

Estimation and Contract management



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COURSE OBJECTIVES

- The objective of this course is to make students to learn:
- Estimate the quantities of work, develop the bill of quantities and arrive at the Cost of civil engineering Project
- Understand and apply the concept of Valuation for Properties
- Understand, Apply and Create the Tender and Contract document



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SYLLABUS

MODULE 1: Quantity Estimation for Building: study of various drawing attached with estimates, important terms, units of measurements, abstract, Types of estimates. Estimation of building by Short wall and long wall method - centre line method. Estimate of R.C.C structures including Slab, beam, column, footings

MODULE 2:

Estimate of Steel truss, manhole and septic tanks and slab culvert. Quantity Estimation for Roads: Computation of volume of earthwork fully in banking, cutting, partly cutting and partly Filling by mid-section, trapezoidal and Prismoidal Methods



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MODULE 3: Specification for Civil Engineering Works: Objective of writing specifications essentials in specifications, general and detail specifications of different items of works in buildings and roads. Analysis of Rates : Factors Affecting Cost of Civil Works , Concept of Direct Cost , Indirect Cost and Project Cost Rate analysis and preparation of bills, Data analysis of rates for various items of Works, Sub-structure components, Rate analysis for R.C.C. slabs, columns and beams

MODULE 4: Contract Management-Tender and its Process: Invitation to tender, Prequalification, administrative approval & Technical sanction. Bid submission and Evaluation process. Contract Formulation: Letter of intent, Award of contract, letter of acceptance and notice to proceed. Features / elements of standard Tender document (source: PWD / CPWD / International Competitive Bidding – NHAI / NHEPC / NPC). Law of Contract as per Indian Contract act 1872, Types of Contract,



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Module-3



- **MODULE5:**Contract Management-Post award :Basic understanding on definitions, Performance security, Mobilization and equipment advances, Secured Advance, Suspension of work, Time limit for completion, Liquidated damages and bonus, measurement and payment, additions and alterations or variations and deviations, breach of contract, Escalation, settlement of account or final payment, claims, Delay's and Compensation, Disputes & its resolution mechanism, Contract management and administration. Valuation: Definitions of terms used in valuation process, Purpose of valuation, Cost, Estimate, Value and its relationship, Capitalized value. Freehold and lease hold and easement, Sinking fund, depreciation—methods of estimating depreciation, Outgoings, Process and methods of valuation: Rent fixation, valuation for mortgage, valuation of lan:



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SPECIFICATION & RATE ANALYSIS

A Visual Framework for Estimation and Costing



THE GOLDEN TRIANGLE of Estimation

QUALITY
(Specifications)

What are we building and
to what standard?

PROJECT COST

(Area = Total Project Value)

VOLUME

(Quantity Take-Off)

How many units are we
building?

COST

(Rate Analysis)

How much does one unit
of this standard cost?



Part 1: The Blueprint (Specifications)

Definition

Detailed descriptions outlining the **materials**, **workmanship**, and **methodologies** required to execute civil engineering works.

Core Objectives



Quality control
& uniformity



Dispute
avoidance



Legal basis
for contracts

Essentials of Good Specifications

Clear, accurate,
and complete

Standardized
terminology

References
relevant IS codes



The Resolution Matrix: Macro vs. Micro

	General Specifications	Detailed Specifications
Scope	Broad description of entire project.	Micro-level requirements for individual items.
Content Focus	Basic materials and general workmanship.	Exact material quality, exact construction procedures.
Commercial Role	Used for preliminary estimating.	Dictates measurement methods and payment terms.
Legal Weight	Secondary reference.	Primary binding document in contract disputes.



Earthwork

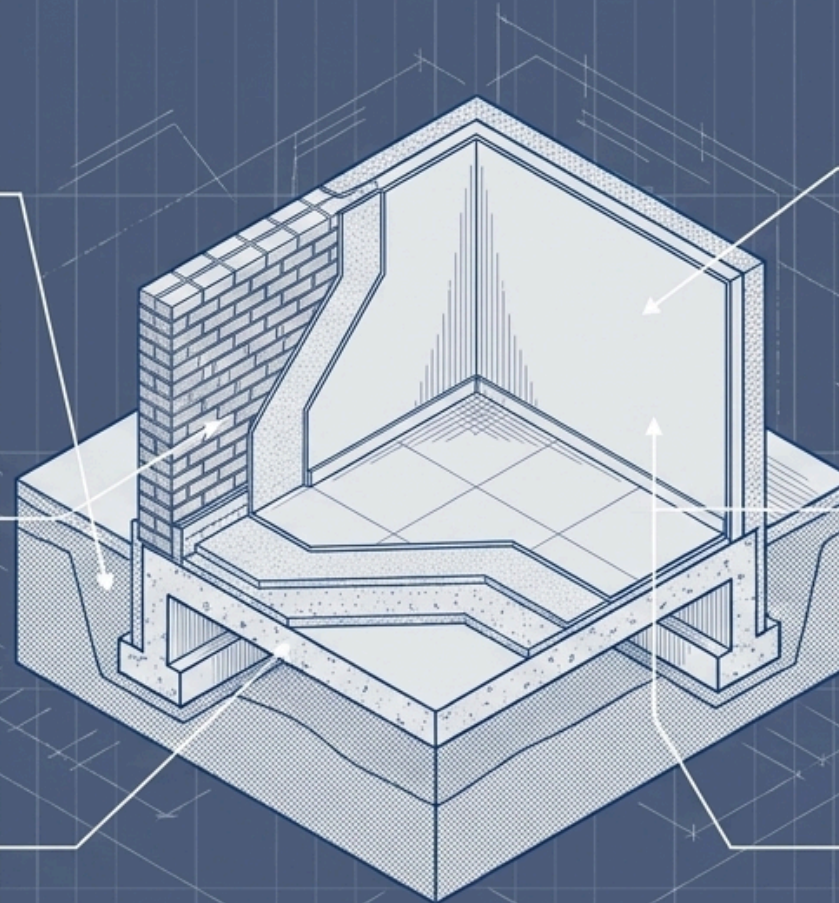
Excavation depth,
backfilling, compaction
specs

Brick Masonry

Brick class, mortar
ratio, bond type

Concrete

Grade, mixing ratios,
curing time, formwork
tolerances



Plastering

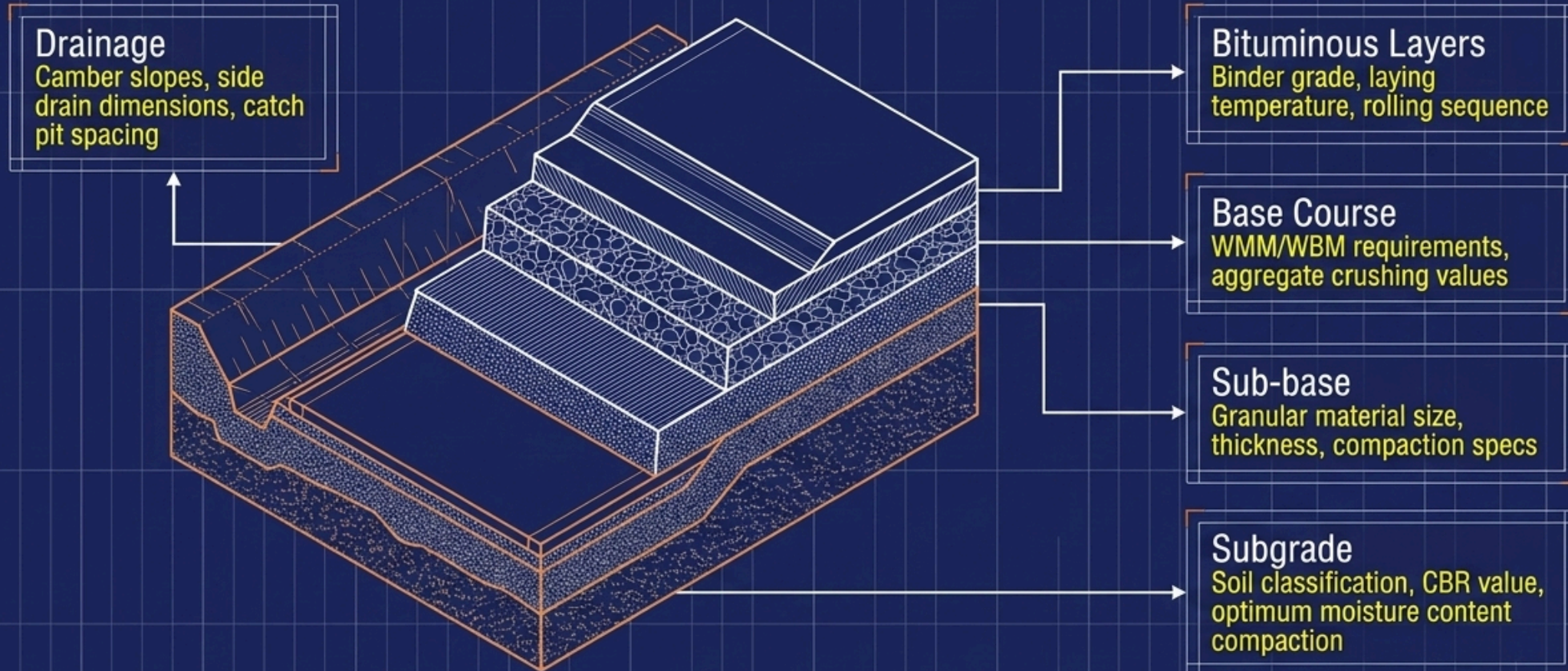
Thickness, number of
coats, finish texture

Flooring

Base preparation,
tile/stone quality, jointing

Painting

Primer requirements,
paint type,
weatherproofing



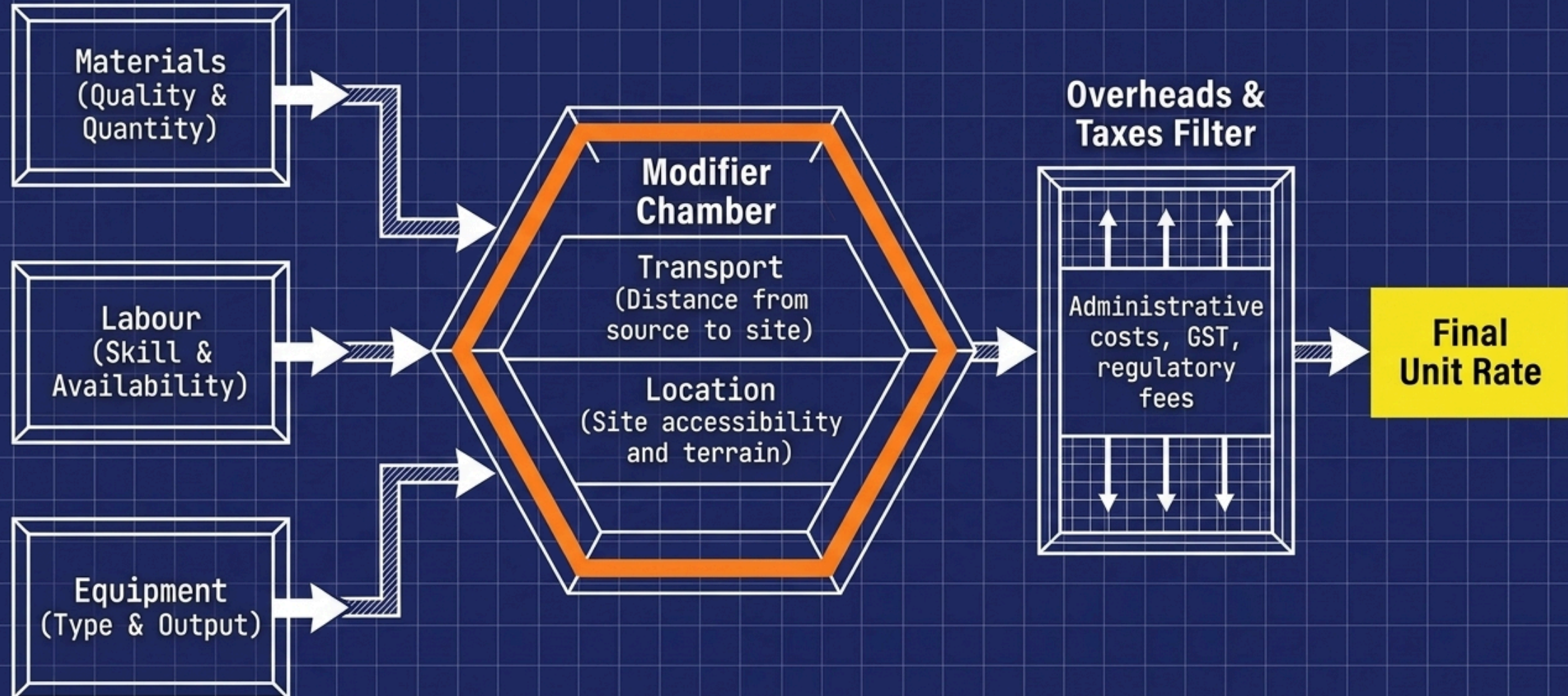


Definition

The systematic process of determining the cost per unit of a specific civil engineering item based on its exact detailed specifications.

Purpose

- 1 Cost Estimation: Predicting project budgets accurately.
- 2 Tender Preparation: Bidding competitively while ensuring profitability.
- 3 Feasibility: Assessing alternative





Direct Cost

Costs traceably and exclusively linked to a specific unit of work.

Includes:

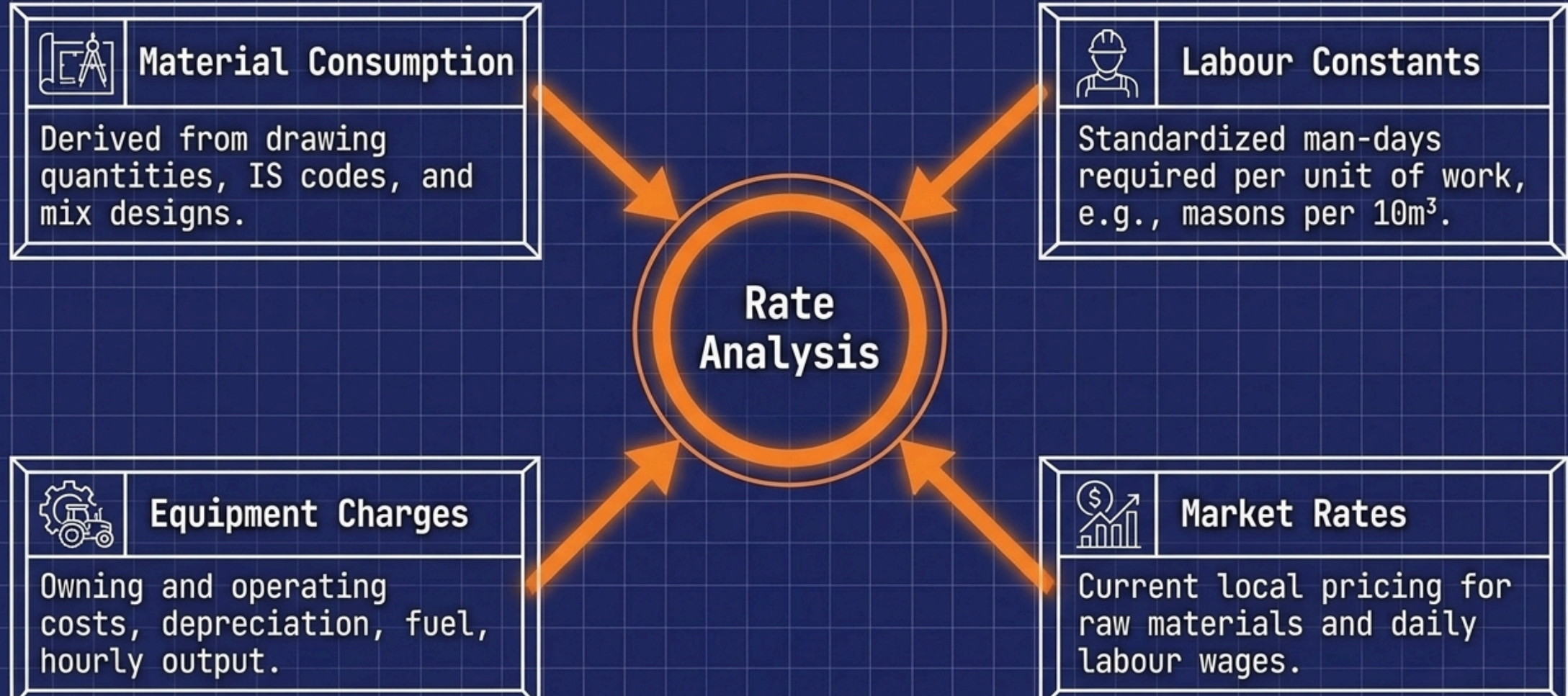
Raw materials, on-site daily wage labour, specific machinery rentals for that task.

Indirect Cost

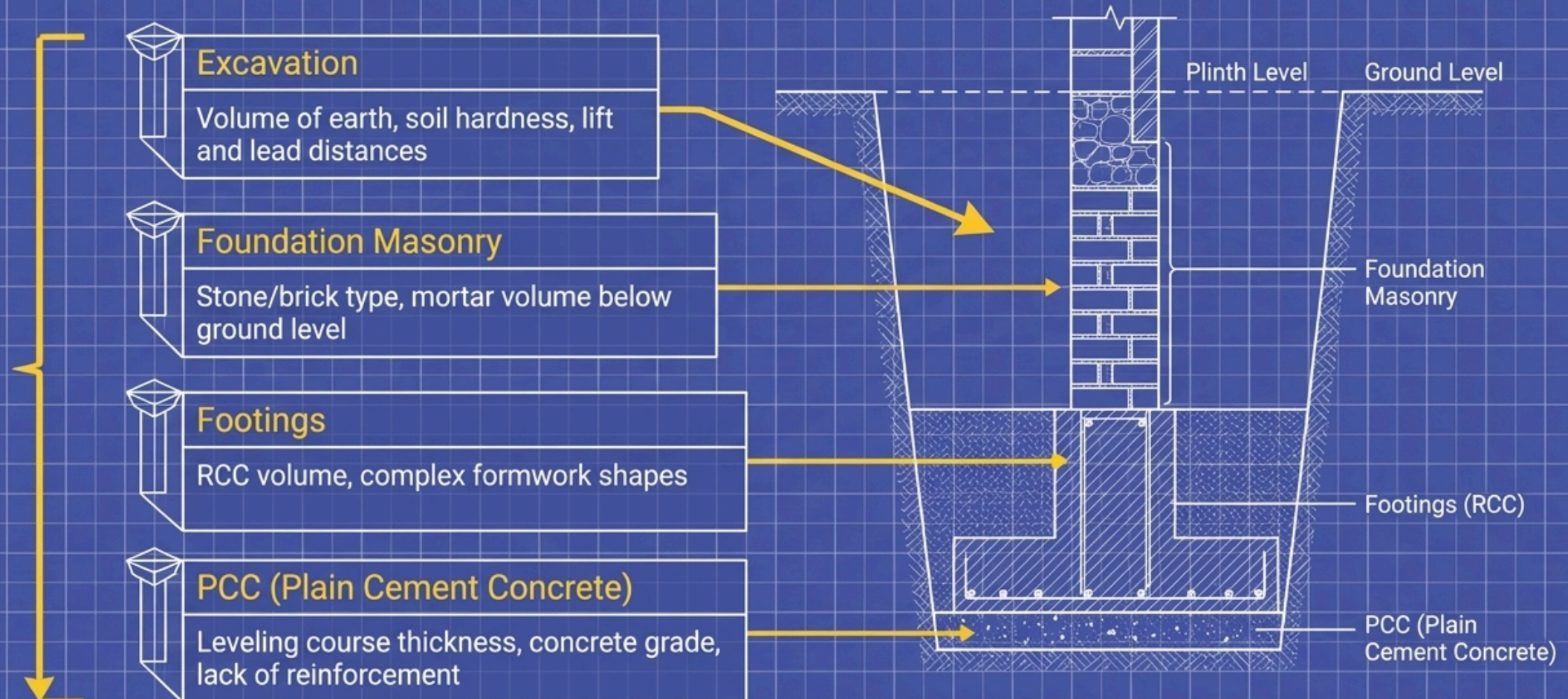
Costs shared across the entire project that cannot be assigned to a single item.

Includes:

Site office overheads, managerial salaries, profit margins, general contingencies.



Rate Analysis: Substructure Sequence



RCC Slab, Beam & Column

Tag 1

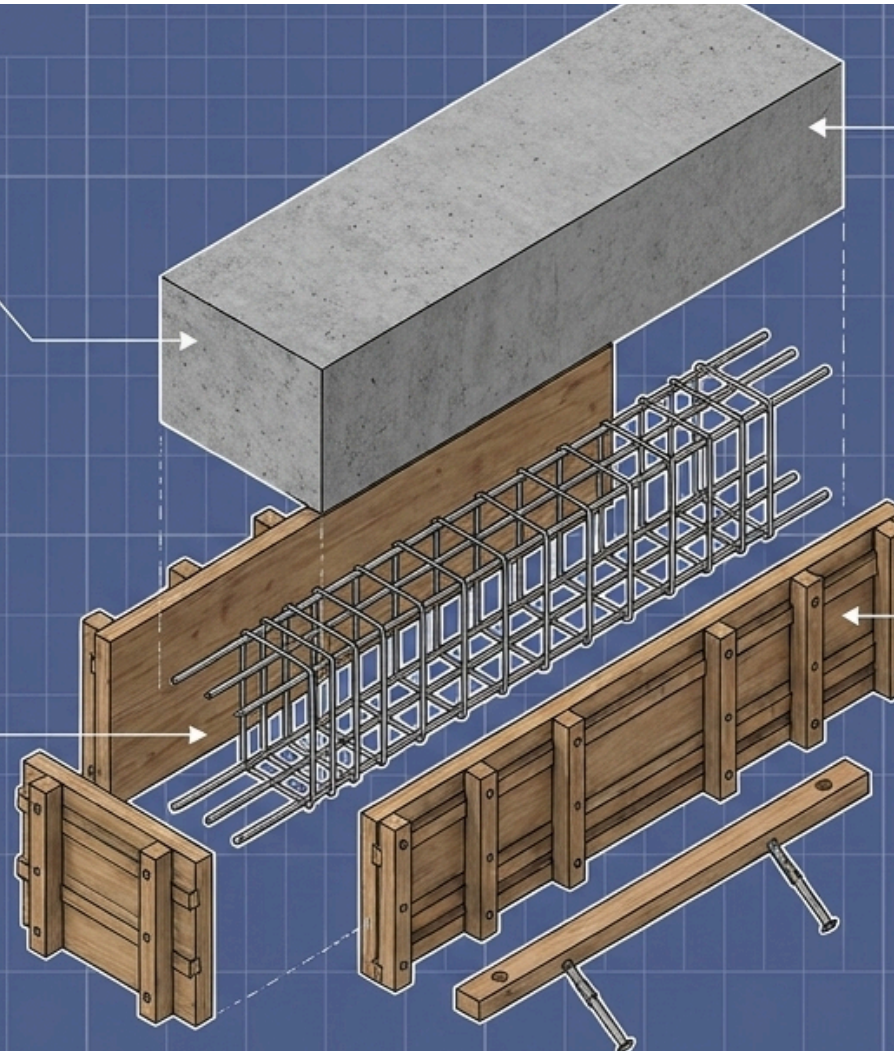
Concrete Quantity

Material cost of **cement**,
sand, aggregate +
Labour for
pouring/vibrating.

Tag 2

Steel Quantity

Material cost of **rebar** +
Labour for cutting,
bending, binding.



Tag 4

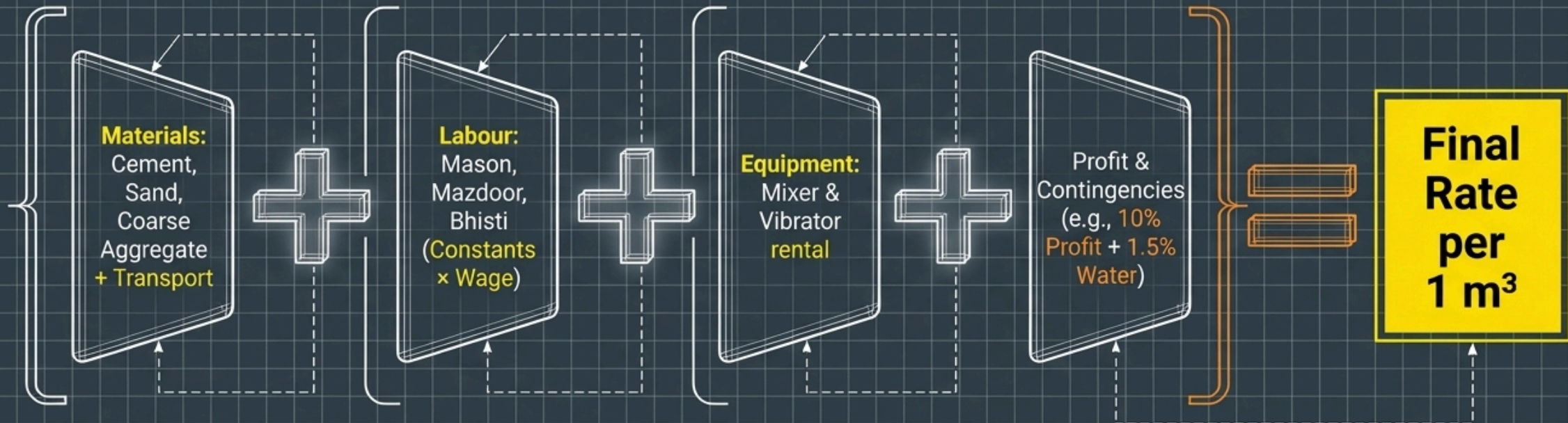
Finishing

Labour for troweling
and curing.

Tag 3

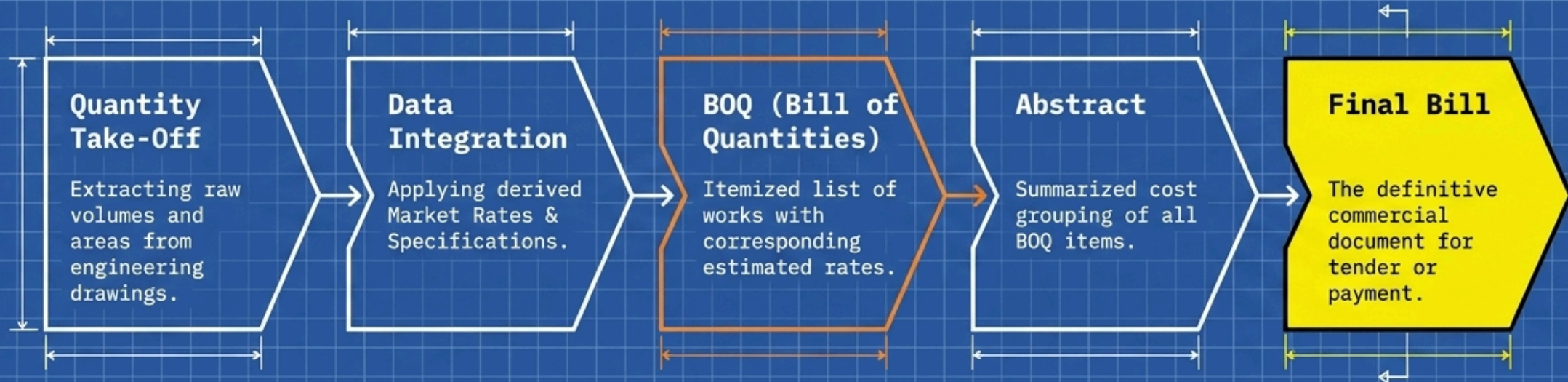
Formwork/Shuttering

Material cost of
timber/plywood +
Labour for erection,
oiling, and
stripping.





Preparation of Bills





Core Contrasts to Master

General vs.
Detailed Specs

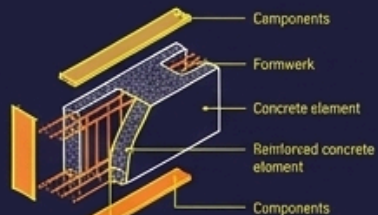
Direct vs.
Indirect Costs

Key Variables to Define

Factors affecting cost (Materials, Transport, Location, Overheads).

Analyses to Practice

Exploded breakdown of RCC
(Concrete + Steel + Formwork).



Substructure step-down rates.



The Golden Rule

Total Cost is the unyielding product of **Quality (Specs)**, **Unit Price (Rates)**, and **Volume (Take-off)**.

Change one, change all.