released, making it a safe, easy option.

# CAT Detect for Personnel



External Alarm

In-cab/External Alarm when tagged person or object is in detection zone

In-cab Alarm

950M CAT

RFID safety vest and/or hard hat identifies workers

RFID tag attached to objects to identify hazards

PL/VL Integration* with telematics for near-miss alerts and notifications

*PL/VL Integration
Current SCAN–LINK Version - Custom integration w/ digital switch inputs on ECM
Gen 2 Cat version - Optional ProductLink integration module (Available Q215)

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# CAT Detect for Personnel

## WHAT ARE THE LIMITATIONS OF CAT DETECT FOR PERSONNEL?

Cat Detect for Personnel will not detect un-tagged people or objects.

Cat Detect for Personnel cannot detect *through* objects. e.g.: Bucket on a wheel loader

Cat Detect for Personnel cannot detect *through* people.

## WHO SHOULD USE CAT DETECT FOR PERSONNEL?

Everyone who may work in or near a dangerous work zone.

Operators who want to be notified when a person has entered a dangerous work zone.

Safety professionals who want to add an *additional* layer of protection to their good safety practices.

Supervisors who care about the safety of their people.

Organizations who are rigorous in their pursuit of safety excellence.

## HOW SHOULD SAFETY PRACTICES CHANGE WITH CAT DETECT FOR PERSONNEL?

Cat Detect for Personnel is not a substitute for good safety practices. Rather, this system provides an additional measure of protection against incidents.

Users of Cat Detect for Personnel should behave in ways that conform to the Human Construction Traffic Interface, or similar protocols.

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# HOW DOES CAT DETECT FOR PERSONNEL WORK?

Cat Detect for Personnel has four primary components:

- An energized Ultra High Frequency (UHF) antenna

- A passive RFID tag equipped safety vest or hardhat

- An in-cab alarm (to notify the operator)

- An external speaker (to notify the ground worker)

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# Cat's Connected Worker Puts Safety In a Hard Hat,



Battery Pack

Hard Ha

Suspension



Power Button

Channel Change

PTT

Status / Resolve Button

SOS Button

Call Button

Volume Up

Volume Down

https://www.equipmentworld.com/technology/article/1506601 9/how-smartcap-keeps-workers-awake

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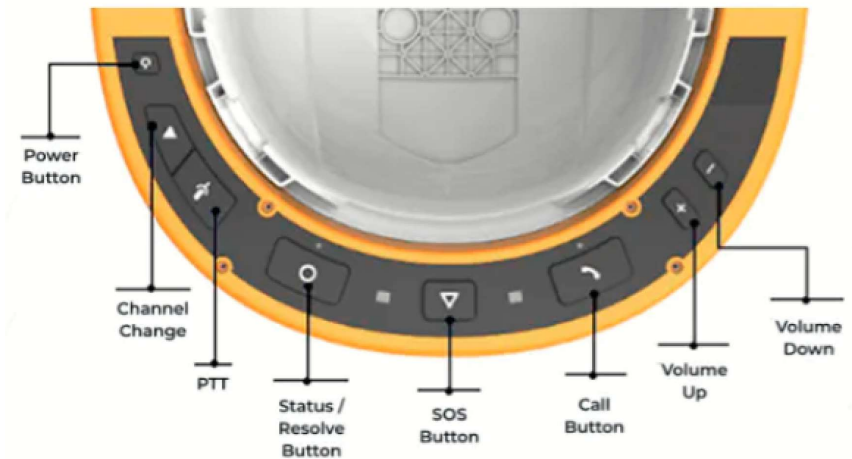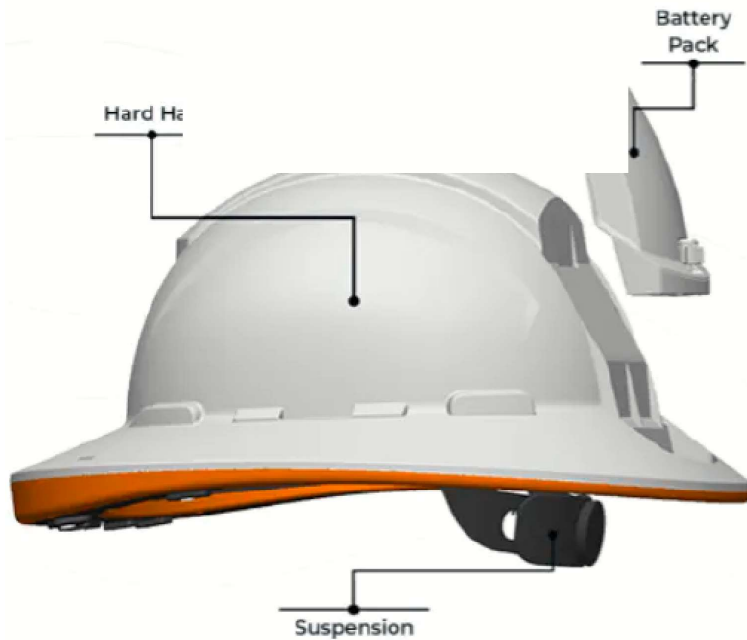
# CAT® 4-POINT RESTRAINT



SEATS

- Noticeable bright orange color
- Easily adjustable lap belt

- Elastic bands to reduce jerk
- No large installation parts

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# Cat Seat Belt Reminder

**IMPROVE
OPERATOR SAFETY**

THE SEAT BELT REMINDER PROVIDES AN IN-CAB AUDIO AND VISUAL ALERT TO THE MACHINE OPERATOR IF THE SEAT BELT IS NOT FASTENED AND THE MACHINE BEGINS TO MOVE.

**SIMPLE
RETROFIT INSTALLATION**

THE UNIVERSAL SEAT BELT KIT CAN BE INSTALLED IN LESS THAN 2 HOURS ON ALL BRANDS OF EQUIPMENT – IDEAL FOR FLEET USE.

**MONITOR
JOBSITE SAFETY**

SAFETY INCIDENTS CAN BE CAPTURED THROUGH THE CAT® APP AND VISIONLINK™ TO KEEP SITE MANAGERS AWARE OF OPERATOR COMPLIANCE AND REPORT ON REMINDER ALERTS.

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# Cat Seat Belt Reminder

- **How it works:**

- **The seat belt reminder detects when the seat belt should be in use by monitoring the machine's parking brake switch.**

- **In order to operate the machine, the operator must turn off the parking brake.**

- **If the seat belt is not buckled when the parking brake is off, the seat belt reminder alarm will sound (audio alert), and the warning light integrated into the buckle will illuminate (visual alert).**

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# Cat Seat Belt Reminder

•The universal belt kit can be retrofitted on all brands of equipment – ideal for mixed fleet use.

•The complete system can be installed in less than 2 hours using existing seat belt mount locations.

•The belt reminder can be used in any closed cab machine with a 12V or 24V system.

•Seat belts are available in various types and sizes to provide the flexibility required for mixed fleet installations.

•Optional dashboard light, amplified alarm, and external beacon available - consult dealer for details.
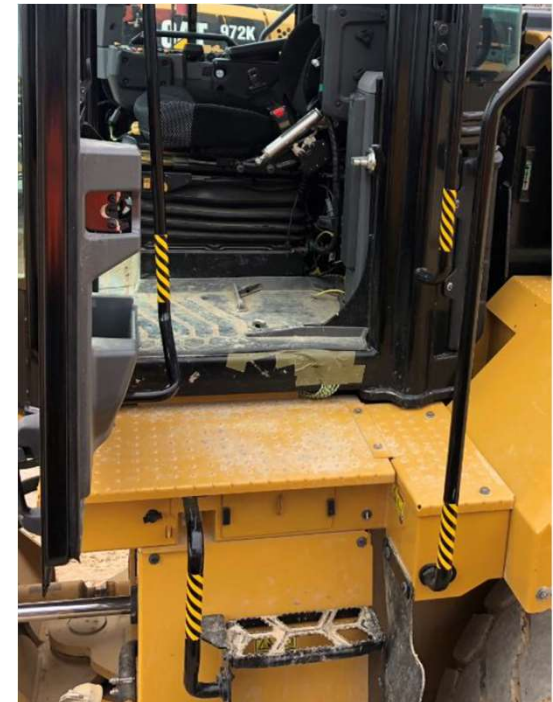
# Cat Seat Belt Reminder





• The universal belt kit can be retrofitted on all brands of equipment – ideal for mixed fleet use.

• Talk to your Cat dealer for more information and how to order the Cat Seat Belt Reminder.

# LEADING EDGE AND GRAB POINT REFLECTORS

**For Ladder Steps, Ladder Rungs, and Handrails**

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# Toolbox Talks

**Keeping your team safe on the jobsite is always your first goal. But in your fast-paced environment, it may be easy to overlook a topic you should discuss. Our Toolbox Talks start conversations about safety and help your employees stay out of harm's way.**

**https://www.cat.com/en_US/by-industry/construction-industry-resources/for-owners/toolbox-talks.html**

# How to use Toolbox Talks

Consider incorporating Toolbox Talks into your daily meeting with your crew. Whether at the start of the day or during shift change, get your employees thinking about safety with these topics. Explore the four categories: talks on equipment, attachments, personal safety and jobsite-wide concerns. Download the Toolbox Talks discussion guides, print them out or pull them up on your phone. Let Toolbox Talks help you build a safe culture on your jobsite.

**EXPAND ALL**

**EQUIPMENT SAFETY TOOLBOX TALKS** ⌄

**ATTACHMENTS TOOLBOX TALKS** ⌄

**PERSONAL SAFETY TOOLBOX TALKS** ⌄

**JOBSITE TOOLBOX TALKS** ⌄
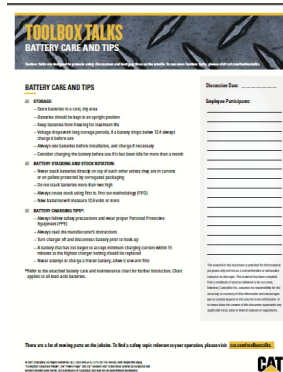
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# Equipment Safety Toolbox Talks

**Help employees stay safe while near and operating equipment.**

Battery Care and Tips

Entering and Exiting the Cab of Your Machine

Extending Tire Life

Machine - 6 S's

Machine - Before Operations

Machine - Emergency Equipment

Machine - Footing

Machine - Overhead Power Line Contact

Machine - Parking On Slope

Machine - Roll-Overs

Machine - Stalled Engine

Machine - Submersion

Machine - Tire Failure

Machine Safety Drive Train Failure

Mining Safety Tips-How to Clean Large Equipment

Windshields

Mount Dismount

Operator Visibility Around Heavy Equipment

Pre-Shift Inspections

Refueling Equipment

Seat Belt

Welding on Machines with Electronic Controls

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# Purpose

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# Importance

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