

Rationale for interactions.

1. Introduction

Attachment 4 of FAST 3 meeting notes addressed interactions between Areas of Change (AOC) and displayed several possibilities that have to be detected in a proposed “Comparison Process”

Later FAST Sub-Methodology now called “Guidelines for identifying Hazards for each Area of Change” calls up Identification of Hazards resulting from Interactions.

This document intends to **clarify the meanings of Interactions and to propose guidelines for ad-hoc Teams (expert panels).**

2. Different Kind of Interactions.

As far as we are the following cases are identified:

- **I 1.** Dependencies between AOC, then possibly dependencies between Hazards meaning that two or more areas of change can be actually linked. This can be that:
 - There are common roots for different area of changes
 - Some AOC may generate other AOC in a so-called Cascade effect.
- **I 2.** **Accumulation of independent AOC** may create accumulation of non correlated hazards that together may create new kinds of accident scenario.

Many accidents are now the result of several non-correlated aggravating events. This point becomes very important in the frame of ambitious Safety objectives at 1.10-7.

Corresponding issue for FAST is to evaluate if and how much a combination of AOC may create hazards and at the end accident scenario.

3. How to address Interactions

Interactions **I 1** look more straight forward than **I 2**

I.1 Dependencies

Keeping in mind proposed categories, it looks feasible during the brainstorming session, thanks to expert judgement and associated intuition to find most common roots, to sort out different expressions of the same issue and to address a reasonable estimation of “Cascade Effect”.

The identification of common roots, of similarities would probably reduce the number of cases.

The identification of cascade issues may result in a different hierarchy in which generating factors will be given more importance than consequences.

Establishing diagrams showing these interrelations would clarify resulting hazards and associated sequence of events.

Reasoning looks more easy for hazards than for AOC, the methodology has to define the transition point between AOC and Hazards, then pave the way towards Safety Issues and Interventions.

I 2 Accumulation of non correlated hazards

Taking the benefit of I 1 methods and training, the same ad-hoc Team should be capable to predict the importance of the accumulation of non correlated events.

A limited sample selected among top AOC will be permitting to estimate with a reasonable confidence level that accumulations are:

- Aggravating seriously an initial situation up to creating accident scenario,
- Slightly aggravating a situation on a significant manner,
- Having no influence (neutral).
- Requiring further investigation because the ad-hoc Team has no opinion and cannot say that there are no adverse combinations.

It is clear that combination of hazards and criticality assessment of various combinations is not an easy task that will require a significant effort for future accident rate reduction.

Previous examples can be found in the application of specific techniques such as “Sneak Analysis” achieved with complex methodology and computer aided tools.

It looks also clear that accidents with remote probability are more and more related to accumulation of several factors. Therefore prevention goes obviously through a constraining prevention programme. But it is believed that complex tools are needed only when combining many / all imaginable factors. The process can be tested then applied on a limited sample of key events within an ad-hoc Team.

4. future work:

It was agreed at FAST meeting 5 (27 to 29 June) that this draft was a good starting point. It will be further developed so that guidelines and application procedures for interactions will be available for the Ad-Hoc Teams’ first meeting.