CICA – Vic / Tas Branch
Crane Safety Bulletin
#356 February 2025

Greetings all. Today's Bulletin is about **Wire Rope Inspection and Retirement Criteria**

Traditionally, many dogging and rigging courses have taught that wire ropes can remain in service with up to **10% of wires broken** within a given length.

However, recent industry guidance, including the **NSW Dogging and Rigging Guide (Section 5.1.5)** and **Australian Standard AS 2759-2004**, indicates that the **actual allowable threshold is much lower - closer to 3%** in most cases.

This discrepancy highlights the need for updated inspection practices to ensure compliance with current safety standards and to prevent potential wire rope failures that could lead to serious safety incidents.

CICA addressed this issue in CICA Safety Bulletin #321 (June 2023), but there are still too many people using ropes that wouldn't pass the correct discard criteria.

Key Inspection Criteria

Regularly inspecting wire ropes is essential for identifying damage and determining whether a rope remains fit for service.

The following key criteria should be considered:

1. Maximum Allowable Number of Broken Wires

Crane hoist ropes:

AS 2759 and the NSW Dogging and Rigging Guide state that crane hoist ropes must be retired if broken wires exceed **3% of the total number of wires in one lay length (which is six times the rope's diameter).**

This is significantly lower than the 10% threshold often taught in some courses.

The standard aligns with international guidelines, including ISO 4309:2017, which sets similar thresholds for wire rope retirement.

2. Fatigue-Related Wire Breakage

Wire fatigue occurs due to repetitive bending over sheaves and drums, which weakens individual wires and eventually leads to failure.

Fatigue breaks often appear **concentrated in one area**—even a small cluster of broken wires can indicate imminent rope failure.

According to **ISO 4309**, the presence of broken wires in valleys between strands is particularly critical and should prompt immediate rope replacement.

3. Corrosion and Internal Degradation

Wire ropes used in **marine, mining, or corrosive environments** are prone to internal degradation, which is not always visible externally.

Internal corrosion can cause significant weakening before external signs appear.

4. Deformation and Structural Damage

Birdcaging, kinking, core protrusion, or strand separation indicate severe structural damage and necessitate immediate removal from service.

Deformations can be caused by improper winding, overloading, or sudden impact loads.

Even if broken wires are within the allowable limits, structural damage can compromise the rope's strength and performance.

5. Heat Damage and Discoloration

- Exposure to high temperatures or electrical arcing can weaken the rope's steel structure, reducing its load-bearing capacity.
- Heat-damaged ropes often show signs of discolouration, brittleness, or lack of elasticity.
- Any rope exposed to excessive heat should be removed from service immediately.

How to Ensure Compliance and Safety

To maintain safe operations and prevent unexpected failures, it is critical to:

Conduct routine inspections before and after each use, following AS 2759 and ISO 4309 guidelines.

Refer to manufacturer recommendations for specific wire rope discard criteria.

Implement non-destructive testing methods (such as Magnetic Rope Testing) for early detection of internal damage.

Update training resources to reflect accurate broken wire thresholds instead of the outdated 10% guidance.

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Immediately replace any wire rope that exceeds the allowable damage limits or shows signs of severe wear.

Educate your team - anyone involved in dogging, rigging, and lifting operations must be made aware of these guidelines.

Pass it on.

Look out for each other - if something isn't right, speak up.

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