# Study on Improvement in Rates and Ratios used in Estimates of Gross Value Added Construction and Gross Fixed Capital Formation

**FINAL REPORT**

**Sponsored by :**
**Ministry of Statistics and Program Implementation, Central Statistics Office, National Accounts Division, Government of India, New Delhi**


**CSIR- Central Building Research Institute**
**Roorkee- 247667**

# PREFACE

Construction activity is one of the important indicators to know the economy of any Country. As India is developing, this shift places cities and towns at the centre of India's development path. In the coming decades, the urban sector will pay a critical role in the structural transformation of the Indian economy and in sustaining the high rates of economic growth. There has been tremendous construction activity and increase in the construction cost in India in the recent past and a huge amount is being spent in this sector.

The expenditure on construction activity plays a pivotal role in estimating the Gross Domestic Product as well as investment levels. The National Accounts Division of Central Statistics Office is responsible for compiling estimates of Gross Value Added (GVA) construction and related macro-economic aggregates for the country. In the estimation of the GVA from Construction sector and Gross Fixed Capital Formation from construction, machinery and equipment through commodity flow approach, various rates and ratios are used. The main rates and ratios used in the estimation of total value of construction output are the proportions of various materials and factor payments in the total cost involve in different typology of construction. There are number of other rates and ratios which are important in deciding the value of output of each component of basic materials such as: cement, steel, timber, bricks, sand, aggregates, etc.

This Report on the ***"Study on Improvement in Rates and Ratios used in the Estimates of Gross Value Added Construction and Gross Fixed Capital Formation"*** has been made possible with the assistance of many construction agencies both public and private in different regions of the country and a number of committed individuals. I would like to thank the Ministry of Statistics & Program Implementation, National Accounts Division, Central Statistics Office, government of India, New Delhi for sponsoring this study to CSIR-CBRI, Roorkee.

As I understand, the major thrust of this research work has been to study the different types of construction projects like residential and non-residential etc. constructed by both private and public sector agencies in eighty cities and towns covering almost all regions of the country ant to record variations in the cost of materials, labour and other items leading to cost of construction.

Reports like this one cannot be written without the collective efforts by a large number of individuals. I would like to take this opportunity to mention a few names. First of all, I would like to record a word of appreciation and thanks to Sh. Ashish Kumar, Director General, Ms. T. Rajeswari, ADG, Ms. Reena Singh, Director, and Mr. Vivek Srivastava, Assistant Director, Ministry of Statistics & Program Implementation, GoI for their valuable intellectual inputs given to the Project Team.

I would also like to thank Sh. Ashok Kumar, Project Leader for his untiring efforts to accomplish the huge task and appreciations to all the team members including project assistants, who have contributed to the project.

Prof. Yadvendra Pandey

Director, CSIR-CBRI, Roorkee

# ACKNOWLEDGEMENT

First and foremost, I am grateful to the almighty 'God' for giving me the perseverance, patience, strength, courage and guidance in the accomplishment of this research study.

This report is the result of collective efforts of a large group of people within and outside CSIR-CBRI to accomplish the goal and objectives of the project. The main focus has been to study different types of residential, non-residential, and other construction projects and roads/ bridges etc. built both by private as well as government construction agencies.

I would like to thank the Ministry of Statistics and Program Implementation, Government of India, New Delhi for sponsoring the research study to CSIR-CBRI, Roorkee. I am grateful to Sh. Ashish kumar, Director General for his inputs and guidance during formulation of the project and at different stages of the work. I am thankful to Ms.T. Rajeswari ADG, Ms. Reena Singh, Director, Sh. Vivek Srivastava, Assistant Director for their invaluable inputs and critical comments and suggestions during different stages of work. I am also thankful to the entire staff of the Ministry including the Accounts department for their kind support and cooperation.

I am grateful to Prof. S.K Bhattacharyya, Former Director, CSIR - CBRI for his continuous guidance. I am thankful to Sh.Y.Pandey, Acting Director for his encouragement throughout the study period. I express my gratitude to the staff of CSIR-CBRI, particularly Sh. R.K. Manjhiwal, FAO, Sh. Anil Kumar and Sh. A.K Saxena, AO, and their staff, S&PO and his team, Staff of PME & RPBD for their support and cooperation.

I wish to express my appreaciation to Co-Investigators, Major Contributors and the Project Assistants Mr. Yogendra Singh, Mr. Sachin Joshi, Ms. Seema Dhiman, Mr. Abhineet Godayal, Mr. Puspak Aggarwal, Mr. Sachin Kumar and the entire staff of Architecture & Planning particularly Vijay Deopa, Aditya, Rizwanul Hasan, Harpal Singh for their continuous support, cooperation and contribution to bring this research study report to this level.

I am also thankful to the PWD Officials of all the States, Construction Agencies, Private Contractors, for providing relevant information about different projects including Bill of Quantities (BoQs) and Schedule of Rates (SoRs).

Last but not the least; I am grateful to everyone who has directly or indirectly contributed to this project of National importance.

ASHOK KUMAR

Project Leader

# SUMMARY

This final report on the "Study on Improvement in Rates and Ratios used in the Estimates of Gross Value Added Construction and Gross Fixed Capital Formation", is a result of over eighteen months efforts on the part of the entire project team and particularly those who have worked hard during surveys for knowing the estimates, bill of quantities and construction cost of different projects both of private and government agencies and variations in the cost of materials, labour and hiring of machines for construction in 80 cities/ towns located in different regions of the country. The report has documented the nature of the construction being undertaken and challenges being faced in different geo-climatic regions.

As expected, a large variation was found in the rates of materials and cost of construction as well as labour costs in different parts of the country from Jammu, Udhampur, Lucknow, Shimla, Hamirpur, Chandigarh, Jalandhar, Pathankot, Rajpura etc. in the North and Chennai, Anantapur, Puducherry, Trivandrum, Hyderabad, Bangalore, Dharwad, etc. in the South to Gangtok, Itanagar, Jorhat, Shillong etc. in East and Jodhpur, Jaipur, Surat, Vadodara, Mumbai, Pune, Nagpur, Aurangabad etc. in West.

The results indicate that there is also a significant variation in the per square meter cost of construction in the government projects both state and central as compared to private sector, with same typology of construction and specifications. This is a clear indicator of deviation in construction cost between private and public sector construction agencies. Similarly, due to non-availability of burnt clay bricks, the recycled bricks (bricks & blocks from fly ash based and other industrial wastes as well as aerated concrete blocks) are being used in building construction. The percentage of such recycled bricks / blocks used in residential buildings is about 2-3% and about 5-6% for non- residential buildings (average about 4%). Also due to large scale construction activity, there is a shortage of conventional materials and therefore, people are going for alternatives. The percentage of these alternatives is likely to grow in the future. Its central message is that construction is an inevitable outcome of the faster rates of growth to which the economy has now transited.

The Final Report covers the broad contents of the survey in 5 Chapters and Annexure covers Tables showing Cost of materials in Residential Buildings, Non-Residential Buildings, Other Construction and Roads & Bridges along with their % distribution also the Tables showing consolidated cost of materials state wise. Survey Data Tables show the details of

quantity and amount in few surveyed projects. The brief details of the Chapters are given below.

The Chapter 1 covers the brief introduction, need of the study, objectives and scope of work and the methodology for data collection questionnaire with model BoQ (Bill of Quantities) used in carrying out the survey of buildings in 80 cities / towns. In Chapter 2, the material specifications and their constants are discussed along with an example of Ranchi city. Chapter 3 covers the list of cities/towns, both Phases I & II. The salient features of the survey covering a brief description of the projects, materials used and their quantities. The details of private and public sector projects surveyed along with their percentage, item-wise expenditure on different commodities such as materials, labor, machinery etc. both consolidated and item wise percentage in cities / towns and states. In Chapter 4, the statistical relationships, earlier developed by CSIR-CBRI, have been modified suiting to the present day cost of construction to predict the building economics. The Building Cost Index has been computed for both residential and non-residential buildings to explain the methodology and steps followed in the application of the statistical relationships. Similarly, the inferences drawn from the survey and analysis are included in Chapter 5 with an example of Ranchi city. The definitions and the broad terms used in the report are included at the end of the report.

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# ABBREVIATIONS

| | |
|---|---|
| Agg. | Aggregate |
| approx. | Approximately |
| BC | Bituminous Concrete |
| BCI | Building Cost Index |
| BoQ | Bill of Quantity |
| BM | Bituminous Macadam |
| CPWD | Central Public Works Department |
| Cum. | Cubic Meter |
| C.C. | Cement Concrete |
| CRBM | Cold Recycled Bound Material |
| C.M. | Cement Mortar |
| CMC | Construction Machinery Center |
| CSIR | Council of Scientific and Industrial Research |
| DPC | Damp Proof Course |
| DSR | Delhi Schedule of Rates |
| DS | Double Storey |
| D/W/V | Door/Window/Ventilator |
| ERW | Electric resistance welding |
| FDN | Foundation |
| G + 8 | Nine Storey (Ground + 8) |
| GDP | Gross Domestic Product |
| GFCF | Gross Fixed Capital Formation |
| GI | Galvanized Iron |
| GVA | Gross Value Added |
| Kg. | Kilogram |
| L.S. | Lump – Sum |
| Lt. | Liter |
| mm | millimeter |
| M/L | Material / Labour |
| M S | Mild Steel |
| MS | Multi Storey |
| Misc. | Miscellaneous |
| Mtr. | Meter |
| NR | Non Residential |
| N, NE NW | N=North, NE=North-East, NW=North-West |
| OPC | Ordinary Portland Cement |
| PMCS | Premix Carpet Surfacing |
| PPC | Portland Pozzolona Cement |
| PVC | Poly Vinyl Chloride |
| PWD | Public Works Department |
| R | Residential |
| RB | Reinforced Brick |
| R.B.C. | Reinforced Brick Concrete |
| R.C.C. | Reinforced Cement Concrete |
| REINF | Reinforcement |
| Rs. | Rupees |
| S, SE SW | S=South, SE=South-East, SW=South-West |
| SoR | Schedule of Rates |
| Sqm. | Square Meter |
| SRF | Surface |

# CHAPTER 1
# INTRODUCTION

## 1.0 Background

Construction activity is one of the important indicators to know the economy of the Country. Of late, there has been tremendous increase in the construction cost in India and huge amount is being spent in this sector. The expenditure on construction activity plays a pivotal role in estimating the Gross Domestic Product (GDP) as well as investment levels. The National Accounts Division of Central Statistics Office is responsible for compiling estimates of Gross Value Added (GVA) construction and related macro-economic aggregates for the country. In the estimation of the GVA from Construction Sector and Gross Fixed Capital Formation (GFCF) from construction, machinery and equipment through commodity flow approach, various rates and ratios are used. The main rates and ratios used in the estimation of total value of construction output are the proportions of various materials and factor payments in the total cost involved in pucca as well as kutcha construction.

To arrive at the rates and ratios for all construction works, the estimated cost of construction was known. ***In the estimates, the quantities of different items of work were calculated and from these quantities, the cost was calculated using prevailing market rates and Schedule of Rates of respective States and Union Territories and CPWD, DSR. Since, foundation is not exposed and invisible, hence, based on the drawings, specifications of materials used in the foundation, the costs have been worked out.*** The rates in the estimates provide for the complete work, which include the cost of materials, transport, labour, scaffolding, tools and plants, cost of water, taxes, establishment and supervision cost, reasonable profit of contractor etc.

The prices of buildings are primarily driven by the cost of construction. Construction costs form nearly 50% to 60% of the total selling price in low- income projects while for luxury projects this figure is 18% to 20%. There are number of other rates and ratios which are important in deciding the value of output of each component of basic materials such as: cement, steel, timber, bricks, sand, aggregates, blocks, paints, windows, doors, glass, wood, and fixtures & fittings etc. Both traditional burnt clay bricks 229 x 114 x 76 mm (nominal size) and blocks of 200 x 150 x 100 or 400 x 200 x 150 mm are used in the majority of buildings. The materials for different items of work vary to some extent from region to region. Uniformity in units is maintained for all items of works throughout the country based

on the Indian Standard Institution. Contrary to land prices, which decline exponentially as projects move away from centrally located to peripheral areas of a city, construction costs fall at a gradual rate from luxury projects to small projects. India's real estate sector continues to grapple with the issue of manpower shortage. This shortage has an adverse impact on the delivery and cost of all types of construction projects. Raw materials, including steel, cement, sand, bricks, etc, have witnessed price escalation of 20-50% in the recent years (Table 1.1). Similarly, due to National Rural Employment Guarantee Act (NREGA) scheme, the labour shortage in construction has risen and this has further impacted the construction costs as it has lead to a considerable rise in wage levels. Table 1.1 shows escalation in the cost of building materials (Steel, Cement, Sand, and Bricks) and labour during 2010 to 2015.

**Table 1.1** Average cost of materials in 80 cities

| **Cost heads** | **Year 2010 (Rs.)** | **Year 2011 (Rs.)** | **Year 2012 (Rs.)** | **Year 2013 (Rs.)** | **Year 2014 (Rs.)** | **Year May 2015 (Rs.)** |
|---|---|---|---|---|---|---|
| Cement (Per Bag) | 200 | 270 | 300 | 335 | 370 | 348 |
| Steel (Per Quintal) | 3800 | 3900 | 4000 | 5000 | 4500 | 5098 |
| Bricks (Per 1000) | 3500 | 4000 | 4200 | 6000 | 5500 | 5928 |
| Aggregates 10mm & 20mm (Per Quintal) | 30 | 35 | 40 | 60 | 65 | 82 |
| Sand (Per Quintal) | 25 | 30 | 50 | 60 | 70 | 85 |
| Skilled Labour (Per Day) | 250 | 300 | 325 | 350 | 400 | 492 |

Hence, there is a need to update the existing rates for the estimation of construction by carrying out survey in different regions. Similarly, as many new materials are being used, there is a need to obtain information on these materials along with the traditional materials

and technologies for the construction of buildings, etc. Hence, the aim of this project is to ***"Update the Existing Rates and Ratios for Estimation of Construction Sector and Estimation of the Capital Formation on account of Construction"*** with special emphasis to building construction as well as roads and bridges etc.

## 1.1 Objectives

The main objectives of the project are as follows:

i) To get the expenditure in respect of different materials used and factor inputs like labour charges, hiring charges, rentals, etc. in various types of construction activities in the building construction sector in different parts of the country.

ii) To identify certain weights for combining the cost estimates for various types of construction activities to arrive at the cost composition for the total construction sector.

iii) To estimate the percentage of recycled bricks / blocks out of total bricks/ blocks used in construction.

## 1.2 Scope of Work

The scope of study is to work out the expenditure in respect of different materials used and factor inputs in the construction sector in all the Northern, Southern, Eastern and Western regions of the country, covering projects of central and state governments and also private and public sector in past two to three years.

The scope of study is limited to the following construction activities: a) Multi storeyed residential buildings, individual houses, single villas, etc.; b) Non-residential buildings such as office buildings, commercial complexes, malls, shops, hotels, etc. and c) Roads and Bridges etc. in the identified 80 cities/towns. In the first phase, 40 cities have been covered and the second phase includes survey of remaining 40 cities and towns.

The project aims to describe the current state of real estate and other construction and to gather and analyze cost of projects in different heads to identify general trends. The goal of the project is to gather specific and quantitative information of buildings surveyed.

As envisaged, gathering the data from interviews, site visits, surveys and reports, each survey provides distinct insight into accomplishing goals. The goal of the surveys is to learn how different organizations evaluate the construction process and the surveys focus on the type of building and how different construction companies carry out different activities.

One of the major goals is to find out the cost of construction per sqm. for different typology of projects in different regions of the country and to find out the variations in the cost of construction in central versus state as well as private contractors and construction agencies. A synthesis of these different data will lead to generation of recommendations for future.

### 1.3 Methodology

To carry out a systematic and scientific study, the following methodology is adopted. The project team was split into different groups. The first group prepared the Questionnaire and conducted the preliminary surveys around Roorkee town to identify the difficulties and/or deficiencies in filling the data or gathering the information on desired format. The survey questionnaire was designed to get a summary of information on completed building or under construction project as mentioned below.

i) Building Typology
ii) Location: City, State
iii) Commencement of construction and completion year
iv) Type of construction (Framed/Masonry), number of storey and Built up area
v) Construction agency (Central/State Govt./Major agency/Private contractor/Petty Contractors)
vi) Schedule of Rates (SoR) followed in preparing cost estimates, Bill of Quantities (BoQs)
vii) Materials and Specifications used in different projects and their cost
viii) Cost of different types of materials and labour
ix) Cost of hiring shuttering, machines etc.
x) Cost of overheads etc.
xi) Special features of the project, if any
xii) Contractor's profit etc.

The Data Collection Questionnaire designed and used to get the information of different projects in all the cities/towns is given below.

| Data Collection Questionnaire | | |
|---|---|---|
| | CSIR- Central Building Research Institute, Roorkee247667, Uttarakhand, India | Project title: Study on Improvement in the Rates and Ratios used in the Estimates of Gross Value Added in Construction Sector and Gross Fixed Capital Formation. |
| | Sponsored by: Govt. of India, Ministry of Statistics and Program Implementation, National Accounts Division, New Delhi | |
| **S. No.** | **DESCRIPTION** | **DETAILS** |
| **1** | Name/ Identification of Building/ Structure (Rural Area/ Urban Area) | |
| **2** | City/Town | |
| **3** | Cass (I II III IV) | |
| **4** | District State/UT | |
| **5** | Building Typology | Residential / Non-Residential |
| **6** | Year of Construction | On Going or Construction completed during (2010/11/ 12/13) |
| **7** | Work Started on | |
| **8** | Work completed on | |
| **9** | Construction Agency | Govt./ Private |
| **10** | Work Done by | Builder/ Contractor/ Company |
| **11** | Project Undertaken for | Govt. Sector/ Public Sector /Private Corporate Sector/ Household Sector |
| **12** | Names of Representatives | |
| **13** | Date of Visit | |
| **14** | Code No | |
| **15** | Geo-climatic Zone Classification | I/II/III/IV/V/VI |

| **S.No.** | **GENERAL** | |
|---|---|---|
| **1** | Type of Building | Villa/ Apartment |
| | | School/Hospital/ Mall/ Shop/ Office/others |
| | | Road & Bridge |
| | | Parking Area |
| **2** | Structural System | Load Bearing Structure |
| | | Framed Structure |
| | | Confined Masonry Structure |
| | | Others (Specify) |
| **3** | Number of Storeys | 1/ 2/ 3/ 4/ more |
| **4** | Storey Height | 2.7m/ 3.0 m/ 3.3 m/ 3.6 m/ 3.9 m/ 4.0 m (Specify) |
| **5** | Plinth Height (Mtrs.) | |
| **6** | Site Area (Sqm.) | |
| **7** | Plinth Area/ Built-up Area (Sqm.) | Basement = |
| | | Ground Floor = |

| S.No. | GENERAL | |
|---|---|---|
| | | First Floor = |
| | | Second Floor = |
| | | Third Floor = |
| | | Fourth Floor = |
| | | Other Floor = |
| **8** | Cost of Construction per Sqm. | Rs. (Residential Building) |
| **9** | Cost of Construction per Sqm. | Rs. (Non- Residential Building) |

| S.No. | BASIC MATERIAL/ LABOUR; UNIT | Unit Rate (Rupees) |
|---|---|---|
| **1** | Cement (Grade: 33/ 43/ 53/ PPC/ Other) ; Bag | |
| **2** | Coarse Sand; Cum. / Trolley Cum. | |
| **3** | Fine Sand; Cum. / Trolley Cum. | |
| **4** | Fly ash | |
| **5** | Coarse Aggregate (40 mm); Cum. | |
| **6** | Coarse Aggregate (20 mm); Cum. | |
| **7** | Coarse Aggregate (10 mm); Cum. | |
| **8** | Brick Aggregate.(25 mm); Cum. | |
| **9** | Bricks; 1000 nos.(Burnt clay, Calcium Silicate, Clay fly ash, Sand lime / Others) | |
| **10** | Blocks; 1000 Nos.(Aerated Concrete blocks, Conc. Blocks, FalG, Hollow Blocks/ Others) | |
| **11** | Brick Tiles; 1000 Nos. | |
| **12** | Stone | |
| **13** | Timber(Scantling: Frame); 10 cubic decimeter | |
| **14** | Timber(Planks: Shutter); 10 Cubic Decimeter | |
| **15** | Timber (Shuttering); 10 cubic decimeter | |
| **16** | Glass (Normal-3mm/4mm/5.5mm/others specify) | |
| **17** | Ballies; mtr. | |
| **18** | Aluminum Frame | |
| **19** | Pressed Steel Frame | |
| **20** | Steel Frame | |
| **21** | Lime; Qtls. | |
| **22** | Marble Chips; Qtls./ Bag 25kg / 50 kg | |
| **23** | Marble Stone | |
| **24** | Granite Stone | |
| **25** | Kota Stone | |
| **26** | Sand Stone (Agra/ Kuddappa/ Dholpur) | |
| **27** | Marble Powder; Cum. | |
| **28** | Ceramic Tiles; Sqm. / Box | |
| **29** | Vitrified Tiles; Sqm. / Box | |

| S.No. | BASIC MATERIAL/ LABOUR; UNIT | Unit Rate (Rupees) |
|---|---|---|
| 30 | Flush Shutters; Sqm. | |
| 31 | Steel W & V; Sqm. | |
| 32 | Glass Panes; Sqm. | |
| 33 | Glass Strips; Mtr. | |
| 34 | T-Iron MS Frames; Kg. | |
| 35 | MS Round Guard Bars; Kg. | |
| 36 | Enamel Paint; Lt. | |
| 37 | Snowcem | |
| 38 | Apex/ Snow Cryl (outside) | |
| 39 | Putty (one / two coat / three coat) (outside) | |
| 40 | Oil Bond Distemper (inside) | |
| 41 | Acrylic Emulsion (inside) | |
| 42 | Textured Paint | |
| 43 | Red Lead Primer; Lt. | |
| 44 | Anti-Termite Chemical; Lt. | |
| 45 | Bitumen; Kg. | |
| 46 | Steel Reinforcement; Kg. | |
| 47 | Steel Sections (Angle/ Tee/ I/ Channel); Kg. | |
| 48 | Water Proofing Treatment ( Mud Phuska + Brick Tiles/ Lime Terracing/ APP/ PMB/ others specify) | |
| 49 | WC; NO. | |
| 50 | Wash Basin & Sink; No. | |
| 51 | BIB/ Stop Cock; No. | |
| 52 | Water Tank (200/400/500/800/1000 Litres); Nos. | |
| 53 | Pipes & Access. (GI/ PVC/ OTHER); LS | |
| 54 | Pipes (RCC NP2/ Stoneware/Other); LS | |
| 55 | Rainwater Harvesting | |
| 56 | Green/ Energy Eff. Design features/ Measures/ Materials Adopted | |
| 57 | Wires & Cables | |
| 58 | Switches | |
| 59 | MCB/MCCB | |
| 60 | Mason; Day | |
| 61 | Carpenter; Day | |
| 62 | Blacksmith; Day | |
| 63 | Painter; Day | |
| 64 | White Washer; Day | |
| 65 | Glazier; Day | |
| 66 | Fitter; Day | |
| 67 | Beldar; Day | |
| 68 | Misc. (if any) | |

**PROFORMA FOR DATA ANALYSES OF MATERIALS & SPECIFICATIONS**

## 1. IDENTIFICATION OF DATA

| | | | |
|---|---|---|---|
| State Name | | District Name | |
| Street Name | | Year of construction | |
| Upgraded /New Construction | | | |

## 2. MATERIALS, STRUCTURAL & CONSTRUCTION ASPECTS

| | | | | | | |
|---|---|---|---|---|---|---|
| Type of Structure | Permanent house | | Semi permanent | | Temporary | |

| **Foundation** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Type of Foundation | Raft | Piles | Stepped | Strip | Isolated | Depth of Foundation | | | |
| Material used in Foundation, Column & Plinth | | | | | | DPC – Yes/ No. | | Mat. & thickness | |

| **Wall** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Grass /Thatch Bamboo/Reeds | | Mud | | Un-burnt Brick | | Wood | |
| | GI/Metal/AC Sheet | | Burnt Brick | | Stone | | Conc. Blocks | |
| | Plastic. Polythene | | Any other | | | | | |
| Thickness | | | | | | | | |
| Mortar | Mud | | Cement | Any other | | | | |

| **Flooring** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Flooring Material | Mud | | Brick | | Wood | | Stone | |
| | | | | | Bamboo | | | |
| | Cement | | Mosaic | | Floor tiles | | Any other | |

| **Finishing materials** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Plastering on External walls | Yes | | No | | Ceiling Plaster | Yes | | No |
| Plaster on Internal walls | Yes | | No | | Plastering Material | | | |

| **Roof** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Roofing Material | Grass, Thatch, mud | | States | | Tiles | | | | RCC | |
| | | | | | Hand Made | | Factory Made | | | |
| | GI/Asbestos/Tar Sheet | | RB/RBC | | Stone | | | | Plastic/ Polythene | |
| | | | | | Dressed | | Random Rubble | | | |
| | Bamboo | | Wood | | Any other | | | | | |
| Typed of Roof | Flat | | Sloppy | | Type | | | | | |

| **Doors** | Framed | | Frameless | | Board/PVC | | Any other |
|---|---|---|---|---|---|---|---|
| Material used | Steel | | Wooden | | GI Sheet | | Any other |
| Windows | Framed | | Frameless | | Board/Glass | | Any other |
| Materials used | Steel | | Wooden | | GI Sheet | | Any other |
| Ventilators | Framed | | Frameless | | Precast | | Any other |
| Materials used | Steel | | Wooden | | Jalli | | Any other |

## 3. RATES OF THE BUILDING MATERIALS AND MANPOWER CHARGES

| Cement | | Sand | | Brick |
|---|---|---|---|---|
| Stone | | Stone aggregate | | Wood |
| MS angle | | MS Bars | | AC.GI Sheet |
| Poly sheet | | Bamboo | | Any other |
| Man power charges | | Skilled | | Unskilled |

## 4. COST EFFECTIVE, ENVIRONMENT-FRIENDLY AND DISASTER RESISTANT TECHNOLOGIES

| Cost effective Technologies used | | | | | Environment-Friendly Tech. used | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Earthquake safety provisions | | | | | Plinth Band | | | | |
| Lintel Band | | | | | Gable/roof band | | | | |
| Through Stone/Conc. Block. | Yes | | No | | Corner Reinforcement | Yes | | No | |
| Rain water harvesting system | Yes | | No | | Specify | | | | |

Another group carried out comprehensive literature review, creating the necessary background research, data recording and analysis and identifying the trends. The other group members conducted the surveys by using the developed questionnaire and the survey

questions were tailored accordingly. Through background research, it was recognized that building owners, government, and construction agencies were the main players. The responses were analyzed and compared the reported data using the Standard Schedule of Rates of CPWD-DSR. This was used as majority of Schedule of Rates (SoRs) in different states follow the specifications prepared under Delhi Schedule of Rates (DSR).

Model / generic spreadsheets were used to compare the rates of materials in different cities / towns. This is due to majority of the items/materials, labour, equipments used in different types of building constructon. Expenditure details were collected for each item such as cement, steel, bricks, sand, aggregate & fittings, etc. and other overheads including rent paid for hiring construction machinery and equipment etc. The conventional materials such as concrete, brick, sand, steel, timber are extensively used in their present form.

There are a small percentage of alternative materials used in the construction but fly ash based blocks, cement concrete blocks and aerated concrete blocks are being used extensively in major cities and towns in non-residential building. This is particularly more where good quality bricks are not available like Telangana, Andhra Pradesh, Rajasthan, Gujarat, and Karnataka etc. For each of the identified type of building / construction work, five projects were to be selected in all the cities / towns for collecting item-wise expenditure on different materials, service inputs and factor inputs used in the construction activity. However, the survey team did not get the desired number of projects in all the cities / towns, where the survey was conducted.

**As whole, 615 projects were studied in the survey that consist of residential, non-residential buildings, other construction works and roads / bridges**. Simple Excel sheets were used for combining the cost estimates of various types of construction activities to arrive at the cost composition for the construction sector and for identifying the weights. For example, the cost estimates collected separately for office buildings, commercial complexes, malls, shops, hotels, etc. have been combined to obtain a cost composition for the non-residential buildings. Same procedure was followed for residential and for other types of construction and roads/bridges etc. Based on the data recorded, the consolidated cost of construction in the construction sector has been computed.

The model BoQs used in collating the information collected through surveys in the form of take-off sheets indicate that the BoQs of all the projects prepared for all the towns and cities in different parts of country match closely. The Model BoQs used are given in Tables 1.2 and 1.3 below as examples.

**Table 1.2.** Details of Model BoQs used in Chandigarh city

| | Bill of Quantities (BoQs) | | Chandigarh | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | R/LB/SS | R/LB/SS | R/LB/SS | R/LB/SS | R/LB/DS | R/LB/DS |
| | | | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. |
| | | | 67.0 | 67.0 | 106.0 | 106.0 | 180.0 | 180.0 |
| S.No. | | | Sqm. | Sqm. | Sqm. | Sqm. | Sqm. | Sqm. |
| **Item of Work : FOUNDATION** | | | | | | | | |
| 1 | Earth work in foundation. | Cum. | 30.7 | 30.7 | 48.8 | 48.8 | 24.2 | 24.2 |
| 2 | Filling excavated earth | Cum. | 10.8 | 10.8 | 18.9 | 18.9 | 7.6 | 7.6 |
| 3 | Fine sand filling | Cum. | 5.2 | 5.2 | 8.6 | 8.6 | 3.4 | 3.4 |
| 4 | Surface dressing | 100 Sqm. | 1.2 | 1.2 | 2.0 | 2.0 | 0.9 | 0.9 |
| 5 | Anti-termite treatment | Sqm. | 67.0 | 67.0 | 106.0 | 106.0 | 45.0 | 45.0 |
| 6 | Plain Cement Concrete(PCC) 1:4:8 – All work up to plinth level | Cum. | | | | | | |
| 7 | Plain Cement Concrete(PCC) 1:5:10 – All work up to plinth level | Cum. | 6.9 | 6.9 | 9.2 | 9.2 | 4.7 | 4.7 |
| 8 | Design mix reinforced cement concrete (RCC) work (M-25 grade) All work up to Plinth, Footing including plinth/ earthquake band etc. | Cum. | | | | | | |
| | **OR** Nominal Mix 1:1.5:3 | Cum. | | | | | | |
| 9 | Centering and Shuttering | Cum. | | | | | | |
| 10 | DPC 40mm thick | Sqm. | 10.1 | 10.1 | 17.7 | 17.7 | 7.7 | 7.7 |
| 11 | Brick work in foundation and plinth in CM1:6 (6.1.2) | Cum. | 14.8 | 14.8 | 24.6 | 24.6 | 14.4 | 14.4 |
| 12 | CB Masonry in Foundation and Plinth | Cum. | | | | | | |
| 13 | RR Masonry in foundation and plinth | Cum. | | | | | | |
| 14 | Plinth Protection (4.17) | Sqm. | | | | | | |
| **Item of Work : WALLING** | | | | | | | | |
| 1 | RCC work in lintels & Beams | Cum. | 0.9 | 0.9 | 2.4 | 2.4 | 4.4 | 4.4 |
| 2 | RCC work in chajjas | Cum. | 0.3 | 0.3 | 0.6 | 0.6 | 1.2 | 1.2 |
| 3 | Centering and Shuttering for lintels & beam | Sqm. | 10.4 | 10.4 | 27.0 | 27.0 | 56.2 | 56.2 |
| 4 | RCC work in bands | Cum. | 0.4 | 0.4 | 1.8 | 1.8 | 4.6 | 4.6 |
| 5 | Brick work in super-structure with 1:6 Mix. | Cum. | 30.9 | 30.9 | 49.6 | 49.6 | 93.4 | 93.4 |
| 6 | Concrete Block Masonry in Superstructure | Cum. | | | | | | |
| 7 | RR Masonry in Superstructure with 1:6 Mix. | Cum. | | | | | | |
| 8 | Half bricks work in super -structure with 1:4 Mix. | Sqm. | 10.8 | 10.8 | 26.3 | 26.3 | 18.2 | 18.2 |
| 9 | Half Concrete Block work in Superstructure | Sqm. | | | | | | |
| 10 | RCC in bed block | | | | | | 0.4 | 0.4 |
| **Item of Work : STRUCTURAL SLAB** | | | | | | | | |
| | **OPTION I** | | | | | | | |
| 1 | RCC In situ slab | Cum. | 8.4 | | 14.1 | | 23.6 | |
| 2 | RCC work in shelves | Cum. | 0.7 | | 1.5 | | 1.6 | |
| 3 | C/S for RCC slab | Sqm. | 72.5 | | 117.0 | | 169.0 | |
| 4 | C/S for shelves | Sqm. | 12.8 | | 23.6 | | 20.2 | |
| 5 | 6mm bearing c. plaster 1:3 | Sqm. | 9.6 | | 22.0 | | 35.4 | |
| | **OPTION II** | | | | | | | |
| 1 | RC Plank & Joist/R.B. Panel/Channel unit | Sqm. | | 74.0 | | 113.0 | | 188.0 |
| 2 | RCC work in shelves | Cum. | | 0.7 | | 1.5 | | 1.6 |
| 3 | C/S for shelves | Cum. | | 12.8 | | 23.6 | | 20.2 |
| 4 | 6mm bearing c. plaster 1:3 | Sqm. | | 9.6 | | 22.0 | | 35.4 |

| | Bill of Quantities (BoQs) | | Chandigarh | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | R/LB/SS | R/LB/SS | R/LB/SS | R/LB/SS | R/LB/DS | R/LB/DS |
| | | | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. |
| | | | 67.0 | 67.0 | 106.0 | 106.0 | 180.0 | 180.0 |
| S.No. | | | Sqm. | Sqm. | Sqm. | Sqm. | Sqm. | Sqm. |
| **Item of Work : Doors** | | | | | | | | |
| | **OPTION I** Tee-iron frame with wooden shutter | | | | | | | |
| 1 | Tee-iron frame | Kg. | | 122.6 | | 223.3 | | 302.6 |
| 2 | Wooden shutters | Sqm. | | 11.2 | | 21.4 | | 31.0 |
| 3 | Wooden Paneling | Sqm. | | 11.2 | | 21.4 | | 31.0 |
| 4 | Painting/ Polishing on Paneled shutters | Sqm. | | 36.9 | | 61.8 | | 88.8 |
| 5 | Painting/Polishing on Flush shutters | Sqm. | | 34.7 | | 57.5 | | 82.8 |
| | **OPTION II** Timber frame with wooden shutter | | | | | | | |
| 1 | Timber frame | 10 deci Cum. | 28.1 | | 49.7 | | 67.0 | |
| 2 | wooden shutters | Sqm. | 10.8 | | 19.7 | | 22.4 | |
| 3 | wooden paneling | Sqm. | 10.8 | | 19.7 | | 22.4 | |
| 4 | Painting/Polishing on paneled shutter | Sqm. | 34.2 | | 57.7 | | 84.8 | |
| 5 | Painting/polishing on Flush shutter | Sqm. | 31.6 | | 53.3 | | 78.2 | |
| **Item of work: Window and Ventilator** | | | | | | | | |
| | **OPTION I** Timer frame with wooden glazed shutter | | | | | | | |
| 1 | Timer frame | 10 Cu. Decm. | 41.7 | | 47.8 | | 78.4 | |
| 2 | Wooden glazed shutters | Sqm. | 9.1 | | 12.1 | | 19.0 | |
| 3 | Hold Fast | Each | | | | | 88.0 | |
| 4 | MS guard bars | Kg. | 92.0 | | 118.8 | | 188.0 | |
| 5 | Painting / polishing | Sqm. | 30.0 | | 38.7 | | 60.8 | |
| | **OPTION II** Tee-iron frame with wooden glazed shutters | | | | | | | |
| 1 | Tee-iron frame | Kg. | | 179.6 | | 205.9 | | 340.8 |
| 2 | Wooden glazed shutters | Sqm. | | 10.4 | | 13.9 | | 21.8 |
| 3 | MS guard bars | Each | | 92.0 | | 118.8 | | |
| 4 | Painting/polishing | Sqm. | | 31.5 | | 40.7 | | 66.8 |
| **Item of work: Flooring** | | | | | | | | |
| 1 | P/ L cement concrete in plinth with 1:5:10 mix | Cum. | 4.1 | 4.1 | 6.4 | 6.4 | 5.6 | 5.6 |
| 2 | Floor finish | Sqm. | 4.1 | 4.1 | 6.4 | 6.4 | 153.2 | 153.2 |
| **Item of work: Finishing** | | | | | | | | |
| 1 | Skirting | Sqm. | 6.1 | 6.1 | 14.3 | 14.3 | 23.6 | 23.6 |
| 2 | 12mm cement plaster of mix 1:6 | Sqm. | 152.0 | 152.0 | 252.0 | 252.0 | 416.0 | 416.0 |
| 3 | 20 mm cement plaster of mix 1:6 | Sqm. | | | | | | |
| 4 | Pointing with Cement Mortar 1:3 | Sqm. | | | | | | |
| 5 | 15mm cement plaster of mix 1:6 | Sqm. | 152.0 | 152.0 | 252.0 | 252.0 | 416.0 | 416.0 |
| 6 | Dado | Sqm. | 10.2 | 10.2 | 22.3 | 22.3 | 24.0 | 24.0 |
| 7 | White washing / colour washing | Sqm. | 402.0 | 402.0 | 668.0 | 668.0 | 1172.0 | 1172.0 |
| **Item of work: Terracing** | | | | | | | | |
| 1 | Painting top of roof with bitumen | Sqm. | 61.0 | 61.0 | 105.4 | 105.4 | 79.4 | 79.4 |
| 2 | Treatment on terrace | Sqm. | 61.0 | 61.0 | 105.4 | 105.4 | 79.4 | 79.4 |

**Table 1.3.** Details of Model BoQs used in Faridabad and Hamirpur city

| | Bill of Quantities (BoQs) | | Faridabad | | Hamirpur | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | R/LB/SS | R/LB/SS | R/LB/SS | R/LB/SS | R/LB/SS | R/LB/SS | R/LB/DS | R/LB/DS |
| | | | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. |
| | | | 73.6 | 73.6 | 52.0 | 52.0 | 148.4 | 148.4 | 110.0 | 110.0 |
| **S. No.** | | | **Sqm.** | **Sqm.** | **Sqm.** | **Sqm.** | **Sqm.** | **Sqm.** | **Sqm.** | **Sqm.** |
| **Item of Work : FOUNDATION** | | | | | | | | | | |
| **1** | Earth work in foundation. | Cum. | 33.2 | 33.2 | 27.7 | 27.7 | 67.7 | 67.7 | 15.3 | 15.3 |
| **2** | Filling excavated earth | Cum. | 13.6 | 13.6 | 8.9 | 8.9 | 26.3 | 26.3 | 5.0 | 5.0 |
| **3** | Fine sand filling | Cum. | 5.8 | 5.8 | 4.1 | 4.1 | 12.1 | 12.1 | 2.3 | 2.3 |
| **4** | Surface dressing | 100 Sqm. | 1.1 | 1.1 | 1.2 | 1.2 | 2.7 | 2.7 | 0.5 | 0.5 |
| **5** | Anti-termite treatment | Sqm. | 72.9 | 72.9 | 52.0 | 52.0 | 145.8 | 145.8 | 28.7 | 28.7 |
| **6** | Plain Cement Concrete(PCC) 1:4:8 – All work up to plinth level | Cum. | | | | | | | | |
| **7** | Plain Cement Concrete(PCC) 1:5:10 – All work up to plinth level | Cum. | 6.3 | 6.3 | 4.9 | 4.9 | 13.3 | 13.3 | 2.9 | 2.9 |
| **8** | Design mix reinforced cement concrete (RCC) work (M-25 grade) All work up to Plinth, Footing including plinth/ earthquake band etc. | Cum. | | | | | | | | |
| | **OR** Nominal Mix 1:1.5:3 | Cum. | | | | | | | | |
| **9** | Centering and Shuttering | Cum. | | | | | | | | |
| **10** | DPC 40mm thick | Sqm. | 11.9 | 11.9 | 8.2 | 8.2 | 22.2 | 22.2 | 5.0 | 5.0 |
| **11** | Brick work in foundation and plinth in CM1:6 (6.1.2) | Cum. | 17.2 | 17.2 | 12.0 | 12.0 | 33.0 | 33.0 | 7.6 | 7.6 |
| **12** | CB Masonry in Foundation and Plinth | Cum. | | | | | | | | |
| **13** | RR Masonry in foundation and plinth | Cum. | | | | | | | | |
| **14** | Plinth Protection (4.17) | Sqm. | | | | | | | | |
| **Item of Work : WALLING** | | | | | | | | | | |
| **1** | RCC work in lintels & Beams | Cum. | 1.0 | 1.0 | 0.9 | 0.9 | 3.1 | 3.1 | 2.6 | 2.6 |
| **2** | RCC work in chajjas | Cum. | 0.5 | 0.5 | 0.2 | 0.2 | 1.5 | 1.5 | 0.8 | 0.8 |
| **3** | Centering and Shuttering for lintels & beam | Sqm. | 12.7 | 12.7 | 9.8 | 9.8 | 27.3 | 27.3 | 33.4 | 33.4 |
| **4** | RCC work in bands | Cum. | 0.6 | 0.6 | 0.5 | 0.5 | 1.4 | 1.4 | 2.6 | 2.6 |
| **5** | Brick work in super-structure with 1:6 Mix. | Cum. | 38.4 | 38.4 | 23.9 | 23.9 | 58.0 | 58.0 | 58.4 | 58.4 |
| **6** | Concrete Block Masonry in Superstructure | Cum. | | | | | | | | |
| **7** | RR Masonry in Superstructure with 1:6 Mix. | Cum. | | | | | | | | |
| **8** | Half bricks work in super - structure with 1:4 Mix. | Sqm. | 2.5 | 2.5 | 11.7 | 11.7 | 3.9 | 3.9 | 18.2 | 18.2 |
| **9** | Half Concrete Block work in Superstructure | Sqm. | | | | | | | | |
| **10** | RCC in bed block | | | | | | | | 0.4 | 0.4 |
| **Item of Work : STRUCTURAL SLAB** | | | | | | | | | | |
| | **OPTION I** | | | | | | | | | |
| **1** | RCC In situ slab | Cum. | 9.4 | | 5.5 | | 15.9 | | 12.2 | |
| **2** | RCC work in shelves | Cum. | 0.9 | | 0.6 | | 1.1 | | 1.2 | |
| **3** | C/S for RCC slab | Sqm. | 83.9 | | 56.2 | | 130.0 | | 96.4 | |
| **4** | C/S for shelves | Sqm. | 15.0 | | 11.8 | | 17.2 | | 19.8 | |
| **5** | 6mm bearing c. plaster 1:3 | Sqm. | 20.1 | | 8.7 | | 22.8 | | 22.0 | |
| | **OPTION II** | | | | | | | | | |
| **1** | RC Plank & Joist/R.B. Panel/Channel unit | Sqm. | | 80.6 | | 59.0 | | 155.5 | | 118.0 |
| **2** | RCC work in shelves | Cum. | | 0.9 | | 0.6 | | 1.1 | | 1.2 |
| **3** | C/S for shelves | Cum. | | 15.0 | | 11.8 | | 17.2 | | 19.8 |
| **4** | 6mm bearing c. plaster 1:3 | Sqm. | | 20.1 | | 8.7 | | 22.8 | | 22.0 |

| | Bill of Quantities (BoQs) | | Faridabad | | Hamirpur | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | R/LB/SS | R/LB/SS | R/LB/SS | R/LB/SS | R/LB/SS | R/LB/SS | R/LB/DS | R/LB/DS |
| | | | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. | RCC in-situ, Timber Frame. | Pre-cast T-Iron Frame. |
| | | | 73.6 | 73.6 | 52.0 | 52.0 | 148.4 | 148.4 | 110.0 | 110.0 |
| S.No. | | | Sqm. | Sqm. | Sqm. | Sqm. | Sqm. | Sqm. | Sqm. | Sqm. |
| **Item of Work : Staircase** | | | | | | | | | | |
| 1 | RCC work in staircase | Cum. | | | | | | | 0.8 | 0.8 |
| 2 | Centering and shuttering for staircase | Sqm. | | | | | | | 4.8 | 4.8 |
| **Item of Work : REINFORCEMENT** | | | | | | | | | | |
| 1 | Steel Reinforcement | Kg. | 1113.0 | 1113.0 | 716.0 | 716.0 | 2253.0 | 2253.0 | 1496.0 | 1496.0 |
| **Item of Work : Doors** | | | | | | | | | | |
| | **OPTION I** Tee-iron frame with wooden shutter | | | | | | | | | |
| 1 | Tee-iron frame | Kg. | | 112.1 | | 115.5 | | 230.7 | | 216.0 |
| 2 | Wooden shutters | Sqm. | | 10.9 | | 9.8 | | 21.0 | | 19.8 |
| 3 | Wooden Paneling | Sqm. | | 10.9 | | 9.8 | | 21.0 | | 19.8 |
| 4 | Painting/ Polishing on Paneled shutters | Sqm. | | 41.4 | | 38.5 | | 60.9 | | 57.4 |
| 5 | Painting/Polishing on Flush shutters | Sqm. | | 39.2 | | 36.5 | | 56.7 | | 53.4 |
| | **OPTION II** Timber frame with wooden shutter | | | | | | | | | |
| 1 | Timber frame | 10 deci Cum. | 24.9 | | 23.9 | | 51.3 | | 47.8 | |
| 2 | wooden shutters | Sqm. | 9.9 | | 9.2 | | 18.8 | | 18.0 | |
| 3 | wooden paneling | Sqm. | 9.9 | | 9.2 | | 18.8 | | 18.0 | |
| 4 | Painting/Polishing on paneled shutter | Sqm. | 30.0 | | 29.2 | | 58.0 | | 54.8 | |
| 5 | Painting/polishing on Flush shutter | Sqm. | 27.7 | | 27.0 | | 53.5 | | 50.6 | |
| **Item of work: Window and Ventilator** | | | | | | | | | | |
| | **OPTION I** Timer frame with wooden glazed shutter | | | | | | | | | |
| 1 | Timer frame | 10 Cu. Decm. | 33.4 | | 27.8 | | 54.5 | | 48.2 | |
| 2 | Wooden glazed shutters | Sqm. | 8.5 | | 6.3 | | 12.7 | | 11.6 | |
| 3 | Hold Fast | Each | | | | | | | 56.0 | |
| 4 | MS guard bars | Kg. | 84.0 | | 65.2 | | 123.0 | | 116.0 | |
| 5 | Painting / polishing | Sqm. | 28.3 | | 20.6 | | 40.0 | | 37.4 | |
| | **OPTION II** Tee-iron frame with wooden glazed shutters | | | | | | | | | |
| 1 | Tee-iron frame | Kg. | | 143.9 | | 119.8 | | 234.8 | | 209.6 |
| 2 | Wooden glazed shutters | Sqm. | | 9.8 | | 7.2 | | 14.6 | | 13.4 |
| 3 | MS guard bars | Each | | 84.0 | | 65.2 | | 123.0 | | |
| 4 | Painting/polishing | Sqm. | | 29.7 | | 21.6 | | 42.0 | | 41.0 |
| **Item of work: Flooring** | | | | | | | | | | |
| 1 | P/ L cement concrete in plinth with 1:5:10 mix | Cum. | 4.4 | 4.4 | 3.2 | 3.2 | 9.0 | 9.0 | 3.4 | 3.4 |
| 2 | Floor finish | Sqm. | 4.4 | 4.4 | 3.2 | 3.2 | 9.0 | 9.0 | 95.0 | 95.0 |
| **Item of work: Finishing** | | | | | | | | | | |
| 1 | Skirting | Sqm. | 9.2 | 9.2 | 4.2 | 4.2 | 16.7 | 16.7 | 13.8 | 13.8 |
| 2 | 12mm cement plaster of mix 1:6 | Sqm. | 166.5 | 166.5 | 125.0 | 125.0 | 255.0 | 255.0 | 267.6 | 267.6 |
| 3 | 20 mm cement plaster of mix 1:6 | Sqm. | | | | | | | | |
| 4 | Pointing with Cement Mortar 1:3 | Sqm. | | | | | | | | |
| 5 | 15mm cement plaster of mix 1:6 | Sqm. | 166.5 | 166.5 | 125.0 | 125.0 | 255.0 | 255.0 | 267.6 | 267.6 |
| 6 | Dado | Sqm. | 14.3 | 14.3 | 6.8 | 6.8 | 20.3 | 20.3 | 18.0 | 18.0 |
| 7 | White washing / colour washing | Sqm. | 443.0 | 443.0 | 330.0 | 330.0 | 687.0 | 687.0 | 815.6 | 815.6 |
| **Item of work: Terracing** | | | | | | | | | | |
| 1 | Painting top of roof with bitumen | Sqm. | 69.3 | 69.3 | 48.0 | 48.0 | 138.0 | 138.0 | 52.4 | 52.4 |
| 2 | Treatment on terrace | Sqm. | 69.3 | 69.3 | 48.0 | 48.0 | 138.0 | 138.0 | 52.4 | 52.4 |

The data of all the projects surveyed has been given separately.

# CHAPTER 2

# SCHEDULE OF ITEMS IN THE SURVEY

## 2.0 Introduction

The following items of works were studied during the surveys by using the questionnaire and using the standard specifications given in the CPWD – DSR 2012 and 2014 and also different Schedule of Rates (SoRs) of various states and UTs.

### A. Earthwork

Earthwork in excavation and earthwork in filling were taken out separately under different items, and quantities were calculated in cubic meter. Foundation trenches are usually dug to the exact width of foundation with vertical sides. Earthwork in excavation in foundation has been calculated by taking the dimensions of each trench length (L) x breadth (B) x depth (D). Filling in trenches after the construction of foundation masonry is also accounted for by deducting the masonry from the excavation. Earthwork in plinth filling is calculated by taking the internal dimensions in between plinth wall (length x breath) which are usually less than the internal dimension of the room to offset of plinth wall i.e. 115 mm and height is taken after deducting the thickness of concrete in floor, usually 75 mm. Excavated earth is used in trench filling and plinth filling and usually not paid for separately, but is included under a separate item back fill at a lesser rate.

### B. Concrete in foundation

The concrete is worked out in cubic meter length x breadth x thickness. The length & breadth of foundation concrete have been considered the same as for excavation; only the depth or thickness differs. The thickness of concrete varied from 200 mm to 300 mm. Foundation base consists of lean cement concrete. The production of cement concrete in foundation is in 1:4:8 or 1:5:10.

### C. Damp proof course

D.P.C. of 25 mm thick rich cement concrete 1:1.5:3 or 20mm thick rich cement mortar 1:2, mixed with standard water proofing material, is provided at the plinth level to full width of plinth wall, and the quantities are counted in sqm. (Length x Breadth). People are also providing plinth band / beam in place of DPC in earthquake prone areas.

**D. Masonry**

Masonry was computed in cum. (Length x Breadth x Height). Foundation and plinth masonry is taken under one item, and masonry in super structure is taken under a separate item. In multistoried buildings, the masonry in each story as ground floor above plinth level, first floor, etc. is computed separately. In taking out quantities the walls have been measured as solid and then deductions are made for opening as door, window etc. different mortar, etc. are taken out under separate item. Thin partition walls are measured in sqm. Stone or Block masonry is calculated in the same manner as for brick masonry.

**E. Lintels over openings**

Lintels either of R.C.C. or R.B.C. are provided in buildings and were calculated in cum. Length of the lintel is equal to the clear span plus two bearings of about 120 mm. Thus, the length of the lintel, l = s+2t, i.e. clear span plus two bearings. Quantity of lintel = l x t x thickness of wall.

**F. Reinforced Cement Concrete and Reinforced Brick Concrete work**

R.C.C. and R.B.C. works in roofs or floor slabs, beams, lintels, columns, foundations, etc. and the quantities were calculated in cum. Length, breadth and thickness are found correctly from the plan, elevations, sections and from other detailed drawings. Bearings are added with the clear span to get the dimensions. The quantities were calculated in cubic meter exclusive of steel reinforcement and its bending but inclusive of centering and shuttering and fixing and binding reinforcement in position. The reinforcement including its bending is taken up separately under steel works in quintal. For this purpose 1% of R.C.C. or R.B.C. work by volume has been taken for steel. In R.C.C. work plastering has not been not taken separately, but the exposed surface are finished with thin rich cement sand mortar plastering to give smooth and even surface, which was not taken into consideration.

**G. Flooring and Roofing**

The base lime concrete and floor finishing of Cement Concrete or stone or marble or mosaic, etc. were taken as combined one item, and the quantity is calculated in sq. m. multiplying the length by the breadth. $1^{st}$ and $2^{nd}$ floor supporting structure is taken separately in cum. as R.C.C., R.B.C. Roof- Supporting structure is taken separately in cum and lime concrete terracing is computed in sq. m. with thickness specified, under a separate item including surface rendering smooth.

**H. Plastering and Pointing**

Plastering of 12 / 15 / 20mm thick is calculated in sqm. For walls, the measurements were taken for the whole face of the wall. Plastering of ceiling usually of 12 / 15mm thick is computed in sq. m. under a separate head as this work is done with richer mortar (1:4). Pointing in walls is calculated in Sqm. for whole surface.

**I. Doors and Windows**

Door and window frames or chaukhats made of wood were computed in cum. Length is obtained by adding the length of all the members of the frame. Door and window leaves or shutters are computed in sqm. by multiplying the breadth by the height of the shutters, the rebate in the frame has been taken into consideration in finding the breadth and the height. The rebates in the frame are taken as 12mm to 20mm. The name of the timber used, the thickness of shutters, type of shutters and the nature of fittings (iron, brass etc.) have been noted in the item. Shutters of different types as paneled and partly paneled and partly glazed, etc. have been computed separately as the rates differ. Fittings are computed by number taken under a separate item in sq. m. basis of shutters, or a sum provision may be made. Holdfasts are taken separately under a separate item by weight or by number.

**J. Wood work**

The quantities of wooden members, cupboards, paneling etc. have been computed in cum.

**K. Iron work**

The quantities of iron work in gates, grills, purlins, rafters, etc. have been computed by weight in kg or quintal and quantities are calculated correctly by multiplying the weight per running meter by the length.

**L. White- washing and / or Colour-washing or Distempering**

The quantities are computed in sqm. and are same as for plastering. The inside is distempered or with white putty and oil bond distemper. The outside is colour-washed, apex, snowcryl and the quantities of colour-washing are same as for outside plaster. Number of coats of paint (white-washing or colour-washing) is taken as one job or work and the rates cover for number of coats. Other type of surface finishing is also considered and taken accordingly.

**M. Painting**

Painting or Varnishing of doors and windows are computed in sqm. For iron bars, grills, etc. the area of the clear opening inside the frame was taken. For both faces of doors and windows, the single area as measured above is multiplied by appropriate number as below:-

i) Paneled, framed and braced, Ledged and battened or ledged battened and braced
ii) Fully glazed
iii) Partly paneled and partly glazed
iv) Flush door
v) Iron bars, grills in windows

Painting is done in two or three coats, usually over a coat of priming. The rate covers for the number of coats of one item. For beams, rafters, purling, posts, etc. of timber or iron, the area of actual exposed surface is taken for painting.

**N. Lump-sum Items**

A lump- sum rate is provided for certain small items for which detailed quantities have not been taken out as it was not possible to find out the details at site.

## 2.1 Analysis of Rates

The determination of rate per unit of a particular item of work, from the cost of quantities of materials, the labours and other miscellaneous petty expenses required for its completion is known as the analysis of rate. A reasonable profit, (10%) for the contractor has been included in the analysis of rate. Rates of materials taken as the rates delivered at the site of work and include the first cost (cost at origin), cost of transport, railway freight if any, taxes, etc. If the materials are brought from a distant place, more than 10 km, then cost of transport is also added. The rates of materials and labour vary from place to place and therefore, the rates of different items of work also vary from place to place.

For the purpose of analysis, the details about all the operations involved in carrying out the work were studied, and number of labours used and their wages per day was also noted. The rates of a particular item of work were collected on the following:-

i) Specifications of works and materials, quality of materials and their proportions, method of constructional operation, etc.

ii) Quantities of materials and their rates, number of different types of labour and their rates.

iii) Location of the site of work and its distance from the source of materials and the rate of transport, availability of water, electricity etc.

iv) Profits and miscellaneous expenses of contractor.

## 2.2 Overhead Costs

Overhead costs include general office expenses, rents, taxes, supervision and other costs which are indirect expenses. The miscellaneous expenses on overheads were considered under the following heads:-

- General Overheads:
  - i) Establishment (office staff),
  - ii) Stationary, printing, postages, etc.
  - iii) Travelling expenses,
  - iv) Telephone,
  - v) Rent and taxes etc.
- Job Overheads: Supervision (Salary of Engineers, Overseers, Supervisors, Mate etc.), handling of materials, repairs, carriage, amenities to labour, workmen compensation, insurance, etc. interest on investment, losses on advances.

The Contractor's net profit of 10 % and the miscellaneous overhead expenses of about 5 to 10 % have been added. For overhead expenses and contractors profit about 15 % of the actual cost has been considered for adding under the head profit. The analysis of rate is worked out for the unit of payment of the particular item of work under two heads-

i) Materials; and

ii) Labour

The Methodology used in computation of percentage of the Total Cost of Materials, Labour & Miscellaneous Items using model BoQ is discussed in Table 2.1 below.

**Table 2.1** Example Ranchi City

| MATERIAL AND LABOUR CONSUMPTION | | | | LOAD BEARING STRUCTURE | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | SINGLE STOREYED-R | | | DOUBLE STOREYED-R | | |
| | **Material with Carriage** | **Unit** | **Rates on dated: 2014-2015** | **Material / Labour consumption per sqm.** | **Per sqm. rates (materials, labour& misc.)** | **% of total cost** | **Material / Labour Consumption per sqm.** | **Per sqm. rates (materials, labour& misc.)** | **% of total cost** |
| **S. No.** | **MATERIAL** | | | | | | | | |
| **1** | **Cement** | **Ton** | **6769.98** | **0.2355** | **1594** | **15.6** | 0.1684 | 1140 | 11.9 |
| **2** | Coarse Sand | Cum. | 653.62 | 0.4816 | 315 | 3.1 | 0.2970 | 194 | 2.0 |
| **3** | Coarse Agg. (40mm) | Cum. | 1246.10 | 0.1551 | 193 | 1.9 | 0.0372 | 46 | 0.5 |
| **4** | Coarse Agg. (20mm) | Cum. | 1458.00 | 0.3296 | 481 | 4.7 | 0.1201 | 175 | 1.8 |
| **5** | Coarse Agg. (10mm) | Cum. | 1368.00 | 0.2582 | 353 | 3.5 | 0.0876 | 120 | 1.3 |
| **6** | Bricks | 1000 Nos. | 5373.35 | 0 | 0 | 0.0 | 0.3063 | 1646 | 17.1 |
| **7** | Fine Sand | Cum. | 617.83 | 0.1577 | 97 | 1.0 | 0.1114 | 69 | 0.7 |
| **8** | Reinforcement Bars (Steel ) | Qtls. | 5307.80 | 0.1815 | 963 | 9.5 | 0.1833 | 973 | 10.1 |
| **9** | Chemical for Anti-termite treatment | Lt. | 185.00 | 0.6982 | 129 | 1.3 | 0.1843 | 34 | 0.4 |
| **10** | Marble Stone Flooring | Sqm. | 1130.30 | 1.0565 | 1194 | 11.7 | 0.8670 | 980 | 10.2 |
| **11** | Marble Chips | Qtls. | 205.39 | 0.0109 | 2 | 0.0 | 0.0109 | 2 | 0.0 |
| **12** | Ceramic Wall Tiles | Sqm. | 409.04 | 0.2325 | 95 | 0.9 | 0.1301 | 53 | 0.6 |
| **13** | Dark Shade Pigment | Kg. | 55.00 | 0.0354 | 2 | 0.0 | 0.0354 | 2 | 0.0 |
| **14** | Bitumen | Ton. | 31805.24 | 0.0015 | 48 | 0.5 | 0.0008 | 25 | 0.3 |
| **15** | Kerosene Oil | Lt. | 51.00 | 0.1101 | 6 | 0.1 | 0.0559 | 3 | 0.0 |
| **16** | Brick Bats | Cum. | 60.00 | 0.0501 | 3 | 0.0 | 0.0255 | 2 | 0.0 |
| **17** | Water Proofing Compound | Kg. | 40.00 | 0.585 | 23 | 0.2 | 0.2971 | 12 | 0.1 |
| **18** | Wood (Frames) | Cum. | 30232.00 | 0.01 | 302 | 3.0 | 0.0079 | 239 | 2.5 |
| **19** | Wood (Shutters) | Cum. | 30232.00 | 0.0116 | 351 | 3.4 | 0.0095 | 287 | 3.0 |
| **20** | Cement Primer | Lt. | 145.00 | 0.2853 | 41 | 0.4 | 0.3502 | 51 | 0.5 |
| **21** | Oil Bond Distemper | Kg. | 28.00 | 0.6113 | 17 | 0.2 | 0.7503 | 21 | 0.2 |
| **22** | Cement Paint | Kg. | 30.00 | 0.6707 | 20 | 0.2 | 0.8232 | 25 | 0.3 |
| **23** | Primer (Wood) | Lt. | 120.00 | 0.1269 | 15 | 0.2 | 0.1062 | 13 | 0.1 |
| **24** | Synthetic Enamel Paint | Lt. | 215.00 | 0.0981 | 21 | 0.2 | 0.0821 | 18 | 0.2 |

| MATERIAL AND LABOUR CONSUMPTION | | | | LOAD BEARING STRUCTURE | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | SINGLE STOREYED-R | | | DOUBLE STOREYED-R | | |
| | **Material with Carriage** | **Unit** | **Rates on dated: 2014-2015** | **Material / Labour consumption per sqm.** | **Per sqm. rates (materials, labour& misc.)** | **% of total cost** | **Material / Labour Consumption per sqm.** | **Per sqm.rates (materials, labour& misc.)** | **% of total cost** |
| **S. No.** | **LABOUR** | | | | | | | | |
| **25** | Mason/ Painter/Carpenter | Day | 450.00 | 2.4731 | 1113 | 10.9 | 2.4688 | 1111 | 11.6 |
| **26** | Black-smith / Mixer Operator/Fitter | Day | 400.00 | 0.1729 | 69 | 0.7 | 0.1746 | 70 | 0.7 |
| **27** | Mate | Day | 350.00 | 0.0202 | 7 | 0.1 | 0.0065 | 2 | 0.0 |
| **28** | Beldar | Day | 250.00 | 2.886 | 722 | 7.1 | 1.3641 | 341 | 3.6 |
| **29** | Bhisti | Day | 250.00 | 1.7268 | 432 | 4.2 | 1.5356 | 384 | 4.0 |
| **30** | Coolie | Day | 250.00 | 1.9948 | 499 | 4.9 | 2.7334 | 683 | 7.1 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | | | | |
| **31** | Batch Mix plant+ Pump Charges | Per Cum. | 500.00 | 0.1767 | 88 | 0.9 | 0.1865 | 93 | 1.0 |
| **32** | Mixer + Vibrator | Per Day | 1200.00 | 0.1362 | 163 | 1.6 | 0.1089 | 131 | 1.4 |
| **33** | Excavator 3D with Driver+ Hire & Running Charges Loader | Per Day | 8000.00 | 0.0017 | 14 | 0.1 | 0.0006 | 5 | 0.1 |
| **34** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | Sqm. | 331.56 | 1.5581 | 517 | 5.1 | 1.4039 | 465 | 4.8 |
| **35** | Sundries, Scaffolding & Misc. | L.S | 1.7 | 180.9839 | 308 | 3.0 | 116.7873 | 199 | 2.1 |
| | | | | | 10198 | 100.0 | | 9613 | 100.0 |
| | **PLINTH AREA RATE (RS.)** | | | | **11845** | **Per Sqm.** | | 11166 | Per Sqm. |

**Computation Procedure**

Example Ranchi City: Material (Cement)

Unit Rate of Cement = Rs. 6769.98 per Ton
Per Sqm. Consumption of Cement = 0.2355 Ton
Cost of Cement per Sqm. (6769.98 x 0.2355) = Rs. 1594
Total Cost of Material from column 1 to 35 = Rs. 10198

Percentage (%) of each material, labour & misc items (say cement) = $\frac{1594}{10198}$ **x 100** = **15.6 %**

Now, Plinth Area Rate of Building Construction at Ranchi City (**Single Storey Residential**) (Add 1% Water Charges & 15% Contractor's Profit) = 10198 x 1.01 x 1.15

= **Rs. 11845**

Hence, the Percentage Values and Plinth Area Rate Values match with the values shown in Table 2.1 (Cement).

# CHAPTER 3

# STUDY OF BUILDINGS, ROADS AND BRIDGES IN 80 CITIES AND TOWNS

## 3.0 Introduction

The study-cum-survey was split into two phases as per the scope of the project. In the first phase, the survey of identified 40 cities was carried out, as shown in Table 3.1. In second phase, 40 cities and towns were identified with a view to cover the entire country as shown in Table 3.2.

## 3.1 List of Cities / Towns Identified for Survey

Based on the requirements and terms of reference of the project specified by the Ministry, the list of identified cities in two phases, and consolidated is given in Table 3.1 - 3.3.

**Table 3.1** List of 40 cities/towns for performing survey of buildings, roads and bridges (I$^{st}$ Phase)

| **Towns / Cities surveyed** | | | |
|---|---|---|---|
| **North** | **South** | **East** | **West** |
| Chandigarh (HR) | Hyderabad (Telangana) | Patna (BH) | Jaipur (RJ) |
| Faridabad (HR) | Visakhapatnam (AP) | Raipur (CHH) | Jodhpur (RJ) |
| Rohtak (HR) | Mahbubnagar (Telangana) | Dhanbad (JKH) | Kota (RJ) |
| Hamirpur (HP) | Puducherry (TN) | Ranchi (JKH) | Ganganagar (RJ) |
| Shimla (HP) | Chennai (TN) | Jamshedpur (JKH) | |
| Palampur (HP) | Coimbatore (TN) | Bhubaneshwar (OD) | |
| Jammu (J&K) | | Rourkela (OD) | |
| Srinagar(J&K) | | | |
| Lucknow (UP) | | | |
| Kanpur (UP) | | | |
| Ghaziabad (UP) | | | |
| Agra (UP) | | | |
| Allahabad (UP) | | | |
| Bareilly (UP) | | | |
| Aligarh (UP) | | | |
| Saharanpur (UP) | | | |
| Khatauli (UP) | | | |
| Dehradun (UK) | | | |
| Haridwar (UK) | | | |
| Roorkee (UK) | | | |
| Haldwani (UK) | | | |
| Rajpura (PB) | | | |
| Ludhiana (PB) | | | |
| Total = 23 | Total = 6 | Total = 7 | Total = 4 |
| **Total number of towns / cities surveyed = 40 (I$^{st}$ Phase)** | | | |

**Table 3.2** List of 40 cities / towns for performing survey of buildings, roads and bridges (II$^{nd}$ Phase)

| North | South | East | West |
|---|---|---|---|
| Tehri (UK) | Panji (GOA) | Howrah (WB) | Surat (GJ) |
| Uttarkashi (UK) | Cochin (KL) | South 24 Parganas (WB) | Vadodara (GJ) |
| Gwalior (MP) | Trivandrum (KL) | Siliguri (WB) | Ahmedabad (GJ) |
| Bhopal (MP) | Tirupati (AP) | Darjeelling (WB) | Mumbai (MH) |
| Indore (MP) | Anantapur (AP) | Malda (WB) | Nagpur (MH) |
| Delhi | Gulbarga (KA) | Gangtok (SK) | Aurangabad (MH) |
| Nangal (PB) | Mysore (KA) | Guwahati (ASM) | Pune (MH) |
| Pathankot (PB) | Bangalore (KA) | Jorhat (ASM) | |
| Jallandhar (PB) | Dharwad (KA) | Itanagar (AR) | |
| Bhatinda (PB) | Tiruchirappalli (TN) | Shillong (ML) | |
| Udhampur (J&K) | | Port Blair (UT) | |
| Gorakhpur (UP) | | | |
| Total = 12 | Total = 10 | Total = 11 | Total = 7 |
| **Total number of towns / cities surveyed = 40 (II$^{nd}$ Phase)** | | | |

A complete list of 80 cities/towns is shown in Table 3.3 and the salient features of a few projects surveyed in these cities/towns are discussed in the Section 3.2.

**Table 3.3** List of 80 cities/towns (alphabetically)

| **Andaman Nicobar (UT)** | **Jammu and Kashmir (J & K)** | **Puducherry (UT)** | Khatauli |
|---|---|---|---|
| Port Blair | Jammu | **Punjab** | Lucknow |
| **Andhra Pradesh** | Srinagar | Jalandhar | Saharanpur |
| Anantapur | Udhampur | Ludhiana | **Uttarakhand** |
| Tirupati | **Jharkhand** | Nangal | Dehradun |
| Visakhapatnam | Dhanbad | Pathankot | Haldwani |
| **Arunachal Pradesh** | Jamshedpur | Rajpura | Haridwar |
| Itanagar | Ranchi | **Rajasthan** | Roorkee |
| **Assam** | **Karnataka** | Ganganagar | Tehri |
| Guwahati | Bangalore | Jaipur | Uttarkashi |
| Jorhat | Dharwad | Jodhpur | **West Bengal** |
| **Bihar** | Gulbarga | Kota | Darjeeling |
| Patna | Mysore | **Sikkim** | Howrah |
| **Chandigarh (UT)** | **Kerala** | Gangtok | Malda |
| **Chhattisgarh** | Cochin | **Tamil Nadu** | Siliguri |
| Raipur | Trivandrum | Chennai | South 24Parganas |
| **Delhi (UT)** | **Madhya Pradesh** | Coimbatore | |
| **Goa** | Bhopal | Karaikudi | |
| Panji | Gwalior | Tiruchirappalli | |
| **Gujarat** | Indore | **Telangana** | |
| Ahmedabad | **Maharashtra** | Hyderabad | |
| Surat | Aurangabad | Mahbubnagar | |
| Vadodara | Mumbai | **Uttar Pradesh** | |
| **Haryana** | Nagpur | Agra | |
| Faridabad | Pune | Aligarh | |
| Rohtak | **Meghalaya** | Allahabad | |
| **Himachal Pradesh** | Shillong | Bareilly | |
| Hamirpur | **Odisha** | Ghaziabad | |
| Palampur | Bhubaneswar | Gorakhpur | |
| Shimla | Rourkela | Kanpur | |

## 3.2 Salient Features of the Survey

The salient features of the information collected are as follows.

**State 1: Andaman Nicobar**

**City 1: Port Blair**

In Port Blair, residential and non-residential buildings were studied as shown in Figure 3.1 and the other building sites were also surveyed. The necessary information was collected from state P.W.D. The construction cost in the area was found about of Rs. 15,000 to 20,000 per sqm. depending upon the type of work carried out. The labour rate was found in the range of Rs. 350 to 550 per day, having large variation. The normal brick rate was found to be Rs. 10 per brick. Pitched roof were seen mainly in building because of high rainfall area, as shown below in the images. Due to non-availability of materials like cement, bricks/blocks, steel in the area, they are transported from Kolkata or Chennai which result in to high cost of construction.

**Figure 3.1** Ongoing construction of Residential & Non-residential Building, Port Blair

**State 2: Andhra Pradesh**

**City 2: Anantapur)**

In Anantapur, a shopping complex under construction was studied as shown in Figure 3.2 and the residential and non-residential buildings were visited. The necessary information was collected from state PWD. The construction of a Shopping Complex near Clock Tower started during January 2015 and expected to be completed in December, 2015. The construction cost in area was found in the range of Rs. 13,400 to Rs. 16,600 per sqm. for non-

residential buildings and Rs. 12,000 to Rs. 13,000 for residential buildings depending upon the type of work carried out. The labour rate was found in the range of Rs. 300- Rs.500 per day from unskilled and skilled. The normal brick rate was found to be Rs. 6.5 per brick and coarse sand rate Rs.720 per cum.

**Figure 3.2** Shopping Complex Building under construction

**City 3: Tirupati**

In Tirupati, a showroom under construction was studied as shown in Figure 3.3 and the residential buildings were also surveyed. Material supplier provided basic rates of material and the most of the information about questionnaire. The construction was started during December 2014.The construction cost for a residential building in the area range from Rs. 14,800 to Rs. 19,500 per sqm. The normal brick rate was found about Rs. 6.2 per brick, cement: Rs. 350 per bag, coarse sand: Rs. 1,236 per cum. and the fine sand Rs.1, 059.4 per cum. The labour rate was found in the range of Rs. 325 to Rs. 500 per day, for unskilled and skilled.

**Figure 3.3.** Four storey Showroom near Trimula Road at Tirupati

**City 4: Visakhapatnam**

In Visakhapatnam, a commercial complex multi storeyed building under construction was studied as shown in Figure 3.4 and the survey of residential & non-residential buildings was also carried out. The construction cost in the area was found in the range of Rs. 12,000 to Rs. 14,000 per sqm. for residential and Rs.12,000 to Rs. 18,000 sqm. for other typology of buildings like hotels etc. depending upon the type of specifications used in the construction. The normal brick rate was found to be Rs 6.5 per brick and coarse sand rate Rs. 900 per cum The labour rate was found in the range of Rs 400 to Rs. 600 per day, as unskilled and skilled which is quite high.. There is no local construction material available in the area. All the construction materials are being transported from Hyderabad or their cities. The coarse aggregate and the fine aggregates rates also found in Rs. 848 per cum. The labour rate for mason was in the range of Rs.350 to Rs. 500 per day, which is quite high. In Visakhapatnam also, alternative materials for walling are commonly used as mentioned in the case of Hyderabad.

**Figure 3.4** Commercial building under construction in Visakhapatnam

**State 3: Arunanchal Pradesh**

**City 5: Itanagar**

In Itanagar, a residential apartment and shopping complex site were studied as shown in Figures 3.5 and 3.6 and other sites were also visited. Necessary information was collected from state P.W.D office. The designated contractor provided most of the information of the questionnaire. The construction cost in the area was found in the range of Rs. 13,000 to Rs.

14,500 per sqm. for residential and non-residential buildings. The labour rate was found in the range of Rs. 550 per day. The normal brick rate was found to be Rs. 7.5 per brick.

**Figure 3.5** Construction of Residential Apartments at Itanagar

**Figure 3.6** Construction site of Shopping Complex at Itanagar

**State 4: Assam**

**City 6: Guwahati**

In Guwahati, a hotel building under construction was studied as shown in Figure 3.7 and the other residential and non-residential buildings were also surveyed. Contractor gave the information about questionnaire. The construction of Hotel Building near Deshbhakta Indoor Stadium started during September, 2012 and expected to be completed during April, 2015. The construction cost for a residential building in the area was Rs. 13,000 to Rs. 16,500 per sqm. The rates of materials used at sites, were also collected from the shops. The normal brick rate was about of Rs. 9 per brick, cement, Rs. 370 per bag, and fine sand Rs. 1,350 per cum. The labour rate was found in the range of Rs. 300 to Rs. 400 per day, for unskilled and skilled. Because of the transportation cost of the building materials, due to non-availability of locally building materials the cost of construction is high.

**Figure 3.7** Hotel building near Deshbhakta Indoor Stadium at Guwahati

**City 7: Jorhat**

In Jorhat, a residential building under construction was studied as shown in Figure 3.8 and the other residential and non-residential buildings were surveyed. Officials of state PWD provided necessary information about the construction activity in the area and the required data. The Kaziranga Technical University, which is on the outskirts of the city, was also visited. It is a G+ 5 storeyed building. The construction cost for a residential building in the area was found to be Rs. 9,500 to Rs. 11,000 per sqm. The normal brick rate was found to be in the range of Rs. 5.7 per brick. The area all around Jorhat was quite Clayey, so mostly burnt clay bricks used. The coarse sand was named by Kanhayighat sand and Maryanne sand having rates in the range of Rs. 770 to Rs.880 per cum. and Rs. 250 to Rs. 350 per cum. respectively.

**Figure 3.8** Ongoing construction of Residential building in Jorhat

**State 5: Bihar**

**City 8: Patna**

In Patna, a multi storeyed commercial complex under construction was studied as shown in Figure 3.9 and the residential, commercial & non-residential building sites were surveyed. The construction cost in the area was found in the range of Rs. 8,000 to 10,000 per sqm. for residential Rs. 10,000 to 12,000 per sqm. for school / colleges and Rs. 12,000 to 14,000 per sqm. for other typology of buildings depending upon the type of work carried out. The labour rate was found in the range of Rs 200 to 300 per day as unskilled and skilled which is quite less. The normal brick rate was found to be Rs 4.0 per brick and coarse sand and fine sand

rates Rs. 990 per cum and Rs. 1,125 per cum. In Bihar, the cost of construction was found to be less due to availability of cheap labour.

**Figure 3.9** Commercial building under construction in Patna

**State 6: Union Territory**

**City 9: Chandigarh**

In Chandigarh, a multistoreyed apartment building was studied as shown in Figure 3.10 and the other residential, commercial & non-residential building sites were surveyed. The construction cost in the area was found in the range of Rs. 9,000 to Rs. 11,000 per sqm. for residential and Rs. 10,000 to 12,000 per sqm for school / colleges and Rs. 12,000 to 14,000 per sqm. for other typology of buildings depending upon the type of specifications used in the work carried out. The labour rate was found in the range of Rs. 300 to Rs. 450 per day as unskilled and skilled. The normal brick rate was found to be Rs. 5.7 per brick.

**Figure 3.10** Apartment building under construction in Chandigarh

**State 7: Chhattisgarh**

**City 10: Raipur**

In Raipur, the residential & non-residential buildings were surveyed. The construction cost for residential buildings was found to be Rs.10, 000 to 12,000 per sqm. The costs of different materials were also obtained. The normal brick was found to be in the range of Rs. 3.8 per brick. The coarse aggregate and the fine aggregates rates also found in the range of Rs. 950 to 1,300 per cum. The contractor as well as the site engineer present at the site provided us all the information including specifications etc. Figure 3.11 shows a commercial complex building under construction.

**Figure 3.11** RCC (Frame structure) Commercial building under construction

**State 8: Union Territory**

**City 11: Delhi**

In Delhi, residential apartments under construction were studied as shown in Figure 3.12 and other types of building sites were also surveyed. The construction site of a G+8 Residential flats was surveyed at Timarpur. The construction started in Oct, 2012 and scheduled to be completed in 2017. The Parshavnath Developers' Ltd. engineer provided most of the information of the questionnaire. The construction cost in the area was found about of Rs. 12,000 to Rs.16,000 per sqm. for residential and Rs.15,000 to Rs.20,000 for non-residential buildings depending upon the type of work carried out. The labour rate was found in the

range of Rs. 350-600 per day, having large variation. The normal brick rate was found to be Rs. 6 per brick.

**Figure 3.12** Ongoing construction of Residential Apartments at Timarpur, Delhi

**State 9: Goa**

**City 12: Panji**

In Panji, a residential building under construction was studied as shown in Figure 3.13 and the survey of residential and non-residential buildings was carried out. The contractor of the site provided all the information. The construction cost for a residential and non-residential building varied in the range of Rs. 15,000 to Rs.17, 000 per sqm. The labour cost in Panji was found to be Rs. 500 to Rs. 700 per day. The market rates from nearby shops were also collected. The rate of normal brick in the area was found to be Rs.7 per brick and Cheera Stone (Block) of size 30x23x18 cm, Rs. 25 per block dressed stone. The Cheera Stone is mostly used in residential buildings.

**Figure 3.13** Ongoing construction of Residential Building at Panji

**State 10: Gujarat**

**City 13: Ahmedabad**

In Ahmedabad, a multi storeyed Shopping Mall under construction was studied as shown in Figure 3.14 the survey of non-residential buildings was also carried. The necessary information was collected from state PWD. The private non - residential building under construction was also visited. Project manager provided all the information. The construction is going on from July, 2013 of site of Shopping Mall. The construction cost for non-residential building varied in the range of Rs. 12,000 to Rs. 15,000 per sqm. and Rs. 12,000 to Rs. 14,000 for residential buildings. Large variation was there in material costs and labour costs at different places. The labour cost in Ahmedabad was found to be Rs. 400 to Rs. 600 per day. The rate of normal brick in the nearby area was found to be Rs. 4.5 per brick.

**Figure 3.14** Site of Shopping Mall at Ahmedabad

**City 14: Surat**

In Surat, a multistoreyed office building under construction was studied as shown in Figure 3.15 and survey of non-residential buildings/sites were performed .The necessary information given by CPWD and State PWD officials. The construction of a Office Building Near Income tax office was going on from September, 2012 and was expected to be completed by 2015. The designated contractor, who was also present at the site, provided most of the information of the questionnaire. The site engineer provided the required details. The construction cost in the area was found in the range of Rs. 11,052 to Rs. 11,580 per sqm. for non-residential buildings and Rs. 10,000 to Rs. 11,000 for residential buildings depending

upon the type of work. The labour rate was found in the range of Rs. 350 to Rs. 600 per day. The normal brick rate was found to be Rs. 5.50 per brick and coarse sand rate Rs. 1,120 per cum.The Schedule of Rates (SoR) was obtained from the concerned authority.

**Figure 3.15** Office Building under construction at Surat

**City 15: Vadodara**

In Vadodara, a multi storeyed hostel building under construction was studied as shown in Figure 3.16 the residential buildings were surveyed. CPWD and PWD engineers provided copies of BoQs and most of the information about questionnaire. The construction stared during January 2013. The construction cost for a residential building in the area was found Rs. 12,000 to Rs. 15,500 per sqm. Contractor provided rates of different materials used.

**Figure3.16** Hostel building in Polytechnic Campus Vadodara

The normal brick rate was found to be around Rs. 6.20 per brick, cement, Rs. 255 per bag, coarse sand (Retti) Rs. 1,236 per cum and fine sand Rs. 1,059.4 per cum. The labour rate was found in the range of Rs. 325 to Rs. 500 per day, for unskilled and skilled labour respectively.

**State 11: Haryana**

**City 16: Faridabad**

In Faridabad, a commercial complex under construction was studied as shown in Figure 3.17 and the residential, commercial & non-residential building sites were surveyed. The construction cost in the area was found in the range of Rs. 11,000 to 13,000 per sqm. for residential and Rs. 12,000 to Rs. 14,000 per sqm. for school / colleges and Rs. 14,000 to Rs. 20,000 per sqm. for other typology of buildings depending upon the type of specifications used in the work carried out. The labour cost was found to be Rs. 315 to Rs. 480 per day. The cost of normal brick in the area was found to be Rs. 5.0 per brick and cement Rs. 280 per bag. All the information filled in the questionnaire.

**Figure 3.17** Commercial complex under construction in Faridabad

**City 17: Rohtak**

In Rohtak, an office complex under construction was studied as shown in Figure 3.18 and the survey of residential & non-residential buildings was carried out. The construction cost in the area was found in the range of Rs. 11,000 to 13000 per sqm. for residential, and Rs. 12,000 to Rs. 14,000 per sqm. for hospitals, school / colleges and Rs. 14,000 to Rs. 20,000 sqm. for other typology of buildings depending upon the type of specification used in the project. The labour cost in Rohtak was found to be Rs. 325 to Rs. 475 per day. The cost of normal brick in the area was found to be Rs. 5.6 per brick and coarse sand Rs.1, 470 per cum.

**Figure 3.18** Office complex under construction in Rohtak

**State 12: Himachal Pradesh**

**City 18: Hamirpur**

In Hamirpur, a hotel building under construction was studied as shown in Figure 3.19 and the survey of residential & non-residential buildings was carried out. The construction cost in the area was found in the range of Rs. 12,000 to Rs. 14,000 sqm. for residential and Rs. 13,000 to 15,000 sqm. for other typology of buildings depending upon the type of specifications used. The normal brick was found to be Rs 7 per brick and coarse sand rate Rs. 1,380 per cum. Due to transportation cost, the material cost was found to be very high. RCC frame structure buildings are commonly used in Hamirpur. Devdar wood is used in door & window and Stone masonry used in buildings.

**Figure 3.19** Hotel building under construction in Hamirpur

**City 19: Palampur**

In Palampur, a hospital building under construction was studied as shown in Figure 3.20 the survey of residential & non-residential buildings was carried out. The construction cost in the area was found in the range of Rs. 12,000 to Rs. 14,000 per sqm. for residential and Rs. 13,000 to Rs. 15,000 per sqm. for other typology of buildings depending upon the type of specifications used in the project.

The normal brick was available for Rs. 6 per brick and steel bar were found to be Rs. 48 kg. The cement bag was found at Rs. 325, coarse sand Rs. 1,280 per cum.

**Figure 3.20** Hospital building under construction in Palampur

**City 20: Shimla**

In Shimla, a hotel building under construction was studied as shown in Figure 3.21 and the survey of residential & non-residential buildings was carried out. The construction cost in area was found to the range of Rs. 13,000 to Rs. 15,000 sqm. for residential and Rs. 14,000 to Rs. 20,000 per sqm. for other typology of buildings like hotels etc.. The normal brick was available for Rs. 7 per brick and steel bar were found to be Rs. 48 per kg. The cost of different materials such as cement: Rs. 325 per bag and coarse sand: Rs. 1280 per cum. The labour cost in Shimla was found to be Rs. 350 to Rs. 550 per day. Due to transportation cost,

the material cost was found to be very high. RCC frame structure is commonly used in Shimla. Devdar wood is commonly used in doors and windows.

**Figure 3.21** Hotel building under construction in Shimla

**State 13: Jammu & Kashmir (J & K)**

**City 21: Jammu**

In Jammu, the residential and non-residential buildings were surveyed. Figure 3.22 shows shopping complex under construction at Jammu. The contractor present at the site provided most of the information of the questionnaire. The construction cost in the area was found in the range of Rs. 11,000 to 14,000 per sqm. depending upon the type of work carried out and specifications followed.

**Figure 3.22** Shopping complex under construction at Jammu

The labour rate was found in the range of Rs. 350 to 500 per day. The cost of materials such as coarse aggregate (Kankra) Rs. 3,200 per tipper and fine aggregate (Bajri) in Rs. 3,600 per tipper (1 tipper-5.66 cum.) commonly used building. The normal brick rate was found to be Rs. 4.8 per brick.

**City 22: Srinagar**

In Srinagar, the residential & non-residential buildings were surveyed. The construction cost of residential buildings range between Rs. 12,000 to 14,000 per sqm. Similarly, the cost of non-residential buildings was found to be in the range of Rs.14,000 to 16,000 per sqm. The normal brick rate was found to be in the range of Rs. 7 per brick. The cost of cement is Rs.425 per bag. The labour rate was found in the range of Rs 400 to 600 per day. Figure 3.23 shows guest house under construction.

**Figure 3.23** Govt. Guest house at Srinagar

**City 23: Udhampur**

In Udhampur, a residential complex and hospital complex under construction were studied as shown Figure 3.24 The survey of residential, non-residential building was also carried out. The hospital complex being built by army is a frame structure building. The rate of construction for a residential building in the area was found to be Rs.12, 000 to Rs. 14,000 per sqm. And for non residential building the plinth area rate was found to be Rs. 14,500 to Rs.18, 000. The normal brick rate was found about Rs.7 per brick. The mason and labour cost was found to be Rs.500 per day and Rs.350 per day. Brick masonry was used in building construction.

**Figure 3.24** Military Hospital under construction at Udhampur

**State14: Jharkhand**

**City 24: Dhanbad**

In Dhanbad, the survey of residential & non-residential buildings was carried out. The construction site of an apartment building was surveyed Figure 3.25. The construction cost for a residential building varies in the range of Rs. 9,000 to 12,000 per sqm. A large variation in material and labour costs was observed. The labour cost was found to be Rs.300 to 400 per day, which is low as compared to other cities. The cost of normal brick in the nearby area was found to be Rs.5 per brick. The costs in non-residential buildings vary between Rs. 11,000 to 15,000 per sqm.

**Figure 3.25** Apartment under construction in Dhanbad

**City 25: Jamshedpur**

In Jamshedpur, the following residential and non-residential buildings were surveyed. The state PWD and Jamshedpur Utilities and Services Company (JUSCO) staff helped to survey one of their sites, known as "Asanbuni Inter College, Asanbuni", at the back side of TATA Motors manufacturing unit. The contractor present at the site provided most of the information. The construction cost for a residential building in the nearby area was found to be between Rs.8, 000 to 10,000 per sqm. The rates for different materials were also obtained from the market.

The normal brick rate was found to be in the range of Rs. 5.5 per brick. The coarse aggregate and fine aggregates also do not have any fixed price, as the sector is being dominated by the black market. The Prakash Jha Mall, located on the outskirts of the city, was also inspected which is being built for a Basement + Ground + 10 storey as shown in Figure 3.26

**Figure 3.26** Construction of Prakash Jha Mall

**City 26: Ranchi**

In Ranchi the following buildings/ sites were visited. After taking the necessary information from state PWD, the construction site of a G+8 Housing complex was surveyed which, was being built for the state Police Housing Agency (Figure 3.27). The construction of the building started during Oct, 2013 and was scheduled to be completed by March 2015. The designated contractor, who was also present at the site, provided most of the information of the questionnaire. Another Residential complex being built near the railway station was also visited. The construction cost in nearby area was found to be in the range of Rs. 12,000 to 16,000 per sqm. depending upon the type of specifications used in the residential and non-residential buildings.

The labour rate was found in the range of Rs. 450 per day, which is quite high. The normal brick rate was found to be Rs. 3.8 per brick. But during the visual inspection, it was observed that the building was built with poor workmanship using unskilled labours. The survey in the

near around sites for non-residential buildings like shop, offices show similar kind of poor quality. The rates of locally available and conventional building materials were also collected.

**Figure 3.27** Ongoing construction of Police Housing Apartments, Ranchi

**State 15: Karnataka**

**City 27: Bangalore**

In Bangalore, the shopping mall and office buildings were studied as shown in Figures 3.28 and 3.29.The construction site of a G+4 Shopping Mall complex was being built for the Private Corporate Sector. The contractor, at the site, provided most of the information of the questionnaire. Another residential and non-residential complex under construction near the railway station was also surveyed. The site engineer provided the required details. The construction cost in the area was found in the range of Rs. 16,000 to Rs. 19,200 per sqm. for non-residential and Rs.14,000 to Rs.15,500 for residential buildings depending upon the type of specifications used in the work carried out. The mason and labour rate were found in the range of Rs. 600 per day & Rs. 400 per day. The normal brick rate was found to be Rs. 7.5 per brick. But the concrete block masonry commonly used in building constructions and the concrete block rate was found Rs. 35 to 38 per block with a size of 40 x 20 x 15 cm. Local

coarse sand and fine sand named ‘Challakere’ & ‘Thirchur’ respectively rated Rs. 1940 per cum. & Rs. 3000 per cum.

**Figure 3.28** Ongoing construction of Shopping Mall in Bangalore

**Figure 3.29** Ongoing construction of Office building in Bangalore

**City 28: Dharwad**

In Dharwad, a residential building under construction was studied as shown in Figure 3.30 and the other residential and non-residential buildings were surveyed. The necessary information was collected from local engineers and contractors. The construction cost for a residential building in the area was found to be Rs. 12,000 to Rs. 14,000 per sqm. The normal brick rate was found around Rs.5 per brick. The contractor and the site engineer provided all the information related to questionnaire. The survey was carried out in the near around sites and the shops, dealing with construction materials. The labour rate was found in the range of Rs.400 to Rs. 600 per day.

**Figure 3.30** Ongoing construction of Residential Building in Dharwad

**City 29: Gulbarga**

In Gulbarga, an apartment building under construction was studied as shown in Figure 3.31 and the survey of non-residential buildings was carried out. The necessary information pertaining to questionnaire was collected from state PWD. The construction rate for a non-residential building varied in the range of Rs. 15,000 to Rs. 19,500 per sqm. The labour cost in Gulbarga was found to be Rs. 400 to Rs. 600 per day. The rate of normal brick in the nearby area was found to be Rs. 6 per brick.

**Figure 3.31** Road Work near PWD Gulbarga

**City 30: Mysore**

In Mysore, The construction site of a G+4 Additional District Court building under construction as shown in Figure 3.32 was studied and other buildings were also surveyed. The necessary information was obtained from state PWD people. P.W.D staff provided most of the information of the questionnaire. The construction cost in the area was found in the range of Rs. 13,000 to Rs. 15,000 per sqm. for residential and non-residential buildings depending upon the type of work carried out. The labour rate was found in the range of Rs.400 to Rs.600 per day. The Nandi wood costing Rs. 63,500 per cum. is used as local construction material for wood work. The normal brick rate was found to be Rs. 6 per brick.

**Figure 3.32** Additional District Court at Mysore

**State16: Kerala**

**City 31: Cochin**

In Cochin, an apartment building and a mall under construction was studied as shown in Figures 3.33 and 3.34and both residential and non-residential buildings were also surveyed. The site engineer and the supervisor provided the necessary information about the construction and the basic rates of materials. The site was a combination of residential and non-residential buildings. The construction cost for a residential building in the area was found to be Rs. 13,000 per sqm. The normal brick rate was found to be about Rs. 11 per brick. Nearby shops with construction materials were also surveyed. There were the two types of blocks used in masonry: (i) ACB (Aerated concrete block) (ii) CC block. The rates are found in the range of Rs.120 per block having size 60 x 20 x 20 cm. and Rs. 18 per block having size 30 x 20 x 20 cm. Local sand used name was 'Amsand' and the rate was found about 1490 per cum.

**Figure 3.33** Construction site of Residential Apartment building at Cochin

**Figure 3.34** Construction site of Mall Complex at Cochin

**City 32: Trivandrum**

In Trivandrum, a G+2 residential complex and office building under construction were studied as shown in Figures 3.35 and 3.36 and the survey of residential and non-residential buildings were also carried out. The state P.W.D engineers provided necessary information of building construction and latest building rates including copies of BoQ of buildings. The construction rate for a residential building varies in the range of Rs. 14,000 to Rs. 16,500 per sqm. and for non-residential building ,the rate varies between Rs.15,000 to Rs.20,000 depending on the specifications used in the construction work. The mason and labour cost in

Trivandrum were found to be Rs. 700 per day & Rs. 450 per day. The rate of normal brick in the area was found to be Rs. 5 per brick.

**Figure 3.35** Construction site of Residential Building at Trivandrum

**Figure 3.36** Construction site of office at Trivandrum

**State 17: Madhya Pradesh**

**City 33: Bhopal**

In Bhopal, an apartment complex under construction was studied as shown in Figure 3.37 both residential & non-residential buildings were also surveyed. PWD engineers provided copies of BoQs and most of the information related to questionnaire. The construction cost for a non-residential building in the area was Rs.11,200 to Rs. 14,500 per sqm. The market survey was also carried out to find out the rate of materials and normal brick rate was about Rs. 5.5 per brick, cement: Rs. 310 per bag, coarse sand (Retti): Rs. 1,120 per cum. and the fine sand: Rs. 1,100 per cum. The labour rate was found in the range of Rs. 300 to Rs. 550 per day, as unskilled and skilled.

**Figure 3.37** Apartment complexes at Bhopal

**City 34: Gwalior**

In Gwalior, both residential and non-residential buildings were studied as shown in Figure 3.38. The necessary information was collected from the engineers of state PWD along with BoQs. Similarly the building construction cost in the area was found in the range of Rs. 9,500 to Rs. 13,000 per sqm. for residential and non-residential buildings depending upon the type of specifications used in the work carried out. The labour rates were found about Rs. 300 to Rs. 500 per day, for unskilled and skilled respectively. The normal brick rate was found to be Rs. 4.5 per brick and coarse sand rate Rs. 980 per cum.

**Figure 3.38** Commercial complex building under construction at Gwalior

**City 35: Indore**

In Indore, a hospital building under construction was studied as shown in Figure 3.39 and both residential and non-residential buildings were surveyed. The necessary information about questionnaire was collected from Development Project Engineer of PWD. The building construction is going on from April, 2014 of site of Medical Hospital near MTH chowk. The construction cost for a non-residential building varied ranged Rs. 10,000 to Rs. 12,600 per sqm. A large variation in material and labour costs was observed. The labour cost in Indore was found to be Rs. 350 to 550 per day.

**Figure 3.39** Medical Hospital at Indore

The rate of normal brick in the area was found to be Rs. 5.2 per brick. The survey of buildings in M.P reveals that stone is locally available material and people use the stone in different forms e.g. flooring and facing etc.

**State 18: Maharashtra**

**City 36: Aurangabad**

In Aurangabad, the survey of residential & non-residential buildings was carried out. The necessary information was obtained from state PWD and the construction site officials including BoQs of buildings and other information about construction. The building cost of residential building varied from Rs. 13,000 to Rs. 15,000 per sqm. and for commercial buildings Rs. 14,000 to Rs. 19,400 per sqm The labour rate was about Rs. 350 to Rs. 600 per day and the cost of normal brick was around Rs. 4.0 to 6.0 per brick. A trend of alternative walling materials like aerated concrete block or other light weight blocks, being used in the construction was also observed.

**Figure 3.40** Site of Non-Residential Building (Hotel) in Aurangabad


**Figure 3.41** Site of Non-Residential Building (Office) in Aurangabad

**City 37: Mumbai**

In Mumbai, both residential & non-residential building sites were visited as shown in Figure 3.42 and 3.43 The construction work of the residential apartment started in 2010 and the builder provided most of the information of the questionnaire and other details. The construction site of a school building was also visited and surveyed. It was a frame structure with the masonry in fly ash brick & block. The construction cost in the area was found in the range of Rs. 14,000 to Rs. 18,200 per sqm. for residential & commercial buildings respectively. The labour rate was found around Rs. 400 to Rs. 750 per day, for unskilled and

skilled respectively. The fly ash bricks rate was found to be Rs 7.0 per brick and coarse sand rate Rs. 3000 per Brash. (1 Brash = 100 $Ft^3$).


**Figure 3.42** Site of Residential Building in Mumbai

**Figure 3.43** Site of Non -Residential Building in Mumbai

**City 38: Nagpur**

In Nagpur, the survey of residential & non-residential buildings was carried out as shown in Figure 3.44 and 3.45. The necessary information was obtained from state PWD and the construction site officials including the basic rates of materials and labours etc. Market survey revealed that brick & block masonry and RCC frame are commonly used in most of building construction. The labour cost was found to be Rs. 250 to Rs. 450 per day. The survey of Maharashtra reveals that significant amount of recycled bricks/blocks are being used in the construction. This is primarily due to availability of such alternative materials and components in these cities.

**Figure 3.44** Site of Non-Residential Building in Nagpur

**Figure 3.45** Site of Residential Building in Nagpur

**City 39: Pune**

In Pune, a multi storeyed hospital building and residential complex were studied as shown in Figure 3.46 and 3.47. PWD engineers provided necessary details. Most of the buildings are brick & block masonry and RCC frame structure in buildings. The construction cost for residential buildings range between Rs. 13,000 to Rs. 16,150 per sqm. Material rates were obtained from shopkeepers and contractors respectively. The normal brick cost was Rs. 6.6 to Rs. 8.0 per brick and steel Rs. 46 per kg. The cement rate was found as Rs. 350 per bag, coarse sand Rs. 800 per cum. Due to paucity of land in the city most of building were multi storeyed.

**Figure 3.46** Site of Hospital building in Pune

**Figure 3.47** Site of Residential building in Pune

**State 19: Meghalaya**

**City 40: Shillong**

In Shillong, residential and commercial buildings were studied as shown in Figures 3.48 and 3.49 and the survey of residential and non-residential buildings was also carried out. The contractor of the site provided the information. The construction cost for a residential building varies in the range of Rs. 15,000 to Rs. 17,200 per sqm. A large variation in material costs and labour costs at different places was observed. The labour cost was found to be Rs. 450 per day. The nearby shops were also surveyed. The rate of normal brick in the area was found to be Rs.8 per brick and block of size 35 x 20 x 6.5 cm. of rate Rs. 14 per block.

**Figure 3.48** Under construction Residential Building at Shillong

**Figure 3.49** Commercial building construction at Shillong

**State 20: Odisha**

**City 41: Bhubaneswar**

In Bhubaneswar, the survey of residential, non-residential and commercial complexes were carried out. The construction sites of Police Housing and Welfare Corporation, Govt. of Odisha were visited. The site included "2 units of Secretariat Campus Fire Station Building", shown in Figure 3.50 The building is G+2 RCC structure started on 15.05.2013 and finished by March, 2014.

**Figure 3.50** New Fire Station Building near Secretariat, Bhubaneswar

**City 42: Rourkela**

In Rourkela, the survey of residential and non-residential buildings was carried out. In the construction site "Utkalamani Gopabandhu Institute of Technology Ladies Hostel", the cost of the building was targeted for Rs. 12,000 per sqm. A residential complex was also surveyed and the construction rate for a residential building varies in the range of Rs. 10,000 to 13,000

per sqm. The labour cost was found to be Rs. 300 per day, which is 40% less as compared to Ranchi. The rate of normal brick in the nearby area was found to be Rs. 5.5 per brick. The Figure 3.51 shows the ladies hostel under construction.

**Figure 3.51** Construction at Utakalamani Gopabandhu Institute of Tech. Girls Hostel, Rourkela

**State 21: Union Territory**

**City 43: Puducherry**

In Puducherry, the survey of ongoing construction of the New Court Complex, near the bus stop was performed (Figure 3.52). As there are no local construction materials available in the area except the bricks so all the building construction materials were transported from Tamil Nadu. The average cost for a standard residential building was in the range of Rs.16,000 per sqm. Another commercial- cum- residential complex was also surveyed. It was a completed structure with G+ 2 elevation. The labour rate for mason was in the range of Rs. 550 to 650 per day, which is quite high. The other rates of carpenter, blacksmith, and painter were in the range of Rs.500 to Rs.650 per day.

**Figure 3.52** New Court Complex, Puducherry

**State 22: Punjab**

**City 44: Jalandhar**

In Jalandhar a rehabilitation centre under construction was studied as shown in Figure 3.53 and residential and non-residential buildings were also surveyed. The necessary information was collected from P.W.D. office and the site contractor, provided most of the information of the questionnaire and the required details. The construction cost in the area was found in the range of Rs. 10,000 to Rs. 12,200 per sqm. for non-residential buildings depending upon the type of work carried out. The labour rate was found in the range of Rs. 350 to Rs. 550 per day. The normal brick rate was found to be Rs. 4.25 per brick and coarse sand rate Rs. 980 per cum.

**Figure 3.53** Rehabilitation Centre, Jalandhar

**City 45: Ludhiana**

In Ludhiana, a residential building under construction was studied as shown in Figure 3.54 and the survey of residential & non-residential buildings was carried out. The construction cost in the area was found in the range of Rs. 11,000 to Rs. 12,000 per sqm. for residential, and Rs. 12,000 to Rs.16,000 per sqm. for hospitals official and commercial buildings etc. depending upon the type of specifications used in the construction work. The normal brick cost was found in the range of Rs. 4.5 per brick. The labour cost was found to be Rs. 450 per

day. In whole of Punjab a very good quality bricks conforming to IS codes are available and therefore, are used in the building construction.

**Figure 3.54** Residential House under construction in Ludhiana

**City 46: Nangal**

In Nangal, a hospital building under construction was studied as shown in Figure 3.55 and lots of residential and non-residential buildings were surveyed. Engineers of PWD provided copies of BoQs and most of the information about questionnaire. The construction was going on from July, 2013 of a Hospital building near bus stand and would be completed on during 2015. The construction cost for a residential building in the area was Rs. 11,200 to Rs. 13,200 sqm. The normal brick rate was found to around of Rs. 5.0 per brick, the rate of cement, Rs. 280 per bag, coarse sand Rs. 1,130 per cum. and fine sand Rs. 1,260 per cum. The labour rate was found in the range of Rs. 350 to Rs. 500 per day, for unskilled to skilled.

**Figure 3.55** Hospital building near bus stand, Nangal

**City 47: Pathankot**

In Pathankot, a commercial complex under construction was studied as shown in Figure 3.56 and the residential and non-residential buildings/sites were visited. The designated contractor, present at the site, provided most of the information of the questionnaire.The construction cost in the area was found in the range of Rs. 14,000-15,000 per sqm. for non-residential buildings depending upon the type of specification used in the construction. The labour rate was found in the range of Rs. 350- Rs.500 per day. The normal brick rate was found to be Rs. 6 per brick and coarse sand rate Rs. 690 per cum.

**Figure 3.56** Residential building at Pathankot

**City 48: Rajpura**

In Rajpura, a multi storeyed apartment building was studied as shown in Figure 3.57 and the survey of residential & non-residential buildings was carried out. The construction cost in the area was found in the range of Rs. 10,000 to Rs. 12,000 per sqm. for residential, and Rs. 11,000 to Rs. 12,000 per sqm. for hospitals, school and Rs. 14,000 to Rs. 20,000 per sqm. for other typology of buildings depending upon the type of specifications used in the construction. The normal brick rate was found to be in the range of Rs. 5.0 per brick. The cement was found to be Rs. 300 per bag.

**Figure 3.57** Apartment building under construction in Rajpura

**State 23: Rajasthan**

**City 49: Ganganagar**

In Ganganagar, the survey of residential and non-residential buildings was carried out. The construction cost for a residential building varies in the range of Rs. 11,000 to 14,000 per sqm. A large variation was observed in material and labour costs at different places. The labour cost in Ganganagar was found in the range of Rs. 225 to 450 per day. Figure 3.58 shows the residential building under construction in Ganganagar, where cement concrete blocks alternative to bricks are used.

**Figure 3.58** Residential building with Cement Concrete blocks under construction

**City 50: Jaipur**

In Jaipur, the survey of residential buildings was carried out. After taking the necessary information from state PWD engineers, the construction site of school building was visited (Figure 3.59). The construction cost for a residential building varies in the range of Rs. 14,000 to 18,000 per sqm. The labour cost in Jaipur was found to be Rs.500 per day, which is high as compared to Jodhpur & Kota. The rate of normal brick in the area was found to be Rs. 4 per brick. Door frames of stone are used instead of wood or iron in the range of Rs. 1.85 per sqm.

**Figure 3.59** School Complex under construction at Jaipur

**City 51: Jodhpur**

In Jodhpur, residential and non-residential buildings were visited. The necessary information related to specifications and schedule of rates was given by Executive and Assistant engineers of state PWD. The housing complex being built (Figure 3.60) for the State Engineering departments for which the construction started around May, 2013 and was scheduled to be completed by November, 2014. The contractor, present at the site, provided most of the information of the questionnaire. The site engineer provided required details. The construction cost in the area was found to be in the range of Rs. 11,000 to 12,000 per sqm. depending upon the type of work carried out. The labour rate was found in the range of Rs. 350 to 600 per day as unskilled and skilled which is quite high. As stone is locally available material, the majority of walling material is stone. The stone concrete blocks are also used as an alternative to stone masonry as a walling and foundation material.

**Figure 3.60** Residential building under construction for Engineering department, Jodhpur

**City 52: Kota**

In Kota the residential and non-residential buildings were surveyed. State PWD shared the present cost of materials used at site. The construction cost for a residential building in the area was found to be in the range of Rs. 10,500 to 15,000 per sqm. The cost of coarse aggregate and the fine aggregates are found in the range of Rs.600 to 700 per cum. Figure 3.61 shows the shopping complex under construction in Kota. Similarly, residential buildings were also surveyed.

**Figure 3.61** Shopping Complex under construction at Kota

**State 24: Sikkim**

**City 53: Gangtok**

In Gangtok, a Cooperative society building under construction was studied as shown in Figure 3.62 and the other **r**esidential and non-residential buildings were surveyed. The construction of the Cooperative Society building started during March 2013 and expected to be completed during 2015. The necessary information was given by Mr. Hari Prasad Sharma, Superintendent Engineer (Road & Bridge) of P.W.D Gangtok. The construction cost in the area was found in the range of Rs 17,000 to Rs. 20,500 per sqm. for non-residential buildings and Rs. 15,000 to Rs. 16,500 for residential buildings depending upon the type of specifications used in the work carried out. The labour rate was found in the range of Rs. 350 to Rs. 400 per day, for unskilled and skilled. The normal brick rate was found to be Rs 12 per brick and coarse sand rate Rs. 1,065 per cum. In Nathula, a building was under

construction using S.I.P (Structural Insulated Panels).The cost of construction is very high due to non-availability of buildings materials locally. All the materials are transported from the neighboring towns.

**Figure 3.62** Co-operative Society Building near Deoroli, Gangtok

**State 25: Tamil Nadu**

**City 54: Chennai**

In Chennai, the survey of residential, non-residential and commercial complexes was carried out. The site of the Atlantic Apartments, built by CEEBROS Builders, was surveyed (Figure 3.63). The building is Basement + ground + 18 storeys. The construction started during Jan, 2014 and was scheduled to be finished by December, 2015. The actual rate of construction was not revealed by the contracting firm. But the use of Aerocon blocks (recycled) at the site gave us information regarding newer building materials used in the construction. The cost of construction near Chennai was found to be Rs. 15,000 to 18,000 per sqm.

Similarly, ongoing construction of Govt. Hospital and Medical College, Chepauk was surveyed. The entire campus was being developed by Vascon Engineers Pvt. Ltd. The building is a G+7 structure (Figure 3.64). The variation in the total cost for the Hospital building was almost 1.5 times that of a private construction, i.e. about Rs. 22,000 per sqm. which clearly slows the difference in costs in private and government constructions with

similar specifications and quantity. Another site of Apartment construction by ETA Properties and Investments Pvt. Ltd. was surveyed for a building of Basement + Ground+ 13 storeys. The cost of construction was found to be Rs.16, 000 per sqm.

**Figure 3.63** Atlantic Apartments, near Alsa Mall

**Figure 3.64** Site for govt. hospital and medical college Chepauk

**City 55: Coimbatore**

In Coimbatore, the survey of residential, non-residential and commercial complexes were carried out. The construction site of CMC Hospital, nearby Coimbatore Railway Station was surveyed (Figure 3.65). The building is designed as G+ 4 storeyed. The targeted cost for the building was in the range of Rs. 18,000 per sqm.

Another building VISTA Heights Apartments, near Trichy Road, which is a G+15 structure was also surveyed. The contractor and the site engineers provided all the information about the material and labour cost used in the site.

**Figure 3.65** CMC Hospital, near Coimbatore Railway Station

**City 56: Karaikudi**

In Karaikudi , an engineering college building B+G+ 6 under construction was studied as shown in Figure 3.66 and the survey of residential, non-residential and commercial complexes were also carried out. The actual rate of construction was not revealed by the contracting firm. The use of Aerocon blocks at the site gave us new information regarding newer building materials.

The rate of construction for a residential building and non-residential buildings was found to be Rs.15,000 to Rs. 20,000 per sqm. The labour rate varied between Rs. 350 to Rs. 550 for skilled and unskilled.

**Figure 3.66** Engineering College, Karaikudi

**City 57: Tiruchirappalli**

In Tiruchirappalli, The survey of residential, non-residential and commercial complexes were carried out. Residential complex and a college building were also studied as shown in Figure 3.67, 3.68. The contractor provided us most of the information. The construction cost for a residential building and non-residential building in the area were found to be Rs. 11,900 per sqm., and Rs. 13, 200 to 15,500 per sqm. The normal brick rate was found to be in the range of Rs. 5 per brick. The mason and labour cost in Tiruchirappalli were found to be Rs. 500 per day & Rs. 350 per day. Usually frame structure and bricks masonry were adopted in building construction.

**Figure 3.67** Construction site of College Building, Tiruchirappalli

**Figure 3.68** Construction site of Residential Building, Tiruchirappalli

**State 26: Telangana**

**City 58: Hyderabad**

In Hyderabad, a commercial complex multi storeyed building under construction was studied as shown in Figure 3.69 and the survey of residential & non-residential buildings was also carried out. The construction cost in the area was found in the range of Rs. 11,000 to 12,000 per sqm. for residential and Rs. 13,000 to Rs. 20,000 per sqm. for other typology of buildings like hotels etc. depending upon the type of specifications used in the construction. The brick rate was found to be in the range of Rs. 6 to Rs.8 per brick and coarse sand rate Rs. 918 per cum. The labour rate was found in the range of Rs 400 to Rs. 600 per day, as unskilled and skilled which is quite high. RCC frame structure is commonly used in Hyderabad. Due to non- availability of good quality bricks, the alternative bricks and blocks like aerated concrete blocks, cement concrete blocks, fly ash brick, compressed blocks, sand cement blocks are commonly used for walling.

**Figure 3.69** Commercial building under construction in Hyderabad

**City 59: Mahbubnagar**

In Mahbubnagar, a multi soreyed apartment building under construction was studied as shown in Figure 3.70 and the survey of residential & non-residential buildings was carried out. The construction cost in the area was found in the range of Rs. 11,000 to Rs. 14,000 per sqm. for residential and Rs. 12,000 to 18,000 per sqm. for hospitals or office buildings or other typology of buildings like hotels etc. depending upon the type of specifications used. The normal brick rate was found to be in the range of Rs. 6.5 per brick. The coarse aggregate and the fine aggregates rates also found in Rs. 808 per cum. and fine aggregate rate in Rs.1,173 per cum. The labour cost was found in the range Rs.225 to Rs. 300 per day. In Mahbubnagar also, alternative walling materials are used as mentioned in case of Hyderabad. This is largely due to non-availability of good quality bricks.

**Figure 3.70** Apartment building under construction in Mahbubnagar

**State 27: Uttar Pradesh**

**City 60: Agra**

In Agra, a multi storeyed commercial building was studied (Figure 3.71) and the survey of residential & non-residential buildings was carried out. The Executive Engineer and Junior Engineers of PWD Agra provided necessary information and copies of BoQs and also provided the information about questionnaire. The construction cost for a residential building in the area was found to be Rs.10, 000 to Rs. 12,000 sqm. for commercial building Rs. 13,000 to Rs. 15,000 per sqm. and for malls Rs. 20,000 to Rs. 25,000 per sqm. The normal brick rate was found to be in the range of Rs. 6 per brick. The cement cost was found to be Rs. 300 per bag, coarse sand (Chambal sand) Rs. 1,400 per cum. and the fine sand Rs. 1,100 per cum.

**Figure 3.71** Multi storey building construction at Agra

**City 61: Aligarh**

In Aligarh, a hospital building under construction was studied (Figure 3.72), the survey of residential & non-residential buildings was carried out. The construction cost a residential building varies in the range of Rs 11,000 to Rs. 13,000 per sqm. and for commercial building Rs. 15,000 to Rs. 17,000 per sqm. There is a large variation in the cost of construction in government and private construction at different places. The labour cost in Aligarh was found to be Rs. 250 to Rs. 450 per day. The cost of normal brick in the area was found to be Rs. 5.5 per brick.

**Figure 3.72** Site of hospital ward in Aligarh

**City 62: Allahabad**

In Allahabad, a multistoreyed commercial complex under construction was studied (Figure 3.73) and other residential & non-residential building sites were visited. The necessary information was given by PWD engineers. The construction cost in area was found to be in the range of Rs. 9,000 to Rs. 12,000 sqm. for residential and for Commercial & Malls, the cost varies in the range of Rs. 14,000 to 23,000 per sqm. depending upon the type of work carried out. The labour

cost was found in the range of Rs 250 to Rs. 450 per day. The normal brick rate was found to be Rs 8 per brick and coarse sand and fine sand rates Rs.1,650 per cum. and Rs. 1,125 per cum.

**Figure 3.73** Commercial building under construction in Allahabad

**City 63: Bareilly**

In Bareilly, a hotel building (frame structure) was studied (Figure 3.74) and other residential buildings & non-residential buildings sites were visited. The necessary information given by officials in Construction Division of PWD, Bareilly was recorded. The construction cost in the area was found in the range of Rs. 10,000 to Rs. 12,000 per sqm., for residential and Rs. 12,000 to 18,000 per sqm. for commercial depending upon the type of work carried out. The labour rate was found in the range of Rs. 250 to Rs. 425 per day, as unskilled and skilled. The normal brick rate was found to be Rs 4.8 per brick and coarse sand and fine sand rates Rs.1, 420 per cum and Rs. 1,120 per cum.

**Figure 3.74** Hotel building under construction in Bareilly

**City 64: Ghaziabad**

In Ghaziabad, a multi storeyed apartment building was studied (Figure 3.75) the survey of residential & non-residential buildings was carried out. The Superintendent Engineer and Assistant Engineer of CPWD provided necessary information including BoQ. The construction cost of residential buildings varies in the range of Rs. 12,000 to Rs. 15,000 per sqm. and non-residential building Rs. 14,000 to 18000 per sqm. The labour cost was found in the range of Rs. 300 to Rs. 450 per day. The cost of normal brick in the nearby area was found to be Rs. 5 per brick. The rate of coarse sand (Yamuna sand) is Rs. 1,195 per cum.

**Figure 3.75** Multi storey building under construction at Ghaziabad

**City 65: Gorakhpur**

In Gorakhpur, a residential complex under construction was studied as shown in Figure 3.76, and the survey of residential, non-residential and commercial complexes was also carried out. The site of the residential multistory B+G+8 building, built by private construction agency, was also surveyed. A huge variation in the materials rate was observed in Gorakhpur region of Uttar Pradesh.

The rate of construction for a residential building near around Gorakhpur was found to be Rs.12000-16000 per sqm. and for non-residential buildings the cost varies from Rs.14,000 to Rs.18,000 per sqm.

**Figure 3.76** Ongoing construction of Residential Enclave, Gorakhpur

**City 66: Kanpur**

In Kanpur, a multi storeyed commercial complex (frame structure) was studied (Figure 3.77) and the survey of residential & a non-residential building was carried out. PWD officials including provided necessary information. The construction cost for a residential building varies in the range of Rs 10,000 to Rs. 12,000 per sqm. for non-residential building in range Rs. 13,000 to Rs. 18,000 per Sqm. The labour cost in Kanpur was found to be Rs. 300 to Rs. 500 per day, which high as compared to Aligarh. The cost of normal brick in the area was found to be Rs. 6 per brick and coarse sand Rs.1,900 to 1,980 per cum.

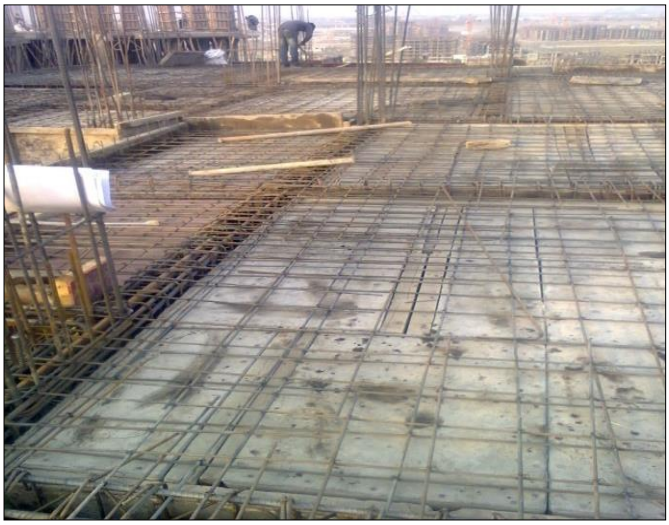

**Figure 3.77** Commercial Complex building under construction in Kanpur

**City 67: Khatauli**

In Khatauli, a four storeyed hospital building was studied as shown in Figure 3.78 and other residential, commercial & non-residential building sites were surveyed. The construction cost in area was found in the range of Rs. 9,000 to Rs. 11,000 per sqm. for residential and Rs. 10,000 to Rs. 12,000 per sqm. for hospital and commercial buildings. The cement cost was found to be in the range of Rs. 300 per bag and steel bars as 46 per kg. The labour rate was found in the range of Rs 260 to 350 per day as unskilled and skilled. The normal brick rate was found to be Rs. 5 brick, coarse sand rate Rs.955 cum.

**Figure 3.78** Hospital building under construction in Khatauli

**City 68: Lucknow**

In Lucknow, a multi storeyed office building (frame structure) was studied as shown in Figure 3.79 and the residential, commercial & non-residential building sites were surveyed. Officials of PWD gave information and BoQs. The construction cost in the area was found in the range of Rs. 11,000 to Rs. 14,000 per sqm. for residential and Rs. 14,000 to Rs. 20,000 per sqm. for Commercial & Malls depending upon the type of work carried out. The cement cost was found to be in the range of Rs. 290 to Rs. 310 per bag and steel reinforcing bars 48 per kg.

**Figure 3.79** Office building under construction in Lucknow

**C69: Saharanpur**

In Saharanpur, a five storeyed commercial complex under construction was studied as shown in figure 3.80 and the residential, non-residential building sites were surveyed. The construction cost in the area was found in the range of Rs. 9,000 to Rs. 11,000 per sqm. for residential and Rs. 11,000 to Rs.13,000 per sqm. for school and other typology of buildings depending upon the type of specifications used in the construction projects. The normal brick rate was found to be Rs. 4.5 per brick, coarse sand rate Rs. 800 per cum. The labour rate was found in the range of Rs 270 to Rs. 425 per day, as unskilled and skilled.

**Figure 3.80** Commercial complex under construction in Saharanpur

**State 28: Uttarakhand**

**City 70: Dehradun**

In Dehradun, residential & non-residential buildings were surveyed. The housing complex being built for the state engineering department was studied. The construction cost was found in the range of Rs 11,000 to 14,000 per sqm. depending upon the type of specification in different quarters (Type I to VI) work carried out. The labour rate was found in the range of Rs 325 to Rs. 475 per day, as unskilled and skilled. The normal brick rate was found to be Rs 6.0 per brick. Figure 3.81 shows the residential building under construction at Dehradun.

**Figure 3.81** Two storey Residential building at Dehradun

**City 71: Haldwani**

In Haldwani, a five storeyed frame structure commercial complex was studied (Figure 3.82), the survey of residential & non-residential buildings was carried out. The construction cost of residential buildings varies in the range of Rs. 12,000 to Rs. 14,000 per sqm. A large variation material and labour costs. The labour cost was found in the range of Rs. 400 to 550 per day. This is due to the tourist area. The rate of normal brick in the nearby area was found to be Rs. 5.5 per brick.

**Figure 3.82** Commercial Complex under construction at Haldwani

**City 72: Haridwar**

In Haridwar, a five storey frame structure apartment building under construction was studied (Figure 3.83), the survey of residential & commercial buildings was also carried out. The construction rate for residential buildings varies in the range of Rs 11,000 to 13,000 per sqm. and Rs.16,000 to 22,000 per sqm. for malls. The labour cost in Haridwar was found in the range Rs. 300 to Rs. 500 per day depending upon the type as skilled or unskilled labour used. The rate of normal brick in the nearby area was found to be Rs. 5.5 per brick.

**Figure 3.83** Five storey Apartment building at Haridwar

**City 73: Roorkee**

In Roorkee, a three storeyed mall under construction was studied (Figure 3.84) and other type of buildings was also surveyed. The construction cost in the area was found between Rs. 10,000 to 12,000 per sqm. for residential and Rs. 12000 to 15000 per sqm. for shopping mall, hospitals and school buildings. The normal brick rate was found to be in Rs. 5.2 per brick. The coarse aggregate was found to be Rs. 65 per quintal and the fine aggregates rates found in Rs. 70 per quintal. The labour cost was found in the range Rs. 250 to Rs. 400 per day. There has been a sharp increase in the cost of sand and aggregates in the area due to ban on mining.

**Figure 3.84** Three storey Mall at Roorkee

**City 74: Tehri**

In Tehri, a hotel building under construction was studied as shown in Figure 3.85 and other residential and non-residential buildings were surveyed. The necessary information was collected form engineers of PWD and the construction site survey. The construction of a Hotel near Ganesh Chowk is going on from September, 2014 and would be completed in December, 2015. The construction cost in the area was found in the range of Rs. 10,500 to Rs. 13,900 sqm. for non-residential buildings depending upon the type of work carried out. The labour rate was found in the range of Rs. 350 to Rs. 500 per day for unskilled and skilled. The normal brick rate was found to be Rs. 8.25 per brick and coarse sand rate Rs. 2,250 per cum. The cartage of materials is mainly responsible for hike in material cost in hills.

**Figure 3.85** Hotel Building at Tehri

**City 75: Uttarkashi**

In Uttarkashi, a Collectorate office building under construction as shown in Figure 3.86 and other residential buildings sites were visited. The necessary information was gathered from engineers of PWD. The construction of a Protection Wall for bridge near Hanuman Chowk was also visited. The construction cost in the area was found in the range of Rs 12,500 to Rs. 14,000 per sqm. for residential buildings and Rs. 14,500 to Rs. 16,000 for non-residential buildings depending upon the type of work carried out. The labour rate was found in the

range of Rs 350 to Rs. 500 per day, for unskilled and skilled. The normal brick rate was about Rs 8.0 per brick and coarse sand Rs.1, 000 per cum.

**Figure 3.86** Collectorate office building under construction at Uttarkashi

**State 29: West Bengal**

**City 76: Darjeeling**

In Darjeeling, a community hall under construction was studied as shown in Figure 3.87 and other residential and non-residential buildings were also surveyed. The necessary information was given by Engineer of Gorkhaland Territorial Administration, Darjeeling. The construction of Community Hall started during February, 2012 and expected to be completed in Sept, 2015. The construction cost in the area was found in the range of Rs. 17,500 to Rs. 23,000 per sqm. for non-residential buildings depending upon the type of specifications used in the work carried out. The labour rate was found in the range of Rs. 350 to Rs. 400 per day, for unskilled and skilled .The normal brick rate was found to be Rs. 10 per brick and coarse sand rate Rs.1, 240 per cum., which is quite high primarily due to huge transportation cost and cartage.

**Figure 3.87** Community Hall, Darjeeling

**City 77: Howrah**

In Howrah, an academic building was studied as shown in Figure 3.88. The residential and Non-residential buildings were also surveyed. The necessary information was collected from engineers of P.W.D. Nabanna and the construction site. The construction site of an Academic Building of Indian Institute of Science & Technology Shibpur was studied. The contractor present at the site, provided most of the information of the questionnaire and the required details. The construction cost in nearby area was found in the range of Rs. 15,000 to Rs. 20,000 per sqm. for non-residential buildings depending upon the type of work carried out. The labour rate was found in the range of Rs. 250 to Rs. 300 per day, for unskilled and skilled. The normal brick rate was found to be Rs. 9 per brick and coarse sand rate Rs. 880 per cum.

**Figure 3.88** Academic Building at I.I.S.T Shibpur (Howrah)

**City 78: Malda**

In Malda, an office building under construction was studied as shown in Figure 3.89 and the other non-residential building sites were visited. The construction of the Office building was going on from March, 2014 and expected to be completed by October, 2015. The designated contractor, who was also present at the site, provided most of the information of the questionnaire. The site engineer provided us the required details and BoQs etc. The construction cost in the area was found in the range of Rs. 13,000 to Rs. 14,000 per sqm. for non-residential buildings and Rs.11,000 to Rs.12,500 for residential buildings depending upon the type of work carried out. The labour rate was found in the range of Rs. 250 to Rs. 500 per day. The normal brick rate was found to be Rs. 6.3 per brick and coarse sand rate Rs. 925 per cum.

**Figure 3.89** Office building at Malda

**City 79: Siliguri**

In Siliguri, an office building under construction was studied as shown in Figure 3.90 and other residential and non-residential buildings were also surveyed. The construction site of Office building started during February 2013, and expected to complete during December 2015. The necessary information was collected from C.P.W.D. and State P.W.D engineers. The designated contractor provided most of the information of the questionnaire. The construction cost in the area was found in the range of Rs. 16,000 to Rs. 22,000 per sqm. for non-residential buildings depending upon the type of specifications used in work carried out. The labour rate was found in the range of Rs. 300 to Rs. 350 per day, for unskilled and skilled. The normal brick rate was found to be Rs. 8 per brick and coarse sand rate Rs. 1,275 per cum.

**Figure 3.90** Official Building near P.W.D. Office, Hakimpara, Siliguri

**City 80: South 24 Parganas**

In South 24 Parganas, an office building under construction was studied as shown in Figure 3.91 and other residential and non-residential buildings were also surveyed. The necessary information was collected from P.W.D. and the required details from the sites. The construction cost in the area was found in the range of Rs. 14,000 to Rs. 17,000 per sqm. for non-residential buildings depending upon the type of work carried out. The labour rate was found in the range of Rs. 250 to Rs. 300 per day for unskilled and skilled. The normal brick rate was found to be Rs. 9 per brick and coarse sand rate Rs. 900 per cum.

**Figure 3.91** Staff building of Police Department at Alipur, South 24 Parganas

The survey conducted infers that the residential building construction is largely done by private sector, where as in case of non-residential buildings, construction done by public sector dominates. Further, for other types of projects, the scenario is found to be uniform, both private as well as public sectors. Similarly, roads/bridges construction is largely done by public sector. However, these scenarios do not give the clear picture of all types of construction activities going on or projects completed in all the cities / towns. Therefore, an extensive study of projects in each town / city is essential.

The details of projects undertaken by both private and public sector are given in the Table 3.4 below.

**Table 3.4** Details of public and private construction projects

| STATE | CITY | RESIDENTIAL | | | | | NON-RESIDENTIAL | | | | | OTHER CONST. WORKS | ROADS & BRIDGES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| **Jharkhand** | Ranchi | Pvt. | Pvt. | Pvt. | Pvt. | Public | | | | | | | |
| | Jamshedpur | Pvt. | Pvt. | Pvt. | Pvt. | Public | Pvt. | Pvt. | Public | Public | Public | | |
| | Dhanbad | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| **Odisha** | Rourkela | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| | Bhubaneswar | Pvt. | Pvt. | Pvt. | Public | Public | | | | | | | |
| **Tamil Nadu** | Chennai | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Pvt. | Pvt. | | |
| | Karaikudi | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Pvt. | Pvt. | | |
| | Coimbatore | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| | Tiruchirappalli | Pvt. | Pvt. | Pvt. | Public | Pvt. | | | | | | | |
| **Rajasthan** | Jodhpur | Pvt. | Pvt. | Pvt. | Public | Pvt. | | | | | | | |
| | Kota | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| | Jaipur | Pvt. | Pvt. | Pvt. | Public | Public | | | | | | | |
| | Ganganagar | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| **Chhattisgarh** | Raipur | Pvt. | Pvt. | Pvt. | Public | Pvt. | | | | | | | |
| **Jammu and Kashmir (J & K)** | Jammu | Pvt. | Pvt. | Public | Pvt. | Pvt. | Public | Pvt. | Public | Public | Public | | |
| | Srinagar | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Pvt. | Public | Pvt. | Public | | |
| | Udhampur | | | | | | Public | Public | Public | Public | Public | | |
| **Uttarakhand** | Dehradun | Pvt. | Pvt. | Pvt. | Pvt. | Public | | | | | | | |
| | Roorkee | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Pvt. | Public | | Public |
| | Haridwar | Public | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| | Haldwani | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Public | | |
| | Tehri | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| | Uttarkashi | | | | | | Public | Public | Public | Public | Pvt. | Pvt. | |
| **Uttar Pradesh** | Ghaziabad | | | | | | Pvt. | Public | Pvt. | Public | Public | | |
| | Agra | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| | Aligarh | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| | Kanpur | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Public | Public | Pvt. | Public | |
| | Allahabad | Pvt. | Pvt. | Public | Pvt. | Pvt. | | | | | | | |
| | Bareilly | Pvt. | Pvt. | Pvt. | Pvt. | Public | | | | | | | |
| | Lucknow | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Pvt. | Public | | |
| | Khatauli | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| | Saharanpur | | | | | | Public | Pvt. | Public | Pvt. | Public | Pvt. | |
| | Gorakhpur | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| **Bihar** | Patna | Public | Pvt. | Pvt. | Public | Pvt. | Public | Public | Public | Pvt. | Public | | |
| **Chandigarh** | | Pvt. | Pvt. | Pvt. | Public | Pvt. | Public | Pvt. | Pvt. | Public | Public | | |
| **Haryana** | Faridabad | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| | Rohtak | Pvt. | Pvt. | Pvt. | Pvt. | Public | | | | | | | |
| **Punjab** | Rajpura | Pvt. | Pvt. | Pvt. | Pvt. | Public | | | | | | | |
| | Jalandhar | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Pvt. | | |
| | Nangal | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| | Ludhiana | | | | | | Public | Public | Public | Public | Public | Pvt. | |
| | Pathankot | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Pvt. | Public | Public | Public | | |
| **Himachal Pradesh** | Hamirpur | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Public | | |
| | Palampur | Pvt. | Pvt. | Public | Pvt. | Pvt. | | | | | | | |
| | Shimla | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | | |
| **Telangana** | Hyderabad | Public | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | | |
| | Mahbubnagar | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| **Andhra Pradesh** | Visakhapatnam | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | | |
| | Tirupati | Pvt. | Public | Public | Pvt. | Pvt. | | | | | | | |
| | Anantapur | Pvt. | Pvt. | Pvt. | Public | Pvt. | Public | Public | Pvt. | Public | Public | | |

| STATE | CITY | RESIDENTIAL | | | | | NON-RESIDENTIAL | | | | | OTHER CONST. WORKS | ROADS & BRIDGES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | | |
| **Gujarat** | Surat | Public | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Public | | |
| | Vadodara | Pvt. | Pvt. | Pvt. | Public | Pvt. | Public | Public | Public | Public | Pvt. | | |
| | Ahmedabad | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Pvt. | Public | | |
| **Maharashtra** | Mumbai | Public | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Pvt. | Pvt. | Public | | |
| | Pune | Pvt. | Pvt. | Public | Public | Pvt. | Public | Public | Public | Public | Public | | |
| | Aurangabad | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Pvt. | Pvt. | | |
| | Nagpur | Pvt. | Public | Pvt. | Pvt. | Pvt. | Public | Pvt. | Public | Public | Public | Public | |
| **Madhya Pradesh** | Gwalior | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Public | | |
| | Bhopal | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Public | Pvt. | | Public |
| | Indore | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | | Public |
| **West Bengal** | Howrah | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Public | Public | Pvt. | | |
| | South 24 Parganas | | | | | | Public | Public | Public | Public | Public | | |
| | Siliguri | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Pvt. | Public | Public | Public | | |
| | Darjeeling | | | | | | Public | Public | Public | Public | Public | | |
| | Malda | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| **Assam** | Guwahati | Public | Pvt. | Pvt. | Public | Pvt. | Pvt. | Public | Public | Public | Pvt. | | |
| | Jorhat | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Pvt. | | Public |
| **Sikkim** | Gangtok | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Public | | |
| **Karnataka** | Bangalore | Pvt. | Public | Pvt. | Pvt. | Public | Public | Pvt. | Public | Public | Pvt. | | |
| | Gulbarga | Pvt. | Public | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Public | | |
| | Mysore | Public | Pvt. | Pvt. | Pvt. | Public | | | | | | | |
| | Dharwad | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Public | | |
| **Kerala** | Cochin | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Pvt. | Public | Public | Pvt. | | |
| | Trivandrum | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Public | Public | Public | | |
| **Goa** | Panji | | | | | | Public | Public | Public | Pvt. | Pvt. | | |
| **Arunachal Pradesh** | Itanagar | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Pvt. | Pvt. | Public | Public | | |
| **Meghalaya** | Shillong | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | Public | Public | Public | Pvt. | Public | | |
| **Delhi** | Delhi | Public | Pvt. | Pvt. | Pvt. | Public | Public | Public | Public | Pvt. | Public | | Public |
| **Puducherry** | | Pvt. | Pvt. | Pvt. | Pvt. | Pvt. | | | | | | | |
| **Andaman Nicobar** | Port Blair | Pvt. | Public | Pvt. | Public | Pvt. | | | | | | | |

Therefore, the consolidated information on different types of projects can be summarized as follows:

**(A) Residential Buildings**

Private Sector Construction = 85%

Public Sector Construction = 15%

Total Percentage = 100%

**(B) Non- Residential Buildings**

Private Sector Construction = 21.7%

Public Sector Construction = 78.3%

Total Percentage = 100%

**(C) Other Projects**

Private Sector Construction = 50%

Public Sector Construction = 50%

Total Percentage = 100%

**(D) Roads & Bridges**

Private Sector Construction = Nil

Public Sector Construction = 100%

The consolidated cost of materials, labour and miscellaneous items of buildings and roads are shown in tables 3.5 and 3.6 respectively.

**Table 3.5.** Consolidated cost of materials, labour and miscellaneous items on building construction in 80 cities

| S.No. | Aggregated for all the sites surveyed | Residential Buildings | % Dist. (of Total) | Non-Residential Buildings | % Dist. (of Total) | Other Const. | % Dist. (of Total) | Total | % Dist. (of Total) |
|---|---|---|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | | | | |
| **1** | Cement | 608985532 | 12.0 | 1779537175 | 12.5 | 42985279 | 23.8 | **2431507986** | 12.5 |
| **2** | Coarse Sand with carriage | 195325405 | 3.8 | 564922157 | 4.0 | 11134017 | 6.2 | **771381579** | 4.0 |
| **3** | Stone Agg. (40mm)/ Brick Agg. (40mm) | 37315265 | 0.7 | 96895572 | 0.7 | 987868 | 0.6 | **135198705** | 0.7 |
| **4** | Stone Agg. (20mm) | 101068358 | 2.0 | 388335544 | 2.7 | 12876574 | 7.1 | **502280476** | 2.6 |
| **5** | Stone Agg. (12.5 - 10mm) | 65463981 | 1.3 | 201489211 | 1.4 | 6534580 | 3.6 | **273487771** | 1.4 |
| **6** | Rubble Stone | 22023678 | 0.4 | 12052530 | 0.0 | 559611 | 0.3 | **34635819** | 0.2 |
| **7** | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 591263783 | 11.6 | 1185298140 | 8.3 | 1690426 | 0.9 | **1778252349** | 9.1 |
| **8** | Fine Sand with carriage | 53795640 | 1.1 | 251061213 | 1.8 | 2013864 | 1.1 | **306870718** | 1.6 |
| **9** | Steel Bar | 675594409 | 13.3 | 2760419333 | 19.4 | 53772194 | 29.7 | **3489785936** | 17.9 |
| **10** | Super-plasticizer / Chlorpyriphos | 40561694 | 0.8 | 80030507 | 0.6 | 117404 | 0.1 | **120709604** | 0.6 |
| **11** | Marble Stone with carriage | 156514234 | 3.1 | 238855653 | 1.7 | 0 | 0.0 | **395369887** | 2.0 |
| **12** | Kota Stone with carriage | 34935541 | 0.7 | 141179927 | 1.0 | 19681 | 0.0 | **176135148** | 0.9 |
| **13** | Marble Chips with carriage | 2228824 | 0.0 | 4587124 | 0.0 | 211 | 0.0 | **6816159** | 0.0 |
| **14** | Vitrified Floor Tiles | 22402642 | 0.4 | 167050599 | 1.2 | 0 | 0.0 | **189453241** | 1.0 |
| **15** | Ceramic Wall Tiles | 33185451 | 0.7 | 110644530 | 0.8 | 47536 | 0.0 | **143877517** | 0.7 |
| **16** | Marble Powder | 80592 | 0.0 | 167887 | 0.0 | 5 | 0.0 | **248484** | 0.0 |
| **17** | Dark Shade Pigment | 2630650 | 0.1 | 12188964 | 0.1 | 1094 | 0.0 | **14820708** | 0.1 |
| **18** | Second class Indian teak wood | 5314348 | 0.1 | 0 | 0.0 | 0 | 0.0 | **5314348** | 0.0 |
| **19** | Bitumen 80/100 With Carriage | 15006357 | 0.3 | 14255802 | 0.1 | 4872 | 0.0 | **29267030** | 0.2 |
| **20** | Kerosene Oil | 1112669 | 0.0 | 1119551 | 0.0 | 303 | 0.0 | **2232523** | 0.0 |
| **21** | Steam Coal | 350530 | 0.0 | 312512 | 0.0 | 90 | 0.0 | **663132** | 0.0 |
| **22** | Mud Phuska / Brick Bats | 1080698 | 0.0 | 1211927 | 0.0 | 544 | 0.0 | **2293169** | 0.0 |
| **23** | Kota Stone with Carriage | 19742579 | 0.4 | 73573956 | 0.5 | 0 | 0.0 | **93316536** | 0.5 |
| **24** | Brick Tiles With Carriage | 7989639 | 0.2 | 14858993 | 0.1 | 11044 | 0.0 | **22859675** | 0.1 |
| **25** | Water Proofing Compound | 8594020 | 0.2 | 11905225 | 0.1 | 3 | 0.0 | **20499248** | 0.1 |
| **26** | PVC sheet (400 micron thick) | 138140 | 0.0 | 1352421 | 0.0 | 0 | 0.0 | **1490561** | 0.0 |
| **27** | Pipe with carriage | 1763268 | 0.0 | 12522113 | 0.1 | 0 | 0.0 | **14285381** | 0.1 |
| **28** | Standard Rolled Steel Sections (Readymade) | 9163057 | 0.2 | 20986435 | 0.1 | 28465 | 0.0 | **30177956** | 0.2 |

| S.No. | Aggregated for all the sites surveyed | Residential Buildings | % Dist. (of Total) | Non-Residential Buildings | % Dist. (of Total) | Other Const. | % Dist. (of Total) | Total | % Dist. (of Total) |
|---|---|---|---|---|---|---|---|---|---|
| **29** | Door Shutter (Flush) | 40244805 | 0.8 | 90137256 | 0.6 | 4829 | 0.0 | **130386891** | 0.7 |
| **30** | Steel Primer | 1066145 | 0.0 | 3571129 | 0.0 | 1527 | 0.0 | **4638801** | 0.0 |
| **31** | Wood (Frame) | 140443929 | 2.8 | 127857554 | 1.0 | 0 | 0.0 | **268301483** | 1.4 |
| **32** | Wood (Shutter 35 mm thick) | 193443675 | 3.8 | 346025573 | 2.4 | 0 | 0.0 | **539469248** | 2.8 |
| **33** | Pressed Steel Frame (Profile B/ C/ E) | 31066626 | 0.6 | 67748560 | 0.5 | 22920 | 0.0 | **98838106** | 0.5 |
| **34** | Ply wood | 12342071 | 0.2 | 23242607 | 0.2 | 0 | 0.0 | **35584678** | 0.2 |
| **35** | Glass Panes | 5440970 | 0.1 | 20150412 | 0.1 | 10721 | 0.0 | **25602104** | 0.1 |
| **36** | Wire Gauze | 1588290 | 0.0 | 6638917 | 0.0 | 0 | 0.0 | **8227207** | 0.0 |
| **37** | M S Angle/Bar/ other sections | 17342198 | 0.3 | 90349785 | 0.6 | 1273 | 0.0 | **107693256** | 0.6 |
| **38** | Cement Primer | 11612091 | 0.2 | 28601232 | 0.2 | 0 | 0.0 | **40213324** | 0.2 |
| **39** | Dry Distemper | 15389399 | 0.3 | 43789976 | 0.3 | 0 | 0.0 | **59179375** | 0.3 |
| **40** | Cement Paint | 11223566 | 0.2 | 39101018 | 0.3 | 20158 | 0.0 | **50344743** | 0.3 |
| **41** | Pink Primer (Wood) | 5993765 | 0.1 | 7402833 | 0.1 | 1048 | 0.0 | **13397646** | 0.1 |
| **42** | Red Lead Primer (Steel) | 214895 | 0.0 | 525689 | 0.0 | 252 | 0.0 | **740836** | 0.0 |
| **43** | Enamel Paint | 6954923 | 0.1 | 10635710 | 0.1 | 362 | 0.0 | **17590994** | 0.1 |
| **44** | Sprit | 815784 | 0.0 | 1188857 | 0.0 | 0 | 0.0 | **2004640** | 0.0 |
| **45** | Shellac | 267969 | 0.0 | 393007 | 0.0 | 0 | 0.0 | **660975** | 0.0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 11068415 | 0.2 | 11516847 | 0.1 | 98176 | 0.1 | **22683438** | 0.1 |
| **47** | Welding | 259131 | 0.0 | 857150 | 0.0 | 4072 | 0.0 | **1120353** | 0.0 |
| | **LABOUR** | | | | | | | | |
| **1** | Mason/ Painter/Carpenter | 469261259 | 9.2 | 1023498945 | 7.2 | 2469642 | 1.4 | **1495229846** | 7.7 |
| **2** | Black-smith / Mixer Operator | 56493520 | 1.1 | 243065472 | 1.7 | 4061665 | 2.2 | **303620658** | 1.6 |
| **3** | Mate | 3920969 | 0.0 | 20647697 | 0.1 | 589455 | 0.3 | **25158121** | 0.1 |
| **4** | Beldar | 320637266 | 6.3 | 975400290 | 6.9 | 16162721 | 8.9 | **1312200277** | 6.7 |
| **5** | Bhisti | 199325580 | 3.9 | 502297362 | 3.5 | 4620116 | 2.6 | **706243058** | 3.6 |
| **6** | Coolie | 312811154 | 6.2 | 712456764 | 5.0 | 2065737 | 1.1 | **1027333655** | 5.3 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | | | | |
| **1** | Batch mix plant+ Pump Charges | 45878156 | 0.9 | 181822600 | 1.3 | 4338649 | 2.4 | **232039405** | 1.2 |
| **2** | Mixer + Vibrator | 55112467 | 1.1 | 126339811 | 0.9 | 901085 | 0.5 | **182353363** | 0.9 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 5344291 | 0.1 | 22811138 | 0.2 | 832062 | 0.5 | **28987491** | 0.2 |
| **4** | Centering & Shuttering sub-structure | 11049677 | 0.2 | 109590948 | 0.8 | 1055809 | 0.6 | **121696435** | 0.6 |
| **5** | Centering & Shuttering Columns | 74412302 | 1.5 | 304530030 | 2.1 | 31491 | 0.0 | **378973824** | 2.0 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 198096361 | 3.9 | 597012778 | 4.2 | 9535896 | 5.3 | **804645035** | 4.1 |
| **7** | Sundries + Scaffolding | 112059318 | 2.2 | 347349237 | 2.4 | 1359736 | 0.8 | **460768291** | 2.4 |
| **Total** | | **5084811951** | **100** | **14233372185** | **100** | **180975067** | **100** | **19499159203** | **100** |

Consolidated cost of materials, labour and miscellaneous items on

i) Residential Buildings = 5084811951 Rs.

ii) Non-Residential Buildings = 14233372185 Rs.

iii) Other Construction = 180975067 Rs. and Total cost = 19499159203 Rs.

**Table 3.6.** Consolidated cost of materials, labours & misc. item in construction of roads

| ITEM-WISE EXPENDITURE OF MATERIALS, LABOUR AND MISC. ITEMS ON ROAD CONSTRUCTION (in Rupees) | | | |
|---|---|---|---|
| | **Aggregated for all sites surveyed** | **Roads & Bridges** | **% Dist. (of Total)** |
| **S.No.** | **MATERIAL** | | |
| **1** | Cement | 68143622 | 15.0 |
| **2** | Stone Agg. (63 mm/50/40 mm) | 20798218 | 4.6 |
| **3** | Stone chippings/ screening (Size:13.2/12.5/11.2/10) mm | 2139376 | 0.5 |
| **4** | Stone chippings/ screenings (Size:4.75/15 micron) mm | 29246607 | 6.4 |
| **5** | Diesel | 4586461 | 1.0 |
| **6** | Bitumen/Paving Asphalt VG 10 | 14569362 | 3.2 |
| **7** | Paving Asphalt VG 30 | 85650470 | 18.9 |
| **8** | Soft brush | 9695 | 0.0 |
| **9** | Bitumen emulsion | 3555993 | 0.8 |
| **10** | Steam Coal | 236855 | 0.1 |
| **11** | Wire brush | 4014 | 0.0 |
| **12** | Solvent | 39908 | 0.0 |
| **13** | Stone Agg. (20/12.5/10 mm) | 41224035 | 9.1 |
| **14** | Stone dust | 7276426 | 1.6 |
| **15** | Stone Agg. (25 mm) | 18191141 | 4.0 |
| **16** | Dry hydrated lime (factory made) | 1149360 | 0.3 |
| **17** | Coarse sand | 22536768 | 5.0 |
| **18** | Fine sand | 268 | 0.0 |
| **19** | Steel Bar | 4472028 | 1.0 |
| **20** | Structural Steel | 573881 | 0.1 |
| **21** | Water | 2348326 | 0.5 |
| **22** | Compensation for earth taken from private land | 573396 | 0.1 |
| | **LABOUR** | | |
| **1** | Chowkidar | 707162 | 0.2 |
| **2** | Mate | 2382059 | 0.5 |
| **3** | Beldar | 42429309 | 9.3 |
| **4** | Bhisti/ Sprayer | 9436340 | 2.1 |
| **5** | Coolie | 6207046 | 1.4 |
| **6** | Mistry | 548188 | 0.1 |
| **7** | Mason/Blacksmith | 5664304 | 1.3 |
| | **MACHINERY** | | |
| **1** | Dozer D 80 | 308222 | 0.1 |
| **2** | Tractor with tipper attachment | 232478 | 0.1 |
| **3** | Motor Grader | 1375014 | 0.3 |
| **4** | Hydraulic Excavator (3D) with driver and fuel | 4004778 | 0.9 |
| **5** | Front end loader | 2583021 | 0.6 |
| **6** | hire and running charges of tipper | 90968 | 0.0 |
| **7** | Hire charges of Diesel Road Roller - 8 to 10 Ton | 3785056 | 0.8 |
| **8** | Road sweeper (Mechanical Broom) | 68993 | 0.0 |
| **9** | Air compressor | 62285 | 0.0 |
| **10** | Emulsion Pressure Distributor | 109513 | 0.0 |
| **11** | Hire charges of Coal tar Boiler 900 to 1400 litres | 93011 | 0.0 |
| **12** | Hire charges of Coal tar Sprayer | 44972 | 0.0 |
| **13** | Hot mix Plant -120 TPH capacity | 13496374 | 3.0 |
| **14** | Paver finisher Hydrostatic with sensor control | 1768942 | 0.4 |
| **15** | Smooth Wheeled Roller 8 to 10 Ton | 191635 | 0.0 |
| **16** | Generator | 884283 | 0.2 |
| **17** | Front end loader 1 Cum. bucket capacity | 1293586 | 0.3 |
| **18** | Tipper -5 Cum. | 489735 | 0.1 |
| **19** | Drum Type HMP of 60-90 TPH capacity | 3838014 | 0.8 |
| **20** | Hire charges of Concrete Mixer | 169 | 0.0 |
| **21** | Wet Mix Plant 60 TPH | 804143 | 0.2 |
| **22** | Production cost of concrete by batch mix plant+ Pumping charges | 12805538 | 2.8 |
| **23** | Pin vibrator | 224171 | 0.0 |
| **24** | Surface Vibrator | 512221 | 0.1 |
| **25** | Batching and Mixing Plant @ 75 Cum. per hour | 432388 | 0.1 |
| **26** | Paver finisher Mechanical 100 TPH | 782154 | 0.2 |
| **27** | Vibratory roller 8 to 10 Ton | 1368175 | 0.3 |
| **28** | Water Tanker 5 to 6 KL capacity | 4688093 | 1.0 |
| **29** | Sundries + Scaffolding | 3066767 | 0.7 |
| | **Total =** | **454105667** | **100.00** |
| **Note:** Other Charges like Water Charges (1%) & Contractor's Profit (15%) are included in the cost. | | | |

Consolidated cost of materials, labours & misc. item on Roads/Bridges = 454105667 Rs.

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Port Blair | Anantapur | Tirupati | Visakhapatnam |
|---|---|---|---|---|---|
| | **MATERIAL** | | | | |
| 1 | Cement | 8337262 | 15322049 | 12895295 | 4646071 |
| 2 | Coarse Sand with carriage | 1479005 | 2592537 | 2720781 | 1075102 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 432566 | 540457 | 390764 | 67428 |
| 4 | Stone Agg. (20mm) | 1815215 | 4108323 | 2772748 | 825473 |
| 5 | Stone Agg. (10mm) | 1750005 | 2204728 | 1589248 | 415901 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 11697222 | 7919915 | 7674562 | 2575922 |
| 8 | Fine Sand with carriage | 488990 | 311158 | 1350766 | 27908 |
| 9 | Steel Bar | 11213789 | 10202575 | 22373960 | 10876609 |
| 10 | Chlorpyriphos/ Super-plasticizer | 817698 | 1705562 | 2681824 | 0 |
| 11 | Marble Stone with carriage | 0 | 1045450 | 7656082 | 2123278 |
| 12 | Kota Stone with carriage | 1774940 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 0 | 0 | 0 | 7875 |
| 14 | Vitrified Floor Tiles | 141123 | 336089 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 227372 | 820240 | 541579 | 197567 |
| 16 | Marble Powder | 0 | 340 | 639 | 343 |
| 17 | Dark Shade Pigment | 68316 | 8431 | 15170 | 8810 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 168417 | 158597 | 197983 | 114030 |
| 20 | Kerosene Oil | 10303 | 13115 | 16599 | 4287 |
| 21 | Steam Coal | 2160 | 1693 | 2074 | 1640 |
| 22 | Mud Phuska/ Brick Bats | 20097 | 11883 | 7315 | 0 |
| 23 | Kota Stone with Carriage | 0 | 0 | 0 | 301802 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 196644 | 103979 | 68275 | 20084 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 |
| 27 | Pipe with carriage | 0 | 47268 | 0 | 122047 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 548833 | 0 | 0 |
| 29 | Door Shutter (Flush) | 235212 | 689177 | 210115 | 0 |
| 30 | Steel Primer | 18530 | 16392 | 0 | 0 |
| 31 | Wood (Frame) | 470432 | 337709 | 4116393 | 1246257 |
| 32 | Wood (Shutter 35 mm thick) | 3898926 | 758427 | 4524896 | 1568999 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 589225 | 0 | 0 | 0 |
| 34 | Ply wood | 0 | 180892 | 0 | 0 |
| 35 | Glass Panes | 614336 | 176041 | 0 | 0 |
| 36 | Wire Gauze | 0 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 263964 | 585769 | 0 | 0 |
| 38 | Cement Primer | 97391 | 0 | 318021 | 96237 |
| 39 | Oil Bound Distemper | 197712 | 0 | 272590 | 90213 |
| 40 | Cement Paint | 122736 | 107057 | 305051 | 96963 |
| 41 | Pink Primer (Wood) | 9942 | 92141 | 237781 | 75006 |
| 42 | Red Lead Primer (Steel) | 1237 | 8464 | 0 | 0 |
| 43 | Enamel Paint | 14518 | 219876 | 283706 | 77992 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | |
|---|---|---|---|---|---|
| **S.No.** | **Items** | **Port Blair** | **Anantapur** | **Tirupati** | **Visakhapatnam** |
| | **MATERIAL** | | | | |
| **44** | Sprit | 0 | 0 | 0 | 0 |
| **45** | Shellac | 0 | 0 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 6123 | 29416 | 8939447 |
| **47** | Welding | 0 | 1166 | 6226 | 145609 |
| | **LABOUR** | | | | |
| **1** | Mason/ Painter/Carpenter | 6404146 | 3572348 | 9387691 | 4126761 |
| **2** | Black-smith / Mixer Operator/Fitter | 1198040 | 899017 | 1761555 | 845503 |
| **3** | Mate | 101582 | 39812 | 56555 | 6405 |
| **4** | Beldar | 6139748 | 6724035 | 7257013 | 2578141 |
| **5** | Bhisti | 3203865 | 2634860 | 4346178 | 1853188 |
| **6** | Coolie | 4355493 | 3081663 | 4820655 | 2105435 |
| | **MISCELLANEOUS & LUMP SUM** | | | | |
| **1** | Batch mix plant+ Pump Charges | 665408 | 2050952 | 1593452 | 586537 |
| **2** | Mixer + Vibrator | 423724 | 520095 | 2307898 | 1377941 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 77809 | 68426 | 92451 | 11742 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 6602 | 291743 | 77038 | 31662 |
| **5** | Centering & Shuttering Columns | 33225 | 1049271 | 1579676 | 2036870 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 3492478 | 2404864 | 2280720 | 2676076 |
| **7** | Sundries + Scaffolding | 6315576 | 1723282 | 2189248 | 957129 |
| **Total** | | **79592980** | **76242824** | **111009992** | **54942287** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Itanagar | Guwahati | Jorhat | Patna |
|---|---|---|---|---|---|
| | **MATERIAL** | | | | |
| 1 | Cement | 41475051 | 6064259 | 6143269 | 23067963 |
| 2 | Coarse Sand with carriage | 4976438 | 1586961 | 1963197 | 720890 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 1981794 | 279764 | 281293 | 401519 |
| 4 | Stone Agg. (20mm) | 8261049 | 1428678 | 1263250 | 1913098 |
| 5 | Stone Agg. (10mm) | 5946079 | 963069 | 808400 | 1356987 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 9242564 | 6177028 | 9590877 | 13056560 |
| 8 | Fine Sand with carriage | 2805651 | 235848 | 68978 | 185763 |
| 9 | Steel Bar | 2593451 | 2897069 | 307994 | 99239104 |
| 10 | Chlorpyriphos/ Super-plasticizer | 1361234 | 124103 | 134892 | 2448183 |
| 11 | Marble Stone with carriage | 0 | 3348187 | 0 | 3292856 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 402516 | 25608 | 17805 | 11216 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 1063315 | 382128 | 205037 | 287848 |
| 16 | Marble Powder | 5590 | 1330 | 971 | 489 |
| 17 | Dark Shade Pigment | 131548 | 13115 | 9575 | 12558 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 744608 | 167686 | 166087 | 944880 |
| 20 | Kerosene Oil | 60936 | 16599 | 13285 | 35516 |
| 21 | Steam Coal | 10220 | 7143 | 7623 | 13585 |
| 22 | Mud Phuska/ Brick Bats | 56717 | 0 | 0 | 26405 |
| 23 | Kota Stone with Carriage | 0 | 65160 | 0 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 747085 | 88542 | 88226 | 197669 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 |
| 27 | Pipe with carriage | 0 | 0 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 |
| 29 | Door Shutter (Flush) | 960537 | 47912 | 827661 | 0 |
| 30 | Steel Primer | 0 | 0 | 0 | 0 |
| 31 | Wood (Frame) | 6371930 | 1511830 | 1234548 | 2072845 |
| 32 | Wood (Shutter 35 mm thick) | 6067140 | 2089346 | 1654664 | 3037437 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 |
| 34 | Ply wood | 327689 | 781248 | 0 | 0 |
| 35 | Glass Panes | 1093376 | 0 | 0 | 0 |
| 36 | Wire Gauze | 0 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 0 | 0 | 0 | 0 |
| 38 | Cement Primer | 404578 | 161130 | 142942 | 197444 |
| 39 | Oil Bound Distemper | 722461 | 239039 | 222767 | 185039 |
| 40 | Cement Paint | 500788 | 131130 | 122203 | 198941 |
| 41 | Pink Primer (Wood) | 285280 | 96379 | 64335 | 142946 |
| 42 | Red Lead Primer (Steel) | 95587 | 0 | 0 | 0 |
| 43 | Enamel Paint | 0 | 186333 | 138202 | 110417 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | |
|---|---|---|---|---|---|
| **S.No.** | **Items** | **Itanagar** | **Guwahati** | **Jorhat** | **Patna** |
| | **MATERIAL** | | | | |
| **44** | Sprit | 0 | 0 | 0 | 0 |
| **45** | Shellac | 0 | 0 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 0 |
| **47** | Welding | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | |
| **1** | Mason/ Painter/Carpenter | 17536360 | 4346303 | 4353582 | 4911533 |
| **2** | Black-smith / Mixer Operator/Fitter | 279105 | 205671 | 23081 | 3266719 |
| **3** | Mate | 98798 | 9079 | 8641 | 53658 |
| **4** | Beldar | 15020347 | 1845968 | 1406334 | 6452571 |
| **5** | Bhisti | 9992550 | 1779571 | 1263542 | 3021958 |
| **6** | Coolie | 8149963 | 2913474 | 3306145 | 3982821 |
| | **MISCELLANEOUS & LUMP SUM** | | | | |
| **1** | Batch mix plant+ Pump Charges | 0 | 551469 | 0 | 2537587 |
| **2** | Mixer + Vibrator | 1309075 | 537242 | 102508 | 1514510 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 135847 | 18523 | 20958 | 128787 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 1074992 | 0 | 0 | 0 |
| **5** | Centering & Shuttering Columns | 10277492 | 0 | 0 | 1093675 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 9954566 | 1582507 | 1773091 | 16176413 |
| **7** | Sundries + Scaffolding | 2866466 | 852061 | 861678 | 2999398 |
| **Total** | | **175390774** | **43758491** | **38597640** | **199297787** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Chandigarh | Raipur | Delhi | Ahmedabad |
|---|---|---|---|---|---|
| | **MATERIAL** | | | | |
| 1 | Cement | 2119777 | 5864183 | 56007084 | 2583163 |
| 2 | Coarse Sand with carriage | 896765 | 306623 | 27525697 | 820872 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 213964 | 162049 | 5587572 | 100701 |
| 4 | Stone Agg. (20mm) | 305278 | 211068 | 10805592 | 334078 |
| 5 | Stone Agg. (10mm) | 286065 | 250394 | 5163873 | 238656 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 3056553 | 7381014 | 84076159 | 3728477 |
| 8 | Fine Sand with carriage | 291605 | 123895 | 4877048 | 398331 |
| 9 | Steel Bar | 1442402 | 4583220 | 55620353 | 2233625 |
| 10 | Chlorpyriphos/ Super-plasticizer | 208800 | 1487766 | 3758638 | 39875 |
| 11 | Marble Stone with carriage | 1027866 | 4242263 | 14193997 | 1767075 |
| 12 | Kota Stone with carriage | 0 | 0 | 1840762 | 0 |
| 13 | Marble Chips with carriage | 2985 | 9138 | 0 | 16494 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 7377073 | 0 |
| 15 | Ceramic Wall Tiles | 176878 | 297634 | 1303571 | 377426 |
| 16 | Marble Powder | 112 | 398 | 0 | 242 |
| 17 | Dark Shade Pigment | 2001 | 10224 | 126052 | 5411 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 5314348 | 0 |
| 19 | Bitumen 80/100 With Carriage | 92608 | 630382 | 0 | 125084 |
| 20 | Kerosene Oil | 8528 | 23695 | 0 | 9275 |
| 21 | Steam Coal | 0 | 9063 | 0 | 1197 |
| 22 | Mud Phuska/ Brick Bats | 5188 | 17616 | 324009 | 4223 |
| 23 | Kota Stone with Carriage | 0 | 0 | 4768640 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 7989639 | 0 |
| 25 | Water Proofing Compound | 59941 | 104884 | 745415 | 36956 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 |
| 27 | Pipe with carriage | 0 | 0 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 |
| 29 | Door Shutter (Flush) | 0 | 0 | 0 | 719055 |
| 30 | Steel Primer | 0 | 0 | 0 | 0 |
| 31 | Wood (Frame) | 720094 | 5461467 | 263998 | 1574378 |
| 32 | Wood (Shutter 35 mm thick) | 1359519 | 6807220 | 6119702 | 1912635 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 |
| 34 | Ply wood | 0 | 0 | 0 | 0 |
| 35 | Glass Panes | 0 | 0 | 0 | 0 |
| 36 | Wire Gauze | 0 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 0 | 0 | 0 | 0 |
| 38 | Cement Primer | 50104 | 150035 | 833345 | 46359 |
| 39 | Oil Bound Distemper | 45094 | 180436 | 1264898 | 92171 |
| 40 | Cement Paint | 80216 | 151173 | 714536 | 134833 |
| 41 | Pink Primer (Wood) | 56755 | 102531 | 0 | 101934 |
| 42 | Red Lead Primer (Steel) | 0 | 0 | 0 | 0 |
| 43 | Enamel Paint | 50643 | 86499 | 0 | 121621 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | |
|---|---|---|---|---|---|
| **S.No.** | **Items** | **Chandigarh** | **Raipur** | **Delhi** | **Ahmedabad** |
| | **MATERIAL** | | | | |
| **44** | Sprit | 0 | 0 | 414803 | 0 |
| **45** | Shellac | 0 | 0 | 133255 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 0 |
| **47** | Welding | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | |
| **1** | Mason/ Painter/Carpenter | 2279442 | 4957903 | 45599313 | 4435450 |
| **2** | Black-smith / Mixer Operator/Fitter | 117883 | 287821 | 5474931 | 240147 |
| **3** | Mate | 17790 | 38948 | 1314294 | 9731 |
| **4** | Beldar | 1199880 | 2833363 | 38729674 | 1380590 |
| **5** | Bhisti | 979253 | 2403067 | 20940398 | 1474250 |
| **6** | Coolie | 1612840 | 4030071 | 34500780 | 2508699 |
| | **MISCELLANEOUS & LUMP SUM** | | | | |
| **1** | Batch mix plant+ Pump Charges | 133642 | 458793 | 4866597 | 262069 |
| **2** | Mixer + Vibrator | 253302 | 834700 | 5708545 | 408737 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 24934 | 90531 | 1601162 | 13912 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 26003 | 1501692 | 0 |
| **5** | Centering & Shuttering Columns | 203331 | 600284 | 9189418 | 0 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 714888 | 2186760 | 26466912 | 1184580 |
| **7** | Sundries + Scaffolding | 368775 | 1171501 | 7639673 | 659961 |
| **Total** | | **20465704** | **58574616** | **510683448** | **30102273** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Surat | Vadodara | Faridabad | Rohtak | Hamirpur |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| 1 | Cement | 2293676 | 3575543 | 5686552 | 8662820 | 1641198 |
| 2 | Coarse Sand with carriage | 936610 | 1211571 | 2651568 | 3547377 | 640039 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 220143 | 340363 | 586315 | 175868 | 176955 |
| 4 | Stone Agg. (20mm) | 216891 | 382751 | 848493 | 1348394 | 217012 |
| 5 | Stone Agg. (10mm) | 183999 | 311748 | 776572 | 1100141 | 188232 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 4567488 | 6247040 | 9290944 | 13783075 | 2862467 |
| 8 | Fine Sand with carriage | 202542 | 414693 | 1016030 | 832426 | 247396 |
| 9 | Steel Bar | 1438494 | 2215738 | 3738305 | 8212709 | 871218 |
| 10 | Chlorpyriphos/ Super-plasticizer | 151120 | 174083 | 579830 | 271069 | 149681 |
| 11 | Marble Stone with carriage | 815226 | 1265794 | 2122004 | 4614701 | 766863 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 7952 | 12694 | 10319 | 22490 | 1947 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 0 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 165564 | 312717 | 518654 | 724513 | 149148 |
| 16 | Marble Powder | 106 | 228 | 403 | 844 | 86 |
| 17 | Dark Shade Pigment | 5180 | 16659 | 9000 | 15074 | 1459 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 151980 | 226512 | 251503 | 230238 | 98301 |
| 20 | Kerosene Oil | 11870 | 14037 | 23827 | 19828 | 4504 |
| 21 | Steam Coal | 1986 | 2506 | 6076 | 1548 | 485 |
| 22 | Mud Phuska/ Brick Bats | 5405 | 8523 | 14467 | 12899 | 3845 |
| 23 | Kota Stone with Carriage | 0 | 0 | 0 | 0 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 57808 | 96120 | 90017 | 100322 | 33647 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 | 0 |
| 27 | Pipe with carriage | 0 | 0 | 0 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 | 0 |
| 29 | Door Shutter (Flush) | 403470 | 808085 | 0 | 0 | 0 |
| 30 | Steel Primer | 0 | 0 | 0 | 0 | 0 |
| 31 | Wood (Frame) | 1192794 | 1212857 | 1927031 | 2458147 | 584825 |
| 32 | Wood (Shutter 35 mm thick) | 1052608 | 1590086 | 3260109 | 4724581 | 936757 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 | 0 |
| 34 | Ply wood | 0 | 0 | 0 | 0 | 0 |
| 35 | Glass Panes | 0 | 0 | 0 | 0 | 0 |
| 36 | Wire Gauze | 0 | 0 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 0 | 0 | 0 | 0 | 0 |
| 38 | Cement Primer | 27654 | 34169 | 176731 | 208796 | 47945 |
| 39 | Oil Bound Distemper | 32323 | 61830 | 113613 | 187490 | 37308 |
| 40 | Cement Paint | 65015 | 80333 | 127845 | 186536 | 35085 |
| 41 | Pink Primer (Wood) | 62054 | 71641 | 129264 | 195861 | 48239 |
| 42 | Red Lead Primer (Steel) | 0 | 0 | 0 | 0 | 0 |
| 43 | Enamel Paint | 67184 | 102890 | 137451 | 174768 | 41302 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | | |
|---|---|---|---|---|---|---|
| **S.No.** | **Items** | **Surat** | **Vadodara** | **Faridabad** | **Rohtak** | **Hamirpur** |
| | **MATERIAL** | | | | | |
| **44** | Sprit | 0 | 0 | 0 | 0 | 0 |
| **45** | Shellac | 0 | 0 | 0 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 0 | 0 |
| **47** | Welding | 0 | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | | |
| **1** | Mason/ Painter/Carpenter | 3735756 | 4730171 | 4948767 | 8370698 | 1668859 |
| **2** | Black-smith / Mixer Operator/Fitter | 131533 | 189920 | 278820 | 553058 | 72151 |
| **3** | Mate | 20986 | 30104 | 45092 | 28674 | 16557 |
| **4** | Beldar | 1376605 | 2038535 | 2359883 | 3351703 | 908207 |
| **5** | Bhisti | 1100970 | 1719004 | 2007827 | 3741881 | 781654 |
| **6** | Coolie | 2265846 | 3114439 | 3469585 | 6421820 | 1353366 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | |
| **1** | Batch mix plant+ Pump Charges | 152505 | 280300 | 388294 | 782129 | 99610 |
| **2** | Mixer + Vibrator | 266022 | 391536 | 697301 | 1227139 | 202520 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 30077 | 42565 | 68615 | 38351 | 21396 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 0 | 0 | 0 | 0 |
| **5** | Centering & Shuttering Columns | 0 | 0 | 637032 | 1614655 | 216683 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 739490 | 1278913 | 1987357 | 3406684 | 488220 |
| **7** | Sundries + Scaffolding | 455144 | 743885 | 1058295 | 1515195 | 311254 |
| **Total** | | **24612075** | **35350582** | **52039791** | **82864501** | **15926419** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Palampur | Shimla | Jammu | Srinagar | Dhanbad |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| 1 | Cement | 18711878 | 1878409 | 4254109 | 4055285 | 4608157 |
| 2 | Coarse Sand with carriage | 9344481 | 758619 | 1075743 | 1426309 | 743014 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 659101 | 193378 | 447003 | 352362 | 112848 |
| 4 | Stone Agg. (20mm) | 2598104 | 276874 | 675746 | 562244 | 562414 |
| 5 | Stone Agg. (10mm) | 1706803 | 252499 | 621120 | 415007 | 414470 |
| 6 | Rubble Stone | 0 | 0 | 0 | 7438005 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 290874 | 3613732 | 4405551 | 401349 | 3776033 |
| 8 | Fine Sand with carriage | 354594 | 265309 | 469571 | 344579 | 190544 |
| 9 | Steel Bar | 10179304 | 969108 | 2266794 | 1797739 | 3474899 |
| 10 | Chlorpyriphos/ Super-plasticizer | 731804 | 167608 | 313398 | 235733 | 115415 |
| 11 | Marble Stone with carriage | 6695797 | 958759 | 1830926 | 1291913 | 4900285 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 18763 | 2290 | 6479 | 5417 | 8920 |
| 14 | Vitrified Floor Tiles | 844036 | 0 | 0 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 515126 | 81382 | 266589 | 251788 | 389005 |
| 16 | Marble Powder | 1129 | 88 | 260 | 183 | 10830 |
| 17 | Dark Shade Pigment | 18303 | 1816 | 5505 | 4024 | 7682 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 526370 | 111435 | 179837 | 147744 | 127189 |
| 20 | Kerosene Oil | 23206 | 5369 | 11193 | 8575 | 12130 |
| 21 | Steam Coal | 2497 | 484 | 883 | 676 | 2900 |
| 22 | Mud Phuska/ Brick Bats | 19814 | 0 | 0 | 0 | 6905 |
| 23 | Kota Stone with Carriage | 0 | 0 | 0 | 0 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 173375 | 32600 | 62437 | 52387 | 51019 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 | 0 |
| 27 | Pipe with carriage | 0 | 0 | 0 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 | 0 |
| 29 | Door Shutter (Flush) | 0 | 0 | 0 | 0 | 0 |
| 30 | Steel Primer | 0 | 0 | 0 | 0 | 0 |
| 31 | Wood (Frame) | 2803160 | 658921 | 1193231 | 683664 | 1200369 |
| 32 | Wood (Shutter 35 mm thick) | 4459467 | 992096 | 1839008 | 1322341 | 1364875 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 | 0 |
| 34 | Ply wood | 0 | 0 | 0 | 0 | 0 |
| 35 | Glass Panes | 0 | 0 | 0 | 0 | 0 |
| 36 | Wire Gauze | 0 | 0 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 0 | 0 | 0 | 0 | 0 |
| 38 | Cement Primer | 483156 | 54063 | 75233 | 74313 | 134127 |
| 39 | Oil Bound Distemper | 375965 | 38617 | 64485 | 59716 | 107781 |
| 40 | Cement Paint | 353560 | 44486 | 53062 | 65517 | 57812 |
| 41 | Pink Primer (Wood) | 295701 | 44632 | 77542 | 57369 | 71390 |
| 42 | Red Lead Primer (Steel) | 0 | 0 | 0 | 0 | 0 |
| 43 | Enamel Paint | 253176 | 43720 | 69336 | 56465 | 100379 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | | |
|---|---|---|---|---|---|---|
| **S.No.** | **Items** | **Palampur** | **Shimla** | **Jammu** | **Srinagar** | **Dhanbad** |
| | **MATERIAL** | | | | | |
| **44** | Sprit | 0 | 0 | 0 | 0 | 0 |
| **45** | Shellac | 0 | 0 | 0 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 0 | 0 |
| **47** | Welding | 0 | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | | |
| **1** | Mason/ Painter/Carpenter | 21222615 | 2012293 | 3157376 | 3627538 | 3132266 |
| **2** | Black-smith / Mixer Operator/Fitter | 977714 | 82041 | 179904 | 142678 | 240974 |
| **3** | Mate | 41944 | 18943 | 25460 | 21575 | 5017 |
| **4** | Beldar | 13655227 | 1031288 | 1901388 | 2758182 | 1032435 |
| **5** | Bhisti | 6956737 | 875013 | 1603577 | 1331515 | 1131122 |
| **6** | Coolie | 13683443 | 1543987 | 2615496 | 2359469 | 1747860 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | |
| **1** | Batch mix plant+ Pump Charges | 1571823 | 117590 | 244147 | 193831 | 357660 |
| **2** | Mixer + Vibrator | 1777659 | 230904 | 425042 | 280907 | 533391 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 60843 | 24849 | 34135 | 30424 | 14098 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 248099 | 0 | 0 | 0 | 0 |
| **5** | Centering & Shuttering Columns | 4249991 | 253301 | 491479 | 607669 | 831543 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 5878477 | 650387 | 1266968 | 951133 | 1851184 |
| **7** | Sundries + Scaffolding | 3236224 | 327867 | 608149 | 559000 | 782587 |
| **Total** | | **136000339** | **18614756** | **32818159** | **33974627** | **34211528** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Jamshedpur | Ranchi | Bangalore | Dharwad |
|---|---|---|---|---|---|
| | **MATERIAL** | | | | |
| 1 | Cement | 3802802 | 4075832 | 29144520 | 4305148 |
| 2 | Coarse Sand with carriage | 873872 | 798346 | 13329329 | 2493640 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 278832 | 475089 | 685316 | 398986 |
| 4 | Stone Agg. (20mm) | 482235 | 1193673 | 3924775 | 569451 |
| 5 | Stone Agg. (10mm) | 412111 | 875528 | 2117000 | 170939 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 3404123 | 340262 | 31144296 | 6428735 |
| 8 | Fine Sand with carriage | 339952 | 248975 | 1555832 | 1309772 |
| 9 | Steel Bar | 2267126 | 2521749 | 44054081 | 2491930 |
| 10 | Chlorpyriphos/ Super-plasticizer | 274369 | 318168 | 1176315 | 488435 |
| 11 | Marble Stone with carriage | 3342705 | 3078904 | 14959682 | 0 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 6601 | 5844 | 21442 | 5387 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 252366 | 240080 | 1800321 | 0 |
| 16 | Marble Powder | 246 | 228 | 738 | 221 |
| 17 | Dark Shade Pigment | 5488 | 5097 | 0 | 5191 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 132859 | 122676 | 324531 | 279246 |
| 20 | Kerosene Oil | 15024 | 14117 | 20464 | 23000 |
| 21 | Steam Coal | 1724 | 953 | 0 | 3918 |
| 22 | Mud Phuska/ Brick Bats | 8210 | 7563 | 0 | 0 |
| 23 | Kota Stone with Carriage | 0 | 0 | 1908566 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 57471 | 58823 | 145153 | 0 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 10429 |
| 27 | Pipe with carriage | 0 | 0 | 98798 | 65489 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 |
| 29 | Door Shutter (Flush) | 0 | 0 | 2241940 | 0 |
| 30 | Steel Primer | 0 | 0 | 80937 | 0 |
| 31 | Wood (Frame) | 755984 | 780135 | 1194085 | 0 |
| 32 | Wood (Shutter 35 mm thick) | 995488 | 903045 | 2197543 | 3233473 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 |
| 34 | Ply wood | 0 | 0 | 747130 | 0 |
| 35 | Glass Panes | 0 | 0 | 0 | 0 |
| 36 | Wire Gauze | 0 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 0 | 0 | 1076028 | 0 |
| 38 | Cement Primer | 114419 | 110134 | 706955 | 98610 |
| 39 | Oil Bound Distemper | 52539 | 45573 | 1211924 | 86690 |
| 40 | Cement Paint | 76857 | 53571 | 531139 | 194049 |
| 41 | Pink Primer (Wood) | 70727 | 39309 | 66157 | 27387 |
| 42 | Red Lead Primer (Steel) | 0 | 0 | 19660 | 0 |
| 43 | Enamel Paint | 100977 | 54465 | 154868 | 0 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | |
|---|---|---|---|---|---|
| **S.No.** | **Items** | **Jamshedpur** | **Ranchi** | **Bangalore** | **Dharwad** |
| | **MATERIAL** | | | | |
| **44** | Sprit | 0 | 0 | 0 | 0 |
| **45** | Shellac | 0 | 0 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 51177 | 0 |
| **47** | Welding | 0 | 0 | 9207 | 0 |
| | **LABOUR** | | | | |
| **1** | Mason/ Painter/Carpenter | 2768224 | 2910205 | 20623452 | 4176776 |
| **2** | Black-smith / Mixer Operator/Fitter | 158496 | 180991 | 4641691 | 224194 |
| **3** | Mate | 15895 | 17488 | 197596 | 51339 |
| **4** | Beldar | 1362310 | 1808289 | 14072041 | 2327823 |
| **5** | Bhisti | 1048948 | 1119170 | 10238357 | 1408072 |
| **6** | Coolie | 1583563 | 1342466 | 14448787 | 3304786 |
| | **MISCELLANEOUS & LUMP SUM** | | | | |
| **1** | Batch mix plant+ Pump Charges | 241917 | 232137 | 3121197 | 0 |
| **2** | Mixer + Vibrator | 402651 | 420710 | 4013139 | 92884 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 36443 | 33314 | 217356 | 54787 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 217272 | 653944 | 0 |
| **5** | Centering & Shuttering Columns | 511664 | 0 | 2382323 | 0 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 1127905 | 1340532 | 5476111 | 1027463 |
| **7** | Sundries + Scaffolding | 657154 | 782101 | 4215383 | 585032 |
| **Total** | | **28040278** | **26772815** | **241001286** | **35943280** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Gulbarga | Mysore | Cochin | Trivandrum |
|---|---|---|---|---|---|
| | **MATERIAL** | | | | |
| 1 | Cement | 16592501 | 13988788 | 2312484 | 15490098 |
| 2 | Coarse Sand with carriage | 10593153 | 6358713 | 1313519 | 7257555 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 733321 | 837510 | 180565 | 562887 |
| 4 | Stone Agg. (20mm) | 2529096 | 1966029 | 350318 | 3114760 |
| 5 | Stone Agg. (10mm) | 1119071 | 715446 | 236915 | 2552724 |
| 6 | Rubble Stone | 0 | 0 | 248503 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 11436913 | 10256756 | 0 | 460748 |
| 8 | Fine Sand with carriage | 2199791 | 2499250 | 202172 | 219434 |
| 9 | Steel Bar | 18397150 | 34183221 | 919951 | 7502230 |
| 10 | Chlorpyriphos/ Super-plasticizer | 746093 | 1238316 | 146433 | 240976 |
| 11 | Marble Stone with carriage | 6927601 | 0 | 1050681 | 7122295 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 0 | 1914 | 3026 | 37407 |
| 14 | Vitrified Floor Tiles | 1561624 | 4329040 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 1127467 | 1732999 | 124350 | 374002 |
| 16 | Marble Powder | 379 | 77 | 72 | 782 |
| 17 | Dark Shade Pigment | 8894 | 67827 | 4867 | 17450 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 382938 | 663167 | 98855 | 346361 |
| 20 | Kerosene Oil | 32931 | 54365 | 5912 | 29849 |
| 21 | Steam Coal | 4251 | 9118 | 0 | 0 |
| 22 | Mud Phuska/ Brick Bats | 0 | 0 | 0 | 14828 |
| 23 | Kota Stone with Carriage | 3410292 | 0 | 570632 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 148380 | 34869 | 48201 | 152814 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 9534 | 0 | 0 |
| 27 | Pipe with carriage | 208880 | 78297 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 1768787 | 0 | 0 | 0 |
| 29 | Door Shutter (Flush) | 195504 | 1175704 | 323719 | 0 |
| 30 | Steel Primer | 76343 | 0 | 0 | 0 |
| 31 | Wood (Frame) | 462659 | 4087135 | 671226 | 3221796 |
| 32 | Wood (Shutter 35 mm thick) | 1362435 | 4927062 | 762403 | 3492197 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 302317 | 0 | 0 | 0 |
| 34 | Ply wood | 0 | 0 | 0 | 0 |
| 35 | Glass Panes | 638858 | 440182 | 0 | 0 |
| 36 | Wire Gauze | 0 | 284621 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 38869 | 22197 | 0 | 0 |
| 38 | Cement Primer | 170727 | 260810 | 32978 | 273346 |
| 39 | Oil Bound Distemper | 143725 | 230537 | 70667 | 447920 |
| 40 | Cement Paint | 315891 | 437522 | 54272 | 468750 |
| 41 | Pink Primer (Wood) | 81169 | 119 | 36709 | 164094 |
| 42 | Red Lead Primer (Steel) | 0 | 119 | 0 | 0 |
| 43 | Enamel Paint | 96846 | 255 | 39744 | 275868 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | |
|---|---|---|---|---|---|
| **S.No.** | **Items** | **Gulbarga** | **Mysore** | **Cochin** | **Trivandrum** |
| | **MATERIAL** | | | | |
| **44** | Sprit | 0 | 98194 | 0 | 0 |
| **45** | Shellac | 0 | 11065 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 30063 | 1090 | 0 | 0 |
| **47** | Welding | 4581 | 546 | 0 | 0 |
| | **LABOUR** | | | | |
| **1** | Mason/ Painter/Carpenter | 6499648 | 11319896 | 2512594 | 12482019 |
| **2** | Black-smith / Mixer Operator/Fitter | 1867810 | 2945790 | 91265 | 873275 |
| **3** | Mate | 80524 | 145043 | 19180 | 33679 |
| **4** | Beldar | 7358420 | 8393792 | 2061827 | 8868881 |
| **5** | Bhisti | 4735745 | 4540712 | 691040 | 5268243 |
| **6** | Coolie | 6757493 | 7438116 | 1089395 | 6907689 |
| | **MISCELLANEOUS & LUMP SUM** | | | | |
| **1** | Batch mix plant+ Pump Charges | 1766731 | 246308 | 94367 | 0 |
| **2** | Mixer + Vibrator | 1973322 | 950445 | 256699 | 1629072 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 97517 | 143165 | 22629 | 43275 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 637745 | 1394878 | 124998 | 336889 |
| **5** | Centering & Shuttering Columns | 3949739 | 2173188 | 0 | 0 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 5816805 | 5144383 | 663222 | 4197516 |
| **7** | Sundries + Scaffolding | 2600907 | 2490371 | 506878 | 2751902 |
| **Total** | | **127991904** | **138328478** | **17943270** | **97233612** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Bhopal | Gwalior | Indore | Aurangabad |
|---|---|---|---|---|---|
| | **MATERIAL** | | | | |
| 1 | Cement | 3930222 | 3642626 | 2360214 | 10042046 |
| 2 | Coarse Sand with carriage | 1244301 | 1383647 | 1535766 | 2939574 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 325782 | 338132 | 202773 | 263188 |
| 4 | Stone Agg. (20mm) | 433550 | 377427 | 215155 | 1320842 |
| 5 | Stone Agg. (10mm) | 519254 | 367345 | 244478 | 705660 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 5249194 | 5990458 | 4672770 | 7823695 |
| 8 | Fine Sand with carriage | 569730 | 196099 | 401852 | 1048351 |
| 9 | Steel Bar | 2867038 | 1827024 | 1587922 | 17586866 |
| 10 | Chlorpyriphos/ Super-plasticizer | 439613 | 339713 | 278154 | 510846 |
| 11 | Marble Stone with carriage | 0 | 0 | 2929464 | 594933 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 182800 |
| 13 | Marble Chips with carriage | 0 | 50324 | 4656 | 109043 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 0 | 261484 |
| 15 | Ceramic Wall Tiles | 224034 | 113746 | 122291 | 692564 |
| 16 | Marble Powder | 2677 | 1443 | 159 | 2278 |
| 17 | Dark Shade Pigment | 86903 | 35121 | 4098 | 87997 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 206010 | 134254 | 129454 | 0 |
| 20 | Kerosene Oil | 29568 | 15054 | 15733 | 0 |
| 21 | Steam Coal | 0 | 3455 | 3439 | 0 |
| 22 | Mud Phuska/ Brick Bats | 11541 | 8226 | 8188 | 3941 |
| 23 | Kota Stone with Carriage | 0 | 0 | 0 | 1534952 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 123426 | 71981 | 71646 | 197043 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 43381 |
| 27 | Pipe with carriage | 46251 | 0 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 889814 |
| 29 | Door Shutter (Flush) | 472687 | 381622 | 388000 | 917363 |
| 30 | Steel Primer | 0 | 0 | 0 | 79485 |
| 31 | Wood (Frame) | 1827913 | 1147897 | 1104727 | 0 |
| 32 | Wood (Shutter 35 mm thick) | 2192231 | 1426900 | 1376941 | 1627894 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 2930626 |
| 34 | Ply wood | 0 | 0 | 0 | 0 |
| 35 | Glass Panes | 0 | 0 | 0 | 363149 |
| 36 | Wire Gauze | 0 | 0 | 0 | 166602 |
| 37 | M S Angle/Bar/ other sections | 0 | 0 | 0 | 126994 |
| 38 | Cement Primer | 103083 | 76137 | 78572 | 86460 |
| 39 | Oil Bound Distemper | 124503 | 81575 | 98215 | 224971 |
| 40 | Cement Paint | 0 | 0 | 0 | 173065 |
| 41 | Pink Primer (Wood) | 84184 | 53223 | 59796 | 13579 |
| 42 | Red Lead Primer (Steel) | 0 | 0 | 0 | 0 |
| 43 | Enamel Paint | 69288 | 55859 | 55491 | 35834 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | |
|---|---|---|---|---|---|
| **S.No.** | **Items** | **Bhopal** | **Gwalior** | **Indore** | **Aurangabad** |
| | **MATERIAL** | | | | |
| **44** | Sprit | 0 | 0 | 0 | 39627 |
| **45** | Shellac | 0 | 0 | 0 | 16671 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 215266 |
| **47** | Welding | 0 | 0 | 0 | 7855 |
| | **LABOUR** | | | | |
| **1** | Mason/ Painter/Carpenter | 5104370 | 3557307 | 3251621 | 4746126 |
| **2** | Black-smith / Mixer Operator/Fitter | 251757 | 147242 | 158265 | 1595320 |
| **3** | Mate | 49014 | 34263 | 31270 | 30035 |
| **4** | Beldar | 2256323 | 1771019 | 1501822 | 4379439 |
| **5** | Bhisti | 1491852 | 1187508 | 1183547 | 2175681 |
| **6** | Coolie | 2365952 | 2784106 | 1969357 | 3919147 |
| | **MISCELLANEOUS & LUMP SUM** | | | | |
| **1** | Batch mix plant+ Pump Charges | 219564 | 175024 | 112514 | 1122014 |
| **2** | Mixer + Vibrator | 425374 | 302955 | 448491 | 446286 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 38789 | 49259 | 37273 | 49557 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 0 | 0 | 256032 |
| **5** | Centering & Shuttering Columns | 0 | 0 | 0 | 1587694 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 1713717 | 1121130 | 1169379 | 4749196 |
| **7** | Sundries + Scaffolding | 922040 | 596996 | 547323 | 1638825 |
| **Total** | | **36021737** | **29846096** | **28360819** | **80562090** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Mumbai | Nagpur | Pune | Shillong |
|---|---|---|---|---|---|
| | **MATERIAL** | | | | |
| 1 | Cement | 17815365 | 15807254 | 30301891 | 25487881 |
| 2 | Coarse Sand with carriage | 3984066 | 3838854 | 8996599 | 5514731 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 682544 | 849319 | 829608 | 1917859 |
| 4 | Stone Agg. (20mm) | 2780294 | 1632765 | 4125460 | 5354780 |
| 5 | Stone Agg. (10mm) | 2090691 | 1392077 | 2219406 | 2366983 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 16748465 | 12146839 | 31639579 | 26914405 |
| 8 | Fine Sand with carriage | 2605016 | 3366208 | 3757717 | 2037823 |
| 9 | Steel Bar | 34526975 | 26512414 | 67500387 | 37135691 |
| 10 | Chlorpyriphos/ Super-plasticizer | 868575 | 1607568 | 1344969 | 1688577 |
| 11 | Marble Stone with carriage | 0 | 0 | 0 | 0 |
| 12 | Kota Stone with carriage | 1626668 | 0 | 1530180 | 26656089 |
| 13 | Marble Chips with carriage | 285106 | 142523 | 395236 | 0 |
| 14 | Vitrified Floor Tiles | 607610 | 429982 | 1067534 | 1277282 |
| 15 | Ceramic Wall Tiles | 1308021 | 1012307 | 1740573 | 3355987 |
| 16 | Marble Powder | 4923 | 4477 | 6513 | 0 |
| 17 | Dark Shade Pigment | 242383 | 121091 | 328239 | 616640 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 0 | 0 | 0 | 0 |
| 20 | Kerosene Oil | 0 | 0 | 0 | 0 |
| 21 | Steam Coal | 0 | 0 | 0 | 0 |
| 22 | Mud Phuska/ Brick Bats | 16834 | 32911 | 0 | 118318 |
| 23 | Kota Stone with Carriage | 0 | 0 | 4194872 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 214809 | 531637 | 449282 | 567 |
| 26 | PVC Sheet (400 miicron thick) | 15039 | 38766 | 17564 | 3428 |
| 27 | Pipe with carriage | 165129 | 252104 | 148197 | 105245 |
| 28 | Standard Rolled Steel Sections (Ready made) | 1580621 | 1499933 | 2334215 | 150214 |
| 29 | Door Shutter (Flush) | 5482655 | 3324770 | 6983644 | 4697586 |
| 30 | Steel Primer | 212804 | 136746 | 251203 | 126062 |
| 31 | Wood (Frame) | 0 | 0 | 0 | 1835158 |
| 32 | Wood (Shutter 35 mm thick) | 2742223 | 3220763 | 5733779 | 2664753 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 6369320 | 3561473 | 8511118 | 6957795 |
| 34 | Ply wood | 0 | 0 | 0 | 0 |
| 35 | Glass Panes | 386321 | 575775 | 941645 | 70195 |
| 36 | Wire Gauze | 268930 | 348924 | 478995 | 0 |
| 37 | M S Angle/Bar/ other sections | 257680 | 192320 | 409736 | 225658 |
| 38 | Cement Primer | 262391 | 136234 | 335466 | 458325 |
| 39 | Oil Bound Distemper | 545730 | 449123 | 808712 | 652461 |
| 40 | Cement Paint | 461241 | 464533 | 555061 | 351790 |
| 41 | Pink Primer (Wood) | 23735 | 23166 | 33110 | 81008 |
| 42 | Red Lead Primer (Steel) | 0 | 0 | 0 | 2179 |
| 43 | Enamel Paint | 65389 | 56694 | 91826 | 0 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | |
|---|---|---|---|---|---|
| **S.No.** | **Items** | **Mumbai** | **Nagpur** | **Pune** | **Shillong** |
| | **MATERIAL** | | | | |
| **44** | Sprit | 67033 | 60063 | 136063 | 0 |
| **45** | Shellac | 27416 | 26531 | 53031 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 468994 | 0 | 545201 | 269656 |
| **47** | Welding | 14705 | 0 | 16100 | 21401 |
| | **LABOUR** | | | | |
| **1** | Mason/ Painter/Carpenter | 15832370 | 10939797 | 18231104 | 13421083 |
| **2** | Black-smith / Mixer Operator/Fitter | 3538582 | 2367232 | 5895614 | 3120976 |
| **3** | Mate | 63671 | 55606 | 89248 | 109102 |
| **4** | Beldar | 11999615 | 9574178 | 22350190 | 9864477 |
| **5** | Bhisti | 6899178 | 4645754 | 7970314 | 6956229 |
| **6** | Coolie | 10845615 | 7266927 | 13566785 | 8390739 |
| | **MISCELLANEOUS & LUMP SUM** | | | | |
| **1** | Batch mix plant+ Pump Charges | 2005966 | 1599829 | 4170378 | 0 |
| **2** | Mixer + Vibrator | 939456 | 602876 | 1369750 | 3413362 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 80813 | 91750 | 147259 | 166911 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 396901 | 470307 | 770569 | 1163228 |
| **5** | Centering & Shuttering Columns | 2884628 | 2728911 | 4795006 | 2205962 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 9221527 | 5999524 | 0 | 9577736 |
| **7** | Sundries + Scaffolding | 3663905 | 3168710 | 5822354 | 4871362 |
| **Total** | | **174197927** | **133307549** | **273991283** | **222377693** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Bhubaneswar | Rourkela | Puducherry | Jalandhar |
|---|---|---|---|---|---|
| | **MATERIAL** | | | | |
| 1 | Cement | 4443227 | 3957783 | 3037487 | 6854178 |
| 2 | Coarse Sand with carriage | 436118 | 354854 | 1075600 | 2379186 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 154908 | 303369 | 190522 | 277239 |
| 4 | Stone Agg. (20mm) | 652802 | 746858 | 342118 | 1331747 |
| 5 | Stone Agg. (10mm) | 424225 | 719890 | 226865 | 945607 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 7151849 | 0 | 4524134 | 13318642 |
| 8 | Fine Sand with carriage | 136674 | 120123 | 527350 | 190633 |
| 9 | Steel Bar | 3942866 | 2052614 | 1663181 | 4510673 |
| 10 | Chlorpyriphos/ Super-plasticizer | 146170 | 276178 | 308437 | 173325 |
| 11 | Marble Stone with carriage | 3763251 | 1717751 | 2159053 | 3991862 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 27086 | 12394 | 5792 | 13910 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 446032 | 159693 | 107294 | 421751 |
| 16 | Marble Powder | 1878 | 965 | 366 | 1595 |
| 17 | Dark Shade Pigment | 9156 | 4705 | 6195 | 10873 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 135265 | 153423 | 156809 | 190375 |
| 20 | Kerosene Oil | 11818 | 13183 | 13250 | 19089 |
| 21 | Steam Coal | 2712 | 3219 | 7523 | 3651 |
| 22 | Mud Phuska/ Brick Bats | 6458 | 7664 | 7542 | 8693 |
| 23 | Kota Stone with Carriage | 0 | 0 | 0 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 43949 | 47685 | 51326 | 135218 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 |
| 27 | Pipe with carriage | 0 | 0 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 |
| 29 | Door Shutter (Flush) | 0 | 690704 | 0 | 1165172 |
| 30 | Steel Primer | 0 | 0 | 0 | 0 |
| 31 | Wood (Frame) | 1158850 | 0 | 4580054 | 2576942 |
| 32 | Wood (Shutter 35 mm thick) | 1198888 | 30916 | 4640614 | 3402597 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 |
| 34 | Ply wood | 0 | 0 | 0 | 0 |
| 35 | Glass Panes | 0 | 0 | 0 | 0 |
| 36 | Wire Gauze | 0 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 0 | 7736347 | 0 | 0 |
| 38 | Cement Primer | 156258 | 100676 | 128729 | 210738 |
| 39 | Oil Bound Distemper | 167419 | 78589 | 94577 | 246317 |
| 40 | Cement Paint | 96851 | 37194 | 86470 | 292766 |
| 41 | Pink Primer (Wood) | 100889 | 26258 | 49499 | 103992 |
| 42 | Red Lead Primer (Steel) | 0 | 0 | 0 | 0 |
| 43 | Enamel Paint | 154752 | 42546 | 79748 | 160840 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | |
|---|---|---|---|---|---|
| **S.No.** | **Items** | **Bhubaneswar** | **Rourkela** | **Puducherry** | **Jalandhar** |
| | **MATERIAL** | | | | |
| **44** | Sprit | 0 | 0 | 0 | 0 |
| **45** | Shellac | 0 | 0 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 497121 |
| **47** | Welding | 0 | 0 | 0 | 29309 |
| | **LABOUR** | | | | |
| **1** | Mason/ Painter/Carpenter | 4225722 | 1607238 | 3831539 | 7007745 |
| **2** | Black-smith / Mixer Operator/Fitter | 294076 | 762113 | 193655 | 290085 |
| **3** | Mate | 9493 | 17475 | 31031 | 18680 |
| **4** | Beldar | 1804375 | 2056041 | 2611641 | 2983442 |
| **5** | Bhisti | 1991459 | 1036926 | 2231106 | 3038524 |
| **6** | Coolie | 3293473 | 1207710 | 3364776 | 6860280 |
| | **MISCELLANEOUS & LUMP SUM** | | | | |
| **1** | Batch mix plant+ Pump Charges | 442108 | 196619 | 195922 | 591833 |
| **2** | Mixer + Vibrator | 654021 | 358785 | 351527 | 762356 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 19261 | 34263 | 39676 | 27007 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 227067 | 0 | 0 |
| **5** | Centering & Shuttering Columns | 1189568 | 0 | 420925 | 0 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 2049219 | 1002603 | 975692 | 2288870 |
| **7** | Sundries + Scaffolding | 874880 | 2376668 | 505640 | 1344893 |
| **Total** | | **41818006** | **30279088** | **38823664** | **68677752** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Nangal | Pathankot | Rajpura | Ganganagar | Jaipur |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| 1 | Cement | 4254971 | 6870562 | 3943456 | 1822900 | 4077666 |
| 2 | Coarse Sand with carriage | 1414666 | 1711467 | 1646250 | 451210 | 1212421 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 424154 | 635771 | 409121 | 110521 | 299138 |
| 4 | Stone Agg. (20mm) | 931067 | 2291071 | 571598 | 163756 | 459309 |
| 5 | Stone Agg. (10mm) | 785914 | 987833 | 537754 | 115627 | 363376 |
| 6 | Rubble Stone | 0 | 0 | 0 | 2496069 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 6989507 | 2176547 | 5723552 | 0 | 5003160 |
| 8 | Fine Sand with carriage | 292564 | 772373 | 552565 | 126689 | 403459 |
| 9 | Steel Bar | 2372894 | 2923781 | 2760333 | 910735 | 2702482 |
| 10 | Chlorpyriphos/ Super-plasticizer | 300621 | 421272 | 396255 | 166054 | 426498 |
| 11 | Marble Stone with carriage | 0 | 0 | 1991476 | 737057 | 3457078 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 47841 | 24723 | 5568 | 1945 | 7677 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 0 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 133374 | 663703 | 322377 | 79196 | 248700 |
| 16 | Marble Powder | 3356 | 879 | 209 | 84 | 198 |
| 17 | Dark Shade Pigment | 24204 | 22278 | 3733 | 1388 | 8045 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 172417 | 260764 | 184808 | 85466 | 247698 |
| 20 | Kerosene Oil | 17288 | 26147 | 15055 | 7115 | 23131 |
| 21 | Steam Coal | 3210 | 1250 | 2057 | 2041 | 4424 |
| 22 | Mud Phuska/ Brick Bats | 7643 | 0 | 9794 | 3888 | 10533 |
| 23 | Kota Stone with Carriage | 0 | 864415 | 0 | 0 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 122462 | 196510 | 114261 | 24192 | 71686 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 | 0 |
| 27 | Pipe with carriage | 0 | 230548 | 0 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 | 0 |
| 29 | Door Shutter (Flush) | 472987 | 800119 | 0 | 0 | 0 |
| 30 | Steel Primer | 0 | 0 | 0 | 0 | 0 |
| 31 | Wood (Frame) | 1045373 | 3179707 | 1403768 | 969634 | 2400444 |
| 32 | Wood (Shutter 35 mm thick) | 1370917 | 8609413 | 2625123 | 1114751 | 3028993 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 | 0 |
| 34 | Ply wood | 0 | 2124941 | 0 | 0 | 0 |
| 35 | Glass Panes | 0 | 0 | 0 | 0 | 0 |
| 36 | Wire Gauze | 0 | 40218 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 0 | 730235 | 0 | 0 | 0 |
| 38 | Cement Primer | 75345 | 117618 | 96459 | 44540 | 98678 |
| 39 | Oil Bound Distemper | 88065 | 126019 | 86813 | 39768 | 101130 |
| 40 | Cement Paint | 104672 | 373213 | 147405 | 13962 | 36312 |
| 41 | Pink Primer (Wood) | 42573 | 154505 | 102034 | 41152 | 63980 |
| 42 | Red Lead Primer (Steel) | 0 | 39606 | 0 | 0 | 0 |
| 43 | Enamel Paint | 65846 | 322460 | 97953 | 55162 | 59373 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | | |
|---|---|---|---|---|---|---|
| **S.No.** | **Items** | **Nangal** | **Pathankot** | **Rajpura** | **Ganganagar** | **Jaipur** |
| | **MATERIAL** | | | | | |
| **44** | Sprit | 0 | 0 | 0 | 0 | 0 |
| **45** | Shellac | 0 | 0 | 0 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 0 | 0 |
| **47** | Welding | 0 | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | | |
| **1** | Mason/ Painter/Carpenter | 3589013 | 7853263 | 3956323 | 2308302 | 5362439 |
| **2** | Black-smith / Mixer Operator/Fitter | 175791 | 335800 | 185886 | 82921 | 386872 |
| **3** | Mate | 29404 | 50924 | 35551 | 8500 | 39452 |
| **4** | Beldar | 2161470 | 3514368 | 1977336 | 1444762 | 3809006 |
| **5** | Bhisti | 1446433 | 1582983 | 1636709 | 647151 | 3237153 |
| **6** | Coolie | 3203290 | 1947979 | 2620603 | 1210455 | 4443477 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | |
| **1** | Batch mix plant+ Pump Charges | 348357 | 784080 | 257086 | 110970 | 307031 |
| **2** | Mixer + Vibrator | 154471 | 109324 | 502283 | 197250 | 583090 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 31420 | 77659 | 49934 | 19442 | 44441 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 0 | 0 | 9690 | 4550 |
| **5** | Centering & Shuttering Columns | 0 | 223857 | 373571 | 196794 | 60248 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 1219830 | 309624 | 1425678 | 532552 | 1693345 |
| **7** | Sundries + Scaffolding | 639552 | 1738631 | 716740 | 365228 | 694608 |
| **Total** | | **34562960** | **56228436** | **37487474** | **16718920** | **45481299** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Jodhpur | Kota | Gangtok | Chennai | Coimbatore |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| 1 | Cement | 5191072 | 3743029 | 6707176 | 4757894 | 2946309 |
| 2 | Coarse Sand with carriage | 1288939 | 1122330 | 1510501 | 1679037 | 1244076 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 341087 | 230380 | 311750 | 459618 | 271177 |
| 4 | Stone Agg. (20mm) | 501475 | 347907 | 1548604 | 1157636 | 602399 |
| 5 | Stone Agg. (10mm) | 359430 | 179500 | 1039556 | 829263 | 473105 |
| 6 | Rubble Stone | 6757245 | 5065156 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 0 | 21358 | 11858450 | 0 | 0 |
| 8 | Fine Sand with carriage | 375272 | 293595 | 510063 | 1080466 | 404704 |
| 9 | Steel Bar | 3044677 | 2565097 | 4884847 | 2702952 | 1444037 |
| 10 | Chlorpyriphos/ Super-plasticizer | 477723 | 403790 | 153535 | 657597 | 223668 |
| 11 | Marble Stone with carriage | 2219432 | 2188786 | 239310 | 2929552 | 1564991 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 4816 | 8523 | 0 | 7474 | 5048 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 3446490 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 164868 | 225527 | 667909 | 189910 | 116108 |
| 16 | Marble Powder | 207 | 277 | 73 | 1034 | 822 |
| 17 | Dark Shade Pigment | 3437 | 6189 | 667 | 4384 | 3623 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 268987 | 243055 | 278733 | 251635 | 111198 |
| 20 | Kerosene Oil | 22393 | 17402 | 20003 | 22529 | 8960 |
| 21 | Steam Coal | 6424 | 1331 | 11477 | 5171 | 2285 |
| 22 | Mud Phuska/ Brick Bats | 12237 | 0 | 0 | 12311 | 5440 |
| 23 | Kota Stone with Carriage | 0 | 0 | 0 | 0 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 76140 | 18678 | 127525 | 143630 | 33851 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 | 0 |
| 27 | Pipe with carriage | 0 | 0 | 0 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 | 0 |
| 29 | Door Shutter (Flush) | 0 | 0 | 1533900 | 1411348 | 0 |
| 30 | Steel Primer | 0 | 0 | 0 | 0 | 0 |
| 31 | Wood (Frame) | 2006735 | 1722352 | 4908115 | 0 | 704360 |
| 32 | Wood (Shutter 35 mm thick) | 2390138 | 1610626 | 4834153 | 0 | 839860 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 | 0 |
| 34 | Ply wood | 0 | 0 | 0 | 0 | 0 |
| 35 | Glass Panes | 0 | 0 | 0 | 0 | 0 |
| 36 | Wire Gauze | 0 | 0 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 0 | 0 | 0 | 2134056 | 0 |
| 38 | Cement Primer | 102324 | 89375 | 178995 | 129249 | 83277 |
| 39 | Oil Bound Distemper | 91361 | 104464 | 303653 | 118171 | 77329 |
| 40 | Cement Paint | 32075 | 26743 | 210411 | 111418 | 65262 |
| 41 | Pink Primer (Wood) | 85127 | 72569 | 110617 | 49741 | 28766 |
| 42 | Red Lead Primer (Steel) | 0 | 0 | 0 | 0 | 0 |
| 43 | Enamel Paint | 114108 | 59954 | 184248 | 82850 | 42781 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | | |
|---|---|---|---|---|---|---|
| **S.No.** | **Items** | **Jodhpur** | **Kota** | **Gangtok** | **Chennai** | **Coimbatore** |
| | **MATERIAL** | | | | | |
| **44** | Sprit | 0 | 0 | 0 | 0 | 0 |
| **45** | Shellac | 0 | 0 | 0 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 0 | 0 |
| **47** | Welding | 0 | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | | |
| **1** | Mason/ Painter/Carpenter | 5825190 | 4899087 | 8175739 | 3536999 | 3175241 |
| **2** | Black-smith / Mixer Operator/Fitter | 277214 | 265140 | 492063 | 574246 | 183095 |
| **3** | Mate | 24975 | 32673 | 16314 | 27001 | 18348 |
| **4** | Beldar | 4088217 | 2898827 | 2958256 | 2968289 | 2382312 |
| **5** | Bhisti | 1879342 | 1483755 | 2340082 | 1721474 | 1417381 |
| **6** | Coolie | 3098426 | 2179047 | 5854849 | 1703033 | 1718171 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | |
| **1** | Batch mix plant+ Pump Charges | 338717 | 262940 | 494848 | 286873 | 152993 |
| **2** | Mixer + Vibrator | 595608 | 526974 | 83261 | 600303 | 277128 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 59204 | 49925 | 19155 | 53440 | 25030 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 8259 | 13232 | 0 | 49565 | 165131 |
| **5** | Centering & Shuttering Columns | 436286 | 443672 | 0 | 0 | 0 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 1776235 | 1123669 | 1992838 | 1720717 | 847179 |
| **7** | Sundries + Scaffolding | 977980 | 782635 | 1139282 | 916761 | 332930 |
| **Total** | | **45323384** | **35329570** | **69147450** | **35087628** | **21998375** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Karaikudi | Tiruchirappalli | Hyderabad | Mahbubnagar |
|---|---|---|---|---|---|
| | **MATERIAL** | | | | |
| 1 | Cement | 6686602 | 9804015 | 6071066 | 2667429 |
| 2 | Coarse Sand with carriage | 1795936 | 3109508 | 1214050 | 725272 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 641356 | 2394925 | 83923 | 164534 |
| 4 | Stone Agg. (20mm) | 1209592 | 2113862 | 1134942 | 314171 |
| 5 | Stone Agg. (10mm) | 560127 | 697487 | 677181 | 310881 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 6382130 | 6256991 | 3107668 | 1958570 |
| 8 | Fine Sand with carriage | 690514 | 699085 | 321985 | 293728 |
| 9 | Steel Bar | 8206628 | 8034330 | 12819202 | 1468139 |
| 10 | Chlorpyriphos/ Super-plasticizer | 540889 | 460187 | 0 | 618345 |
| 11 | Marble Stone with carriage | 0 | 0 | 2368807 | 823166 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 54029 | 52721 | 8832 | 3172 |
| 14 | Vitrified Floor Tiles | 0 | 723275 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 0 | 849625 | 221590 | 96623 |
| 16 | Marble Powder | 1149 | 1144 | 385 | 138 |
| 17 | Dark Shade Pigment | 27976 | 27844 | 9880 | 3548 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 192243 | 110694 | 103989 | 165259 |
| 20 | Kerosene Oil | 13380 | 7704 | 5428 | 9403 |
| 21 | Steam Coal | 3178 | 0 | 2076 | 3596 |
| 22 | Mud Phuska/ Brick Bats | 0 | 0 | 4035 | 6990 |
| 23 | Kota Stone with Carriage | 1198311 | 775378 | 0 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 95586 | 61850 | 24032 | 41631 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 |
| 27 | Pipe with carriage | 103364 | 91650 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 275890 | 114749 | 0 | 0 |
| 29 | Door Shutter (Flush) | 0 | 139810 | 0 | 0 |
| 30 | Steel Primer | 7831 | 11870 | 0 | 0 |
| 31 | Wood (Frame) | 0 | 578880 | 1448932 | 768563 |
| 32 | Wood (Shutter 35 mm thick) | 406397 | 3210105 | 1395328 | 811814 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 |
| 34 | Ply wood | 611773 | 2979909 | 0 | 0 |
| 35 | Glass Panes | 99647 | 41446 | 0 | 0 |
| 36 | Wire Gauze | 0 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 1081352 | 1319716 | 0 | 0 |
| 38 | Cement Primer | 124014 | 121582 | 131326 | 69961 |
| 39 | Oil Bound Distemper | 103345 | 101318 | 123122 | 65590 |
| 40 | Cement Paint | 198459 | 277902 | 132300 | 70491 |
| 41 | Pink Primer (Wood) | 7790 | 29526 | 103594 | 67488 |
| 42 | Red Lead Primer (Steel) | 12559 | 7750 | 0 | 0 |
| 43 | Enamel Paint | 0 | 74478 | 161955 | 92522 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | |
|---|---|---|---|---|---|
| **S.No.** | **Items** | **Karaikudi** | **Tiruchirappalli** | **Hyderabad** | **Mahbubnagar** |
| | **MATERIAL** | | | | |
| **44** | Sprit | 0 | 0 | 0 | 0 |
| **45** | Shellac | 0 | 0 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 14860 | 0 | 0 |
| **47** | Welding | 0 | 2426 | 0 | 0 |
| | **LABOUR** | | | | |
| **1** | Mason/ Painter/Carpenter | 3245336 | 5962421 | 2997992 | 1832906 |
| **2** | Black-smith / Mixer Operator/Fitter | 744244 | 765205 | 659194 | 72294 |
| **3** | Mate | 39516 | 39516 | 4080 | 13182 |
| **4** | Beldar | 4168254 | 6349703 | 1717681 | 974506 |
| **5** | Bhisti | 1454578 | 2176317 | 1510053 | 725416 |
| **6** | Coolie | 2291460 | 2632369 | 1705324 | 1116848 |
| | **MISCELLANEOUS & LUMP SUM** | | | | |
| **1** | Batch mix plant+ Pump Charges | 216086 | 992259 | 795728 | 152087 |
| **2** | Mixer + Vibrator | 250930 | 510910 | 954454 | 338513 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 58194 | 58194 | 16831 | 37325 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 218471 | 212100 | 17719 | 7344 |
| **5** | Centering & Shuttering Columns | 902282 | 925131 | 2269278 | 193351 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 1957395 | 1335654 | 3364627 | 729650 |
| **7** | Sundries + Scaffolding | 1029180 | 1641363 | 1024058 | 516144 |
| **Total** | | **47907974** | **68899745** | **48712646** | **18330588** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Agra | Aligarh | Allahabad | Bareilly | Gorakhpur |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| 1 | Cement | 1872405 | 3037341 | 6677179 | 3989275 | 4098122 |
| 2 | Coarse Sand with carriage | 798756 | 1183405 | 2723928 | 1596257 | 2638629 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 112524 | 108381 | 606097 | 317581 | 713020 |
| 4 | Stone Agg. (20mm) | 268288 | 618563 | 1136879 | 581442 | 943382 |
| 5 | Stone Agg. (10mm) | 193297 | 435735 | 977469 | 440685 | 1110398 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 3193187 | 731317 | 13549522 | 6990289 | 6843117 |
| 8 | Fine Sand with carriage | 249362 | 242357 | 933711 | 540686 | 219871 |
| 9 | Steel Bar | 1055326 | 2115202 | 4034194 | 2465912 | 2459073 |
| 10 | Chlorpyriphos/ Super-plasticizer | 162259 | 86578 | 631126 | 368320 | 382964 |
| 11 | Marble Stone with carriage | 797492 | 1824623 | 369960 | 1731171 | 0 |
| 12 | Kota Stone with carriage | 0 | 0 | 1324103 | 0 | 0 |
| 13 | Marble Chips with carriage | 3124 | 5877 | 0 | 7752 | 94454 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 0 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 99241 | 230817 | 0 | 321193 | 82424 |
| 16 | Marble Powder | 81 | 230 | 0 | 257 | 2166 |
| 17 | Dark Shade Pigment | 1816 | 5126 | 110308 | 6251 | 39552 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 63186 | 64554 | 275882 | 148131 | 315988 |
| 20 | Kerosene Oil | 0 | 6931 | 29621 | 15905 | 23870 |
| 21 | Steam Coal | 1730 | 1767 | 7554 | 4056 | 4565 |
| 22 | Mud Phuska/ Brick Bats | 4119 | 4208 | 17985 | 9657 | 23551 |
| 23 | Kota Stone with Carriage | 0 | 0 | 0 | 0 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 25630 | 26185 | 153871 | 82619 | 169087 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 | 0 |
| 27 | Pipe with carriage | 0 | 0 | 0 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 | 0 |
| 29 | Door Shutter (Flush) | 0 | 0 | 0 | 0 | 584402 |
| 30 | Steel Primer | 0 | 0 | 0 | 0 | 0 |
| 31 | Wood (Frame) | 698664 | 1593285 | 2525566 | 1356577 | 1540261 |
| 32 | Wood (Shutter 35 mm thick) | 950185 | 2324858 | 3156839 | 2008883 | 2566492 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 | 0 |
| 34 | Ply wood | 0 | 0 | 0 | 0 | 0 |
| 35 | Glass Panes | 0 | 0 | 0 | 0 | 0 |
| 36 | Wire Gauze | 0 | 0 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 0 | 0 | 0 | 0 | 0 |
| 38 | Cement Primer | 41663 | 55960 | 218388 | 116975 | 127273 |
| 39 | Oil Bound Distemper | 46988 | 54961 | 203903 | 98084 | 161616 |
| 40 | Cement Paint | 25776 | 38372 | 73348 | 59785 | 66493 |
| 41 | Pink Primer (Wood) | 40955 | 83885 | 144863 | 84785 | 92700 |
| 42 | Red Lead Primer (Steel) | 0 | 0 | 0 | 0 | 0 |
| 43 | Enamel Paint | 54295 | 95144 | 144976 | 100536 | 109524 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | | |
|---|---|---|---|---|---|---|
| **S.No.** | **Items** | **Agra** | **Aligarh** | **Allahabad** | **Bareilly** | **Gorakhpur** |
| | **MATERIAL** | | | | | |
| **44** | Sprit | 0 | 0 | 0 | 0 | 0 |
| **45** | Shellac | 0 | 0 | 0 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 0 | 0 |
| **47** | Welding | 0 | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | | |
| **1** | Mason/ Painter/Carpenter | 1983421 | 3315742 | 6099241 | 3573295 | 3815789 |
| **2** | Black-smith / Mixer Operator/Fitter | 92164 | 192587 | 348757 | 207628 | 214414 |
| **3** | Mate | 15537 | 7753 | 48213 | 27178 | 29140 |
| **4** | Beldar | 1014012 | 1694601 | 3273590 | 1902712 | 1749403 |
| **5** | Bhisti | 745383 | 1186098 | 2335707 | 1336609 | 1473980 |
| **6** | Coolie | 1501590 | 1607190 | 3788196 | 2249768 | 2225712 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | |
| **1** | Batch mix plant+ Pump Charges | 122747 | 271185 | 444592 | 268861 | 268934 |
| **2** | Mixer + Vibrator | 209609 | 421261 | 916188 | 459357 | 237372 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 25016 | 12183 | 83139 | 46769 | 50248 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 0 | 0 | 0 | 0 |
| **5** | Centering & Shuttering Columns | 85878 | 692304 | 907239 | 545136 | 0 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 528016 | 1197190 | 2093892 | 1309901 | 1386897 |
| **7** | Sundries + Scaffolding | 363476 | 541285 | 1074048 | 737255 | 779530 |
| **Total** | | **17447201** | **26115041** | **61440072** | **36107530** | **37644414** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Kanpur | Khatuali | Lucknow | Dehradun | Haldwani |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| 1 | Cement | 2659928 | 3394140 | 4161140 | 5282682 | 8622880 |
| 2 | Coarse Sand with carriage | 1040200 | 972809 | 1706497 | 2275657 | 2596572 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 255046 | 100662 | 399049 | 308916 | 210253 |
| 4 | Stone Agg. (20mm) | 469530 | 474998 | 883514 | 386467 | 798529 |
| 5 | Stone Agg. (10mm) | 351555 | 318197 | 754033 | 355073 | 606407 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 5329310 | 4842994 | 8670780 | 5222090 | 15414871 |
| 8 | Fine Sand with carriage | 353755 | 342939 | 524687 | 256821 | 836839 |
| 9 | Steel Bar | 1791906 | 1968138 | 2963993 | 2046021 | 50828 |
| 10 | Chlorpyriphos/ Super-plasticizer | 250269 | 107956 | 112271 | 388939 | 236073 |
| 11 | Marble Stone with carriage | 1097565 | 1535708 | 1923501 | 1056011 | 2125599 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 6287 | 8794 | 12124 | 14219 | 31796 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 0 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 173048 | 255878 | 290674 | 170586 | 460858 |
| 16 | Marble Powder | 162 | 286 | 322 | 600 | 1342 |
| 17 | Dark Shade Pigment | 3623 | 5224 | 7836 | 4509 | 10084 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 92138 | 103537 | 172182 | 203784 | 216341 |
| 20 | Kerosene Oil | 9893 | 7206 | 18487 | 8181 | 8685 |
| 21 | Steam Coal | 2523 | 2173 | 4714 | 23254 | 24687 |
| 22 | Mud Phuska/ Brick Bats | 6007 | 11209 | 11225 | 22146 | 23511 |
| 23 | Kota Stone with Carriage | 0 | 0 | 0 | 0 | 0 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 68604 | 43989 | 96033 | 126189 | 133964 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 | 0 |
| 27 | Pipe with carriage | 0 | 0 | 0 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 | 0 |
| 29 | Door Shutter (Flush) | 0 | 0 | 0 | 0 | 0 |
| 30 | Steel Primer | 0 | 0 | 0 | 0 | 0 |
| 31 | Wood (Frame) | 1033062 | 2166171 | 1794492 | 2079651 | 4757751 |
| 32 | Wood (Shutter 35 mm thick) | 1537495 | 1809924 | 2156020 | 1349272 | 2990676 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 | 0 |
| 34 | Ply wood | 0 | 0 | 0 | 0 | 0 |
| 35 | Glass Panes | 0 | 0 | 0 | 0 | 0 |
| 36 | Wire Gauze | 0 | 0 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 0 | 0 | 0 | 0 | 0 |
| 38 | Cement Primer | 62575 | 144172 | 90364 | 107673 | 285530 |
| 39 | Oil Bound Distemper | 63387 | 220671 | 118118 | 164806 | 437035 |
| 40 | Cement Paint | 40122 | 55657 | 37178 | 18082 | 47949 |
| 41 | Pink Primer (Wood) | 58889 | 82792 | 92773 | 61812 | 135740 |
| 42 | Red Lead Primer (Steel) | 0 | 0 | 0 | 0 | 0 |
| 43 | Enamel Paint | 63251 | 85368 | 94165 | 63735 | 139963 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | | |
|---|---|---|---|---|---|---|
| **S.No.** | **Items** | **Kanpur** | **Khatuali** | **Lucknow** | **Dehradun** | **Haldwani** |
| | **MATERIAL** | | | | | |
| **44** | Sprit | 0 | 0 | 0 | 0 | 0 |
| **45** | Shellac | 0 | 0 | 0 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 0 | 0 |
| **47** | Welding | 0 | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | | |
| **1** | Mason/ Painter/Carpenter | 2951230 | 3459138 | 4062607 | 5215725 | 7710701 |
| **2** | Black-smith / Mixer Operator/Fitter | 147463 | 177236 | 278926 | 187661 | 4662 |
| **3** | Mate | 21233 | 8435 | 33540 | 28810 | 17978 |
| **4** | Beldar | 1467116 | 1109340 | 2162800 | 3251756 | 2579727 |
| **5** | Bhisti | 1057946 | 1267444 | 1666226 | 1650876 | 3169223 |
| **6** | Coolie | 2140941 | 2284065 | 2794046 | 4101466 | 7170413 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | |
| **1** | Batch mix plant+ Pump Charges | 186467 | 305068 | 274229 | 235901 | 621983 |
| **2** | Mixer + Vibrator | 287455 | 482955 | 578990 | 367908 | 697166 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 29790 | 14954 | 51373 | 40665 | 25412 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 0 | 0 | 18118 | 105749 |
| **5** | Centering & Shuttering Columns | 385453 | 936510 | 614832 | 438145 | 1211667 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 846335 | 1321653 | 1298644 | 579175 | 2500046 |
| **7** | Sundries + Scaffolding | 519931 | 693021 | 747667 | 753142 | 1120137 |
| **Total** | | **26861489** | **31121409** | **41660052** | **38866523** | **68139625** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

**Residential Buildings**

| S.No. | Items | Haridwar | Roorkee | Tehri | Howrah | Malda |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| 1 | Cement | 5676925 | 13177802 | 3527559 | 3844293 | 5413641 |
| 2 | Coarse Sand with carriage | 1796646 | 4111932 | 1774704 | 813888 | 1055964 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 144588 | 380965 | 467784 | 543030 | 484770 |
| 4 | Stone Agg. (20mm) | 508024 | 1302995 | 702770 | 675705 | 1359891 |
| 5 | Stone Agg. (10mm) | 395823 | 1033431 | 606937 | 735273 | 690473 |
| 6 | Rubble Stone | 0 | 0 | 18699 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 7507493 | 17831010 | 6683292 | 6214922 | 2722559 |
| 8 | Fine Sand with carriage | 563411 | 805345 | 527596 | 384863 | 634385 |
| 9 | Steel Bar | 3436668 | 9001512 | 1872779 | 2366198 | 2760207 |
| 10 | Chlorpyriphos/ Super-plasticizer | 137160 | 423217 | 339034 | 335025 | 443901 |
| 11 | Marble Stone with carriage | 1729704 | 4683343 | 79195 | 0 | 0 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 23186 | 64430 | 5814 | 0 | 0 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 0 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 281038 | 1052782 | 236976 | 230157 | 294748 |
| 16 | Marble Powder | 979 | 2720 | 203 | 5336 | 0 |
| 17 | Dark Shade Pigment | 7353 | 20433 | 3768 | 45100 | 37165 |
| 18 | Second Class Indian Teak Wood | 0 | 0 | 0 | 0 | 0 |
| 19 | Bitumen 80/100 With Carriage | 156405 | 402930 | 197632 | 241723 | 165050 |
| 20 | Kerosene Oil | 10401 | 28047 | 16786 | 11964 | 10265 |
| 21 | Steam Coal | 17051 | 45978 | 3211 | 10297 | 7079 |
| 22 | Mud Phuska/ Brick Bats | 16239 | 43789 | 7950 | 0 | 0 |
| 23 | Kota Stone with Carriage | 0 | 0 | 0 | 0 | 149561 |
| 24 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 0 |
| 25 | Water Proofing Compound | 92523 | 249507 | 126339 | 82626 | 8084 |
| 26 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 | 0 |
| 27 | Pipe with carriage | 0 | 0 | 0 | 0 | 0 |
| 28 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 | 0 |
| 29 | Door Shutter (Flush) | 0 | 0 | 33172 | 534295 | 560257 |
| 30 | Steel Primer | 0 | 0 | 0 | 0 | 47943 |
| 31 | Wood (Frame) | 3162185 | 20703053 | 1196451 | 2061405 | 4327191 |
| 32 | Wood (Shutter 35 mm thick) | 1876122 | 7097742 | 1332901 | 3183167 | 13045377 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 | 1844750 |
| 34 | Ply wood | 0 | 0 | 0 | 0 | 4588489 |
| 35 | Glass Panes | 0 | 0 | 0 | 0 | 0 |
| 36 | Wire Gauze | 0 | 0 | 0 | 0 | 0 |
| 37 | M S Angle/Bar/ other sections | 0 | 0 | 0 | 0 | 1141280 |
| 38 | Cement Primer | 192898 | 539703 | 103127 | 87190 | 117005 |
| 39 | Oil Bound Distemper | 295252 | 826076 | 224932 | 133455 | 160246 |
| 40 | Cement Paint | 35947 | 90632 | 43295 | 78309 | 172177 |
| 41 | Pink Primer (Wood) | 48971 | 316126 | 50800 | 83972 | 61492 |
| 42 | Red Lead Primer (Steel) | 726 | 0 | 0 | 0 | 27010 |
| 43 | Enamel Paint | 0 | 325961 | 52381 | 108230 | 0 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | | | |
|---|---|---|---|---|---|---|
| **S.No.** | **Items** | **Haridwar** | **Roorkee** | **Tehri** | **Howrah** | **Malda** |
| | **MATERIAL** | | | | | |
| **44** | Sprit | 0 | 0 | 0 | 0 | 0 |
| **45** | Shellac | 0 | 0 | 0 | 0 | 0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 0 | 0 |
| **47** | Welding | 0 | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | | |
| **1** | Mason/ Painter/Carpenter | 5352736 | 13742132 | 3028823 | 3664177 | 9081179 |
| **2** | Black-smith / Mixer Operator/Fitter | 322511 | 802503 | 131263 | 475028 | 344129 |
| **3** | Mate | 12501 | 30461 | 28970 | 37283 | 24950 |
| **4** | Beldar | 1769881 | 4708146 | 1714989 | 2206811 | 3141036 |
| **5** | Bhisti | 2489780 | 5177049 | 1180346 | 1263556 | 1866669 |
| **6** | Coolie | 3883825 | 8912094 | 2249963 | 2129627 | 2178765 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | |
| **1** | Batch mix plant+ Pump Charges | 445993 | 1083261 | 188100 | 204693 | 567659 |
| **2** | Mixer + Vibrator | 633933 | 1625603 | 112511 | 208021 | 191329 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 19161 | 54155 | 38889 | 48698 | 37879 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 16263 | 46834 | 0 | 0 | 248992 |
| **5** | Centering & Shuttering Columns | 925899 | 1487938 | 0 | 0 | 361626 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 1709531 | 4495472 | 1125874 | 1155658 | 198120 |
| **7** | Sundries + Scaffolding | 909443 | 2333081 | 488448 | 6886874 | 1382683 |
| **Total** | | **46605176** | **129060189** | **30524267** | **41090848** | **61955977** |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | |
|---|---|---|---|---|
| **S.No.** | **Items** | **Siliguri** | **Total** | **% Dist. from Total cost of Residential Buildings** |
| | **MATERIAL** | | | |
| **1** | Cement | 6720671 | 608985532 | 12.0 |
| **2** | Coarse Sand with carriage | 2412277 | 195325405 | 3.8 |
| **3** | Stone Agg. (40mm)/ Brick Agg. (40mm) | 1193195 | 37315265 | 0.7 |
| **4** | Stone Agg. (20mm) | 1433081 | 101068358 | 2.0 |
| **5** | Stone Agg. (10mm) | 1175952 | 65463981 | 1.3 |
| **6** | Rubble Stone | 0 | 22023678 | 0.4 |
| **7** | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 14971827 | 591263783 | 11.6 |
| **8** | Fine Sand with carriage | 525571 | 53795640 | 1.1 |
| **9** | Steel Bar | 5566766 | 675594409 | 13.3 |
| **10** | Chlorpyriphos/ Super-plasticizer | 640621 | 40561694 | 0.8 |
| **11** | Marble Stone with carriage | 3443206 | 156514234 | 3.1 |
| **12** | Kota Stone with carriage | 0 | 34935541 | 0.7 |
| **13** | Marble Chips with carriage | 0 | 2228824 | 0.0 |
| **14** | Vitrified Floor Tiles | 0 | 22402642 | 0.4 |
| **15** | Ceramic Wall Tiles | 414563 | 33185451 | 0.7 |
| **16** | Marble Powder | 1323 | 80592 | 0.0 |
| **17** | Dark Shade Pigment | 11180 | 2630650 | 0.1 |
| **18** | Second Class Indian Teak Wood | 0 | 5314348 | 0.1 |
| **19** | Bitumen 80/100 With Carriage | 492254 | 15006357 | 0.3 |
| **20** | Kerosene Oil | 30454 | 1112669 | 0.0 |
| **21** | Steam Coal | 20968 | 350530 | 0.0 |
| **22** | Mud Phuska/ Brick Bats | 0 | 1080698 | 0.0 |
| **23** | Kota Stone with Carriage | 0 | 19742579 | 0.4 |
| **24** | Brick Tiles With Carriage | 0 | 7989639 | 0.2 |
| **25** | Water Proofing Compound | 165028 | 8594020 | 0.2 |
| **26** | PVC Sheet (400 miicron thick) | 0 | 138140 | 0.0 |
| **27** | Pipe with carriage | 0 | 1763268 | 0.0 |
| **28** | Standard Rolled Steel Sections (Ready made) | 0 | 9163057 | 0.2 |
| **29** | Door Shutter (Flush) | 832219 | 40244805 | 0.8 |
| **30** | Steel Primer | 0 | 1066145 | 0.0 |
| **31** | Wood (Frame) | 3609859 | 140443929 | 2.8 |
| **32** | Wood (Shutter 35 mm thick) | 4337121 | 193443675 | 3.8 |
| **33** | Pressed Steel Frame (Profile B/ C/ E) | 0 | 31066626 | 0.6 |
| **34** | Ply wood | 0 | 12342071 | 0.2 |
| **35** | Glass Panes | 0 | 5440970 | 0.1 |
| **36** | Wire Gauze | 0 | 1588290 | 0.0 |
| **37** | M S Angle/Bar/ other sections | 0 | 17342198 | 0.3 |
| **38** | Cement Primer | 144031 | 11612092 | 0.2 |
| **39** | Oil Bound Distemper | 196407 | 15389399 | 0.3 |
| **40** | Cement Paint | 153919 | 11223566 | 0.2 |
| **41** | Pink Primer (Wood) | 136916 | 5993765 | 0.1 |
| **42** | Red Lead Primer (Steel) | 0 | 214895 | 0.0 |
| **43** | Enamel Paint | 175937 | 6954923 | 0.1 |

**Table 3.7 (a)** Total cost of Residential Building Construction (in Rupees)

| Residential Buildings | | | | |
|---|---|---|---|---|
| **S.No.** | **Items** | **Siliguri** | **Total** | **% Dist. from Total cost of Residential Buildings** |
| | **MATERIAL** | | | |
| **44** | Sprit | 0 | 815784 | 0.0 |
| **45** | Shellac | 0 | 267969 | 0.0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 0 | 11068415 | 0.2 |
| **47** | Welding | 0 | 259131 | 0.0 |
| | **LABOUR** | | | |
| **1** | Mason/ Painter/Carpenter | 5919068 | 469261259 | 9.2 |
| **2** | Black-smith / Mixer Operator/Fitter | 319929 | 56493520 | 1.1 |
| **3** | Mate | 60278 | 3920969 | 0.1 |
| **4** | Beldar | 4091296 | 320637266 | 6.3 |
| **5** | Bhisti | 3199517 | 199325580 | 3.9 |
| **6** | Coolie | 5217649 | 312811154 | 6.2 |
| | **MISCELLANEOUS & LUMP SUM** | | | |
| **1** | Batch mix plant+ Pump Charges | 459604 | 45878156 | 0.9 |
| **2** | Mixer + Vibrator | 853449 | 55112467 | 1.1 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 85025 | 5344291 | 0.1 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 11049677 | 0.2 |
| **5** | Centering & Shuttering Columns | 0 | 74412302 | 1.5 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 2265771 | 198096361 | 3.9 |
| **7** | Sundries + Scaffolding | 1088534 | 112059318 | 2.2 |
| **Total** | | **72365465** | **5084811951** | **100.0** |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Anantapur | Visakhapatnam | Itanagar | Guwahati | Jorhat | Patna |
|---|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | | |
| 1 | Cement | 25924865 | 5837311 | 21211596 | 87402791 | 14845873 | 9505572 |
| 2 | Coarse Sand with carriage | 4712784 | 1334203 | 3641695 | 35372873 | 2795482 | 274132 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 1043366 | 84460 | 563293 | 47070216 | 104095 | 89062 |
| 4 | Stone Agg. (20mm) | 6379114 | 1069708 | 3704628 | 31380304 | 4329220 | 751907 |
| 5 | Stone Agg. (10mm) | 2647899 | 538899 | 1760643 | 6588459 | 2081646 | 470948 |
| 6 | Rubble Stone | 2092930 | 0 | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 13227861 | 3152168 | 26322684 | 57050658 | 3878493 | 4264942 |
| 8 | Fine Sand with carriage | 948746 | 222473 | 1149223 | 7519480 | 1775256 | 65071 |
| 9 | Steel Bar | 26897422 | 13888425 | 1487942 | 161922479 | 786300 | 24182550 |
| 10 | Chlorpyriphos/ Super-plasticizer | 2497202 | 0 | 526067 | 0 | 365205 | 0 |
| 11 | Marble Stone with carriage | 0 | 2446138 | 0 | 0 | 2521223 | 3259702 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 4487809 | 0 | 0 |
| 13 | Marble Chips with carriage | 0 | 7607 | 164823 | 0 | 0 | 11476 |
| 14 | Vitrified Floor Tiles | 4382127 | 0 | 0 | 0 | 3110378 | 0 |
| 15 | Ceramic Wall Tiles | 606034 | 227343 | 2051398 | 861228 | 670247 | 289091 |
| 16 | Marble Powder | 594 | 332 | 2289 | 0 | 0 | 501 |
| 17 | Dark Shade Pigment | 14721 | 8510 | 53867 | 245854 | 0 | 12849 |
| 18 | Bitumen 80/100 With Carriage | 793176 | 135954 | 897834 | 0 | 0 | 187236 |
| 19 | Kerosene Oil | 65590 | 5111 | 73476 | 0 | 0 | 7038 |
| 20 | Steam Coal | 8468 | 1955 | 12323 | 0 | 0 | 2692 |
| 21 | Mud Phuska/ Brick Bats | 0 | 0 | 39577 | 0 | 0 | 5232 |
| 22 | Kota Stone with Carriage | 280679 | 359827 | 0 | 899306 | 0 | 0 |
| 23 | Brick Tiles With Carriage | 0 | 0 | 771288 | 0 | 0 | 0 |
| 24 | Water Proofing Compound | 18844 | 23945 | 174 | 89734 | 0 | 39170 |
| 25 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | Pipe with carrage | 118817 | 160981 | 0 | 1114370 | 0 | 0 |
| 27 | Standard Rolled Steel Sections (Ready made) | 164208 | 0 | 0 | 0 | 0 | 0 |
| 28 | Door Shutter (Flush) | 1732423 | 0 | 763047 | 0 | 0 | 0 |
| 29 | Steel Primer | 4904 | 0 | 92886 | 0 | 0 | 0 |
| 30 | Wood (Frame) | 161088 | 1556292 | 5353868 | 0 | 1010192 | 1791204 |
| 31 | Wood (Shutter 35 mm thick) | 578047 | 1905058 | 4269432 | 7693279 | 1353405 | 2294413 |
| 32 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 4721356 | 0 | 0 | 0 |
| 33 | Ply wood | 453273 | 0 | 260315 | 4959742 | 0 | 0 |
| 34 | Glass Panes | 52670 | 0 | 744492 | 0 | 80594 | 0 |
| 35 | Wire Gauze | 0 | 0 | 0 | 289530 | 28229 | 0 |
| 36 | M S Angle/Bar/ other sections | 0 | 0 | 159324 | 7764622 | 0 | 0 |
| 37 | Cement Primer | 79662 | 116419 | 234179 | 1097506 | 293627 | 185750 |
| 38 | Oil Bound Distemper | 65437 | 109132 | 418177 | 1628169 | 457601 | 227449 |
| 39 | Cement Paint | 440018 | 117298 | 237338 | 2481880 | 585729 | 145567 |
| 40 | Pink Primer (Wood) | 10301 | 88257 | 108734 | 103960 | 17040 | 105693 |
| 41 | Red Lead Primer (Steel) | 0 | 0 | 44148 | 0 | 5671 | 0 |
| 42 | Enamel Paint | 24581 | 91771 | 0 | 200989 | 50446 | 89909 |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Anantapur | Visakhapatnam | Itanagar | Guwahati | Jorhat | Patna |
|---|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | | |
| **43** | Sprit | 0 | 0 | 0 | 0 | 0 | 0 |
| **44** | Shellac | 0 | 0 | 0 | 0 | 0 | 0 |
| **45** | MS Tube/ ERW Tube/ GI Pipe | 6208 | 0 | 0 | 0 | 0 | 0 |
| **46** | Welding | 1183 | 0 | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | | | |
| **1** | Mason/ Painter/Carpenter | 7361856 | 4955466 | 13249467 | 26797637 | 5715202 | 3040517 |
| **2** | Black-smith / Mixer Operator/Fitter | 2207552 | 925029 | 225426 | 12193809 | 55380 | 796033 |
| **3** | Mate | 151083 | 6373 | 60826 | 2140806 | 54107 | 5981 |
| **4** | Beldar | 12088191 | 2708735 | 7222487 | 52411242 | 3087754 | 1942350 |
| **5** | Bhisti | 4253627 | 2185523 | 4995967 | 19227425 | 2466772 | 1747458 |
| **6** | Coolie | 7136908 | 2527289 | 11065227 | 25543921 | 2952945 | 1982503 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | | |
| **1** | Batch mix plant+ Pump Charges | 3292986 | 761412 | 0 | 4698192 | 0 | 1043195 |
| **2** | Mixer + Vibrator | 415339 | 1597125 | 529046 | 4239587 | 690375 | 1334944 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 183458 | 11684 | 82736 | 3795071 | 119514 | 17015 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 2200263 | 52258 | 553499 | 6857507 | 203227 | 43983 |
| **5** | Centering & Shuttering Columns | 2637373 | 2098446 | 5517701 | 9159249 | 653831 | 2887645 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 6044511 | 3397769 | 7438026 | 18791031 | 6052992 | 4823903 |
| **7** | Sundries + Scaffolding | 3212771 | 1130003 | 2260597 | 10743151 | 3873113 | 1369786 |
| **Total** | | **147621161** | **55846689** | **135043122** | **664823865** | **67071165** | **69294467** |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Chandigarh | Delhi | Panji | Ahmedabad | Surat | Vadodara |
|---|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | | |
| 1 | Cement | 4404907 | 492226626 | 30398717 | 7396385 | 5317811 | 4304006 |
| 2 | Coarse Sand with carriage | 1812291 | 196150927 | 14010035 | 1975581 | 1154336 | 1074622 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 178918 | 2720104 | 1180877 | 191713 | 118277 | 102778 |
| 4 | Stone Agg. (20mm) | 723318 | 108348025 | 5079306 | 1276149 | 756054 | 671052 |
| 5 | Stone Agg. (10mm) | 537095 | 67847789 | 2077527 | 713932 | 566276 | 508659 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 6674292 | 415209532 | 17161926 | 5451779 | 3578519 | 2894403 |
| 8 | Fine Sand with carriage | 318425 | 15919775 | 4027915 | 674261 | 472393 | 35002 |
| 9 | Steel Bar | 3948030 | 810770760 | 53861466 | 18647316 | 14377203 | 11985949 |
| 10 | Chlorpyriphos/ Super-plasticizer | 124269 | 0 | 1467669 | 0 | 0 | 0 |
| 11 | Marble Stone with carriage | 2460290 | 27228044 | 0 | 6502995 | 0 | 0 |
| 12 | Kota Stone with carriage | 0 | 25377092 | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 9878 | 2364593 | 4139 | 34050 | 296431 | 209246 |
| 14 | Vitrified Floor Tiles | 0 | 3369311 | 9914477 | 0 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 358563 | 43734992 | 2032966 | 696587 | 415660 | 364906 |
| 16 | Marble Powder | 371 | 108468 | 107 | 501 | 3966 | 3760 |
| 17 | Dark Shade Pigment | 6622 | 4818258 | 79630 | 11170 | 193088 | 274609 |
| 18 | Bitumen 80/100 With Carriage | 106086 | 0 | 132746 | 172524 | 103470 | 81812 |
| 19 | Kerosene Oil | 9769 | 0 | 10842 | 12792 | 8081 | 5070 |
| 20 | Steam Coal | 0 | 0 | 1738 | 1651 | 1352 | 905 |
| 21 | Mud Phuska/ Brick Bats | 5943 | 0 | 276 | 5825 | 3680 | 3078 |
| 22 | Kota Stone with Carriage | 0 | 14241666 | 0 | 0 | 0 | 0 |
| 23 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | Water Proofing Compound | 68664 | 2220405 | 518848 | 50972 | 39356 | 34717 |
| 25 | PVC Sheet (400 miicron thick) | 0 | 26467 | 13984 | 0 | 0 | 0 |
| 26 | Pipe with carrage | 0 | 2442931 | 245978 | 0 | 0 | 0 |
| 27 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 | Door Shutter (Flush) | 0 | 40613342 | 2961681 | 1830082 | 1098788 | 1098788 |
| 29 | Steel Primer | 0 | 2081798 | 622 | 0 | 0 | 0 |
| 30 | Wood (Frame) | 1340937 | 6285881 | 7728650 | 3847697 | 2733890 | 1931891 |
| 31 | Wood (Shutter 35 mm thick) | 2504391 | 49617269 | 13149338 | 4276325 | 2298899 | 2085669 |
| 32 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 45381685 | 9571 | 0 | 0 | 0 |
| 33 | Ply wood | 0 | 0 | 7244950 | 0 | 0 | 0 |
| 34 | Glass Panes | 0 | 10538537 | 0 | 0 | 0 | 0 |
| 35 | Wire Gauze | 0 | 0 | 0 | 0 | 0 | 0 |
| 36 | M S Angle/Bar/ other sections | 0 | 3585011 | 40909 | 0 | 0 | 0 |
| 37 | Cement Primer | 128957 | 12150643 | 290498 | 91602 | 67215 | 42688 |
| 38 | Oil Bound Distemper | 116061 | 18442941 | 259373 | 182124 | 78563 | 77245 |
| 39 | Cement Paint | 206457 | 22118165 | 626155 | 266422 | 158025 | 100360 |
| 40 | Pink Primer (Wood) | 117597 | 63053 | 2603 | 236697 | 140324 | 97426 |
| 41 | Red Lead Primer (Steel) | 0 | 0 | 1544 | 0 | 0 | 0 |
| 42 | Enamel Paint | 104933 | 48159 | 5092 | 282414 | 151925 | 139922 |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Chandigarh | Delhi | Panji | Ahmedabad | Surat | Vadodara |
|---|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | | |
| **43** | Sprit | 0 | 743058 | 88345 | 0 | 0 | 0 |
| **44** | Shellac | 0 | 238707 | 9105 | 0 | 0 | 0 |
| **45** | MS Tube/ ERW Tube/ GI Pipe | 0 | 6754656 | 8935 | 0 | 0 | 0 |
| **46** | Welding | 0 | 536084 | 4478 | 0 | 0 | 0 |
| | **LABOUR** | | | | | | |
| **1** | Mason/ Painter/Carpenter | 4581123 | 367366839 | 23061988 | 9132983 | 6793986 | 4667482 |
| **2** | Black-smith / Mixer Operator/Fitter | 322660 | 77648838 | 4888887 | 2004853 | 1322414 | 1034019 |
| **3** | Mate | 12209 | 5306130 | 107809 | 13918 | 9475 | 7051 |
| **4** | Beldar | 1880474 | 260835390 | 16787514 | 4347490 | 3046893 | 2494974 |
| **5** | Bhisti | 1896091 | 169689933 | 7863546 | 3878315 | 1898508 | 1477930 |
| **6** | Coolie | 3506168 | 244015555 | 10741514 | 4403182 | 2585786 | 1938510 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | | |
| **1** | Batch mix plant+ Pump Charges | 403325 | 85754469 | 3038542 | 1065432 | 723805 | 638344 |
| **2** | Mixer + Vibrator | 575844 | 24107081 | 1254151 | 1486042 | 399443 | 375104 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 17411 | 5806365 | 136093 | 22965 | 15634 | 11633 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 55136028 | 1847585 | 42596 | 46221 | 25846 |
| **5** | Centering & Shuttering Columns | 1152921 | 115097315 | 2572439 | 1827270 | 1241454 | 1332057 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 1826393 | 109848504 | 9502209 | 5326981 | 3419047 | 3235279 |
| **7** | Sundries + Scaffolding | 769982 | 93685501 | 4017542 | 1670881 | 1066625 | 936937 |
| **Total** | | **43211666** | **4068622702** | **260472837** | **90052454** | **56702873** | **46303728** |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Hamirpur | Shimla | Jammu | Srinagar | Udhampur |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| 1 | Cement | 3838993 | 3529382 | 5887319 | 7479238 | 16027038 |
| 2 | Coarse Sand with carriage | 1478563 | 1259223 | 1404955 | 2367381 | 3152317 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 448735 | 138313 | 247914 | 251675 | 1075420 |
| 4 | Stone Agg. (20mm) | 547395 | 563965 | 938476 | 1152770 | 3748242 |
| 5 | Stone Agg. (10mm) | 484308 | 458205 | 755485 | 714999 | 1793153 |
| 6 | Rubble Stone | 0 | 0 | 0 | 1538696 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 6157357 | 5928956 | 6438827 | 9257227 | 472505 |
| 8 | Fine Sand with carriage | 551274 | 363773 | 543804 | 512866 | 0 |
| 9 | Steel Bar | 2372342 | 2627527 | 3501698 | 3997667 | 16463030 |
| 10 | Chlorpyriphos/ Super-plasticizer | 390904 | 99575 | 137955 | 136200 | 730863 |
| 11 | Marble Stone with carriage | 1843111 | 2039235 | 2513100 | 2857676 | 7165864 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 6350 | 4691 | 10644 | 12787 | 7721 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 0 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 190525 | 188554 | 255278 | 281564 | 1315446 |
| 16 | Marble Powder | 280 | 180 | 427 | 432 | 268 |
| 17 | Dark Shade Pigment | 4756 | 3719 | 9044 | 9498 | 5672 |
| 18 | Bitumen 80/100 With Carriage | 256369 | 144671 | 154350 | 157654 | 497217 |
| 19 | Kerosene Oil | 11746 | 6971 | 9607 | 9150 | 37169 |
| 20 | Steam Coal | 1264 | 629 | 758 | 722 | 2346 |
| 21 | Mud Phuska/ Brick Bats | 10029 | 0 | 0 | 0 | 0 |
| 22 | Kota Stone with Carriage | 0 | 0 | 0 | 0 | 2010803 |
| 23 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 0 |
| 24 | Water Proofing Compound | 87750 | 42324 | 53588 | 55900 | 167201 |
| 25 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 0 | 0 |
| 26 | Pipe with carrage | 0 | 0 | 0 | 0 | 0 |
| 27 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 | 0 |
| 28 | Door Shutter (Flush) | 0 | 0 | 0 | 0 | 0 |
| 29 | Steel Primer | 0 | 0 | 0 | 0 | 0 |
| 30 | Wood (Frame) | 1066723 | 1140335 | 1557924 | 1606091 | 4482592 |
| 31 | Wood (Shutter 35 mm thick) | 1661254 | 1942959 | 2496732 | 2471053 | 7992355 |
| 32 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 | 0 |
| 33 | Ply wood | 0 | 0 | 0 | 0 | 0 |
| 34 | Glass Panes | 0 | 0 | 0 | 0 | 0 |
| 35 | Wire Gauze | 0 | 0 | 0 | 0 | 0 |
| 36 | M S Angle/Bar/ other sections | 0 | 0 | 0 | 0 | 0 |
| 37 | Cement Primer | 84883 | 112313 | 150362 | 153984 | 162944 |
| 38 | Oil Bound Distemper | 66051 | 80224 | 128882 | 123737 | 174583 |
| 39 | Cement Paint | 62115 | 92418 | 106051 | 135757 | 191543 |
| 40 | Pink Primer (Wood) | 83233 | 79649 | 109196 | 120759 | 218080 |
| 41 | Red Lead Primer (Steel) | 0 | 0 | 0 | 0 | 0 |
| 42 | Enamel Paint | 71263 | 78020 | 97640 | 118856 | 224865 |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Hamirpur | Shimla | Jammu | Srinagar | Udhampur |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| **43** | Sprit | 0 | 0 | 0 | 0 | 0 |
| **44** | Shellac | 0 | 0 | 0 | 0 | 0 |
| **45** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 0 | 0 |
| **46** | Welding | 0 | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | | |
| **1** | Mason/ Painter/Carpenter | 3256683 | 3772309 | 4841666 | 5684584 | 8095032 |
| **2** | Black-smith / Mixer Operator/Fitter | 196467 | 222436 | 277913 | 317275 | 1334389 |
| **3** | Mate | 38788 | 9387 | 12907 | 13909 | 54216 |
| **4** | Beldar | 2225460 | 1512584 | 2024198 | 2704066 | 6659390 |
| **5** | Bhisti | 1775363 | 1656850 | 2307028 | 2658236 | 3638649 |
| **6** | Coolie | 2739934 | 2811018 | 4181286 | 5806115 | 2268920 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | |
| **1** | Batch mix plant+ Pump Charges | 250716 | 303362 | 410114 | 492711 | 1691874 |
| **2** | Mixer + Vibrator | 489510 | 467229 | 559810 | 582314 | 1590186 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 48722 | 11739 | 17833 | 20216 | 62367 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 0 | 0 | 0 | 403188 |
| **5** | Centering & Shuttering Columns | 646261 | 710376 | 1202386 | 1939627 | 2910852 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 1164668 | 1641686 | 1888557 | 2166525 | 7139995 |
| **7** | Sundries + Scaffolding | 637384 | 625637 | 862482 | 928005 | 1791843 |
| **Total** | | **35247530** | **34670422** | **46096197** | **58837920** | **105760138** |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Jamshedpur | Bangalore | Dharwad | Gulbarga | Cochin |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| 1 | Cement | 5134962 | 46500315 | 9391481 | 65667291 | 22869276 |
| 2 | Coarse Sand with carriage | 1193598 | 26025327 | 4328698 | 36708085 | 6055867 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 196821 | 2481073 | 709362 | 3988797 | 929056 |
| 4 | Stone Agg. (20mm) | 690039 | 9866655 | 1447438 | 12511546 | 3794190 |
| 5 | Stone Agg. (10mm) | 469409 | 6401189 | 485862 | 6158418 | 2562345 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 | 252896 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 7926784 | 0 | 8204077 | 16879709 | 0 |
| 8 | Fine Sand with carriage | 315427 | 3935452 | 2496758 | 13646048 | 569760 |
| 9 | Steel Bar | 3484885 | 54577730 | 12133853 | 56464670 | 30458411 |
| 10 | Chlorpyriphos/ Super-plasticizer | 124096 | 0 | 815759 | 3248693 | 1068131 |
| 11 | Marble Stone with carriage | 5337037 | 6158201 | 0 | 0 | 0 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 | 0 |
| 13 | Marble Chips with carriage | 10649 | 0 | 30366 | 0 | 31678 |
| 14 | Vitrified Floor Tiles | 0 | 13041464 | 0 | 6992990 | 482682 |
| 15 | Ceramic Wall Tiles | 249376 | 4683803 | 0 | 8181460 | 1955309 |
| 16 | Marble Powder | 397 | 0 | 1244 | 3566 | 753 |
| 17 | Dark Shade Pigment | 8854 | 0 | 34380 | 83772 | 50949 |
| 18 | Bitumen 80/100 With Carriage | 103017 | 0 | 546852 | 653222 | 0 |
| 19 | Kerosene Oil | 11650 | 0 | 45041 | 56174 | 0 |
| 20 | Steam Coal | 1337 | 0 | 7672 | 7252 | 0 |
| 21 | Mud Phuska/ Brick Bats | 6366 | 0 | 53637 | 64506 | 0 |
| 22 | Kota Stone with Carriage | 0 | 5280988 | 0 | 8182604 | 0 |
| 23 | Brick Tiles With Carriage | 0 | 0 | 1238405 | 1325522 | 0 |
| 24 | Water Proofing Compound | 44562 | 401636 | 105 | 356210 | 327828 |
| 25 | PVC Sheet (400 miicron thick) | 0 | 817809 | 2684 | 0 | 0 |
| 26 | Pipe with carrage | 0 | 399837 | 16853 | 637908 | 115111 |
| 27 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 152279 | 3213520 | 0 |
| 28 | Door Shutter (Flush) | 0 | 1967197 | 247252 | 765228 | 2294048 |
| 29 | Steel Primer | 0 | 0 | 5510 | 153437 | 0 |
| 30 | Wood (Frame) | 897473 | 0 | 1578381 | 4556483 | 666213 |
| 31 | Wood (Shutter 35 mm thick) | 1079232 | 9854893 | 3563675 | 925167 | 2482172 |
| 32 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 769152 | 0 |
| 33 | Ply wood | 0 | 0 | 0 | 0 | 874657 |
| 34 | Glass Panes | 0 | 0 | 242049 | 1160673 | 0 |
| 35 | Wire Gauze | 0 | 0 | 0 | 0 | 0 |
| 36 | M S Angle/Bar/ other sections | 0 | 2951510 | 0 | 3048353 | 1154550 |
| 37 | Cement Primer | 168581 | 181926 | 209086 | 364492 | 112157 |
| 38 | Oil Bound Distemper | 77410 | 311873 | 183812 | 306843 | 240336 |
| 39 | Cement Paint | 113239 | 150467 | 438843 | 523735 | 662967 |
| 40 | Pink Primer (Wood) | 76693 | 158507 | 89770 | 79834 | 174547 |
| 41 | Red Lead Primer (Steel) | 0 | 0 | 44715 | 60041 | 0 |
| 42 | Enamel Paint | 109494 | 185524 | 139337 | 158414 | 377953 |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Jamshedpur | Bangalore | Dharwad | Gulbarga | Cochin |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| **43** | Sprit | 0 | 0 | 8462 | 0 | 0 |
| **44** | Shellac | 0 | 0 | 969 | 0 | 0 |
| **45** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 0 | 72108 | 30478 |
| **46** | Welding | 0 | 0 | 0 | 10988 | 4976 |
| | **LABOUR** | | | | | |
| **1** | Mason/ Painter/Carpenter | 3596400 | 21471085 | 7916973 | 17395691 | 9750595 |
| **2** | Black-smith / Mixer Operator/Fitter | 243630 | 5922339 | 1070693 | 5926367 | 3196020 |
| **3** | Mate | 8293 | 342717 | 68027 | 423164 | 190069 |
| **4** | Beldar | 1301803 | 25839061 | 5905126 | 30167279 | 16035388 |
| **5** | Bhisti | 1433382 | 7465866 | 3359218 | 12247429 | 5277498 |
| **6** | Coolie | 2602105 | 14383736 | 5415397 | 16986242 | 3639294 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | |
| **1** | Batch mix plant+ Pump Charges | 398965 | 3641480 | 0 | 2744900 | 3402319 |
| **2** | Mixer + Vibrator | 617711 | 2146942 | 273318 | 1929231 | 404314 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 19497 | 329865 | 78627 | 512964 | 191962 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 2002223 | 359528 | 3588928 | 462707 |
| **5** | Centering & Shuttering Columns | 926624 | 5338844 | 1308548 | 5340249 | 2209621 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 1807452 | 11766956 | 2564570 | 7613235 | 3456523 |
| **7** | Sundries + Scaffolding | 803588 | 8092014 | 1254431 | 9068191 | 3371044 |
| **Total** | | **41590837** | **305076505** | **78469121** | **371930780** | **132186652** |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Trivandrum | Bhopal | Gwalior | Indore | Aurangabad |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| 1 | Cement | 10252651 | 5208555 | 5266462 | 5595211 | 72436873 |
| 2 | Coarse Sand with carriage | 2973514 | 1564541 | 1163215 | 2488955 | 21948104 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 280131 | 83058 | 101753 | 97836 | 5244284 |
| 4 | Stone Agg. (20mm) | 1480495 | 842161 | 806783 | 741165 | 11640042 |
| 5 | Stone Agg. (10mm) | 817017 | 483488 | 457116 | 496501 | 4131439 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 6442636 | 4051289 | 3211499 | 5450376 | 27583924 |
| 8 | Fine Sand with carriage | 1147952 | 192258 | 308871 | 655599 | 845260 |
| 9 | Steel Bar | 18237139 | 10729668 | 12455864 | 12926237 | 106616802 |
| 10 | Chlorpyriphos/ Super-plasticizer | 351376 | 0 | 0 | 0 | 25611525 |
| 11 | Marble Stone with carriage | 9038547 | 5630947 | 8137038 | 9576872 | 2614691 |
| 12 | Kota Stone with carriage | 0 | 0 | 0 | 0 | 4815544 |
| 13 | Marble Chips with carriage | 25806 | 0 | 10859 | 11029 | 30031 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 0 | 0 | 16739970 |
| 15 | Ceramic Wall Tiles | 429699 | 246704 | 270481 | 302602 | 5683022 |
| 16 | Marble Powder | 539 | 317 | 311 | 376 | 627 |
| 17 | Dark Shade Pigment | 12038 | 10303 | 7578 | 9708 | 277545 |
| 18 | Bitumen 80/100 With Carriage | 135457 | 60967 | 56690 | 68476 | 2433659 |
| 19 | Kerosene Oil | 11674 | 8751 | 6357 | 8322 | 127350 |
| 20 | Steam Coal | 0 | 0 | 1459 | 1819 | 104385 |
| 21 | Mud Phuska/ Brick Bats | 0 | 3416 | 3474 | 4331 | 3175 |
| 22 | Kota Stone with Carriage | 861175 | 0 | 0 | 0 | 0 |
| 23 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 58157 |
| 24 | Water Proofing Compound | 63254 | 36527 | 30395 | 37898 | 14 |
| 25 | PVC Sheet (400 miicron thick) | 7194 | 0 | 0 | 0 | 0 |
| 26 | Pipe with carrage | 56956 | 0 | 0 | 0 | 0 |
| 27 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 0 | 0 | 0 |
| 28 | Door Shutter (Flush) | 169506 | 829810 | 879031 | 1614556 | 3390547 |
| 29 | Steel Primer | 90476 | 0 | 0 | 0 | 69496 |
| 30 | Wood (Frame) | 4083575 | 3341440 | 2692467 | 3105183 | 0 |
| 31 | Wood (Shutter 35 mm thick) | 3468646 | 3673038 | 2988568 | 4700818 | 1405356 |
| 32 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 | 3665244 |
| 33 | Ply wood | 1124559 | 0 | 0 | 0 | 0 |
| 34 | Glass Panes | 0 | 0 | 0 | 0 | 0 |
| 35 | Wire Gauze | 0 | 0 | 0 | 0 | 0 |
| 36 | M S Angle/Bar/ other sections | 223801 | 0 | 0 | 0 | 445867 |
| 37 | Cement Primer | 172525 | 130670 | 138447 | 166137 | 750752 |
| 38 | Oil Bound Distemper | 282709 | 157823 | 148336 | 207671 | 1953487 |
| 39 | Cement Paint | 294299 | 0 | 0 | 0 | 1673491 |
| 40 | Pink Primer (Wood) | 61996 | 141927 | 112260 | 152849 | 1444 |
| 41 | Red Lead Primer (Steel) | 50459 | 0 | 0 | 0 | 0 |
| 42 | Enamel Paint | 0 | 116813 | 117819 | 141844 | 3811 |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Trivandrum | Bhopal | Gwalior | Indore | Aurangabad |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| **43** | Sprit | 0 | 0 | 0 | 0 | 0 |
| **44** | Shellac | 0 | 0 | 0 | 0 | 0 |
| **45** | MS Tube/ ERW Tube/ GI Pipe | 23075 | 0 | 0 | 0 | 0 |
| **46** | Welding | 4884 | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | | |
| **1** | Mason/ Painter/Carpenter | 8870444 | 6216554 | 4651479 | 6991661 | 20109877 |
| **2** | Black-smith / Mixer Operator/Fitter | 2220092 | 908332 | 988561 | 1288329 | 9098784 |
| **3** | Mate | 54385 | 9256 | 7399 | 9021 | 1217898 |
| **4** | Beldar | 6356842 | 2392331 | 2365793 | 3009099 | 41095203 |
| **5** | Bhisti | 3854679 | 2059883 | 2070317 | 2605649 | 13013137 |
| **6** | Coolie | 4279817 | 2476553 | 2377542 | 3151731 | 21417426 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | |
| **1** | Batch mix plant+ Pump Charges | 1263062 | 581800 | 541982 | 533501 | 0 |
| **2** | Mixer + Vibrator | 1831015 | 1291704 | 1546841 | 1371416 | 4173123 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 72664 | 8811 | 12209 | 12653 | 999086 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 60307 | 35345 | 29360 | 38073 | 3746971 |
| **5** | Centering & Shuttering Columns | 1242739 | 1365088 | 1222573 | 1579875 | 2433805 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 1750461 | 3969173 | 3542848 | 4942492 | 32003641 |
| **7** | Sundries + Scaffolding | 1927010 | 1088516 | 1047112 | 1383566 | 18704987 |
| **Total** | | **96459278** | **59947819** | **59777151** | **75479439** | **490319853** |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Mumbai | Nagpur | Pune | Shillong | Jalandhar | Ludhiana |
|---|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | | |
| 1 | Cement | 37576072 | 93874699 | 93360683 | 21521968 | 66418040 | 5848457 |
| 2 | Coarse Sand with carriage | 7533904 | 21192737 | 26939696 | 4560169 | 21384861 | 1871931 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 1856494 | 2269456 | 3284296 | 2184070 | 4269412 | 112076 |
| 4 | Stone Agg. (20mm) | 7038836 | 11276014 | 12978204 | 5316886 | 16782568 | 1220781 |
| 5 | Stone Agg. (10mm) | 4115286 | 6731927 | 6098105 | 2297685 | 7399113 | 733765 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 10310728 | 39378504 | 44217332 | 14550446 | 122028941 | 4194631 |
| 8 | Fine Sand with carriage | 1164895 | 18145382 | 32883298 | 1741759 | 103079614 | 356929 |
| 9 | Steel Bar | 50509924 | 134875256 | 150758790 | 41743163 | 13590912 | 13551046 |
| 10 | Chlorpyriphos/ Super-plasticizer | 5306761 | 8125462 | 17850068 | 2037885 | 0 | 0 |
| 11 | Marble Stone with carriage | 2825934 | 1424464 | 10570339 | 19172562 | 0 | 3753713 |
| 12 | Kota Stone with carriage | 11239247 | 28166786 | 15523306 | 1029538 | 0 | 0 |
| 13 | Marble Chips with carriage | 87332 | 0 | 0 | 0 | 3726 | 8791 |
| 14 | Vitrified Floor Tiles | 0 | 962305 | 18563145 | 601655 | 52753614 | 0 |
| 15 | Ceramic Wall Tiles | 524450 | 3569986 | 2284512 | 3140197 | 0 | 403898 |
| 16 | Marble Powder | 1508 | 0 | 0 | 0 | 427 | 330 |
| 17 | Dark Shade Pigment | 648873 | 1392226 | 924356 | 23816 | 2913 | 5893 |
| 18 | Bitumen 80/100 With Carriage | 0 | 0 | 0 | 0 | 3669563 | 63406 |
| 19 | Kerosene Oil | 0 | 0 | 0 | 0 | 367946 | 5460 |
| 20 | Steam Coal | 0 | 0 | 0 | 0 | 70372 | 0 |
| 21 | Mud Phuska/ Brick Bats | 21771 | 86420 | 0 | 153611 | 464770 | 3552 |
| 22 | Kota Stone with Carriage | 48869 | 0 | 20727610 | 0 | 0 | 0 |
| 23 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 11465620 | 0 |
| 24 | Water Proofing Compound | 281975 | 1396021 | 2219984 | 736 | 2413 | 40618 |
| 25 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 4128 | 0 | 0 |
| 26 | Pipe with carrage | 272360 | 988909 | 0 | 0 | 806175 | 0 |
| 27 | Standard Rolled Steel Sections (Ready made) | 929776 | 5803564 | 0 | 0 | 0 | 0 |
| 28 | Door Shutter (Flush) | 1351510 | 1216285 | 3729601 | 1153342 | 0 | 0 |
| 29 | Steel Primer | 33872 | 282709 | 0 | 0 | 81949 | 0 |
| 30 | Wood (Frame) | 289614 | 0 | 3639295 | 0 | 0 | 2160370 |
| 31 | Wood (Shutter 35 mm thick) | 4355707 | 13031946 | 67094950 | 0 | 0 | 3835776 |
| 32 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 3868432 | 0 | 0 | 1178895 | 0 |
| 33 | Ply wood | 907468 | 0 | 0 | 0 | 0 | 0 |
| 34 | Glass Panes | 227247 | 3187178 | 0 | 0 | 0 | 0 |
| 35 | Wire Gauze | 0 | 313687 | 5605051 | 0 | 0 | 0 |
| 36 | M S Angle/Bar/ other sections | 7421501 | 1013037 | 29960632 | 7031989 | 141467 | 0 |
| 37 | Cement Primer | 204477 | 552070 | 430029 | 311878 | 0 | 123543 |
| 38 | Oil Bound Distemper | 425278 | 1820011 | 1036677 | 443983 | 0 | 111189 |
| 39 | Cement Paint | 343933 | 733821 | 615656 | 305298 | 0 | 110372 |
| 40 | Pink Primer (Wood) | 755025 | 141109 | 594472 | 0 | 0 | 95163 |
| 41 | Red Lead Primer (Steel) | 6702 | 45933 | 0 | 0 | 0 | 0 |
| 42 | Enamel Paint | 1040046 | 189040 | 1648668 | 0 | 0 | 98124 |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Mumbai | Nagpur | Pune | Shillong | Jalandhar | Ludhiana |
|---|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | | |
| **43** | Sprit | 0 | 43144 | 0 | 24014 | 0 | 0 |
| **44** | Shellac | 0 | 19057 | 0 | 7714 | 0 | 0 |
| **45** | MS Tube/ ERW Tube/ GI Pipe | 1509694 | 206023 | 0 | 0 | 234399 | 0 |
| **46** | Welding | 47335 | 8546 | 0 | 0 | 13819 | 0 |
| | **LABOUR** | | | | | | |
| **1** | Mason/ Painter/Carpenter | 17707907 | 35449776 | 52276915 | 8625546 | 30074573 | 4940031 |
| **2** | Black-smith / Mixer Operator/Fitter | 5657176 | 11605015 | 15418449 | 4046090 | 904241 | 1021873 |
| **3** | Mate | 952586 | 365870 | 4512370 | 134935 | 2626111 | 6408 |
| **4** | Beldar | 28842243 | 45912532 | 107021873 | 10203856 | 34331368 | 2324311 |
| **5** | Bhisti | 14292503 | 26519394 | 25353089 | 5541497 | 16615560 | 2059883 |
| **6** | Coolie | 12596792 | 26242370 | 39169395 | 5466693 | 53522362 | 2397650 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | | |
| **1** | Batch mix plant+ Pump Charges | 0 | 246791 | 0 | 2648114 | 7247533 | 727250 |
| **2** | Mixer + Vibrator | 3042936 | 10083571 | 9465513 | 2369587 | 815192 | 861136 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 755892 | 338139 | 5000378 | 183561 | 1507337 | 11749 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 2517047 | 1704525 | 6042023 | 1891090 | 1599245 | 32217 |
| **5** | Centering & Shuttering Columns | 9202033 | 14745714 | 18048919 | 2574618 | 1636234 | 0 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 12906661 | 64934846 | 35348690 | 8766779 | 25188678 | 3088265 |
| **7** | Sundries + Scaffolding | 13353329 | 17438548 | 25473306 | 8724636 | 7515705 | 934383 |
| **Total** | | **283041508** | **661919238** | **916669674** | **190535497** | **609795672** | **57114967** |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Pathankot | Gangtok | Chennai | Karaikudi | Hyderabad | Ghaziabad |
|---|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | | |
| 1 | Cement | 16528162 | 19505826 | 6590768 | 39691811 | 7769555 | 5029846 |
| 2 | Coarse Sand with carriage | 3505126 | 4049563 | 2046057 | 11982464 | 1593232 | 1720871 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 746277 | 1990361 | 152098 | 1104626 | 128216 | 112320 |
| 4 | Stone Agg. (20mm) | 4855020 | 6560782 | 1705729 | 5394685 | 1484485 | 1112014 |
| 5 | Stone Agg. (10mm) | 3151713 | 2427092 | 891960 | 2619424 | 878301 | 658741 |
| 6 | Rubble Stone | 0 | 0 | 0 | 8168008 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 12455384 | 16309452 | 0 | 697605 | 3952744 | 4454776 |
| 8 | Fine Sand with carriage | 2547111 | 1311800 | 666160 | 4166215 | 315080 | 361400 |
| 9 | Steel Bar | 44937678 | 39400717 | 12608787 | 57579711 | 17200297 | 11763849 |
| 10 | Chlorpyriphos/ Super-plasticizer | 518392 | 0 | 0 | 2169894 | 0 | 0 |
| 11 | Marble Stone with carriage | 0 | 0 | 5567192 | 30515969 | 3316431 | 2439684 |
| 12 | Kota Stone with carriage | 388142 | 865991 | 0 | 670944 | 0 | 0 |
| 13 | Marble Chips with carriage | 136818 | 0 | 12592 | 207207 | 8204 | 9215 |
| 14 | Vitrified Floor Tiles | 604835 | 5674332 | 0 | 0 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 1472161 | 2477572 | 311421 | 0 | 294439 | 274796 |
| 16 | Marble Powder | 4862 | 0 | 1742 | 4407 | 358 | 311 |
| 17 | Dark Shade Pigment | 170666 | 36269 | 7386 | 143205 | 9177 | 6947 |
| 18 | Bitumen 80/100 With Carriage | 0 | 0 | 78895 | 1212954 | 134583 | 57773 |
| 19 | Kerosene Oil | 0 | 0 | 7064 | 84421 | 7025 | 5175 |
| 20 | Steam Coal | 0 | 0 | 1621 | 20051 | 2687 | 1320 |
| 21 | Mud Phuska/ Brick Bats | 0 | 0 | 3860 | 0 | 5223 | 3142 |
| 22 | Kota Stone with Carriage | 0 | 1674883 | 0 | 7273417 | 0 | 0 |
| 23 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | Water Proofing Compound | 228528 | 123833 | 45032 | 580182 | 31103 | 19552 |
| 25 | PVC Sheet (400 miicron thick) | 0 | 41859 | 0 | 0 | 0 | 0 |
| 26 | Pipe with carrage | 95106 | 485080 | 0 | 37991 | 210145 | 0 |
| 27 | Standard Rolled Steel Sections (Ready made) | 1022686 | 0 | 0 | 0 | 0 | 0 |
| 28 | Door Shutter (Flush) | 2618852 | 0 | 870216 | 705542 | 0 | 0 |
| 29 | Steel Primer | 115727 | 0 | 0 | 0 | 0 | 0 |
| 30 | Wood (Frame) | 0 | 0 | 0 | 9267227 | 1824341 | 1919272 |
| 31 | Wood (Shutter 35 mm thick) | 2498305 | 15717113 | 0 | 13381669 | 1738585 | 2072046 |
| 32 | Pressed Steel Frame (Profile B/ C/ E) | 1207223 | 0 | 0 | 0 | 0 | 0 |
| 33 | Ply wood | 0 | 2790573 | 0 | 2073695 | 0 | 0 |
| 34 | Glass Panes | 287319 | 0 | 0 | 0 | 0 | 0 |
| 35 | Wire Gauze | 152856 | 249563 | 0 | 0 | 0 | 0 |
| 36 | M S Angle/Bar/ other sections | 144867 | 5825166 | 2747123 | 0 | 0 | 0 |
| 37 | Cement Primer | 266861 | 347950 | 185825 | 814901 | 121981 | 104348 |
| 38 | Oil Bound Distemper | 285923 | 590272 | 169897 | 679084 | 114360 | 91474 |
| 39 | Cement Paint | 408649 | 627879 | 160189 | 359501 | 122886 | 44605 |
| 40 | Pink Primer (Wood) | 13097 | 301415 | 72634 | 663481 | 96222 | 104385 |
| 41 | Red Lead Primer (Steel) | 0 | 125203 | 0 | 125435 | 0 | 0 |
| 42 | Enamel Paint | 40495 | 502049 | 120982 | 1375800 | 150430 | 118396 |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Pathankot | Gangtok | Chennai | Karaikudi | Hyderabad | Ghaziabad |
|---|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | | |
| **43** | Sprit | 67436 | 0 | 0 | 0 | 0 | 0 |
| **44** | Shellac | 26257 | 0 | 0 | 0 | 0 | 0 |
| **45** | MS Tube/ ERW Tube/ GI Pipe | 69224 | 0 | 0 | 0 | 0 | 0 |
| **46** | Welding | 8372 | 0 | 0 | 0 | 0 | 0 |
| | **LABOUR** | | | | | | |
| **1** | Mason/ Painter/Carpenter | 9536686 | 17496906 | 4111535 | 40115929 | 3395178 | 3303956 |
| **2** | Black-smith / Mixer Operator/Fitter | 3448494 | 4698058 | 1725757 | 4435930 | 892086 | 913215 |
| **3** | Mate | 40192 | 266064 | 4674 | 213720 | 3996 | 6542 |
| **4** | Beldar | 7870914 | 11782729 | 3323478 | 33788533 | 2243507 | 2157564 |
| **5** | Bhisti | 3920060 | 5755876 | 2278566 | 12358867 | 1858604 | 1615179 |
| **6** | Coolie | 6192225 | 10855680 | 1832957 | 17769553 | 1965030 | 2214287 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | | |
| **1** | Batch mix plant+ Pump Charges | 2168254 | 1980653 | 745684 | 0 | 1032512 | 644012 |
| **2** | Mixer + Vibrator | 712179 | 423810 | 1085177 | 6259071 | 1333632 | 836983 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 73686 | 256842 | 11018 | 286793 | 16482 | 11993 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 419196 | 495770 | 41703 | 1340407 | 18074 | 25128 |
| **5** | Centering & Shuttering Columns | 2608392 | 2175322 | 0 | 12784391 | 2665508 | 2084507 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 10755718 | 2648666 | 3466918 | 17788758 | 4637717 | 2679946 |
| **7** | Sundries + Scaffolding | 3243242 | 4452955 | 1145319 | 6828691 | 1473198 | 862793 |
| **Total** | | **152569367** | **193301923** | **54798016** | **357742167** | **63045615** | **49842364** |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Kanpur | Lucknow | Saharanpur | Haldwani | Roorkee |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| 1 | Cement | 5240672 | 2057760 | 114541679 | 6975626 | 4743018 |
| 2 | Coarse Sand with carriage | 1973393 | 817074 | 25679012 | 1954600 | 1287628 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 197833 | 76769 | 3286058 | 145126 | 152354 |
| 4 | Stone Agg. (20mm) | 973696 | 448974 | 22249571 | 772297 | 470115 |
| 5 | Stone Agg. (10mm) | 621037 | 333661 | 12517428 | 532013 | 361711 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 13445559 | 4661004 | 90557097 | 10390384 | 6351032 |
| 8 | Fine Sand with carriage | 498562 | 198098 | 9765234 | 569539 | 500271 |
| 9 | Steel Bar | 3883991 | 1672865 | 146664122 | 5525378 | 3287105 |
| 10 | Chlorpyriphos/ Super-plasticizer | 154414 | 18500 | 3652786 | 157815 | 145814 |
| 11 | Marble Stone with carriage | 2539565 | 916043 | 0 | 1426802 | 1810133 |
| 12 | Kota Stone with carriage | 0 | 0 | 16510094 | 0 | 0 |
| 13 | Marble Chips with carriage | 15361 | 6088 | 624945 | 21343 | 23031 |
| 14 | Vitrified Floor Tiles | 0 | 0 | 2503607 | 0 | 0 |
| 15 | Ceramic Wall Tiles | 261944 | 241665 | 8422928 | 309349 | 299045 |
| 16 | Marble Powder | 397 | 162 | 18417 | 901 | 972 |
| 17 | Dark Shade Pigment | 8854 | 3935 | 1340765 | 6769 | 7304 |
| 18 | Bitumen 80/100 With Carriage | 107016 | 55682 | 0 | 145218 | 137343 |
| 19 | Kerosene Oil | 11490 | 5978 | 0 | 5830 | 9560 |
| 20 | Steam Coal | 2930 | 1525 | 0 | 16571 | 15672 |
| 21 | Mud Phuska/ Brick Bats | 6976 | 3630 | 215718 | 15782 | 14926 |
| 22 | Kota Stone with Carriage | 0 | 0 | 0 | 0 | 0 |
| 23 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 0 |
| 24 | Water Proofing Compound | 79682 | 31056 | 864435 | 89923 | 85048 |
| 25 | PVC Sheet (400 miicron thick) | 0 | 0 | 58299 | 0 | 0 |
| 26 | Pipe with carrage | 0 | 0 | 553965 | 0 | 0 |
| 27 | Standard Rolled Steel Sections (Ready made) | 0 | 0 | 6281949 | 0 | 0 |
| 28 | Door Shutter (Flush) | 0 | 0 | 6189838 | 0 | 0 |
| 29 | Steel Primer | 0 | 0 | 488775 | 0 | 0 |
| 30 | Wood (Frame) | 1959288 | 1083491 | 0 | 3193651 | 3595211 |
| 31 | Wood (Shutter 35 mm thick) | 2744760 | 1241895 | 0 | 2007482 | 2517433 |
| 32 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 6947001 | 0 | 0 |
| 33 | Ply wood | 0 | 0 | 0 | 0 | 0 |
| 34 | Glass Panes | 0 | 0 | 2202899 | 0 | 0 |
| 35 | Wire Gauze | 0 | 0 | 0 | 0 | 0 |
| 36 | M S Angle/Bar/ other sections | 0 | 0 | 523250 | 0 | 0 |
| 37 | Cement Primer | 135841 | 53787 | 2529734 | 191661 | 189660 |
| 38 | Oil Bound Distemper | 137605 | 70308 | 3896242 | 293359 | 290296 |
| 39 | Cement Paint | 87099 | 22130 | 518955 | 32186 | 31850 |
| 40 | Pink Primer (Wood) | 106190 | 50485 | 236983 | 91115 | 114493 |
| 41 | Red Lead Primer (Steel) | 0 | 0 | 0 | 0 | 0 |
| 42 | Enamel Paint | 114056 | 51242 | 488711 | 93950 | 118055 |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Kanpur | Lucknow | Saharanpur | Haldwani | Roorkee |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| **43** | Sprit | 0 | 0 | 214398 | 0 | 0 |
| **44** | Shellac | 0 | 0 | 91196 | 0 | 0 |
| **45** | MS Tube/ ERW Tube/ GI Pipe | 0 | 0 | 1273202 | 0 | 0 |
| **46** | Welding | 0 | 0 | 107842 | 0 | 0 |
| | **LABOUR** | | | | | |
| **1** | Mason/ Painter/Carpenter | 5767686 | 2220274 | 53749632 | 5212635 | 4534309 |
| **2** | Black-smith / Mixer Operator/Fitter | 319630 | 157425 | 15278058 | 506788 | 293052 |
| **3** | Mate | 15697 | 5615 | 739362 | 13002 | 10783 |
| **4** | Beldar | 2106521 | 819207 | 73280646 | 2378098 | 1668475 |
| **5** | Bhisti | 2085661 | 797061 | 29075576 | 2257462 | 1853684 |
| **6** | Coolie | 4756714 | 1494057 | 38967698 | 4805265 | 3127826 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | |
| **1** | Batch mix plant+ Pump Charges | 479630 | 176613 | 14899809 | 619853 | 385776 |
| **2** | Mixer + Vibrator | 623876 | 264950 | 9509232 | 479803 | 627152 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 22591 | 8713 | 1155860 | 18567 | 19247 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 0 | 0 | 3027309 | 106040 | 0 |
| **5** | Centering & Shuttering Columns | 1344264 | 382539 | 16632130 | 1219991 | 972098 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 1952532 | 844917 | 54512145 | 2479368 | 1639868 |
| **7** | Sundries + Scaffolding | 956505 | 394000 | 18670709 | 850780 | 819201 |
| **Total** | | **55739520** | **21689180** | **821515302** | **55912321** | **42510552** |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Uttarkashi | Darjeeling | Howrah | Siliguri | South 24 Parganas |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| 1 | Cement | 34820647 | 9297454 | 164264557 | 22452084 | 7566285 |
| 2 | Coarse Sand with carriage | 11061246 | 1961347 | 26007729 | 5700929 | 1677285 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 1847050 | 303929 | 74057 | 2631424 | 249888 |
| 4 | Stone Agg. (20mm) | 9572801 | 2782475 | 50234438 | 7095589 | 2769438 |
| 5 | Stone Agg. (10mm) | 4499397 | 1452540 | 24182494 | 4290248 | 1686864 |
| 6 | Rubble Stone | 0 | 0 | 0 | 0 | 0 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 28601614 | 7780055 | 64955395 | 19133033 | 0 |
| 8 | Fine Sand with carriage | 5339997 | 782745 | 4300972 | 2915467 | 237566 |
| 9 | Steel Bar | 68787031 | 21112652 | 371678875 | 46469588 | 13014232 |
| 10 | Chlorpyriphos/ Super-plasticizer | 2197231 | 0 | 0 | 0 | 0 |
| 11 | Marble Stone with carriage | 15727018 | 0 | 21759164 | 4074128 | 3685800 |
| 12 | Kota Stone with carriage | 0 | 0 | 32105434 | 0 | 0 |
| 13 | Marble Chips with carriage | 127617 | 0 | 0 | 0 | 0 |
| 14 | Vitrified Floor Tiles | 3449165 | 7251894 | 7397890 | 9254757 | 0 |
| 15 | Ceramic Wall Tiles | 2174304 | 672481 | 4192819 | 2404471 | 369252 |
| 16 | Marble Powder | 1414 | 0 | 0 | 0 | 1072 |
| 17 | Dark Shade Pigment | 33890 | 0 | 1159661 | 0 | 9064 |
| 18 | Bitumen 80/100 With Carriage | 440337 | 161207 | 0 | 0 | 112382 |
| 19 | Kerosene Oil | 44241 | 10679 | 0 | 0 | 6953 |
| 20 | Steam Coal | 8123 | 6127 | 0 | 0 | 4787 |
| 21 | Mud Phuska/ Brick Bats | 0 | 0 | 0 | 0 | 0 |
| 22 | Kota Stone with Carriage | 0 | 0 | 11732129 | 0 | 0 |
| 23 | Brick Tiles With Carriage | 0 | 0 | 0 | 0 | 0 |
| 24 | Water Proofing Compound | 0 | 57349 | 585327 | 295469 | 36937 |
| 25 | PVC Sheet (400 miicron thick) | 0 | 0 | 0 | 379998 | 0 |
| 26 | Pipe with carrage | 475226 | 0 | 2874224 | 413190 | 0 |
| 27 | Standard Rolled Steel Sections (Ready made) | 3418452 | 0 | 0 | 0 | 0 |
| 28 | Door Shutter (Flush) | 555979 | 2264049 | 5378577 | 1021071 | 827067 |
| 29 | Steel Primer | 68968 | 0 | 0 | 0 | 0 |
| 30 | Wood (Frame) | 16458017 | 5359419 | 8445027 | 0 | 4146860 |
| 31 | Wood (Shutter 35 mm thick) | 15366818 | 7192231 | 29425903 | 14718558 | 4352955 |
| 32 | Pressed Steel Frame (Profile B/ C/ E) | 0 | 0 | 0 | 0 | 0 |
| 33 | Ply wood | 2553375 | 0 | 0 | 0 | 0 |
| 34 | Glass Panes | 1426754 | 0 | 0 | 0 | 0 |
| 35 | Wire Gauze | 0 | 0 | 0 | 0 | 0 |
| 36 | M S Angle/Bar/ other sections | 100970 | 0 | 13607951 | 2457885 | 0 |
| 37 | Cement Primer | 961806 | 188993 | 2764445 | 152762 | 130670 |
| 38 | Oil Bound Distemper | 1906437 | 303738 | 4231294 | 208312 | 178187 |
| 39 | Cement Paint | 423944 | 222163 | 1773335 | 102554 | 125676 |
| 40 | Pink Primer (Wood) | 641614 | 240032 | 97949 | 108244 | 126298 |
| 41 | Red Lead Primer (Steel) | 15840 | 0 | 0 | 0 | 0 |
| 42 | Enamel Paint | 632631 | 288749 | 126246 | 139093 | 167154 |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

**Non-Residential Buildings**

| S.No. | Items | Uttarkashi | Darjeeling | Howrah | Siliguri | South 24 Parganas |
|---|---|---|---|---|---|---|
| | **MATERIAL** | | | | | |
| **43** | Sprit | 0 | 0 | 0 | 0 | 0 |
| **44** | Shellac | 0 | 0 | 0 | 0 | 0 |
| **45** | MS Tube/ ERW Tube/ GI Pipe | 120180 | 0 | 0 | 1208667 | 0 |
| **46** | Welding | 12717 | 0 | 0 | 95926 | 0 |
| | **LABOUR** | | | | | |
| **1** | Mason/ Painter/Carpenter | 25107728 | 8523816 | 65755820 | 10826557 | 5419968 |
| **2** | Black-smith / Mixer Operator/Fitter | 4746003 | 1370951 | 24962084 | 2914221 | 914349 |
| **3** | Mate | 147220 | 10203 | 10737 | 218014 | 8389 |
| **4** | Beldar | 14181936 | 4400058 | 52734317 | 12035255 | 3545752 |
| **5** | Bhisti | 9776850 | 2517080 | 40107677 | 6032626 | 2620329 |
| **6** | Coolie | 11795785 | 5242170 | 37993819 | 8895090 | 2216720 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | |
| **1** | Batch mix plant+ Pump Charges | 3751141 | 940671 | 21910732 | 2779673 | 761412 |
| **2** | Mixer + Vibrator | 5796724 | 71210 | 13196381 | 1229160 | 973785 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 216373 | 16836 | 14641 | 251806 | 13842 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 513027 | 46934 | 10992688 | 1000636 | 42246 |
| **5** | Centering & Shuttering Columns | 3732982 | 1673739 | 28737662 | 3557387 | 1196427 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 5389621 | 5126727 | 54024088 | 7840577 | 3865866 |
| **7** | Sundries + Scaffolding | 6543346 | 1750711 | 44483270 | 3836683 | 1275233 |
| **Total** | | **325571586** | **101383415** | **1248279806** | **209141131** | **64336992** |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

| Non-Residential Buildings | | | |
|---|---|---|---|
| **S.No.** | **Items** | **Total** | **% Dist. from Total cost of Non-Residential Buildings** |
| | **MATERIAL** | | |
| **1** | Cement | 1779537175 | 12.5 |
| **2** | Coarse Sand with carriage | 564922157 | 4.0 |
| **3** | Stone Agg. (40mm)/ Brick Agg. (40mm) | 96895572 | 0.7 |
| **4** | Stone Agg. (20mm) | 388335544 | 2.7 |
| **5** | Stone Agg. (10mm) | 201489211 | 1.4 |
| **6** | Rubble Stone | 12052530 | 0.1 |
| **7** | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 1185298140 | 8.3 |
| **8** | Fine Sand with carriage | 251061213 | 1.8 |
| **9** | Steel Bar | 2760419333 | 19.4 |
| **10** | Chlorpyriphos/ Super-plasticizer | 80030507 | 0.6 |
| **11** | Marble Stone with carriage | 238855653 | 1.7 |
| **12** | Kota Stone with carriage | 141179927 | 1.0 |
| **13** | Marble Chips with carriage | 4587124 | 0.0 |
| **14** | Vitrified Floor Tiles | 167050599 | 1.2 |
| **15** | Ceramic Wall Tiles | 110644530 | 0.8 |
| **16** | Marble Powder | 167887 | 0.0 |
| **17** | Dark Shade Pigment | 12188964 | 0.1 |
| **18** | Bitumen 80/100 With Carriage | 14255802 | 0.1 |
| **19** | Kerosene Oil | 1119551 | 0.0 |
| **20** | Steam Coal | 312512 | 0.0 |
| **21** | Mud Phuska/ Brick Bats | 1211927 | 0.0 |
| **22** | Kota Stone with Carriage | 73573956 | 0.5 |
| **23** | Brick Tiles With Carriage | 14858993 | 0.1 |
| **24** | Water Proofing Compound | 11905225 | 0.1 |
| **25** | PVC Sheet (400 miicron thick) | 1352421 | 0.0 |
| **26** | Pipe with carrage | 12522113 | 0.1 |
| **27** | Standard Rolled Steel Sections (Ready made) | 20986435 | 0.1 |
| **28** | Door Shutter (Flush) | 90137256 | 0.6 |
| **29** | Steel Primer | 3571129 | 0.0 |
| **30** | Wood (Frame) | 127857554 | 0.9 |
| **31** | Wood (Shutter 35 mm thick) | 346025573 | 2.4 |
| **32** | Pressed Steel Frame (Profile B/ C/ E) | 67748560 | 0.5 |
| **33** | Ply wood | 23242607 | 0.2 |
| **34** | Glass Panes | 20150412 | 0.1 |
| **35** | Wire Gauze | 6638917 | 0.0 |
| **36** | M S Angle/Bar/ other sections | 90349785 | 0.6 |
| **37** | Cement Primer | 28601232 | 0.2 |
| **38** | Oil Bound Distemper | 43789976 | 0.3 |
| **39** | Cement Paint | 39101018 | 0.3 |
| **40** | Pink Primer (Wood) | 7402833 | 0.1 |
| **41** | Red Lead Primer (Steel) | 525689 | 0.0 |
| **42** | Enamel Paint | 10635710 | 0.1 |

**Table 3.7 (b)** Total cost of Non-Residential Building Construction (in Rupees)

| Non-Residential Buildings | | | |
|---|---|---|---|
| **S.No.** | **Items** | **Total** | **% Dist. from Total cost of Non-Residential Buildings** |
| | **MATERIAL** | | |
| **43** | Sprit | 1188857 | 0.0 |
| **44** | Shellac | 393007 | 0.0 |
| **45** | MS Tube/ ERW Tube/ GI Pipe | 11516847 | 0.1 |
| **46** | Welding | 857150 | 0.0 |
| | **LABOUR** | | |
| **1** | Mason/ Painter/Carpenter | 1023498945 | 7.2 |
| **2** | Black-smith / Mixer Operator/Fitter | 243065472 | 1.7 |
| **3** | Mate | 20647697 | 0.1 |
| **4** | Beldar | 975400290 | 6.9 |
| **5** | Bhisti | 502297362 | 3.5 |
| **6** | Coolie | 712456764 | 5.0 |
| | **MISCELLANEOUS & LUMP SUM** | | |
| **1** | Batch mix plant+ Pump Charges | 181822600 | 1.3 |
| **2** | Mixer + Vibrator | 126339811 | 0.9 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 22811138 | 0.2 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 109590948 | 0.8 |
| **5** | Centering & Shuttering Columns | 304530030 | 2.1 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 597012778 | 4.2 |
| **7** | Sundries + Scaffolding | 347349237 | 2.4 |
| **Total** | | **14233372185** | **100.0** |

**Table 3.7(c)** Total cost of other construction works (in Rupees)

| Other Construction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **S.No.** | **Items** | **Nagpur** | **Ludhiana** | **Kanpur** | **Saharanpur** | **Uttarkashi** | **Total** | **% Dist. from Total cost of Other Const.** |
| | **MATERIAL** | | | | | | | |
| **1** | Cement | 750193 | 39246604 | 1461540 | 223625 | 1303317 | 42985279 | 23.8 |
| **2** | Coarse Sand with carriage | 222122 | 9916950 | 371767 | 46937 | 576240 | 11134017 | 6.2 |
| **3** | Stone Agg. (40mm)/ Brick Agg. (40mm) | 34840 | 343988 | 362012 | 42937 | 204091 | 987868 | 0.5 |
| **4** | Stone Agg. (20mm) | 101521 | 11916629 | 422163 | 42066 | 394195 | 12876574 | 7.1 |
| **5** | Stone Agg. (10mm) | 45242 | 6164007 | 133580 | 12485 | 179265 | 6534580 | 3.6 |
| **6** | Rubble Stone | 0 | 0 | 0 | 0 | 559611 | 559611 | 0.3 |
| **7** | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 611458 | 895743 | 183225 | 0 | 0 | 1690426 | 0.9 |
| **8** | Fine Sand with carriage | 151569 | 489576 | 76 | 0 | 1372643 | 2013864 | 1.1 |
| **9** | Steel Bar | 1090553 | 50890086 | 569611 | 0 | 1221943 | 53772194 | 29.7 |
| **10** | Chlorpyriphos/ Super-plasticizer | 0 | 0 | 0 | 0 | 117404 | 117404 | 0.1 |
| **11** | Kota Stone with carriage | 19681 | 0 | 0 | 0 | 0 | 19681 | 0.0 |
| **12** | Marble Chips with carriage | 0 | 0 | 211 | 0 | 0 | 211 | 0.0 |
| **13** | Ceramic Wall Tiles | 47536 | 0 | 0 | 0 | 0 | 47536 | 0.0 |
| **14** | Marble Powder | 0 | 0 | 5 | 0 | 0 | 5 | 0.0 |
| **15** | Dark Shade Pigment | 973 | 0 | 122 | 0 | 0 | 1094 | 0.0 |
| **16** | Bitumen 80/100 With Carriage | 4368 | 0 | 504 | 0 | 0 | 4872 | 0.0 |
| **17** | Kerosene Oil | 248 | 0 | 54 | 0 | 0 | 303 | 0.0 |
| **18** | Steam Coal | 76 | 0 | 14 | 0 | 0 | 90 | 0.0 |
| **19** | Mud Phuska/ Brick Bats | 453 | 0 | 91 | 0 | 0 | 544 | 0.0 |
| **20** | Brick Tiles With Carriage | 8598 | 0 | 2446 | 0 | 0 | 11044 | 0.0 |
| **21** | Water Proofing Compound | 3 | 0 | 0 | 0 | 0 | 3 | 0.0 |
| **22** | Standard Rolled Steel Sections (Readymade) | 25021 | 0 | 3444 | 0 | 0 | 28465 | 0.0 |
| **23** | Door Shutter (Flush) | 0 | 0 | 4829 | 0 | 0 | 4829 | 0.0 |
| **24** | Steel Primer | 1331 | 0 | 196 | 0 | 0 | 1527 | 0.0 |
| **25** | Pressed Steel Frame (Profile B/ C/ E) | 21186 | 0 | 1734 | 0 | 0 | 22920 | 0.0 |
| **26** | Glass Panes | 9605 | 0 | 1116 | 0 | 0 | 10721 | 0.0 |
| **27** | M S Angle/Bar/ other sections | 1144 | 0 | 129 | 0 | 0 | 1273 | 0.0 |
| **28** | Cement Paint | 19137 | 0 | 1021 | 0 | 0 | 20158 | 0.0 |
| **29** | Pink Primer (Wood) | 773 | 0 | 275 | 0 | 0 | 1048 | 0.0 |
| **30** | Red Lead Primer (Steel) | 208 | 0 | 43 | 0 | 0 | 252 | 0.0 |
| **31** | Enamel Paint | 0 | 0 | 362 | 0 | 0 | 362 | 0.0 |
| **32** | MS Tube/ ERW Tube/ GI Pipe | 98176 | 0 | 0 | 0 | 0 | 98176 | 0.0 |
| **33** | Welding | 4072 | 0 | 0 | 0 | 0 | 4072 | 0.0 |
| | **LABOUR** | | | | | | | |
| **1** | Mason/ Painter/Carpenter | 239295 | 1423438 | 395978 | 51933 | 358998 | 2469642 | 1.4 |
| **2** | Black-smith / Mixer Operator/Fitter | 94393 | 3837579 | 47108 | 0 | 82585 | 4061665 | 2.2 |
| **3** | Mate | 25179 | 530263 | 15973 | 2032 | 16008 | 589455 | 0.3 |
| **4** | Beldar | 443259 | 14449933 | 559440 | 111145 | 598944 | 16162721 | 8.9 |
| **5** | Bhisti | 161557 | 4152823 | 158212 | 18289 | 129235 | 4620116 | 2.6 |
| **6** | Coolie | 320214 | 1173971 | 255745 | 30571 | 285235 | 2065736 | 1.1 |
| | **MISCELLANEOUS & LUMP SUM** | | | | | | | |
| **1** | Batch mix plant+ Pump Charges | 95998 | 4101121 | 39360 | 0 | 102170 | 4338649 | 2.4 |
| **2** | Mixer + Vibrator | 16165 | 802202 | 50727 | 7526 | 24464 | 901085 | 0.5 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 27697 | 777718 | 17570 | 2484 | 6593 | 832062 | 0.5 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 6258 | 972017 | 0 | 0 | 77534 | 1055809 | 0.6 |
| **5** | Centering & Shuttering Columns | 31491 | 0 | 0 | 0 | 0 | 31491 | 0.0 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 300781 | 8906368 | 109498 | 0 | 219249 | 9535896 | 5.3 |
| **7** | Sundries + Scaffolding | 65190 | 1127394 | 55504 | 6321 | 105327 | 1359736 | 0.8 |
| **Total** | | **5097563** | **162118411** | **5225689** | **598352** | **7935053** | **180975067** | **100** |

**Table 3.7(d)** Total cost of construction for Roads & Bridges (in Rupees)

| Roads & Bridges | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **S.No.** | **Items** | **Jorhat** | **Delhi** | **Bhopal** | **Indore** | **Roorkee** | **Total** | **% Dist. from Total cost of Roads & Bridges** |
| | **MATERIAL** | | | | | | | |
| **1** | Cement | 3491 | 448436 | 67236976 | 448436 | 6284 | 68143622 | 15.0 |
| **2** | Stone Agg. (63 mm/50/40 mm) | 0 | 0 | 16451716 | 2024122 | 2322379 | 20798218 | 4.6 |
| **3** | Stone chippings/ screening (Size:13.2/12.5/11.2/10) mm | 250119 | 785103 | 319052 | 785103 | 0 | 2139376 | 0.5 |
| **4** | Stone chippings/ screenings (Size:4.75/15 micron) mm | 0 | 4201142 | 3281226 | 9041971 | 12722269 | 29246607 | 6.4 |
| **5** | Diesel | 172718 | 555708 | 3080202 | 555784 | 222048 | 4586461 | 1.0 |
| **6** | Bitumen/Paving Asphalt VG 10 | 2766686 | 4001955 | 397545 | 4001955 | 3401220 | 14569362 | 3.2 |
| **7** | Paving Asphalt VG 30 | 0 | 18849300 | 7665994 | 20982374 | 38152802 | 85650470 | 18.9 |
| **8** | Soft brush | 1514 | 2020 | 1242 | 2020 | 2898 | 9695 | 0.0 |
| **9** | Bitumen emulsion | 0 | 772046 | 1351371 | 772046 | 660529 | 3555993 | 0.8 |
| **10** | Steam Coal | 44978 | 65060 | 6463 | 65060 | 55294 | 236855 | 0.1 |
| **11** | Wire Brush | 628 | 772 | 502 | 772 | 1342 | 4014 | 0.0 |
| **12** | Solvent | 39908 | 0 | 0 | 0 | 0 | 39908 | 0.0 |
| **13** | Stone Agg. (20/12.5/10 mm) | 546255 | 4587717 | 20536413 | 7672570 | 7881080 | 41224035 | 9.1 |
| **14** | Stone dust | 0 | 0 | 1278558 | 2793147 | 3204720 | 7276426 | 1.6 |
| **15** | Stone Agg. (25 mm) | 0 | 2162449 | 7339504 | 4725782 | 3963406 | 18191141 | 4.0 |
| **16** | Dry hydrated lime (factory made) | 0 | 6107 | 184533 | 6107 | 952614 | 1149360 | 0.3 |
| **17** | Coarse sand | 322 | 274080 | 21987705 | 274080 | 580 | 22536768 | 5.0 |
| **18** | Fine Sand | 52 | 41 | 41 | 41 | 93 | 268 | 0.0 |
| **19** | Steel Bar | 1323 | 1058 | 4466208 | 1058 | 2381 | 4472028 | 1.0 |
| **20** | Structural Steel | 0 | 0 | 573881 | 0 | 0 | 573881 | 0.1 |
| **21** | Water | 2348326 | 0 | 0 | 0 | 0 | 2348326 | 0.5 |
| **22** | Compensation for earth taken from private land | 573396 | 0 | 0 | 0 | 0 | 573396 | 0.1 |
| | **LABOUR** | | | | | | | |
| **1** | Chowkidar | 69105 | 202535 | 228432 | 202560 | 73636 | 776267 | 0.2 |
| **2** | Mate | 45130 | 497498 | 1057560 | 505294 | 252602 | 2358084 | 0.5 |
| **3** | Beldar | 1039911 | 3965449 | 31511688 | 4109050 | 2797991 | 43424089 | 9.6 |
| **4** | Bhisti/ Sprayer | 438351 | 1572473 | 4471224 | 1606967 | 745766 | 8834781 | 1.9 |
| **5** | Coolie | 518999 | 1690843 | 1806266 | 1691042 | 580545 | 6287695 | 1.4 |
| **6** | Mistry | 15707 | 12207 | 4775 | 12207 | 0 | 44895 | 0.0 |
| **7** | Mason/ Blacksmith | 347 | 277 | 5647419 | 277 | 624 | 5648944 | 1.2 |
| | **MACHINERY** | | | | | | | |
| **1** | Dozer D 80 | 308222 | 0 | 0 | 0 | 0 | 308222 | 0.1 |
| **2** | Tractor with tipper attachment | 207352 | 4273 | 11000 | 4273 | 5581 | 232478 | 0.1 |
| **3** | Motor Grader | 1375014 | 0 | 0 | 0 | 0 | 1375014 | 0.3 |
| **4** | Hydraulic Excavator (3D) with driver and fuel | 0 | 1038149 | 1472457 | 1038149 | 456023 | 4004778 | 0.9 |
| **5** | Front end loader | 0 | 648843 | 966020 | 648843 | 319315 | 2583021 | 0.6 |
| **6** | hire and running charges of tipper | 0 | 15469 | 39823 | 15469 | 20207 | 90968 | 0.0 |
| **7** | Hire charges of Diesel Road Roller - 8 to 10 Ton | 766916 | 839224 | 1003850 | 839339 | 335727 | 3785056 | 0.8 |
| **8** | Road sweeper (Mechanical Broom) | 0 | 22580 | 4516 | 22580 | 19318 | 68993 | 0.0 |
| **9** | Air compressor | 0 | 20384 | 4077 | 20384 | 17440 | 62285 | 0.0 |
| **10** | Emulsion Pressure Distributor | 0 | 35841 | 7168 | 35841 | 30664 | 109513 | 0.0 |
| **11** | Hire charges of Coal tar Boiler 900 to 1400 litres | 23137 | 34937 | 0 | 34937 | 0 | 93010 | 0.0 |
| **12** | Hire charges of Coal tar Sprayer | 3632 | 11575 | 6115 | 11575 | 12074 | 44972 | 0.0 |
| **13** | Hot mix Plant -120 TPH capacity | 0 | 3582537 | 999090 | 3989761 | 4924986 | 13496374 | 3.0 |

| Roads & Bridges | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **S.No.** | **Items** | **Jorhat** | **Delhi** | **Bhopal** | **Indore** | **Roorkee** | **Total** | **% Dist. from Total cost of Roads & Bridges** |
| **14** | Paver finisher Hydrostatic with sensor control | 0 | 469556 | 130949 | 522930 | 645508 | 1768942 | 0.4 |
| **15** | Smooth Wheeled Roller 8 to 10 Ton | 0 | 50869 | 14186 | 56651 | 69930 | 191635 | 0.0 |
| **16** | Generator | 0 | 126073 | 199868 | 256835 | 301507 | 884283 | 0.2 |
| **17** | Front end loader 1 Cum. bucket capacity | 0 | 162094 | 284498 | 390349 | 456645 | 1293586 | 0.3 |
| **18** | Tipper -5 Cum. | 0 | 129997 | 36253 | 144774 | 178710 | 489735 | 0.1 |
| **19** | Drum Type HMP of 60-90 TPH capacity | 0 | 421960 | 1168858 | 1045214 | 1201982 | 3838014 | 0.8 |
| **20** | Hire charges of Concrete Mixer | 33 | 26 | 26 | 26 | 59 | 169 | 0.0 |
| **21** | Wet Mix Plant 60 TPH | 0 | 0 | 141298 | 308680 | 354165 | 804143 | 0.2 |
| **22** | Production cost of concrete by batch mix plant+ Pumping charges | 0 | 0 | 12805538 | 0 | 0 | 12805538 | 2.8 |
| **23** | Pin vibrator | 14 | 11 | 224108 | 11 | 26 | 224171 | 0.0 |
| **24** | Surface Vibrator | 0 | 0 | 512221 | 0 | 0 | 512221 | 0.1 |
| **25** | Batching and Mixing Plant @ 75 Cum. per hour | 0 | 15487 | 401414 | 15487 | 0 | 432388 | 0.1 |
| **26** | Paver finisher Mechanical 100 TPH | 0 | 6195 | 267610 | 240043 | 268306 | 782154 | 0.2 |
| **27** | Vibratory roller 8 to 10 Ton | 0 | 157691 | 409748 | 371997 | 428739 | 1368175 | 0.3 |
| **28** | Water Tanker 5 to 6 KL capacity | 4607812 | 1239 | 40141 | 18778 | 20123 | 4688093 | 1.0 |
| **29** | Sundries + Scaffolding | 194916 | 128201 | 2525320 | 128219 | 90111 | 3066767 | 0.7 |
| **Total** | | **16360821** | **52129052** | **157325671** | **71992537** | **88153963** | **454105667** | **100** |

**Table 3.8** Total Cost (in Rupees) for Public and Private Building construction

| S.No. | Items | Residential Buildings | | | | Non-Residential Buildings | | | | Other Construction | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Public | Private | Total | % Dist. | Public | Private | Total | % Dist. | Public | Private | Total | % Dist. |
| | **MATERIAL** | | | | | | | | | | | | |
| 1 | Cement | 160754955 | 448230577 | 608985532 | 12.0 | 1249712761 | 529824414 | 1779537175 | 12.5 | 2211733 | 40773547 | 42985279 | 23.8 |
| 2 | Coarse Sand with carriage | 52643145 | 142682260 | 195325405 | 3.8 | 396715304 | 168206853 | 564922157 | 4.0 | 593889 | 10540127 | 11134017 | 6.2 |
| 3 | Stone Agg. (40mm)/ Brick Agg. (40mm) | 9486083 | 27829181 | 37315265 | 0.7 | 62528284 | 34367288 | 96895572 | 0.7 | 396852 | 591016 | 987868 | 0.5 |
| 4 | Stone Agg. (20mm) | 26689006 | 74379351 | 101068358 | 2.0 | 270289778 | 118045766 | 388335544 | 2.7 | 523684 | 12352889 | 12876574 | 7.1 |
| 5 | Stone Agg. (10mm) | 17262394 | 48201587 | 65463981 | 1.3 | 142331638 | 59157572 | 201489210 | 1.4 | 178822 | 6355757 | 6534579 | 3.6 |
| 6 | Rubble Stone | 2077808 | 19945870 | 22023678 | 0.4 | 5723669 | 6328862 | 12052530 | 0.1 | 0 | 559611 | 559611 | 0.3 |
| 7 | Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 149134997 | 442128786 | 591263783 | 11.6 | 845165480 | 340132659 | 1185298140 | 8.3 | 794683 | 895743 | 1690426 | 0.9 |
| 8 | Fine Sand with carriage | 13041442 | 40754198 | 53795640 | 1.1 | 181651985 | 69409228 | 251061213 | 1.8 | 151644 | 1862220 | 2013864 | 1.1 |
| 9 | Steel Bar | 185970995 | 489623413 | 675594409 | 13.3 | 1941612533 | 818806800 | 2760419333 | 19.4 | 1660164 | 52112030 | 53772194 | 29.7 |
| 10 | Chlorpyriphos/ Super-plasticizer | 10166359 | 30395335 | 40561694 | 0.8 | 53307516 | 26722991 | 80030507 | 0.6 | 0 | 117404 | 117404 | 0.1 |
| 11 | Marble Stone with carriage | 44159476 | 112354758 | 156514234 | 3.1 | 170603575 | 68252078 | 238855653 | 1.7 | 0 | 0 | 0 | 0.0 |
| 12 | Kota Stone with carriage | 2590543 | 32344998 | 34935541 | 0.7 | 100866434 | 40313492 | 141179926 | 1.0 | 19681 | 0 | 19681 | 0.0 |
| 13 | Marble Chips with carriage | 583143 | 1645682 | 2228824 | 0.0 | 3232374 | 1354750 | 4587124 | 0.0 | 211 | 0 | 211 | 0.0 |
| 14 | Vitrified Floor Tiles | 6470125 | 15932517 | 22402642 | 0.4 | 112621296 | 54429302 | 167050598 | 1.2 | 0 | 0 | 0 | 0.0 |
| 15 | Ceramic Wall Tiles | 7987659 | 25197792 | 33185451 | 0.7 | 79587790 | 31056739 | 110644529 | 0.8 | 47536 | 0 | 47536 | 0.0 |
| 16 | Marble Powder | 18714 | 61878 | 80592 | 0.0 | 120507 | 47380 | 167887 | 0.0 | 5 | 0 | 5 | 0.0 |
| 17 | Dark Shade Pigment | 550945 | 2079705 | 2630650 | 0.1 | 8756622 | 3432342 | 12188964 | 0.1 | 1094 | 0 | 1094 | 0.0 |
| 18 | Second Class Indian Teak Wood | 2430004 | 2884344 | 5314348 | 0.1 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 0.0 |
| 19 | Bitumen 80/100 With Carriage | 3616150 | 11390207 | 15006357 | 0.3 | 9379776 | 4876026 | 14255802 | 0.1 | 4872 | 0 | 4872 | 0.0 |
| 20 | Kerosene Oil | 274847 | 837821 | 1112669 | 0.0 | 751334 | 368218 | 1119552 | 0.0 | 303 | 0 | 303 | 0.0 |
| 21 | Steam Coal | 77229 | 273301 | 350530 | 0.0 | 187530 | 124982 | 312512 | 0.0 | 90 | 0 | 90 | 0.0 |
| 22 | Mud Phuska/ Brick Bats | 297814 | 782884 | 1080698 | 0.0 | 859163 | 352764 | 1211927 | 0.0 | 544 | 0 | 544 | 0.0 |
| 23 | Kota Stone with Carriage | 5944146 | 13798433 | 19742579 | 0.4 | 57430385 | 16143571 | 73573956 | 0.5 | 0 | 0 | 0 | 0.0 |
| 24 | Brick Tiles With Carriage | 3472091 | 4517548 | 7989639 | 0.2 | 10309536 | 4549457 | 14858993 | 0.1 | 11044 | 0 | 11044 | 0.0 |
| 25 | Water Proofing Compound | 2283225 | 6310794 | 8594020 | 0.2 | 8925913 | 2979313 | 11905226 | 0.1 | 3 | 0 | 3 | 0.0 |
| 26 | PVC Sheet (400 micron thick) | 16244 | 121896 | 138140 | 0.0 | 829386 | 523035 | 1352421 | 0.0 | 0 | 0 | 0 | 0.0 |
| 27 | Pipe with carriage | 340653 | 1422615 | 1763268 | 0.0 | 8734265 | 3787848 | 12522113 | 0.0 | 0 | 0 | 0 | 0.0 |
| 28 | Standard Rolled Steel Sections (Readymade) | 1557702 | 7605354 | 9163057 | 0.2 | 15687472 | 5298962 | 20986434 | 0.1 | 28465 | 0 | 28465 | 0.0 |
| 29 | Door Shutter (Flush) | 8391655 | 31853150 | 40244805 | 0.8 | 63472772 | 26664485 | 90137257 | 0.6 | 4829 | 0 | 4829 | 0.0 |
| 30 | Steel Primer | 200694 | 865452 | 1066145 | 0.0 | 2603074 | 968055 | 3571129 | 0.0 | 1527 | 0 | 1527 | 0.0 |
| 31 | Wood (Frame) | 34804739 | 105639190 | 140443929 | 2.8 | 94404831 | 33452722 | 127857553 | 0.9 | 0 | 0 | 0 | 0.0 |
| 32 | Wood (Shutter 35 mm thick) | 45842471 | 147601204 | 193443675 | 3.8 | 268689276 | 77336296 | 346025572 | 2.4 | 0 | 0 | 0 | 0.0 |
| 33 | Pressed Steel Frame (Profile B/ C/ E) | 5123369 | 25943257 | 31066626 | 0.6 | 47626288 | 20122272 | 67748560 | 0.5 | 22920 | 0 | 22920 | 0.0 |
| 34 | Ply wood | 2516346 | 9825725 | 12342071 | 0.2 | 12419434 | 10823173 | 23242607 | 0.2 | 0 | 0 | 0 | 0.0 |
| 35 | Glass Panes | 1489151 | 3951819 | 5440970 | 0.1 | 14984453 | 5165959 | 20150412 | 0.1 | 10721 | 0 | 10721 | 0.0 |
| 36 | Wire Gauze | 435164 | 1153126 | 1588290 | 0.0 | 6436634 | 202282 | 6638916 | 0.0 | 0 | 0 | 0 | 0.0 |
| 37 | M S Angle/Bar/ other sections | 2479618 | 14862580 | 17342198 | 0.3 | 71340616 | 19009169 | 90349785 | 0.6 | 1273 | 0 | 1273 | 0.0 |
| 38 | Cement Primer | 2909698 | 8702393 | 11612091 | 0.2 | 19934344 | 8666889 | 28601233 | 0.2 | 0 | 0 | 0 | 0.0 |
| 39 | Oil Bound Distemper | 4020119 | 11369280 | 15389399 | 0.3 | 30467425 | 13322550 | 43789975 | 0.3 | 0 | 0 | 0 | 0.0 |

| S.No. | Items | Residential Buildings | | | | Non-Residential Buildings | | | | Other Construction | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Public | Private | Total | % Dist. | Public | Private | Total | % Dist. | Public | Private | Total | % Dist. |
| **40** | Cement Paint | 2901311 | 8322255 | 11223566 | 0.2 | 27570899 | 11530119 | 39101018 | 0.3 | 20158 | 0 | 20158 | 0.0 |
| **41** | Pink Primer (Wood) | 1432046 | 4561719 | 5993765 | 0.1 | 5466014 | 1936819 | 7402833 | 0.1 | 1048 | 0 | 1048 | 0.0 |
| **42** | Red Lead Primer (Steel) | 69094 | 145801 | 214895 | 0.0 | 413211 | 112478 | 525689 | 0.0 | 252 | 0 | 252 | 0.0 |
| **43** | Enamel Paint | 1694617 | 5260306 | 6954923 | 0.1 | 7801221 | 2834489 | 10635710 | 0.1 | 362 | 0 | 362 | 0.0 |
| **44** | Sprit | 301407 | 514377 | 815784 | 0.0 | 811287 | 377570 | 1188857 | 0.0 | 0 | 0 | 0 | 0.0 |
| **45** | Shellac | 93041 | 174928 | 267969 | 0.0 | 275501 | 117506 | 393007 | 0.0 | 0 | 0 | 0 | 0.0 |
| **46** | MS Tube/ ERW Tube/ GI Pipe | 343964 | 10724451 | 11068415 | 0.2 | 8145481 | 3371366 | 11516847 | 0.1 | 98176 | 0 | 98176 | 0.1 |
| **47** | Welding | 16558 | 242573 | 259131 | 0.0 | 614856 | 242293 | 857149 | 0.0 | 4072 | 0 | 4072 | 0.0 |
| | **LABOUR** | | | | | | | | | | | | |
| **1** | Mason/ Painter/Carpenter | 121941367 | 347319892 | 469261259 | 9.2 | 726272900 | 297226045 | 1023498945 | 7.2 | 635274 | 1834368 | 2469642 | 1.4 |
| **2** | Black-smith / Mixer Operator/Fitter | 15631471 | 40862050 | 56493520 | 1.1 | 172079333 | 70986139 | 243065472 | 1.7 | 141501 | 3920164 | 4061665 | 2.2 |
| **3** | Mate | 1206500 | 2714469 | 3920969 | 0.0 | 15048257 | 5599440 | 20647697 | 0.1 | 41152 | 548303 | 589455 | 0.3 |
| **4** | Beldar | 88683303 | 231953963 | 320637266 | 6.3 | 691848554 | 283551736 | 975400290 | 6.9 | 1002699 | 15160022 | 16162721 | 8.9 |
| **5** | Bhisti | 53070391 | 146255189 | 199325580 | 3.9 | 357457584 | 144839778 | 502297362 | 3.5 | 319769 | 4300347 | 4620116 | 2.6 |
| **6** | Coolie | 79911145 | 232900009 | 312811154 | 6.2 | 506130283 | 206326481 | 712456764 | 5.0 | 575959 | 1489778 | 2065736 | 1.1 |
| | **MISCELLANEOUS AND LUMP SUM** | | | | | | | | | | | | |
| **1** | Batch mix plant+ Pump Charges | 12044516 | 33833640 | 45878156 | 0.9 | 127664071 | 54158530 | 181822601 | 1.3 | 135358 | 4203291 | 4338649 | 2.4 |
| **2** | Mixer + Vibrator | 14461816 | 40650651 | 55112467 | 1.1 | 89826607 | 36513203 | 126339810 | 0.9 | 66892 | 834193 | 901085 | 0.5 |
| **3** | Excavator 3D with Driver+ Hire & Running Charges Loader | 1582175 | 3762116 | 5344291 | 0.1 | 16670805 | 6140334 | 22811139 | 0.2 | 45267 | 786795 | 832062 | 0.5 |
| **4** | Centering & Shuttering sub-structure & Concrete block | 3090329 | 7959348 | 11049677 | 0.2 | 77050017 | 32540931 | 109590948 | 0.8 | 6258 | 1049551 | 1055809 | 0.6 |
| **5** | Centering & Shuttering Columns | 19583959 | 54828343 | 74412302 | 1.5 | 218429556 | 86100474 | 304530030 | 2.1 | 31491 | 0 | 31491 | 0.0 |
| **6** | Centering & Shuttering Slab, Beam, Chajja, Stair-case etc. | 49141494 | 148954867 | 198096361 | 3.9 | 419971876 | 177040902 | 597012778 | 4.2 | 410278 | 9125617 | 9535895 | 5.3 |
| **7** | Sundries + Scaffolding | 31533086 | 80526232 | 112059318 | 2.2 | 244112845 | 103236392 | 347349237 | 2.4 | 120694 | 1239042 | 1359736 | 0.8 |
| **Total** | | **1316844509** | **3767967442** | **5084811951** | **100** | **10083962613** | **4149409572** | **14233372185** | **100** | **10323251** | **170651816** | **180975067** | **100** |

Total Cost (in Rupees) for Public and Private Building construction

i) Residential Buildings = 5084811951 Rs.

ii) Non-Residential Buildings = 14233372185 Rs.

iii) Other Construction = 180975067 Rs.

Total cost (i + ii + iii) = 19499159203 Rs.

# CHAPTER 4

# STATISTICAL RELATIONSHIPS FOR BUILDING COST INDEX

## 4.0 Introduction

For all engineering works, it is imperative to know the probable cost of construction early known as the estimated cost. If the estimated cost is greater than the money available then attempts are made to reduce the cost by reducing the quantity and items of works or by changing the specifications. In preparing a cost estimate, one has to go into details of each item, big or small, nothing can be left out. The rates in estimate are calculated for the complete work, which consist of the cost of materials, transport, labour, tools and plants, water and supervision cost and reasonable profit of contractor or construction agency etc.

This chapter focuses on the development of statistical relationships for building cost index in order to estimate approximate quantities of certain materials and their cost both for residential and non-residential buildings. CSIR-CBRI had earlier developed the statistical relationships during 1988 and based on the survey carried out in 80 cities for studying the estimated cost of residential and non-residential building, the analysis reveal that these equations do not match with the present day cost of constructions. This is primarily due to the significant increase in the cost of labour and materials during the past twenty five years. Hence, to fulfill this research gap, new statistical relationships have been developed and are discussed in the following sections.

## 4.1 Material Constants in Buildings

Material constants are the quantities of material consumed or required to produce a unit quantity of items of work. These are used for the formulation of Analysis of Rates (AoR) or Schedule of Rates (SoR) for buildings and other civil engineering works. Schedule of Rates is used for preparing the detailed Bills of Quantities (BoQ), which are generally required for inviting tenders and form an important part of tender documents. These are very useful and for pricing the additions or alterations etc. in a building contract for making tender documents. It is, therefore, utmost necessary to use the Schedule of Rates (SoR) on rationally stipulated materials and labour constants (Ref. 1).

At present, different departments such as state Public Work Department (PWD), Central PWD, MES, Railways, Municipal Corporations, Housing Boards, Development

Authorities, Irrigation Departments etc. are having their own Schedule of Rates. A comparison of the material constants for different items of work in these Schedules of Rates (SoR) has indicated that there is a good variation in them which results in existence of different rates of the same items. This indicated that there is a great need for evolving rational and standard material constants for building works. These are discussed below.

### 4.1.1 Material Constants

After studying the effects of types and sizes of aggregates, the constants for mortar and concrete may be worked out with the aid of laboratory and field studies. The most common types and mixes are described below.

#### 4.1.1.1 Constants for Mortar

The material constants for cement mortars are given in Table 4.1. These constants are calculated with sand of fineness modulus 1.26 and conforming to the grade specified by Indian Standards in relevant codes (Ref.1). These may be worked out for the workability having a flow of 110 ± 5 for all the mixes.

**Table 4.1.** Material Constants for Mortar

| Items (Mix by Volume) | Constants per Cum. of Mortar | |
|---|---|---|
| | Cement (Ton.) | Sand (Cum.) |
| Cement mortar 1:3 (1 cement : 3 sand) | 0.424 | 0.90 |
| Cement mortar 1:4 (1 cement : 4 sand) | 0.340 | 0.96 |
| Cement mortar 1:5 (1 cement : 5 sand) | 0.280 | 0.99 |
| Cement mortar 1:6 (1 cement : 6 sand) | 0.233 | 0.99 |
| Cement mortar 1:7 (1 cement : 7 sand) | 0.203 | 1.01 |
| Cement mortar 1:8 (1 cement : 8 sand) | 0.179 | 1.01 |

In order to find the effect of the fineness of aggregates on the yield of mortar and concrete, yield studies were carried out at CSIR-CBRI using different grading of aggregates. The grading of sand for use in mortar for brick work and plastering are given in I.S. 2116 and I.S. 1542 respectively. According to these standards the minimum and maximum fineness modulus specified for use in mortars for brickwork are 1.15 and 2.95 respectively. While for plastering, these are 1.25 and 2.95, in the case of concrete, the range of fineness modulus of fine aggregate is 1.35 to 3.87, while that of the coarse aggregate is 6.05 to 7.65 as given in

I.S. 383. A systematic study of the effect of the fineness of fine aggregate on the yield of mortar and concrete mixes has shown that the yield is more by about 2 percent in the case of mixes wherein fine aggregate having maximum fineness modulus (as given above) is used instead of the minimum one. Similarly, in the case of concrete mixes, the yield is more by 4 percent when both the fine and coarse aggregate with fineness modulus 3.87 and 7.65 respectively are used instead of those having fineness modulus 1.35 and 6.05.

#### 4.1.1.2 Constants for Concrete

Material constant for cement concrete are given in Table 4.2. These constants are worked out using rounded aggregate for all cement concrete mixes with all materials conforming to Indian Standard Specifications. In case of cement concrete, the fineness modulus of coarse sand is 2.87 and fineness modulus of aggregates (20mm nominal size) is 6.50 for all rich mixes for1:2:4, 1:1.5:3 and 1:1:2. Similarly for leaner mixes, the fineness modulus of sand and coarse aggregate is 1.26 and 6.90 respectively. These constants per cubic meter of concrete are obtained from the yield results of different mixes with the compaction factor of 0.85 ± 0.02.

**Table 4.2.** Material Constants for Concrete

| Item (Mix by Volume) | Fineness Modulus | | Size of Agg. (Nominal Gauge)mm | Constants per Cum of concrete | | |
|---|---|---|---|---|---|---|
| | Fine Agg. | Coarse Agg. | | Cement (Ton) | Sand (Cum) | Agg. (Cum) |
| Cement concrete 1:1:2 ( 1cement:1 sand: 2 aggregate) | 2.87 | 6.50 | 20 | 0.488 | 0.35 | 0.70 |
| Cement concrete 1:1.5:3 ( 1cement:1.5 sand: 2 aggregate) | 2.87 | 6.50 | 20 | 0.367 | 0.39 | 0.78 |
| Cement concrete 1:2:4 ( 1cement:2 sand: 4 aggregate) | 2.87 | 6.50 | 20 | 0.292 | 0.41 | 0.82 |
| Cement concrete 1:3:6 ( 1cement:3 sand: 6 aggregate) | 1.26 | 6.90 | 40 | 0.2 | 0.42 | 0.84 |
| Cement concrete 1:4:8 ( 1 cement:4 sand: 8 aggregate) | 1.26 | 6.90 | 40 | 0.16 | 0.45 | 0.90 |
| Cement concrete 1:5:10 (1 cement:5 sand: 10 aggregate) | 1.26 | 6.90 | 40 | 0.105 | 0.45 | 0.90 |

#### 4.1.1.3 Reinforced Cement Concrete (RCC) Work

The Indian Standard 1200 Part-II specifies that the items of R.C.C work should include the fair finish to the exposed surfaces. The quantity of mortar consumed in finishing these surfaces mainly depends upon the types and quality of shuttering used for casting the R.C.C. members. Consumption of mortar may be assessed by taking field observations on construction sites. Field observations at CSIR-CBRI revealed that on an average 10 mm thick plaster is required to give a fairly smooth surface where an average quality of timber was

used for shuttering. In most of the organizations, the thickness of fair finish is conventionally taken as 6 mm, so the consumption of mortar also depends upon the shape and section of R.C.C. member because of the variation in exposed surface. Materials required for this quantity of mortar can be taken from Table 4.1 and that for concrete from the Table 4.2 in order to work out the total consumption of material for different R.C.C. items. The material constants for R.C.C work are given in Table 4.3 below.

**Table 4.3.** Material Constant for reinforced Cement Concrete Work

| Description of Items | Consumption of Materials per Cum | | | | |
|---|---|---|---|---|---|
| | Concrete | | | Fair Finish | |
| | Cement (Ton) | Coarse Sand (Cum) | Agg. (Cum) | Cement (Ton) | Fine Sand (Cum) |
| Reinforced cement concrete including finishing and plastering the exposed surface with cement mortar 1:3 (1 cement: 3 fine sand) of thickness 6mm (average) to give a smooth and even surface in: 1:2:4 (1 cement : 2 Coarse sand : 4 Aggregate - 20 mm nominal gauge) | | | | | |
| a) Suspended floor. Roof, landing, shelves and their supports and balconies etc. | 0.292 | 0.41 | 0.82 | 0.022 | 0.05 |
| b) Walls including attached plasters, buttresses etc. | 0.292 | 0.41 | 0.82 | 0.051 | 0.11 |
| c) Lintels, beams and cantilevers etc. | 0.292 | 0.41 | 0.82 | 0.035 | 0.07 |
| d) Columns, pillars, posts and struts etc. | 0.292 | 0.41 | 0.82 | 0.056 | 0.12 |
| e) Chajjas etc. | 0.292 | 0.41 | 0.82 | 0.0435 | 0.09 |
| 1:1.5:3 (1 cement : 1.5 Coarse sand : 3 Aggregate - 20 mm nominal gauge) | | | | | |
| a) Suspended floor. Roof, landing, shelves and their supports and balconies etc. | 0.367 | 0.39 | 0.78 | 0.022 | 0.05 |
| b) Walls including attached plasters, buttresses etc. | 0.367 | 0.39 | 0.78 | 0.051 | 0.11 |
| c) Lintels, beams and cantilevers etc. | 0.367 | 0.39 | 0.78 | 0.035 | 0.07 |
| d) Columns, pillars, posts and struts etc. | 0.367 | 0.39 | 0.78 | 0.056 | 0.12 |
| e) Chajjas etc. | 0.367 | 0.39 | 0.78 | 0.0435 | 0.09 |
| 1:1:2 (1 cement : 1 Coarse sand : 2 Aggregate - 20 mm nominal gauge) | | | | | |
| a) Suspended floor. Roof, landing, shelves and their supports and balconies etc. | 0.488 | 0.35 | 0.70 | 0.022 | 0.05 |
| b) Walls including attached plasters, buttresses etc. | 0.488 | 0.35 | 0.70 | 0.051 | 0.11 |
| c) Lintels, beams and cantilevers etc. | 0.488 | 0.35 | 0.70 | 0.035 | 0.07 |
| d) Columns, pillars, posts and struts etc. | 0.488 | 0.35 | 0.70 | 0.056 | 0.12 |
| e) Chajjas etc. | 0.488 | 0.35 | 0.70 | 0.0435 | 0.09 |

### 4.1.1.4 Brick Work

The consumption of material in brick work depends upon the size of bricks, the thickness of joints and position of the frog. For the computation, the actual size of bricks was

taken as 229x110x70 mm, for traditional brick work and 190x90x90 mm for modular brick work with frog-up position and thickness of joints as 10 mm. The consumption of material also depends upon the thickness of wall. Hence, constants are worked out for various thicknesses of wall and reasonable weightage applied in order to arrive at the consolidated figures for 1 $m^3$ which works out to be 473 bricks and 0.203 $m^3$ of mortar for traditional brick work and 517 bricks and 0.186 $m^3$ of mortar for modular brick work. An allowance of 0.031 $m^3$ and 0.021 $m^3$ of mortar for traditional and modular brick work respectively is too added when the bricks are laid frog-up. Half brick work is generally measured separately in square meter units. Constants for half brick work are worked out on similar lines.

The consumption of brick for 10 $m^2$ half brick wall is 520 and that of mortar is 0.188 $m^3$ in case of traditional brick work, while corresponding figures are 506 and 0.139 $m^3$ for modular brick work. Extra allowance of mortar is 0.034 and 0.020 for using the bricks with frog-up position for traditional and modular brickwork respectively. The detailed constant in terms of the ingredients for brick work worked out with the help of information given in Table 4.1 are given in Table 4.4 & 4.5 for traditional and modular brick work respectively. The detailed constants terms of the ingredients for brick worked out with the help of information given in Table 4.1 are given in Tables 4.4 & 4.5 for traditional and modular brick work respectively.

**Table 4.4.** Material Constants for Brickwork using Conventional Bricks

| **Description of Items** | **Constants per Cum** | | |
|---|---|---|---|
| | **Frog up** | | |
| | **Bricks (No.)** | **Cement (Ton)** | **Fine Sand (Cum)** |
| Brickwork in cement mortar 1:3 (1 cement: 3 sand) | 473 | 0.0995 | 0.210 |
| Brickwork in cement mortar 1:4 (1 cement: 4 sand) | 473 | 0.0795 | 0.225 |
| Brickwork in cement mortar 1:5 (1 cement: 5 sand) | 473 | 0.0655 | 0.232 |
| Brickwork in cement mortar 1:6 (1 cement: 6 sand) | 473 | 0.0545 | 0.232 |
| Half brickwork in cement mortar 1:3 (1 cement: 3 sand) | 520 | 0.094 | 0.200 |
| Half brickwork in cement mortar 1:4 (1 cement: 4 sand) | 520 | 0.0755 | 0.214 |

**Table 4.5.** Material Constants for Brickwork using Modular Bricks

| Description of Items | Constants per Cum | | |
|---|---|---|---|
| | Frog up | | |
| | Bricks (No.) | Cement (Ton) | Fine sand (Cum) |
| Brickwork in cement mortar 1:3 (1 cement: 3 sand) | 517 | 0.088 | 0.187 |
| Brickwork in cement mortar 1:4 (1 cement: 4 sand) | 517 | 0.0705 | 0.200 |
| Brickwork in cement mortar 1:5 (1 cement: 5 sand) | 517 | 0.058 | 0.205 |
| Brickwork in cement mortar 1:6 (1 cement: 6 sand) | 517 | 0.048 | 0.204 |
| Half brickwork in cement mortar 1:3 (1 cement: 3 sand) | 506 | 0.0675 | 0.143 |
| Half brickwork in cement mortar 1:4 (1 cement: 4 sand) | 506 | 0.054 | 0.153 |

## 4.2 Material and Labour Requirements for Buildings

An estimate of manpower and material requirements is generally required for any building prior to the start of construction for various purposes such as budgeting and procurement of materials, consumption of cost indices, justification of tenders etc. Rough calculations for the quantities of important materials are usually based on certain percentage of the total cost of building. This may not project the true consumption as these percentages remain constant only when there is uniform increase or decrease in prices of materials and labour, a phenomenon which rarely occurs.

An alternative method of computation of requirements of materials and labour is to prepare detailed estimates and Bills of Quantities (BoQ) and then calculate the requirements with the aid of material and labour constants, usually derived from the Analysis of Rates (AoR). Study carried out at the Institute projects a quick method of estimation of material and labour for various types of buildings.

Simple statistical equations have been worked out for building portion, which relate the consumption of each material and labour to the plinth area of the building. The study covers office as well as residential buildings both load bearing and framed construction.

### 4.2.1 Statistical Relationships of Residential and Non-Residential Buildings (Building Portion Only)

The study has been based on the past as well as the present performance of completed buildings in terms of actual quantities of materials and labour consumed for completion of the works. The actual quantities of materials and labour were computed from the final bills of contractors. This exercise was done for a number of buildings with different plinth areas for each category of construction based on the survey carried out in 80 cities. Similarly, projects with various layouts such as detached, semi-detached or row housing have been studied in order to get the average consumption of material and labour for common walls. Statistical relationships have been established between each type of material and labour and plinth area of the buildings which are discussed below.

#### 4.2.1.1 Building Typology

The types of buildings considered are as follows:

I. Residential Buildings

A. Load Bearing Construction

i) Single Storey Dwellings

ii) Double Storey Dwellings

B. Framed Construction

i) Four Storey Dwellings/Apartments

II. Non-Residential Buildings

A. Load Bearing Construction (up to 3 or 4 storey)

B. Frame Construction (Greater than 3 or 4 storey)

In case of residential buildings, the relationships have been worked out for load bearing as well as for framed construction. In load bearing construction, single and double storeyed buildings with normal depth 900 mm and width of foundation 900 mm have been considered. The relationships are applicable for plinth areas varying from 50 to 300 $m^2$. In case of four storeyed framed constructions, the analysis has been done considering column foundation of two meter depth and the relationships are applicable for the range of 50 to 300 $m^2$ plinth area only. The storey height of building taken is 3.10 m. The equations of material and labour for different zones (North, North-East, North-West, South, South-East and South-West) are listed in Table 4.6 & Table 4.7.

**Table 4.6.** Statistical Relationships for Residential Buildings (Building Portion Only)

| | Material/Labour | Unit | Relationships (N, NE and NW region) | | |
|---|---|---|---|---|---|
| | | | **Single Storey** | **Double Storey** | **Multi Storey** |
| **(a)** | **Material** | | (Load Bearing Construction) | | (R.C.C Framed Cons.) |
| **1** | Bricks | % Nos. | 2.26A+66.8 | 2.15A+63 | $-26.2+2.96A-0.0045A^2$ |
| **2** | Cement | Ton | 0.153A+6.57 | 0.145A+6.54 | 0.182A+2.676 |
| **3** | Steel | Kg. | 21.3A-614 | 21.97A-105 | $-1491+92A-0.36A^2s$ |
| **4** | Coarse Sand + Fine Sand | Cum | 0.67A-7 | 0.63A-12 | 0.561A-3.98 |
| **5** | Coarse Aggregate | | | | |
| | (i) 10 mm nom. Size | Cum | 0.176A-0.21 | 0.075A+1.78 | 0.295A-17 |
| | (ii) 20 mm nom. Size | Cum | 0.145A+1.5 | 0.178A-0.21 | $0.45+0.27A-0.0001A^2$ |
| **6** | Timber (frames and Shutters) | Cum | 0.019A-1 | 0.019A-1 | 0.02A-1 |
| **7** | Timber (Shuttering) | Cum | 0.0092A | 0.0092A | 0.009A+0.04 |
| **8** | Primer | Lt. | 0.24A | 0.12A+5 | 0.12A+5 |
| **9** | Paint | Lt. | 0.08A+1.27 | 0.08A+2.27 | 0.075A+0.93 |
| **(b)** | **Labour** | | | | |
| **10** | Mason +Carpenter +Painter | Day | 2.709A+19 | 2.709A+10 | 2.309A+12.3 |
| **11** | Blacksmith | Day | 0.269A-12 | 0.269A-1.4 | 0.469A-5.4 |
| **12** | Beldar + Bhisti + Coolie | Day | 6.769A+32 | 6.61A-10 | 6.49A-25.1 |

Notes :

- 'A' is the plinth area of one dwelling in sqm.
- Based on the survey findings for single, double (Load Bearing) and multi storey (Framed Structure) building construction, the statistical relationships have been developed for the N, NE and NW region of country.
- The most common building materials and labour used in the construction closely match with the survey data.
- Similarly, the cost of other building construction materials used may be worked out as per the local BoQ and prevailing market rates, which may vary of the order of 10-15% of the cost arrived at using statistical relationships.
- The symbols are : N-North, NE-North east, NW-North West

**Table 4.7.** Statistical Relationships for Residential Buildings (Building Portion Only)

| | Material/Labour | Unit | Relationships (S,SE and SW Region) | | |
|---|---|---|---|---|---|
| | | | **Single Storey** | **Double Storey** | **Multi Storey** |
| **(a)** | **Material** | | Load Bearing Construction | | R.C.C Framed Cons. |
| **1** | Bricks | % Nos. | 2.26A+10 | 2.15A | -26.2+2.96A-0.0096A² |
| **2** | Cement | Ton | 0.153A+6.57 | 0.145A+10 | 0.182A-5.35 |
| **3** | Steel | Kg. | 21.3A | 41.97A-105 | -1491+92A-0.36A²+465 |
| **4** | Coarse Sand + Fine Sand | Cum | 0.67A-7 | 0.63A-7 | 0.561A-3.98 |
| **5** | Coarse Aggregate | | | | |
| | (i) 10 mm nom. Size | Cum | 0.176A-0.21 | 0.178A-0.21 | 0.195A-0.75 |
| | (ii) 20 mm nom. Size | Cum | 0.145A+1.5 | 0.075A+10.78 | 0.45+0.27A-0.0001A² |
| **6** | Timber (frames and Shutters) | Cum | 0.019A-1.2 | 0.019A+1.2 | 0.01A-0.35 |
| **7** | Timber (Shuttering) | Cum | 0.0082A | 0.0082A | 0.009A+0.04 |
| **8** | Primer | Lt. | 0.12A | 0.12A | 0.090A+0.56 |
| **9** | Paint | Lt. | 0.08A+1.27 | 0.08A+0.27 | 0.075A+0.93 |
| **(b)** | **Labour** | | | | |
| **10** | Mason + Carpenter+ Painter | Day | 2.709A-10 | 2.709A-10 | 2.309A+12.3 |
| **11** | Blacksmith | Day | 0.269A+5 | 0.269A+15 | 0.469A+5.4 |
| **12** | Beldar + Bhisti + Coolie | Day | 6.769A+32 | 6.61A-13 | 6.49A-25.1 |

Notes :

- 'A' is the plinth area of one dwelling in sqm.
- Based on the survey findings for single, double (Load Bearing) and multi storey (Framed Structure) building construction, the statistical relationships have been developed for the S, SE and SW region of country.
- The most common building materials and labour used in the construction closely match with the survey data.
- Similarly, the cost of other building construction materials used may be worked out as per the local BoQ and prevailing market rates, which may vary of the order of 10-15% of the cost arrived at using statistical relationships.
- The symbols are : S-South, SE-South East, SW-South West

## 4.3 Labour Constants for Buildings

The labour output, on a given task, when brought to a standardized value and expressed as man-day is usually called 'Labour Constant' for that task. These labour constants fairly represent the average or normal output by the worker having normal skill, working under normal conditions. These constants, together with materials constants, are required to price an item of any building work.

In India, the various construction departments do have their respective 'Analysis of Rates' containing pricing-details for various items of building works. It is observed that the labour constants prevalent in these organizations differ among themselves and these variations are difficult to understand. Nevertheless, for these variations in the basic values of labour, the validity of the analyzed prices suffers. One may, however, reason out that the existing labour constants, inherited as they are from old times, do not hold good for present-day building techniques and conditions of working.

### 4.3.1 Computation of Constants

The computation of constants is the next important part of the study after having taken sufficient observations on work-sites is processing the data The observed data is reduced to working hours by first multiplying the duration of study with the number of workers and then subtracting from it, the total unproductive time measured either by the stop-watch or estimated through percentage of unproductive spot-reading (in case of activity sampling). The amount of work done within the above computed time period is also calculated. (Ref. 1)

The time-data, computed as above, is then reduced to working-hours per unit of work by dividing the total working-hours with the corresponding work done.

These working-hours are then converted into the Basic Working-Hours by applying the following relationship (Ref.1):

$$\text{Basic Working Hours} = \frac{\text{Observed Working Hours x Observed Average Rating}}{100}$$

By using the above equation, the basic working hours are computed.

## 4.4 Computation of Building Cost Indices

The Cost Index (CI) may be defined as a number that gives an indication of relative increase or decrease in cost of a certain item or commodity with respect to its cost at certain base year. There are various categories of cost indices being prepared for different purposes

such as wholesale price index to know the trend in movement of prices of various commodities, consumer's price index which normally forms the basis for adjustment of claims for relief in wages, indices for industrial production which indicate the relative productive activity.

Building Cost Index (BCI) is an important tool used by engineers and planners to carry out economic evaluation studies of construction activities. The cost index numbers for building materials and labour are also important and any escalation in them may to upset the physical targets fixed in the plan expenditure. These are useful for economic analysis at different stages of construction and to know the trend in movement of building costs over a number of years, which may be required for the long term planning. These are also useful for updating the construction estimates.

Various categories of cost indices are prepared and maintained at state and national level and are given strategic importance but not much efforts have been made in the building industry to prepare the cost indices. Neither there is any well recognized procedure for evolving them. Various construction agencies have worked out their own systems, which lack comparability because of non-uniformity in their approach. It has been observed that generally same norms or weightage diagram is used for compilation of cost indices irrespective of the size and type of the building, type of construction and specifications in practice as all these factors will have sizeable effect on the pattern of weightage diagram. Similarly, for others, the cost index is based on the building portion only. This practice is also irrational since there is non-uniform escalation of prices in materials required for building portion.

Studies have been carried out at the Institute to give the data in basic form for computation of building cost indices. The data are given in the form of material and labour inputs for various categories of buildings and different types of construction. These inputs are expressed in terms of statistical expressions in tabular form, which relate the requirements of individual material and category of labour with the plinth area of the building. Hence, new relationships have been developed by modifying the exits one based on the actual consumption of materials and labour in the completed buildings during 2013-2014 in 80 identified cities discussed in chapter 3 of this report of different plinth areas adopting a particular set of specifications being commonly used in the construction works. These requirements are given in the form of statistical equations for building portion for important materials and labour only, which constitute the major portion of building cost as shown in Tables 4.8 and 4.9 in respect of residential buildings. It may be mentioned that these

requirements are only for a particular set of specifications and shall get changed as soon as the building deviates from these specifications.

The data given in various tables can be made use of for computation of Building Cost Index at any time and place. Requirements of major materials and labour can be computed with the help of these norms for a particular type of building or construction project in question. If there are different types of tenements in a project, the quantities may be worked out for a medium size tenement. These quantities should be priced with the rates of the base year and also with the current market rates. The ratio of total costs for both the years computed in terms of percentage increase or decrease will give the present cost index.

**Table 4.8.** Data for Computation of Cost Index for Residential Building to N, NE & NW Regions (Building Portion Only)

| | **Material/Labour** | **Unit** | **Relationships (N, NE and NW region)** | | |
|---|---|---|---|---|---|
| | | | **Single Storey** | **Double Storey** | **Multi Storey** |
| **(a)** | **Material** | | (Load Bearing Construction) | | (R.C.C Framed Cons.) |
| **1** | Bricks | % Nos. | 2.26A+66.8 | 2.15A+63 | -26.2+2.96A-0.0045A$^2$ |
| **2** | Cement | Ton | 0.153A+6.57 | 0.145A+6.54 | 0.182A+2.676 |
| **3** | Steel | Kg. | 21.3A-614 | 21.97A-105 | -1491+92A-0.36A²s |
| **4** | Sand | Cum | 0.67A-7 | 0.63A-12 | 0.561A-3.98 |
| **5** | Coarse Aggregate | Cum | 0.321A-1.29 | 0.0.253+1.57 | 0.565A-16.55 |
| **6** | Timber | Cum | 0.0282A-1 | 0.0282A-1 | 0.029A-0.96 |
| **7** | Mason, Carpenter, & Painter | Day | 2.709A+19 | 2.709A+10 | 2.309A+12.3 |
| **8** | Blacksmith | Day | 0.269A-12 | 0.269A-1.4 | 0.469A-5.4 |
| **9** | Beldar, Bhisti & Coolie | Day | 6.769A+32 | 6.61A-10 | 6.49A-25.1 |

Notes :

- 'A' is the plinth area of individual tenement in sqm.
- The relation are applicable for plinth area varying from 50 to 300 Sqm in case of single and double storey buildings for load bearing construction and from 50 to 300 Sqm for four storey framed building.
- The symbols are : N-North, NE- North East, NW- North West

**Table 4.9.** Data for Computation of Cost Index for Residential Building to S, SE & SW Regions (Building Portion Only)

| | Material/Labour | Unit | Relationships (S,SE and SW Region) | | |
|---|---|---|---|---|---|
| | | | **Single Storey** | **Double Storey** | **Multi Storey** |
| **(a)** | **Material** | | Load Bearing Construction | | R.C.C Framed Cons. |
| **1** | Bricks | Nos. | 2.26A+10 | 2.15A | $-26.2+2.96A-0.0096A^2$ |
| **2** | Cement | Ton | 0.153A+6.57 | 0.145A+10 | 0.182A-5.35 |
| **3** | Steel | Kg. | 21.3A | 41.97A-105 | $-1491+92A-0.36A^2+465$ |
| **4** | Sand | Cum | 0.67A-7 | 0.63A-7 | 0.561A-3.98 |
| **5** | Coarse Aggregate | Cum | 0.321A-1.29 | 0. 253A-10.57 | 0.465A-0.30 |
| **6** | Timber | Cum | 0.0272A-1.2 | 0.0272A+1.2 | 0.019A-0.31 |
| **7** | Mason, Carpenter & Painter | Day | 2.709A-10 | 2.709A-10 | 2.309A+12.3 |
| **8** | Blacksmith | Day | 0.269A+5 | 0.269A+15 | 0.469A+5.4 |
| **9** | Beldar, Bhisti & Coolie | Day | 6.769A+32 | 6.61A-13 | 6.49A-25.1 |

Notes :

- 'A' is the plinth area of individual tenement in sqm.
- The relation are applicable for plinth area varying from 50 to 300 sqm in case of single and double storey buildings for load bearing construction and from 50 to 300 sqm for four storey framed building.
- The symbols are : S-South, SE-South East, SW-South West

Hence, examples to compute the quantity of materials and labour and their cost of single storey, double storey and four storey frame construction buildings with the help of statistical relationships are shown, in Tables 4.10, 4.11, 4.12, 4.13, 4.14 & 4.15 respectively. These equations are applicable for North, North-East & North-West regions and South, South-East & South West regions. The examples are given in following tables:

**Table 4.10.** Computation of Material and Labour Cost using Statistical Relationships for South, South-East and South-West Region (Single Storey Building)

| | | | **Statistical Relationships for Residential Buildings (Building Portion Only)** | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Plinth Area (A)** = 100 Sqm. | | | | S,SE and SW Region | | | | |
| | **Material/Labour** | | **Single Storey (Load Bearing Construction)** | | | | | |
| **(a)** | **Material** | **Unit** | **Statistical Equation** | **Equation Quantity** | **Quantity** | **Rate** | **Old Equation Amount (Rs.)** | **Modified Equation Amount (Rs.)** |
| **1** | Bricks | % Nos. | 2.26A+10 | 23600.00 | 36420.00 | 5.5 | 129800 | 200310 |
| **2** | Cement | Ton. | 0.153A+6.57 | 21.87 | 19.87 | 7775 | 170039 | 154489 |
| **3** | Steel | Kg. | 21.3A | 2130.00 | 4830.00 | 52 | 110760 | 251160 |
| **4** | Coarse Sand + Fine Sand | Cum | 0.67A-7 | 60.00 | 59.70 | 2058 | 123480 | 122863 |
| **5** | Coarse Aggregate | | | | | | | |
| | (i) 10 mm nom. Size | Cum | 0.176A-0.21 | 17.39 | 7.00 | 1082 | 18816 | 7574 |
| | (ii) 20 mm nom. Size | Cum | 0.145A+1.5 | 16.00 | 18.07 | 1134 | 18144 | 20491 |
| **6** | Timber(frames and Shutters) | Cum | 0.019A-1.2 | 0.70 | 0.40 | 67681 | 47377 | 26734 |
| **7** | Timber (Shuttering) | Cum | 0.0082A | 0.82 | 1.19 | 64729 | 53078 | 76704 |
| **8** | Primer | Lt. | 0.12A | 12.00 | 2.64 | 195 | 2340 | 515 |
| **9** | Paint | Lt. | 0.08A+1.27 | 9.27 | 0.00 | 261 | 2419 | 0 |
| **(b)** | **Labour** | | | | | | | |
| **10** | Mason + Carpenter + Painter | Day | 2.709A-10 | 260.90 | 245.00 | 560 | 146104 | 137200 |
| **11** | Blacksmith | Day | 0.269A+5 | 31.90 | 46.00 | 500 | 15950 | 23000 |
| **12** | Beldar + Bhisti + Coolie | Day | 6.769A+32 | 708.90 | 645.00 | 380 | 269382 | 245100 |
| | | | | | | | **1107689** | **1266140** |
| | | | | | | Plinth rate | 11077 | 12661 |
| | | | | | Percentage Variation = -12.5 | | | |

Notes :

- 'A' is the plinth area of one dwelling in square meter.
- Based on the survey finding for single, double (Load Bearing) & multi storey (Framed Structure) Building construction, the statistical relationships have been developed for the S, SE and SW region of country.
- The most common building materials and labour used in the construction the result indicate a closely match with the survey data.
- Similarly, the cost of other building construction materials used may be worked out as per the local BoQs and prevailing market rates, which may vary of the order of 10-15% of the cost arrived at used statistical relationships.
- The symbols are : S-South, SE-South East, SW-South West

**Table 4.11.** Computation of Material and Labour Cost using Statistical Relationships for South, South-East and South-West Region (Double Storey Building)

| | | | **Statistical Relationships for Residential Buildings (Building Portion Only)** | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Plinth Area (A) =** 100 Sqm | | | | S,SE and SW Region | | | | |
| | **Material/Labour** | | **Double Storey (Load Bearing Construction)** | | | | | |
| **(a)** | **Material** | **Unit** | **Statistical Equation** | **Equation Quantity** | **Quantity** | **Rate** | **Old Equation Amount (Rs.)** | **Modified Equation Amount(Rs.)** |
| **1** | Bricks | % Nos. | 2.15A | 21500.00 | 23610.00 | 5.50 | 118250 | 129855 |
| **2** | Cement | Ton. | 0.145A+10 | 24.50 | 24.12 | 7775.00 | 190488 | 187533 |
| **3** | Steel | Kg. | 41.97A-105 | 4092.00 | 4461.00 | 52.00 | 212784 | 231972 |
| **4** | Coarse Sand + Fine Sand | Cum | 0.63A-7 | 57.40 | 56.28 | 2058.00 | 118129 | 115824 |
| **5** | Coarse Aggregate | | | | | | | |
| | (i) 10 mm nom. Size | Cum | 0.178A-0.21 | 17.59 | 10.80 | 1082.00 | 19032 | 11686 |
| | (ii) 20 mm nom. Size | Cum | 0.075A+10.78 | 18.28 | 24.30 | 1134.00 | 20730 | 27556 |
| **6** | Timber(frames and Shutters) | Cum | 0.019A+1.2 | 0.70 | 0.39 | 67681.00 | 47377 | 26057 |
| **7** | Timber (Shuttering) | Cum | 0.0082A | 0.82 | 0.61 | 64729.00 | 53078 | 39647 |
| **8** | Primer | Lt. | 0.12A | 12.00 | 5.99 | 195.00 | 2340 | 1168 |
| **9** | Paint | Lt. | 0.08A+0.27 | 8.27 | 5.31 | 261.00 | 2158 | 1386 |
| **(b)** | **Labour** | | | | | | | |
| **10** | Mason + Carpenter+ Painter | Day | 2.709A-10 | 260.90 | 212.00 | 560.00 | 146104 | 118720 |
| **11** | Blacksmith | Day | 0.269A+15 | 41.90 | 44.00 | 500.00 | 20950 | 22000 |
| **12** | Beldar + **B**histi + Coolie | Day | 6.61A-13 | 648.00 | 606.00 | 380.00 | 246240 | 230280 |
| | | | | | | | **1197660** | **1143684** |
| | | | | | | Plinth rate | 11977 | 11437 |
| | | | | | | Percentage variation = 4.72 | | |

Notes :

- ‘A' is the plinth area of one dwelling in square meter.
- Based on the survey finding for single, double (Load Bearing) & multi storey (Framed Structure) Building construction, the statistical relationships have been developed for the S, SE and SW region of country.
- The most common building materials and labour used in the construction the result indicate a closely match with the survey data.
- Similarly, the cost of other building construction materials used may be worked out as per the local BoQs and prevailing market rates, which may vary of the order of 10-15% of the cost arrived at used statistical relationships.
- The symbols are : S-South, SE-South East, SW-South West

**Table 4.12** Computation of Material and Labour Cost using Statistical Relationships for South, South-East and South-West Region (Multi Storey Building)

| | | | **Statistical Relationships for Residential Buildings (Building Portion Only)** | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Plinth Area(A) =** 100 Sqm. | | | | S,SE and SW Region | | | | |
| | **Material/Labour** | | **Multi Storey (R.C.C Framed Construction)** | | | | | |
| **(a)** | **Material** | **Unit** | **Statistical Equation** | **Equation Quantity** | **Quantity** | **Rate** | **Old Equation Amount (Rs.)** | **Modified Equation Amount(Rs.)** |
| **1** | Bricks | % Nos. | -26.2+2.96A-0.0096A² | 17380.00 | 9150.00 | 5.50 | 95590 | 50325 |
| **2** | Cement | Ton. | 0.182A-5.35 | 23.55 | 33.45 | 7775.00 | 183101 | 260074 |
| **3** | Steel | Kg. | -1491+92A-0.36A²+465 | 4574.00 | 3552.00 | 52.00 | 237848 | 184704 |
| **4** | Coarse Sand + Fine Sand | Cum | 0.561A-3.98 | 52.12 | 81.65 | 2058.00 | 107263 | 168036 |
| **5** | Coarse Aggregate | | | | | | | |
| | (i) 10 mm nom. Size | Cum | 0.195A-0.75 | 18.75 | 19.68 | 1082.00 | 20288 | 21294 |
| | (ii) 20 mm nom. Size | Cum | 0.45+0.27A-0.0001A² | 26.45 | 40.48 | 1134.00 | 29994 | 45904 |
| **6** | Timber(frames and Shutters) | Cum | 0.01A-0.35 | 0.65 | 0.17 | 67681.00 | 43993 | 11167 |
| **7** | Timber (Shuttering) | Cum | 0.009A+0.04 | 0.94 | 0.54 | 64729.00 | 60845 | 34630 |
| **8** | Primer | Lt. | 0.090A+0.56 | 9.56 | 3.94 | 195.00 | 1864 | 768 |
| **9** | Paint | Lt. | 0.075A+0.93 | 8.43 | 2.95 | 261.00 | 2200 | 770 |
| **(b)** | **Labour** | | | | | | | |
| **10** | Mason +Carpenter +Painter | Day | 2.309A+12.3 | 243.20 | 213.00 | 560.00 | 136192 | 119280 |
| **11** | Blacksmith | Day | 0.469A+5.4 | 52.30 | 38.00 | 500.00 | 26150 | 19000 |
| **12** | Beldar + **B**histi + Coolie | Day | 6.49A-25.1 | 674.10 | 698.00 | 380.00 | 256158 | 265240 |
| | | | | | | | **1201486** | **1181192** |
| | | | | | | Plinth rate | 12015 | 11812 |
| | | | | | | Percentage variation = 1.72 | | |

Notes :

- ‘A' is the plinth area of one dwelling in sqm.
- Based on the survey finding for single, double (Load Bearing) & multi storey (Framed Structure) Building construction, the statistical relationships have been developed for the S, SE and SW region of country.
- The most common building materials and labour used in the construction the result indicate a closely match with the survey data.
- Similarly, the cost of other building construction materials used may be worked out as per the local BoQs and prevailing market rates, which may vary of the order of 10-15% of the cost arrived at used statistical relationships.
- The symbols are : S-South, SE-South East, SW-South West

**Table 4.13.** Computation of Material and Labour Cost using Statistical Relationships for North, North -East and North -West Region (Single Storey Building)

| | | | **Statistical Relationships for Residential Buildings (Building Portion Only)** | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Plinth Area (A) =** 100 Sqm. | | | | N,NE and NW Region | | | | |
| | **Material/Labour** | | **Single Storey (Load Bearing Construction)** | | | | | |
| **(a)** | **Material** | **Unit** | **Statistical Equation** | **Equation Quantity** | **Quantity** | **Rate** | **Old Equation Amount (Rs.)** | **Modified Equation Amount(Rs.)** |
| **1** | Bricks | % Nos. | 2.26A+66.8 | 29280.00 | 40700.00 | 6.78 | 198644 | 276120 |
| **2** | Cement | Ton. | 0.153A+6.57 | 21.87 | 22.16 | 6277.37 | 137286 | 139107 |
| **3** | Steel | Kg. | 21.3A-614 | 1516.00 | 1535.00 | 48.00 | 72770 | 73682 |
| **4** | Coarse Sand + Fine Sand | Cum | 0.67A-7 | 60.00 | 57.78 | 1592.38 | 95543 | 92008 |
| **5** | Coarse Aggregate | | | | | | | |
| | (i) 10 mm nom. Size | Cum | 0.176A-0.21 | 17.39 | 14.28 | 1652.19 | 28732 | 23593 |
| | (ii) 20 mm nom. Size | Cum | 0.145A+1.5 | 16.00 | 16.67 | 1669.57 | 26713 | 27832 |
| **6** | Timber(frames and Shutters) | Cum | 0.019A-1 | 0.90 | 0.92 | 58206.17 | 52386 | 53550 |
| **7** | Timber (Shuttering) | Cum | 0.0092A | 0.92 | 1.10 | 57349.03 | 52761 | 63084 |
| **8** | Primer | Lt. | 0.24A | 24.00 | 18.64 | 154.29 | 3703 | 2876 |
| **9** | Paint | Lt. | 0.08A+1.27 | 9.27 | 14.42 | 219.29 | 2033 | 3162 |
| **(b)** | **Labour** | | | | | | | |
| **10** | Mason +Carpenter +Painter | Day | 2.709A+19 | 289.90 | 277.00 | 450.00 | 130455 | 124650 |
| **11** | Blacksmith | Day | 0.269A-12 | 14.90 | 15.00 | 450.00 | 6705 | 6750 |
| **12** | Beldar + **B**histi + Coolie | Day | 6.769A+32 | 708.90 | 686.00 | 360.95 | 255879 | 247613 |
| | | | | | | | **1063609** | **1134027** |
| | | | | | | Plinth rate | 10636 | 11340 |
| | | | | | Percentage variation = -6.21 | | | |

Notes :`

- ‘A' is the plinth area of one dwelling in sqm.
- Based on the survey finding for single, double (Load Bearing) & multi storey (Framed Structure) Building construction, the statistical relationships have been developed for the N, NE and NW region of country.
- The most common building materials and labour used in the construction the result indicate a closely match with the survey data.
- Similarly, the cost of other building construction materials used may be worked out as per the local BoQs and prevailing market rates, which may vary of the order of 10-15% of the cost arrived at used statistical relationships.
- The symbols are : N-North, NE- North East, NW- North West

**Table 4.14.** Computation of Material and Labour Cost using Statistical Relationships for North, North -East and North -West Region (Double Storey Building)

| | | | Statistical Relationships for Residential Buildings (Building Portion Only) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Plinth Area (A) =** 100 Sqm | | | | | N,NE and NW Region | | | |
| | **Material/Labour** | | **Double Storey (Load Bearing Construction)** | | | | | |
| **(a)** | **Material** | **Unit** | **Statistical Equation** | **Equation Quantity** | **Quantity** | **Rate** | **Old Equation Amount (Rs.)** | **Modified Equation Amount(Rs.)** |
| **1** | Bricks | % Nos. | 2.15A+63 | 27800.00 | 30550.00 | 6.78 | 188603 | 207260 |
| **2** | Cement | Ton. | 0.145A+6.54 | 21.04 | 22.07 | 6277.37 | 132076 | 138542 |
| **3** | Steel | Kg. | 21.97A-105 | 2092.00 | 1033.00 | 48.00 | 100419 | 49585 |
| **4** | Coarse Sand + Fine Sand | Cum | 0.63A-12 | 51.00 | 50.08 | 1592.38 | 81211 | 79746 |
| **5** | Coarse Aggregate | | | | | | | |
| | (i) 10 mm nom. Size | Cum | 0.075A+1.78 | 9.28 | 12.09 | 1652.19 | 15332 | 19975 |
| | (ii) 20 mm nom. Size | Cum | 0.178A-0.21 | 17.59 | 20.51 | 1669.57 | 29368 | 34243 |
| **6** | Timber(frames and Shutters) | Cum | 0.019A-1 | 0.90 | 1.06 | 58206.17 | 52386 | 61699 |
| **7** | Timber (Shuttering) | Cum | 0.0092A | 0.92 | 2.03 | 57349.03 | 52761 | 116419 |
| **8** | Primer | Lt. | 0.12A+5 | 17.00 | 27.22 | 154.29 | 2623 | 4200 |
| **9** | Paint | Lt. | 0.08A+2.27 | 10.27 | 22.06 | 219.29 | 2252 | 4837 |
| **(b)** | **Labour** | | | | | | | |
| **10** | Mason +Carpenter +Painter | Day | 2.709A+10 | 280.90 | 321.00 | 450.00 | 126405 | 144450 |
| **11** | Blacksmith | Day | 0.269A-1.4 | 26.00 | 13.00 | 450.00 | 11700 | 5850 |
| **12** | Beldar + **B**histi + Coolie | Day | 6.61A-10 | 651.00 | 622.00 | 360.95 | 234980 | 224512 |
| | | | | | | | **1030116** | **1091318** |
| | | | | | | Plinth rate | 10301 | 10913 |
| | | | | | Percentage variation = -5.61 | | | |

Notes :

- ‘A' is the plinth area of one dwelling in sqm.
- Based on the survey finding for single, double (Load Bearing) & multi storey (Framed Structure) Building construction, the statistical relationships have been developed for the N, NE and NW region of country.
- The most common building materials and labour used in the construction the result indicate a closely match with the survey data.
- Similarly, the cost of other building construction materials used may be worked out as per the local BoQs and prevailing market rates, which may vary of the order of 10-15% of the cost arrived at used statistical relationships.
- The symbols are : N-North, NE- North East, NW- North West

**Table 4.15.** Computation of Material and Labour Cost using Statistical Relationships for North, North -East and North -West Region (Multi Storey Building)

| | | | **Statistical Relationships for Residential Buildings (Building Portion Only)** | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Plinth Area (A) =** 100 Sqm. | | | | N,NE and NW Region | | | | |
| | **Material/Labour** | | **Multi Storey (R.C.C Framed Construction)** | | | | | |
| **(a)** | **Material** | **Unit** | **Statistical Equation** | **Equation Quantity** | **Quantity** | **Rate** | **Old Equation Amount (Rs.)** | **Modified Equation Amount(Rs.)** |
| **1** | Bricks | % Nos. | $-26.2+2.96A-0.0045A^2$ | 22480 | 24330 | 6.78 | 152511 | 165062 |
| **2** | Cement | Ton. | 0.182A+2.676 | 20.88 | 19.81 | 6277.37 | 131046 | 124355 |
| **3** | Steel | Kg. | $-1491+92A-0.36A^2$ | 4109.00 | 4408.00 | 48.00 | 197238 | 211590 |
| **4** | Coarse Sand + Fine Sand | Cum | 0.561A-3.98 | 52.12 | 71.55 | 1592.38 | 82995 | 113935 |
| **5** | Coarse Aggregate | | | | | | | |
| | (i) 10 mm nom. Size | Cum | 0.295A-17 | 12.50 | 11.44 | 1652.19 | 20652 | 18901 |
| | (ii) 20 mm nom. Size | Cum | $0.45+0.27A-0.0001A^2$ | 26.42 | 19.89 | 1669.57 | 44110 | 33208 |
| **6** | Timber(frames and Shutters) | Cum | 0.02A-1 | 0.90 | 0.37 | 58206.17 | 52386 | 21536 |
| **7** | Timber (Shuttering) | Cum | 0.009A+0.04 | 0.94 | 0.55 | 57349.03 | 53908 | 31542 |
| **8** | Primer | Lt. | 0.12A+5 | 17.00 | 4.77 | 154.29 | 2623 | 736 |
| **9** | Paint | Lt. | 0.075A+0.93 | 8.43 | 4.01 | 219.29 | 1849 | 879 |
| **(b)** | **Labour** | | | | | | | |
| **10** | Mason +Carpenter +Painter | Day | 2.309A+12.3 | 243.20 | 167.00 | 450.00 | 109440 | 75150 |
| **11** | Blacksmith | Day | 0.469A-5.4 | 41.50 | 43.00 | 450.00 | 18675 | 19350 |
| **12** | Beldar + Bhisti + Coolie | Day | 6.49A-25.1 | 623.90 | 513.00 | 360.95 | 225198 | 185169 |
| | | | | | | | **1092631** | **1001412** |
| | | | | | | Plinth rate | 10926 | 10014 |
| | | | | | Percentage variation = 9.11 | | | |

Notes :

- 'A' is the plinth area of one dwelling in sqm.
- Based on the survey finding for single, double (Load Bearing) & multi storey (Framed Structure) Building construction, the statistical relationships have been developed for the N, NE and NW region of country.
- The most common building materials and labour used in the construction the result indicate a closely match with the survey data.
- Similarly, the cost of other building construction materials used may be worked out as per the local BoQs and prevailing market rates, which may vary of the order of 10-15% of the cost arrived at used statistical relationships.
- The symbols are : N-North, NE- North East, NW- North West

# CHAPTER 5
# CONCLUSIONS

## 5.0 Introduction

A significant amount of construction activity is going on in the country and huge amount is spent in the construction sector. Due to the large scale construction activities in different kinds of projects, such as buildings, roads, bridges and other types, there is a shortage of conventional materials. Through this project, it has been possible to know the bill of quantities, specifications and estimates of materials, and machinery, labour requirements and to assess the variation in the cost of construction in 80 cities/towns surveyed located in different regions. The following types of construction projects were surveyed:

i) Residential buildings : Single Storey (SS); Double Storey (DS) and Multi Storey (MS);
ii) Non-Residential buildings-SS, DS & MS
iii) Other building types, both load bearing and framed construction; and
iv) Roads and Bridges etc.

The survey was carried out in two stages covering 80 cities, 40 cities / towns in Phase I and 40 cities / towns in Phase II as shown in Table 3.1, 3.2 and 3.3 in Chapter 3 of this report. The survey findings infer that there is a large variation in the cost of construction and labour in different regions of the states. The methodology used in the computation of cost of materials, labour and lump sum & miscellaneous items in building construction in 80 cities/ towns is described. The results indicate that due to non-availability of burnt clay bricks, the recycled bricks (bricks & blocks from fly ash based and other industrial wastes as well as aerated concrete blocks) are being used in building construction. The percentage of such recycled bricks / blocks used in residential buildings is about 2-3% and about 5-6% for non-residential buildings (average about 4%).

The survey conducted infers that the residential building construction is largely done by private sector (85%) and by public sector, it is 15%. Similarly, for non- residential buildings, private sector projects contribute to 21.67% and public sector 78.33%. Further, for other types of projects, the scenario is found to be uniform, both private as well as public sectors. The roads/bridges construction is largely done by public sector. However, these scenarios do not give the clear picture of all types of construction activities going on or

projects completed in all the cities / towns. Therefore, an extensive study of projects in each town / city is essential.

Similarly, to estimate the approximate quantities of certain building materials and their cost both for residential and non-residential buildings, CSIR-CBRI had developed earlier the statistical relationships for building cost index during 1988 and based on the survey carried out in 80 cities for studying the estimated cost of residential and non-residential building, the analysis reveal that these equations do not match with the present day cost of constructions. This is primarily due to the significant increase in the cost of labour and materials during the past twenty five years. Hence, to fulfill this gap, new statistical relationships have been developed. A few examples are given by using the statistical relationship / equations and may be useful to project or estimate the quantities and the cost of a project approximately.

Example (Ranchi City)

Material (Cement)

Cost of cement = Rs. 6769.98 per Ton

Total Quantity of cement = 29.97 Ton

(Double storey residential building at Ranchi)

Total Cost of cement (6769.98 x 29.97) = Rs. 2, 02,887 …… (A)

Add 1% Water Charges to the cost arrived at (A)

= 202887 x 1.01

= Rs. 2, 04,916 …… (B)

Add 15% Contractor's Profit

(Average Contractor's Profit that varies from 12% to 18% in 80 Cities/Towns) to the cost arrived at (B) = 204916 x 1.15

= Rs. 2, 35,654 ……. (C)

The minimal variation is due to the values used in Excel sheet with more than four decimals. The same procedure is applicable to all tables and also applicable to Roads, Bridges etc. for tables given in Survey Data Tables.

Similarly, the cost of material in residential and non-residential buildings, other construction including roads and bridges along with % distribution of materials is given separately in Annexure. The state wise consolidated cost of materials along with % distribution of residential, non- residential, other construction and roads & bridges is also given separately in Annexure.

**Table 5.1** Example Double storey Residential Building in Ranchi City

| **Name of city: RANCHI** | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Name of work: RESIDENTIAL BUILDING-1 (Plinth Area = 178 Sqm.)** | | | | | | | | | | | | | | | | | | | | | | |
| | | | **QUANTITY** | | | | | | | | | | **AMOUNT (Indian Rupees)** | | | | | | | | | |
| **MATERIAL** | **UNIT** | **RATE** | **FDN** | **WALL** | **SLAB** | **STAIR** | **REINF** | **FLOOR** | **ROOF** | **D/W/V** | **FINISH** | **TOTAL** | **FDN** | **WALL** | **SLAB** | **STAIR** | **REINF** | **FLOOR** | **ROOF** | **D/W/V** | **FINISH** | **TOTAL** |
| Cement | Ton | 6769.98 | 2.41 | 9.703566 | 8.588 | 0.456 | 0 | 2.3291888 | 2.6192593 | 0 | 3.8595232 | 29.97 | 19019.434 | 76302.359 | 67530.293 | 3585.6793 | 0 | 18315.184 | 20596.105 | 0 | 30348.711 | 235698 |
| Coarse Sand with carriage | Cum. | 653.62 | 8.51225 | 29.780074 | 9.605 | 0.51 | 0 | 3.9683732 | 0.4896 | 0 | 0 | 52.86 | 6462.3268 | 22608.426 | 7291.9203 | 387.18161 | 0 | 3012.7081 | 371.69435 | 0 | 0 | 40134 |
| Stone Agg. (40mm)/ Brick Agg. (40mm) | Cum. | 1246.10 | 6.63 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.63 | 9595.8983 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9596 |
| Stone Agg. (20mm) | Cum. | 1458.00 | 2.448 | 5.358 | 12.882 | 0.684 | 0 | 0 | 0 | 0 | 0 | 21.37 | 4145.6072 | 9073.5962 | 21815.242 | 1158.3314 | 0 | 0 | 0 | 0 | 0 | 36193 |
| Stone Agg. (10mm) | Cum. | 1368.00 | 0 | 2.632 | 6.328 | 0.336 | 0 | 0 | 6.2962963 | 0 | 0 | 15.59 | 0 | 4182.069 | 10054.762 | 533.88115 | 0 | 0 | 10004.387 | 0 | 0 | 24775 |
| Bricks/Clay Fly ash Brick/Fly ash Lime Brick | 1000 Nos. | 5373.35 | 6.8666 | 47.6525 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54.51 | 42855.453 | 297406.21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 340262 |
| Fine Sand with carriage | Cum. | 617.83 | 3.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16.233526 | 19.83 | 2583.3944 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11649.333 | 14233 |
| Steel Bar | Qtls. | 5307.80 | 0 | 0 | 0 | 0 | 32.634 | 0 | 0 | 0 | 0 | 32.63 | 0 | 0 | 0 | 0 | 201188.93 | 0 | 0 | 0 | 0 | 201189 |
| Chlorpyriphos/ Super-plasticizer | Lt. | 185 | 32.808333 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32.80 | 7049.7726 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7050 |
| Marble Stone with carriage | Sqm. | 1130.3 | 0 | 0 | 0 | 0 | 0 | 154.33 | 0 | 0 | 0 | 154.33 | 0 | 0 | 0 | 0 | 0 | 202611.13 | 0 | 0 | 0 | 202611 |
| Marble Chips with carriage | Qtls. | 205.39 | 0 | 0 | 0 | 0 | 0 | 1.93584 | 0 | 0 | 0 | 1.93 | 0 | 0 | 0 | 0 | 0 | 461.81493 | 0 | 0 | 0 | 462 |
| Ceramic Wall Tiles | Sqm. | 409.04 | 0 | 0 | 0 | 0 | 0 | 23.165 | 0 | 0 | 0 | 23.16 | 0 | 0 | 0 | 0 | 0 | 11005.691 | 0 | 0 | 0 | 11006 |
| Marble Powder | Cum. | 1000 | 0 | 0 | 0 | 0 | 0 | 0.01554 | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 18.04971 | 0 | 0 | 0 | 18 |
| Dark Shade Pigment | Kg. | 55 | 0 | 0 | 0 | 0 | 0 | 6.3048 | 0 | 0 | 0 | 6.30 | 0 | 0 | 0 | 0 | 0 | 402.76639 | 0 | 0 | 0 | 403 |
| Bitumen 80/100 With Carriage | Ton | 31805.24 | 0 | 0 | 0 | 0 | 0 | 0 | 0.13872 | 0 | 0 | 0.13 | 0 | 0 | 0 | 0 | 0 | 0 | 5124.5646 | 0 | 0 | 5125 |
| Kerosene Oil | Lt. | 51 | 0 | 0 | 0 | 0 | 0 | 0 | 9.9552 | 0 | 0 | 9.95 | 0 | 0 | 0 | 0 | 0 | 0 | 589.7112 | 0 | 0 | 590 |
| Steam Coal | Qtls. | 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2856 | 0 | 0 | 0.28 | 0 | 0 | 0 | 0 | 0 | 0 | 39.806928 | 0 | 0 | 40 |
| Mud Phuska/ Brick Bats | Cum. | 60 | 0 | 0 | 0 | 0 | 0 | 0 | 4.5333333 | 0 | 0 | 4.53 | 0 | 0 | 0 | 0 | 0 | 0 | 315.928 | 0 | 0 | 316 |
| Water Proofing Compound | Kg. | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 52.888889 | 0 | 0 | 52.88 | 0 | 0 | 0 | 0 | 0 | 0 | 2457.2178 | 0 | 0 | 2457 |
| Wood (Frame) | Cum. | 30232 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.4038889 | 0 | 1.40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49296.811 | 0 | 49297 |
| Wood (Shutter 35 mm thick) | Cum. | 30232 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6888748 | 0 | 1.68 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59303.94 | 0 | 59304 |
| Cement Primer | Lt. | 145 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62.328 | 62.32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10497.126 | 10497 |
| Oil Bound Distemper | Kg. | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 133.56 | 133.56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4343.6383 | 4344 |
| Cement Paint | Kg. | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 146.5344 | 146.53 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5105.9912 | 5106 |
| Pink Primer (Wood) | Lt. | 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18.9 | 18.90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2634.282 | 2634 |
| Enamel Paint | Lt. | 215 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14.616 | 14.61 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3649.9441 | 3650 |
| **LABOUR** | | | | | | | | | | | | | | | | | | | | | | |
| Mason/ Painter/Carpenter | Day | 450 | 11.028 | 92.64 | 3.842 | 0.204 | 0 | 28.923828 | 21.330805 | 94.632139 | 186.85419 | 439.45 | 5764.0599 | 48420.612 | 2008.1174 | 106.6257 | 0 | 15117.762 | 11149.079 | 49461.853 | 97664.014 | 229692 |
| Black-smith / Mixer Operator/Fitter | Day | 400 | 0 | 0 | 0 | 0 | 31.08 | 0 | 0 | 0 | 0 | 31.08 | 0 | 0 | 0 | 0 | 14439.768 | 0 | 0 | 0 | 0 | 14440 |
| Mate | Day | 350 | 1.152 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.15 | 468.3168 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 468 |
| Beldar | Day | 250 | 44.754047 | 36.87365 | 45.2 | 2.4 | 31.08 | 22.86157 | 31.811911 | 16.449074 | 11.37864 | 242.80 | 12995.456 | 10707.186 | 13124.95 | 696.9 | 9024.855 | 6638.4284 | 9237.3837 | 4776.3999 | 3304.0726 | 70506 |
| Bhisti | Day | 250 | 10.46525 | 30.824874 | 20.34 | 1.08 | 0 | 85.119613 | 27.2 | 0 | 98.305206 | 273.33 | 3038.847 | 8950.7728 | 5906.2275 | 313.605 | 0 | 24716.608 | 7898.2 | 0 | 28545.374 | 79370 |
| Coolie | Day | 250 | 21.63981 | 282.4556 | 0 | 0 | 0 | 19.07 | 17.377778 | 0 | 146.0068 | 486.54 | 6283.6598 | 82018.045 | 0 | 0 | 0 | 5537.4513 | 5046.0722 | 0 | 42396.725 | 141282 |
| **MISCELLANEOUS & LUMP SUM** | | | | | | | | | | | | | | | | | | | | | | |
| Batch Mix plant+ Pump Charges | Cum. | 500 | 0 | 9.4 | 22.6 | 1.2 | 0 | 0 | 0 | 0 | 0 | 33.20 | 0 | 5459.05 | 13124.95 | 696.9 | 0 | 0 | 0 | 0 | 0 | 19281 |
| Mixer + Vibrator | Day | 1200 | 0.714 | 0.2193333 | 0.5273333 | 0.028 | 0 | 17.893333 | 0 | 0 | 0 | 19.38 | 995.1732 | 305.7068 | 734.9972 | 39.0264 | 0 | 24939.728 | 0 | 0 | 0 | 27015 |
| Excavator 3D with Driver+ Hire & Running Charges Loader | Day | 8000 | 0.10065 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.10 | 935.2398 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 935 |
| Centering & Shuttering Slab, Beam, Chajja, Staircase etc. | Sqm. | 331.56 | 0 | 0 | 237.3 | 12.6 | 0 | 0 | 0 | 0 | 0 | 249.90 | 0 | 0 | 91385.179 | 4852.3104 | 0 | 0 | 0 | 0 | 0 | 96237 |
| Sundries + Scaffolding | L.S | 1.7 | 654.86525 | 3472.118 | 293.8 | 15.6 | 1644.4428 | 4967.559 | 1117.7306 | 1892.1039 | 6729.9158 | 20788.13 | 1293.0642 | 6855.8706 | 580.12279 | 30.80298 | 3247.0345 | 9808.6936 | 2207.015 | 3736.0537 | 13288.555 | 41047 |
| | | | | | | | | | | | | | 123485.7 | 572289.9 | 233556.76 | 12401.244 | 227900.58 | 322586.01 | 75037.164 | 166575.06 | 253427.77 | 1987260 |

**Note:**

**FDN=** Foundation**; REINF=** Reinforcement; **D/W/V=**Door/Window/Ventilator; **Agg. =** Aggregate; **Cum. =** Cubic Metre; **Sqm. =** Square Metre; **Qtls. =** Quintal; **Lt. =** Litre; & **L.S. =** Lump Sum

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# DEFINITIONS

a) **Load Bearing Structure:** Load bearing structures are structures where the load is transferred to the foundations via load bearing internal and external walls e.g. masonry houses. They are generally characterized by having a small window to wall ratio (i.e. more structural wall area than window openings) and internal walls.

b) **Load Bearing Wall:** A wall designed to carry an imposed vertical load in addition to its own weight, together with any lateral load.

c) **Frame Structure**: Frame structures are the structures having the combination of beam, column and slab to resist the lateral and gravity loads. These structures are usually used to overcome the large moments developing due to the applied loading.

d) **Ordinary Portland Cement (OPC):** OPC is available in various grades such as 33, 43 and 53. The IS specifications for these grades are based on desired strength (IS-269, 1989; IS -18112, 1989 and IS -12269, 1987). While OPC 33 is used for general construction work, plastering and finishing which does not require cement of high compressive strength, OPC 43 is preferred for higher grade M20, M25 concrete. OPC 53 is used for precast, pre-stressed concrete in tall structures.

e) **Portland Pozzolana Cement (PPC):** Pozzolana refers to those substances which are not cementitious by themselves but contain chemical constituents that combine with lime at ordinary temperature in presence of water to develop cementitious properties (IS -1489, 1991: Part 1 & 2). Besides fly ash, burnt clay and surkhi also act as Pozzolana. Pozzolana cements are obtained by blending a mixture of clinker, Pozzolana (10 to 25 per cent) and the stipulated quantity of gypsum. Pozzolana cement provides better resistance to sulphate attack and is, therefore, included in the category of cement with special properties suited to a specific environment or climatic condition. These are used in plastering, masonry and finishing works for green buildings.

f) **Ready Mixed Concrete (RMC):** RMC is defined as concrete manufactured at a centralized plant, transported and delivered to the purchaser in a plastic and unhardened state. Concrete being a heterogeneous material and, as such, designing the mix and its production at site may result in quality deficiencies. The centralized production of concrete in large volumes results in economy due to the bulk purchase of raw materials and large volume production under controlled conditions in covered

factories. Repeated operations with the same workers alPso result in faster productivity.

g) **Column:** An isolated vertical load bearing member, width of which does not exceed four times the thickness.

h) **Pier:** A thickened section forming integral part of a wall placed at intervals along the wall, to increase the stiffness of the wall or to carry a vertical concentrated load. Thickness I/ of a pier is the overall thickness including the thickness of the wall or, when bonded into a leaf of a cavity wall, the thickness obtained by treating that leaf as an independent wall

i) **Curtain Wall:** A non-load bearing wall subject to lateral loads. It may be laterally supported by vertical or horizontal structural members where necessary.

j) **Masonry:** An assemblage of masonry units properly bonded together with mortar.

k) **Masonry Unit:** Individual units which are bonded together with the help of mortar to form a masonry element such as wall, column, pier, buttress, etc.

l) **Partition Wall:** An interior non-load bearing wall, one storey or part storey in height.