

Book Reviews: Safety-I and Safety-II: The Past and Future of Safety Management

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**Safety-I and Safety-II
The Past and Future of Safety Management**

by Eric Hollnagel
2014, 200 pages, £20 (paperback)
Farnham, UK: Ashgate
ISBN: 978-1-4724-2308-5

Although someone may judge from the book title that the author refers to a new methodology for managing safety, Hollnagel's work is definitely more than this. The specific book recommends a new way of thinking and approaching safety itself, prior to attempting to manage it. The real life examples and the smooth introduction of the reader to safety related concepts, which are based on broad and solid theoretical and empirical bases, are just few of the strong points in Hollnagel's book.

In the first chapter, the author supports the need to redefine safety; the need move from the traditional view, which has focused on the absence of failures (Safety-I), to the new perspective that emphasizes the presence of successes during daily activities (Safety-II).

Chapter 2 serves as a basis for the rest of the book's arguments and it reviews the three eras of approaches to safety causality and mechanisms: the technology improvement oriented, the human factors study era, and the most recent models addressing organizational effects on safety.

In chapter 3, the book introduces the notion of habituation as an inevitable part of human nature and continues with a discussion about the distance between the Work-As-Imagine, linked to the blunt-end perceptions, and the Work-As-Done, meaning the sharp-end real activities in the operational environment. The specific chapter provides valuable views on the differences between humans and machines and on the unambiguous subjectivity when it comes to evaluate the outcomes and the causes of accidents attributed to human error. Moreover, the author presents the conflict that Safety-I practice provokes between safety and productivity and the reactive nature of the old view of safety and risk management systems.

Safety-I myths are thoroughly discussed in chapter 4: the law of causation that the sequential and epidemiological accident models are based on, the accident pyramid and its misinterpretation, the 90% human error contribution to accidents and the concept of root-cause analysis.

Chapter 5 deconstructs Safety-I in its three underlying characteristics; phenomenology that means how safety is perceived (absence of accidents, near misses etc.), aetiology which seeks for the underlying mechanisms to explain accidents and is linked to the concepts of chapter 4, and ontology that includes the parts that compose what safety really is. The latter refer to the notions of systems' decomposition, the bimodal functions of system components and the ability to predict how events develop.

The need to change is argued in chapter 6. Hollnagel presents how systems have been developed in parallel while humans still think sequentially, and discusses the paradox of how complex technology increased the need for more automation to compensate for our inability to control technology. The author argues that the contemporary complex socio-technical systems are untraceable, include very much variability and are difficult to be bounded. The most important point that Hollnagel raises is the need to accept human variability as an inextricable characteristic of modern systems and to value it as a source of success.

Taking into account the concepts of chapter 6, the next chapter constructs the Safety-II view. It starts from the ontology side which suggests that human variability is normal and indispensable, and that the adjustments of humans during their activities are always approximate, and not ideal, due to limited resources. The aetiology part of Safety-II distinguishes between the old view of accident outcomes as resultant, sourcing from Safety-I concepts of linear causation, and the new approach of emergent outcomes. This new approach supports the use of the emergent outcomes term, which implies the combination of conditions only existed in particular points of time and space. The latter are explained through the functional resonance analysis model (FRAM) that is a subject the author has deeply analysed in a former work. Lastly, the phenomenology of Safety-II is concisely described as the success under expected and unexpected conditions that lead to increase of intended and positive outcomes.

Chapter 8 concludes with the comparison between Safety-I and Safety-II and provides the reader with advice about methods to be followed for researching what goes right: interviews and observations, working conditions evaluation, compensation of missing resources in the working place, existing barriers, successful design etc. Finally, the author presents Safety-I as an investment to avoid accidents, whereas Safety-II is deemed as investment to improve productivity, and in chapter 9 the author closes his work with some final thoughts.

As a conclusion, Hollnagel in this work suggests a radical safety management approach based on the concepts of his previous work on FRAM. He points the need to transform our old views of line or multilevel causation into the management of variability. However, somebody may claim that the underlying problem for that is not only conceptual; from a more practical viewpoint, it would be a challenge to attempt capturing all hazardous conditions that are successfully avoided or mitigated in a working environment under every day (and night) complex operations. The resources needed to monitor, record

and measure successes must be explored, assessed and studied on the real field; a pilot research would demonstrate the practical value of Hollnagel's theory in terms of cost effectiveness and practicality.

Moreover, in a later version of this outstanding work, the author might include a reference to exceptional violations and to state their place in this theory. It will be interesting to discuss how unsafe actions are included in the variability concept and if, under Safety-II concept, are predictable. I strongly suggest the professional society and the tertiary education institutions, especially the ones of applied sciences, to commence relevant small and medium scale studies for researching Safety-II feasibility and to provide valuable feedback to both the industry and the academia.

Dr. Nektarios Karanikas works as Senior Lecturer – Researcher Aviation Safety and Human Factors in the Aviation Academy of the AUAS/Hogeschool van Amsterdam. He was awarded his doctorate (Safety and Quality Management) from Middlesex University and he holds an MSc Human Factors and Safety Assessment in Aeronautics (Cranfield University). His prior professional experience includes aircraft engineering, maintenance management, quality assurance, accident investigation and lecturing – research in safety and human factors (Hellenic Air Force Academies and CPD courses). He has been member of various associations including ISASI, IOSH and EAAP.