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RESEARCH

**A Holistic Approach to Incident Investigation
and Analysis**

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February 16, 2017

Center for Urban Transportation Research | University of South Florida

Overview

- Define relentless root cause analysis
- Understanding the “WHY” questions
- Creating corrective actions
- Documenting corrective actions
- Validating corrective actions
- Reviewing an actual incident

Relentless Root Cause

- Is a method that determines the actual cause(s) of an unacceptable:
 - Incident
 - Condition
 - Problem
 - Process
 - Product



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Relentless Root Cause

- What happened
- When did it happen
- How did it happen
- **Why** did it happen
- Proposed corrective action



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Relentless Root Cause

- When performing the analysis, always:
 - Ask **why, why, why** (as many times as practical) before finalizing the real root cause(s).
 - Unless we know the real root cause(s), we will never arrive at the appropriate corrective actions.



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Relentless Root Cause

- Keep an open mind – if you have an opinion before you start the process, you will most likely not get to the bottom of the issue
- Involve **EVERYONE** – you will be surprised who has pertinent information
- Listen/review everything – from the time you open for business until the end of the day



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Relentless Root Cause

- Write the issue quantitatively and not in general terms:
 - Be specific – “We rear ended someone”, does not explicitly define what happened
 - The more time taken at this step will increase your chance of successfully getting to the root cause.
 - Different employees will have different input – use it all



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Relentless Root Cause

- Clearly define the problem(s) or incident(s):
 - Keep it simple
 - Keep it precise
 - This is not the place for opinions



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Relentless Root Cause

- Define where and how the problem(s) or incident(s) occurred
 - Maybe more than one problem
 - Maybe more than one issue
 - Maybe more than one person/department



Relentless Root Cause

Defining the problem or incident

- Bus was hit by train. (incomplete definition)



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Defining the problem or incident

- Bus was hit by train. (incomplete definition)
- Articulated bus was partially on railroad tracks and hit by train. (better but still not there)



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Relentless Root Cause

Defining the problem or incident

- Bus was hit by train. (incomplete definition)
- Articulated bus was partially on railroad tracks and hit by train. (better but still not there)
- Articulated bus was partially on railroad tracks, (10ft) and struck by train. The impact of the collision was just behind the accordion and bus was bent. (well written & complete)



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Relentless Root Cause

- Real root cause(s) are those that once fixed will eliminate the unacceptable condition(s) forever
- Lack of adequate documentation and training are known to be the real culprits in most root causes



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Relentless Root Cause

- Driver did not realize bus was on railroad tracks (not a root cause) keep asking WHY
- Driver was not physically trained on articulated bus (getting better) keep asking WHY
- Driver was not physically trained on articulated bus due to lack of funding and sufficient number of articulated buses available for training (bingo, well defined)



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Corrective Actions

- Corrective actions should be appropriate to the real root cause(s) outlined
- Corrective action plans should be precise, who will do what and by when?
- Attach objective evidences of corrective actions already completed. As an example:
 - Old form & new form



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Corrective Actions

- Train drivers on articulated buses on the road (not good, lack of funding and buses)
- Train drivers on articulated bus issues and concerns using:
 - Videos
 - Drawings and pictures
 - Simulator if available
 - Updated procedures or work instructions
 - Training(well written corrective actions)



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Corrective Actions

- Once the corrective actions are fully implemented, the same unacceptable condition(s) should not recur in the future.
 - If same condition exists after being corrected, the real root cause was not determined.
- Design corrective actions to prevent the error/problem from occurring at the source.



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Corrective Actions

- Corrective actions should be such that they will mistake proof the process that generated the unacceptable condition.
- Remember, employees want to perform their jobs correctly
 - Problems are usually caused by
 - Poor documentation
 - Inadequate training
- Validate the plan



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Corrective Actions

Validation:

- Root cause(s) identified
- Revised process(s) generated
- Corrective actions defined
- Procedure(s), documentation, and/or training if applicable has been identified, revised, and conducted
- Corrective actions implemented and completed



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Actual Incident

Articulated bus was partially on railroad tracks (10ft) and struck by a train. The impact of the collision was just behind the accordion and bus was bent.

- Operator stopped at a service stop to pick up passengers
 - Did not realize part of bus still on train track
 - Did not pull up to or past the bust stop sign
 - Stopped where passengers congregated



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Issues Identified

- Placement of bus stop sign
- Operator was a new CDL holder
- Never drove a bus prior to coming to agency
- Stopped where passengers congregated
- Minimal training on an articulated bus
- Training group does not have access to new buses for training
- Operator unfamiliar with actual articulated bus he was driving

Issues Identified

- Operator unfamiliar with route.
- Operator distracted by a passenger talking with him
- Other passengers were rowdy and distracting
- Inexperienced driver selected for extra board
- Operator was working his second piece
 - Previous bus was a 40 ft bus
- Articulated buses recently added to route due to high service demand.



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How should the agency conduct root cause analysis, for this incident?

Issues:

- How are bus stop sign locations selected?
 - What was missed?
 - Why, Why, Why
- How are bus drivers selected?
 - Why was no CDL missed?



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How should the agency conduct root cause analysis, for this incident?

Issues:

- Never drove bus prior to being hired by agency
- Stopped where passengers congregated
- Minimal training on articulated bus
- Operator unfamiliar with route
- Training group does not have access to new buses for training



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How should the agency conduct root cause analysis, for this incident?

Issues:

- Operator distracted by passenger talking with him
- Other passengers were rowdy and distracting
- Operator was working his second piece
 - Previous bus was a 40 ft bus
- Articulated buses recently added to route due to high service demand.
- Articulated bus removal from accident scene



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Summary

- We defined relentless root cause analysis
- Explained the importance of the “WHY” questions
- Identified how corrective actions are written and documented
- We reviewed the validation process
- Utilized an actual incident



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