

# Contents

<b>1</b>	<b>Introduction</b> .....	1
1.1	Aim and Emphasis .....	2
1.2	Policy of Writing and Presentation .....	2
1.3	Structure and Organization .....	3
1.3.1	Part I: Conceptual Introduction .....	3
1.3.2	Part II: Cyber-risk Assessment Exemplified .....	4
1.3.3	Part III: Known Challenges .....	4
1.4	Intended Readers and Ways to Read .....	5
1.5	Relevant Standards .....	6
 <b>Part I Conceptual Introduction</b>		
<b>2</b>	<b>Risk Management</b> .....	9
2.1	What is Risk? .....	9
2.2	What is Risk Management? .....	12
2.3	Communication and Consultation .....	13
2.3.1	Establish a Consultative Team .....	14
2.3.2	Define a Plan for Communication and Consultation .....	14
2.3.3	Ensure Endorsement of the Risk Management Process .....	14
2.3.4	Communicate Risk Assessment Results .....	15
2.4	Risk Assessment .....	15
2.4.1	Context Establishment .....	15
2.4.2	Risk Identification .....	18
2.4.3	Risk Analysis .....	20
2.4.4	Risk Evaluation .....	21
2.4.5	Risk Treatment .....	21
2.5	Monitoring and Review .....	22
2.5.1	Monitoring and Review of Risks .....	23
2.5.2	Monitoring and Review of Risk Management .....	23
2.6	Further Reading .....	24

- 3 Cyber-systems** ..... 25
  - 3.1 What is a Cyberspace? ..... 25
  - 3.2 What is a Cyber-system? ..... 26
  - 3.3 Further Reading ..... 26
- 4 Cybersecurity** ..... 29
  - 4.1 What is Cybersecurity? ..... 29
  - 4.2 How Does Cybersecurity Relate to Information Security? ..... 30
  - 4.3 How Does Cybersecurity Relate to Critical Infrastructure Protection? ..... 30
  - 4.4 How Does Cybersecurity Relate to Safety? ..... 31
  - 4.5 Further Reading ..... 32
- 5 Cyber-risk Management** ..... 33
  - 5.1 What is Cyber-risk? ..... 33
  - 5.2 Communication and Consultation of Cyber-risk ..... 34
  - 5.3 Cyber-risk Assessment ..... 35
    - 5.3.1 Context Establishment for Cyber-risk ..... 37
    - 5.3.2 Identification of Malicious Cyber-risk ..... 37
    - 5.3.3 Identification of Non-malicious Cyber-risk ..... 40
    - 5.3.4 Analysis of Cyber-risk ..... 42
    - 5.3.5 Evaluation of Cyber-risk ..... 43
    - 5.3.6 Treatment of Cyber-risk ..... 44
  - 5.4 Monitoring and Review of Cyber-risk ..... 45
    - 5.4.1 Monitoring and Review of Cyber-risk ..... 46
    - 5.4.2 Monitoring and Review of Cyber-risk Management ..... 46
  - 5.5 Further Reading ..... 47

**Part II Cyber-risk Assessment Exemplified**

- 6 Context Establishment** ..... 51
  - 6.1 Context, Goals, and Objectives ..... 51
    - 6.1.1 External Context ..... 52
    - 6.1.2 Internal Context ..... 52
    - 6.1.3 Goals and Objectives ..... 52
  - 6.2 Target of Assessment ..... 53
    - 6.2.1 Electricity Customer ..... 54
    - 6.2.2 Distribution System Operator ..... 54
    - 6.2.3 Communication Channels Between Components ..... 55
  - 6.3 Interface to Cyberspace and Attack Surface ..... 55
  - 6.4 Scope, Focus, and Assumptions ..... 56
    - 6.4.1 Scope ..... 56
    - 6.4.2 Focus ..... 56
    - 6.4.3 Assumptions ..... 57
  - 6.5 Assets, Scales, and Risk Evaluation Criteria ..... 57
    - 6.5.1 Assets ..... 57
    - 6.5.2 Likelihood Scale ..... 58

- 6.5.3 Consequence Scales ..... 58
- 6.5.4 Risk Evaluation Criteria ..... 59
- 6.6 Further Reading ..... 60
- 7 Risk Identification ..... 61**
  - 7.1 Risk Identification Techniques ..... 61
  - 7.2 Malicious Risks ..... 64
    - 7.2.1 Threat Source Identification ..... 65
    - 7.2.2 Threat Identification ..... 66
    - 7.2.3 Vulnerability Identification ..... 68
    - 7.2.4 Incident Identification ..... 70
  - 7.3 Non-malicious Risks ..... 73
    - 7.3.1 Incident Identification ..... 75
    - 7.3.2 Vulnerability Identification ..... 76
    - 7.3.3 Threat Identification ..... 77
    - 7.3.4 Threat Source Identification ..... 79
  - 7.4 Further Reading ..... 80
- 8 Risk Analysis ..... 81**
  - 8.1 Threat Analysis ..... 81
    - 8.1.1 Malicious Threats ..... 82
    - 8.1.2 Non-malicious Threats ..... 83
  - 8.2 Vulnerability Analysis ..... 84
    - 8.2.1 Malicious Threat Vulnerabilities ..... 85
    - 8.2.2 Non-malicious Threat Vulnerabilities ..... 85
  - 8.3 Likelihood of Incidents ..... 86
  - 8.4 Consequence of Incidents ..... 88
  - 8.5 Further Reading ..... 89
- 9 Risk Evaluation ..... 91**
  - 9.1 Consolidation of Risk Analysis Results ..... 91
  - 9.2 Evaluation of Risk Level ..... 92
  - 9.3 Risk Aggregation ..... 92
  - 9.4 Risk Grouping ..... 95
  - 9.5 Further Reading ..... 96
- 10 Risk Treatment ..... 97**
  - 10.1 Risk Treatment Identification ..... 97
    - 10.1.1 Malicious Risks ..... 97
    - 10.1.2 Non-malicious Risks ..... 99
  - 10.2 Risk Acceptance ..... 101
  - 10.3 Further Reading ..... 103

## Part III Known Challenges and How to Address Them in Practice

<b>11 Which Measure of Risk Level to Use?</b> .....	107
11.1 Two-factor Measure .....	107
11.2 Three-factor Measure .....	108
11.3 Many-factor Measure .....	109
11.4 Which Measure to Use for Cyber-risk? .....	110
11.5 Further Reading .....	110
<b>12 What Scales Are Best Suited Under What Conditions?</b> .....	111
12.1 Classification of Scales .....	111
12.2 Qualitative Versus Quantitative Risk Assessment .....	112
12.3 Scales for Likelihood .....	114
12.4 Scales for Consequence .....	115
12.5 What Scales to Use for Cyber-risk? .....	115
12.6 Further Reading .....	116
<b>13 How to Deal with Uncertainty?</b> .....	117
13.1 Conceptual Clarification .....	117
13.2 Kinds of Uncertainty .....	118
13.3 Representing Uncertainty .....	119
13.4 Reducing Uncertainty .....	120
13.5 How to Handle Uncertainty for Cyber-risk? .....	121
13.6 Further Reading .....	121
<b>14 High-consequence Risk with Low Likelihood</b> .....	123
14.1 Dealing with Black Swans .....	123
14.2 Identifying Gray Swans .....	124
14.3 Communicating Gray Swans .....	125
14.4 Dealing with Gray Swans .....	126
14.5 Recognizing Gray Swans in Cyberspace .....	126
14.6 Further Reading .....	127
<b>15 Conclusion</b> .....	129
15.1 What We Have Put Forward in General .....	129
15.2 What We Have Put Forward in Particular .....	130
15.3 What We Have not Covered .....	131
<b>Glossary</b> .....	133
<b>References</b> .....	137
<b>Index</b> .....	141



<http://www.springer.com/978-3-319-23569-1>

Cyber-Risk Management

Refsdal, A.; Solhaug, B.; Stolen, K.

2015, XI, 145 p. 32 illus., Softcover

ISBN: 978-3-319-23569-1