Thumb Rules Formula for Civil Engineers & Quantity Surveyors

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Thumb Rules Formula for Civil Engineers & Quantity Surveyors | Thumb Rules for Civil Engineering

In this Article today we will talk about the **Thumb Rules Formula for Civil Engineers & Quantity Surveyors** | **Thumb Rules for Civil Site Engineers pdf** | **Thumb Rules for Civil Engineering** | **Thumb Rules for Steel in RCC** | **Thumb Rule for Brick Calculation** | **Thumb Rule for Concrete Mix Design** | **Thumb Rule for Shuttering Work**

Thumb Rules For Civil Site Engineer pdf

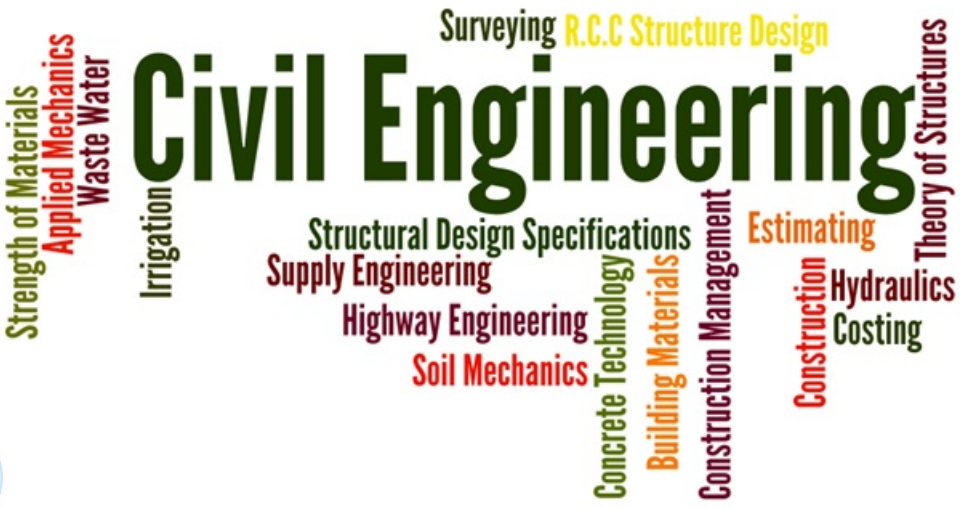
Thumb Rules For Civil Engineering is essential for any **civil engineer,** Site engineer, or civil supervisor. They play a crucial role while taking quick decisions on site. There is some **Civil Engineering Basic Knowledge** that every civil engineer must know.

Thumb Rule of Civil Engineering or the thumb rule for construction helps you in finding out the solution using a simple **mathematical formula** and make smart decisions whenever needed.

But, while using these **thumb rules**, you must remember that the thumb rule never gives the exact or accurate results, you just have used them for **approximate results**.

There is a number of **Thumb Rule For Civil Engineers** that we used in **construction work**. So, the following are some most frequently used Thumb rules on the **Construction site**.

The Thumb rule method is an **approximate** & **comparing method.** In thumb rules and the **units** are not the same when we compare to get the results. So, ignore **units** while performing the **thumb rule**. **Thumb Rules for Steel in RCC**



Thumb Rules for Civil Engineering | Thumb Rules Formulas

Thumb Rules for Civil Engineering In Construction

Following are thumb rules in **Civil Engineering**,

1. Thumb Rule for Concrete Volume

The **volume of concrete** required = **0.038 m3/square feet** area

Example:-If Plan Area = 40 x 20 = **800 Sq. m**.

So, for the plan area of **800 Sq. m.** the area the total volume of **concrete** required

= 800 x 0.038m3 = **30.4m3** Thumb Rules for Steel in RCC

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2. Thumb Rule for Steel Quantity for Slab, Beams, Footings & Columns

Following are some important **thumb rules** for **steel calculation** for slab, beam, column, and footings.

Steel required in **residential buildings** **= 4.5 Kgs – 4.75 Kgs / sq. Ft.**

Steel required For **Commercial** buildings **= 5.0 Kgs-5.50 Kgs/Sq. Ft.**

You can also use **BN Datta** recommendations for the more accurate result,

The following recommendations **Thumb Rules For Civil Engineering are given in B N Datta** for the Steel quantity used in different members of the building. **Thumb Rules for Steel in RCC**

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3. Percentage of Steel in Structural Members

Following are thumb rules for **reinforcement** **in** **concrete** members,

1. **Slab** – **1%** of the total volume of concrete (**Slab steel calculation** thumb rule)
2. **Beam** – **2%** of the total volume of concrete
3. **Column** – **2.5%** of total volume of concrete
4. **Footings** – **0.8%** of the total volume of concrete

Example:

How to calculate the **steel quantity** of slab having the Length, width, and depth of the slab is **5m x 4m x 0.15m**

Step 1: Calculate the Volume of Concrete:

The Total Volume of **Concrete** for given Slab = **5 x 4 x 0.15**

= **$3m^3$**

Step 2: Calculate The Steel Quantity Using Formula:

As per the guidelines are given in the **BN Dutta** reference book the **steel quantity** of slab is **1%** of the **total volume** of concrete utilized.

b rule to estimate Steel quantity of above slab = **Volume of Concrete x Density of Steel x % of Steel of Member**

Steel weight required for above slab = 3 x 7850 x 0.01 = **235 Kgs**

For accurate **estimation**, you can refer to **Bar Bending Schedule**

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4. Thumb Rules For Shuttering Work

Shuttering costs are taken as **15-18%** of the **total construction** of the building. **Shuttering work** is done to bring the concrete in Shape. The Thumb rule to estimate the **shuttering** required is **6 times** the quantity of concrete or 2.4 times of the **Plinth area.** **Thumb Rules for Steel in RCC**

For example, the **concrete** quantity is $0.5m^3$, then

Area of **Shuttering** is 0.5 x 6 = $3m^2$

Components of Shuttering

The Shuttering plate **Ply, Battens, Nails** are components of Shuttering.

Shuttering Ply Quantity estimation

Suppose, The **Shuttering Ply** has a length, width & depth of 2.44 x 1.22 x 0.012

The No. of Shuttering **Ply Sheets = 0.22** times of Shuttering

Suppose, the **Shuttering Area** = 3m

Then Ply required for shuttering = 0.22 x 3 = **$0.66m^2$**

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5. Battens Quantity Calculation

Shuttering Batten usually has a **length** & **width** of 75mm x 40mm.

Batten Quantity = 19.82 x No. of Ply Sheets

If work requires **25 Ply sheets,** the total quantity of Battens are 19.82 x 25 = **495** Battens

Nails & Binding Wire Quantity in Shuttering:

Approximately,

75 grams of **Nails** were used in the shuttering of the **$1m^2$ area.**

75gms of **Binding wire** is used for every $1m^2$ of Shuttering.

Thumb rule for Shuttering oil estimation :

Shuttering oil is applied on the **shuttering plate** surface used to **de-frame** or **de-assemble** from the concrete easily.

Total required Shuttering oil = 0.065 x Total Area of Shuttering

(or)

For every **15m^2** of shuttering **1 liter** of **shuttering oil** is consumed.

Example :

If, total area of shuttering is 15 m2, then Shuttering **oil Consumption** = 0.065 x 15 = **0.975.** **Thumb Rule for Brick Calculation**

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6. Thumb Rule for Cement, Sand, Coarse Aggregate Quantity Calculations

Note: 1 bag of cement = 50Kgs

Thumb rule for Cement required in **Brickwork**, **Cement Masonry** & **Plastering** work in construction.

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7. Thumb Rule for Concrete Mix Designs

FOR ADDING 4 LITERS OF WATER IN 1 CU.M FRESHLY MIXED CONCRETE

1. The slump value will be increased by 25 mm.
2. The compressive strength of concrete will be decreased by 1.5 to 2.0 N/mm2
3. The shrinkage potential will be increased by 10%.
4. 1/4 bag of cement will be wasted.

IF THE TEMPERATURE OF FRESHLY MIXED CONCRETE IS INCREASED BY 1%, THEN

1. 4 liters of water per cu.m will give equal slump.
2. The air content will be decreased by 1%.
3. The compressive strength of concrete will be decreased by 1.0 to 1.5 N/mm2.

IF THE AIR CONTENT OF FRESHLY MIXED CONCRETE IS

1. creased by 1% then the compressive strength will be decreased by 5 %.
2. creased by 1%, the yield will be decreased by 0.03 cu.m per 1 cu.m.

3. Decreased by 1%, then the slump value will be decreased by about 12.5 mm.
4. Decreased by 1%, then the durability of the concrete will be reduced by 10%. **Thumb Rule for Brick Calculation**

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8. Basic Thumb Rules Used in Building Construction

1. Minimize floor-to-floor height:

By minimizing the floor-to-floor height, the cost associated with mechanical services, stairs, exterior building cladding can be significantly reduced. **Thumb Rule for Brick Calculation**

2. Use repetitive formwork

The cost of formwork may be very high and is not given due consideration by the designers. The cost can be reduced when the framing system is used repetitively (10 or more times) on a structure. **Thumb Rule for Shuttering Work**

3. Use standard column size

This can be achieved by varying the amount of reinforcing steel and the concrete strength within the column. This will allow for a single column form and will minimize the number of variations to meet beam or slab forms. **Thumb Rule for Shuttering Work**

4. Adopt uniform column layout

Uniform column layout results in simple formwork, which can be used repetitively from floor-to-floor. Similarly, regular-shaped buildings will be more economical than irregularly shaped buildings with L- or T-shaped columns.

5. As far as possible, use the same depth for beams

The saving in formwork and shoring costs will exceed any additional costs for concrete and reinforcing steel. This will also provide a uniform ceiling elevation and minimize mechanical service installation difficulties.

e high strength concrete in columns

The high strength may reduce the column size or the amount of reinforcing steel required for the column. **Thumb Rule for Shuttering Work**

7. Use high early strength concrete

This will allow for earlier form stripping and will reduce total construction time.

8. Specify self-consolidating concrete

Heavily reinforced columns and beams can be very congested with rebar, which prevents the proper placement of the concrete. SSC maximizes concrete flowability without harmful segregation and dramatically minimize honeycombing and air pockets.

9. Specify locally available materials

The use of local aggregates and recycled materials in concrete makes it a 'green' product, which is requested by environmentally responsible owners.

10. Use the commonly available size of bars and spirals

For a single structural member, the number of different sizes of bars should be kept to a minimum.

11. Use the largest bar size that satisfies the design considerations

Use larger size bars in columns and smaller size bars in slabs. Larger diameter bars reduce the number of bars that must be placed and minimize installation costs.

12. Eliminate bent bars where possible

Bent bars increase fabrication costs and require greater storage area and sorting time on the job site. **Thumb Rule for Concrete Mix Design**

13. Avoid the congestion of steel

Congestion of bars should be avoided, especially at beam-column joints, so that all reinforcements can be properly placed. **Thumb Rule for Brick Calculation**

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9. Thumb Rules For Civil Engineers for Brickwork or Brick Calculation

following are **Thumb Rules for civil engineering** for brickwork and **cement quantity** calculations.

Brickwork for 1m^3	**Cement Qty in m^3**	**Cement Qty in Bags**
230 mm Brickwork	0.876m^3	25.4 Bags
115 mm Brickwork	0.218m^3	6.32 Bags

Thumb Rules for Civil Engineering

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10. Thumb Rules For Cement Masonry Quantity

Cement Masonry Type & Mix	Cement Qty in Bags	Cement Qty in Kgs
200mm in Cement Masonry work of Ratio 1:6	0.124Bags/m^2	6.2Kgs/m^2
150mm in Cement Masonry work of Ratio 1:6	0.093Bags/m^2	4.65Kgs/m^2
200mm in Cement Masonry work of Ratio 1:4	0.206Bags/m^2	10.3Kgs/m^2
150mm in Cement Masonry work of Ratio 1:4	0.144Bags/m^2	7.2Kgs/m^2
100mm in Cement Masonry work of Ratio 1:4	0.103Bags/m^2	5.15Kgs/m^2

Thumb Rules for Civil Engineering Thumb Rule for Concrete Mix Design

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11. Thumb Rules Plastering Quantity

Type of Plastering	Cement Qty in Bags	Cement Qty in Kgs
Rough Plastering	0.09 Bags/m^2	4. 5Kgs/m^2
Internal Wall Plastering	0.09 Bags/m^2	4.5 Kgs/m^2
Duct Plastering	0.09 Bags/m^2	4.5 Kgs/m^2
External Wall plastering	0.175 Bags/m^2	8.75 Kgs/m^2
Stucco Plastering	0.175 Bags/m^2	8.75 Kgs/m^2
Lathen Plastering	0.55 Bags/m^2	27.5 Kgs/m^2

Thumb Rules for civil engineering

12. Types of Area and Some Useful Requirements for Building:

1. Carpet area:

The actual area you use. The area on which '**you can put a carpet**'.

2. Built up area:

Carpet area + **area of walls and ducts**. Around 10% more than the carpet area. A terrace is considered as half the actual area for calculating built up area. Some projects charge dry terrace same as internal rooms.

uper built up / Saleable area:

Built up area + **markup for common spaces** like lifts and stairs. Usually 25% more than the built up area.

FAQs

What is Thumb Rule?

The **rule of thumb** is colloquially referred to as a thumb rule. A **Thumb Rule** is a guideline which provides concise advice on a given subject. It is a general concept that offers specific guidance for executing or approaching a given task. Thumb rules usually evolve as a result of practice and experience rather than a theoretical study.

How do you calculate the steel by thumb rule?

Following are Thumb Rule for reinforcement steel in concrete members,

1. Slab – 1% of the total volume of concrete (Slab steel calculation thumb rule)
2. Beam – 2% of the total volume of concrete **Thumb Rule for Shuttering Work**
3. Column – 2.5% of the total volume of concrete
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What is a Good Rule of Thumb?

Thumb Rule can be called a guideline, idea, or principle that helps you make quick decisions. **"Arrive early"** is an efficient good Thumb Rule for most appointments. It referred to builders who frequently use their thumb to estimate measurements. It is a helpful rule even being inexact. **Thumb Rule for Shuttering Work**

What is the Basic Knowledge of Civil Engineering?

BASIC THINGS CIVIL ENGINEERS SHOULD KNOW,

1. Lapping in reinforcement is not allowed for the bars having diameters more than 36 mm.
2. Steel Char maximum spacing is 1.00 m (or) 1 No per 1m2.
3. In steel dowels, a rod minimum of 12 mm diameter should be used.
4. Steel Chairs minimum of 12 mm diameter bars to be used.
5. Longitudinal reinforcement should not be less than 0.8% and more than 6% of gross C/S.

6. The minimum bars used for a square column are 4 No's and 6 No's for the circular column. **Thumb Rules for Steel in RCC**

What is the Thumb Rule to determine Beam Depth?

The method for determining the width-depth ratio of reinforced concrete beams is not specifically given in codes. However, a thumb rule can be used i.e taking depth that is two and a half to three times the beam's width. For long-span beams, it is generally economical to use deep and narrow sections. **Thumb Rule for Concrete Mix Design**

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Thumb Rules for Civil Engineering

Thumb rule requirement of standard materials and standard calculation in high raised building,

- Steel =3 to 5 kg / sqft.
- Cement =0.5bags/ sqft.
- RMC =0.05 m3/sqft.
- Block =12.5 nos /sqm.
- Electrical cast = Rs 133/sqft. **Thumb Rule for Brick Calculation**
- Plumbing cost = Rs 126/sqft.
- Fire fighting cost = Rs 40/sqft.
- External development = Rs 94.5/sqft. **Thumb Rule for Concrete Mix Design**

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Conclusion:

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Engr Waseem Raja

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