

## Contents

List of publications .....	9
Author's contribution to the publications .....	10
Introduction .....	11
Purpose .....	14
Focus and scope of the research.....	14
Research methods .....	14
Outline of the dissertation .....	16
Abbreviations .....	17
1 On-site construction activity risk assessment framework .....	18
1.1 Process of the failure mode and effects analysis.....	18
1.2 Economic input value for enhanced decision-making .....	19
1.3 Criticism against FMEA.....	20
1.4 Construction process multi-criteria assessment method .....	21
2 Data collection and validation of the components.....	22
2.1 Selection of experts in the panel.....	22
2.2 Technical severity data.....	23
2.3 Region-specific data .....	24
2.4 Development of Likert scales .....	25
2.5 Repair techniques and company-specific cost data .....	26
3 Selection of the on-site degradation factors of ETICS.....	28
3.1 Substrate .....	30
3.2 Adhesive.....	31
3.3 Insulation material .....	33
3.4 Mechanical anchors .....	35
3.5 Reinforcement layer.....	36
3.6 Finishing layer .....	37
3.7 Additional details .....	38
4 Relevance of the components .....	41
4.1 Technical severity categories .....	41
4.1.1 Comparison of the severity categories' relevance and their correlation.....	43
4.1.2 Weighting system for technical severity.....	45
4.1.3 Mechanical resistance and stability .....	46
4.1.4 Safety in case of fire .....	47
4.1.5 Energy economy and heat retention .....	48
4.1.6 Protection against noise.....	49
4.1.7 Humidity and weather protection .....	49
4.1.8 Long-term durability .....	50
4.1.9 Corrosion protection.....	52
4.1.10 Ability to bypass tensions.....	52
4.2 Weighted technical severity value .....	53
4.3 Probability of the occurrence.....	56
4.4 Detectability.....	57
4.5 Economic components.....	60
4.5.1 Real interest rate.....	60
4.5.2 Latency period.....	60
4.5.3 Economic assessment value.....	62
4.6 Conclusions on the impact of individual components .....	64
5 Priority setting of the degradation factors.....	66
5.1 Technical failure mode and effects analysis .....	66
5.1.1 Conclusions of the technical failure mode and effects analysis.....	69
5.2 Economic failure mode and effects analysis .....	70
5.2.1 Conclusions of the economic failure mode effects analysis .....	72
5.3 Technical-economic relevance model.....	73
5.3.1 Distribution of the latency period by risk category.....	79
5.3.2 Conclusions of the technical-economic relevance assessment .....	80

6 Discussion.....	82
Conclusions .....	85
Limitations of the study .....	86
Recommendations for further research .....	86
List of Figures .....	88
List of Tables .....	90
References .....	91
Acknowledgements.....	101
Abstract.....	103
Kurzfassung .....	105
Lühikokkuvõte .....	107
Appendix 1 .....	109
Appendix 2 .....	117
Appendix 3 .....	125
Appendix 4 .....	153
Appendix 5 .....	169
Curriculum vitae.....	197
Elulookirjeldus.....	198