



# Vale Learning - 21120 - CAR 07 - Critical Activity Requirements: Machine Guarding

Hello,

Welcome to the **CAR 07** course – **Critical Activity Requirements: Machine Guarding**.

In this knowledge journey we will explain the requirements for this critical activity, through videos, texts, graphics and interactions.

Expand your knowledge, review your activities and behaviors. The obsession with security is one of the key behaviors of those who are part of Vale!

Good course!

≡ Welcome

≡ Context

≡ Machine guarding

≡ Responsibilities

≡ In practice

≡ Incidents Cases and Lessons Learned



# Welcome

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Watch the video in full to continue.

# Context

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To start, let's better understand why we have the CARs and how important they are to Vale and to you.

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Click on the following video and start your journey of knowledge!





# Context

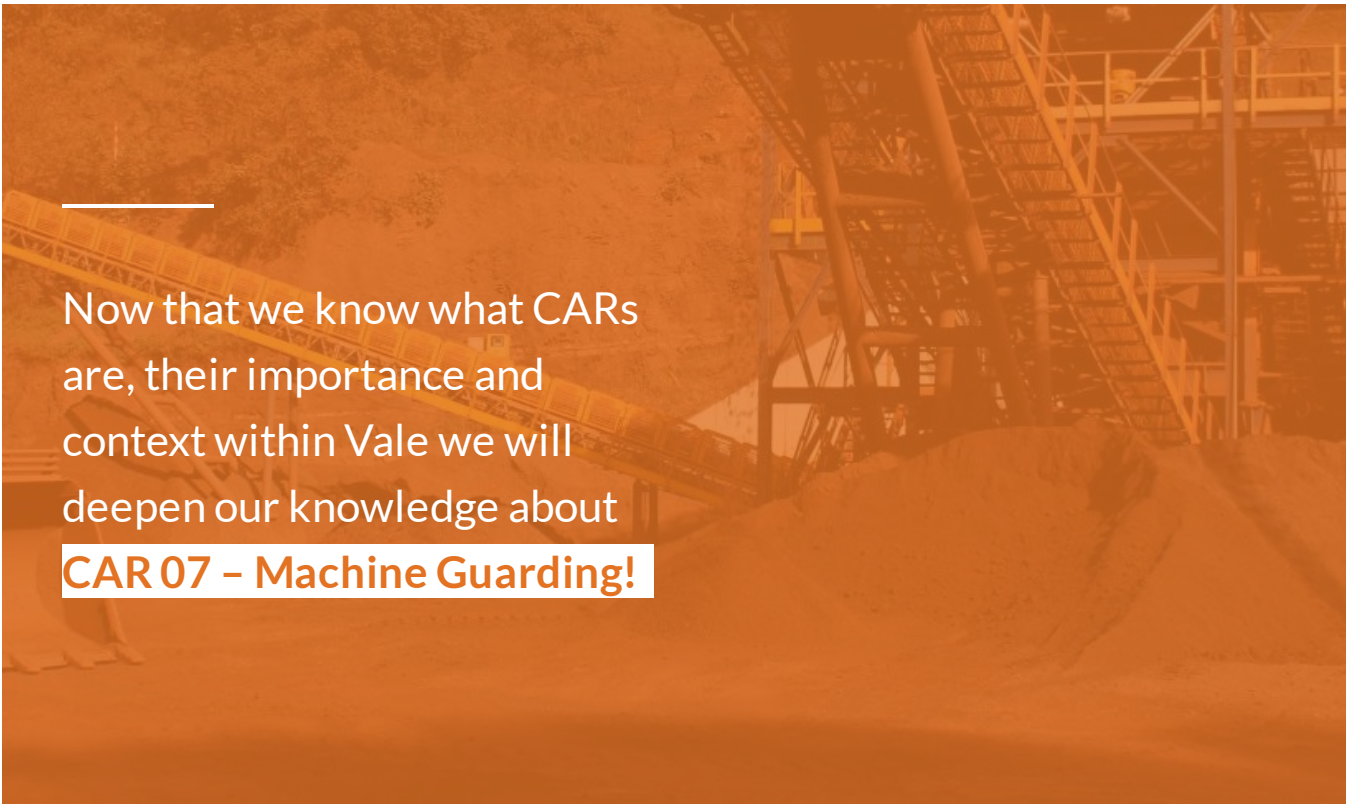
CARs



Watch the full video to continue.

# Machine guarding

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Now that we know what CARs are, their importance and context within Vale we will deepen our knowledge about **CAR 07 – Machine Guarding!**

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Check out the following video!



# Machine Guarding

CAR 07



Watch the full video to continue.

***Keep an eye  
on the CAR!***



**CAR 07: Machine Guarding**

This CAR aims to establish minimum requirements for the protection of potentially dangerous parts of machines, the objective is to avoid accidents in activities related to them.

These requirements are for all stages of the machine's useful life, which are:

- 1 Acquisition.
- 2 Installation.
- 3 Commissioning.
- 4 Maintenance.
- 5 Operation.



Complete the content above before moving on.



Next, we will present the **APPLICABILITY** of CAR 07.

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Check out the video below!



# Applicability

## CAR 07



Watch the full video to continue.

# Keep an eye on the CAR!



## CAR 07: Application

CAR 07 applies to **all machines** existing in Vale's facilities and those owned by third parties that provide service and maintenance for Vale.



Complete the content above before moving on.

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Safety is not the absence of risks, but the presence of protective barriers. Safety is also respecting what can and should be done, in the right way, with care with you and the others.



In our company, unfortunately, there were critical and unwanted accidents, and that's what you can see in the video below!



Watch the full video to continue.



# Responsibilities

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See the following video for **roles and responsibilities** related to CAR 07  
and see what is expected of you!



# Roles and Responsibilities

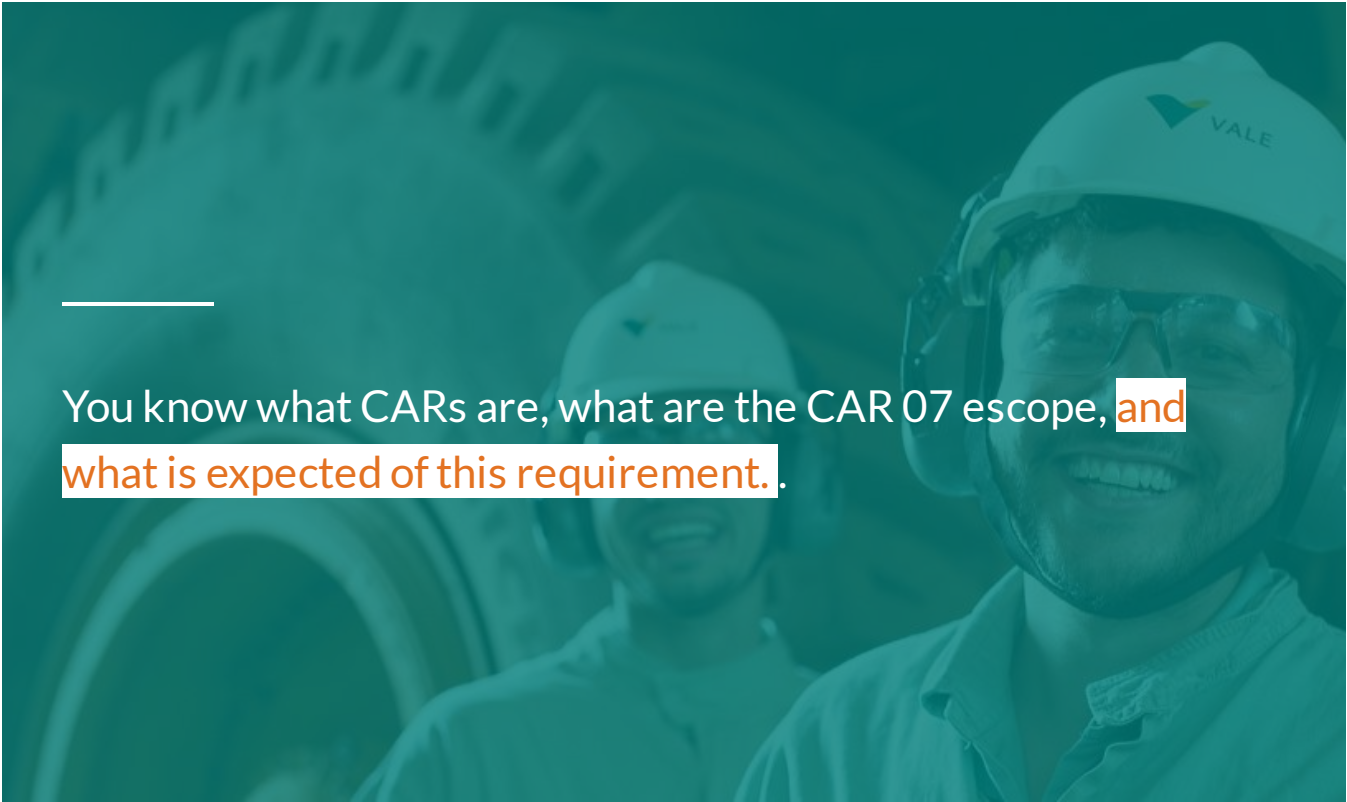
## CAR 07



Watch the full video to continue.

## In practice

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You know what CARs are, what are the CAR 07 escape, and what is expected of this requirement.

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Now it's time to see in practice how it applies!



# In Practice

CAR 07



Watch the full video to continue.

**SAFETY SYSTEMS**



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**Fixed and mobile  
protections;** interconnected safety  
devices, which protect the health and  
physical integrity of workers, are part of  
safety systems contemplated in CAR 07.

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Learn more in the following video.



# Safety Systems

## CAR 07



Watch the full video to continue.

**LOCKOUT AND TAGOUT SYSTEMS (CAR 04)**



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CARs are not isolated requirements and,  
depending on the activity, they have  
converging points.

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For example: to comply with CAR 07, we must observe requirements  
in CAR 04, such as **energy lockout and tagout system**, presented in the  
following video!





## CAR-04 Lockout, tagout and Zero Energy

CAR 07



Watch the full video to continue.

# Incidents Cases and Lessons Learned

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## INCIDENTS

### What are **Incidents**?

Incidents are unwanted events, but if they do happen, it is critical that we identify the main contributing factors and share any lessons learned in order to implement the necessary control measures to prevent other similar incidents from happening. This way, we generate organized learning and continuous improvement.

We are now going to know or **recall some incidents** that occurred at Vale related to machine protection and **understand what were the main contributing factors** associated with each event and **what the requirements of CAR 07 could have been applied** to prevent these undesirable occurrences.



Complete the content above before moving on.

## Incident Report



**Date:** 08/31/2020.

**Location:** PDE Borrachudo Superior, Mina Cauê, Itabira, Minas Gerais, Brazil.

**Type of Occurrence:** N2.

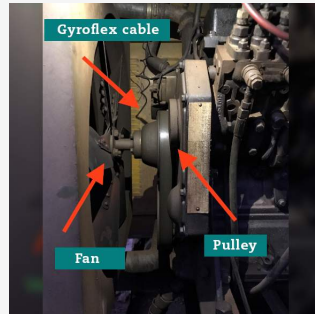
### Event description:

On August 31, 2020, at around 4:00 pm, **the Geocontrole employee, K.F.O.**, a survey assistant, in order to charge the rig's joystick battery, **went to check the functioning of the gyroflex** to check the passage condition of current to the charger. In an attempt to access the power cable and assess its functioning, he

opened the motor protection fairing, when he placed his right hand to access the gyroflex cable in the fan region, he came into contact with the moving parts, causing injuries.



View of the access doors to the interior of the probe.



View of the employee (injured) when opening the probe side door - access to the rear of the engine (fan and pulley).

## CAR 07 requirements associated

### 7.6.1 (I) - Characteristics of fixed protections —

The main features of fixed protections must:

- Be designed and installed for removal only with the use of tools

( X ) *Absent requirement.*

( ) *Present and flawed requirement.*

### 7.6.1 (M) - Characteristics of mobile protections —

The main features of mobile protections must:

- Ensure interlocking, with machine stop command when the door is opened;

☒ **Absent requirement.**

☐ **Present and flawed requirement.**

### 7.7.1 (B) - Inspection plans —

Each location must have an inspection and maintenance plan (Vale's own machines) or an inspection and maintenance procedure (machines from contracted companies) to verify the effectiveness and reliability (TM - mission time) of the machines' safety protection systems and components, in accordance with the most restrictive manufacturer or plan at Vale's discretion. The plan must include at least:

The plan must include at least:

- Fixed protections – grids, bulkheads, screens, fixings etc.;
- Mobile protections – interlocking doors, fixings, logics, etc.;
- Automatic protection devices – presence sensors, light curtain, interlocks, controllers, actuators etc.;
- E-stop devices – buttons, ropes etc.

☒ **Absent requirement.**

☐ **Present and flawed requirement.**



Complete the content above before moving on.



# Main Lessons Learned

Machines must be designed and constructed in such a way as to avoid or reduce the exposure of people to a hazard in any mode of operation and maintenance.

CAR 07 establishes **minimum requirements** for the protection of machines in acquisition, installation, commissioning, operation and maintenance activities to avoid accidents.

Fixed (examples: grille, covers, fairings, etc.) and mobile (example: interlocking doors) protections are part of CAR 7 and **aim to prevent contact of people with moving parts of machinery**, as required by requirements 7.6.1.1 and 7.6. 1.m.

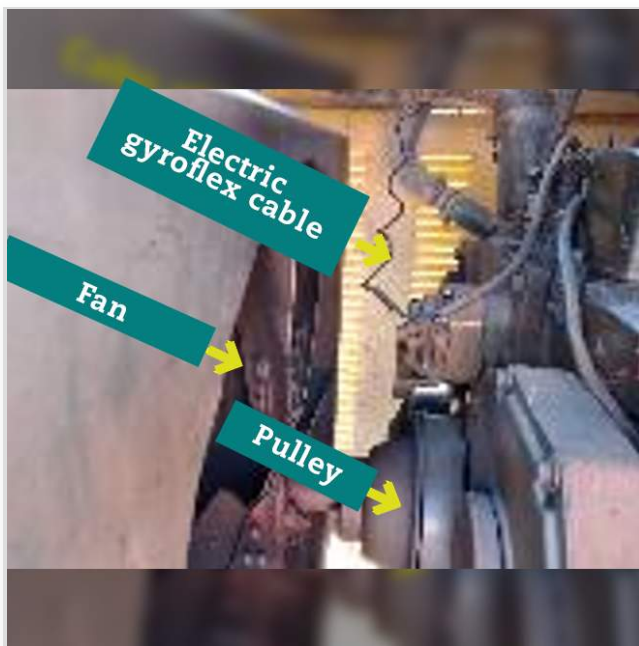
In the reported event, **the machine (probe) was in operation without implementing the necessary control measures**. The access door to the moving parts did not have interlocks, the fan and pulley did not have fixed physical protection (grid or fairing), which is prohibited by RAC 7. If one of these protections (fixed or mobile) had been applied and all aspects involved in carrying out the activity with machines, the incident could have been avoided.

***Door opening sequence by the worker.***



### ***Employee view***

*Click on the cards below to see the description:*

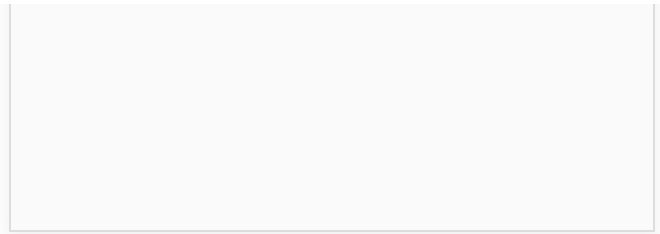
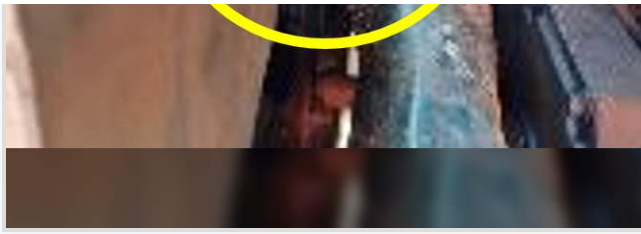


View of the employee (injured) when opening the probe side door - access to the rear of the engine (fan and pulley).



Simulation of the employee's right hand entry position





## Inspection and maintenance of machine guards.

To ensure that the machines have their protections applied, and in good condition, **an inspection and maintenance plan** (Vale machines) or an inspection and maintenance procedure for machines from contracted companies must be in place. **If non-conformities** or situations that contravene the requirements of the CAR **are found** at the time of inspection or even execution of the activity, **it is important to stop immediately and activate the help chain**, in order to ensure the safety of everyone involved.



Complete the content above before moving on.

## the expert's word



The CARs are requirements that must be applied on a daily basis, in the routine of each activity. Its adoption generates results and makes a difference.

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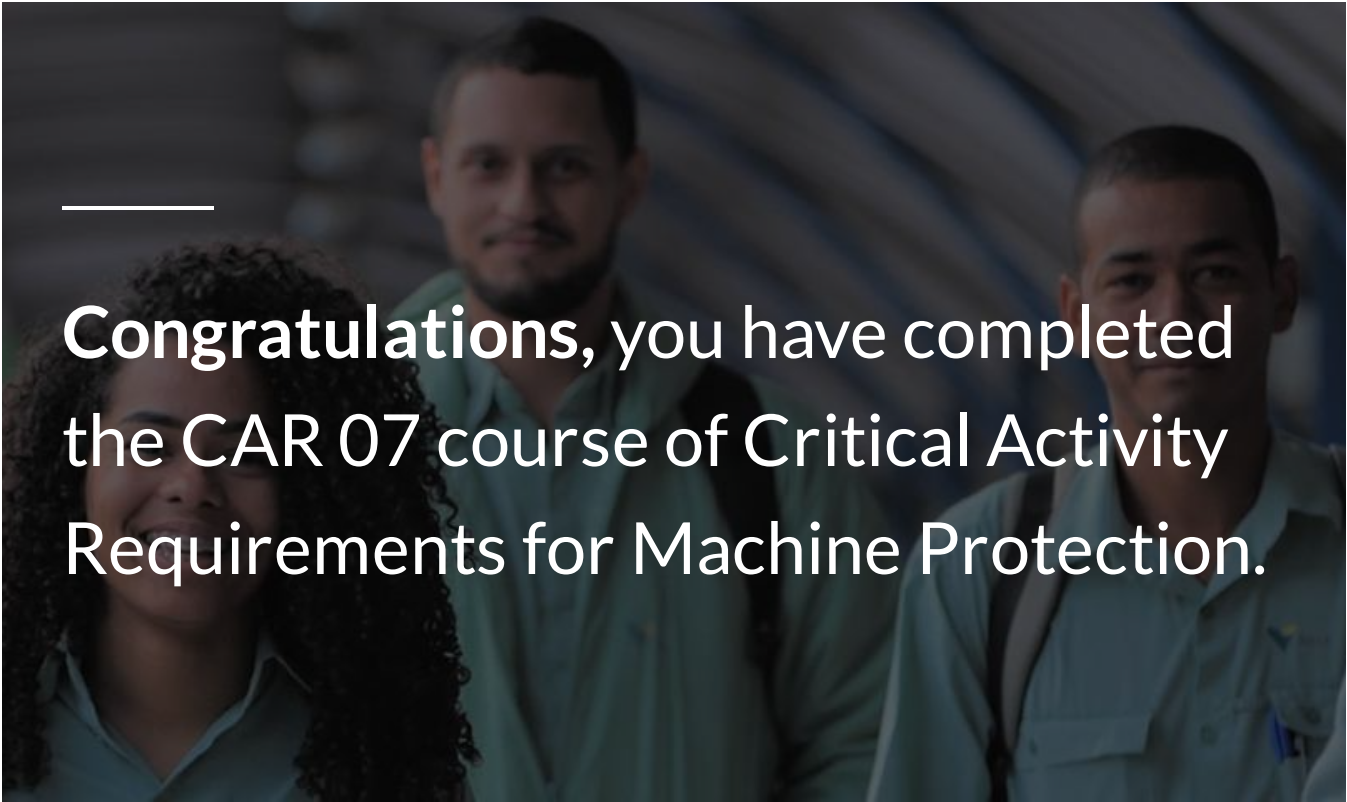
Check out in the video below the words of a colleague who tells us in his view the importance of CAR 07.



Watch the full video to continue.

## Conclusion

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**Congratulations, you have completed the CAR 07 course of Critical Activity Requirements for Machine Protection.**

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Also check the courses of the other CARs. Apply the knowledge acquired here in your day to day, and good work.





Thank you for completing the  
Vale Online Module Training.

Complete Your  
Module Validation

[PLEASE CLICK HERE](#)