

Pricing of Construction Items

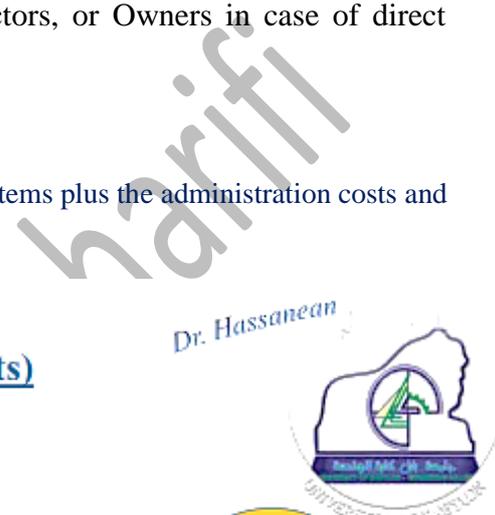
What is difference between item cost and the item price (or tendering price) of construction project?

A “**Price**” for a construction item refers to the amount of money needed to providing from the owner to build any item of project by construction company, contractor, or subcontractors.

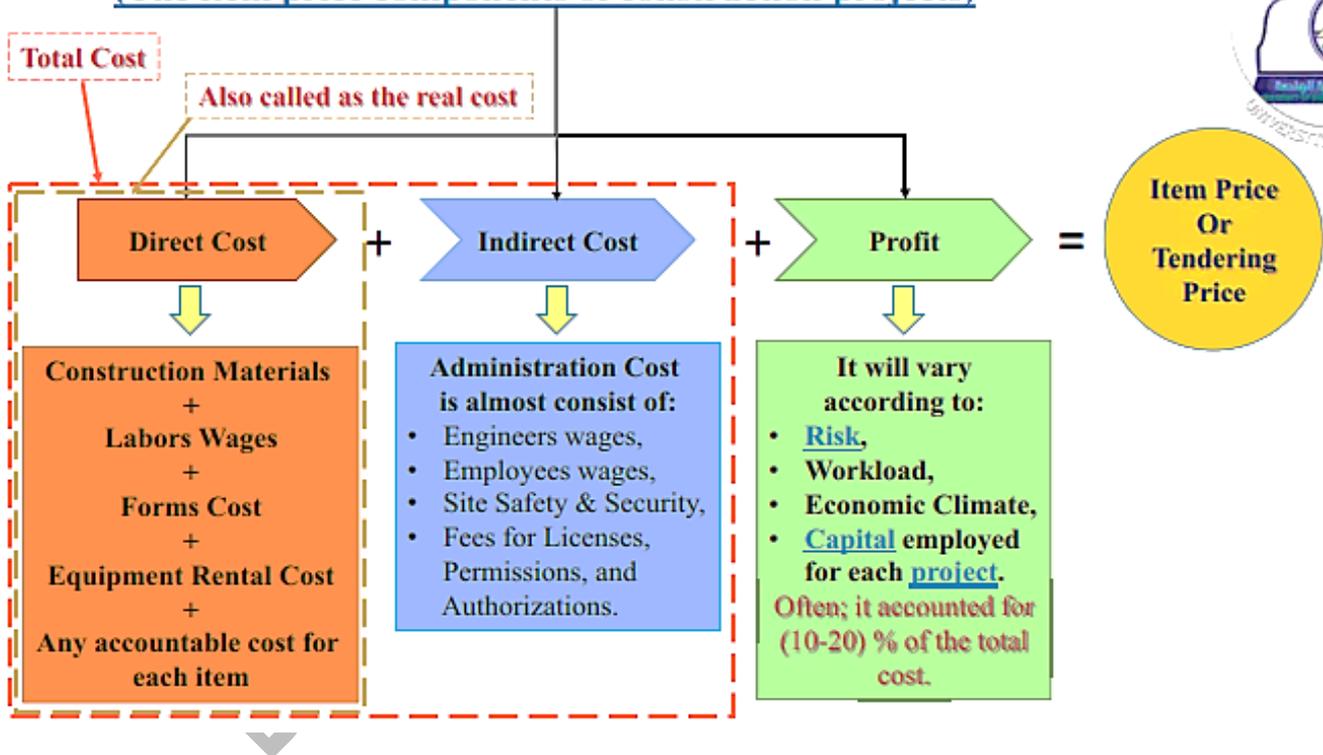
Whereas, A “**Cost**” for a construction item refers to the amount of money spent to execute any item of project by construction company, contractor, and subcontractors, or Owners in case of direct execution.

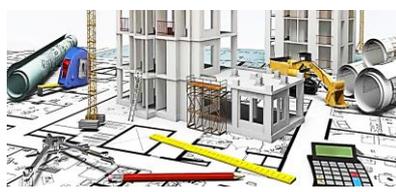
What is the pricing of items?

It is the estimated value that consist of the real cost of the construction items plus the administration costs and profit.



(The item price components of construction projects)





Case Study No. 17-1: Could you provide an acceptable price offer for a tender based on a one cubic meter of the masonry brickworks with cement mortar of the wall item above Padlo layer (i.e., D.P.C), which is the administration cost and profit for this offer represent **10% and 15%**, respectively of the total cost. The following information is useful for making estimating values: Price of supplying masonry bricks is 1×10^6 IQD per 4000 Brick, Price of supplying 1 cubic meter of sand is 25×10^3 IQD, Price of supplying 1 ton of cement 170×10^3 IQD. The output for group of workers is **4 m³/day** where each group consist of **one** skill worker his wage **80 × 10³ IQD/day**, and **four** unskilled workers their wages are **20 × 10³ IQD/day** for each one of them.

Solution:

Calculation of Quantities per m³:

Quantity of bricks for 1m³ = **400** Brick (unit)

Volume of mortar for 1m³ = **0.22** m³

One cement bag = **50** kg

Cement-sand mortar **1:3** (standard mix)

$$0.22 = 0.75 \times (1x + 3x)$$

$$0.22 = 0.75 \times (4x)$$

$$x = \left(\frac{0.22}{3}\right) = 0.0733$$

Weight of Cement = Volume of Cement × Density of Cement

$$= 1x = 1 \times 0.0733 \text{ m}^3 \times 1400 \text{ kg/m}^3 = 102.62 = \mathbf{103 \text{ kg per m}^3 \text{ of brickwork}}$$

Volume of Sand = 3x = $3 \times 0.0733 = 0.2199 = \mathbf{0.22 \text{ m}^3 \text{ of brickwork}}$

Cost of materials per m³:

$$\text{Cost of cement} = 103 \times \left(\frac{170 \times 10^3}{1000}\right) = 17\,510 \text{ IQD}$$

$$\text{Cost of sand} = 0.22 \times 25 \times 10^3 = 5\,500 \text{ IQD}$$

$$\text{Cost of bricks} = 400 \times \left(\frac{1 \times 10^6}{4000}\right) = 100\,000 \text{ IQD}$$

$$\text{Cost of materials} = \sum \text{Cost of cement} + \text{Cost of sand} + \text{Cost of brick} = \mathbf{122\,650 \text{ IQD/ m}^3}$$

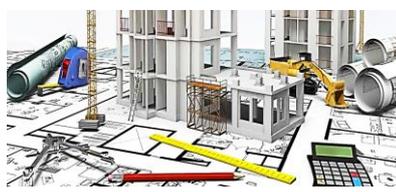
Cost of labor work per m³:

Cost of workers per day = \sum Skill labors + UnSkill labors

$$\text{Cost of workers per day} = \sum (80\,000 + (4 \times 20\,000)) = 160\,000 \text{ IQD}$$

$$\text{Cost of workers per m}^3 = \left(\frac{\text{Cost of workers per day}}{\text{Output of workers per day}}\right) = \left(\frac{160\,000}{4}\right) = \mathbf{40\,000 \text{ IQD/ m}^3}$$





The real cost = $\sum(\text{Cost of materials} + \text{Cost of labor}) = 122\,650 + 40\,000 = 162\,650 \text{ IQD/m}^3$

The administration cost = $162\,650 \times 0.1 = 16\,265 \text{ IQD/m}^3$

The total cost = The real cost + The administration cost

The total cost = $162\,650 + 16\,265 = 178\,915 \text{ IQD/m}^3$

The final price of item = Total Cost + Profit

The final price of item = $178\,915 \times 1.15 = 205\,753 \text{ IQD/m}^3$

Case Study No. 17-2: Find the price of 1m^3 of reinforced concrete for bidding contract based on the following information: Concrete mix of (1:2:4) with steel reinforcement of weight 100 kg/m^3 , wages of labor for form works $40 \times 10^3 \text{ IQD/m}^3$ (include labor of steel work), and the cost of casting concrete is $25 \times 10^3 \text{ IQD/m}^3$. In addition, the administration cost and profit are assumed for 10% and 15%, respectively of the total cost. Assume cost of a one ton of steel reinforcement equal to $1\,000\,000 \text{ IQD}$.

Solution:

Quantity of reinforced concrete material per 1 m^3

Concrete mix of (1:2:4) thus:

Cement 300 kg , Sand 0.43 m^3 , Gravel 0.85 m^3

Steel reinforcement 100 kg/m^3

Cost of materials:

Cost of cement = $\left(\frac{170 \times 10^3}{1000}\right) \times 300 = 51\,000 \text{ IQD/m}^3$

Cost of sand = $0.43 \times 25 \times 10^3 = 10\,750 \text{ IQD/m}^3$

Cost of gravel = $0.85 \times 35 \times 10^3 = 30\,000 \text{ IQD/m}^3$

Cost of steel reinforcement = $\left(\frac{1\,000\,000}{1000}\right) \times 100 = 100\,000 \text{ IQD/m}^3$



Cost of materials = $\sum \text{Cost of cement} + \text{Cost of sand} + \text{Cost of gravel} + \text{Cost of Steel reinforcement}$

Cost of materials = $51\,000 + 10\,750 + 30\,000 + 100\,000 = 191\,750 \text{ IQD/m}^3$

Cost of labors:

Cost of labor formworks with steel work = $40\,000 \text{ IQD/m}^3$

Cost of concrete casting = $25\,000 \text{ IQD/m}^3$

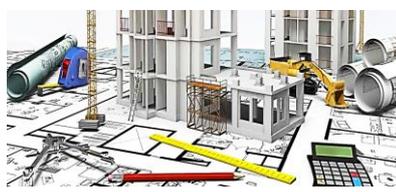
Cost of workers per m^3 = $\sum 40\,000 + 25\,000 = 65\,000 \text{ IQD/m}^3$

The real cost = Cost of materials + Cost of labor = $191\,750 + 65\,000 = 256\,750 \text{ IQD/m}^3$

Total cost including administration expenditures = $256\,750 \times 1.1 = 282\,425 \text{ IQD/m}^3$

Profit = Total cost * 0.15 = $282\,425 \times 0.15 = 42\,364 \text{ IQD/m}^3$

The final price of item = Total cost + Profit = $282\,425 + 42\,364 = 324\,789 \text{ IQD/m}^3$



Case Study No. 17-3: Find the total cost of lining of 1 m^2 by marble and cement mortar, assume **10%** administration cost, and **15%** profit of the total cost. Cost of one square meter marble is 34×10^3 IQD. The cost of a one ton of cement material equal to **170000 IQD**, and also five labors required to doing this job where a one is skill worker, and other four unskilled labors.

Solution:

Quantity of lining material per 1 m^2

Cement-sand mortar (1:3), lining thickness **4 cm**

Vol. of mortar for lining 1 m^2 : $1 \times 1 \times 0.04 = 0.75 \times (1x + 3x)$

$$x = 0.0133$$

Wt. of cement = $1x = 1 \times 0.0133 \times 1400 = \mathbf{20 \text{ kg}}$

Vol. of sand = $3x = 3 \times 0.0133 = 0.04 \text{ m}^3$

Cost of materials:

Cost of cement = $\left(\frac{170 \times 10^3}{1000}\right) \times 20 = \mathbf{3\ 400 \text{ IQD/m}^2}$

Cost of sand = $0.04 \times 25 \times 10^3 = \mathbf{1\ 000 \text{ IQD/m}^2}$

Cost of marble = $34 \times 10^3 = \mathbf{34\ 000 \text{ IQD/m}^2}$

Cost of materials = $3\ 400 + 1\ 000 + 34\ 000 = \mathbf{38\ 400 \text{ IQD/m}^2}$

Cost of labors:

Output of the group (1 skill labor + 4 unskilled labor) = 15 m^2 per day

Cost of workers per day = \sum Skill labors + UnSkill labors

Cost of workers per day = $\sum(80\ 000 + (4 \times 20\ 000)) = 160\ 000 \text{ IQD}$

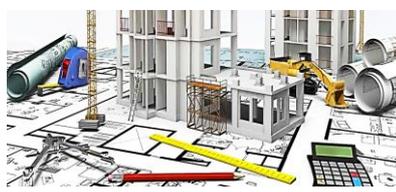
Cost of workers per $\text{m}^2 = \left(\frac{\text{Cost of workers per day}}{\text{Output of workers per day}}\right) = \left(\frac{160\ 000}{15}\right) = \mathbf{10\ 670 \text{ IQD/m}^2}$

The real cost = Cost of materials + Cost of labor = $38\ 400 + 10\ 670 = 49\ 070 \text{ IQD/m}^2$

Total cost including administration expenditures = $49070 \times 1.1 = \mathbf{53\ 977 \text{ IQD/m}^2}$

Final price of item = $53977 \times 1.15 = \mathbf{62\ 074 \text{ IQD/m}^2}$





Case Study No. 17-4: Find a suitable tendering price for the item of rendering 1m^2 of cement mortar (1:3). Assume administration cost 10% and profit 15% of the total cost. Use the following information: Work cost based on output of group labors (1 skilled worker and 3 unskilled worker) is $20\text{ m}^2/\text{day}$, wages of skill worker 80 000 IQD/day, wages of each unskilled labor 25 000 IQD/day. In addition, cement cost 100 000 IQD/ton, and sand 25 000 IQD/m³.

Solution:

Quantity of rendering material per 1 m^2

Cement-sand mortar (1:3), rendering thickness 2 cm

$$\text{Vol. of mortar for rendering } 1\text{ m}^2: 1 \times 1 \times 0.02 = 0.75 \times (1x + 3x)$$

$$x = 0.00667$$

$$\text{Wt. of cement} = 1x = 1 \times 0.00667 \times 1400 = 9.4 = 10\text{ kg}$$

$$\text{Vol. of sand} = 3x = 3 \times 0.00667 = 0.02\text{ m}^3$$

Cost of materials:

$$\text{Cost of cement} = \left(\frac{100 \times 10^3}{1000}\right) \times 10 = 1000\text{ IQD/m}^2$$

$$\text{Cost of sand} = 0.02 \times 25 \times 10^3 = 500\text{ IQD/m}^2$$

$$\text{Cost of materials} = 1000 + 500 = 1500\text{ IQD/m}^2$$

Cost of labors:

Output of the group (1 skill labor + 3 unskilled labor) = 20 m^2 per day

Cost of workers per day = \sum Skill labors + UnSkill labors

$$\text{Cost of workers per day} = \sum(80\,000 + (3 \times 25\,000)) = 155\,000\text{ IQD}$$

$$\text{Cost of workers per m}^2 = \left(\frac{\text{Cost of workers per day}}{\text{Output of workers per day}}\right) = \left(\frac{155\,000}{20}\right) = 7750\text{ IQD/m}^2$$

Total cost = Cost of materials + Cost of work + Administration cost

$$= 1500 + 7750 + (9250 \times 0.1) = 10\,175\text{ IQD/m}^2$$

$$\text{Profit} = 10175 \times 0.15 = 1\,526\text{ IQD/m}^2$$

$$\text{Price of rendering } 1\text{ m}^2 \text{ of cement mortar (1:3)} = 10175 + 1526 = 11\,701\text{ IQD/m}^2$$

