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How to Identify Safety Non-Compliance in Conveyor Systems

1. Why Safety Standards Matter

European (EN) and International (ISO) standards exist to provide a clear framework for designing safe and reliable machinery. They establish a consistent "blueprint" that ensures products, systems, and processes meet minimum safety and quality requirements across different regions.

Key objectives of these standards include:

- Protecting operators and maintenance personnel
- Ensuring machinery operates safely and predictably
- Reducing the risk of injury and legal liability

Examples include:

- **EN 619:2022** - Safety requirements for conveyor systems
- **BS EN ISO 13849-1:2023** – Safety related parts of control systems
- **BS EN ISO 13850:2015** - Emergency stop design principles

It is important to understand that these standards define **minimum requirements**, not best practice ceilings.

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2. Legal Responsibilities

Compliance with safety standards is not optional.

When a manufacturer issues a **Declaration of Conformity**, they are legally confirming that:

- The machine complies with all applicable directives and standards
- A complete technical file exists and is available for inspection

Failure to comply can result in legal action.

In addition, modifying machinery after installation - such as removing or disabling safety systems is a **criminal offence in the UK and EU**, particularly when it exposes operators to risk.

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3. Common Causes of Non-Compliance

In practice, non-compliance often arises due to:

- Cost reduction pressures
- Simplified design decisions
- Aesthetic considerations overriding safety
- Poor understanding of standards
- Post-installation modifications by operators

These issues can lead to unsafe machinery being placed into service

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4. How to Identify Non-Compliance

4.2 Emergency Stop Design

Emergency stops (e-stops) are a critical safety feature and must comply with strict design rules.

According to **BS EN ISO 13850:2015** and associated standards:

✅ **A compliant emergency stop must:**

- Be **red in colour**
- Be mounted on a **yellow background**
- Be clearly visible and accessible
- Be operable with an **open palm (not obstructed)**

🚫 **Common non-compliance indicators:**

- Incorrect colours (e.g. black buttons used as emergency stops)
- Text such as “Emergency Stop” printed on or around the actuator
- Physical obstructions (guards, recesses, or overhangs) preventing quick activation
- Placement in awkward or hard-to-reach positions

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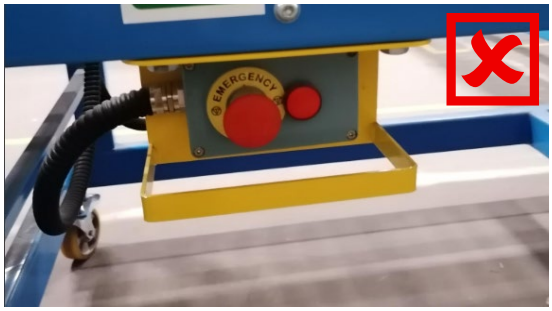

Any of these issues may indicate broader safety design failures.

4.3 Emergency stop device

4.3.1 Emergency stop devices shall be designed to be easily identified and actuated by the operator and others who could need to actuate them. The actuator of the emergency stop device may be one of the following types:

a) pushbuttons easily activated by the palm of a hand;

4.3.6 The actuator of the emergency stop device shall be coloured RED. As far as a background exists behind the actuator and as far as practicable, the background shall be coloured YELLOW.

4.3.7 Neither the actuator nor the background should be labelled with text or symbols. Where a symbol is needed for clarification, the symbol from IEC 60417-5638 shall be used, see Figure 2.

When it is necessary to identify the direction of unlatching the actuator (button) then this identification shall have the same or nearly the same colour as the actuator (see also IEC 60947-5-5)

NOTE The identification of unlatching (i.e. arrows) could be misinterpreted as direction of actuation.

Figure 2 - Symbol IEC 60417-5638: Emergency stop

4.3.10 Measures against unintended actuation of an emergency stop device shall not create a risk of obstruction of the actuation or impair access to the emergency stop; such measures shall not impair the visibility of the emergency stop device or its actuator (see also 4.5).

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4.2 Accessibility and Positioning

Emergency stops must be positioned so they are:

- Easily reachable
- Located within a suitable height range

Buttons mounted too low (for example, beneath conveyor frames) may not comply with standards.

Practical guidance: If a control feels awkward or difficult to reach, it is likely unsuitable and may be non-compliant.

> The actuator of emergency stop device intended to be actuated by hand should be mounted between 0.6m and 1.7m above the access level (e.g. floor level, platform level).

4.3 Colour and Control Separation

Standards such as **EN 60204-1:2018+A1:2025** require clear differentiation between controls.

Key rules:

- Emergency stop buttons must be **red on yellow**
- Standard stop buttons may also be red, but:

  They must **not be placed next to emergency stops in a way that causes confusion**

🚫 A common issue:

- A red stop button located directly beside a red emergency stop

This creates ambiguity and is likely non-compliant.

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The colour RED shall be used for emergency stop and emergency switching off actuators (including supply disconnecting devices where it is foreseen that they are for use in an emergency). If a background exists immediately around the actuator, then this background shall be coloured YELLOW. The combination of a RED actuator with a YELLOW background shall only be used for emergency operation devices.

The colours for STOP/OFF actuators should be BLACK, GREY or WHITE with a preference for BLACK. GREEN shall not be used. RED is permitted, but it is recommended that RED is not used near an emergency operation device.

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5. Conveyor-Specific Safety Risks

Conveyor systems introduce additional hazards, particularly around:

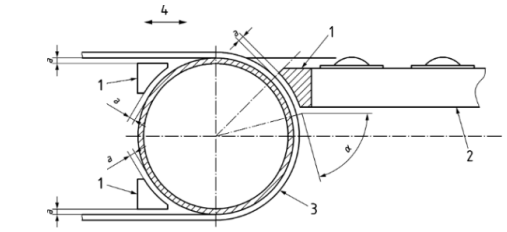
- Moving belts
- Drive drums
- In-running nip points (drawing-in hazards)

5.1 Drawing-In Hazards

Under **EN 619:2022**, dangerous moving parts must be properly guarded.

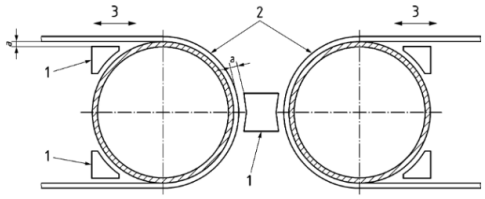
Requirements:

- Maximum gap sizes typically **≤ 5 mm**
- Guards must be **rigid and secure**
- Flexible or damaged guards are not acceptable



Key
1 protective device
2 table
3 belt conveyor
4 moving direction
a gap between rotating and fixed components
α angle between fixed part and rotating part

Figure C.5 — Protection by nip-guards



Key
1 protective device
2 belt conveyors
3 moving directions
a gap between rotating and fixed/rotating components

Figure C.8 — Protection by nip-guard between two belt conveyors

Warning signs of non-compliance:

- Large gaps near belt or roller contact points
- Missing or damaged guarding
- Easily deformable barriers

These hazards can cause severe injuries, including entrapment.

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5.2 Telescopic Conveyor Risks

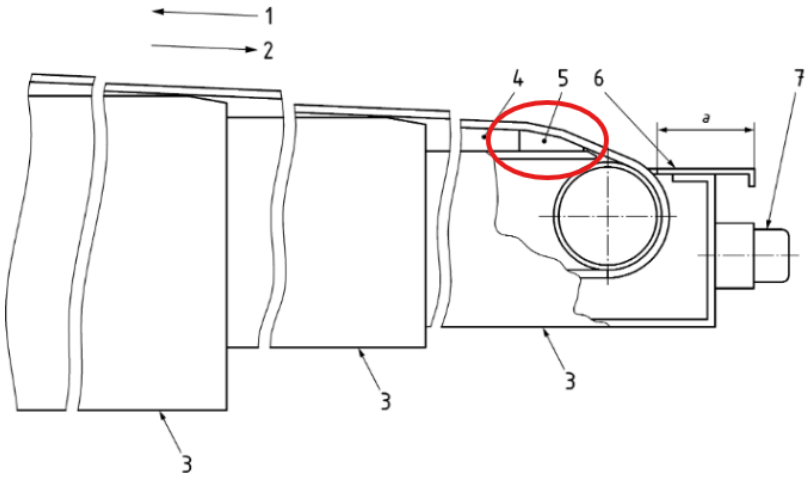
Telescopic conveyors often present recurring safety issues.

Common problems:

- Emergency stops mounted:
  - At an angle
  - Under steel overhangs
  - Recessed into frames
- Missing yellow backgrounds on e-stops
- Obstructed access preventing palm activation
- Confusing arrangement of stop controls

Critical requirement:

Modern telescopic conveyors must include a **wedge-shaped guard** to prevent access to the end pulley as the machine retracts and the belt angle increases.



🚫 Absence of this feature indicates non-compliance with current standards.

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6. Warning Signs of Poor Compliance

When assessing machinery, look for multiple indicators:

- Emergency stops below recommended height
- Incorrect colours or markings
- Obstructed or recessed controls
- Missing guarding around moving parts
- Poor overall design consistency

⚠️ Important: One failure often suggests others. Non-compliance is rarely isolated.

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7. Readily Available but Non-Compliant Components

It is possible to purchase components that **do not meet required standards**, even from reputable suppliers. Responsibility lies with:

- Designers
- Integrators
- Manufacturers

not the component supplier alone. Always verify suitability against current standards before use.

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8. Key Takeaways

- Safety standards define **minimum legal requirements**, not optional guidance
- Emergency stop design is highly regulated and easy to assess visually
- Conveyor systems present significant risks if not properly guarded
- Small design issues often indicate wider safety concerns
- Compliance must be maintained throughout the machine's lifecycle

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Conclusion

Ensuring compliance with machinery safety standards is both a legal obligation and a fundamental duty of care.

Seemingly minor issues such as incorrect button colour, poor positioning, or inadequate guarding can expose workers to serious risk and may indicate deeper design flaws.

Regular inspection, awareness of standards, and a proactive approach to safety are essential to prevent incidents and ensure equipment remains fit for use.
