Water Quality Investigations and Root Cause Analysis: A Human Factors approach

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SUMMARY

This project aimed to integrate Human Factors (HF) into water quality investigations to enhance understanding of human behaviour in incidents, improve coordination, and ensure better system management. By developing an HF Root Cause Analysis tool, the client identified gaps in their investigation process, leading to a revised approach that fosters a learning-driven, human-focused culture for water quality events.

KEYWORDS

Utilities, root cause analysis

Introduction

The client (a large utilities company) wanted to understand how the recognition of Human Factors elements could ensure comprehensive understanding and effective management of water quality events.

By considering Human Factors, they would acknowledge the role of human behaviour, cognition and communication in water quality incidents and then create strategies that would address both technical and human elements to enhance water quality systems, improve response coordination and contribute to the safeguarding of water resources and public health.

The aims of the project were to:

- Integrate HF into incident investigation processes.
- Improve investigation outputs.
- Leads to better results and actions.
- Implement and train.
- Create a safer and more productive working environment.
- A reduction in the number of accidents.

Method

An agile project (consisting of five sprints over 15 weeks) was instigated to explore how Human Factors could be integrated into water quality investigations.

Sprints are fixed length projects of work which ensure short iterations for feedback to inspect and adapt both how the work is done and what is being worked on. This project consisted of five sprints:

The first sprint was a workshop which focused on organisation readiness by understanding the current water quality process.

The second sprint focused on a document review, as well as understanding roles, commitments and expectations of the project and looking at what is and not working currently within the organisation.

The third sprint reviewed interventions and introduced the SUPA model.

The fourth print was a workshop that set out to evaluate the proposed solutions.

The fifth and final sprint was a retrospective review of the project and the production of a draft project report.

Information was collected by reviewing documentation, site visits, engagement workshops and feedback analysis.

Results

The initial stages of the project revealed little evidence of Human Factors being integrated and applied within the water quality investigation process. It was apparent that the overall investigation process was complex and required input from a multidisciplinary team of stakeholders.

It was identified that although the investigation process was thorough, there was a preoccupation of technical system characteristics over the human's making alterations to the water quality systems and the justifications for doing so.

IHF created the HF Root Cause Analysis tool in collaboration with the client the address Human Factors shortcomings within the investigation process. This tool was able to identify human error types, uncover critical moments in an incident and ascribe Performance Influence Factors to an event – recognised as essential Human Factors functions in an investigation.

Key takeaways

The development of this tool allowed the client to identify gaps in knowledge and competency concerning the application of Human Factors knowledge when using the tool. The client subsequently revised their investigation process to include stakeholders across the entire investigation process and allow those involved to be included in generating meaningful recommendations.

The client is now committed to being a Human Factors oriented organisation with a focus on creating a learning driven and just and fair culture which recognises the human contribution to water quality events.