

## **A Practical Introduction to the Functional Resonance Analysis Method (FRAM)**

**Course instructor: Professor Erik Hollnagel**

### **Objective**

The objective of this course is to introduce the Functional Resonance Analysis Method (FRAM). The purpose of the FRAM is to model how complex socio-technical systems function. A FRAM model can be the basis for accident investigation, performance improvement, safety management, and system design.

### **Prerequisites**

Some practical experience with work analysis and work management in industrial settings. Basic knowledge about Safety Management and Human Factors and/or Resilience Engineering will be an advantage. Practical experience with event analysis or safety management is not a requirement, but may be useful.

### **Course Description**

The safe and efficient functioning of today's industrialised societies arises from a non-trivial network of complex socio-technical systems where performance depends on tightly coupled social and technical factors. It is vital to be able to analyse and understand these systems in order to prevent accidents, to recover from disruptions or disturbances, and to make use of opportunities. Most analysis methods are based on linear cause-effect relations among sub-systems and components. The experiences from many different domains is, however, that such methods are unable to account for the non-linear dynamics and dependencies that characterize today's socio-technical systems. The FRAM has been developed within the Resilience Engineering framework as a practical approach to model the functioning of complex socio-technical systems and to use these models for both reactive and proactive analyses.

### **Course Contents**

This is a two-day non-residential course.

Day 1:

Introduction to Safety-I and Safety-II

Introduction to the FRAM and the FRAM Model Visualiser (FMV)

Practice in how to use the method and the FMV (prepared examples).

Group exercises and discussion.

Day 2:

Beginning to build a FRAM model for self-provided examples.

How to complete the model.

How to plan a FRAM analysis and how to use the resulting model.  
Group exercises and discussion.

### **Target Group**

Professionals who are working with work and safety management in different industries (for instance process industries, energy, transportation, production, construction and health care).

### **Outcome**

After the course, the participants will have a good understanding of the FRAM, and of how to apply a Safety-II perspective in practice. They will have practical experience with the method, and how it can be used in their own work.

### **Course Material**

Lectures in pdf format will be provided, as well as a FRAM handbook and the FRAM Model Visualiser (FMV) software.

Recommended literature:

Hollnagel, E. FRAM: The Functional Resonance Analysis Method for modelling complex socio-technical systems. (Ashgate.)

Hollnagel, E. Safety-I and Safety-II. The past and future of safety management. (Ashgate.)

### **Course staff**

Erik Hollnagel is Professor and Industrial Safety Chair at MINES ParisTech (France) and Visiting Professor at the Norwegian University of Science and Technology (NTNU) in Trondheim (Norway). He has worked at universities, research centres, and industries in several countries and with problems from several domains, including nuclear power generation, aerospace and aviation, software engineering, healthcare, and land-based traffic. His professional interests include industrial safety, resilience engineering, accident investigation, cognitive systems engineering and cognitive ergonomics. He has published widely and is the author/editor of 17 books, including three books on resilience engineering. The latest title from Ashgate is “The ETTO Principle: Why things that go right, sometimes go wrong.”

David Slater

David is an Honorary Professor in the School of Engineering, Cardiff, where he is involved in projects such as Marine renewables, Systems Risk and Cyber security and has been responsible for a number of successful sustainable technology start-ups. An early pioneer of Risk Analysis in the nuclear, offshore and oil and gas industries, he has been instrumental in introducing and developing formal risk management in the United Kingdom, United States, Europe and Australia. He has been closely involved in developing policy in Health and Safety, and the Environment as a regulator and as adviser to United Kingdom and European Governments. He takes a special interest in corporate governance, culture and performance in Health, Safety and Environment (HSE).

### **Practical Information**

#### **Date**

The course will take place over the 2 days October 2<sup>nd</sup> - October 3<sup>rd</sup>.

#### **Place**

Cardiff University, School of Engineering, Newport Road, Cardiff.

#### **Course fee**

GPB 300.00 incl VAT. This includes two lunches, coffee breaks, a common dinner on the evening of the first day, and all course materials.

#### **Accommodation and Transport**

Course participants are responsible for their own hotel reservations and transport to workshop location

**Questions** regarding the course could be addressed to David Slater

#### **Minimum and maximum participation**

The course will be held if at least 10 persons participate. The maximum number of participants is 25.



**Registration Form**  
**Functional Resonance Analysis Method (FRAM)**  
**2-days Course at Cardiff University, October 2<sup>nd</sup> - 3<sup>rd</sup> 2018**

**Please submit your registration to FRAMsynt  
(ellen.pawley@Cambrensis.org)**

Name \_\_\_\_\_

Title: \_\_\_\_\_

Organisation: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

Invoice address: \_\_\_\_\_

Invoice reference: \_\_\_\_\_