

**INVESTIGATION ON THE INFLUENCE OF MOISTURE
CONTENT OF WOOD BEFORE PRESERVATIVE TREATMENT
IN DIPPING DIFFUSION METHOD**

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Degree of Master of Science in Civil Engineering

Department of Civil Engineering

University of Moratuwa

Sri Lanka

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**The thesis submitted in partial fulfillment of the requirements for the degree
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Declaration

I hereby declare that this thesis entitled “INVESTIGATION ON THE INFLUENCE OF MOISTURE CONTENT OF WOOD BEFORE PRESERVATIVE TREATMENT IN DIPPING DIFFUSION METHOD” is the result of my original work and has not been submitted in part or in whole for any other degree or diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgment is made in the text. All sources used in this thesis have been duly acknowledged and referenced.

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The above candidate has carried out research for the Master under our supervision.

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Abstract

Wood is a versatile and widely utilized material in various industries, ranging from construction to furniture manufacturing. In the context of the wood industry in Sri Lanka, The uses of wood in Sri Lanka date back to ancient times, with evidence of woodworking found in archaeological sites. This research aims to shed light on the intricate dynamics involved in the preservation and enhancement of wood quality by considering the specific effect of wood moisture content before dip diffusion treatment. This research conducted the quantitative industrial survey of mid-scale wood companies and qualitative testing procedures using Pine (*Pinus*), Hawarinuga (*Alstonia*), Mahogany (*Swietenia*), Mango (*Mangifera indica*), and Rubberwood (*Hevea brasiliensis*) types treated with two types of organic wood preservatives namely FSWOM, FSWM, and two types of industrial wood preservatives namely boron based treatment and ACQ.the wood samples tested with different moisture content level during six week. The study determined the recommended moisture content ranges for the selected wood preservative types and wood types. Pine wood can be recommended for FSWOM, FSWM, ACQ and Boron at 18% to 22 %. And considering Alastonia wood can only recommend FSWM moisture content range of 26 % to 30 %. consider the Mahogany wood can only recommended FSWM moisture content range of 24 % to 28 %. Also, Mango wood can recommended FSWOM moisture content range is 16 % to 26 %, FSWM is 16 % to 28 %, ACQ is 18 % to 28 % and Boron is 16 % to 22 % for Mango wood. Finally, Rubberwood moisture content is recommended as FSWOM moisture content range is 14 % to 17 %, FSWM is 14 % to 18 %, ACQ is 15 % to 18 % and Boron is 15 % to 18 %. Alstonia and Mahogany null hypothesis accepted. Can not recommend moisture ranges for FSWOM, ACQ and Boron. It would affect other factors to the Alstonia wood preservatives uptake. The study confirms the moisture content significantly affects the uptake of preservatives during wood treatment. The experimental findings indicate that preservative uptake is limited by the moisture content present in the wood.

Keywords: Dip diffusion, moisture content, organic preservatives, preservative uptake, wood treatment.

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Dedication

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Table of Contents

Declaration	III
Abstract	IV
Acknowledgment	V
Dedication	VI
Table of Contents	VII
Table of Figure	XI
List of Table	XIII
List of Abbreviations.....	XIII
Chapter 01: Introduction	1
1.1 Background of the study.....	1
1.2. The research problem.....	2
1.2 Research objectives	4
1.4 Research Methodology.....	5
1.5. Findings.....	7
1.6 Dissertation structure	7
Chapter 2: literature review.....	8
2.1 Chapter introduction.....	8
2.2. Background of the wood	9
2.2.1. The chemical composition of wood	9
2.2.2 The anatomical structure of wood.....	13
2.2.3 The mechanical properties of wood	14
2.3 Wood as Construction Material	15
Wood in Manufacturing	16
2.4 Main limitations of wood utilization as construction material.....	18
2.4.1 Deforestation	18
2.4.2 Durability	18
2.4.3 Dimensional Stability.....	19
2.4.4 Fire Resistance	19
2.5 How to overcome the limitation of wood utilization	20
2.6 Wood treatment.....	22

2.6.1 Pressure Treatment.....	23
2.6.2 Vacuum Treatment.....	24
2.6.3 Dip Treatment	25
2.7 Wood modification.....	26
2.7.1. Chemical modification.....	26
2.7.2. Thermal modification.....	28
2.7.3. Mechanical modification.....	29
2.7.4. Biological modification.....	30
2.8 The benefit of the wood modification.....	30
2.9 Difference between wood treatment and wood modification	32
2.10 Diffusion	32
2.10.1 Dip diffusion	33
2.10.2 Mechanism of dip diffusion	34
2.11 Wood preservative methods in Sri Lanka	35
2.11.1 Non-pressure treatment	35
2.11.2 Limitation of non-pressure treatment.....	38
2.11.3 Pressure treatment methods.....	38
2.12 Wood preservatives	39
2.12.1 CCA	40
2.12.2 ACQ	41
2.12.3 Borate Preservatives.....	42
2.13 Organic wood preservatives.....	42
2.14 The benefit of organic wood preservatives	43
2.15 Wood Preservatives Used in Sri Lanka.....	43
2.15.1 CCA (Chromated Copper Arsenate)	43
2.15.2 Creosote	43
2.15.3 Borates	44
2.15.4 Copper-based preservatives	44
2.15.5 Organic preservatives.....	44
2.16 Environmental impact of wood modification	44
2.17 Novel organic wood preservatives in Sri Lanka	47
2.18 What are the FSWOM and FSWM	47
2.19 Wood moisture.....	48

2.19.1 Moisture Adsorption and Desorption.....	50
2.19.2 Dimensional Stability.....	50
2.19.3 Mechanical Properties.....	50
2.19.4 Microbial Activity.....	51
2.20 interaction between moisture and wood.....	51
2.21 Wood Moisture Affects Wood Modification.....	52
2.21.1 Hydroxyl removal.....	53
2.21.2 Bulking.....	53
2.21.3 Cross-linking.....	53
2.21.4 Component removal.....	54
2.21.5 Thermal modification.....	54
2.22 Relation between Wood preservative treatment and moisture.....	54
2.23 Wood density and wood preservative uptake.....	55
2.24 Chapter Summary.....	56
Chapter 03: research methodology.....	57
3.1 Chapter introduction.....	57
3.2 Research method.....	57
3.2.1 Industrial survey.....	58
3.2.2 Testing procedure.....	59
3.2.3 Time frame.....	61
3.2.4 Sample preparation.....	62
3.3 Equations.....	65
3.3.1 Wood density.....	65
3.3.2 Chemicals uptake.....	65
3.3.3 Wood moisture content (100%).....	65
3.4 Chapter Summary.....	65
Chapter 04: Results and Discussions.....	66
4.1 Chapter introduction.....	66
4.2. Industrial survey results.....	66
4.3 Testing results.....	69
4.3.1. Chemical uptake vs. time.....	69
4.3.2. Moisture Content vs. Time.....	74
4.3.3 Chemical Uptake vs. Preservative Types.....	77

4.3.4 Moisture Content vs. Chemical Uptake	80
4.3.5. Wood density vs. chemical uptake.....	93
4.3 Statistical analysis	94
4.3.1 Moisture content vs. preservatives uptake in Pinewood.....	94
4.3.2 Moisture content vs. preservative uptake in Alstonia wood	95
4.3.3 Moisture content vs. preservative uptake in Mahogany wood.....	97
4.3.4 Moisture content vs. preservatives uptake in Mango.....	99
4.3.5 Moisture content vs. preservatives uptake in Rubber wood	101
4.4 Chapter Summary.....	102
Chapter 5: Conclusions and Future Works	105
5.1 Conclusion	105
5.2 Recommendations	106
5.3 Future Development and Possibilities.....	107
References	108
Appendix	120
Appendix A: Industrial survey form	120
Appendix B: Preservatives Uptake data.....	122
Appendix C: Moisture content variation with different period.....	127

Table of Figure

Figure 1: Molecule structure of Cellulose, Hemicellulose, and Lignin (Yuan et al., 2022).	10
Figure 2: The hierarchical structure of wood (Chen et al., 2020).	11
Figure 3: Composition in cross-section and the longitudinal direction (Chen et al., 2020)	11
Figure 4: Anisotropy of wood at multiple length scales (Chen et al., 2020).	12
Figure 5: The schematic representations of three different binding modes of hemicellulose chains to the cellulose microfibrils: (a) bridge, (b) loop, and (c) random scattering (Zhang et al., 2015).	12
Figure 6: (a) The network of hydrogen bonds in cellulose microfibrils; (b) Crystalline structure of a unit cell of cellulose; (c) Cross-sectional view and (d) 3D view of a cellulose microfibril bundle (Zhang et al., 2015).	12
Figure 7: Microscopic structure of softwood. A Cross section, 1 tracheid, B tangential section, 2 wood rays, and C radial section (Richter, 2015).	13
Figure 8: Microscopic structure of hardwood, A Cross section, 1 vessel with tylosis, B tangential section, 2 libriform fibers, C radial section, 3 wood rays, 4 longitudinal parenchyma (Richter, 2015).	14
Figure 9: Cell Structure, Cell Lumen, Wood cell wall, Micro Fibrils, Elementary Fibrils (Mendis & Halwatura, 2023).	14
Figure 10: The efficient use of harvested wood (Sikkema et al., 2017).	16
Figure 11: Temples, Ambalam, Tampita (Mendis et al., 2020).	17
Figure 12: Effect of chemical modification (Sandberg et al., 2017).	27
Figure 13: Diffusion mechanism (Paul et al., 2014).	33
Figure 14: (a), (b) Wood dipping diffusion method (Narasimhamurthy, 2022).	34
Figure 15: Brushing treatment	36
Figure 16: Spraying	36
Figure 17: Dipping methods	37
Figure 18: Moisture transport in softwood (Engelund et al., 2013).	50
Figure 19: Simplified overview of wood structure on different length scales: Wood macrostructure with annual rings; porous microstructure with pits, which are pathways through cell walls that connect lumina (singular: lumen) of adjacent cells; and cell wall material (Thybring & Fredriksson, 2021)	51
Figure 20: moisture in wood (Thybring & Fredriksson, 2021).	52
Figure 21: wood modification methods affected water molecules (Thybring & Fredriksson, 2021)	53
Figure 22: Research Design	57
Figure 23: sample area	58
Figure 24: Sample Area	59
Figure 25: Industrial survey	59
Figure 26: wood samples testing	60
Figure 27: Testing procedure	61
Figure 28: Sample preparation	62
Figure 29: Prepared samples	63

Figure 30: Sample treated according to this schedule per week	64
Figure 31: Dipped wood samples.....	64
Figure 32: Industrial Timber types usage in the selected sample	67
Figure 33: wood types usage for wood preservative treatment.....	67
Figure 34: Consideration of wood moisture content after the wood preservative treatment.....	69
Figure 35: Chemical uptake in Pinewood	69
Figure 36: Chemical uptake in Alstonia.....	71
Figure 37: Chemical uptake in Mahogany	71
Figure 38: Chemical uptake in Mango wood.....	72
Figure 39: Chemical uptake in Rubberwood	72
Figure 40: Moisture content vs. time in pine wood samples.....	74
Figure 41: Moisture content vs. time in Alstonia samples.....	74
Figure 42: Moisture content vs. time in Mahogany samples	75
Figure 43: Moisture content vs. time in Mango samples	76
Figure 44: Moisture content vs. time in Rubberwood.....	76
Figure 45: FSWOM uptake vs. selected wood types	77
Figure 46: FSWM uptake vs. selected wood types	78
Figure 47: ACQ uptake va selected wood types	79
Figure 48: Boron uptake vs. selected wood types.....	80
Figure 49: Moisture content Vs. FSWOM uptake in Pine wood	81
Figure 50: Moisture content vs. FSWOM uptake in Alstonia wood.....	81
Figure 51: Moisture content vs. FSWOM uptake in Mahogany wood.....	82
Figure 52: Moisture content vs. FSWOM uptake in Mango wood.....	82
Figure 53: Moisture content vs. FSWOM uptake in Rubberwood	83
Figure 54: Moisture content vs. FSWM uptake in Pine wood.....	84
Figure 55: Moisture contents FSWM uptake in Alstonia wood	85
Figure 56: Moisture content vs. FSWM uptake in Mango wood.....	85
Figure 57: Moisture content vs. FSWM uptake in Rubberwood	86
Figure 58: Moisture content vs. FSWM uptake in Mahogany wood.....	86
Figure 59: Moisture content vs. ACQ uptake	87
Figure 60: Moisture content vs. ACQ uptake	87
Figure 61: Moisture content vs. ACQ uptake	88
Figure 62: Moisture content vs. ACQ uptake in Mango wood.....	88
Figure 63: Moisture content vs. ACQ uptake in Rubber wood.....	89
Figure 64: Moisture content vs. boron uptake in pine wood	89
Figure 65: Moisture content vs. Boron uptake in Alstonia wood	90
Figure 66: Moisture content vs. Boron uptake in Mahogany wood.....	91
Figure 67: Moisture content vs. Boron uptake in Mango wood	91
Figure 68: Moisture content vs. Boron uptake in Rubber wood	92
Figure 69: Wood density vs. preservative uptake	93
Figure 70: Scatter plot of Moisture content vs. preservative uptake in Pinewood	95
Figure 71: Scatter plot of Moisture content vs. preservative uptake in Alstonia wood	96

Figure 72: Scatter plot of Moisture content vs. preservative uptake in Mahogany wood	98
Figure 73: Scatter plot of Moisture content vs. preservative uptake in Mango wood	100
Figure 74: Scatter plot of Moisture content vs. preservative uptake in Rubberwood	101

List of Table

Table 1: vairiuse industry of wood	15
Table 2: Preservative Components.....	42
Table 3: Selected plant Spices.....	48
Table 4: Testing schedule.....	62
Table 5: Consideration of wood moisture content before the wood preservative treatment.....	68
Table 7: Pairwise Pearson Correlations of Pinewood	94
Table 8: Pairwise Pearson Correlations of Alstonia Wood.....	96
Table 9: Pairwise Pearson Correlations of Mahogany Wood	97
Table 10: Pairwise Pearson Correlations Mango Wood	99
Table 11: Pairwise Pearson Correlations of Rubberwood	101

List of Abbreviations

- Cross-laminated timber (CLT)
- Laminated veneer lumber (LVL)
- Liquefied Petroleum Gas (LPG)
- Moisture Content (MC)
- Alkaline Copper Quaternary (ACQ)
- Chromate Copper Arsenate (CCA)
- Final Solution Without Mud (FSWOM)
- Final Solution With Mud (FSWM)
- Life Cycle Assessment (LCA)