

**EFFECTIVE CONTROL OF HAZARDS RELATED TO
STEAM BOILERS USED IN MANUFACTURING
INDUSTRIES IN SRI LANKA**

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DECLARATION

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ABSTRACT

Effective control of hazards related to steam boilers used in manufacturing industries in Sri Lanka

Steam Boiler (SB) is the major equipment use in a steam system. It is a pressurized vessel in which heating of water take places and generates steam. It is operated under high heat and high pressure. Therefore, it is considered as dangerous equipment. Many incidents have been reported around the world. This study is focused to control Steam Boiler related hazards found in manufacturing industries in Sri Lanka, by revealing measures to enhance Steam Boiler manufacturing and operation.

A literature survey, a detailed questionnaire survey, and expert interviews were used to collect data. The pilot survey was conducted to make necessary adjustments and validate the questionnaires. Hundred and twenty manufacturing industries were selected as sample. This study sample was selected among the manufacturing industries registered in the Industrial Safety Division of Department of Labour. This was included sixty factories with Steam Boiler related incidents. Steam Boiler related incidents were not reported in other sixty factories. Questionnaire was given to all selected factories and results were analysed using Graphical and Relative Important Index method (RII). Graphical method was used to evaluate the available work practises and RII method was used to identify critical causes of those incidents. Expert interviews were conducted to find expert opinions regarding Steam Boiler operation procedure and manufacturing procedure.

Steam Boiler related hazards are classified as Accidental, Physical, Biological, Chemical, Ergonomic and Psychosocial factors. Only accident type hazards, such as structural explosions, steam leakages fuel leakages were reported in Sri Lanka. The highest number of hazardous incidents was reported in rice mills. Both unsafe actions and unsafe conditions had caused to those incidents. Hazards incidents were not reported in factories with good work practises. Finally, expert suggestions and study results were used to propose strategies to enhance standard of Steam Boiler operation procedure and manufacturing procedure.

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TABLE OF CONTENT

Declaration	i
Abstract	ii
Acknowledgements	iii
Table of Content	iv
List of Figures	vii
List of Tables	viii
List of Abbreviation	ix
List of Appendices.....	x
CHAPTER 01 – INTRODUCTION	01
1.1 Background	01
1.2 Research Problem.....	03
1.3 Aim	04
1.4 Objectives	04
1.5 Research Methodology	04
1.6 Scope and Limitations	06
1.7 Chapter Breakdown	07
CHAPTER 02 – LITERATURE REVIEW	08
2.1 Introduction.....	08
2.2 Overview of a Steam Boiler	09
2.2.1 Types of Steam Boilers.....	10
2.3 Boiler Attending Staff	10
2.4 Hazard.....	11
2.5 Hazards related to Steam Boiler	11

2.5.1 Physical Hazards.....	12
2.5.2 Biological Hazards	13
2.5.3 Chemical Hazards.....	14
2.5.4 Ergonomic, Psychosocial and Organizational factors.....	15
2.5.5 Accidental Hazards.....	16
2.6 Boiler Failures	18
2.6.1 Behavior of Steam Boiler Staff.....	19
2.6.2 Steam Boiler Operation.....	19
2.6.3 Steam Boiler Construction and installation.....	20
2.6.4 Steam Boiler Inspection.....	21
2.6.5 Steam Boiler Maintenance.....	22
2.7 Control Measures to Minimize Hazards.....	23
2.8 Summary	24
CHAPTER 03 – RESEARCH METHODOLOGY.....	26
3.1 Introduction.....	26
3.2 Research Design	26
3.2.1 Research Philosophy.....	26
3.2.2 Research Approach	27
3.2.3 Research Techniques	28
3.3 Research Process.....	29
3.4 Data Collection	29
3.4.1 Pilot Survey.....	30
3.4.2 Questionnaire Survey	30
3.4.3 Questionnaire Design.....	30
3.4.4 Sampling.....	31
3.4.5 Expert Interview.....	32
3.5 Data Analysis	33
3.6 Summary	33
CHAPTER 04 – RESEARCH FINDINGS AND DATA ANALYSIS.....	35
4.1 Introduction.....	35

4.2 Respondent Rate and the Characteristics of the sample	35
4.3 Steam Boiler Related Hazards.....	35
4.4 Causes of Steam Boiler Related Incidents.....	36
4.4.1 Types of Steam Boiler Related Incidents.....	38
4.4.2 Types of Manufacturing Industries.....	38
4.4.3 Causes of Steam Boiler Related Incidents.....	39
4.5 Current Work Practices	41
4.5.1 Steam Boiler Manufacturing and Installation.....	41
4.5.2 Steam Boiler Operator.....	42
4.5.3 Steam Boiler Operation	43
4.5.4 Steam Boiler Inspection.....	44
4.5.5 Steam Boiler Maintenance.....	45
4.6 Enhance Standard of Steam Boiler Operation and manufacturing Procedures	47
4.6.1 Expert Suggestions for improving operation.....	47
4.6.2 Expert Suggestions for manufacturing.....	53
4.7 Summary	56
 CHAPTER 05 – CONCLUSION AND RECOMMENDATIONS.....	57
5.1 Conclusion.....	57
5.2 Recommendations.....	59
5.3 Further Research.....	60
 REFERENCE LIST.....	61
 APPENDICES	66

LIST OF FIGURES

Figure 1.1: Chapter breakdown	07
Figure 2.1: A view of a Steam boiler	09
Figure 2.2: Steam boiler operator job related hazards	11
Figure 3.1: Research Design	26
Figure 3.2: Research Process	29
Figure 3.3: Sample and Population	31
Figure 4.1: Types of Steam Boiler Related Reported Incidents.....	38
Figure 4.2: Type of Manufacturing Industry	39
Figure 4.3(a) Boiler manufacturing and installing details (without incidents)	42
Figure 4.3(b) Boiler manufacturing and installing details (with incidents)	42
Figure 4.4(a) Boiler operator details (Factories without incidents)	43
Figure 4.4(b) Boiler operator details (Factories with incidents)	43
Figure 4.5(a) Boiler operation details (Factories without incidents)	44
Figure 4.5(b) Boiler operation details (Factories with incidents)	44
Figure 4.6(a) Boiler inspection details (Factories without incidents)	45
Figure 4.6(b) Boiler inspection details (Factories with incidents)	45
Figure 4.7(a) Boiler maintenance details (Factories without incidents)	46
Figure 4.7(b) Boiler maintenance details (Factories with incidents)	46

LIST OF TABLES

Table 1.1 Reported Steam Boiler Related Incidents in (2010-2015) in Sri Lanka...	02
Table 2.1: Safety and Health problems if high heat reported in the work environment.....	12
Table 2.2: Steam Boiler operator job related physical hazards.....	13
Table 2.3: Steam Boiler operator job related chemical hazards.....	14
Table 2.4: Steam Boiler operator job related Ergonomic and Psychosocial hazards	15
Table 2.5: Steam Boiler operator job related accidental hazards	16
Table 2.6: Steam boiler related accidents	17
Table 2.7: Steam boiler Failures	18
Table 3.1: Experts profile	33
Table 4.1 Steam Boiler Related Hazards	36
Table 4.2 Unsafe Actions and Unsafe Conditions Details	37
Table 4.3 Ranking of causes of hazardous Incidents.....	40
Table 4.4 Expert suggestions for improve Steam Boiler operation procedure.....	52
Table 4.5 Expert suggestions for improve Steam Boiler manufacturing procedure.....	55

LIST OF ABBREVIATION

CO₂ – Carbon Dioxide

CO – Carbon Monoxide

DOL – Department of Labour

HSE – Health and Safety Executive

IIOOSH – Israel Institute for Occupational Safety and Hygiene

ILO – International Labour Organization

ISD – Industrial Safety Division

ISO - International Organization for standardization

NIHL – Noise Induce Hearing Loss

OSH – Occupational Safety and Health

OHSAS – Occupational Health and Safety Assessment Series

PPE – Personal Protective Equipment

SB – Steam Boiler

LIST OF APPENDICES

APPENDIX A – Details Requesting Letter.....	66
APPENDIX B – Questionnaire Guideline	67
APPENDIX C – Questionnaire for detail Collection	68
APPENDIX D – Questionnaire Data Sheet For Identify Economic Activity and type of Incident	72
APPENDIX E -Questionnaire Data Sheet For Identify reason/reasons for Incident	75
APPENDIX F - Summary of Questionnaire Data Sheet Identify level of work practices in steam boiler incident reported factories.....	78
APPENDIX G - Summary Of Questionnaire Data Sheet Identify level of work practices in steam boiler incident reported factories	79
APPENDIX H - Summary Of Questionnaire Data Sheet	81