GUIDELINES
FOR PREPARATION AND SUBMISSION
OF B.E PROJECT

ANNAMALAI UNIVERSITY
Annamalainagar – 608 002,
Month, 2016

ARRANGEMENT OF PARTS OF A PROJECT

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INSIDE COVER PAGE

CERTIFICATE

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B.E PROJECT FORMAT GUIDELINES
For
ENGINEERING / PHARMACY

B.E Project format is designed to provide the student with the formatting requirements for their thesis reports. It covers structure, layout, form, and style.

1. GENERAL:

The guidelines for the preparation of B.E Project are outlined below. In general, the B.E Project shall have, in an organized fashion, an account of original work of the B.E scholar leading to the discovery of new facts or techniques or correlation of facts already known (analytical, experimental, hardware oriented etc) and demonstrating a quality so as to make a definite contribution to the advancement of knowledge.

2. ARRANGEMENT OF CONTENTS:

The sequence in which the B.E Project arranged and bound shall be as follows:

1. **Cover page:** includes the title, author, degree ("A Project Report submitted by **STUDENT NAMES (REG.NO.)** for the award of the degree of "**BACHELOR OF ENGINEERING**, Department, university, and month and date. A specimen copy of the cover page is given in **Annexure 1**
2. **Certificate Page**: The Bonafide Certificate shall be in double line spacing using Font Style Times New Roman and Font Size 12, as per the format given in **Annexure 2.**

   The certificate shall carry the Guide signature and shall be followed by the Guide name, academic designation, department and full address of the institution where the Guide has guided the student. In case main and co-guides are present, Use co-Guide below the guide.
3. **Acknowledgments page:** This should not exceed two pages
4. **Dedication page** (optional): This should not exceed one page
5. **Abstract:** a concise summary of the essential information of the work being presented, namely of the study's scope, purpose and results. The reference-free single spaced abstract should not exceed two pages (not more than 600 words) and should contain not more than 6 key words. Refer **Annexure 3.**
6. **Table of Contents:** It includes all the subsections of each chapter and the list of appendices (if applicable) and page numbers. The table of contents should list all materials following it as well as any material which precedes it. The title page and Bonafide Certificate will not find a place among the items listed in the Table of

Contents but the page numbers of which are in lower case Roman letters. One and a half spacing should be adopted for typing the matter under this head. A specimen copy of the Table of Contents is given in **Annexure 4.**

7. **List of Tables:** The list should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head. It includes table number, caption, and the page number. Refer **Annexure 5.**
8. **List of Figures:** The list should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head. Its include figure number, caption, and the page number. Refer **Annexure 6.**
9. **List of Abbreviations:** Refer **Annexure 7.**
10. **List of Notations:** Refer **Annexure 8.**
11. **Thesis text:** the layout is described in the next section. The table and figures shall be introduced in the appropriate places. Refer **Annexure 9.**
12. **Appendices** – Appendices are provided to give supplementary information, which is included in the main text may serve as a distraction and cloud the central theme.
    - Appendices should be numbered using Arabic numerals, e.g. Appendix 1, Appendix 2, etc.
    - Appendices, Tables and References appearing in appendices should be numbered and referred to at appropriate places just as in the case of chapters.
    - Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.
13. **List of References** –The listing of references should be typed 4 spaces below the heading "REFERENCES" in alphabetical order in single spacing left – justified. The reference material should be listed in the alphabetical order of the first author. The name of the author/authors should be immediately followed by the year and other details. A typical illustrative list given below relates to the citation example quoted above.

The **References** shall be in one and half line spacing using Font Style Times New Roman and Font Size 12, as per the format in **Annexure 10.**

3. THESIS FRAMEWORK

This information is offered as a general guideline. B.E students should always consult their advisor for additional guidelines.

1. *Introduction:* background; statement of the problem; definition of terms; purpose of the study; theoretical basis; contributions of the study; organization of the remainder of the study.
2. *Past Studies/Literature Review*: chronological, categorical or related theoretical viewpoints related to topic.
3. *Methodology:* research design or approach (quantitative, qualitative or algorithmic); population and / or sample; collection and tabulation of data; and data analysis procedures.
4. *Analysis of the Data:* presentation and discussion of the findings, including limitations.
5. *Conclusions, Recommendations:* summarizes the entire research effort; addresses the initial purpose of the study (stated in the introduction); stresses the importance of the work accomplished; leaves a final impression on the reader. It can also include suggestions for further work.
6. *Bibliography/References:* references should acknowledge any work done by someone other than the author. The reference should also include work performed by the author if presented or published at an earlier date.
7. *Appendices:* material too detailed or lengthy for inclusion in the body of the study (e.g. questionnaires, maps). Appendices may also contain information that might clarify the thesis but is routine in nature or indirectly related to the thesis. Raw data and examples of calculation could be incorporated.

4. SPECIFICATIONS FOR PROJECT FORMAT

4.1 Preparation of Manuscript and Copies

The Project Report needs to be prepared using a standard text processing software and must be printed in black colour text (colour for images, if necessary) using a laser printer or letter quality printer in standard typeface (Times New Roman).

The thesis must be printed or photocopied on both sides of A4 size white paper. All copies of thesis pages must be clear, sharp and even, with uniform size and uniformly spaced characters, lines and margins on every page of good quality white paper of 80 gsm. Thesis should be free from typographical errors.

4.2 Paper: Use high-quality acid-free A4-size paper.

4.3 Page Dimensions and Margin:

The dimensions of the thesis should be 290 mm × 205 mm. Standard A4 size (297mm × 210mm) paper may be used for preparing the copies.

The Report /Thesis (at the time of submission) should have the following page margins:

Top edge:	25.4 mm (1.0 in)
Bottom edge:	17 mm (0.67 in)
Left side:	31.7 mm (1.25 in)
Right side:	31.7 mm (1.25 in)

Please note that the bottom of the page numbers should be 17.0 mm above the bottom edge of the numbered pages.

Tables and figures should conform to the margin specifications. Large size figures should be photographically or otherwise reduced to the appropriate size before insertion.

4.3 Size

In disciplines where section numbering is normally used, the following guidelines apply:

- Chapter title: 14pt size, bold.
- Main Section Headings: can be numbered as chapter-number. Section-number (e.g., 3.2 for chapter 3, section 2) in 12pt size, bold.
- Second Headings: can be numbered as x.y.z (e.g., 3.2.4 for chapter 3, section 2, sub section 4) in 12 pt size, bold. Avoid numbering beyond.
- First Subheadings: preferably unnumbered, 12 pt, italics, under lined

4.4 Page Numbering

The page numbering starts from acknowledgement to the first Chapter and should be printed using small roman letters i.e i, ii, iii, iv,v, .. . Refer **Annexure 4.**

The page numbering starts from first Chapter onwards and it should be printed using Arabic numerals i.e 1, 2, 3, 4, 5,..

The page numbers should be located at the bottom centre of each page, 17mm (2/3") from the bottom edge using normal print

Beginning with the first page of the text in the thesis (chapter 1), all pages should be numbered consecutively and consistently in Arabic numerals through the appendices.

Page numbers prior to Chapter 1 should be in lower case Roman numerals.

The title page is considered to be page (i) but the number is not printed.

All page numbers should be placed without punctuation in the bottom centre of the page.

4.4 Line Spacing

One and a half spacing is required for the text. Only footnotes, long quotations, bibliography entries (double space between entries), table captions, and similar special material may be single spaced.

Use **double spacing** between the lines. Use **triple spacing** between the paragraphs. All paragraphs in the thesis should be left justified completely, from the first line to the last line. Use **double spacing** between the regular text and quotations.

Provide three line spaces (preferably 12pts, Times New Roman) between:

(a) Chapter title and first sentence of a chapter.
(b) Last line of a section / sub-section and the title of the next section/ sub-section.
(c) Paragraphs.

Use single spacing:

(a) in footnotes and endnotes for text,
(b) in explanatory notes for tables and figures.
(c) in text corresponding to bullets, listings, and quotations in the main body of the thesis.

Use **single space** in references and **double space** between references.

Justification **:** The text should be fully justified.

Hyphenation should be avoided as far as possible.

Quotations from other research work must be indented on the left and the right. if they are longer than two lines. Shorter quotations can be included as a part of the text.

widows & Orphans: At the bottom of a page, a paragraph should have atleast two lines. Similarly at the top of a page. a paragraph should end with atleast two lines

4.6 Tables

A sample for tables is provided in annexure 11. All tables should have sharp lines, drawn in black ink, to separate row/ column as and when necessary.

Tables should follow immediately after they are reflected to for the first time in the text. Spitting of paragraphs, for including tables on the page, should be avoided. Provide three spaces on the top and the bottom of all tables to separate them from the regular text ,wherever applicable. See annexure 11 for an example.

The last line of the title of any table should be 10 mm or 15 mm above the top most horizontal line of the table, and the title should be centered with respect to the table. The title must be in the same font as the regular text and should be single-spaced. The title format is given below:

Table<blank><chapter number><serial number><left indent><table title>

Table 2.1

Percentage of samples with discretized priority vector rankings different from original priority vector ranking. Results of the simulation experiment. The contents of the table will be within the surrounding double line (which indicates the top-most, left-most, right-most, and bottom-most boundaries of the table). Wherever a table exceeds one page present the full title of the table on the first page and in the following pages provide the table number and state "(contd.)" after it.

Example : (notice the left justification)

Table 5.7 (contd.)

Wherever explanatory notes are used for clarifying any information presented inside the tables. Print them after leaving a single space immediately below the tables. All tables in landscape format must be placed such that their top portions are near the binding of the thesis and their bottom portions near the outer edge.

If tables are of only half a page or less, they may appear on the same page as text but separated above and below by triple line spacing. Font size for text should be the same as for the general text.

4.7 Figures

Smple figures age given in Annexure 11. All figures, drawings, and graphs should be drawn in the blank ink with sharp lines and adequate contrast between different plots if more than one plot is present in the same graph. Figures should follow immediately after it is referred to for the first time in the text. Splitting of paragraphs, for including figures on the page, should be avoided. Provide three spaces on the top and bottom of all figures to separate them from the regular text, wherever applicable. See Annexure 11 for an example.

The first line of the title for figures, drawings, graphs and photos should be between 10 mm and 15 mm below the bottom and they should be centered with respect to the figure. The title must be in the same font as the regular text and should be single-spaced. The titled format is given below:

Fig.<blank><chapter number><serial number><left indent><figure title>.

Example : **Fig. 6.2 Bending Moment Diagram in Nm**

Wherever a figure exceeds one page (as in the case of large flow charts for computer programs) present the full title of the figure on the first page and in the following pages provided in the figure number and state"(contd.)" after it.
Example: (notice the left justification)

Fig 4.23 (Contd.)

When there are many plots in a single graph or figure, the lettering, labelling or numbering of each plot for its identification should be of a size such that even after size reduction in the thesis, the identification should be clearly legible. All figures in landscape format must be placed such that their top portion are near the binding of the thesis and their bottom portions near the outer edge.

If figures are of only half a page or less, they may appear on the same page as text but separated above and below by triple line spacing. Font size for text should be the same as for the general text.

4.8 Equations

All equations typed using equation editor wherever possible, on the same paper used to type the text and conform to the specifications outlined earlier. It should be inserted as close to the textual reference as possible.

All equations should be numbered sequentially either throughout the thesis or chapter-wise using Arabic numerals. They are referred to in the body of the text capitalizing the first letter of the word and number, as for instance, Equation (33), or Equation (4.16), etc. Font size for text should be the same as for the general text. All variables should be typed in italics including super and subscripts but not the symbols and numbers.

$$\Delta_i = \Delta_{i-1} + \theta_{i-1}(x_i - x_{i-1}) - \frac{1}{2}\phi_{i-1}(x_i - x_{i-1})^2 \tag{4.1}$$

$$\phi_i = f(M_i, P) \tag{4.2}$$

$$P_{uR} = C_c + C_F = af_{ck}bD + \sum_{i=1}^{n}\left(f_{fi} - f_{ci}\right)A_{fi} \tag{4.3}$$

4.9 Photos

Use colour photos only if they are necessary. Remember that the thesis may have to be photocopied. In case colour photos are used, all copies of the thesis must contain only colour photos. Photos should be printed on A4 size paper. Each photo should be numbered and referred inside the text atleast once.

4.10 Drawings

Drawing which are larger than A4 size are not encouraged, if larger drawing are absolutely necessary they may be suitably folded to A4 size in the thesis. (Take care to reduce the sizes when A5 form of the thesis is prepared). Each drawing should be numbered and referred to as figure. Drawing titles should be similar to those provided for figures.

Good quality Line Drawings/figures must be drawn using standard software that provides vector rather than bit-map graphics. Figures must be scalable. *Images, Photographs, etc*. must be scanned in resolution exceeding 200dpi with 256.

4.11 Footnotes

In presenting footnotes and reference use a consistent form acceptable in your discipline. See annexure 11 for a sample.

4.12 Punctuation

Please refer to any standard style manual such as the *Chicago Manual of style*. Where rules of punctuation are clarified. The research scholar must note that different styles are in practice now a days. For example, some people insert a full stop before ending a sentence in double quotes. Where as other insert the full stop after the double quotes. Both style are in practice. The *Chicago Manual of style.* Prentice- Hall of India, New Delhi, 1989.

Insert a comma wherever there would be a slight pause between words or phrases in the spoken sentence.

- Insert a semicolon between two parts of a sentence; the proviso is that both parts must be able to stand alone as separate sentences.
- Use a colon to introduce an explanation or an example of something: here is an example. If there are several simple explanations or examples, separate them with commas; otherwise, use semicolons.
- Avoid excessive use of parentheses ( ). Use them to make an aside (an extra remark) only if commas could be confusing. Never use parentheses within parentheses: find another way of saying it.
- Use brackets [ ] for material inserted into a quotation and ellipsis (three dots) for material omitted: According to Smith (1999), "few such [descriptive] studies were done… before 1950."
- Use dashes--two hyphens with no spaces anywhere--for emphatic asides.
- Use one or two spaces after a period, colon, or semicolon. Note, though, that Web browsers delete more than one space unless you make them non-breaking spaces.
- Use double quotation marks (") for speech and verbatim quotations.
- If a quotation is long, type it as an indented block of text without quotation marks, as shown in this example:
  According to Smith (1982)...
  The "newbie effect" disappeared when behaviors were studied in this manner. Examples of methods included indirect observation, self-reports, and retrospective questionnaires. (p. 276)

- Use double quotation marks the first time you introduce a newly coined or slang term; do not use quotation marks thereafter.
- Don't use "smart quotes" (66 and 99), because they create problems when translated into Web documents.
- Use single quotation marks (') for quotes within quotes.
- Use the apostrophe (') to denote possession:
  an athlete's responses, two athletes' responses.
  But note that *its = of it*, whereas *it's = it is*.
- Put commas, semicolons, colons, and periods outside closing quotation marks: "this", for example, but not "this," or "this." Exception: "If the quotation ends in a complete sentence, the period is part of the quote and should therefore go inside the quotation marks, like this." [APA: all punctuation goes within the quotation marks.]
- Use of *and/or* instead of *or* is acceptable when you want to emphasize *either or both*.
- The forward slash (/) can be used instead of *or* in sentences that are already replete with *and*s and/or *or*s.

- Use Title Case (initial upper-case letters for words of four or more letters) in:
    - the title and subheadings of your article;
    - titles of journals;
    - titles of books or articles in the text, but not in the reference list;
    - proper nouns, including trade names (Wilks's lambda, Aspro, the Web and a Web site, but not in a website);
    - names of experiments (the Slump Cone Test);
    - nouns followed by numbers (on Day 2, in Group B) but not in the control group;
    - names of institutional departments (Department of Sport Science, University of Wherever), but not of disciplines (a department of sport science);
    - references to sections of the article (in the Methods section; see Results; in Figure 1; in Table 2; see Appendix 3; in Chapter 4).

5 Binding

Thesis should be bound using flexible cover of thick white art paper. The cover should be printed in **black colour** and the text for printing should be identical as prescribed for the cover page. Pages are secured with glue and then covered using black book cloth

ANALYSIS AND DESIGN OF MULTISTOREIED SHOPPING COMPLEX

A PROJECT REPORT

Submitted by

S. PARTHIBAN (REG. NO. 111020895)

in partial fulfillment of the requirements
for the award of the degree of

BACHELOR OF ENGINEERING
(CIVIL AND STRUCTURAL ENGINEERING)

DEPARTMENT OF CIVIL & STRUCTURAL ENGINEERING
FACULTY OF ENGINEERING & TECHNOLOGY
ANNAMALAI UNIVERSITY
ANNAMALAI NAGAR - 608 002

APRIL 2018

CERTIFICATE

This is to certify that the project entitled **ANALYSIS AND DESIGN OF MULTISTORIED SHOPPING COMPLEX** submitted by **S. PARTHIBAN (Reg.No:111020895)** to the Annamalai University, Annamalai Nagar, for the award of the degree of Bachelor of Engineering in Civil and Structural Engineering is a bonafide record of project work done by him/her under my supervision during the academic year 2017-18. The contents of this thesis, in full or in parts, have not been submitted to any other Institute or University for the award of any Degree or Diploma.

Project Guide

Dr. J. SARAVANAN
Assistant Professor
Dept. of Civil and Structural Engg.

Dr. P.N. RAGHUNATH
Professor and Head
Dept. of Civil and Structural Engg.

Internal Examiner

External Examiner

Place:

Date:

Annexure 3

ABSTRACT OF PROJECT WORK

Reinforced Cement Concrete (RCC) structure is a vital constituent of the modern society. RCC structures are now being used in increasing numbers all over the world, including India. The prescribed simplified analysis methods of RCC structure with soft storey world-wide, including in India, continue to be based on approximate modelling, analysis and heuristically assumed safety factors. The aim of the present project work is to assess the prevailing analytical procedures of RCC structure with soft storey on the basis of more rigorous modelling and analysis using ETabs Software, and to make improved recommendations for more rational design.

KEY WORDS: Reinforced Cement Concrete, Simplified Analysis, Dynamic analysis, Analytical Procedures, ETabs Software, Rational design**.**

A **soft story building** is a multi-story building in which one or more floors have windows, wide doors, large unobstructed commercial spaces, or other openings in places where a shear wall would normally be required for stability as a matter of earthquake engineering design. A typical soft story building is an apartment building of three or more stories located over a ground level with large openings, such as a parking garage or series of retail businesses with large windows. Soft story partial collapse due to inadequate shear strength at ground level, Loma Prieta earthquake Buildings are classified as having a "soft story" if that level is less than 70% as stiff as the floor immediately above it, or less than 80% as stiff as the average stiffness of the three floors above it.Soft story buildings are vulnerable to collapse in a moderate to severe earthquake in a phenomenon known as **soft story collapse**.[5]The inadequately-braced level is relatively less resistant than surrounding floors to lateral earthquake motion, so a disproportionate amount of the building's overall side-to-side drift is focused on that floor. Subject to disproportionate lateral stress, and less able to withstand the stress, the floor becomes a weak point that may suffer structural damage or complete failure, which in turn results in the collapse of the entire building. Soft story failure was responsible for nearly half of all homes that became uninhabitable in California's Loma Prieta earthquake of 1989, and was projected to cause severe damage and possible destruction of 160,000 homes in the event of a more significant earthquake in the San Francisco Bay Area, California. As of 2009 few such buildings in the area had undergone the relatively inexpensive seismic retrofit to correct the condition. In 2013, San Francisco mandated screening of soft story buildings to determine if retrofitting is necessary, and required that retrofitting be completed by 2017 through 2020.

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ANNEXURE 7

ABBREVIATIONS

The student must take utmost care in the use of technical abbreviations. For example, "KM" stands for "Kelvin mega" and not kilometre (Which should be abbreviated as km) and "gms" stands for "grams meter second" and not "grams" (Which should be abbreviated as g). In addition, abbreviations pertaining to any specific discipline should be listed in alphabetical order as shown below.

AVP	Average Vertical Profile
AREA	American Railway Engineering Association
B.G	Broad Gauge
FEA	Finite Element Analysis
FEMAP	Finite Element Modelling and Preprocessor
FORM	First Order Reliability Method
HT	High Strength Steel
IS	Indian Standards
kN	Kilo Newton
M.G	Meter Gauge
MPa	Mega Pascal
MSC	MacNeal Schwendler Corporation
NASTRAN	NASA Structural Analysis Program
ORE	Office for Research and Experiments of the International Union of Railways

ANNEXURE 8

NOTATIONS

The student must explain the meaning of special symbols and rotations used in the thesis. Define English symbols, and Miscellaneous symbols seperately. Some examples are presented below. Use italics for all sub and super srcits expect numerals.

English Symbols (in alphabetical order)

a	the mean radius of the Earth = 6.37×10^6 m
a_n	a series of expansion coefficients with index *n*
A_e	total fractional area coverage by clouds
b_e, b_o	regression coefficients for eccentricity and obliquity
B_e	equilibrium Bowen ration
B_r (T)	Planck's blackbody emission at frequency v and temperature T
Q_{abr}	absorption coefficient

Greek Symbols

α_s	albedo of bare ground
β_E	ratio of evapotranspiration to potential evaporation
ΔF_{ao}	the divergence of the horizontal transport of energy by the atmosphere and ocean
σ(x)	the standard deviation of x
ψ_{sf}	meridional mass stream function

Miscellaneous Symbols

$\lvert x \rvert$	absolute value of x
‰	per thousand

CHAPTER 1
INTRODUCTION

1.1 GENERAL

1.2 HISTORICAL REVIEW

1.2.1 Types of Analyses

Sub classifications

.
.
.

1.8 ORGANIZATION OF PROJECT

The Project is organized as follows

Chapter 1 covers the general introduction to the development of Fibres materials.

Chapter 2 reports a detailed literature review on the basic properties of Fibres

Chapter 3 describes the experimental study

Chapter 4 introduces the detailed Finite Element Modelling

Chapter 5 summarizes the final conclusions.

1.9 SUMMARY

CHAPTER 2
LITERATURE REVIEW

2.1 GENERAL

2.2 HISTORICAL REVIEW

2.2.1 Types of Analyses

Sub classifications

2.4 SUMMARY

ANNEXURE 10

REFERENCES

To cite sources in the text, use the author-date method; list the last names of the authors, then the year. The formats are as follows: one author—(Smith 2004); two authors—(Smith and Jones 2004); three or more authors—(Smith *et al*. 2004). Prepare a reference section listing all references alphabetically by last name of the first author. For anonymous reports and standards, alphabetize by the issuing institution. Double-space the reference section. Below are samples of properly formatted and complete references:

For papers by single author:

<S.No>. Prakhya, G.K.V. (2001) *Tension Stiffening and Moment-Curvature Relations of Reinforced Concrete Elements*, Journal of Structural Engineering, Vol. 87, Sept.–Oct., pp 597–602.

For papers by single author in the same year:

<S.No>. Prakhya, G.K.V. (2002a) Ductile Beam column connections for Prestressed Concrete Elements, Journal of Structural Engineering, Vol. 87, Sept.–Oct., pp 597–602.

<S.No>. Prakhya, G.K.V. (2002b) *Tension Stiffening and Moment-Curvature Relations of Reinforced Concrete Elements*, Journal of Structural Engineering, Vol.87, pp 597–602.

For papers by two authors:

<S.No>. Gergely, P. and Lutz, L.A (2001) *Maximum Crack Width in Reinforced Concrete Flexural Members*, Causes, Mechanism, and Control of Cracking in Concrete, (SP–20), Journal of Structural Engineering, Vol.6, pp 87–117.

For papers with more than two authors:

<S.No>. **Ahmed El-sayed, Ehab EI – Salakawy and Brahim Benmokrane** (2005) Shear strength of one way concrete slabs reinforced with fiber reinforced polymer composite bars, *Journal of composites for construction*, Vol.9(2), pp.147-157.

For books :

<S.NO.> **Popov, E.P**., *Mechanics of Materials*, Second edition, Prentice Hall Inc., Englewood Cliffs, New Jersey, 1978.

For articals in edited books/volumes:

<S.NO.> **Pimental. D.** *Energy Flow in agroeco systems.* pp. 121-132 *In* **R.Lowrance, B.R. Stinner,** and **G.J. Horse** (eds) *Agricultura ecosystems*, John Wiley, Somerset, New Jersey, 1984.

For papers present at conferences:

<S.NO > **Bakis,C.E., Freimanis,.J., Gremel,D. and Nanni,A (**1998) Effect of resin material on Bond and tensile properties of unconditioned and conditioned FRP reinforced rods, *Proceedings of 1st International conference on durability of Fibre Reinforced Polymer* (FRP) *Composites for Construction*, Sherbrooke, August, 525-535.

Standards and codes:

<S.NO > ACI Committee 435, *Deflections of Reinforced Concrete Flexural Members*, Journal ACI, Vol. 63, No. 6, June 1966, pp 637–674.

ASTM-D 3916-84, *Standard Test Methods for Tensile properties of Pultruded Glass-Fibre Reinforced Plastic Rod*.

<S.NO > *Building Code Requirements for Reinforced Concrete*, ACI Standard 318–89, Am. Conc. Inst., Detroit, Michigan, USA, 1989.

<S.NO > CSA Standard CAN – A23.3 – M84 — *Design of Concrete Structures for Buildings*, Canadian Standards Association, Rexdale, Ontario, 1984.

<S.NO > *Design Aids (for Reinforced Concrete) to IS 456* : *1978*, Special Publication SP:16, Bureau of Indian Standards, New Delhi, 1980.

Unpublished Material:

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Web Pages and On-line Material:

Burka, L. P. (2002). "A hypertext history of multiuser dimensions." MUD history, <http://www.ccs.neu.edu> (Dec. 5, 2003).

Include an author if possible, a copyright date, a title, the Web address, and the date the material was accessed or downloaded (in parentheses at the end).

CD-ROM:

Liggett, J. A., and Caughey, D. A. (1998). "Fluid statics." Fluid mechanics (CD-Rom), ASCE, Reston, Va. Include authors, copyright date, titles, medium, and producer/publisher and their location.

ANNEXURE 11

Table 3.1 Properties of Concrete

Material	M20 grade of concrete	M30 grade of concrete
Cement	62 kg	77 kg
Fine aggregate	80 kg	84.7 kg
Coarse aggregate	183 kg	204.82 kg
Water †	28 litres	31 litres
Average compressive strength	28 MPa	40 MPa

Fig.3.10 Torsion Testing Equipment

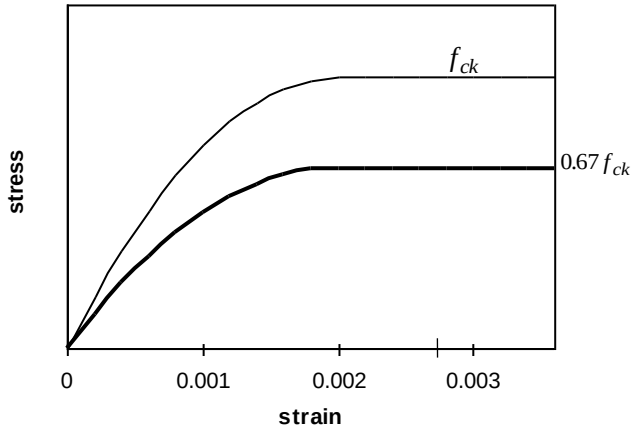

Fig. 5.1 Stress-strain Curve of Concrete in Flexural Compression

† Water standards as per IS