

CAR 05 - Lifting of Loads (Vale North Atlantic)



Hello, welcome to the CAR 05 course - CRITICAL ACTIVITIES REQUIREMENTS: LIFTING OF LOADS.

The purpose of this awareness module is to provide an overview of the Vale Critical Activity Requirements that have been introduced to Vale's operations globally. These requirements are in the process of being fully implemented across our operations.

- ≡ Welcome
- ≡ Context
- ≡ Bowtie
- ≡ Activity Planning
- ≡ Requirements for Area Isolation
- ≡ General Requirements for Execution of Lifting Activity
- ≡ Requirements Vary According to the Type of Equipment



Requirements for Training



Quiz



Conclusion

Welcome



Watch the video in full to continue.

Context



CARs are part of Vale's safety culture. Their application is essential for the execution of critical activities.

PNR-000069 Rev.1 Nov. 24, 2020

Critical Activity Requirements are described in the document number 00813. In December 2019, CARs 01 to 05 were revised.

PNR-000069 Rev.1 Nov. 24, 2020 has changed both in form and in content, with the aim of making requirements more robust, making critical activities SAFER and fulfilling our value life matters most.



In this course, we will deal specifically with CAR 05.



Complete the content above before moving on.



Please note: The use of cranes to lift people is covered in CAR01 Work at Heights and CAR05 Lifting of Loads.



CAR 05

Lifting of Loads



Watch the video in full to continue.

Before continuing with the requirements, check out what Bowties are in the next topic, and how they can help us to identify the requirements for each type of event we want to prevent.



Complete the content above before moving on.

Bowtie

Do you know what a bowtie is?

It is a very efficient risk analysis tool that identifies the event, the barriers (controls) and the consequences.

For CARs, bowties assist in understanding the requirements. This training will show some bowties diagrams about the main events of the CARs.

It is important that you know this tool!



**Important: the diagrams were made for the main
CAR events and requirements.**

**Not all requirements in the document will be present
in the bowtie. Reading the document is essential.**

Watch the video below and understand bowties better!



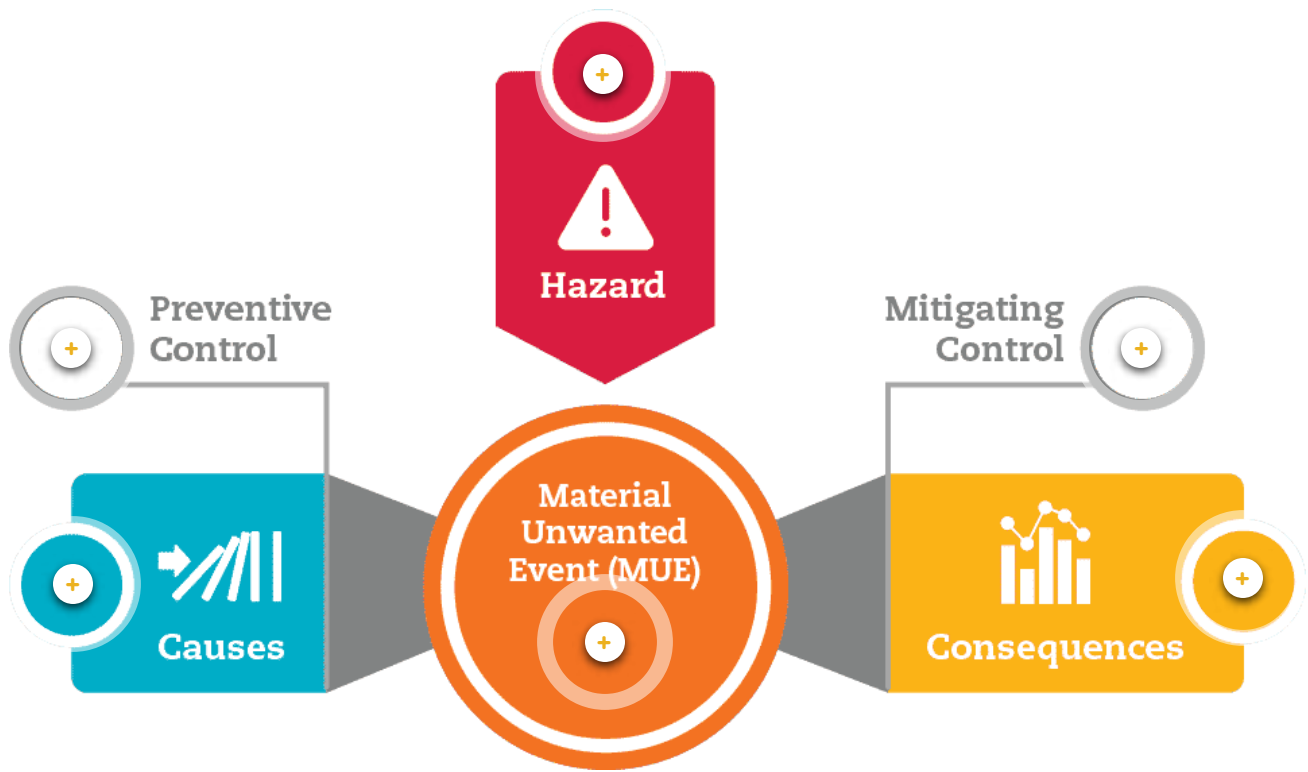
Watch the video in full to continue.

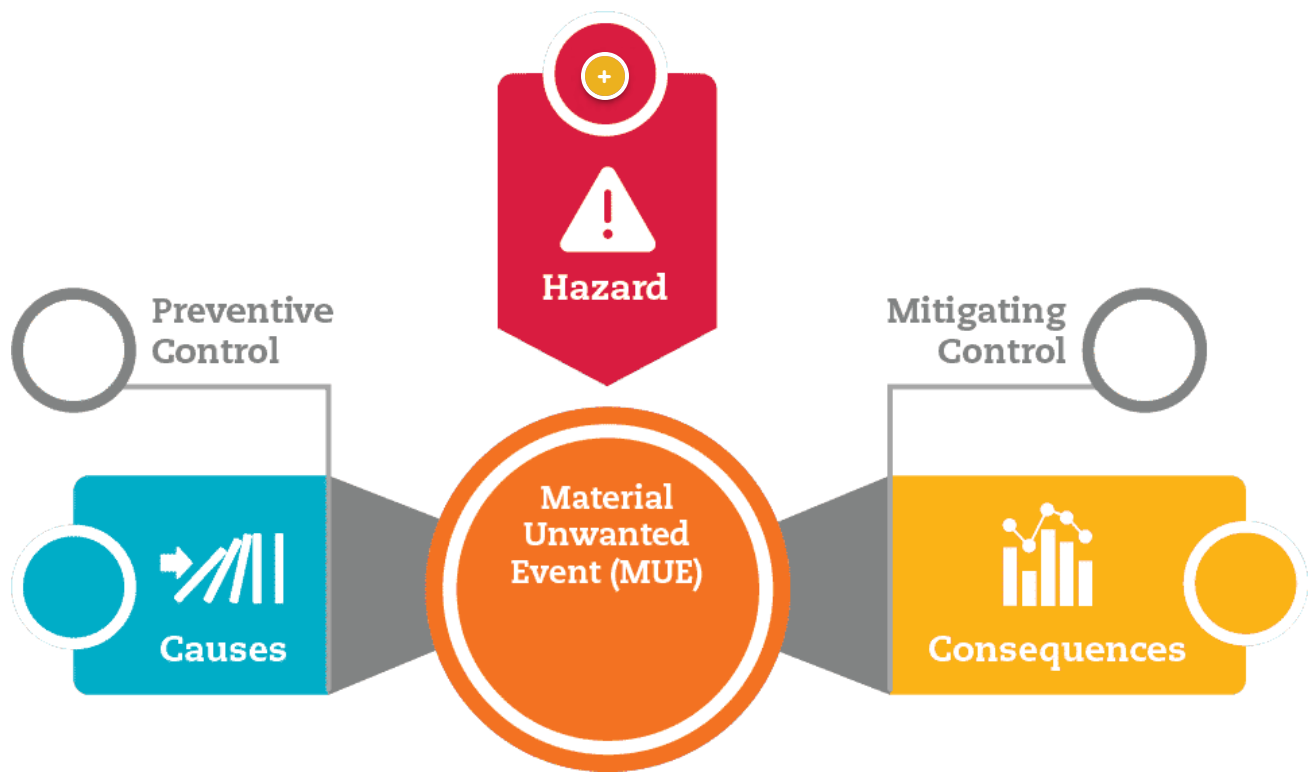
Check below the bowtie of CAR 05 related to the main events that may occur in lifting of load.



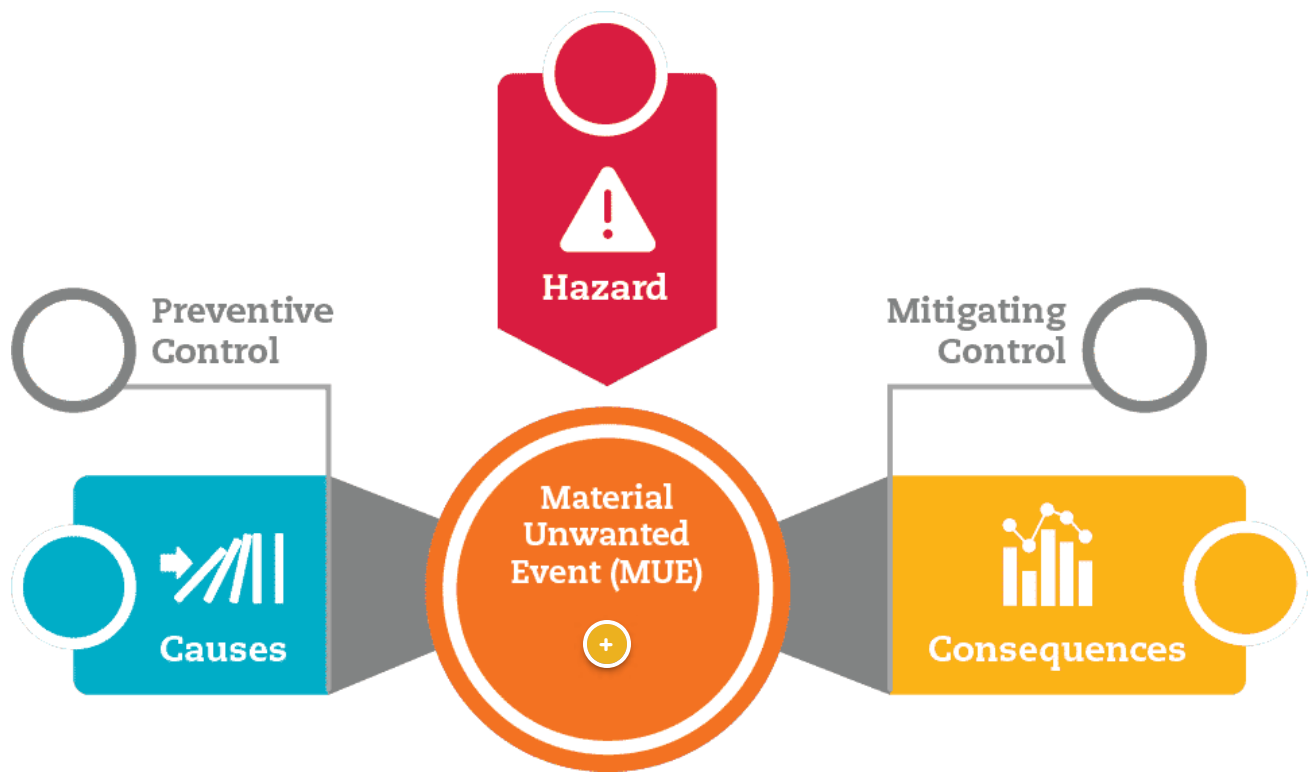
Fall of the load from overhead crane

Click on the indications below and learn more:

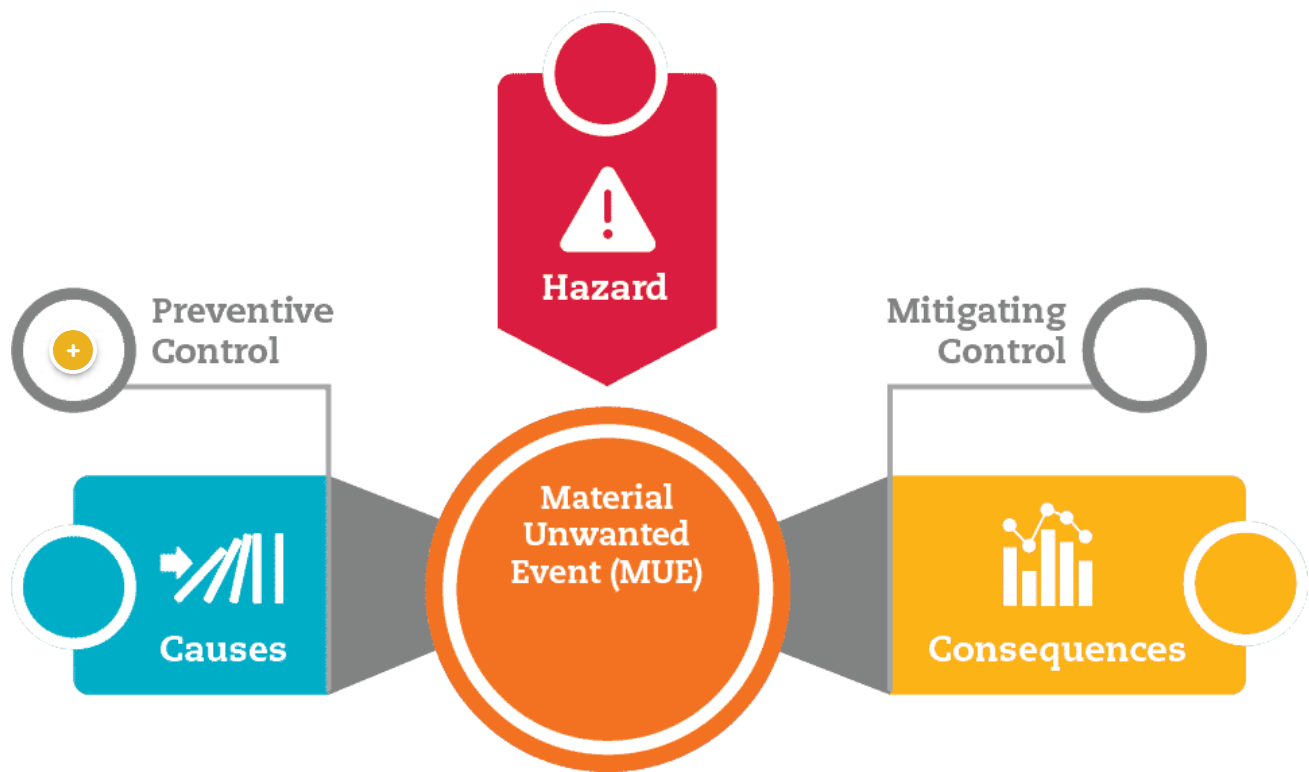




Lifting of load



Fall of the load from overhead crane



Preventive Control

Damaged equipment:

- IV Test before first use;
- I, II Pre use and periodic inspection.

Lack of training:

- Training for operation;
- Training in risk prevention.

Moving of the equipment beyond the limit:

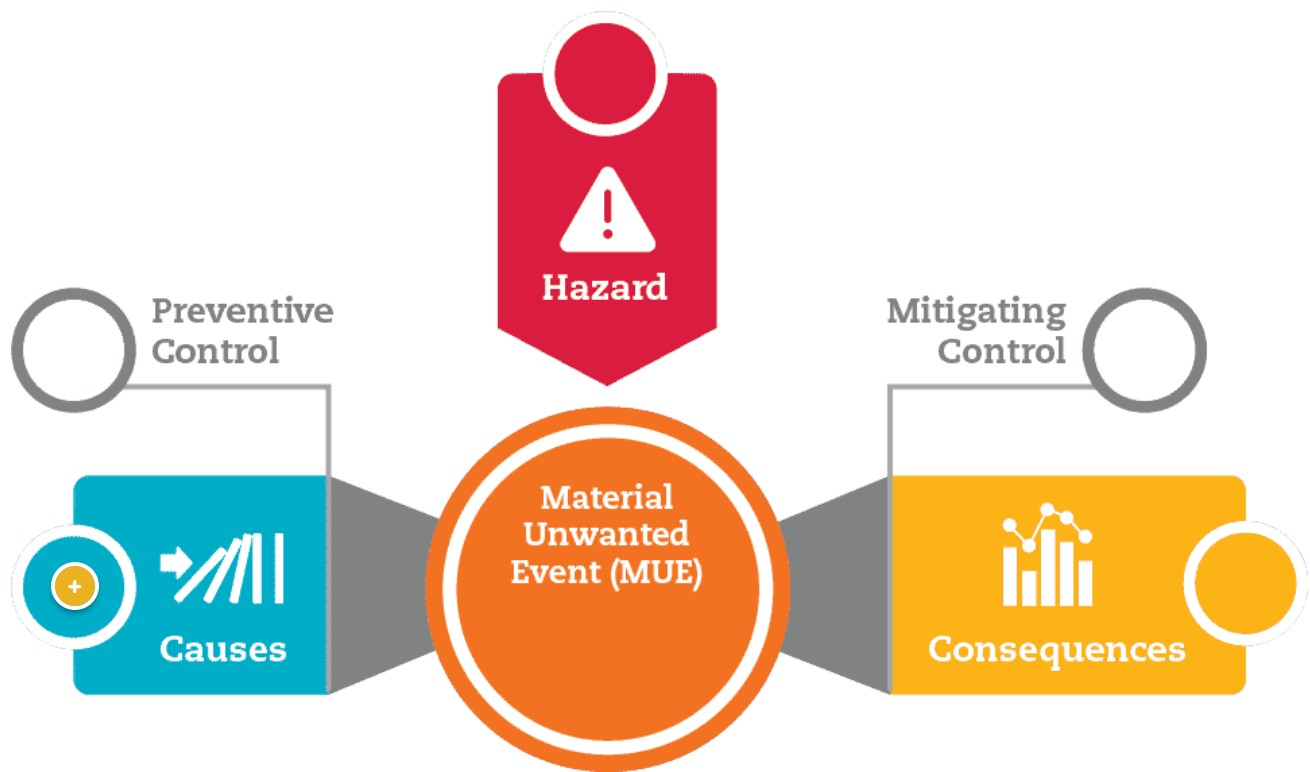
- Limit stop switch;

Loose cable:

- Loose cable in the limit switch.

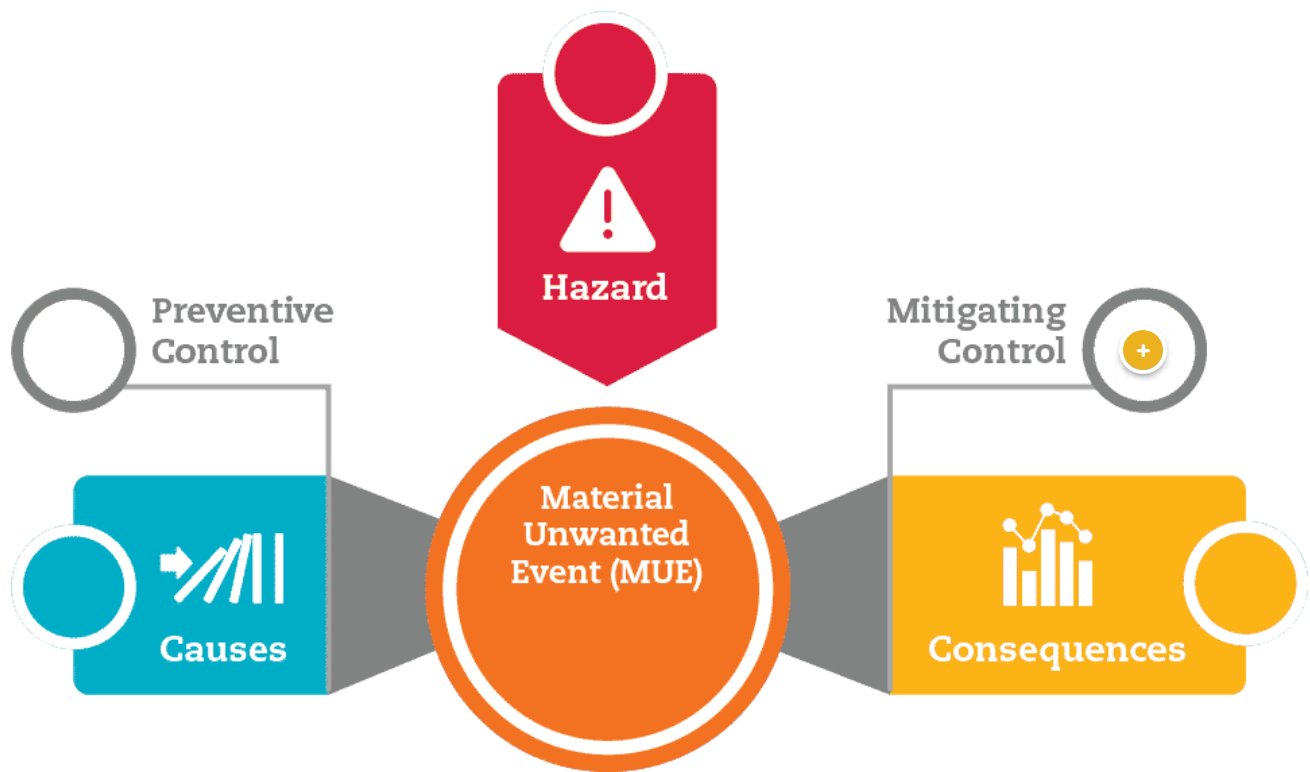
Cable wear due to inclination:

- Inclinometer.



Causes

- Damaged equipment;
- Lack of training;
- Moving of the equipment beyond the limit;
- Loose cable;
- Cable wear due to inclination.



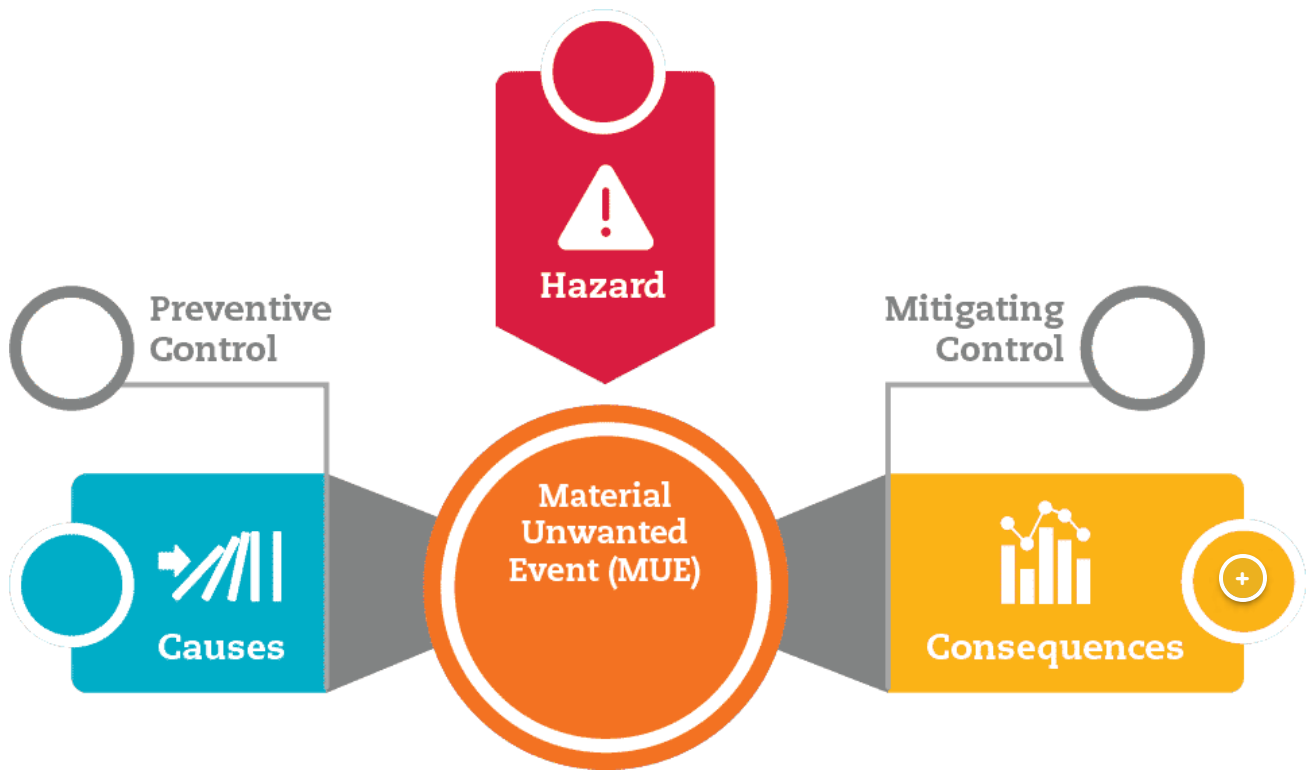
Mitigating Control

Hitting of person NOT involved in the activity:

- Movement sound alarm;
- Area isolation;
- Prohibition to access lifting area;
- Emergency response plan.

Hitting of person involved in the activity:

- Prohibition of position under suspended load;
- Emergency response plan.



Consequences

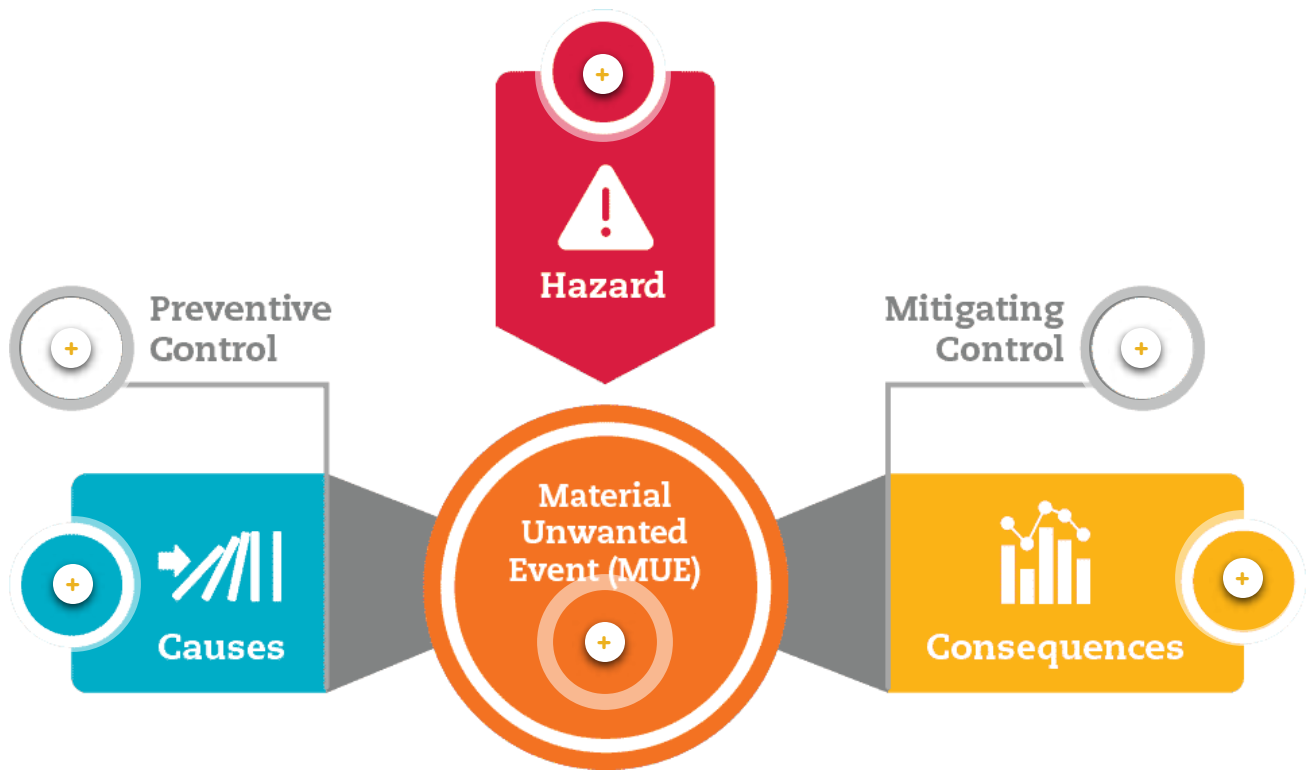
- Hitting of person NOT involved in the activity;
- Hitting of person involved in the activity.

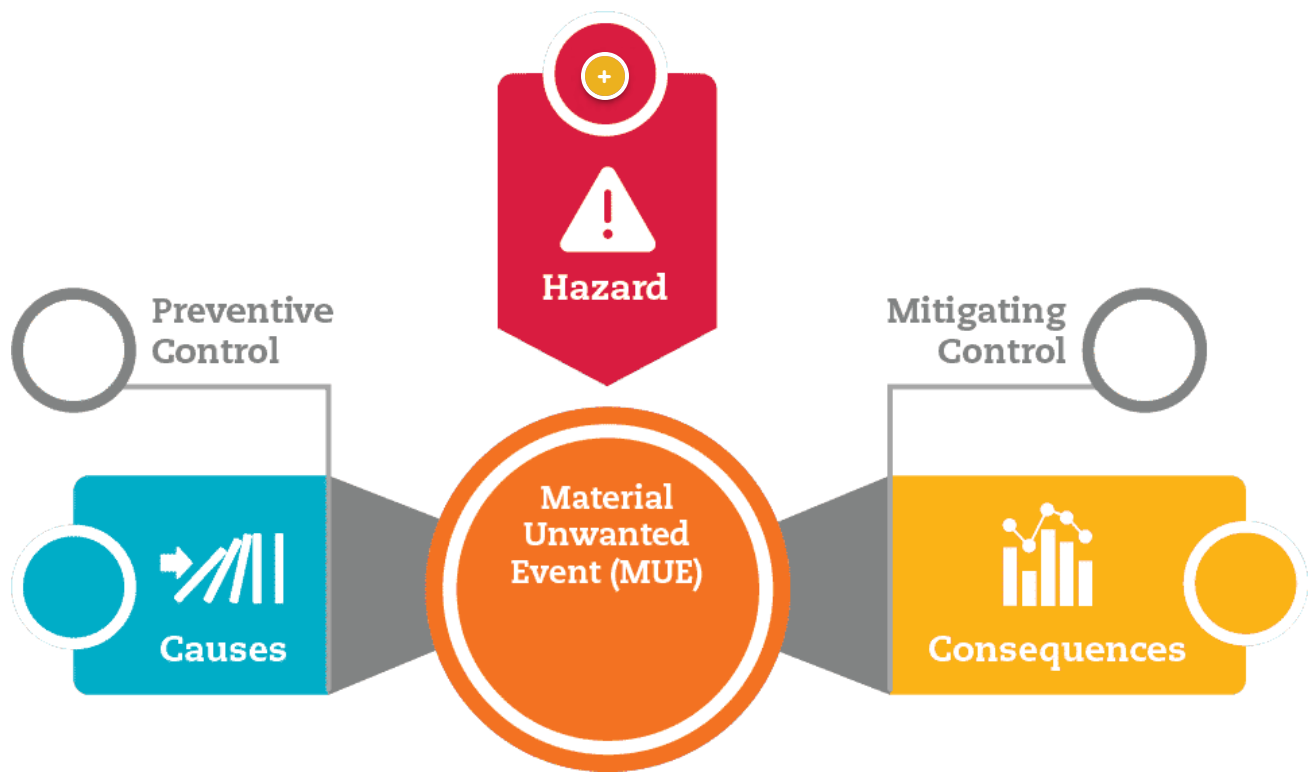


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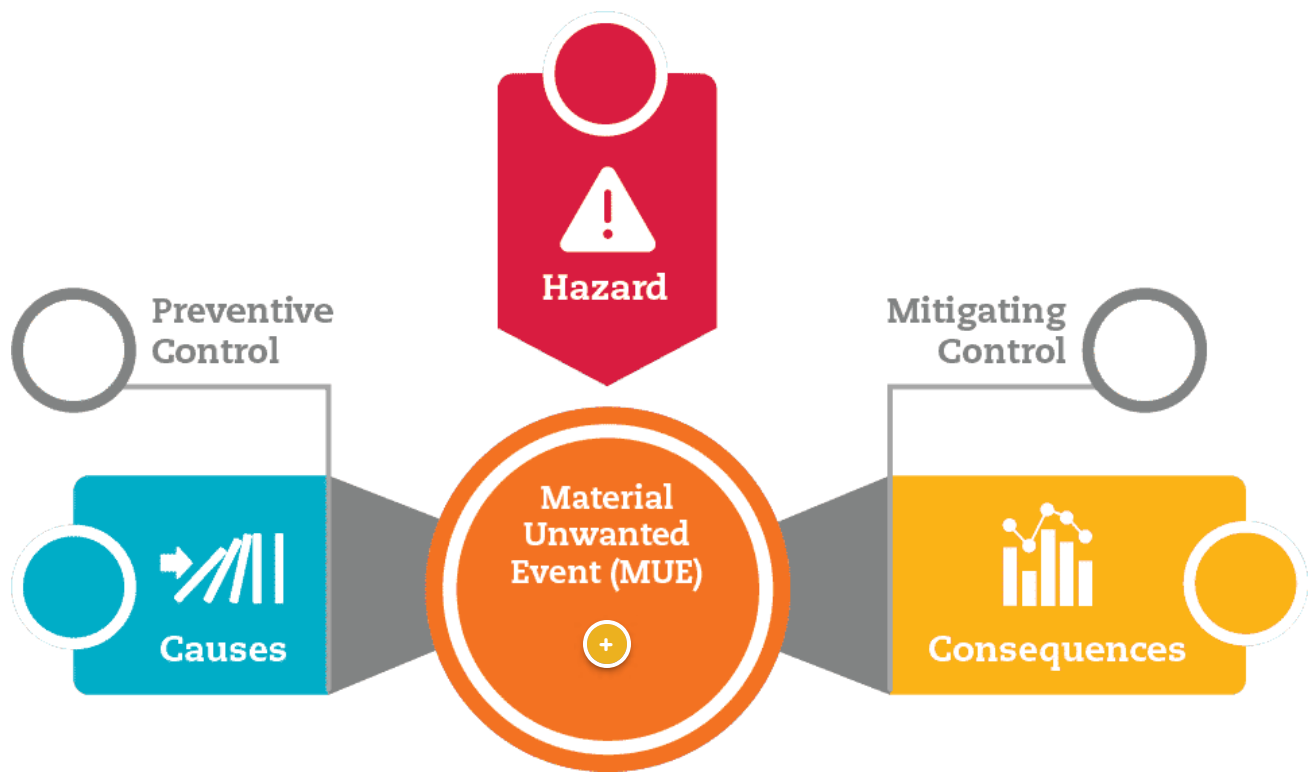
Mobile crane overturning

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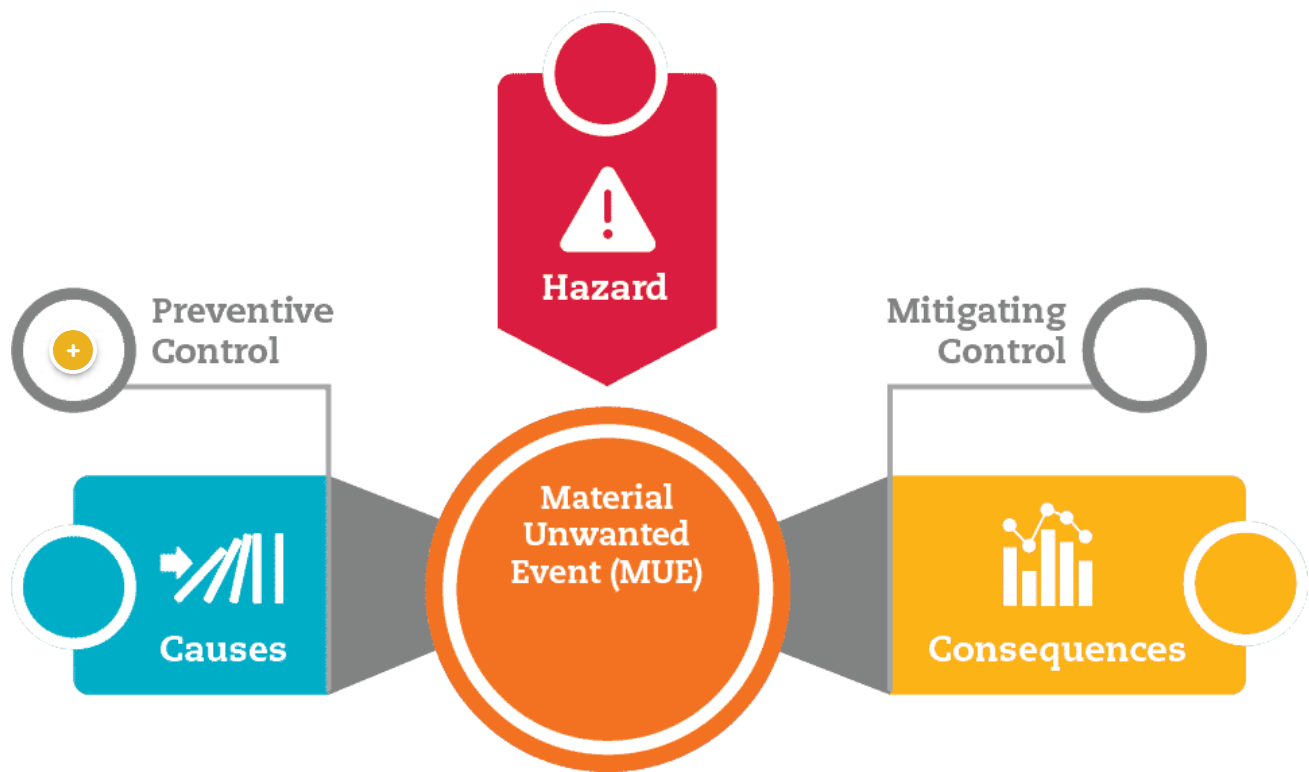




Lifting of load



Mobile crane overturning



Preventive Control

Overload:

- Visible indication of the maximum load;
- Load table;
- Overload sensor.

Unevenness of equipment:

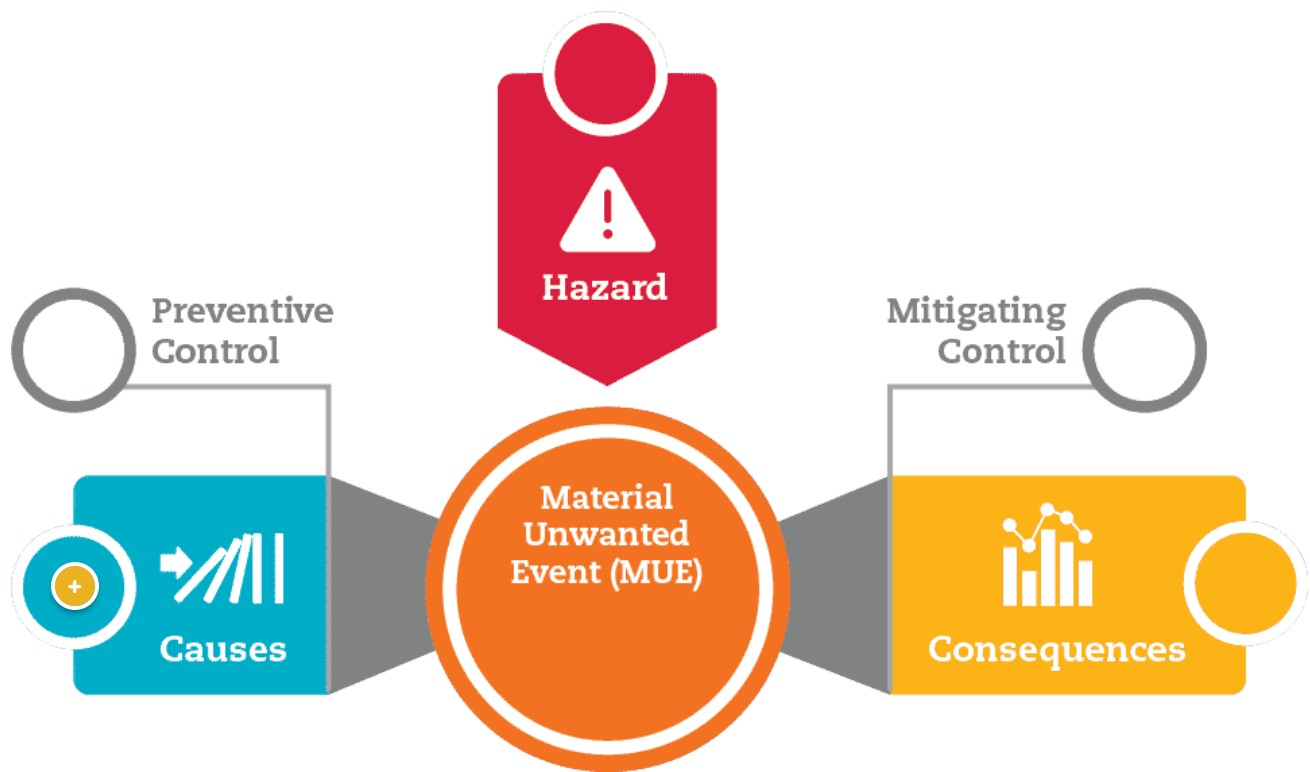
- Full extending of the outriggers;
- Outriggers pressure monitoring;
- Outriggers leveling control system.

Lack of training:

- Training for operation.

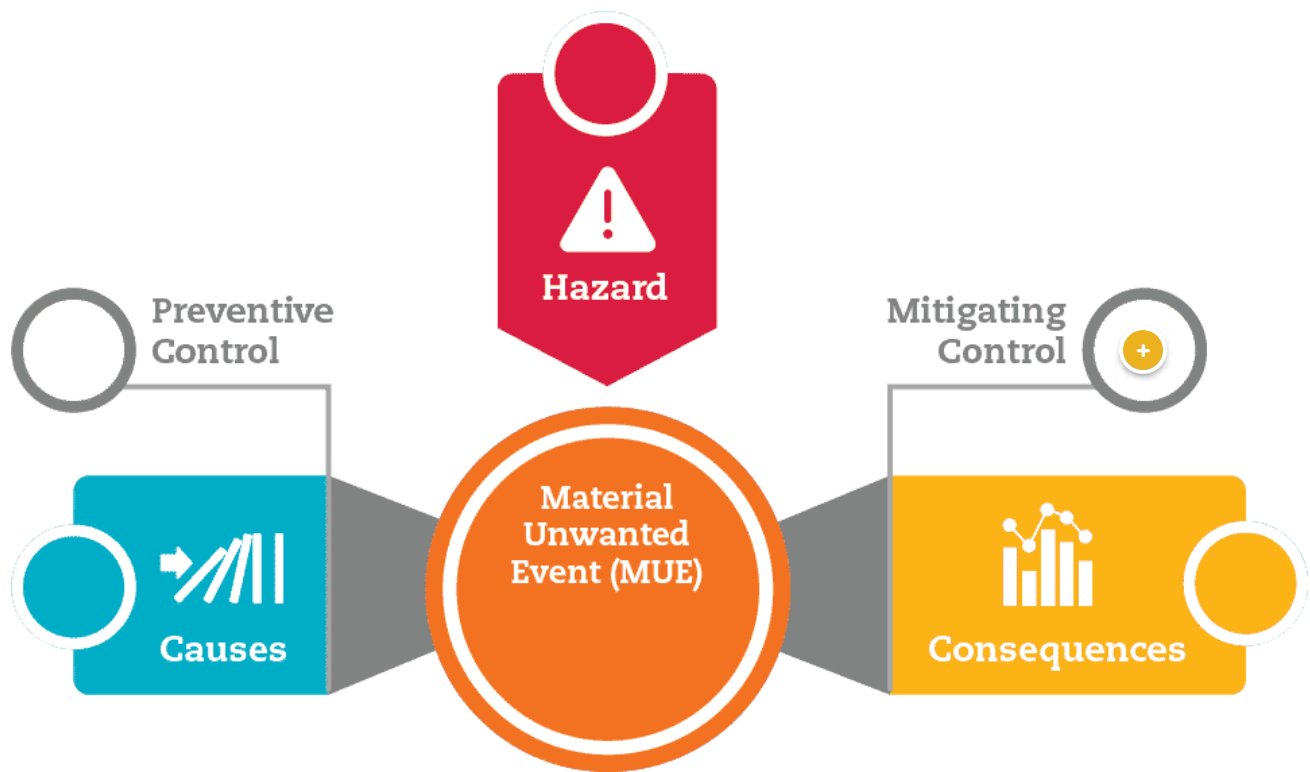
Lack of planning for critical lifting:

- Rigging plan.



Causes

- Overload;
- Unevenness of equipment;
- Lack of training;
- Lack of planning for critical lifting.



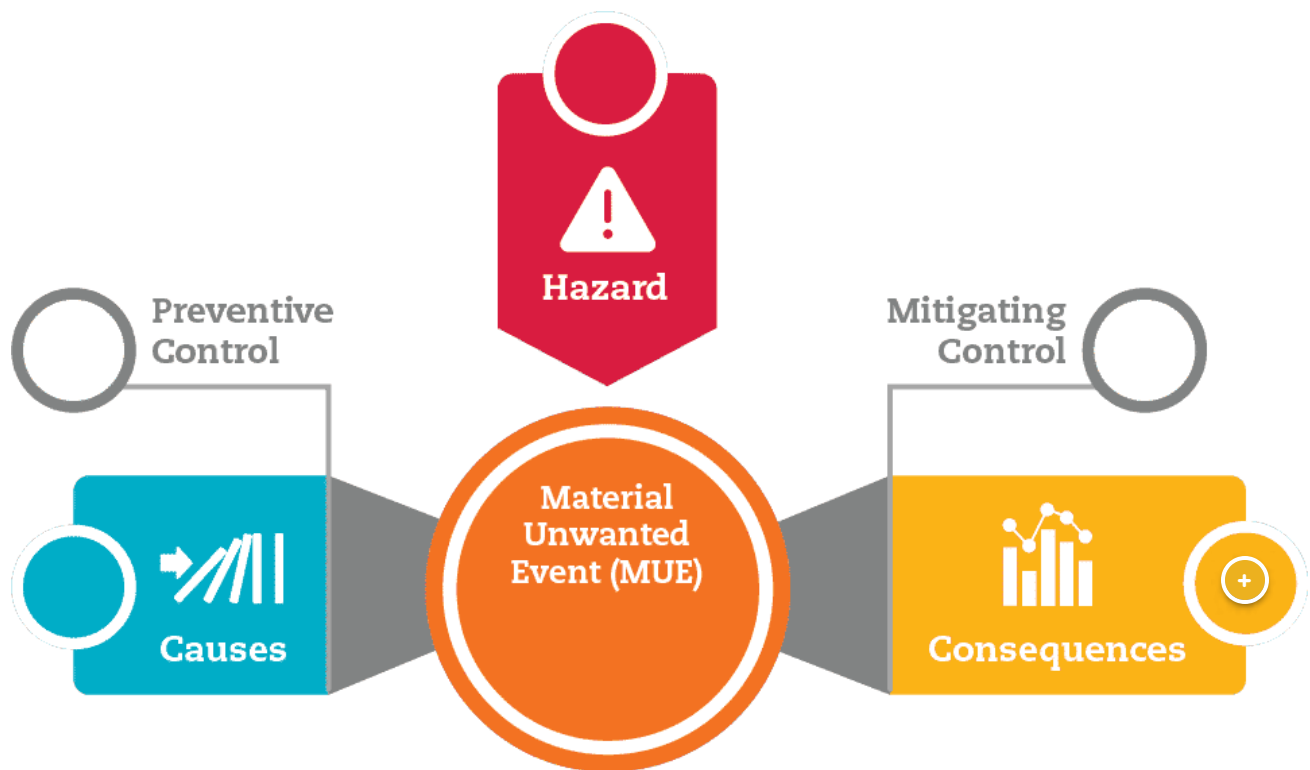
Mitigating Control

Hitting pf person NOT involved in the activity:

- Area isolation;
- Prohibition to access lifting area;
- Emergency response plan.

Fatality of the operator:

- Emergency response plan.



Consequences

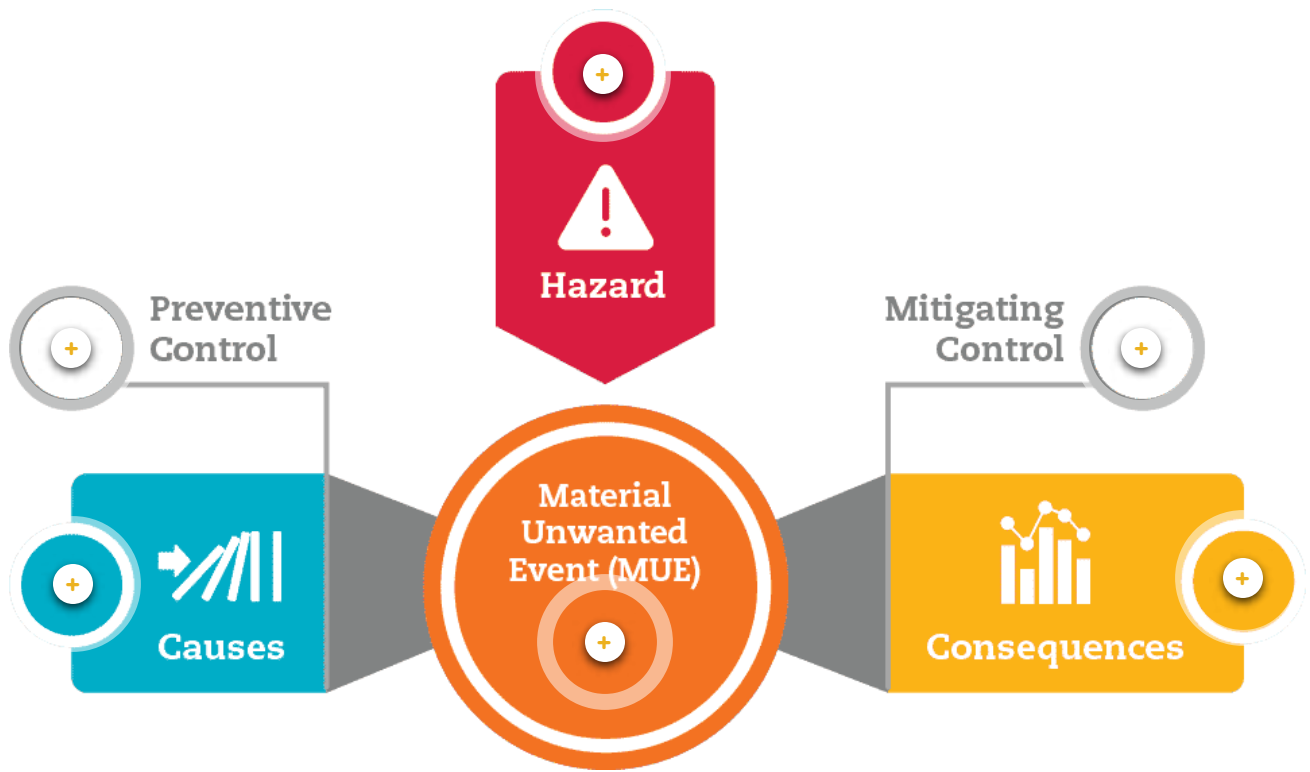
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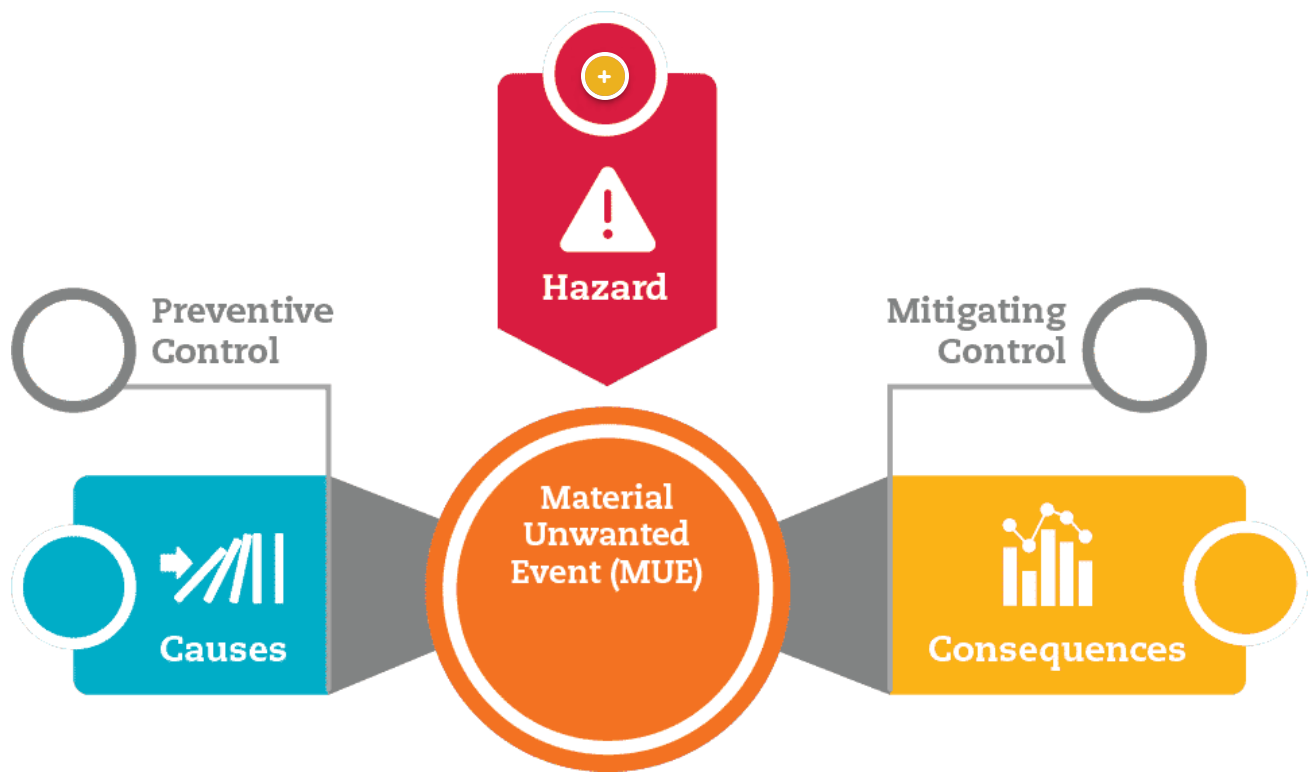


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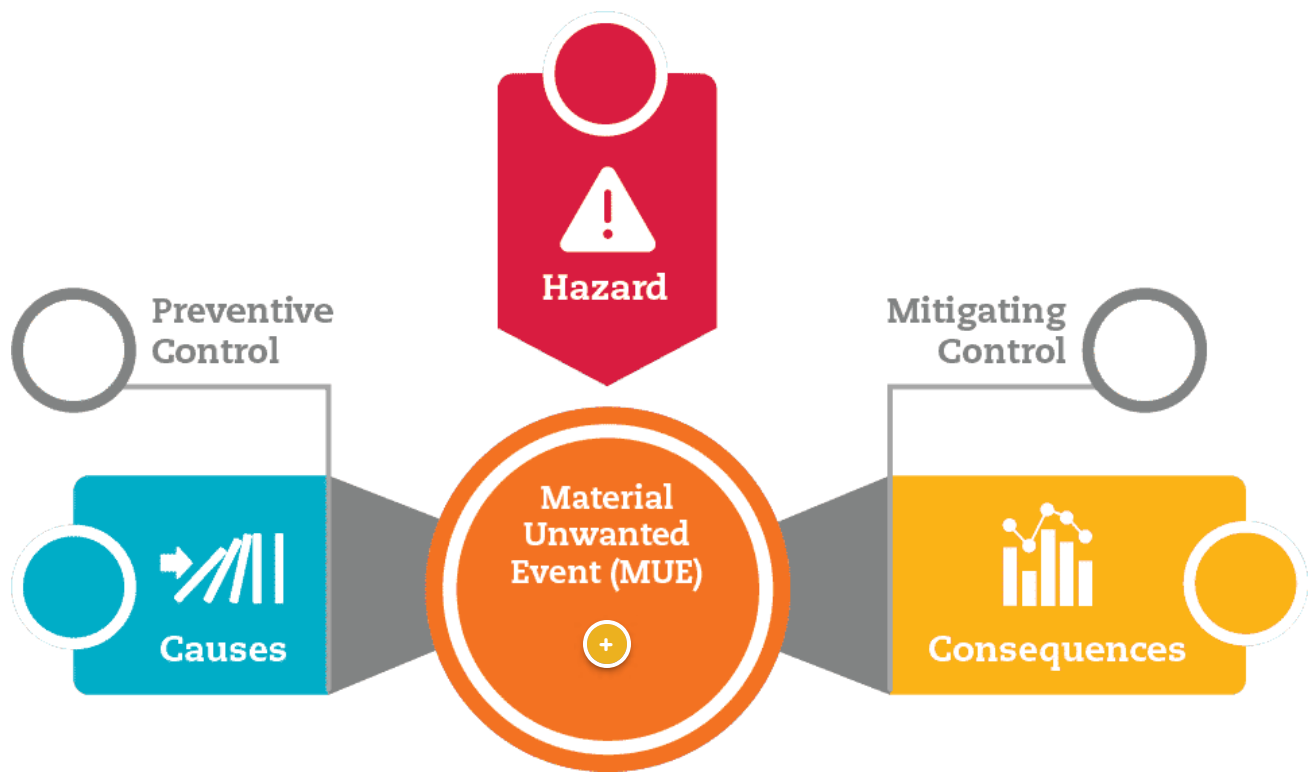
Fall of the load from the crane

Click on the indications below and learn more:mais:

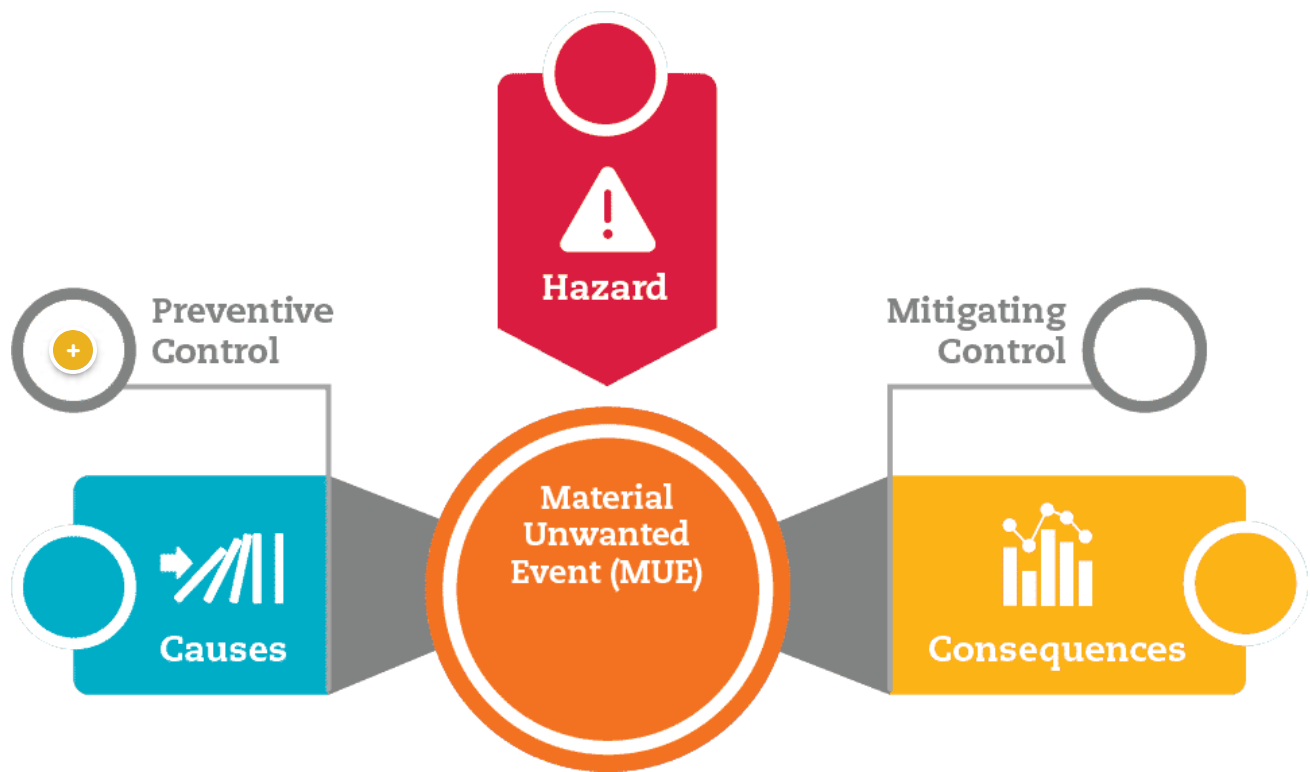




Lifting of load



Fall of the load from the crane



Preventive Control

Overload

- Visible indication of the maximum load;
- Load table;
- Overload sensor.

Damaged equipment:

- Test before first use;
- I, II Pre use and periodic inspection;
- Disposal of damaged accessories.

Lack of training:

- Training for operation;
- Training in risk prevention.

Load without fixation:

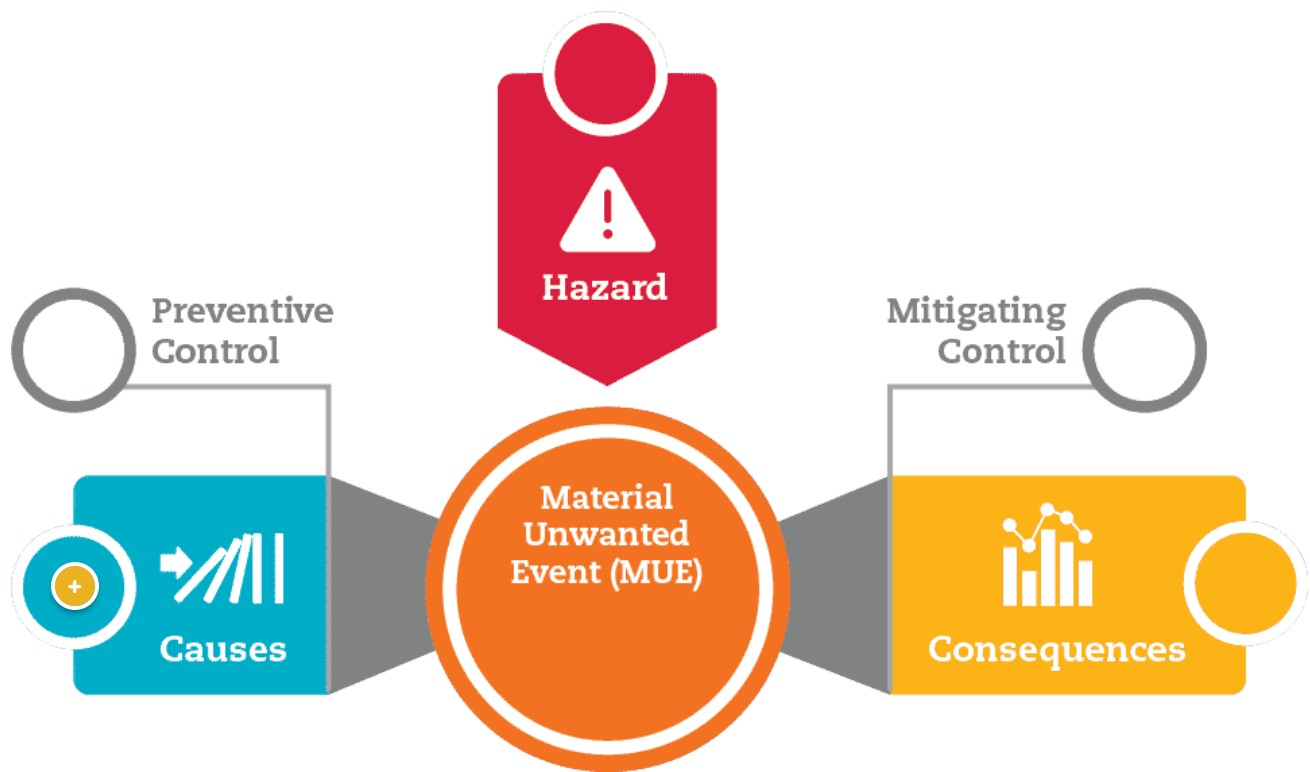
- Hook with safety latches.

High speed wind:

- Anemometer.

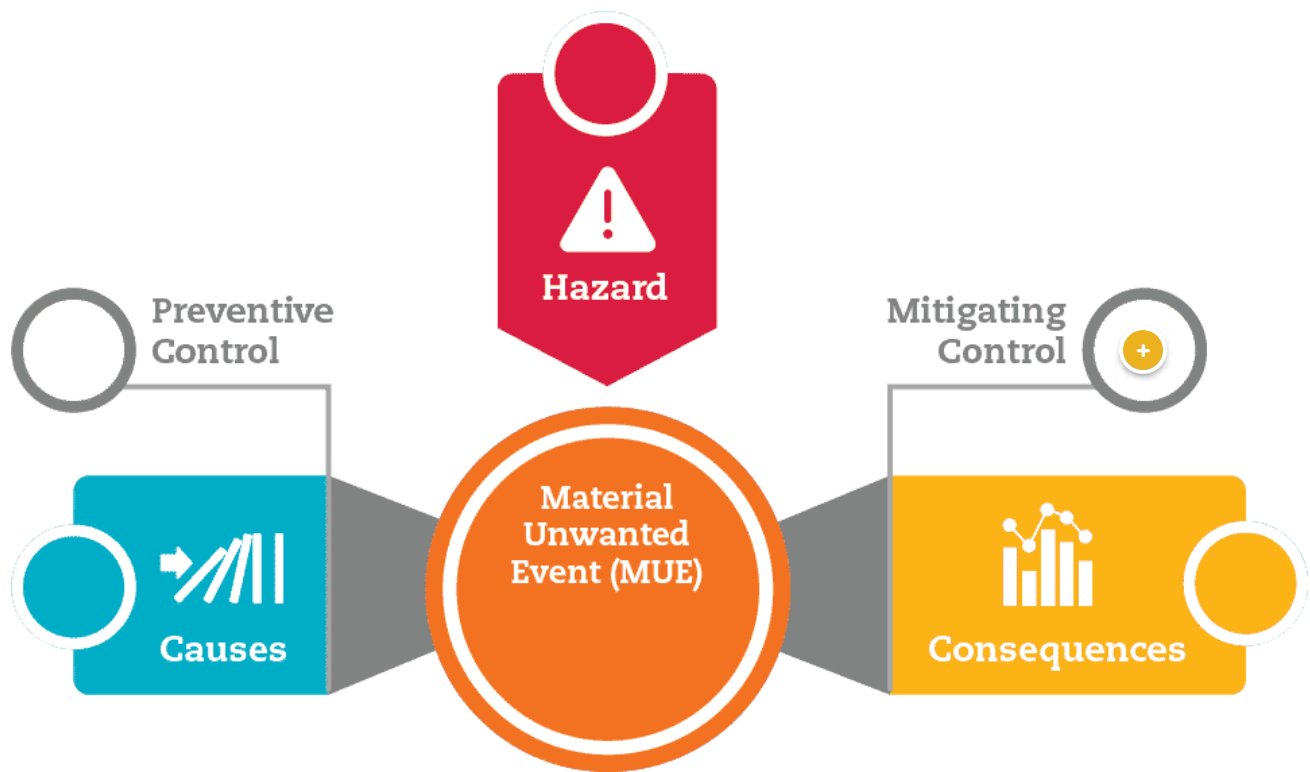
Moving of the equipment beyond the limit:

- Limit stop switch.



Causes

- Overload;
- Damaged equipment;
- Lack of training;
- Load not secured;
- High speed wind;
- Moving of the equipment beyond the limit.



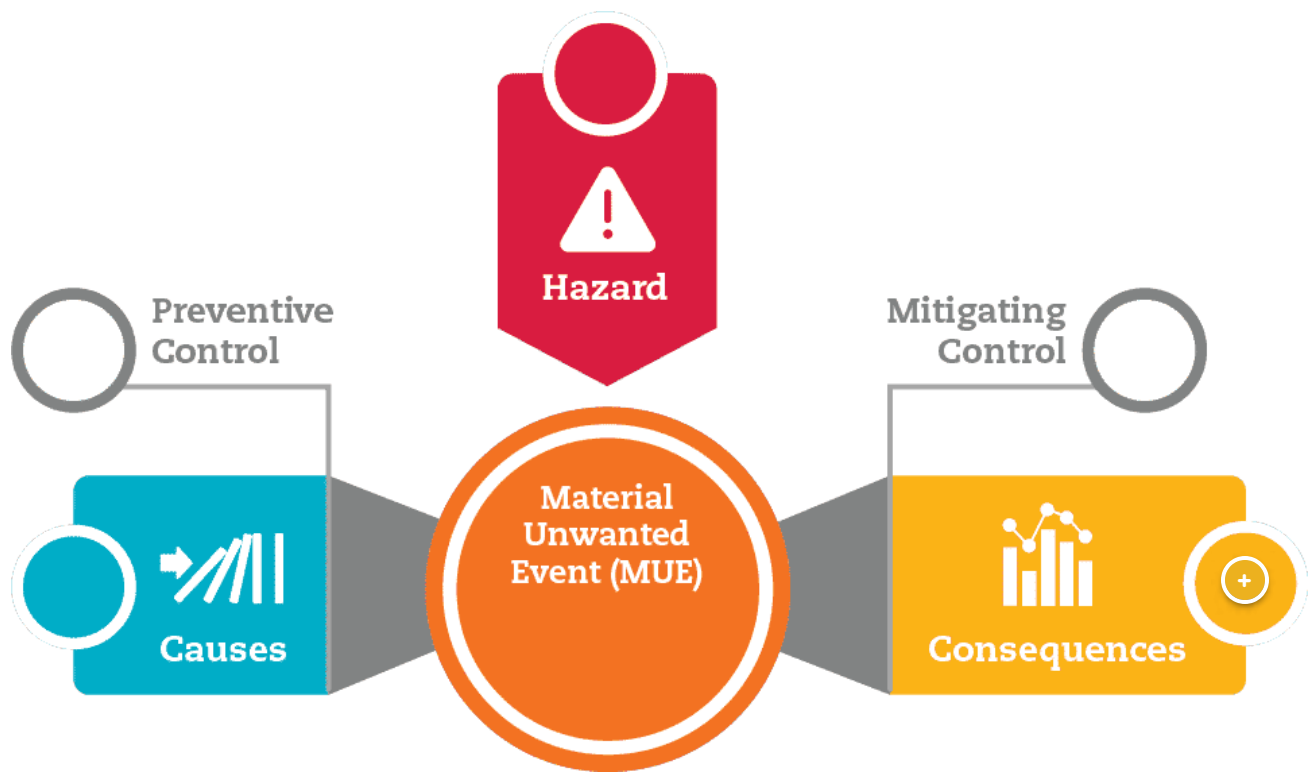
Mitigating Control

Hitting of person NOT involved in the activity:

- Area isolation;
- Prohibition to access lifting area.

Lesion or fatality of the operator.

- Prohibition to touch suspended load;
- Safety helmet.



Consequences

- Hitting of person NOT involved in the activity;
- Injury or fatality of the operator.


i During this training, several bowties diagrams with the requirements of RAC 05 will be shown. Carefully analyze the bowties and learn more about RAC requirements!



Complete the content above before moving on.

Activity Planning

In this chapter we are going to talk about a very important step for lifting of load: **activity planning**.

 Please note: Colour coding for the identification of synthetic slings is not currently in use.



Activity Planning

CAR 05



Watch the video in full to continue.

Activity

Study the images below and then connect the columns with the names of each type of hitch:



1



2



3



1

Vertical hitch

☰ 2

Choker hitch

☰ 3

Basket type hitch



















SUBMIT




Complete the content above before moving on.

Webbing slings colors chart

See now the webbing Slings colours chart. The webbing slings must be produced according to the International Color Standard (EM 1492), thus guaranteeing maximum safety when using the slings in relation to their load capacity.

ROUND SLINGS										
FLAT SLINGS										
L=LOAD FACTOR		L=1.0	L=0.8	L=20	L=1.9	L=1.7	L=1.4	L=1.0	L=1.7	L=1.38
COLOUR CODE	W.L.L Tonnes	VERTICAL W.L.L Tonnes	CHOKE S.W.L Tonnes	BASKET S.W.L Tonnes	30° S.W.L Tonnes	60° S.W.L Tonnes	90° S.W.L Tonnes	120° S.W.L Tonnes	60° S.W.L Tonnes	60° CHOKE S.W.L Tonnes
Violet	1.0	1.0	0.8	2.0	1.9	1.7	1.4	1.0	1.7	1.3
Green	2.0	2.0	1.6	4.0	3.8	3.4	2.8	2.0	3.4	2.7
Yellow	3.0	3.0	2.4	6.0	5.7	5.1	4.2	3.0	5.1	4.1
Grey	4.0	4.0	3.2	8.0	7.6	6.9	5.6	4.0	6.9	5.5
Red	5.0	5.0	4.0	10.0	9.5	8.6	7.0	5.0	8.6	6.9
Brown	6.0	6.0	4.8	12.0	11.4	10.3	8.4	6.0	10.3	8.2
Blue	8.0	8.0	6.4	16.0	15.2	13.8	11.2	8.0	13.8	11.0
Orange	10.0	10.0	8.0	20.0	19.0	17.3	14.1	10.0	17.3	13.8

 Source: <https://www.forankra.pl/en/soft-lifting-info/>



Complete the content above before moving on.



RIGGING PLAN

This is a detailed load lifting planning, also called critical lifting.



Complete the content above before moving on.

Requirements for Area Isolation

In this chapter we will know the requirements of CAR 05 for **area isolation**.



Requirements for Area Isolation

CAR 05



Please note; Crawler type cranes are not typically equipped with outriggers.



Watch the video in full to continue.

This entire course is aimed at explaining the importance of CAR 05 and its requirements for the safety during the load lifting activity.

And for that, we must know some real cases of incidents that occurred in the company, in order to have a clear view of the importance of safety requirements for everyone. **See now an incident at Vale that demonstrates the importance of correct Isolation of the area.**

Incident at Vale!

During the load lifting activity using an overhead crane, the reducing motor (load that was being lifted) touched the scaffolding pipe that was mounted on the structure for preventive maintenance, breaking the housing of the reducing motor, which fell at a height of approximately 46 meters.

The area was isolated, but the parts of the motor were projected out of the isolated area



Complete the content above before moving on.



Which requirement of CAR 05 would protect the workers on lower levels?

- ☐ Isolated area.
- ☐ Respect the load capacity of the equipment.
- ☐ Periodic inspection in the equipment.

SUBMIT



Complete the content above before moving on.

And which isolation criteria has not been adequately verified?

- ☐ Load perimeter.
- ☐ Equipment Perimeter.

SUBMIT

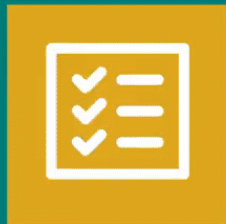


Complete the content above before moving on.

General Requirements for Execution of Lifting Activity



Now that we have seen the requirements for planning and isolating the area, as well as some requirements for interaction with lifted load, in this chapter we will learn about the **general requirements of CAR 05 for installation/equipment and procedures, applied during the activity of lifting of loads.**



General Requirements

CAR 05



Watch the video in full to continue.



The lifted load had a weight of approximately 2 tons and a webbing sling was used without identification of the load capacity that supposedly held 1 ton. **At a height of approximately 1 meter, the sling broke, causing the fall of the load.**

The incident had a critical potential, because it could have killed an employee.



Complete the content above before moving on.



What requirement of CAR 05 could have prevented this event?



Respect the load table of crane equipment.



Insulate the area.



Pre-use inspection and check the capacity of accessories, such as slings and chains, and respect this capacity.

SUBMIT



For each unwanted event there are one or more preventive requirements.

Be aware in your daily life of risk situations that have not yet been mapped. CAR 05 is constantly evolving, and new requirements may be inserted in future reviews.



Complete the content above before moving on.

Requirements Vary According to the Type of Equipment

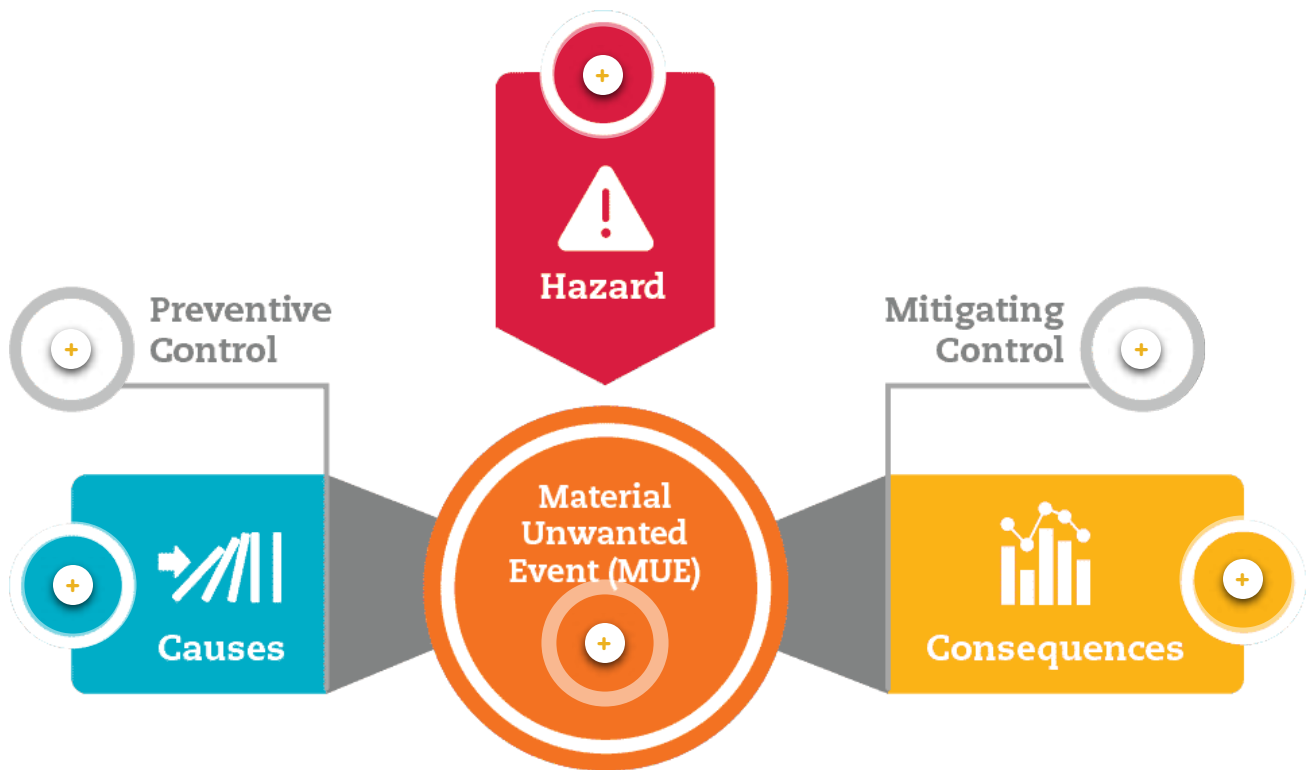
In this chapter we will learn about the requirements of CAR 05 that vary **according to the type of equipment.**

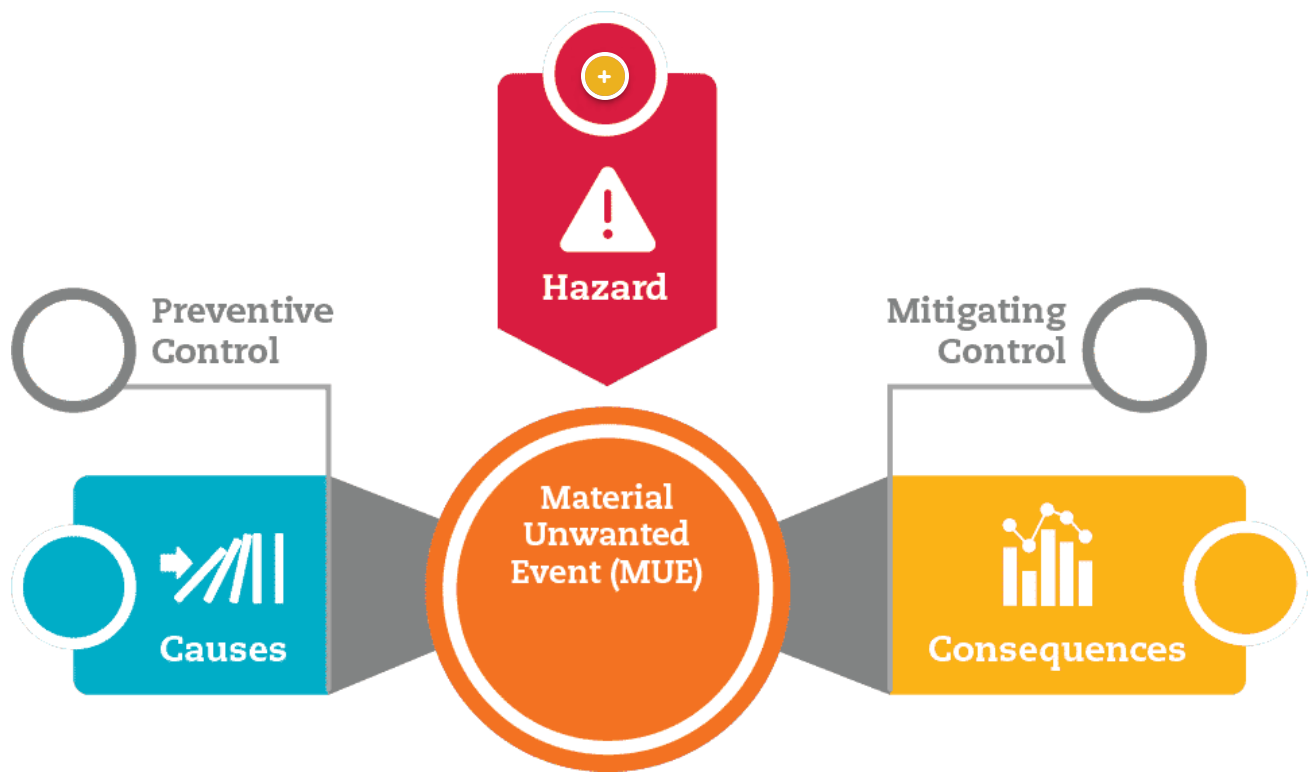
As mentioned earlier, some requirements are only required for some specific equipment.



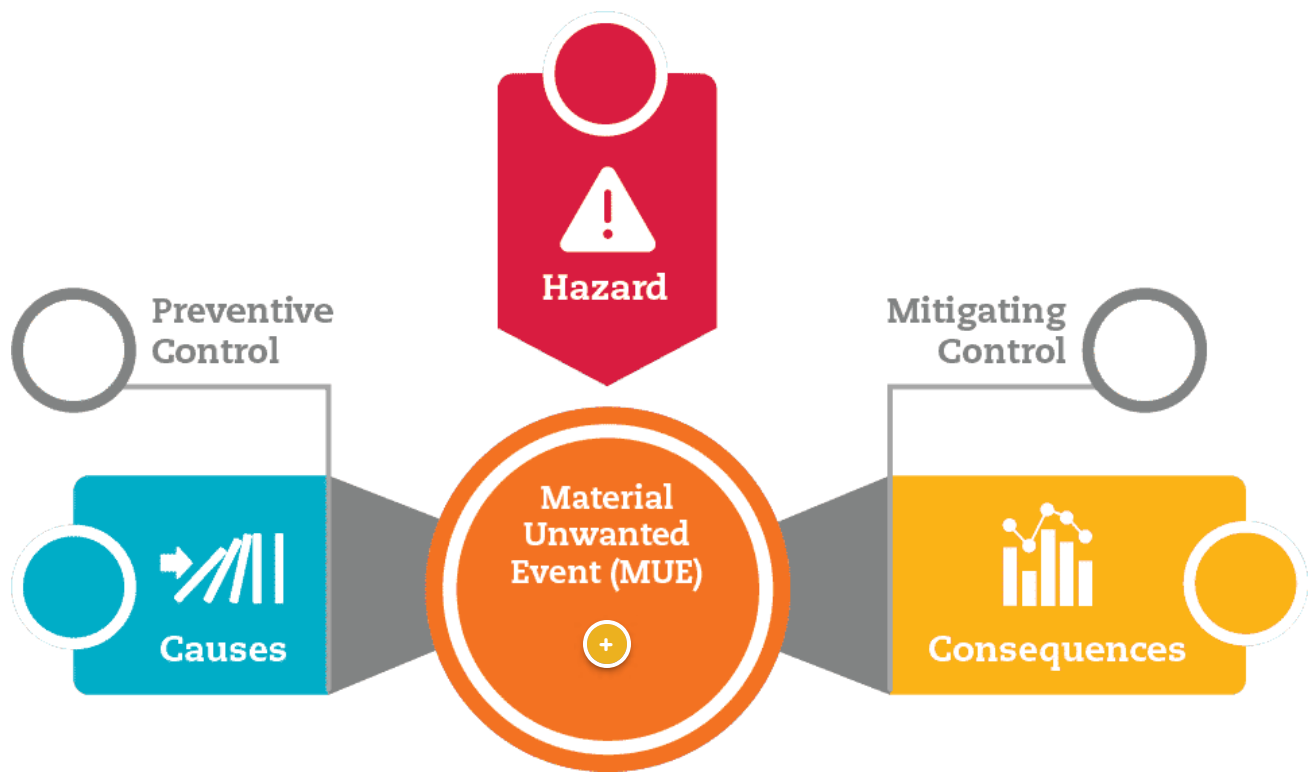
Watch the video in full to continue.

Fall of the load from overhead crane

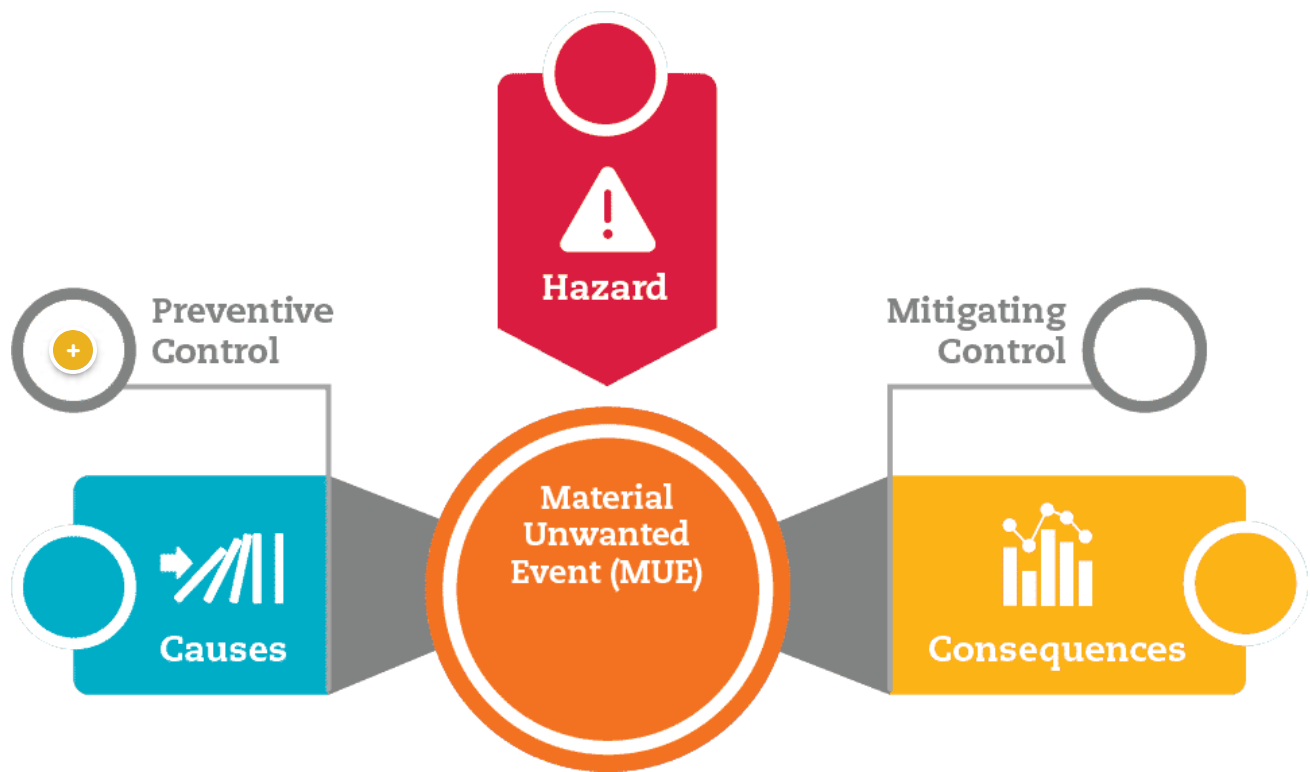




Lifting of load



Fall of the load from overhead crane



Preventive Control

Damaged equipment:

- IV Test before first use;
- I, II Pre use and periodic inspection.

Lack of training:

- Training for operation;
- Training in risk prevention.

Moving of the equipment beyond the limit:

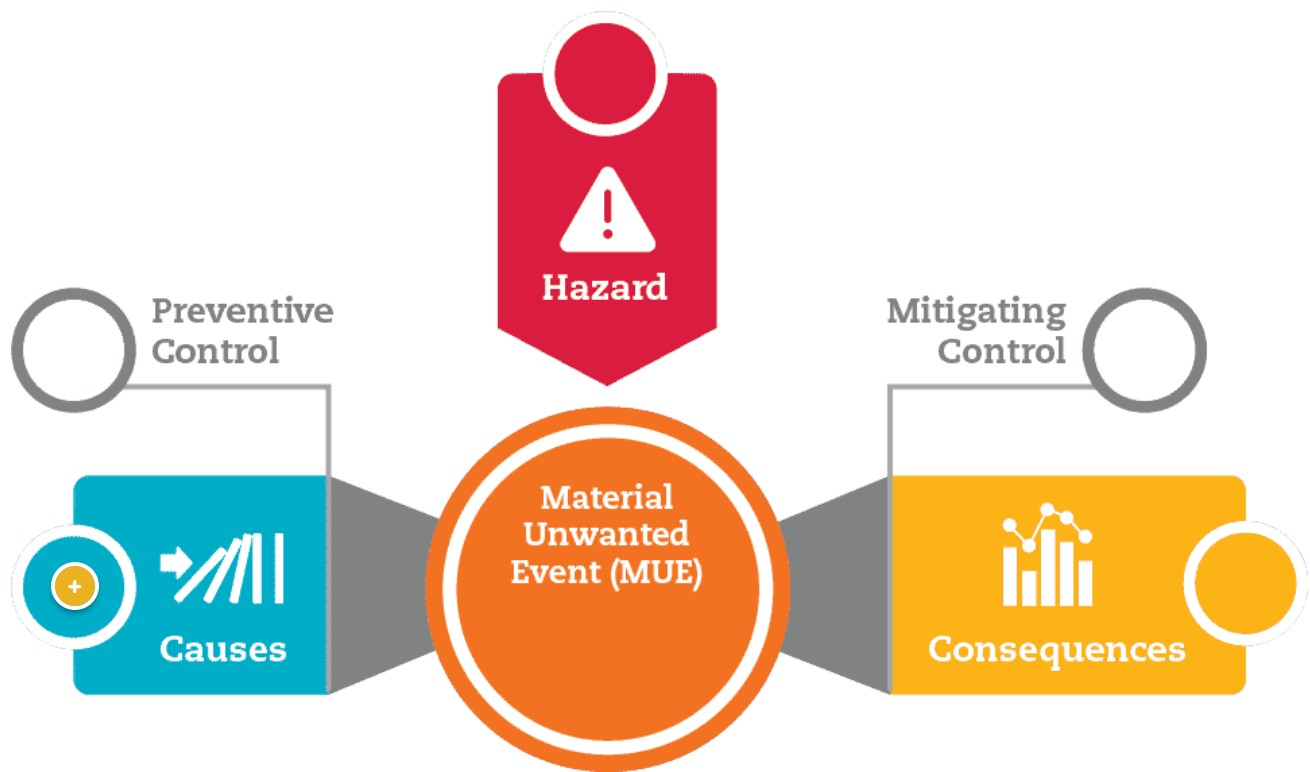
- Limit stop switch;

Loose cable:

- Loose cable in the limit switch.

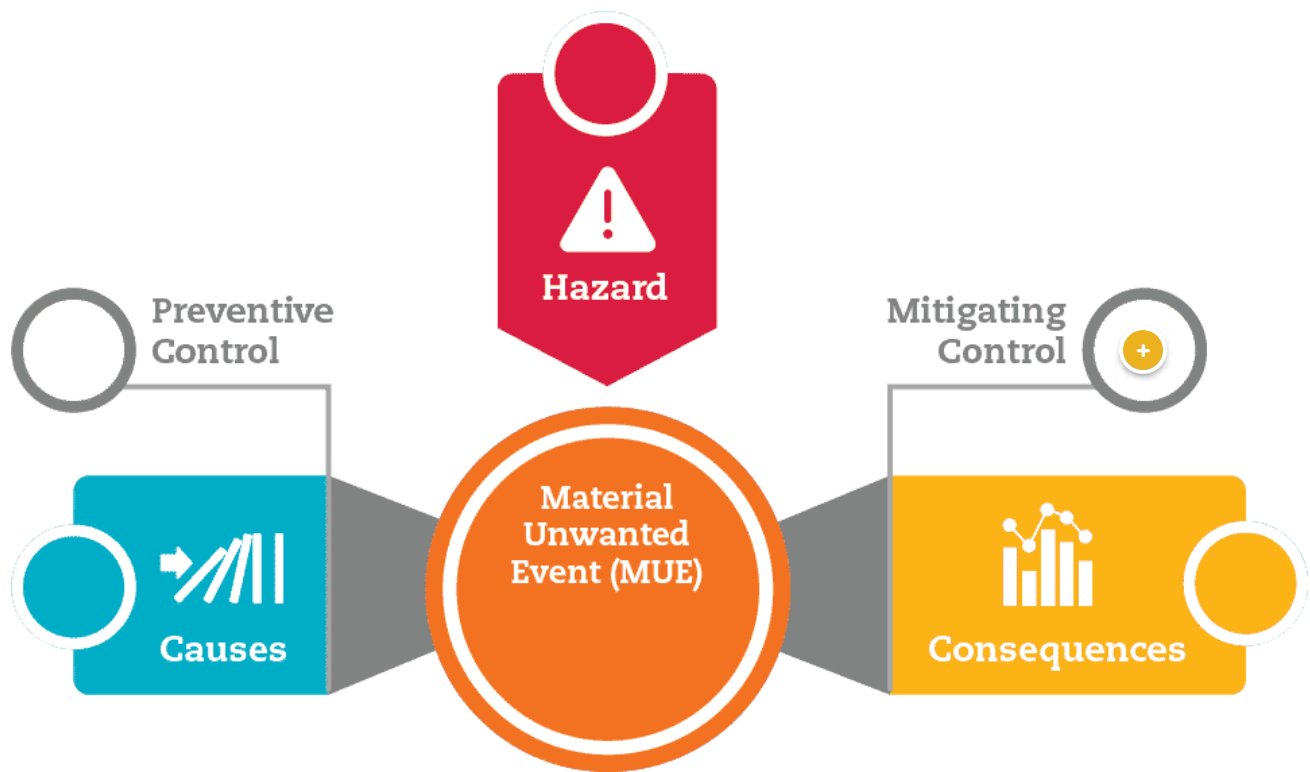
Cable wear due to inclination:

- Inclinometer.



Causes

- Damaged equipment;
- Lack of training;
- Moving of the equipment beyond the limit;
- Loose cable;
- Cable wear due to inclination.



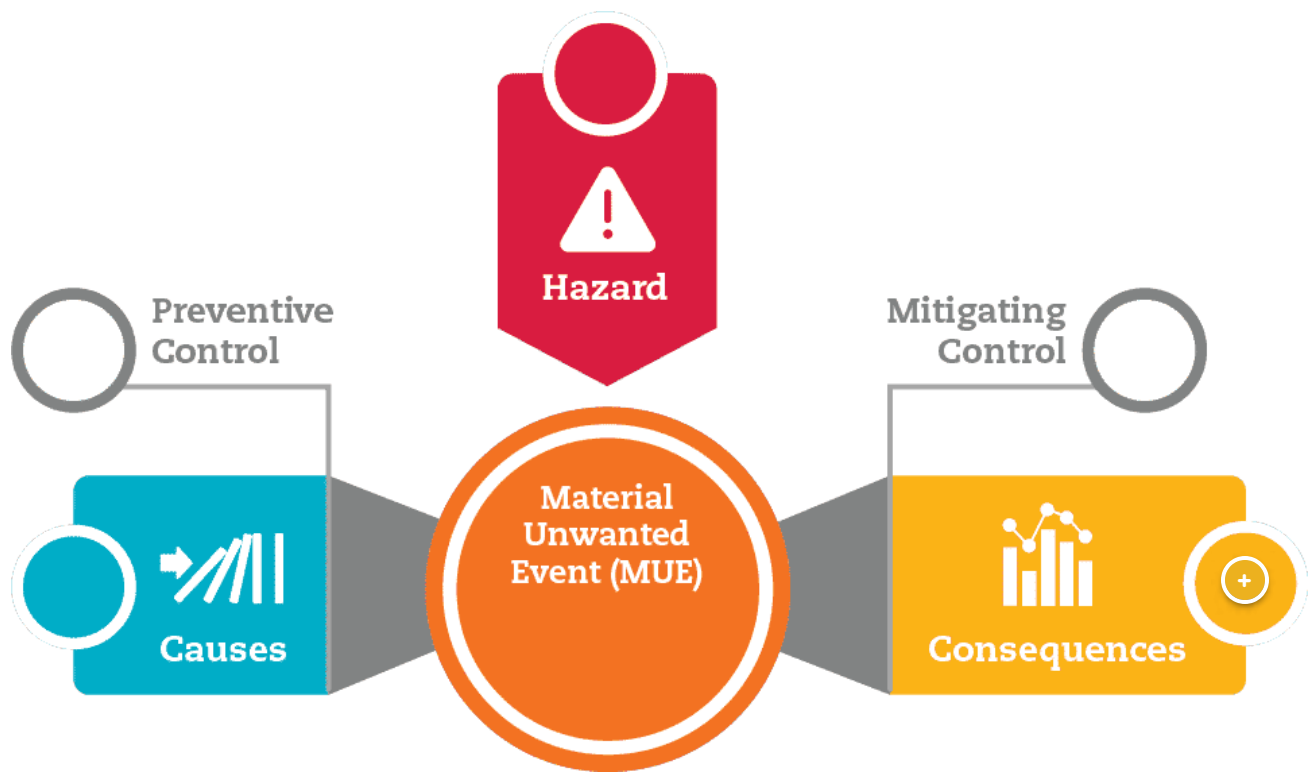
Mitigating Controls

Hitting of person NOT involved in the activity;

- Movement sound alarm;
- Area isolation;
- Prohibition to access lifting area;
- Emergency response plan.

Hitting of person involved in the activity.

- Prohibition of position under suspended load;
- Emergency response plan.



Consequences

- Hitting of person NOT involved in the activity;
- Hitting of person involved in the activity.



Complete the content above before moving on.

Now we will learn about the requirements of CAR 05 that are **specific to some types of cranes.**



Specific Requirements for Cranes

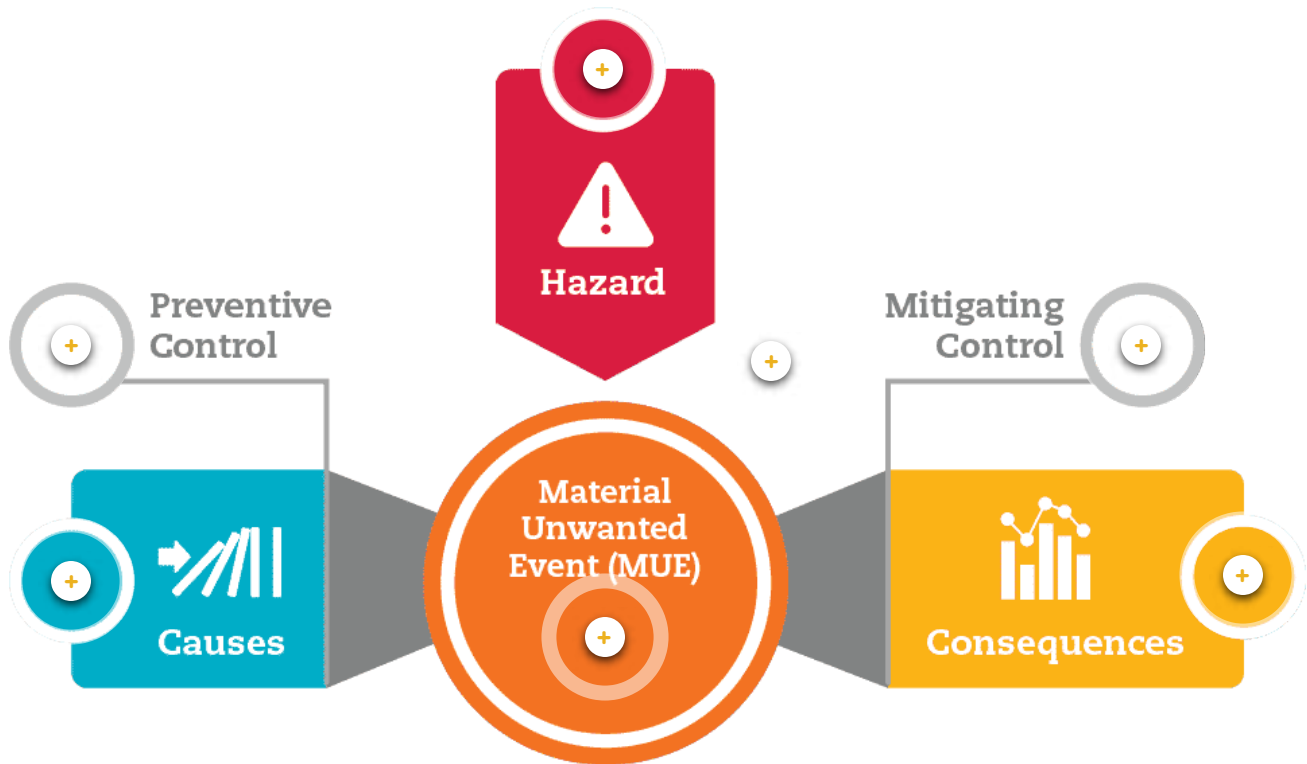
CAR 05

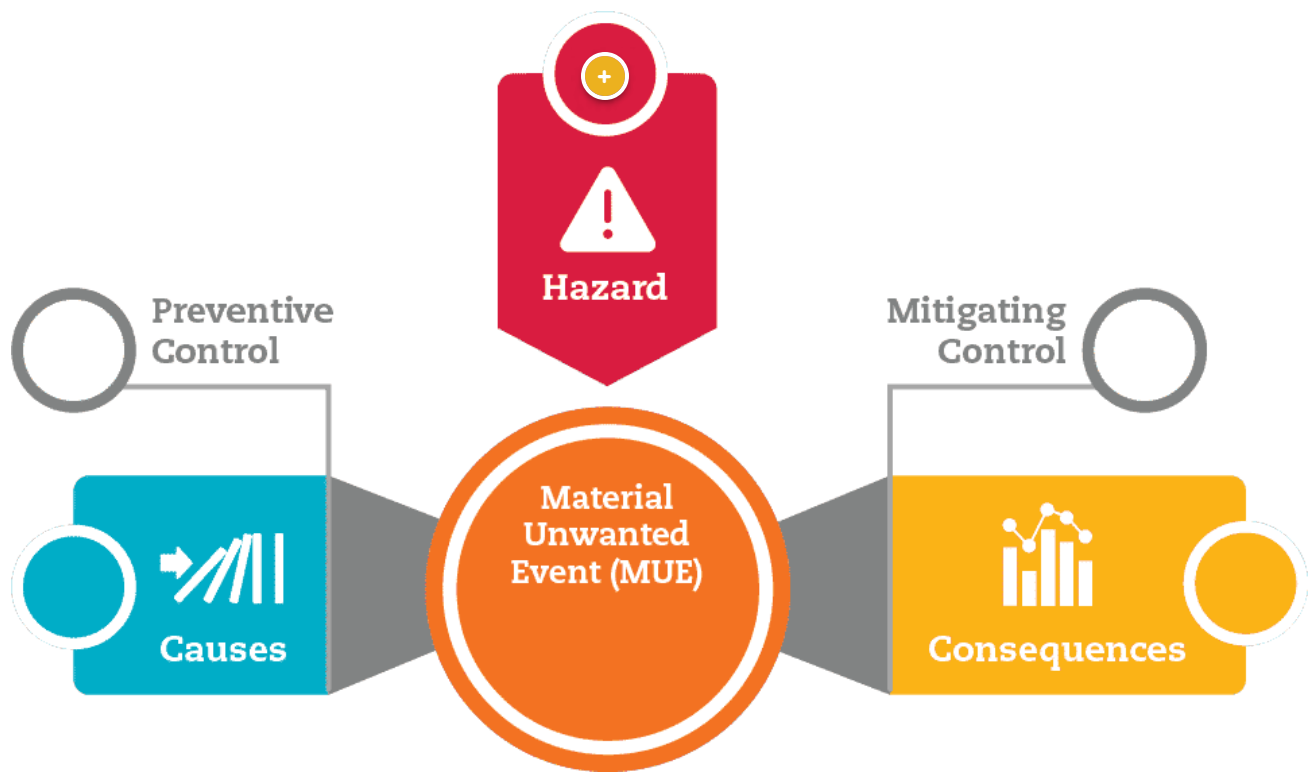


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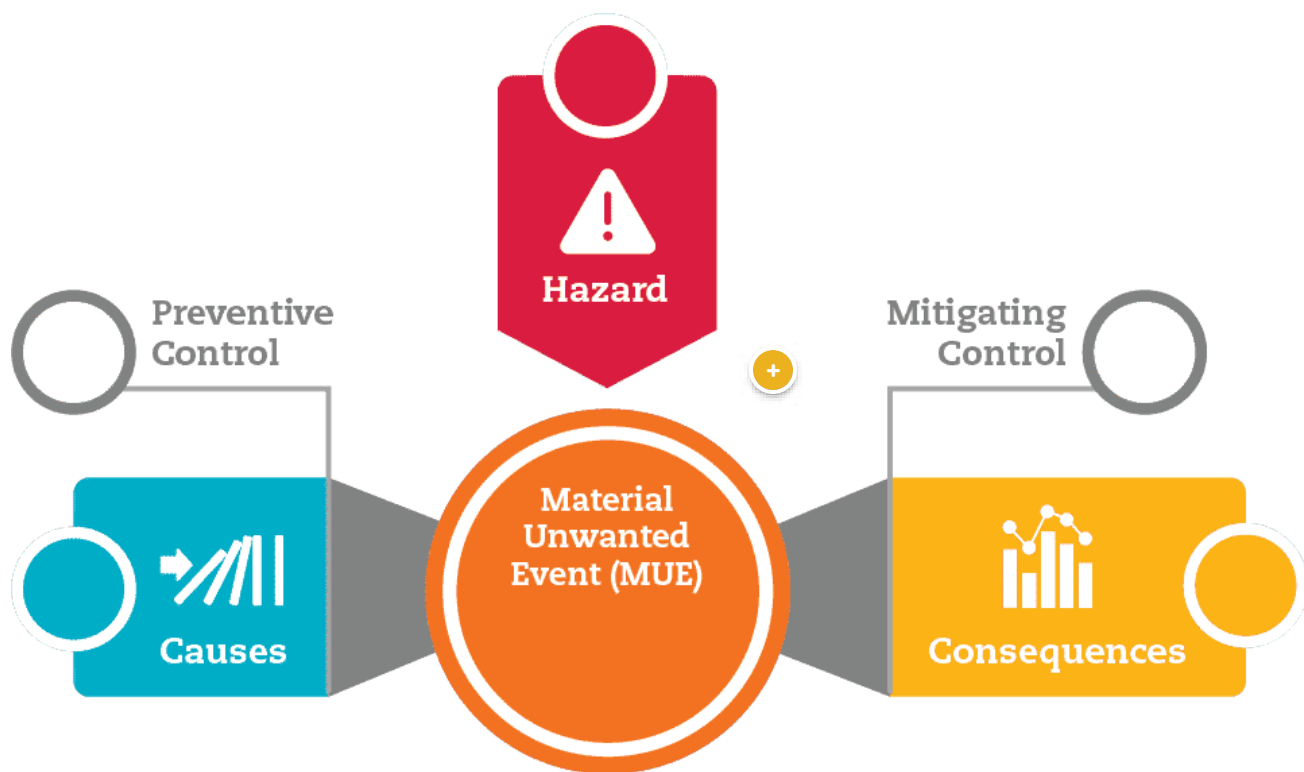
In addition to the prevention requirements, it is very important to be aware of the requirements for mitigation, that is, requirements implemented to mitigate the impact in the event of an accident. At any time you can return to the chapter on Bowties to study them better.

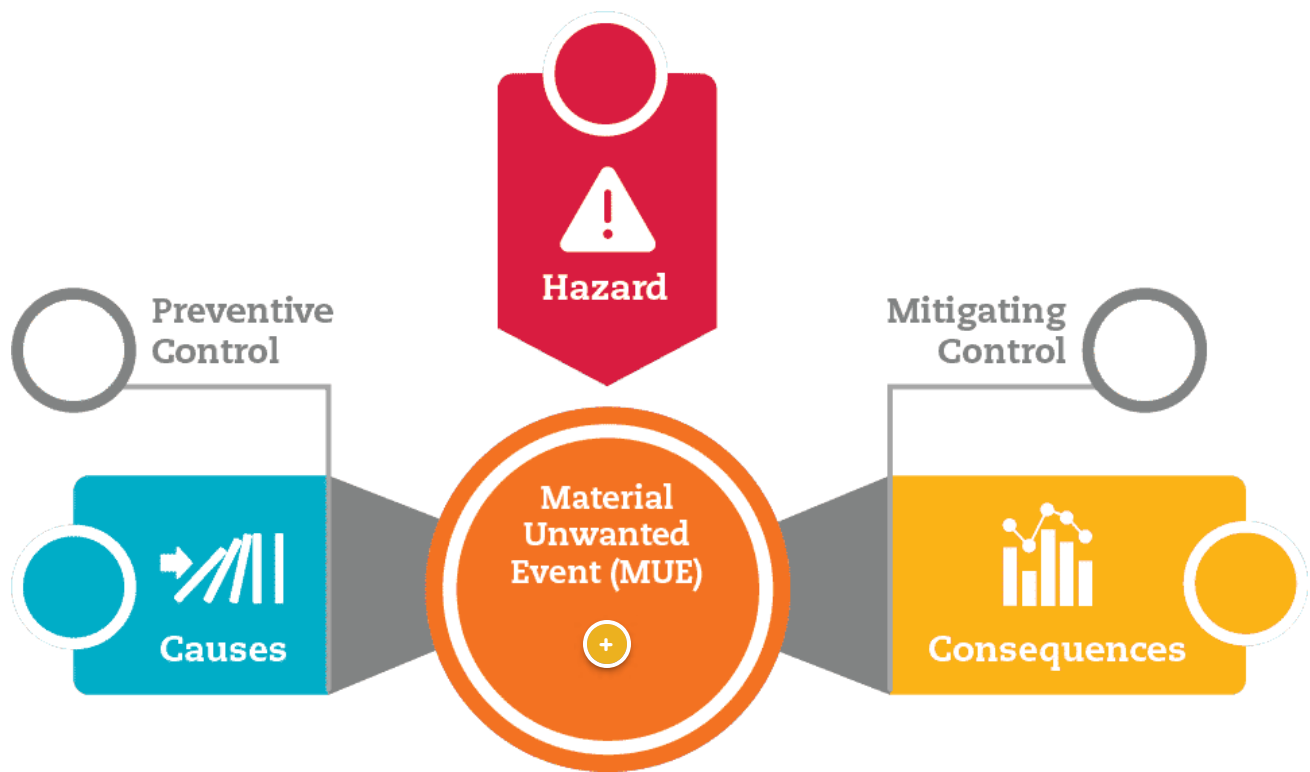
Mobile crane overturning



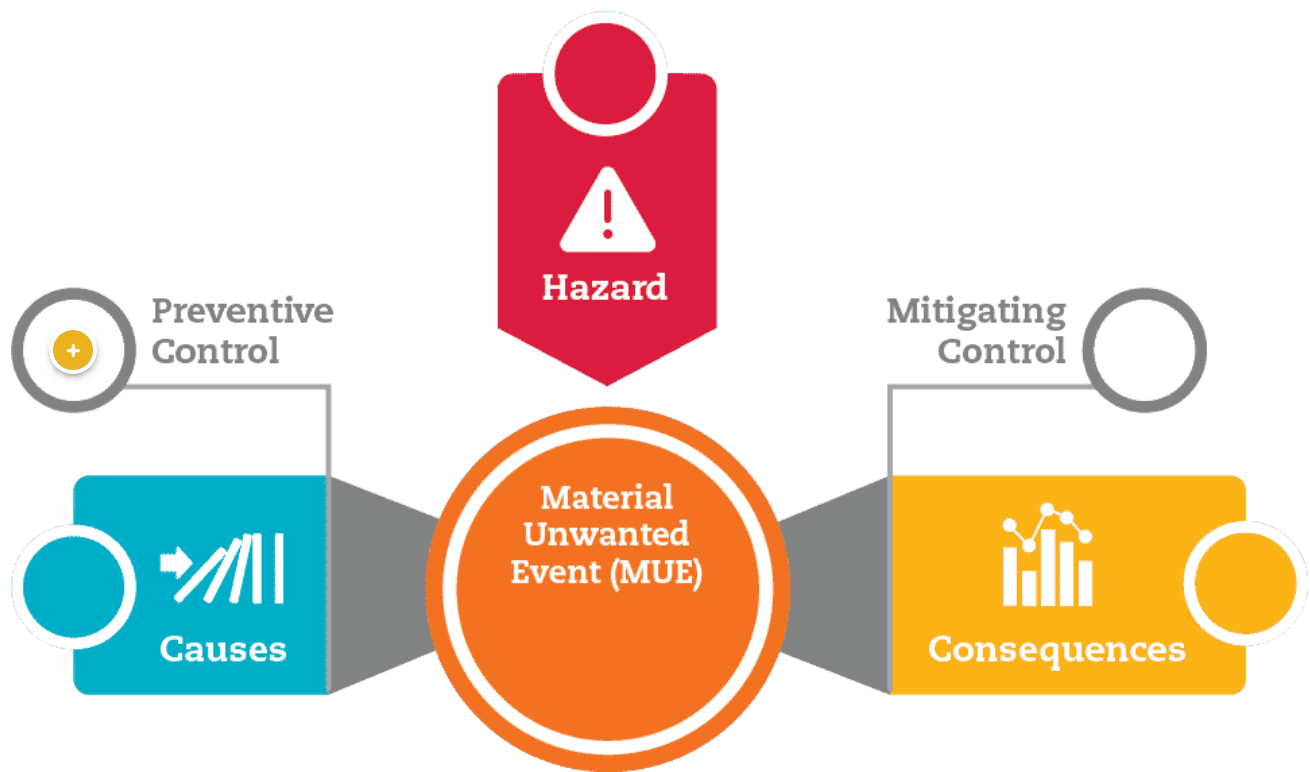


Lifting of load





Mobile crane overturning



Preventive Control

Overload:

- Visible indication of the maximum load;
- Load table;
- Overload sensor.

Unevenness of equipment:

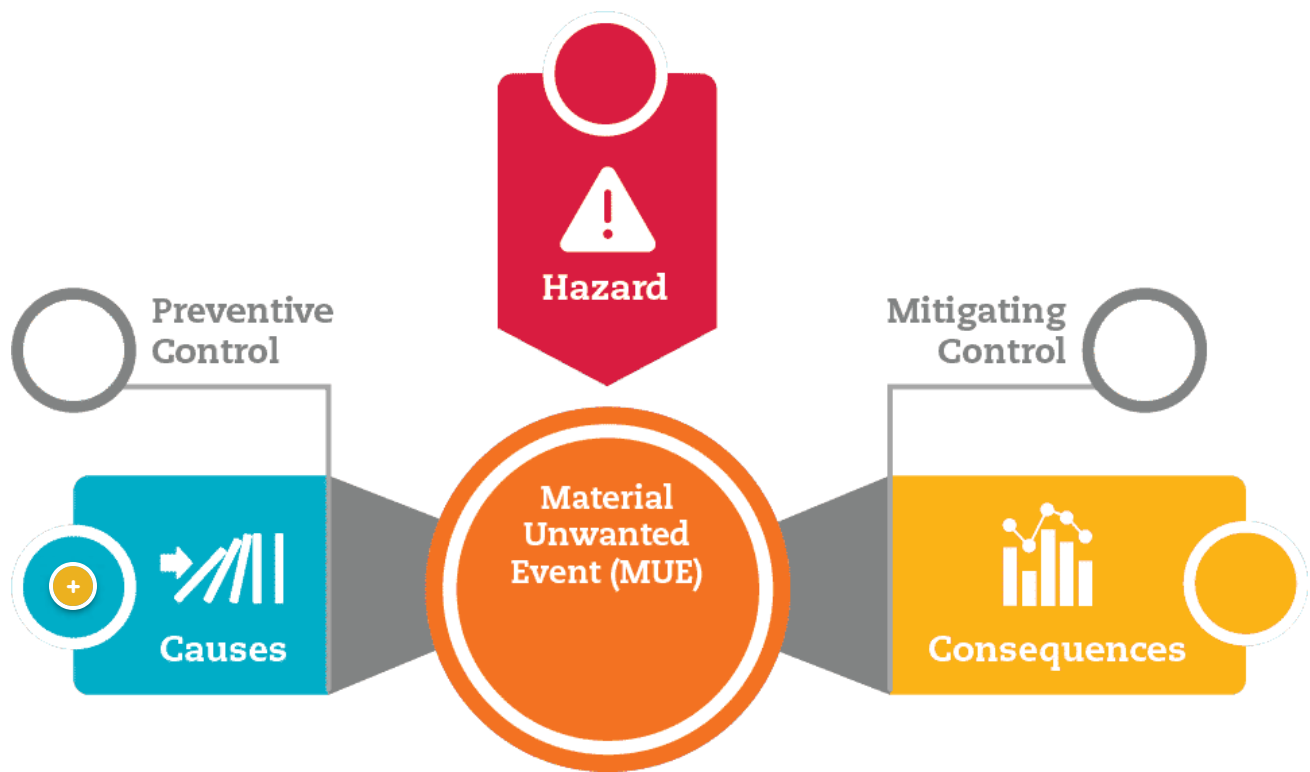
- Full extending of the outriggers;
- Outriggers pressure monitoring;
Check standard (pressure monitoring)
- Outriggers leveling control system.

Lack of training:

- Training for operation.

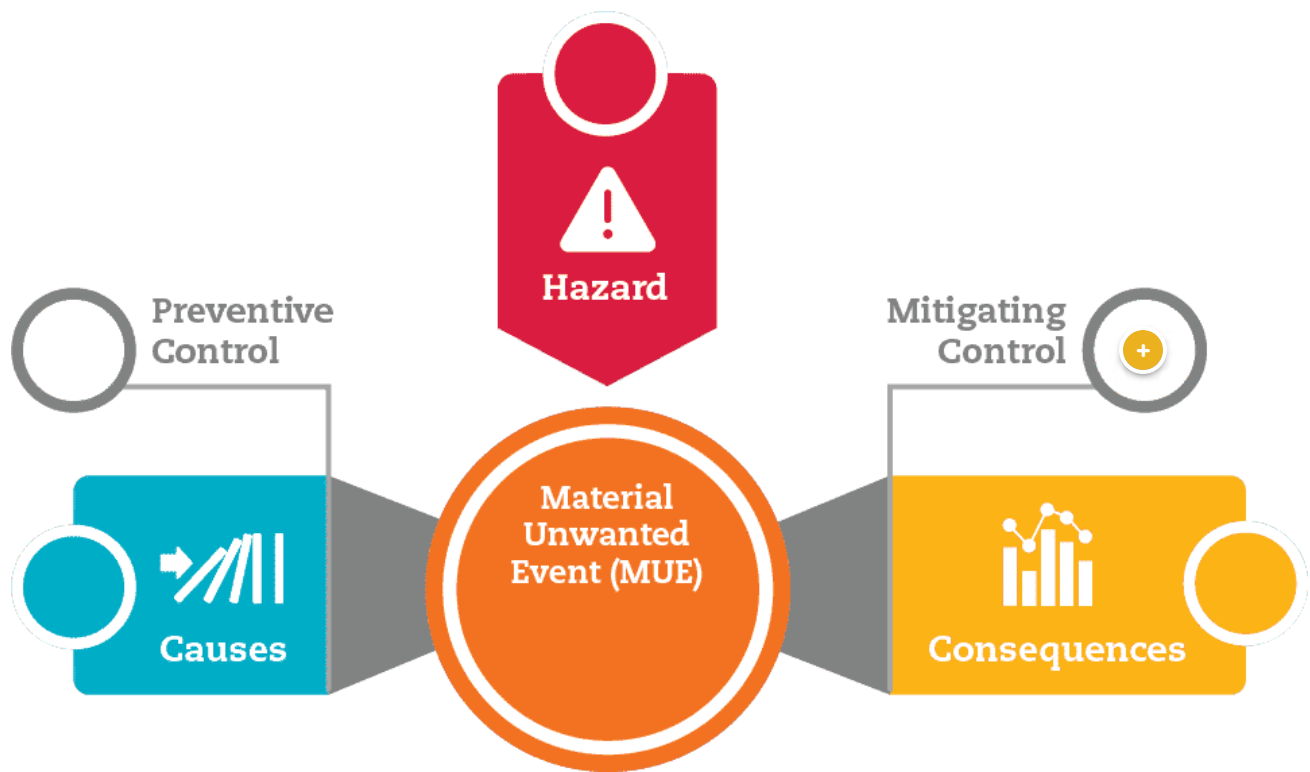
Lack of planning for critical lifting:

- Rigging plan.



Causes

- Overload;
- Unevenness of equipment;
- Lack of training;
- Lack of planning for critical lifting.



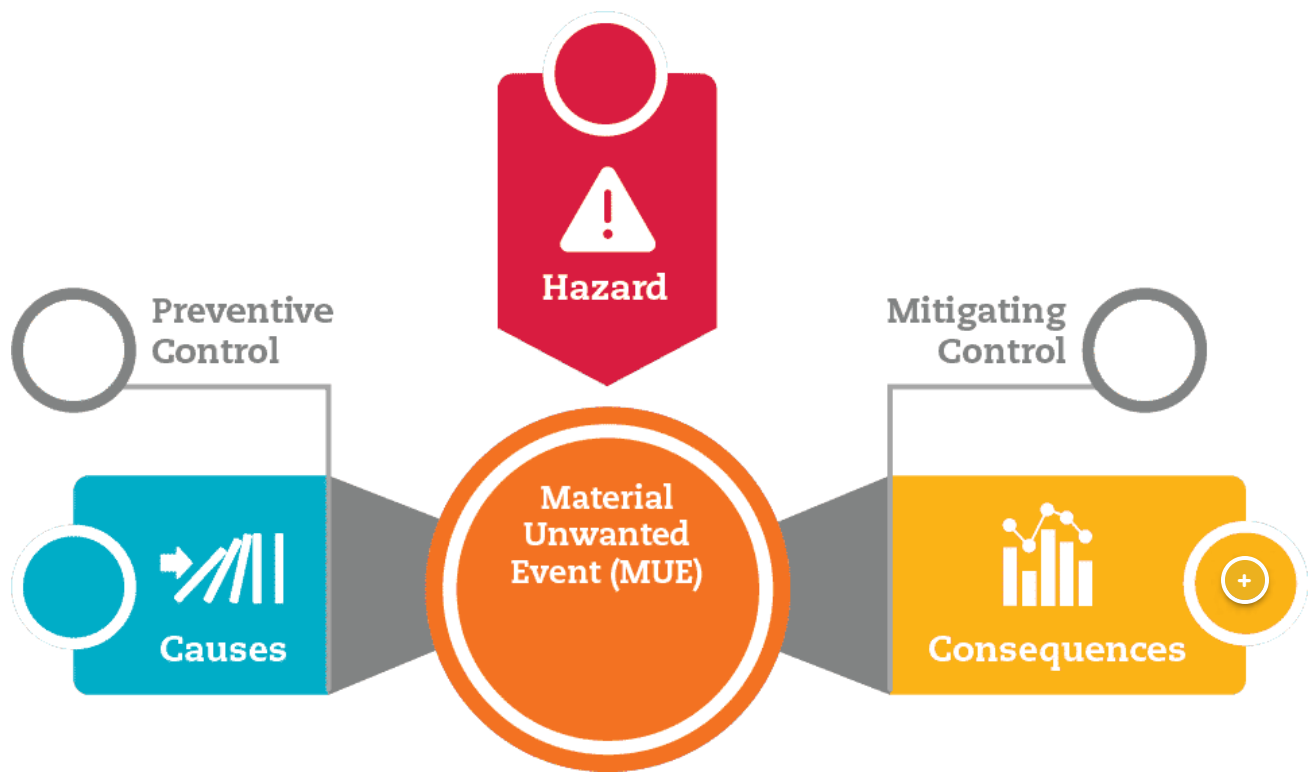
Mitigating Control

Hitting pf person NOT involved in the activity:

- Area isolation;
- Prohibition to access lifting area;
- Emergency response plan.

Fatality of the operator:

- Emergency response plan.



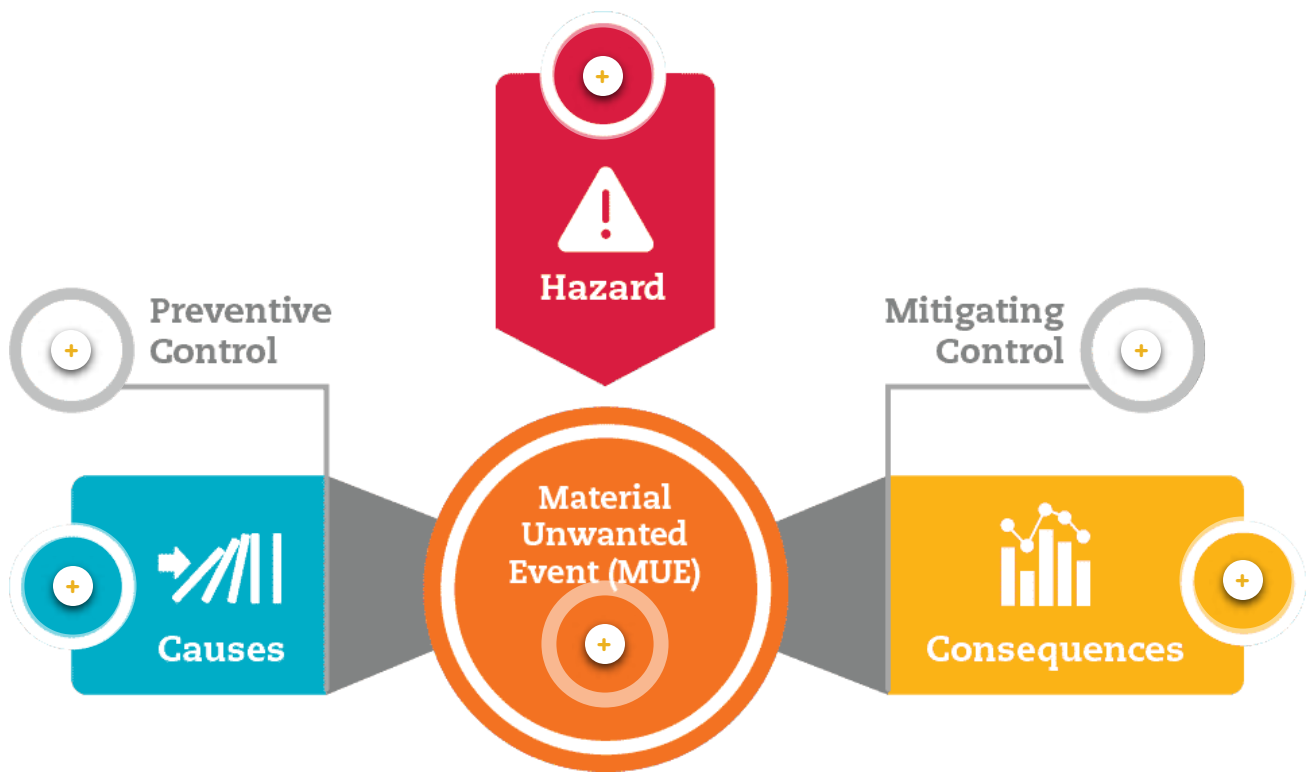
Consequences

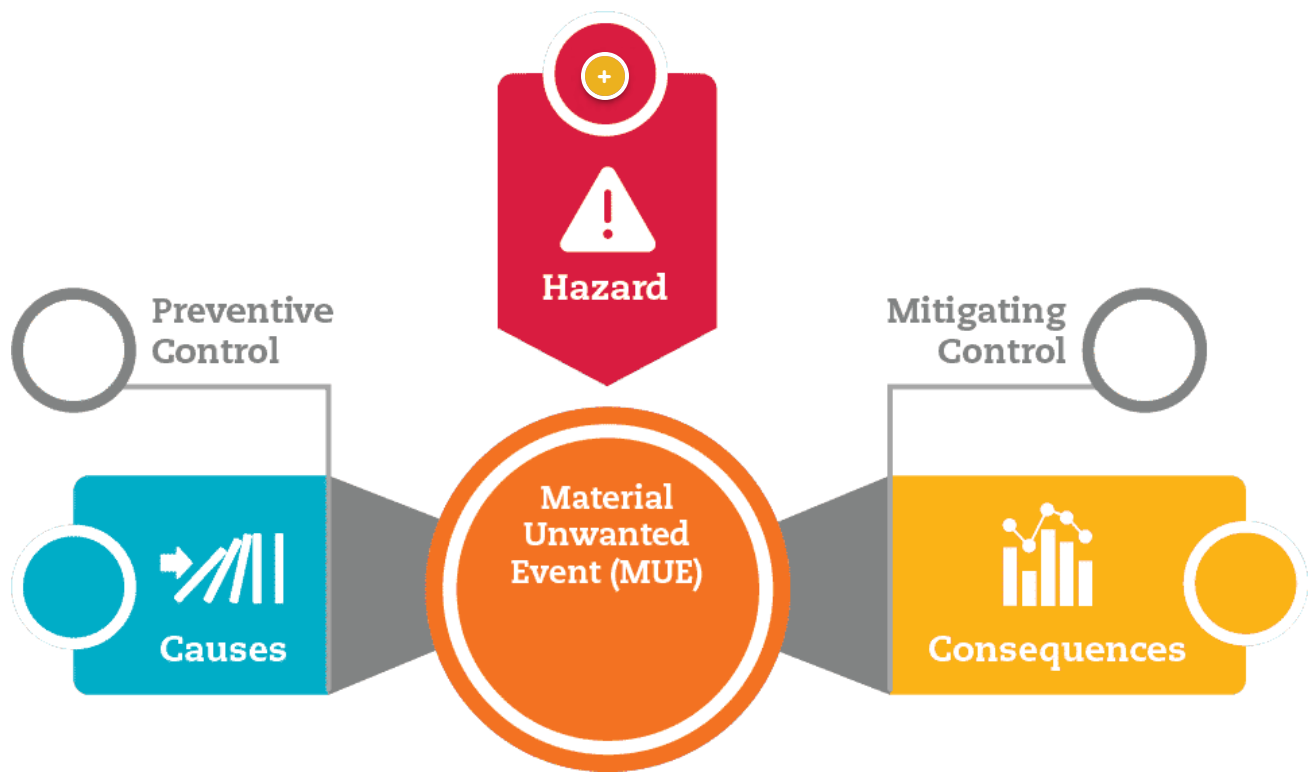
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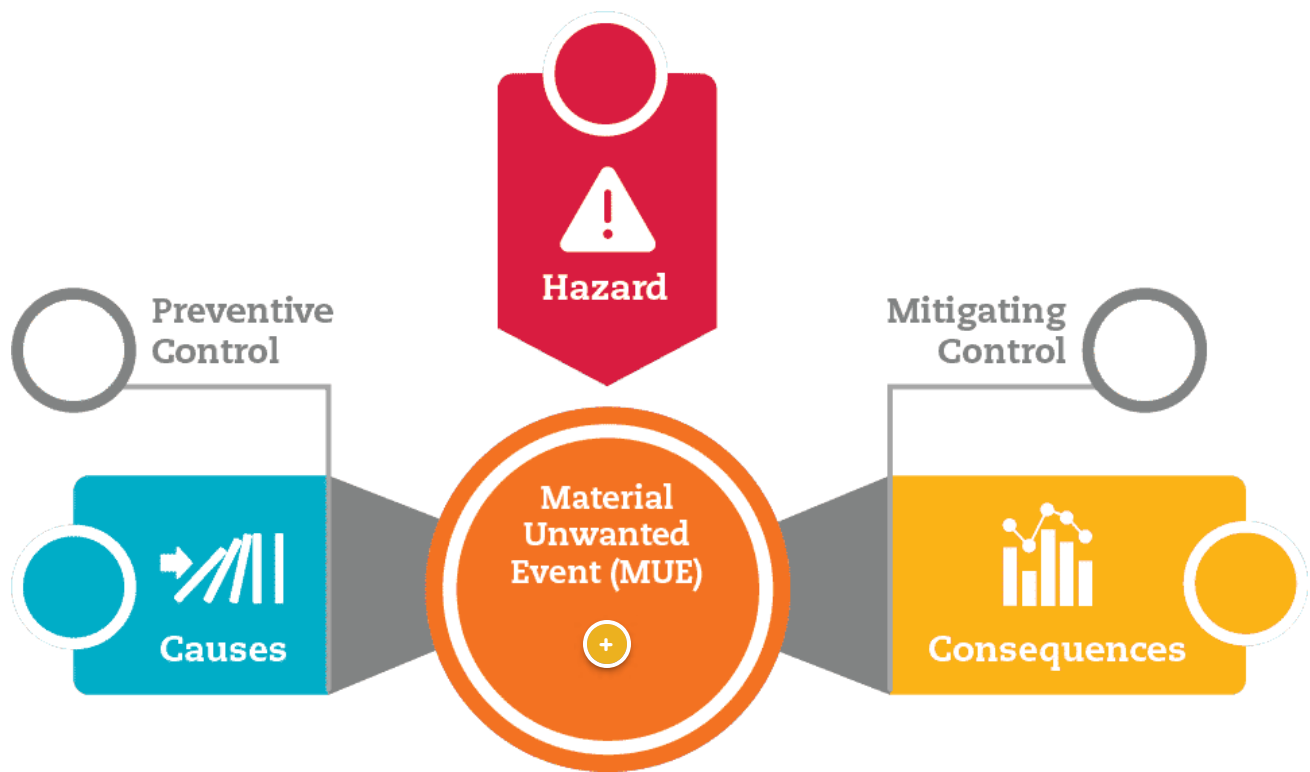
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Fall of the load from the crane

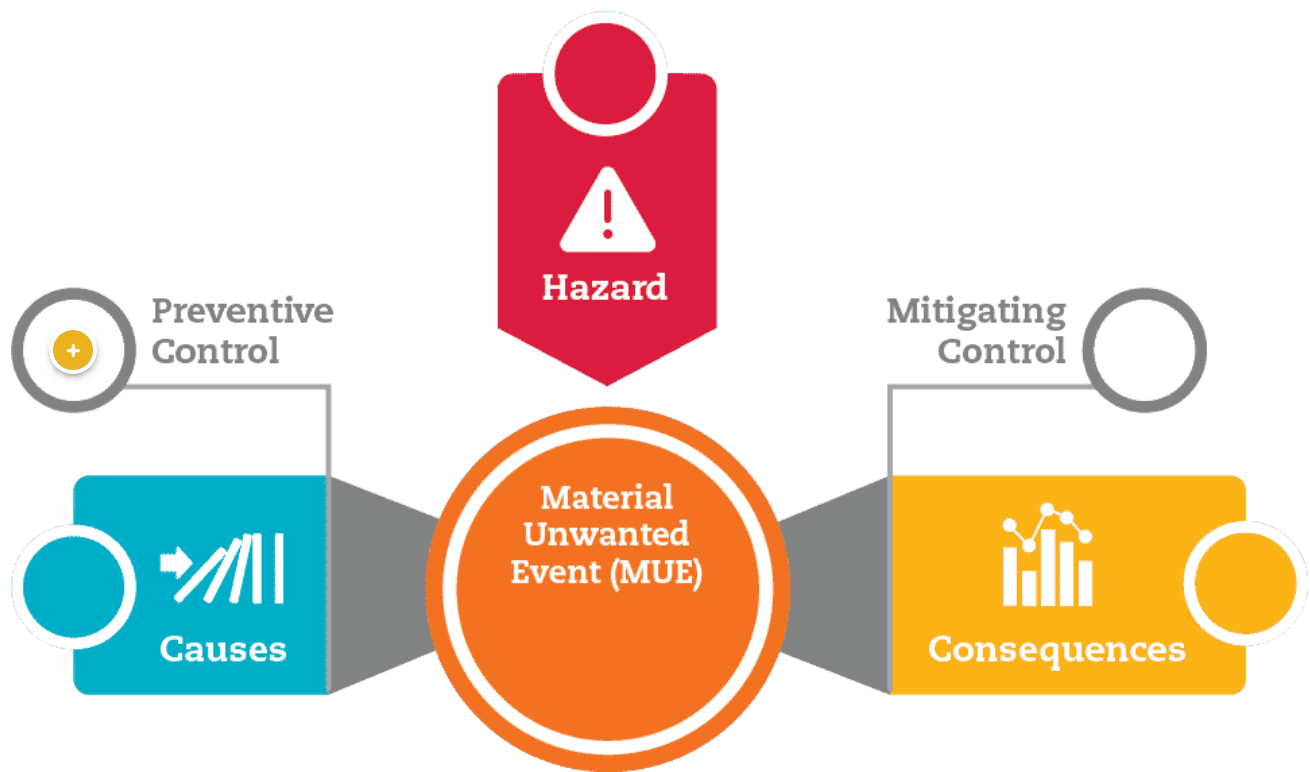




Lifting of load



Fall of the load from the crane



Preventive Control

Overload:

- Visible indication of the maximum load;
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Damaged equipment:

- Test before first use;
- I, II Pre use and periodic inspection;
- Disposal of damaged accessories.

Lack of training:

- Training for operation;
- Training in risk prevention.

Load without fixation:

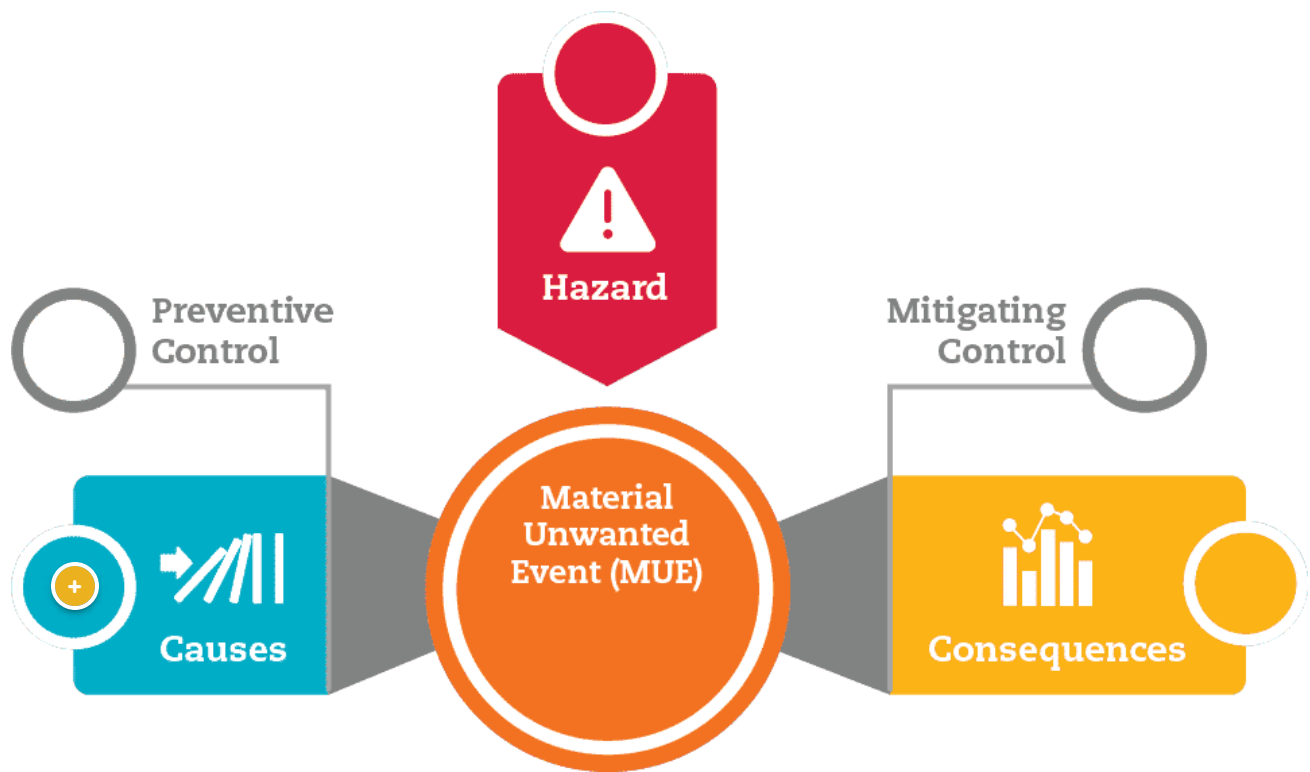
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High speed wind:

- Anemometer.

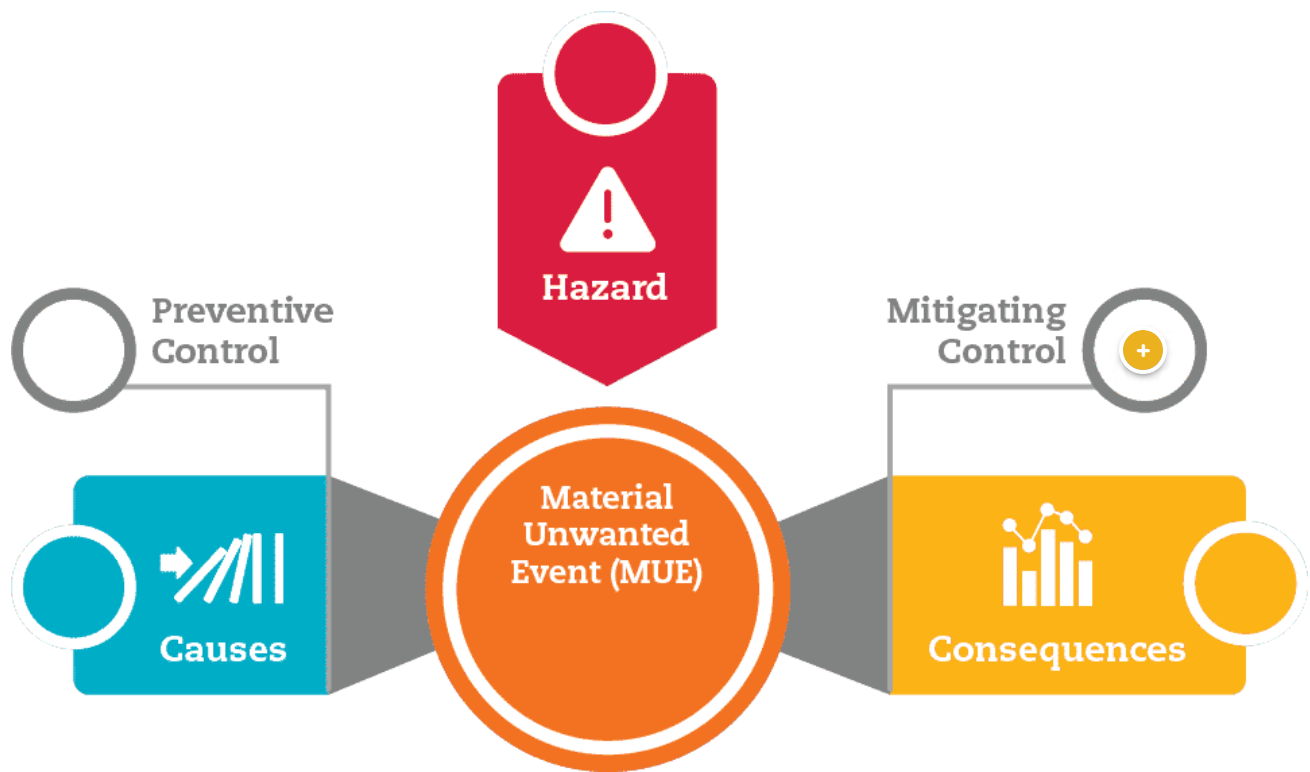
Moving of the equipment beyond the limit:

- Limit stop switch.



Causes

- Overload;
- Damaged equipment;
- Lack of training;
- Load not secured;
- High speed wind;
- Moving of the equipment beyond the limit.



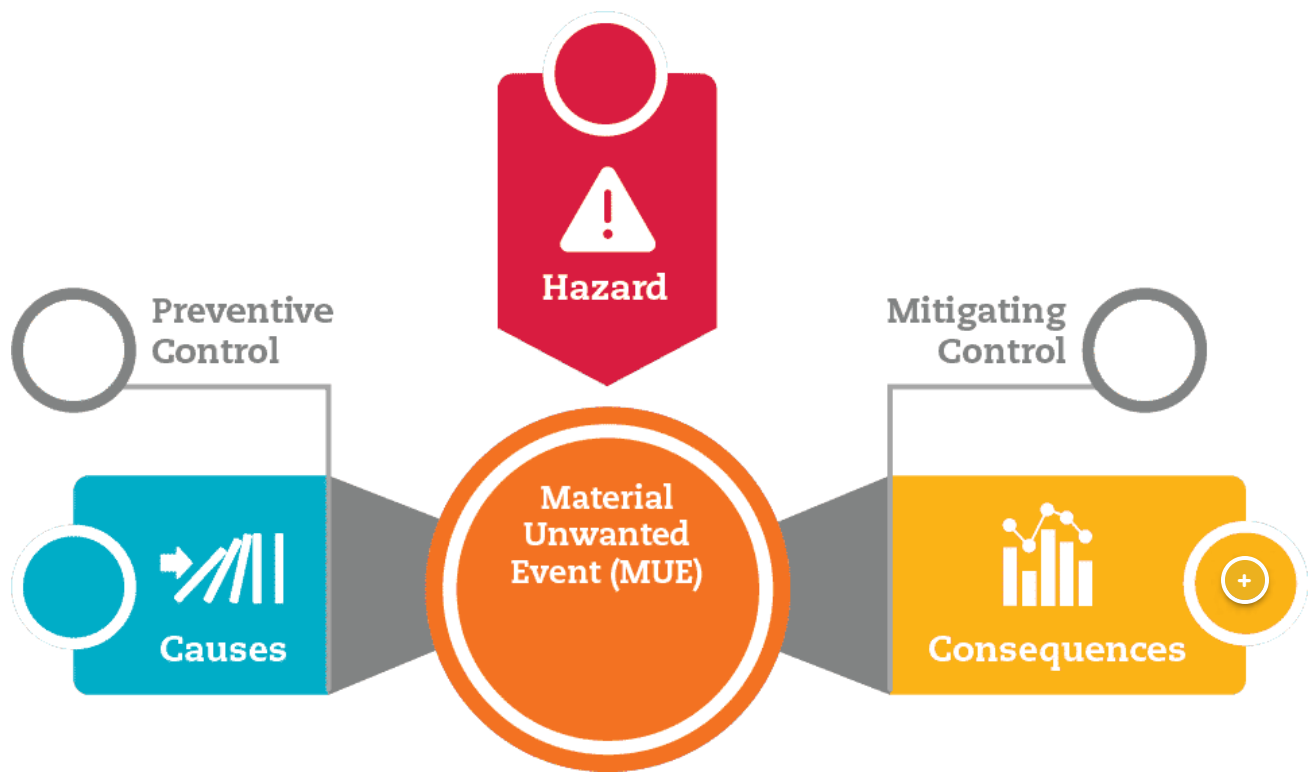
Mitigating Control

Hitting of person NOT involved in the activity:

- Area isolation;
- Prohibition to access lifting area.

Lesion or fatality of the operator.

- Prohibition to touch suspended load;
- Safety helmet.



Consequences

- Hitting of person NOT involved in the activity;
- Injury or fatality of the operator.



Complete the content above before moving on.

Requirements for Training

In this chapter we will learn about the **requirements for training**.



Requirements for Training

CAR 05



Watch the video in full to continue.

Lesson 9 of 10

Quiz

You will now take a quiz.

Question

01/04

During the planning of the lifting activity of a load with a mass of 500 kg, an employee presented to the team a webbing sling without indication of load capacity and with a small cut. The employee assured the team that the webbing sling could be used and said that the day before he had carried out a lifting of a load of 700 kg with that same webbing sling.

Based on the situation described, check the correct alternative:

- ☐ The team can use the webbing sling, because if the previous day a load of 700 kg was lifted, it would certainly be possible to lift the load of 500 kg.
- ☐ The team can use the webbing sling, but only after the approval of the supervisor, since the accessory was without indication of load capacity.
- ☐ The team can use the webbing sling as long as there is no one inside the lifting area. Thus, in the event of a rupture of the strap, no employee would be hit by the load.
- ☐ The team cannot use the webbing sling, which must be permanently discarded because it is without indication of load capacity and damaged.

Question

02/04

Mark which types of inspections are established as mandatory by CAR 05 - Lifting Loads.

- ☐ Pre-use Inspection of Lifting Equipment and Accessories, (in accordance with the requirements of the respective applicable standards).
- ☐ Detailed periodic inspection of lifting equipment and accessories in accordance with manufacturers specifications and local legislation.
- ☐ Verifications, tests and approval of equipment and accessories at the time of acquisition / procurement before first use.
- ☐ All of the above.

Question

03/04

A load with a sharp side surface will be lifted. Which accessory should not be used to perform this activity?

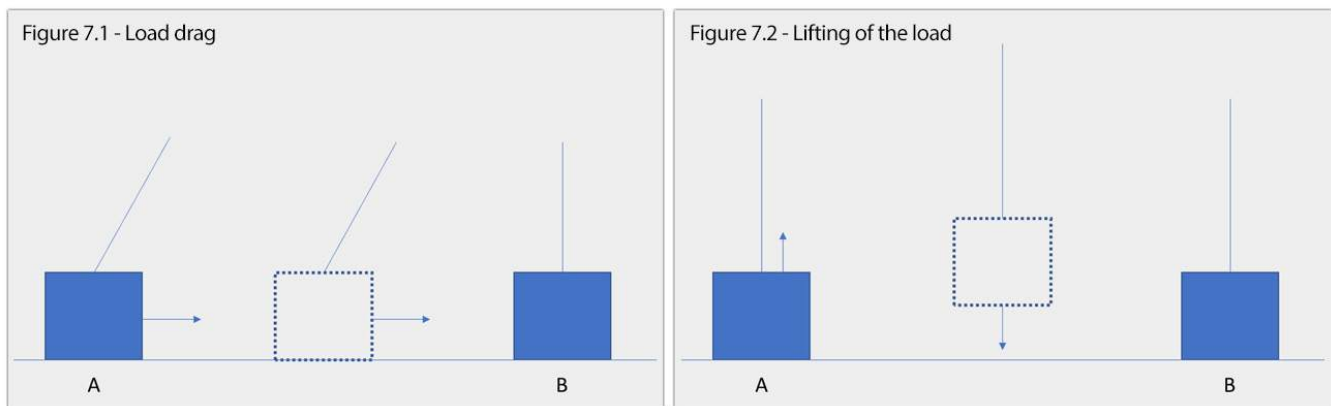
- ☐ Webbing sling.
- ☐ Chain.
- ☐ Steel cable.
- ☐ None of the previous alternatives.

Question

04/04

During load lifting activity on an overheadcrane, an employee decides to drag the load with inclined cable (**figure 7.1**) from point A to point B, rather than lifting load (**figure 7.2**). The employee said that the load was lightweight, and that it would be safer to drag it than to carry out the lifting.

The drag activity of the load performed by the employee is:



- ☐ Correct, as light loads can be dragged.
- ☐ Correct, because the load drag optimizes the working time and is allowed when performed by overhead cranes.
- ☐ Incorrect, as the loading drag can only be carried out by cranes.
- ☐ Incorrect, as the load drag is not a safe activity and may present risks in operations. CAR 05 also states that overhead cranes must contain

inclinometer, a device that will alert you to the inclination of the cable during the activity.

Conclusion



Remember, the purpose of this awareness module is to provide an overview of the Vale Critical Activity Requirements that have been introduced to Vale's operations globally. These requirements are in the process of being fully implemented across our operations.



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Click on the button beside to exit.

SAVE AND EXIT