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EXTENDING THE STAMP FRAMEWORK WITH A WORK-AS-DONE ANALYSIS

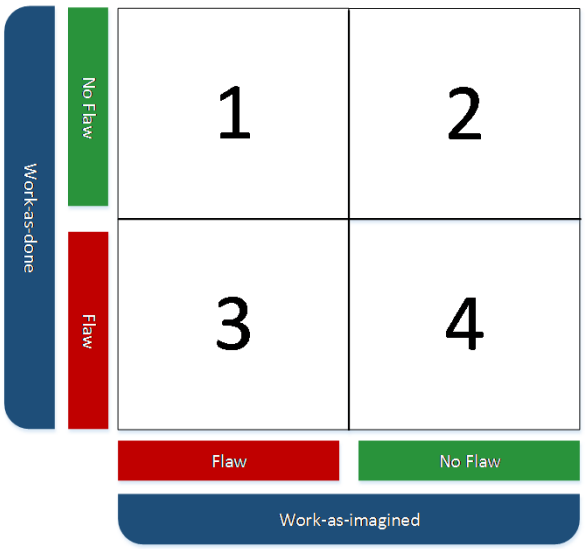
How a work-as-done analysis contributes to identifying safety risks

ABSTRACT

This study aims to determine the contribution of a work-as-done analysis to the existing STAMP framework. The additional analysis is expected to make the differences between how the system is designed to operate (work-as-imagined) and the way it actually operates (work-as-done) explicit. Understanding this possible gap can be valuable for companies, as it shows how well their rules, procedures and safety policy withstand the everyday practice. Also, it may expose new, relatively to the traditional STAMP framework, unsafe situations in systems. To investigate the possible contribution, both a work-as-imagined STAMP-analysis and a work-as-done STAMP-analysis were performed at a real world socio-technical system. Eventually, the two analysis can be compared and graphically displayed in a matrix. The results show that the new method is capable of exposing unsafe situations in both the work-as-imagined and work-as-done and of comparing them. Also, the method is a perfect tool for gapping the differences between the work-as-imagined and work-as-done.

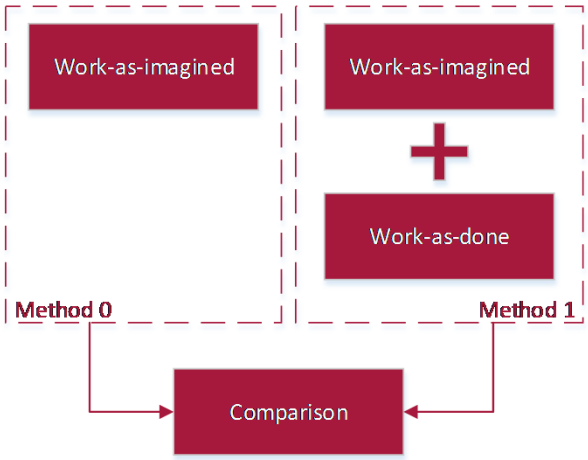
RESULTS

Method 0 resulted in a number of unsafe situations, which occur because of the way the systems is designed. Method 1 allows evaluating these unsafe situations in the everyday practice. The results showed that there were unsafe situations in the work-as-imagined, but they were overcome in the work-as-done (represented by number 1 in the matrix). This means a gap exists between the work-as-imagined and work-as-done. It is also a possibility that an unsafe situation is the result of the work-as-imagined being insufficient in the everyday practice (represented by number 4 in the matrix). Concluding, the combination of a work-as-imagined and work-as-done analysis showed great contribution to identifying potential unsafe situations.



METHOD

A real-world social-technical system was analysed using two methods. The first method consists of a STPA on the work-as-imagined. The data originates from written procedures, job descriptions and safety policy. The second method consists of the STPA on the work-as-done and comparing it with the work-as-imagined STPA. The data for the work-as-done was gathered by line observations and interviews with the people in the workplace. Eventually, it is possible to compare the methods and review the added value of the new method.



CASE STUDY

The case study was conducted at a company and showed the usefulness for the new method in a real world situation. In short, the company is responsible for ensuring a safe guidance of traffic similarly to the air traffic control. An employee is responsible for the safe guidance and controls multiple areas. Therefore, the employee doesn't have any physical sensors of the actual situation. To overcome this, the guidelines instruct the traffic controller and the driver to communicate trough radio communications. This communication starts when a driver requests clearance to move from point A to B. The controller then approves or declines the request upon the given circumstances. Is it safe to move? The usefulness of the new method in this case is shown by two examples.

The first example is a result of an unsafe situation in the work-as-done, whereas this unsafe situation does not occur in the work-as-imagined. Because the controller does not have any visual sensors of the controlled process, cameras were provided. However, in practice the cameras have insufficient coverage to provide a correct image of the controlled process. This resulted in incidents where the controller thought that it was safe for the traffic to move. In his defence, the cameras showed no movement of other traffic and based on what the controller saw on the cameras, it was safe to give clearance to move. What the controller did not see, was other traffic movement outside the scope of the cameras. This resulted in a near collision. Luckily the two drivers noticed each other in time to prevent the collision.

This incident illustrates the danger of misalignment between the work-as-imagined and work-as-done and encourages the need for methods that acknowledge the gap. The new method is capable of finding these gaps and therefore contributes to identifying unsafe situations.

AVIATION ENGINEERING

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