

LIST OF TABLES

TABLE NO	TITLE	PAGE NO.
2.1	Worldwide Production of Fly ash	9
3.1	Type of Fly ash used for the Study	30
3.2	Test Report on Fly ash Analysis (ASTM Class F)	31
3.3	Test Result of Sodium Silicate	32
3.4	Sieve Analysis Result of Fine Aggregate	33
3.5	Sieve Analysis Result of Coarse Aggregate	34
3.6	Mix Proportions for GPC for 1 m ³ of Concrete	39
3.7	Mix Proportion for Geopolymer Brick	40
4.1	Assessment Criteria for Absorption	49
4.2	Details of Specimen	56
4.3	Specimen Details of Brick Masonry Prism	56
5.1	Slump Values for Different Grades of GPC	59
5.2	Compressive Strength of GPC Concrete Block at 30°C	61
5.3	Compressive Strength of GPC Concrete Block at 60°C	62
5.4	Compressive Strength Value	62
5.5	Split Tensile Strength of GPC Concrete Block at 30°C	65
5.6	Split Tensile Strength of GPC Concrete Block at 60°C	65
5.7	Comparison of Split Tensile Strength	66
5.8	Flexural Strength of GPC Concrete Block at 30°C	68
5.9	Compressive Strength of GPC Hollow block at 30°C	69
5.10	Compressive Strength of GPC Hollow block at 60°C	70

TABLE NO	TITLE	PAGE NO.
5.11	Comparison of Compressive Strength for GPC Hollow Block	70
5.12	Split Tensile Strength of GPC Hollow Block at 30°C	73
5.13	Split Tensile Strength of GPC Hollow Block at 60°C	73
5.14	Comparison of Split Tensile Strength for GPC Hollow Block	74
5.15	Water Absorption for Specimen Cured at 30°C	77
5.16	Water Absorption for Specimen Cured at 60°C	77
5.17	Comparison of Percentage of Water Absorption	78
5.18	Weight Change of Specimen Cured at 30°C	81
5.19	Percentage Weight Loss on Acid Immersion for Specimen Cured at 30°C	82
5.20	Weight Change of Specimen Cured at 60°C	82
5.21	Percentage Weight Loss on Acid Immersion for Specimen Cured at 60°C	83
5.22	Residual Compressive Strength on Acid Immersion for Specimen Cured at 30°C	85
5.23	Residual Compressive Strength on Acid Immersion for Specimen Cured at 60°C	85
5.24	Percentage Loss in Compressive Strength for Specimen Cured at 30°C	86
5.25	Percentage Loss in Compressive Strength for Specimen Cured at 60°C	86
5.26	Residual Split Tensile Strength on Acid Immersion for Specimen Cured at 30°C	88
5.27	Residual Split Tensile Strength on Acid Immersion for Specimen Cured at 60°C	89
5.28	Percentage Loss in Split Tensile Strength for Specimen Cured at 30°C	89
5.29	Percentage Loss in Split Tensile Strength for Specimen Cured at 60°C	90

TABLE NO	TITLE	PAGE NO.
5.30	Regression Equation for Brick Prism	100
5.31	Variation of Modulus of Elasticity for Clay Brick Prism	101
5.32	Variation of Modulus of Elasticity for Geopolymer Brick Prism GBP (M1)	103
5.33	Variation of Modulus of Elasticity for Geopolymer Brick Prism GBP (M2)	105
5.34	Validation of Clay Brick Prism (CBP)	107
5.35	Validation of Geopolymer Brick Prism GBP (M1)	108
5.36	Validation of Geopolymer Brick Prism GBP (M2)	109
5.37	Comparison of Experimental Results with Published Data (Water Absorption)	111
5.38	Comparison of Experimental Results with Published Data (Residual Compressive Strength)	112
5.39	Comparison of Experimental Results with Published Data (Change in Weight after Acid Immersion)	113

LIST OF FIGURES

FIGURE NO	TITLE	PAGE NO
2.1	Methodology of Total Investigation	28
3.1	Material used in Geopolymer Concrete	34
3.2	Preparation of Geopolymer Concrete	35
3.3	Dry Mixing of Materials	36
3.4	Fresh Geopolymer Concrete	36
3.5	Specimen After Curing	37
3.6	Oven Curing	38
4.1	Flow Chart for Experimental Process	42
4.2	Compressive Strength Testing	44
4.3	Split Tensile Test for Cylinder	46
4.4	Geometry of Beam Specimen	46
4.5	Experimental Setup for Flexural Test	48
4.6	Brick Masonry Prism	52
4.7	Geopolymer Brick Prism	53
4.8	Sample Specimens of Cylinder	53
4.9	Sample Specimens of Cube	53
4.10	Sample Specimens of Hollow block	54
4.11	Sample Specimensof Geopolymer Brick	54
4.12	English Bond Prism of Dimension 609 x 220 x 609 mm for aspect ratio of $h/t = 2.77$.	57
4.13	English Bond Prism of Dimension 609 x 220 x 914 mm for aspect ratio of $h/t = 4.3$.	57
5.1	Development of Compressive Strength of GPC Solid Block for Curing at 30°C	63
5.2	Development of Compressive Strength of GPC Solid Blocks for Curing at 60°C	63

FIGURE NO	TITLE	PAGE NO
5.3	Comparison of Compressive Strength	64
5.4	Development of Split Tensile Strength of GPC Solid Block for Curing at 30°C	66
5.5	Development of Split Tensile Strength for GPC Solid Block for Curing at 60°C	67
5.6	Comparison of Split Tensile Strength for GPC Solid Block.	67
5.7	Development of Flexural Strength for GPC Solid Block at 30°C	68
5.8	Development of Compressive Strength for GPC Hollow Block for Curing at 30°C	71
5.9	Development of Compressive Strength for GPC Hollow Block for Curing at 60°C	71
5.10	Comparison of Compressive Strength Value of GPC Hollow Block	72
5.11	Development of Split Tensile Strength for GPC Hollow Block for Curing at 30°C	74
5.12	Development of Split Tensile Strength for GPC Hollow Block for Curing at 60°C	75
5.13	Comparison of Split Tensile Strength for GPC Hollow Block	75
5.14	Percentage of Water Absorption for Specimen Cured at 30°C	78
5.15	Percentage of Water Absorption for Specimen Cured at 60°C	79
5.16	Comparison of Percentage of Water Absorption	79
5.17	Performance of Specimen after Immersion in H ₂ SO ₄	80
5.18	Percentage Weight loss for Specimen Cured at 30°C	83
5.19	Percentage Weight Loss for Specimen Cured at 60°C	84
5.20	Percentage Loss in Residual Compressive Strength for Specimen Cured at 30°C	87

FIGURE NO	TITLE	PAGE NO
5.21	Percentage Loss in Residual Compressive Strength for Specimen Cured at 60°C	87
5.22	Percentage Loss in Residual Split Tensile Strength for Specimen Cured at 30°C	90
5.23	Percentage Loss in Residual Split Tensile Strength for Specimen Cured at 60°C	91
5.24	Variation of pH Value	92
5.25	Stress- Strain Curve for Clay Brick Prism	93
5.26	Variation of Modulus of Elasticity for Clay Brick Prism	93
5.27	Stress- Strain Curve for GBP (M1) Prism with 10M	95
5.28	Stress- Strain Curve for GBP (M1) Prism with 12M	95
5.29	Variation of Modulus of Elasticity for GBP (M1) Prism with 10M	96
5.30	Variation of Modulus of Elasticity for GBP (M1) Prism with 12M	96
5.31	Stress- Strain Curve for GBP (M2) Prism with 10M	97
5.32	Stress- Strain Curve for GBP (M2) Prism with 12M	98
5.33	Variation of Modulus of Elasticity for GBP (M2) Prism with 10M	98
5.34	Variation of Modulus of Elasticity for GBP (M2) Prism with 12M	99
5.35	Comparison of Axial Strength of Brick Masonry Prism	99
5.36	Modulus of Elasticity for Clay Brick Prism (CBP)	102
5.37	Modulus of Elasticity for GBP (M1)	104
5.38	Modulus of Elasticity for GBP (M2)	106
5.39	Equivalent Homogenized Elastic Modulus of Brick Masonry	110