

Guidance on human factors safety critical task analysis

Second edition

GUIDANCE ON HUMAN FACTORS SAFETY CRITICAL TASK ANALYSIS

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CONTENTS

	Page
Foreword	6
Acknowledgements	7
1 Introduction	8
1.1 Background	8
1.2 What is safety critical task analysis?	8
1.3 Benefits	10
1.4 Purpose	10
1.5 Scope	11
1.5.1 Focus on qualitative approaches	11
1.5.2 Other approaches to task analysis	11
1.5.3 SCTA and routine task risk assessment	11
2 Safety critical task analysis process	12
2.1 Overview	12
2.2 Step 1 – Identify main site hazards	13
2.3 Step 2 – Identify and prioritise safety critical tasks	13
2.3.1 Capturing SCTs at the right level	14
2.3.2 Identifying tasks	15
2.3.3 Screening and prioritising tasks	18
2.3.4 What types of task are of interest?	20
2.3.5 Defining required actions	21
2.3.6 Common pitfalls, misunderstandings and misapplications – and their solutions	21
2.4 Step 3 – Understand the tasks	24
2.5 Step 4 – Represent the safety critical tasks	26
2.6 Step 5 – Identify human failures and performance influencing factors	29
2.6.1 Group-based approaches	30
2.7 Step 6 – Determine safety measures to control risk of human failures	32
2.8 Step 7 – Implement and monitor effectiveness of safety measures	34
2.9 Step 8 – Review the effectiveness of the process	34
2.10 SCTA techniques and output summary	35
2.11 Illustrative examples of outputs	35
2.12 Frequently asked questions	40
3 Supporting methods and techniques	42
3.1 Hierarchical task analysis	42
3.1.1 Brief description	42
3.1.2 Applicability	42
3.1.3 Pros and cons	42
3.1.4 Examples and further reading	43
3.2 Human HAZOP and team/guideword based variants	43
3.2.1 Brief description	43
3.2.2 Applicability	44
3.2.3 Pros and cons	44
3.2.4 Examples and further reading	44
3.3 Other techniques	44
3.3.1 Fault tree analysis	44

Contents continued

	Page
3.3.2	Event tree analysis 46
3.3.3	Bow tie analysis 47
3.3.4	Layer of protection analysis (LOPA) 48
3.3.5	Integrating SCTA into daily operations 49
3.3.6	Additional techniques 51
4	Case studies 52
4.1	Case study 1 – Identifying SCTS at a refinery 52
4.2	Case study 2 – Identifying SCTS at another refinery 52
4.3	Case study 3 – Identifying SCTS for a series of mature offshore production platforms. 55
4.3.1	Operations. 55
4.3.2	Maintenance 55
4.3.3	Process upsets 56
4.3.4	Emergency response. 56
4.3.5	Decommissioning. 56
4.4	Case study 4 – Using task screening to identify safety critical sub-tasks 57
4.5	Case study 5 – Chemical offloading operation 57
4.6	Case study 6 – Power plant control room operation. 59
5	High- versus low- quality SCTA 63
5.1	How to recognise a high quality SCTA 63
5.2	How to recognise a low quality SCTA 63
Annexes	
Annex A	Examples of supporting material 65
Annex B	References and bibliography. 76
B.1	References 76
B.2	Bibliography. 78
Annex C	Abbreviations and accronymns 79

LIST OF FIGURES AND TABLES

	Page
Figures	
Figure 1	Summary of SCTA process 12
Figure 2	Example simple criticality/prioritisation tables and matrix 19
Figure 3	Data collection techniques 24
Figure 4	Example HTA diagram 28
Figure 5	Mapping techniques to SCTA steps 35
Figure 6	Simplified tanker unloading example 45
Figure 7	Associated fault tree 46
Figure 8	Example event tree analysing MAH escalation 47
Figure 9	Partially developed bow tie 47
Figure 10	Human error as a degradation factor, highlighting 'start-up' as an SCT 48
Figure A.1	Example risk-based operating task classification guide 75
Tables	
Table 1	Example procedure screening matrix for a LPG bulk storage/distribution site 17
Table 2	Example simple criticality/prioritisation table 19
Table 3	Blockers to SCT identification and potential enablers 22
Table 4	Example human failure identification guidewords 29
Table 5	Mapping effective safety measures against human failure classification 32
Table 6	Example of emergency response task analysis 36
Table 7	Example of task analysis relating to accident initiation – operations – road tanker loading at fuel terminal. 37
Table 8	Example of task analysis relating to accident initiation – maintenance – pipeline interventions 38
Table 9	Examples of task analysis relating to accident escalation – detection, control and mitigation of events 39
Table 10	Illustrative ALARP demonstration 40
Table 11	TIP outline 50
Table 12	Operational SCTs 53
Table 13	Maintenance, inspection or testing tasks 54
Table 14	Emergency response tasks 54
Table 15	Summary of case study 5 58
Table 16	Example output from human HAZOP 59
Table 17	Summary of case study 6 60
Table 18	Example output from nuclear power station SCTA 62
Table A.1	Performance influencing factors 65
Table A.2	Alternative checklist of performance influencing factors 66
Table A.3	Example adaptation of the HSE's 5-item task criticality scheme – covering environmental hazards, posed by loss of containment 68
Table A.4	Example task criticality scoring for tasks involving handling or use of hazardous substances 69
Table A.5	Example human HAZOP guidewords 71

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.

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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 accident¹, 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)
