

Contents

Abstract	VII
1 Introduction to the Problem	1
1.1 History	3
1.1.1 Historical Development of Wooden Bridges	3
1.1.2 Bridges in Antiquity	3
1.1.3 Bridges in the Middle Ages.....	5
1.1.4 Bridges in Renaissance	5
1.1.5 Wooden Bridges in Medieval China	7
1.1.6 Swiss Bridge School	8
1.1.7 Wooden Bridges in America	9
1.1.8 Wooden Bridges at the Beginning of the Railway	9
1.2 Material.....	12
1.2.1 Wood Construction	12
1.2.2 Submicroscopic Wood Construction	12
1.2.3 Microscopic Wood Construction.....	13
1.2.4 Macroscopic Wood Construction.....	16
1.2.5 Wood Properties	19
1.3 Wood in Numbers	26
2 Research Question and Aims of the Work	29
3 Hypothesis.....	31
4 Methodology and Method of Organizing the Collection and Acquisition of Experimental Data	33
4.1 Empirical Methods	34
4.1.1 Observation Methods.....	34
4.1.2 Measurement Methods.....	35
4.1.3 Experimental Methods	36
4.2 Theoretical Methods	37
4.2.1 Theoretical Methods Based on the Logic of Thinking	37
4.2.2 Theoretical Methods Based on Analogy and Modeling	37

5	Analysis of Selected Bridge Structures in the Czech Republic.....	39
5.1	Detailed Analysis	40
5.1.1	Český Krumlov	40
5.1.2	Veveří.....	47
5.1.3	Olšava	54
5.2	Analysis of Humidity Conditions.....	61
5.2.1	Lenora.....	63
5.2.2	Černý kříž.....	64
5.2.3	Modrava	65
5.2.4	Polka	66
5.2.5	Borová Lada	67
5.2.6	Huštěnovice	69
5.2.7	Buchlovské vrchy	70
5.2.8	Olšava	71
5.2.9	Příbor.....	72
5.2.10	Horní Bečva	73
5.2.11	Prostřední Bečva.....	74
5.2.12	Benešov 1	75
5.2.13	Benešov 2	76
5.2.14	Obořany-Brno.....	76
5.2.15	Černvír	78
5.2.16	Nedvědice.....	78
5.2.17	Švařec	80
6	Possible Solutions of Short Life	81
6.1	Timber-concrete Bridge Constructions	83
6.1.1	Laboratory Measurements.....	85
6.2	Composite Materials	94
6.2.1	Laboratory Measurements.....	95
6.2.2	IN-SITU.....	100
7	Discussion, conclusion.....	105

7.1	The Quality of the Wood Used	107
7.2	Environmental Impact	108
7.3	Design Solution.....	113
7.4	Closing Word	114
8	Literature.....	115