64º Congreso Ingeniería Naval e Industria Marítima

March 27, 2025

Identification and monitoring of critical safety controls on warships

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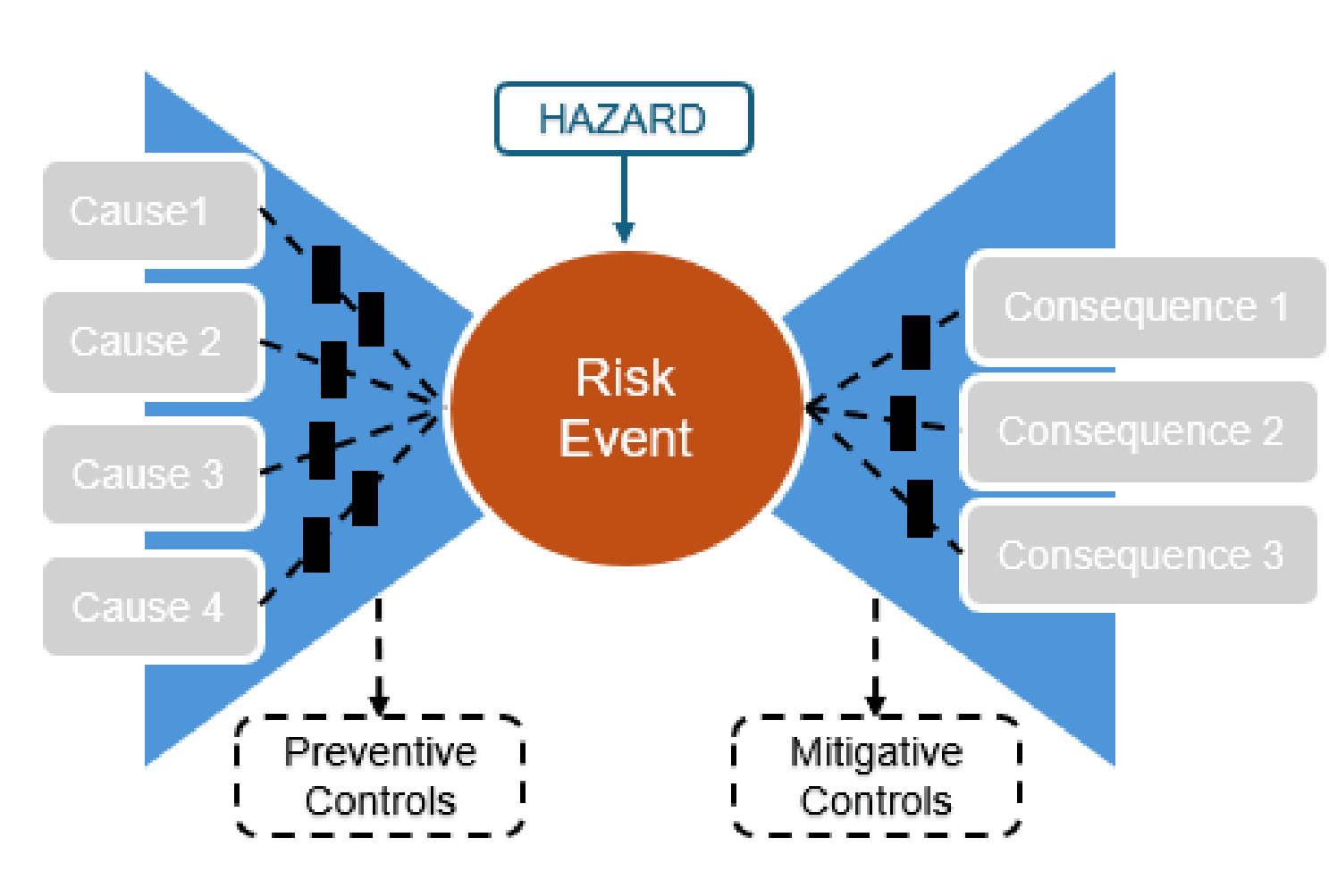
ABSTRACT

1) Depending on the design and location of a system or its malfunction, the consequences can range from negligible to critical or catastrophic.
2) In the case of a ship, the consequences of a hazard will also depend on the type of system
3) Critical controls (CC) play a fundamental role in hazards management.

What is a critical control in a ship's hazard register and what is its importance?



Hazard register (HR)

- A hazard register is a hazard tracking system to record the **identification, analysis, treatment, and management of hazards, causes, and associated accidents**.

- The hazard register **provides traceability** of formal risk analysis and ensures effective management of hazards and accidents.

- The main objective in Safety management, system safety, is to eliminate or reduce risks. **To pursue this objective, hazards are analyzed, and appropriate control measures are applied.**

- The **hierarchy of controls** provides a systematic approach to **increasing safety, eliminating hazards, and reducing or controlling risks.**

Hierarchy of controls

1- **Identify hazards**: a risk assessment must be conducted for all potential hazards identified in the operational scenario.
2- **Apply** the **hierarchy of controls**.
3- **Implement improvements**: Live the process as a continuous improvement.
4- **Training**: Ensure operators are adequately trained in the correct use and maintenance of any personal protective equipment.
5- **Monitoring**: Regularly evaluate the effectiveness of the implemented controls.

Levels of the hierarchy of controls

1- **Elimination**: Completely remove the hazard.

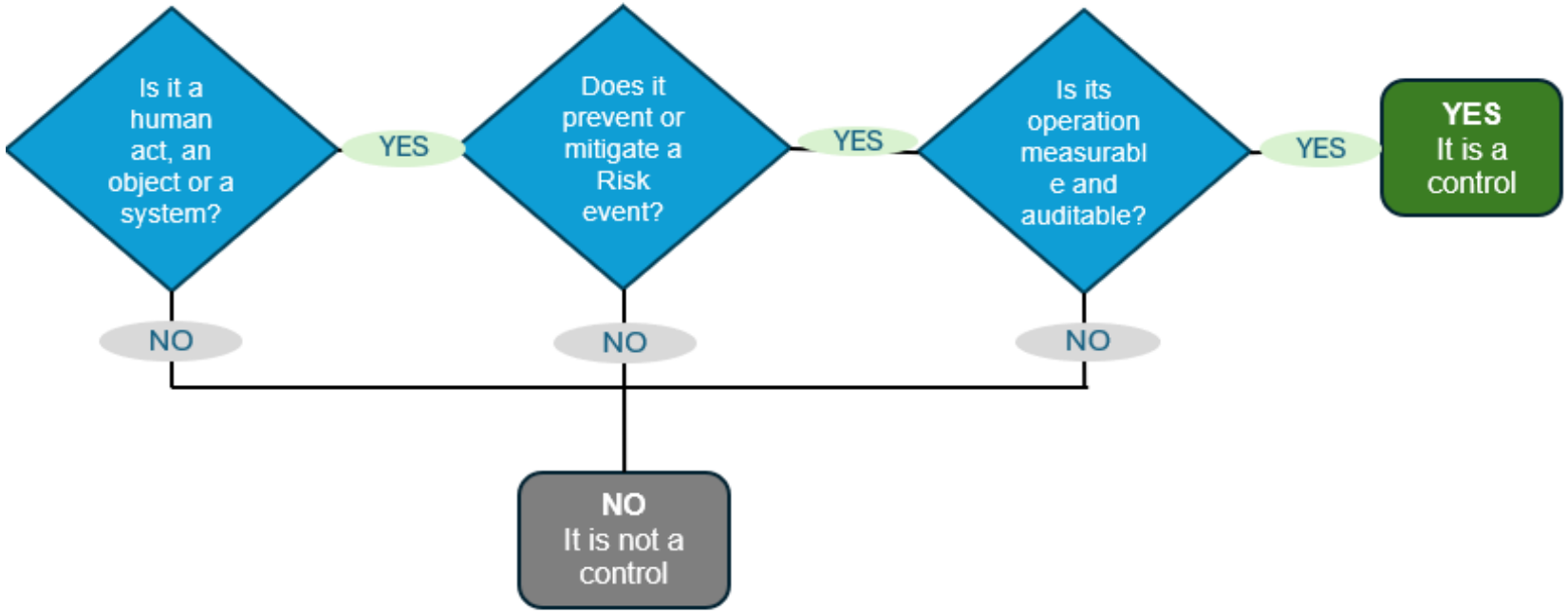
2- **Substitution**: Replace a hazardous material or process with a less hazardous one.

3- **Engineering controls**: These controls are designed to protect operators by separating them from the hazard through a physical barrier or change in the system or equipment.

4- **Administrative controls**: These are changes in operator behavior or how they operate.

5- **Personal Protective Equipment (PPE):** This is the last line of defense and should only be used when other measures are impractical or when they provide additional protection.

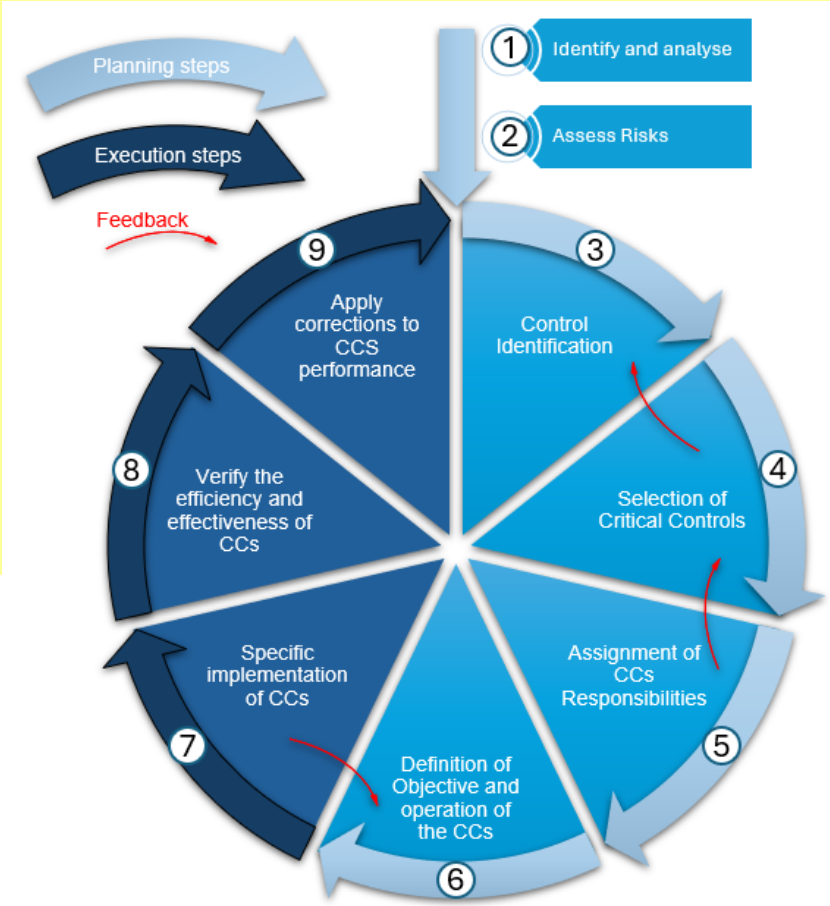
Classifying activities to determine if they are controls



Every control is:

- **Specifiable**, because it can be applied to very specific situations.
- **Measurable**, because its application can be quantified concretely.
- **Auditable**, because its effectiveness can be analysed and its potential defects corrected.

How are critical controls applied in warship systems?



Critical controls applied in warship

A **warship is a very particular system**, and the operational scenarios and environments are also particular.

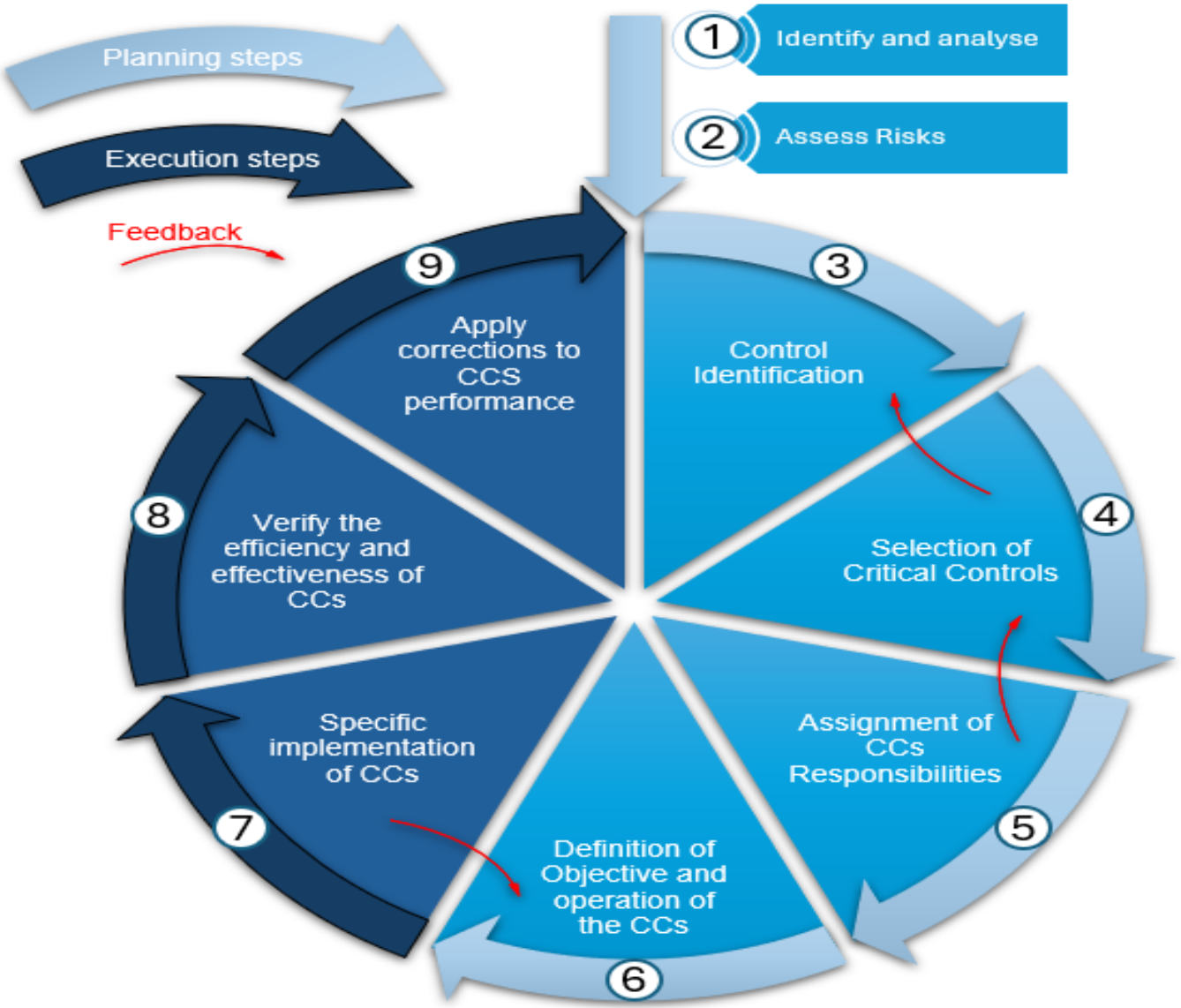
That said, and in general, for critical controls to fulfill their objective, they **must be identified, documented, and applied meticulously**.

They must also be carried out in an agile, flexible, and adaptive manner, to also allow for the implementation of:

- **Effective supervision.**

- **Periodic reviews and adjustments**, based on the needs of the context.

Critical controls applied in warship



PLANNING STAGE

STEP 1. **- Identify** and analyze

STEP 2. - **Evaluate** the risks

STEP 3. - **Identify** probable controls

STEP 4. - **Select** critical controls

STEP 5. - **Assign** responsibilities in the application of controls

STEP 6. **- Define** the operation of the controls and reporting

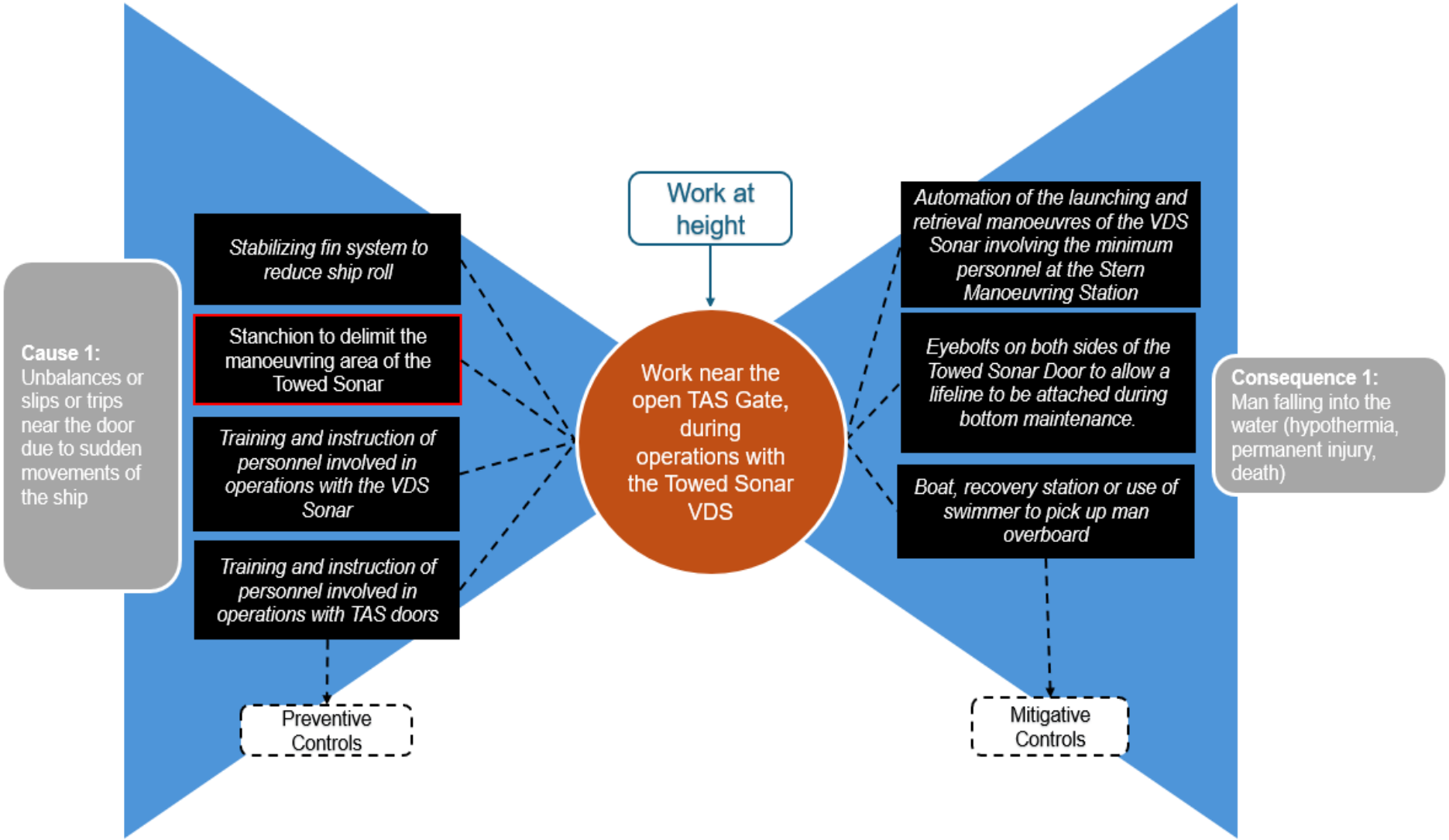
EXECUTION STAGE:

STEP 7. - **Apply specific controls** for each audited activity

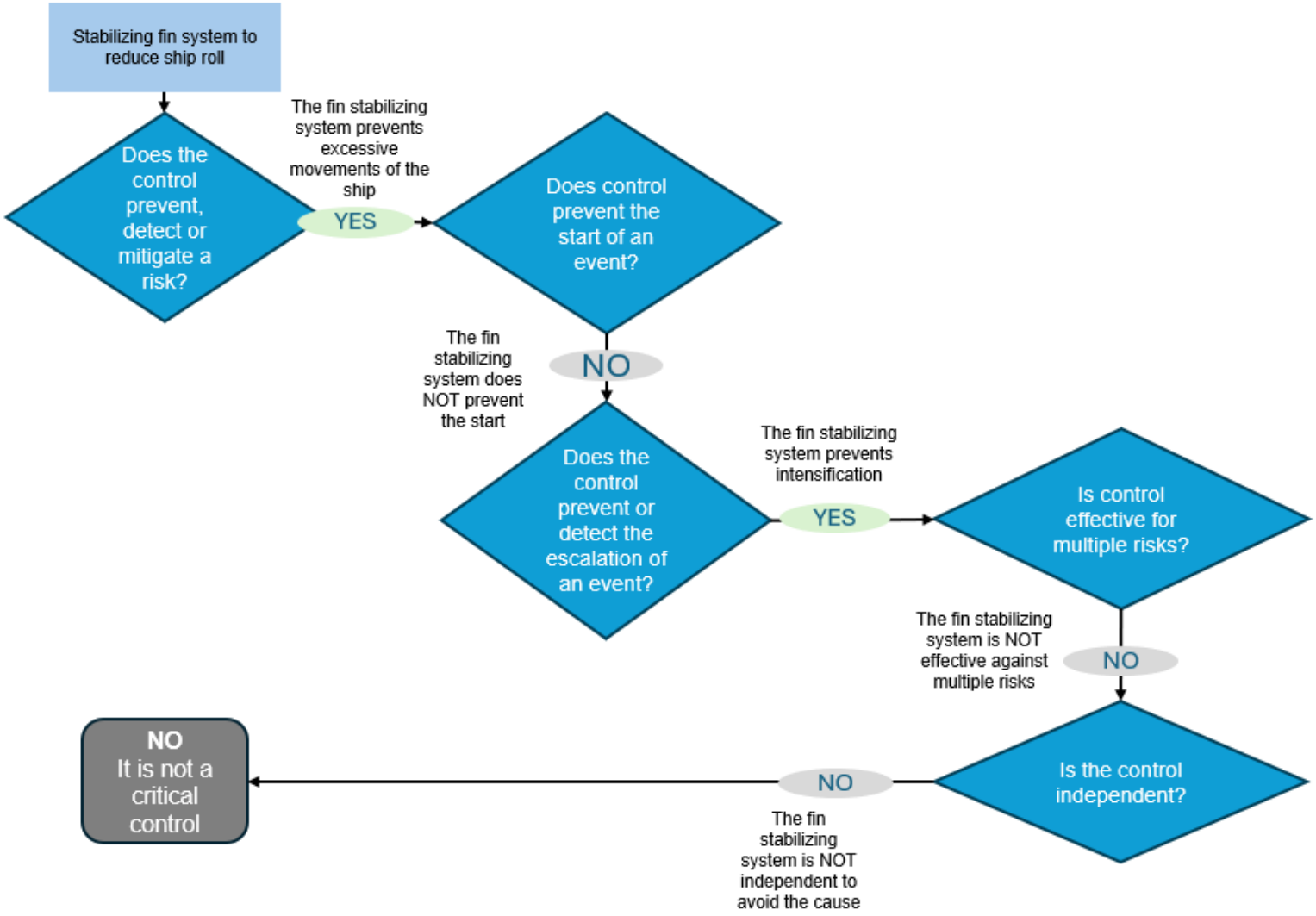
STEP 8. - **Verify** the efficiency and effectiveness of the controls

STEP 9. - **Apply corrections**

Example BT Working at Height towed sonar operation



Evaluation of the "stabilizer fins" control as a "critical control" using the Decision Tree tool



Benefits of proper management of Critical Controls on warships

Benefits of proper management

The objective of proper management of critical controls is to prevent unwanted high-severity accidents or mitigate their possible consequences to the maximum:

- Offers a **clear view of the controls** necessary to manage critical or catastrophic risks.
- Allows the **use of simple analysis methods** to determine the links between critical or catastrophic risks, their potential causes, and the critical control that prevents their occurrence.
- Helps **minimize the consequences** of critical or catastrophic risks if they finally occur.
- **Avoids delays** or interruptions in operations.
- **Saves costs** and optimizes the use of physical and human resources.

Benefits of proper management

- **Increase satis**faction, motivation, and commitment.
- Helps consolidate a **new safety culture** for systems.
- **Improves internal and external reputation** and image. Avoids negative publicity.

Consequently, critical controls are vital for:

- Preventing or **minimizing accident** risks.
- Ensuring **comprehensive safety** for people, equipment, and the environment.
- **Protecting the life** and physical integrity of operators.
- Ensuring **operational continuity** and system efficiency.
- Improving overall **productivity**.
- **Increasing workers' confidence** in their superiors.
- Performing **more efficient maintenance**.
- **Reducing costs** and improving the quality of equipment.

Conclusions

Conclusions (1/2)

- A critical control is a control that **is essential to prevent a potential undesirable event** or mitigate its consequences.

- The absence or failure of a critical control would disproportionately **increase the risk despite the existence of other controls.**

- It is important that once we have defined critical controls, we understand that **they are non-negotiable**, that we cannot prioritize operation over critical risk control, we cannot implement them when it suits us, we cannot lose them in budget reviews, a **critical control saves lives, saves a system/equipment, saves an operation, a mission, etc.**

Conclusions (2/2)

- A robust risk management system must have this as its main pillar: "**a critical risk control is non-negotiable.“**

- The critical controls management method focuses on **identifying which controls are necessary to manage a critical/catastrophic risk**, identifying which are critical controls, and ensuring that these controls are supervised and monitored by identified responsible parties.

¡Thanks!