

# The Complete Book on Cement & Concrete Products Manufacturing

**Author:** Ashish Dey

**Format:** Paperback

**ISBN:** 9788195744749

**Code:** NI356

**Pages:** 496

**Price:** Rs. 1,975.00 US\$ 50.00

**Publisher:** Asia Pacific Business Press Inc.

Usually ships within **5** days

The Complete Book on

Cement & Concrete Products Manufacturing

(AAC Blocks, Slag & High Alumina Cement, Clinker, Concrete Block, Floor Slab, Roof Tiles, Interlocking Paving Blocks,

Fly Ash Bricks, Flooring Tiles, Precast RCC Wall, Prestressed Concrete Beams, Poles, Pipe, Sleeper, RCC Beam, Ready Mix Concrete and Wall Putty with Manufacturing Process, Machinery Equipment Details and Factory Layouts)

Cement is a powdery substance made by calcining lime and clay. When cement is mixed with water, it forms mortar, and when it is mixed with sand, gravel, and water, it makes concrete. Mortar is used as a bonding agent for plastering, masonry work, and pointing.

Concrete is a mixture of aggregates and paste. The aggregates are sand and gravel or crushed stones; and the paste is made from water and portland cement mixture. Concrete is used for laying floors, roofs and constructing lintels, beams, pillars and other masonry structures. Concrete products such as pipes, blocks, bricks, and concrete articles are made using concrete.

The cement and concrete products market consists of sales of cement and concrete products and related services by entities (organizations, sole traders and partnerships) that manufacture cement and concrete products such as concrete pipes, bricks, and paving blocks. The cement and concrete products manufacturing industry includes establishments engaged in manufacturing portland cement, pozzolanic cement, ready-mix concrete, concrete blocks, bricks, and pipes and related products.

The global cement and concrete products market was valued at \$333,255.8 million. The market accounted for 0.40% of the global GDP. In terms of per capita consumption, the market accounted for \$43.5. The market was also supported by rapid urbanization, and government initiatives towards infrastructure development. Growth in the forecast can be attributed to increasing spending on infrastructure, global economic growth, the development of affordable housing, and a rapidly growing urban population.

The cement and concrete industry is still expected to grow in the coming years. Companies are looking for ways to reduce their environmental footprint by making use of more efficient manufacturing processes and renewable energy sources. They are also developing new materials that are stronger and more sustainable than traditional materials. This means that the industry will remain an important part of the global economy for many years to come.

This book contains in-depth information about Cement & Concrete Products, AAC Blocks, Slag & High Alumina Cement, Clinker, Concrete Block, Floor Slab, Roof Tiles, Interlocking Paving Blocks, Fly Ash Bricks, Flooring Tiles, Precast RCC Wall, Prestressed Concrete Beams, Poles, Pipe, Sleeper, RCC Beam, Ready Mix Concrete and Wall Putty with Manufacturing Process, Machinery Equipment Details and Factory Layouts.

This book is also a fantastic resource for people interested in or who have worked in the Cement & Concrete industry.

Profitable and viable business opportunities exist in the Cement & Concrete sector. As a result, creating your own business is a good way to get into it. To learn more about Cement & Concrete industry in depth, read this book. It will assist you in figuring out how to establish your own Cement & Concrete Business. Because of the increasing demand for Cement & Concrete in today's market, it's a terrific method to earn money.

## **Contents**

### **1. INTRODUCTION**

#### **1.1 Chemistry**

##### **1.1.1 Hydraulic Cement**

##### **1.1.2 Non-Hydraulic Cement**

#### **1.2 Cement Physical Properties**

#### **1.3 Cement Chemical Properties**

#### **1.4 Cement Industry**

### **2. HOW TO START YOUR OWN CEMENT BUSINESS**

#### **2.1 Make A Cement Factory Cost Analysis Plan**

#### **2.2 Make a Budget- Cement Plant**

#### **2.3 Choose Your Cement Factory Market or Region**

#### **2.4 Choose a Location with a Plentiful Supply of Raw Materials**

#### **2.5 Understand the Cement Manufacturing Process**

#### **2.6 Determine the Supply of Raw Material and Energy Supply**

#### **2.7 Get Environment Clearance**

#### **2.8 Make Your Project in Line with CSR and Sustainability**

#### **2.9 Get the Necessary Personnel and Begin Production**

#### **2.10 Gauge Your Competition**

### **3. RAW MATERIALS USED FOR CEMENT PRODUCTION**

#### **3.1 Introduction**

#### **3.2 Lime Component**

##### **3.2.1 Limestone**

##### **3.2.2 Chalk**

##### **3.2.3 Marl**

#### **3.3 Clay Component**

#### **3.4 Corrective Ingredients**

#### **3.5 Auxiliary Components of Cement Raw Materials**

##### **3.5.1 Magnesium Oxide**

##### **3.5.2 Alkalies**

##### **3.5.3 Sulfur**

##### **3.5.4 Chloride**

##### **3.5.5 Fluoride**

##### **3.5.6 Phosphorus**

### **4. MANUFACTURING PROCESS OF CEMENT**

#### **4.1 Dry Cement Manufacturing Process**

##### **4.1.1 Treatment of Raw Materials**

##### **4.1.2 Burning or Calcination of the Dry Mix**

##### **4.1.3 Grinding of Clinker**

- 4.1.4 Packing and Storage of Cement
- 4.2 Wet Process of Manufacturing of Cement.
  - 4.2.1 Preparation of Slurry
  - 4.2.2 Burning or Calcination
  - 4.2.3 Grinding of Clinker
- 5. EQUIPMENT AND MACHINERY REQUIRED FOR CEMENT PLANT
  - 5.1 Stages of Cement Manufacturing
    - 5.1.1 Stage-1 Opencast Lime Stone Mining
    - 5.1.2 Stage-2 Lime Stone Crushing & Stacking
    - 5.1.3 Stage-3 Raw Material Handling & Grinding
    - 5.1.4 Stage-4 Coal Grinding
    - 5.1.5 Stage-5 Preheater Kiln & Cooler
    - 5.1.6 Stage-6 Clinker Grinding (Cement Mill)
    - 5.1.7 Stage-7 Packing Plant & Loading Plant
- 6. TYPES OF CEMENT
  - 6.1 Introduction
    - 6.1.1 Ordinary Portland Cement (OPC)
    - 6.1.2 Portland Pozzolana Cement (PPC)
    - 6.1.3 Rapid Hardening Cement
    - 6.1.4 Quick Setting Cement
    - 6.1.5 Low Heat Cement
    - 6.1.6 Sulphate Resisting Cement
    - 6.1.7 Blast Furnace Cement
    - 6.1.8 High Alumina Cement
    - 6.1.9 White Cement
    - 6.1.10 Colored Cement
    - 6.1.11 Air Entraining Cement
    - 6.1.12 Expansive Cement
    - 6.1.13 Hydrophobic Cement
- 7. WHITE CEMENT MANUFACTURING
  - 7.1 Introduction
  - 7.2 How to Improve White Cement's Whiteness
    - 7.2.1 Select the Best Raw Materials
    - 7.2.2 Select the Appropriate Fuel
    - 7.2.3 Select the Best Raw Mill and Cement Mill
    - 7.2.4 Choose the Best Cooling Method
  - 7.3 The Primary Applications
  - 7.4 Differences between White Cement and Grey Cement
  - 7.5 Raw Materials
  - 7.6 White Cement Manufacturing
    - 7.6.1 White Cement Clinker Manufacturing
    - 7.6.2 White Cement Clinker Bleaching Process
  - 7.7 Process
    - 7.7.1 Crushing
    - 7.7.2 Grinding
    - 7.7.3 Calcination of Clinker
    - 7.7.4 Clinker Cooling
    - 7.7.5 Cement Grinding
    - 7.7.6 Packing of Cement
- 8. QUICK SETTING CEMENT IN CONSTRUCTION
  - 8.1 Applications
  - 8.2 Why is Quick-Setting Cement a Good Choice for Construction?

- 8.3 How to Use Quick Setting Cement?
- 8.4 Considerations for Using This Type of Cement
- 8.5 Main Characteristics
- 8.6 Difference Between Quick Setting Cement and Rapid Hardening Cement
- 8.7 Ingredient
- 8.8 Manufacturing of Quick-Setting Cement
  - 8.8.1 Raw Materials Crushing
  - 8.8.2 Raw Materials Grinding
  - 8.8.3 Clinker Calcination
  - 8.8.4 Grinding Clinker
  - 8.8.5 Cement Packing
- 9. PRODUCTION OF ORDINARY PORTLAND CEMENT (OPC)
  - 9.1 Ordinary Portland Cement Varieties
    - 9.1.1 33-Grade Cement
    - 9.1.2 43-Grade Cement
    - 9.1.3 53-Grade Cement
  - 9.2 Chemical Characteristics of OPC
    - 9.2.1 Factor of Lime Saturation
    - 9.2.2 The Alumina-Iron Ratio
    - 9.2.3 Insoluble Waste
    - 9.2.4 Magnesia
    - 9.2.5 Ignition Failure
    - 9.2.6 Anhydride of Sulphur
  - 9.3 Advantages
  - 9.4 OPC Cement Properties
  - 9.5 Specifications OPC Cement
  - 9.6 Raw Materials
  - 9.7 Manufacturing Process
    - 9.7.1 Crushing and Grinding
    - 9.7.2 Material Mixing
    - 9.7.3 Heating the Slurry in the Rotary Kiln
    - 9.7.4 Formation of Clinker
    - 9.7.5 Grinding the Clinker with Gypsum
- 10. HIGH ALUMINA CEMENT
  - 10.1 Introduction
  - 10.2 Applications
  - 10.3 Hydration of High Alumina Cement (HAC)
    - 10.3.1 Conversion of High Alumina Cement
    - 10.3.2 Effect of Curing Temperature on High Alumina Cement
  - 10.4 Advantages
  - 10.5 Difference between High Alumina Cement and Ordinary Portland Cement
  - 10.6 Raw Materials
  - 10.7 Manufacturing of High Alumina Cement
  - 10.8 Physical Properties
  - 10.9 Concrete Technology
    - 10.9.1 Resistance to Chemical Attack
  - 10.10 Refractory Properties of High Alumina Cement
- 11. BLAST FURNACE SLAG CEMENT AND ITS MANUFACTURING
  - 11.1 Blast-Furnace Slag is Used in Making-Four Classes of Cement

11.2 What Industries are Blast Furnace Slag Used After Grinding?

11.3 Classification of Blast Furnace Slag

11.3.1 Air-Cooled Slag

11.3.2 Granulated Slag

11.3.3 Expansive Slag

11.3.4 Slag Cotton

11.4 Advantages of Blast-Furnace Slag Cement

11.5 Disadvantages of Blast-Furnace Slag Cement

11.6 Manufacturing Method

11.7 Process

11.7.1 Raw Material Production

11.7.2 Raw Mill

11.7.3 Clinker Production

11.7.4 Clinker Grinding

11.7.5 Finished Cement Storage and Packing

12. PORTLAND POZZOLANA CEMENT

12.1 Features

12.2 Applications

12.3 Composition

12.4 Advantages

12.5 Portland Pozzolana Cement Properties

12.6 Manufacturing Process

13. HOW CEMENT IS MADE WITH CLINKER

13.1 Composition of Clinker

13.2 Clinker Thermochemistry

13.3 Cement Clinker Types and Uses

13.3.1 Sulfate Resistant Clinker

13.3.2 Low Heat Clinker

13.3.3 White Clinker

13.3.4 Low-Alkali Clinker

13.3.5 Belite Calciumsulfoaluminate Ternesite (BCT)

13.4 Cement Clinker Use: Changing to Cement

13.5 How is Cement Clinker Produced?

13.6 What are Differences Between Clinker Cement and Grey Cement?

13.7 Manufacturing Process

13.7.1 Crushing of Limestone

13.7.2 Prehomogenisation

13.7.3 Grinding of Raw Materials

13.7.4 Homogenization

13.7.5 Pyro Processing

13.7.6 Clinker Formation

14. PLASTER OF PARIS AND ITS DIFFERENT USES

14.1 Properties of Plaster of Paris

14.2 Additional Features of Gypsum Plaster

14.3 What Distinguishes Gypsum from Plaster of Paris?

14.4 Types of Plaster of Paris

14.4.1 Gypsum Plaster

14.4.2 Clay Plaster

14.4.3 Lime Plaster

14.4.4 Cement Plaster

14.4.5 Heat Resistant Plaster

- 14.5 The Different Uses of Plaster of Paris
- 14.6 Process of Manufacture
- 15. CONCRETE AND ITS MANUFACTURING PROCESS
- 15.1 Concrete Components
- 15.2 Hardened Concrete
- 15.3 Development for the Long Term
- 15.4 Quality Concrete Essentials
- 15.5 Suitable Materials
- 15.6 Water-Cementitious Materials Ratio
- 15.7 Design-Workmanship-Environment
- 15.8 Concrete vs. Cement
- 15.9 Manufacturing Processes of Concrete
- 15.9.1 Batching
- 15.9.2 Mixing
- 15.9.3 Transporting
- 15.9.4 Placing
- 15.9.5 Compacting
- 15.9.6 Curing
- 15.9.7 Finishing
- 16. HOW TO START CONCRETE BUSINESS
- 16.1 Select a Name for Concrete Company
- 16.2 Create a Concrete Business Plan
- 16.3 Select the Legal Structure for Concrete Company
- 16.3.1 Limited Liability Company
- 16.3.2 Partnerships
- 16.3.3 Limited Liability Company (LLC)
- 16.3.4 C Corporation
- 16.3.5 S Corporation
- 16.4 Obtain Startup Capital for Concrete Business
- (If Needed)
- 16.5 Establish a Business Location
- 16.6 Register Concrete Business with the Internal Revenue Service
- 16.7 Establish a Business Bank Account
- 16.8 Apply for a Business Credit Card
- 16.9 Obtain the Necessary Business Licenses and Permits
- 16.10 Obtain Business Insurance for Concrete Company
- 16.11 Purchase or Lease the Appropriate Concrete Business Equipment
- 16.12 Create Concrete Business Marketing Materials
- 16.13 Buy and Install the Software Required to Run Concrete Business
- 16.14 Ready for Business
- 17. DIFFERENT TYPES OF CONCRETE
- 17.1 What is the Significance of Concrete in Construction?
- 17.2 How to Choose a Concrete Type?
- 17.3 Concrete Work Safety Tips
- 17.4 Types
- 17.4.1 Plain Cement Concrete (PCC)
- 17.4.2 Cement Reinforced Concrete (RCC)
- 17.4.3 FRC (Fibre Reinforced Concrete)
- 17.4.4 Glass Fibre Reinforced Concrete (GFRC)

- 17.4.5 Ferrocement
- 17.4.6 Ready Mix Concrete
- 17.4.7 Precast Concrete
- 17.4.8 Prestressed Concrete
- 17.4.9 Light Weight Concrete
- 17.4.10 Polymer Concrete
- 17.4.11 High Density Concrete
- 17.4.12 High Performance Concrete
- 17.4.13 High Strength Concrete
- 17.4.14 Air Entrained Concrete
- 17.4.15 Self-compacting Concrete (SCC)
- 17.4.16 Shotcrete
- 17.4.17 Guniting Concrete
- 17.4.18 Pumped Concrete
- 17.4.19 Pervious Concrete
- 17.4.20 Smart Concrete
- 17.4.21 Stamped Concrete
- 17.4.22 Limecrete
- 17.4.23 Asphalt Concrete
- 17.4.24 Bacterial Concrete
- 17.4.25 Smog Eating Concrete
- 18. DIFFERENCE BETWEEN RCC AND PRESTRESSED CONCRETE
- 18.1 Materials Used in Prestressed Concrete
  - 18.1.1 Steel
  - 18.1.2 Tendons
  - 18.1.3 Wires Strands or Cables
  - 18.1.4 Bars
  - 18.1.5 Concrete
- 18.2 The Comparisons Between the RCC and Prestressed Concrete
- 19. CONCRETE FLOOR SLAB PRODUCTION PROCESS
- 19.1 Different Slabs
  - 19.1.1 One-Way Slabs on Beams
  - 19.1.2 One-Way Joist Slab (Ribbed Slab)
  - 19.1.3 Waffle Slab (Grid Slab)
  - 19.1.4 Flat Plates
  - 19.1.5 Flat Slabs
  - 19.1.6 Two-Way Slabs on Beams
  - 19.1.7 Hollow Core Slab
  - 19.1.8 Hardy Slab
  - 19.1.9 Bubble Deck Slab
  - 19.1.10 Composite Slab
  - 19.1.11 Precast Slab
  - 19.1.12 Slab on Grade
- 19.2 Design Requirements of RCC Slab, Structural Design, Building Design
  - 19.2.1 Effective Span in Slab Design
  - 19.2.2 Limiting Stiffness
  - 19.2.3 Minimum Reinforcement
  - 19.2.4 Maximum Diameter of the Bars
  - 19.2.5 Spacing of the Main Reinforcement Bars
  - 19.2.6 Percentage of Distribution Reinforcement
  - 19.2.7 Cover to the RCC Slab

### 19.3 Process

#### 19.3.1 Assemble and Erect Formwork for Slab

#### 19.3.2 Prepare and Place Reinforcement for Slab

#### 19.3.3 Pour, Compact and Finishing Concrete Floor Slab

#### 19.3.4 Curing Concrete and Remove Formwork

### 20. CONCRETE BLOCK MAKING PROCESS

#### 20.1 What do Need to Understand About Concrete Blocks?

#### 20.2 Why Use Concrete Blocks for Construction?

#### 20.3 Advantages of Concrete Blocks

#### 20.4 Raw Materials Utilized in Concrete Blocks

#### 20.5 Concrete Blocks Manufacturing Process

#### 20.6 Process

##### 20.6.1 Mixing

##### 20.6.2 Molding

##### 20.6.3 Curing

##### 20.6.4 Cubing

### 21. TYPES OF CONCRETE BLOCKS USED IN CONSTRUCTION

#### 21.1 Hollow Concrete Blocks vs. Solid Concrete Blocks

#### 21.2 Types of Hollow Concrete Blocks

##### 21.2.1 Stretcher Block

##### 21.2.2 Pillar Block

##### 21.2.3 Lintel Block

##### 21.2.4 Jamb Block

##### 21.2.5 Column Block

##### 21.2.6 Corner Block

##### 21.2.7 Splitface Block

##### 21.2.8 Bullnose Block

##### 21.2.9 Partition Block

#### 21.3 Types of Solid Concrete Blocks

##### 21.3.1 Fly Ash Block

##### 21.3.2 Aerated Autoclaved Block

##### 21.3.3 Paving Block

##### 21.3.4 Cellular Lightweight Block

##### 21.3.5 Expanded Clay Aggregate Block

### 22. CONCRETE ROOF TILES PRODUCTION

#### 22.1 Extruded Concrete Roofing Tiles

#### 22.2 Improvements to Colourings, Coatings and Textures

#### 22.3 Concrete Roof Tiles and Other Roofing Materials

#### 22.4 The Use of Pigments

#### 22.5 Reducing Efflorescence

#### 22.6 Life Expectancy and Design Criteria

#### 22.7 Roof Tile Testing

#### 22.8 Weathering Tests and Roof Tile Fixing

#### 22.9 Future of Concrete Roof Tiles

#### 22.10 Raw Materials

##### 22.10.1 Sand

##### 22.10.2 Cement

##### 22.10.3 Colour

#### 22.11 Manufacturing Process

#### 22.12 Equipment

### 23. HOW TO START ROOF TILES PRODUCTION BUSINESS

#### 23.1 Conduct Research on Roof Tiles



- 23.2 Create an Effective Business Plan
- 23.3 Include Business
- 23.4 Registration for Taxes
- 23.5 Lease a Facility and Establish a Manufacturing Factory
- 23.6 Raw Material Source
- 23.7 Market Research Source
- 24. INTERLOCKING CONCRETE PAVING BLOCKS MANUFACTURING
  - 24.1 Types of Pavers
    - 24.1.1 Natural Stone Pavers
    - 24.1.2 Brick Pavers
    - 24.1.3 Concrete Pavers
  - 24.2 Manufacturing Process
    - 24.2.1 Raw Material Required for the Making of Paver Blocks
    - 24.2.2 Batching
    - 24.2.3 Mixing
    - 24.2.4 Filling of Moulds
    - 24.2.5 Compaction
    - 24.2.6 Curing
    - 24.2.7 Quality Control
  - 24.3 Manufacturing Equipment
    - 24.3.1 Batching Equipment
    - 24.3.2 Mixer
    - 24.3.3 Moulding Machine
    - 24.3.4 Curing Chamber
- 25. USE OF RICE HUSK ASH IN CONCRETE
  - 25.1 Introduction
  - 25.2 Salient Features
  - 25.3 Physical Properties
  - 25.4 Chemical Properties
  - 25.5 Why RHA?
    - 25.5.1 High Performance Concrete (HPC)
    - 25.5.2 Supplementary Cementing Materials
    - 25.5.3 Research on RHA
    - 25.5.4 Research Significance
  - 25.6 Material Properties and Mix Design
    - 25.6.1 Water
    - 25.6.2 Methodology
  - 25.7 Methodology Adopted for Mix Design
    - 25.7.1 Design of Concrete Mix
    - 25.7.2 Preparation of Mix Design
  - 25.8 Casting of Specimens
    - 25.8.1 Specimens for Split Tensile Strength
    - 25.8.2 Specimens for Young's Modulus
    - 25.8.3 Testing of Specimens
  - 25.9 Material Used
    - 25.9.1 Cement
    - 25.9.2 Rice Husk Ash
    - 25.9.3 Aggregate
    - 25.9.4 Super Plasticizers
    - 25.9.5 Water

- 25.10 Production of Rice Husk Ash
- 25.11 Burning Process of Rice Husk
- 25.12 Mix Design
- 26. SULFATE RESISTANCE OF HIGH-PERFORMANCE CONCRETE
  - 26.1 Introduction
    - 26.1.1 Materials
    - 26.1.2 Mix Proportions
    - 26.1.3 Mixing and Casting
    - 26.1.4 Curing and Testing
  - 26.2 Compressive Strength Determination
  - 26.3 Resistance to Sulfate Attack
- 27. PRESTRESSED CONCRETE CEMENT POLES PRODUCTION METHOD
  - 27.1 Different Shapes of Prestressed Concrete Poles
  - 27.2 Advantages of Prestressed Concrete Poles
  - 27.3 Design Considerations of Prestressed Concrete Poles
  - 27.4 Manufacturing Methods of Prestressed Concrete Poles
    - 27.4.1 Centrifugal Casting Method
    - 27.4.2 Long Line Method
    - 27.4.3 Mensel's Method
  - 27.5 Manufacturing Process
    - 27.5.1 Forms and Moulds
    - 27.5.2 Aggregate (Coarse or Fine)
    - 27.5.3 Cement
    - 27.5.4 H.T. Wire
    - 27.5.5 Water
    - 27.5.6 Admixtures
    - 27.5.7 Reinforcement and Tensioning
    - 27.5.8 Designing, Mixing, Placing and Compacting Concrete
    - 27.5.9 Curing of Poles
    - 27.5.10 Detensioning and Cutting of Wires
    - 27.5.11 Curing of Poles in Vats, Handling and Stacking
    - 27.5.12 Sampling and Inspection
- 28. PRESTRESSED CONCRETE CYLINDER PIPE WITH ITS MANUFACTURING PROCESS
  - 28.1 Standard Pipe
    - 28.1.1 Bar-Wrapped Concrete Pressure Pipe
    - 28.1.2 Welded Steel Pipe
  - 28.2 Lined Cylinder Pipe (L-301) Features
  - 28.3 Advantages
  - 28.4 Embedded Cylinder Pipe (E-301) Features
  - 28.5 Advantages
  - 28.6 Manufacturing Process
  - 28.7 Bar-Wrapped Concrete Pressure Pipe
  - 28.8 Special Sections and Fittings
  - 28.9 Quality Assurance
- 29. HOW TO START CONCRETE PIPE MANUFACTURING BUSINESS
  - 29.1 Understand the Industry
    - 29.1.1 Industry Statistics that are Interesting
  - 29.2 Conduct Market Research and Feasibility Studies

- 29.2.1 Demographics and Psychographics
- 29.3 Decide What Niche to Concentrate On
- 29.3.1 The Industry's Level of Competition
- 29.4 Understand the Industry's Major Competitors
- 29.4.1 Economic Analysis
- 29.5 Decide Whether to Buy a Franchise or Start from Scratch
- 29.6 Know the Possible Threats and Challenges Will Face
- 29.7 Choose the Most Suitable Legal Entity (LLC, C Corp, S Corp)
- 29.8 Choose a Catchy Business Name from the Ideas Below
- 29.9 Consult with an Agent to Determine the Best Insurance Policies
- 29.10 Protect Intellectual Property with Trademark, Copyrights, Patents
- 29.11 Get the Necessary Professional Certification
- 29.12 Obtain the Legal Documents Required to Operate
- 29.13 Obtain the Required Startup Capital
- 29.14 Select an Appropriate Business Location
- 29.15 Hire Employees to Meet Technical and Manpower Requirements
- 29.15.1 The Service Delivery Process of the Business
- 29.16 Create a Marketing Plan that is Jam-Packed with Ideas and Strategies
- 29.17 Create a Set of Unbreakable Competitive Strategies to Help Win
- 29.18 Brainstorm Possible Ways to Retain Clients & Customers
- 29.19 Create a Corporate Identity and Develop Strategies to Increase Brand Awareness
- 29.20 Create a Suppliers/Distribution Network
- 30. PRESTRESSED CONCRETE BEAMS PRODUCTION PROCESS
- 30.1 Prestressed Concrete
- 30.2 Advantages
- 30.3 Levels of Prestressing
- 30.4 Materials for Making Prestressed Beams
- 30.4.1 Concrete, Steel, Grout
- 30.5 Prestressed Concrete Beams Production Process
- 30.6 Pre-Tensioning
- 30.6.1 Preparing the Mould
- 30.6.2 Placing of Reinforcement
- 30.6.3 Prestressing
- 30.6.4 Casting of Concrete
- 30.6.5 Removing the Mould
- 30.6.6 Storage
- 30.7 Post-Tensioning
- 30.7.1 Placing of Reinforcement and Duct
- 30.7.2 Prestressing
- 31. PRESTRESSED CONCRETE SLEEPER MANUFACTURING
- 31.1 What are the Characteristics of Prestressed Concrete?

31.2 What Materials Make up Prestressed Concrete?

31.3 Prestressed Concrete Sleepers Manufacturing

Process

31.3.1 Preparing Molds

31.3.2 Pre-Tensioning of Strands

31.3.3 Concreting

31.3.4 Steam Curing

31.3.5 Removing Molds

31.3.6 Wet Curing

31.3.7 Testing and Transportation

32. RCC (REINFORCED CEMENT CONCRETE) BEAM

32.1 Purpose of Beams

32.2 Purpose of Stirrups in the Beam

32.3 Types of Beam According to the Support Conditions

32.3.1 Simply Supported Beams

32.3.2 Continuous Beams

32.3.3 Fixed Beams

32.3.4 Cantilever Beams

32.3.5 Overhanging Beam

32.4 Types of Loads on Beams

32.4.1 Point Load or Concentrated Load

32.4.2 Distributed Load

32.4.3 Uniformly Distributed Load (UDL)

32.4.4 Uniformly Varying Load (UVL)

32.4.5 Couple Forces

32.5 Reinforcement in RCC Beam

32.5.1 Single Reinforcement

32.5.2 Double Reinforcement

32.5.3 Shear Force

32.5.4 Bending Moment

32.5.5 Deflection

32.6 The Manufacturing Process

33. PRECAST RCC WALL PRODUCTION

33.1 Materials

33.2 Basic Material Testing

33.2.1 Test on Cement

33.2.2 Test on M-Sand and Coarse Aggregate

33.3 Mix Proportions for One cum of Concrete (SSD Condition)

33.4 Test on Concrete

33.4.1 Compressive Strength Test

33.4.2 Slump Test

33.5 Manufacturing Process

34. TYPES OF ADMIXTURES AND ITS EFFECT ON CONCRETE

34.1 What Purposes do Admixtures Serve?

34.2 What is the Purpose of Admixtures in Concrete?

34.3 What is the Ideal Concrete Admixture?

34.4 Types of Concrete Admixtures

34.4.1 Water Reducing Admixtures

34.4.2 Retarding Admixtures

34.4.3 Accelerating Admixtures

34.4.4 Air Entraining Concrete Admixture

34.4.5 Pozzolanic Admixtures

- 34.4.6 Damp-Proofing Admixtures
- 34.4.7 Gas forming Admixtures
- 34.4.8 Air Detraining Admixtures
- 34.4.9 Alkali Aggregate Expansion Preventing Admixtures
- 34.4.10 Anti-washout Admixtures
- 34.4.11 Grouting Admixtures
- 34.4.12 Corrosion Preventing Admixtures
- 34.4.13 Bonding Admixtures
- 34.4.14 Fungicidal, Germicidal, Insecticidal Admixtures
- 34.4.15 Coloring Admixtures
- 34.5 Mechanism of Action of Chemical Admixtures
- 34.6 Admixtures and Concrete Rheology
- 34.7 Concrete Admixtures and Their Effect on Concrete Properties
  - 34.7.1 Air Entraining Admixtures
  - 34.7.2 Water Reducing
  - 34.7.3 Retarders
  - 34.7.4 Accelerators
  - 34.7.5 High Range Water Reducing Admixtures
- 34.8 Miscellaneous Admixtures
- 35. FLY ASH BRICKS MANUFACTURING PROCESS
  - 35.1 History
  - 35.2 Sources of Fly Ash
  - 35.3 Properties of Fly ash Bricks
  - 35.4 Environmental Advantages of Fly Ash Bricks
  - 35.5 Merit of Fly Ash Brick
  - 35.6 Raw Materials
  - 35.7 Manufacturing Process
- 36. HOW TO BEGIN FLY ASH BRICK MANUFACTURING BUSINESS
  - 36.1 Determine a Business Plan
  - 36.2 Required Space
  - 36.3 Abundance of Water
  - 36.4 Availability of Raw Material
  - 36.5 Required Machinery
  - 36.6 Worker Attainability
  - 36.7 Costing
  - 36.8 Analyze the Competitor
  - 36.9 Profitability
- 37. AAC BLOCKS (AUTOCLAVED AERATED CONCRETE BLOCKS) PRODUCTION-FLY ASH BASED
  - 37.1 History About ACC Blocks
  - 37.2 Benefits of AAC Blocks
  - 37.3 AAC Blocks Manufacturing
  - 37.4 Ingredients of AAC Blocks
  - 37.5 Process
    - 37.5.1 Raw Material Preparation
    - 37.5.2 Dosing and Mixing
    - 37.5.3 Moulding, Rising and Pre-Curing
    - 37.5.4 De-Moulding and Wire Cutting
    - 37.5.5 Autoclaving of AAC blocks
- 38. MOSAIC FLOORING TILES PRODUCTION PROCESS
  - 38.1 History of Mosaic Art

- 38.2 How to Make Mosaic Art
- 38.3 Purpose of Mosaic Floor Tiles
- 38.4 Construction of Mosaic Flooring
- 38.5 Advantages of Mosaic Floor Tiles
- 38.6 Disadvantages of Mosaic Tiles
- 38.7 Types of Mosaic Floor Tiles
  - 38.7.1 Chevron Mosaic Tile
  - 38.7.2 Penny Hexagonal Tile
  - 38.7.3 Hexagon Mosaic Tile
  - 38.7.4 Octagonal Mosaic Tiles
  - 38.7.5 Herringbone Floor Tiles
  - 38.7.6 Glass Mosaics
  - 38.7.7 Metal Mosaics
  - 38.7.8 Natural Pebble (Stone) Mosaics
  - 38.7.9 Natural Wood Mosaics
  - 38.7.10 Marble Mosaic Tile
  - 38.7.11 Porcelain Mosaic Tile
- 38.8 There are Three Method
  - 38.8.1 Direct Method
  - 38.8.2 Indirect Method
- 38.9 Manufacture of Mosaic Tiles
  - 38.9.1 Preparation of Clay
  - 38.9.2 Moulding
  - 38.9.3 Drying
  - 38.9.4 Burning
  - 38.9.5 Pollution Control
  - 38.9.6 Energy Conservation
- 39. HOW TO PRODUCE WALL PUTTY
  - 39.1 Types of Wall Putty
    - 39.1.1 Cement Wall Putty
    - 39.1.2 Acrylic Wall Putty
  - 39.2 Is Plaster the Same as Wall Putty?
  - 39.3 What does Wall Putty do in Building?
  - 39.4 Benefits of Using Wall Putty
    - 39.4.1 Repairing Cracks and Damages on Walls
    - 39.4.2 Providing a Base for New Paint
    - 39.4.3 Improving Insulation
    - 39.4.4 Easy to Use and Apply
    - 39.4.5 Quick-Drying Time
    - 39.4.6 Resistant to Moisture
    - 39.4.7 Wall Putty doesn't Flake or Get Easily Damaged
  - 39.5 Chemical Composition
  - 39.6 Applications
    - 39.6.1 Use in Construction
    - 39.6.2 Polyester Based Putty
    - 39.6.3 Plumber's Putty
    - 39.6.4 Other Uses
  - 39.7 Wall Putty vs. White Cement
  - 39.8 Wall Putty vs. POP
  - 39.9 Raw Material
  - 39.10 Putty Manufacturing Process
    - 39.10.1 Raw Material Unloading & Storage
    - 39.10.2 Weighing/Batching of the Ingredients

- 39.10.3 Conveying of Raw Material to Charge Hoppers
- 39.10.4 Blending & Mixing
- 39.11 Main Components of the Wall Putty Making Machine
  - 39.11.1 Raw Material Storage Equipment
  - 39.11.2 Dosing Device
  - 39.11.3 Mixer
  - 39.11.4 Packaging Machine
  - 39.11.5 Dust Collector
  - 39.11.6 Conveying and Lifting Equipment
- 40. READY MIX CONCRETE
  - 40.1 Merits of R.M.C.
  - 40.2 Scope of Ready Mix Concrete
  - 40.3 Materials Required For Ready Mix Concrete
  - 40.4 Mixing Process
    - 40.4.1 Transit Mixed (or “Truck-Mixed”) Concrete
    - 40.4.2 Shrink Mixed Concrete
    - 40.4.3 Central Mixed Concrete
  - 40.5 Slurry Mixing
  - 40.6 Equipment Required In Ready Mixed Concrete
    - 40.6.1 Batching
    - 40.6.2 Inline Bins
    - 40.6.3 Silos
  - 40.7 Tests Carried on R.M.C
  - 40.8 Ready Mix Concrete Quality Testing Methods
    - 40.8.1 Concrete Slump Tests
    - 40.8.2 Air Content Testing
    - 40.8.3 Unit Weight
    - 40.8.4 On-Field Testing of Existing Concrete
    - 40.8.5 Schmidt Rebound Hammer
    - 40.8.6 Destructive Concrete Testing
    - 40.8.7 Comprehensive Strength Laboratory Test
- 41. HOW TO MAKE MANUFACTURED SAND
  - 41.1 M Sand Types
  - 41.2 Why is Manufactured Sand Significant Today?
  - 41.4 The Factors that Promote the Development of Artificial Sand
    - 41.4.1 Natural Sand Depletion
    - 41.4.2 The Need for Energy Saving and Environmental Protection
    - 41.4.3 The Need for the Development of High-Performance Concrete Technology
  - 41.5 Advantages of Manufactured Sand
  - 41.6 Manufactured Sand Production Process
  - 41.7 Coarse and Fine Crushing
    - 41.7.1 Primary Crushing
    - 41.7.2 Jaw Crusher
    - 41.7.3 Secondary Crushing
  - 41.8 Impact Crusher
  - 41.9 Cone Crusher
  - 41.10 Sand Making and Screening
  - 41.11 Sand Washing and Recycling
- 42. ISO STANDARDS

43. INDIAN STANDARD CODES

44. BIS STANDARDS

45. PLANT LAYOUT AND PROCESS FLOW CHART & DIAGRAM

46. PHOTOGRAPHS OF PLANT AND MACHINERY WITH SUPPLIERS

CONTACT DETAILS

- Automatic Block Making Machine
- Hydraulic Interlocking Block Machine
- Rotary Kiln
- Rotary Cooler
- Cement Clinker Ball Mill
- Weigh Feeder
- Cone Crusher
- Jaw Crushers
- Sand Rotary Dryer
- Psc Pole Mold Making Machine
- Vibratory Feeder
- Fly Ash Brick Making Machines
- Prestressed Electric Pole Mould
- Prestressed Concrete Pipe Mould
- Cement Packing Machine
- Clinker Granulator
- Concrete Sleeper Steel Moulds
- Rotary Cooler
- Steel Silo
- Bucket Elevator
- Belt Conveyors
- Roof Tile Forming Machine
- Artificial Sand Making Machine
- Paver Block Making Machine
- Concrete Testing Machines
- Wall Putty Making Machine
- Prestressed Concrete Hollow Core Slab Machine

## About NIIR

**NIIR PROJECT CONSULTANCY SERVICES (NPCS)** is a reliable name in the industrial world for offering integrated technical consultancy services. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-up Ideas, Business Ideas for Entrepreneurs, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes various process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by



manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.

---

**NIIR PROJECT CONSULTANCY SERVICES** , 106-E, Kamla Nagar, New Delhi-110007, India. **Email:** [npcs.india@gmail.com](mailto:npcs.india@gmail.com) **Website:** [NIIR.org](http://NIIR.org)

Wed, 01 May 2024 12:56:59 +0530