



# **CEFIC guidelines for investigating transport incidents and Root Cause Analysis**



**Issue Team Logistics Risk Management Task Forces**



## RCI is part of learning

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- 1. Incident investigation**
- 2. The incident investigation process**
- 3. The Root Cause Analysis tool for logistics operations**
- 4. Corrective actions**



## When to perform an RCI

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- **The 2days-2weeks rule of thumb.**
- **clear policy when RCA is needed**
- **‘Hi Potential incidents’  
= Classify by potential, not by effect as you just might have been lucky.**

# The RCA tool for logistics operations

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**Tool developed by analysis of 102 shared incidents**

**This tool is composed by four lists:**

- 1. Type of Events**
- 2. Immediate/direct causes**
- 3. Basic/Root causes**
- 4. Corrective Actions on organisational causes**



# 1. Type of Events

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Go to the **'3.1 Type of Events'-list** and identify the event(s) that best describes the incident that happened.

Use the event tree “chain of events” diagram to identify which event is to be analysed.

## Type of Events

- Person/object caught between/in/on
- Collision of persons/equipment
- Human exposure to (electricity, heat, cold, chemicals, etc)
- Container/Tank implosion
- Equipment failure
- Explosion
- Fall from height
- Fire
- Leaving the road / Derailment
- Loss of containment (leaks, spills, etc.)
- Overfilling / overflowing of tanks
- Overturning/Roll over/Tipping over
- Slip and fall / trip over
- Struck against / by / into
- Unintended mixture (for example (un) loading in the wrong tank, etc.)
- Unintended chemical reaction
- Object falling off
- Unintended mMoving of cargo



## 2. Immediate/direct causes

### Immediate/direct causes

For each identified event go through the list of

### '3.2 Immediate/direct causes'

These are the causes that are obvious and identified at the initial investigation step of the incident.

A way to identify immediate/direct causes that caused a primary event is by asking the following questions:

- What was needed for that event to happen?
- Was it necessary?
- Was it sufficient?

As such one or more immediate causes are identified that triggered the primary event.

The choices made should be supported by evidence as has been gathered according to the method.

- Non-standard operation
- Weather conditions
- Equipment/material failure
- Instrument failure
- Instrument not calibrated
- Failing to use PPE properly
- High Speed
- Inappropriate loading of truck (overweight/underweight/uneven load distribution)
- Incorrect (un) loading
- Incorrect lifting
- Incorrect position for task
- Incorrect cargo securing
- Incorrect storage/placement
- Lack of coordination between operator and driver
- Lack of instrument
- No warning
- Non-compliant documentation
- Non-compliance with legislation
- Non-compliance with site regulation
- Physical obstacle
- Operating equipment without permission
- Human failure (operator and/or driver)
- Overriding safety devices
- Using defective equipment



### 3. Basic/Root causes

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To find the root causes it is necessary to dig deeper.

For each direct cause go to the '**3.3 Basic/Root causes**'-list.

Examine the list carefully; the investigation team should identify at least one of these causes as the cause of the incident.

A way to identify root causes that caused an immediate cause is again by asking the following questions:

- What was needed for that cause?
- Was it necessary?
- Was it sufficient?

## Corrective Actions on organisational causes:

- Implement SHEQ&Sec management systems
- Improve visible and felt (senior) management commitment to HSE
- Carry out risk analysis and implement mitigation measures accordingly. See examples below of mitigation measures:

## 4. Corrective



- BBS training/refreshing
- fatigue risk management
- installation of interlock systems to avoid human error
- near-misses and unsafe acts and conditions reporting
- preventive maintenance
- road information systems
- route familiarization training
- subcontractors selection (for example through SQAS) and follow up of gaps and performance issues
- task analysis
- Investigate if working at height can be avoided or provide fall protection
- Improve lighting

Go to the '4.1 Corrective Actions on organisational causes'-list

and select the action(s) that correct(s) the basic/root cause(s) identified in the step before and.

- Clarify responsibilities
- Define/implement/improve procedures
- Implement Management of Change
- Follow up of corrective actions of previous incident
- Implement work permit systems (entry into confined spaces, working at height, hot work, breaking of containment, working with electrical equipment, etc.)
- Improve communication
- Improve housekeeping
- Improve competence requirement definition and tracking
- Provide training/refresher training (detect training needs, provide training, evaluate effectiveness)
- improve recruitment procedure (jobs description, pre-employment checks, induction training)
- Improve route selection
- Install technology upgrades on trucks (truck overturning warning systems, forward distance alert system, Lane departure system, etc.)
- Promote safety by incentives (bulletin boards, individual/group awards and recognition)
- Initiate improvements with (un) loading sites





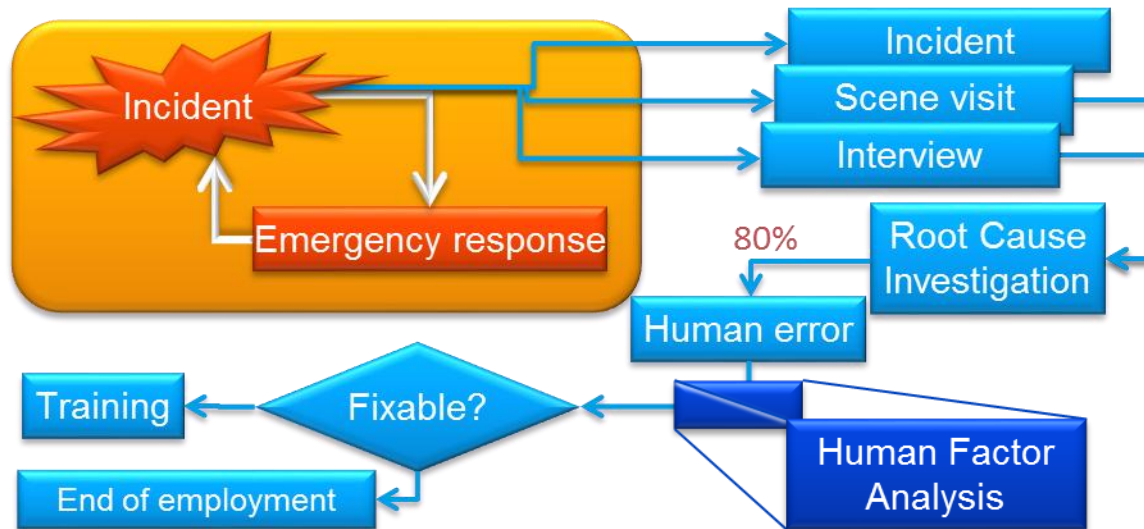
## 4. Corrective actions (cont)

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Go to the 4.2 Corrective Actions on human causes: **Human Factor Analysis** for corrective actions on behaviour or human error.



# Human Factor Analysis

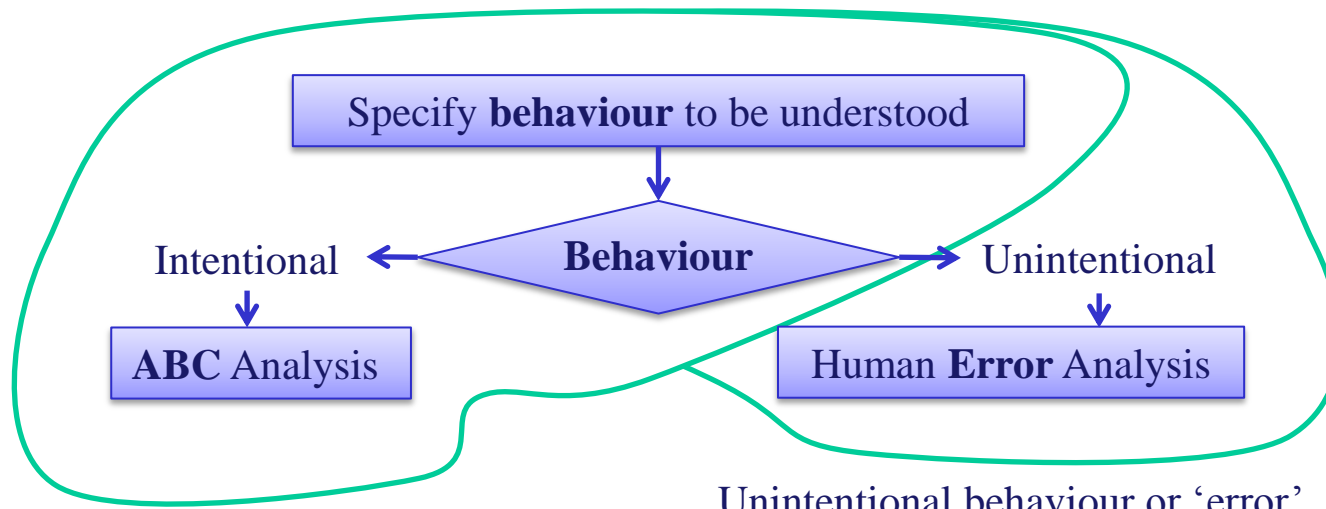


Many incidents that are blamed on the actions or omissions of an individual who was directly involved in operational or maintenance work are usually rooted deeper in the organisation's design, management and decision-making functions.



# Error or behaviour ?

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Intentional behaviour or 'violation'

Note: It's the behaviour which is intentional, not the outcome, (the speeding, not the accident)



# Behaviour

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## ABC

Behaviour = intentional  
Consequences bonuses or fines, reduced or increased workload, praise or criticism  
Antecedents For example: a warning light, a buzzer, signs, policies, training.

## BOC

Consequences can be either 'Positive' (or encouraging) or 'Negative' (or discouraging) and will be either 'Personal' or affecting 'Others'. Consequences can either take effect 'Immediately' or in 'Future' and will be either 'Certain' or 'Uncertain'.

Effective mitigations will enhance EPIC or DPIC consequences, or change the rules/job/organisation so the consequences become EPIC or DPIC.



# Error

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When the root cause is unintentional; it is an '(human) error', not a 'violation'.

An **action** is the result of a **decision** which in turn is based on both **memory** and **perception**

## E.g. **Perception (Sensory) Error**

Did the individual misperceive or fail to perceive something via their senses?

(Sight, hearing, smell, taste, touch or balance)

*Your cell phone rings and you pick up the landline -> Make signs and triggers more visible or distinctive*

Examples and corrective actions are described in het guideline.