Guidance on human factors safety critical task analysis

Second edition

energy institute

GUIDANCE ON HUMAN FACTORS SAFETY CRITICAL TASK ANALYSIS

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FOREWORD

The human contribution to major accident hazard (MAH) risk in the energy and allied industries is well-known. In recent years, the sector has made significant inroads in both the management of human failure, and in optimising human performance. In part this can be attributed to application of the first edition of the Energy Institute's (EI) document *Guidance on human factors safety critical task analysis* (SCTA). Originally published in 2011, the first edition filled a gap by enabling companies and human factors (HF) non-specialists to conduct quality HF analyses in a structured and consistent format. The document raised awareness of the value of investing in HF studies to better manage the risk of human failure, leading to reported improvements in safety and reductions in losses. Regulators also recognise that its correct application will help satisfy requirements for safety critical tasks to be comprehensively analysed and their risk appropriately assessed.

This second edition of the guidance has been updated, focusing on the identification of safety critical tasks (SCT). Feedback to EI's Human and Organisational Factors Committee (HOFCOM), as custodian of the guidance, confirms that users would benefit from learning more about the range of methods for SCT identification that has been developed, and how to avoid pitfalls. New case studies are included in section 4 to show how companies have identified SCTs.

This publication has drawn on many existing sources from the public domain, and has supplemented these with input from practitioners and case study material. It is aimed at those who: participate in SCTA; incorporate SCTA into a wider risk assessment; commission SCTA, and those that are required to read, understand and act upon SCTA. Thus, the target audience includes designers, operations personnel, assessors and managers.

The EI welcomes feedback on its publications. Feedback or suggested revisions should be submitted to:

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1 INTRODUCTION

1.1 BACKGROUND

There is widespread awareness in the energy industry that human failures whilst performing SCTs have contributed to major accidents, such as Macondo, Piper Alpha, Chernobyl and Texas City. The proactive identification and analysis of such SCTs has improved in recent years reflecting increased awareness and acceptance of the value of looking at such activities in detail, using the SCTA process. This growth is due to: significant uptake of the first edition of this guidance; the recognition that purely technical approaches to safety have their limitations, and through ongoing regulatory support.

1.2 WHAT IS SAFETY CRITICAL TASK ANALYSIS?

Task analysis can be simply defined as the study of what a person is required to do, in terms of actions and mental processes, to achieve a goal (Kirwan and Ainsworth, *A guide to task analysis*). It involves describing how a task is done, often through a series of smaller sub-tasks. SCTA focuses on how tasks that are critical to major accident risk are performed. The following is a definition of an SCT:

- An SCT is a task where human factors could cause, or contribute to, a major accident[1], or fail to reduce the effect of one, including during:
  - operational tasks;
  - prevention and detection;
  - control and mitigation, and
  - emergency response.

Using these headings, the following show illustrative SCTs identified by practitioners:

- Operational tasks:
  - loading liquid petroleum gas (LPG) from bulk storage to road tanker;
  - sampling of hazardous substances, and
  - blinding/de-blinding of piping and equipment.
- Prevention and detection:
  - test level trips, and
  - override or suppress safety function (e.g. inhibit fire or gas detectors).
- Control and mitigation:
  - pressure safety valve (PSV) inspection and testing, and
  - firewater pump inspection and testing.
- Emergency response:
  - deploy active firefighting equipment (to fight fire), and
  - launching a lifeboat.

1 Control of Major Accident Hazards (COMAH) Regulations: 'major accident' means an occurrence such as a major emission, fire, or explosion resulting from uncontrolled developments in the course of the operation of any establishment to which these regulations apply, and leading to serious danger to human health or the environment (whether immediate or delayed) inside or outside the establishment, and involving one or more dangerous substances (COMAH Regulations 2015)