Example:

Prepare an approximate estimate of building project with total plinth area of all building is 500 m2. and from the following data:

1. Plinth area rate. 250,000 ID per m2

2. Cost of water supply 8% of cost of building.

3. Cost of Sanitary 8% of cost of building.

4. Cost of Electrical installation 8% of cost of building.

5. Cost of architectural features 1% of building cost.

6. Cost of roads and lawns 5% of building cost.

Solution:

Cost of Construction = plinth area x plinth area rate = 500 x 250000 = 125.000.000 ID

Cost of water supply = 8/100 x125,000,000 = 10,000,000 ID

Cost of Sanitary = 8/100 x125,000,000 = 10,000,000 ID

Cost of Electrical installation = 8/100 x125,000,000 = 10,000,000 ID

Cost of architectural features = 1/100 x125,000,000 = 1,250,000 ID

Cost of roads and lawns= 5/100 x125,000,000 = 6,250,000 ID

Total Approximate Cost = 162,500,000 ID

Assume Add supervision charges 7.5% on overall cost

7.5 /100x 162,500,000 = 12, 187, 500 ID

Total Approximate Cost = 162,500,000 + 12,187,500 = 174.687.500 ID

Example

A building was implemented in dimensions of (25 m × 30 m), It contained a basement, ground, 1^{st}, 2^{nd} floor and ceiling. The total cost of the building equal 2,250,000,000 ID. Calculate the Cost Per m^2 according to the following conditions:

1. The Three floors, basement and ceiling have the same costs.

2. The cost of the basement comprises (70%) and for ceiling (30%) of the cost of other (similar) floors.

Soulution:

Total Area of Building = (25 × 30) × 5 = 3750 m^2

Cost Per m2 = 2250 × 10^6/ 3750 = 0.6 × 10^6 = 600 000 ID/ m^2

Area of ground, 1st, 2nd floor = (25 × 30) × 3 = 2250 m^2

Equivalent area of basement = 0.7 × (25 × 30) = 525 m2

Equivalent area of ceiling = 0.3 × (25 × 30) = 225 m^2

Total area = 2250 + 525 + 225 = 3000 m^2

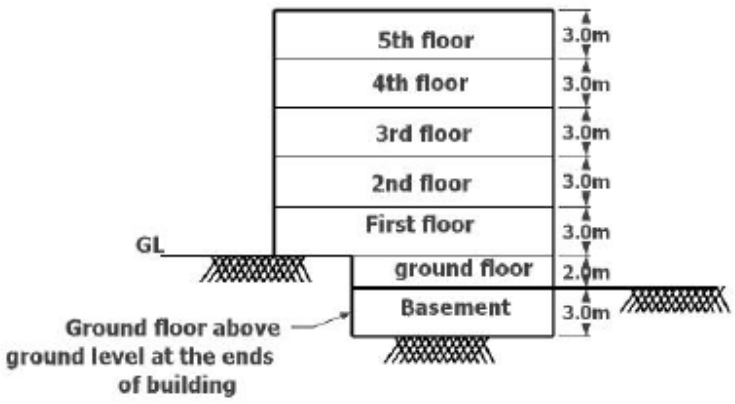
Cost Per m^2 of similar floors = 2250 × 106 / 3000 = 750 000 ID/ m^2

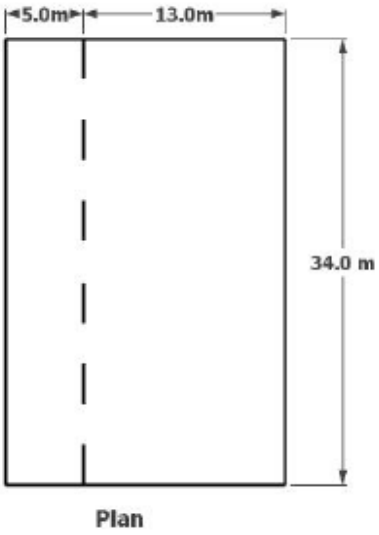
Cost Per m^2 of basement = 750 000 × 0.7 = 525000 ID/ m^2

Cost Per m^2 of ceiling = 750 000 × 0.3 = 225000 ID/ m^2

Example

A building was implemented in dimensions of (34 × 18 m) as shown in figure below. It contained a basement, ground, 1st, 2nd, 3rd, 4th and 5th floors. Calculate total cost of the building if the Cost Per m^2 equal to 500,000 ID. All the floors have the same costs.





Soulution

Basement Area = 34x13 = 442m^2

Ground floor Area = 34x13 = 442m^2

Area of (1st to 5th floor) = 34 x 18 x 5 = 3060 m^2

Total Area = 442 +442 + 3060 = 3944 m^2

Total cost of the building = Cost per m^2 x total Area = 500,000 x 3944 = 1,972,000,000 ID

Example

A commercial building (25 mx 20 m) consists of three floors (each 3 m Hight).

Calculate the total rough cost from the following data:

1. Cubical content rate = 80,000 ID per m3
2. water supply & Sanitary arrangement = 7.5%
3. Electrification = 6%
4. Fluctuation of rates = 5%
5. Supervision charge = 8%

Solution

Cubical content = No. of storeys (Plinth Area x height of each story) = 3[(25 x 20) x 3] = 4,500 m3

Building cost = Cubical content x cubical content rate = 4,500 x 80,000 = 360.000.000 ID

water supply & Sanitary arrangement = 7.5/100 x 360,000,000 =27,000,000 ID

Electrification = 6/100 x360,000,000 = 21,600,000 ID

Fluctuation of rates = 5/100 x 360,000,000 = 18,000,000 ID

SUM = 426,600,000ID

Supervision charge = 8/100 x 426,600,000 = 34,128,000 ID

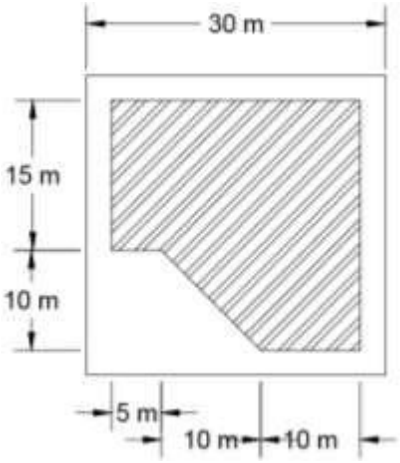
Total Approximate Cost = 426,600.000 + 34,128,000 =460.728,000 ID

مثال :

طلب من مهندس انشاء قاعة متعددة الاغراض على مساحة الارض الموصوفة بالمخطط ادناه وبمواصفات هندسية مطابقة لقاعة اخرى ثم انشاءها مسبقا بمساحة بناء ٢٥٠م٢ وبكلفة ٣٠٠ مليون دينار، ماهي الكلفة التخمينية التقريبية لتنفيذ القاعة على اعتبار عدم تغيير اسعار المواد والعمل.

Example :

An engineer was asked to build a multi-purpose hall on the land area described in the plan below, with engineering specifications identical to another hall that had been previously built with a construction area of 250 m^2 and at a cost of 300 million ID. What is the approximate estimated cost of implementing the hall, assuming that the prices of materials and labor do not change?



Solution:

Area of Hall = 25 x 25 – [(5+15)/2] x10 = 525 m^2

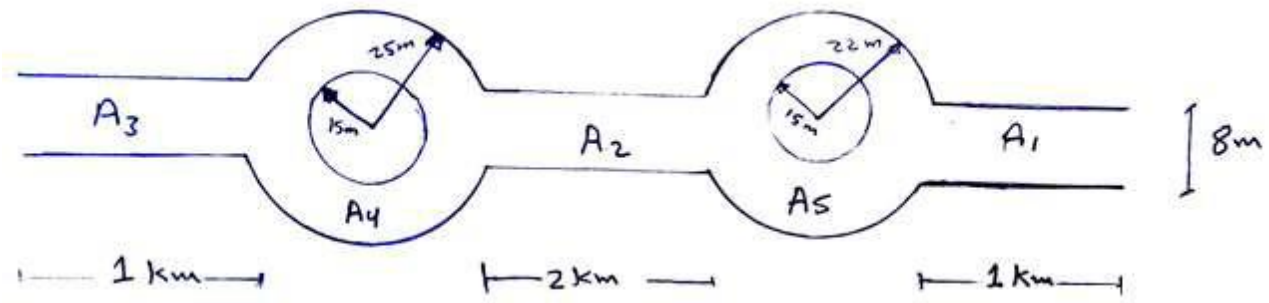
Cost of previous Hall per m^2 = 300,000,000/250 = 1,200,000 ID

Approximate Cost of new Hall = 525 x1,200,000 = 630, 000,000 ID

مثال٢ : يُراد انشاء طريق داخل المدينة على المساحة الموصوفة بالمخطط ادناه، احسب الكلفة التقريبية لتنفيذ الطريق علما بانه تم تنفيذ طريق مماثل له وبنفس المواصفات الفنية وبمساحة ٥٠٠,٠٠٠م بكلفة ٤,٧٥٠,٠٠٠,٠٠٠ دينار.

Example :

A road is to be built inside the city on the area described in the plan below. Calculate the approximate cost of implementing the road, knowing that a similar road has been implemented with the same technical specifications and an area of 500,000 m^2 at a cost of 4,750,000,000 ID



Solution:

The total area of the road is,

A_1 = 8 x 1000 = 8000 m^2

A_2 = 8 x 2000 = 16000 m^2

A_3 = 8 x 2000 = 16000 m^2

A_4 = 3.14 x (25^2 - 15^2) = 1207 m^2

A_5 = 3.14 x (22^2 - 15^2) = 814 m^2

Total area = 8000 +16000 + 16000 +1207 + 814 = 42071 m^2

Cost of one m^2 of previous road is,

4,750,000,000/500,000 = 9,500 ID

The cost of new road is,

42071 x 9,500 = 399,674,500 ID

مثال:

تم تخمين بناية بابعاد ٤٠*٦٠م مكونة من سرداب طابق ارضي، اول، ثاني. الارتفاع للطوابق الثلاث كان ٣ م وللسرداب ٢,٨ الكلفة الكلية للبناية ٢٢,٥ مليار م. دينار عراقي احسب كلفة المتر المكعب الواحد على اساس ان:

أ- الطوابق الثلاث والسطح والسرداب ذات كلف متساوية للمتر المكعب الواحد.

ب كلفة السرداب للمتر المكعب الواحد تشكل ٦٠% من كلفة باقي الطوابق.

Example:

A building of dimensions 40*60 m was estimated to consist of a basement, ground floor, first floor, and second floor. The height of the three floors was 3 m and the basement 2.8m. The total cost of the building was 22.5 billion Iraqi dinars. Calculate the cost per cubic meter based on the following:

A- The three floors, the roof, and the basement have equal costs per cubic meter.

B- The cost of the basement per cubic meter constitutes 60% of the cost of the remaining floors.

Solution: A)

Volume of basement = (40 x 60 x 2.8) = 6,720 m^3

Volume of ground floor = (40x 60 x 3) = 7,200 m^3

Volume of 1^{st} floor = (40x 60 x 3) = 7,200 m^3

Volume of 2^{nd} floor = (40x 60 x 3) = 7,200 m^3

Total Volume = 28,320 m^3

The cost of one m^3 = 22,5 x10^9 /28,320 = 794,500 ID / m^3

B) Assume the cost of 1 m^3 for each floor = y

Total cost for the building = volume of (ground+1^{st} foor + 2^{nd} floor) y + (volume of basement x 0.60) y .

22,500 x 10^6 = (3 x 7,200) y+ (6,720 0.60) y

22,500 x 10^6 = 21,600 y +4,032 y

22,500 x 10^6 = 25,632 y

Y = 22,500 x 10^6 /25,632

Y = 877,809 ID / m^3

Example:

A building with dimensions of 20 * 35 m was estimated to consist of a basement, ground floor, first floor, second floor, and roof. The total cost of the building is 1.89 billion Iraqi dinars. Calculate the cost per square meter based on the following:

A- The three floors, roof, and basement have equal costs per square meter.

B- The cost of the basement per square meter constitutes 60% of the cost of the remaining floors, and the cost of the roof per square meter constitutes 40% of the cost of the remaining floors.

Solution

A) Since the three floors, basement and roof are the same cost.

The total area = area of three floors + basement area + roof area)

The total area = (20 x 30) x 5 (all floors ,basement and roof are the same area)

The total area = 3500 m^2

The cost of 1 m^2 = 1,89 x10^9/3500 = 540000ID / m^2

B) Assume the cost of 1 m^2 for each floor = y

The total cost for the building = area of each floor x cost of 1 m^2 for each floor

The total cost for the building =(area of three floors) y +(basement area)y + (roof area) y

1,890,000,000 = (20 x 35 x3) y +(20 x35 x 0.60) y +(20 x 35 x 0.40) y

1,890,000,000 = 2100 y + 420 y +280 y

1,890,000,000 = 2800 y

y = 1,890,000,000/2800 =675000ID / m^2

Example

Prepare an approximate estimate or rough cost estimate of a hospital building for 50 beds. The cost of construction altogether for each bed is 2,800,000 ID. Determine the total cost of hospital building.

Solution

Total Cost of Hospital building = 50 x 2,800,000 = 140,000,000 ID

Example

To prepare the rough cost estimate of a hostel building which accommodate 150 students. The cost of construction including all provisions is 14.000.000 per student. Determine total cost of building.

Solution

Total Cost of hostel building = 150 x 14,000,000= 2,100,000,000 ID

Home Work

Assume that the current cost for a school accommodate 120 pupils constructed of wood frame for a city is $1,200,000. We are asked to develop an order of magnitude estimate for a school with 90 pupils.