CERTIFICATE

This is to certify that the thesis entitled **"EFFECT OF TEMPERATURE ON STRENGTH & STRESS-STRAIN RELATIONSHIP FOR THE HIGHER GRADE OF CONCRETE**" by **Vivek Kr. Singh**, University Roll No. 9086, College Roll No. 12/str/09 in partial fulfilment of the requirement for the award of the degree of Master of Engineering in Structural Engineering, Delhi College of Engineering, Delhi, is an authentic. The work is being carried out by him under our guidance and supervision in the academic year 2010-2011. This is to our knowledge has reached requisite standards.

Also, I do hereby state that I have not submitted the matter embodied in this thesis for the award of any degree.

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ABSTRACT

The structural elements subjected to high temperatures lead to significant losses due to the reduction in the strength of the concrete. In this study it is observed that strength reduction occurs in concrete on rising the temperature. For use in fire resistance calculations, the relevant thermal properties of high strength concrete were determined as a function of temperature.

A number of compressive & tensile strength tests were conducted to examine the strength variation & stress-strain relationship due to rise in temperature on concrete. Tests were conducted at various temperatures (27 ℃, 100 ℃ & 200°C) for 1hour. Three types of concrete mix were taken (M30, M40, M50) respectively. The results of a study on the influence of temperature on the compressive & tensile strength of concrete are evaluated. Stress-strain relationships were also studied at different temperature. The variation of temperature on concrete samples shows changes in various properties of concrete. The behaviour of concrete in fire is not well defined at present, and further research is required. The response of concrete material to heating is fundamentally complex.

TABLE OF CONTENTS

CERTIFICATE		**i**
ACKNOWLEDGEMENT		**ii**
ABSTRACT		**iii**
TABLE OF CONTENTS		**iv**
LIST OF SYMBOLS		**vi**
LIST OF TABLES		**vii**
LIST OF FIGURES		**viii**
Chapter 1.	**INTRODUCTION**	
1.1.	GENERAL	1
1.2.	OBJECTIVE OF THE WORK	2
1.3.	OVERVIEW	3
Chapter 2.	**LITERATURE REVIEW**	4
Chapter 3.	**THERMAL PROPERTIES**	
3.1.	DEFINITION	9
3.2.	TYPES OF THERMAL PROPERTIES	9
Chapter 4.	**TEMPERATURE EFFECT ON CONCRETE**	
4.1	HOT WEATHER CONCRETING	12
4.2.	INFLUNCE OF EARLY TEMPERATURE ON STRENGTH OF CONCRETE	15

Chapter 5. MIX DESIGN

5.1. INTRODUCTION 18

5.2. TYPES OF MIXES 19

5.3. IS RECOMMENDATION OF CONCRETE MIX DESIGN (IS: 10262 – 2009) 20

5.4. M30 MIX DESIGN PROPORTIONING 27

5.5. TEST PROCEDURE 30

Chapter 6. RESULT & DISCUSSIONS

6.1. STRENGTH CALCULATIONS ON CUBICAL SPECIMENS 32

6.2. STRENGTH CALCULATIONS ON CYLINDRICAL SPECIMENS 36

6.3. STRESS-STRAIN RELATIONSHIP 39

Chapter 7. CONCLUSIONS 47

Chapter 8. SCOPE OF FUTURE WORK 48

REFERENCES 49

APPENDIX –A 51

APPENDIX –B 52

APPENDIX –C 54

LIST OF SYMBOLS

δ - Diffusivity

K - Conductivity

c - Specific heat of concrete

ρ - Density of concrete

V - Absolute volume of concrete

S_c - Specific gravity of cement

W - Mass of water per cubic metre of concrete, kg

C - Mass of cement per cubic metre of concrete, kg

P - Ratio of fine aggregate to total aggregate by absolute volume

f_a - Total masses of fine aggregates, per cubic metre of concrete

C_a - Total masses of coarse aggregates, per cubic metre of concrete

S_{fa} - Specific gravities of saturated surface dry fine aggregates

S_{ca} - Specific gravities of saturated surface dry coarse aggregates

S - Standard deviation

f_{ck} - Characteristics strength of concrete, N/mm^2

f_t - Target mean strength of mix design

LIST OF TABLES

TITLE	PAGE NO.
Table 3.1**:** Coefficient of Thermal Expansion of Concrete at High Temperature	10
Table 3.2: Typical values of Thermal Conductivity of Concrete made with different Aggregates	11
Table 5.1: Assumed Standard Deviation as per IS456 – 2000	21
Table 5.2: Maximum Water Content per cubic metre of Concrete for Nominal Maximum size of Aggregate	22
Table 5.3: Approximate Entrapped Air Content	22
Table 5.4: Volume of Coarse Aggregate per unit Volume of Total aggregate for Different Zones of Fine Aggregate	23
Table 5.5: Observation Sheet for Sieve Analysis	26
Table 5.6: Mix Design M30 details	27
Table A1: Observation sheet of Compressive Strength of M30 mix	52
Table A2: Observation sheet of Compressive Strength of M40 mix	52
Table A3: Observation sheet of Compressive Strength of M50 mix	52
Table B1: Observation sheet of Tensile Strength of M30 mix	53
Table B2: Observation sheet of Compressive Strength of M30 mix	53
Table B3: Observation sheet of Compressive Strength of M40 mix	54
Table C1: Observation Table for Test conduct at 27℃	55
Table C2: Observation Table for Test conduct at 100℃	56
Table C3: Observation Table for Test conduct at 200℃	57

LIST OF FIGURES

TITLE	PAGE NO.
Fig 1.1: Flow chart showing the overview of the Project work	3
Fig 4.1: Effect of curing temperatures on 1-day and 28-day Compressive strength of concrete	13
Fig 4.2: Effect of temperature during the first two hours after casting on the development of strength (all specimens sealed and after the age of 2 hours cured at 21℃	16
Fig 4.3: Typical values of strength of concrete made with modified cement and a water/cement ratio of 0.55; steam curing was applied immediately after casting.	17
Fig 5.1: Grading curves for fine aggregate	27
Fig 6.1: Variation of compressive strength of cube of M30 mix	33
Fig 6.2: Variation of compressive strength of cube of M40 mix	34
Fig 6.3: Variation of compressive strength of cube of M50 mix	35
Fig 6.4: Variation of tensile strength of cylinder of M30 mix	37
Fig 6.5: Variation of compressive strength of cylinder of M30 mix	38
Fig 6.6: Variation of compressive strength of cylinder of M40 mix	39
Fig 6.7: Stress-strain relationship of cement paste, concrete & aggregate	39
Fig 6.8: Combined Stress-strain relationship of M30 mix tested on 27, 100 & 200℃	46