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Estimation & Quantity Surveying

التخمين و المسح الكمي

❖ ***Activities and items of Quantity Surveying (Bill of Quantities details)*** *فقرات المسح الكمي*

1- *Levelling & Preparation of Site*: measured by Lump-Sum unit (L.S)

2- *Work planning:* measured by Lump-Sum unit (L.S)

3- *Foundation works*: including the following:-

a- *drilling footing excavation*: done manually or mechanically and measured by m^3

b- *Blinding layer*: measured by m^2 with mentioning the material type and its thickness

c- *Pouring of foundation concrete base*: the mix rate must be indicated, whether, it is a normal mix measured by m^2 with the thickness mentioned, or it is a reinforced mix measured by m^3 with mentioning the concrete percent.

d- *Bricks work under d.p.c*: Bricks below the level of the damp proof course measured by m^3 or m^2, with mentioning the wall thickness

e- *Pouring the concrete of (D.P.C.) Damp Proof Course*: measured by m^2 with mentioning the thickness or m.L with mentioning the thickness and the width.

f- *Foundation earth filling*: measured by m^3

4- *Building with bricks*: using concrete, thermal stone, or limestone bricks above the level of d.p.c measured by m^3 or m^2 with mentioning the thickness.

5- *Concrete ceiling slab casting, columns, and lintels beams*: measured by m^3 or m^2 with mentioning the thickness.

6- *Concrete pouring for parapet wall*: Pal m2 or m along with the stated height (fish)

7- *Walls finishing:*

a- *White gypsum plastering*: measured by m^2

b- *Cement mortar plastering with cement mortar from the outside (sometimes from the inside also)*: measured by m^2

c- *Painting, prose sprinkling & covering*: measured by m^2

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d- *Ceramic tiles*: measured by m^2

8. ***Ceilings finishing:***
   a. *Gypsum plastering:* measured by m^2
   b. Secondary ceilings: measured by m^2
9. ***Floor tiles application:***
   a. *Mosaic tiles & marble:* measured by m^2
   b. Fair face concrete: measured by m^2
10. ***Roofing layers:***
   a. *Slab concrete tiles (80 × 80 × 4) cm:* measured by m^2
   b. Moisture barrier material asphalt + Isolated earth (dust clean) + filler for pores (Mastic): measured by m^2
11. ***Doors and windows***: measured by m^2

1. تسوية وتعديل الموقع levelling and preparation of site: تقاس جملة Lump Sum (L. S.)
2. تخطيط الاعمال Planning: تقاس جملة
3. اعمال الاسس Foundation: وتشمل:-
   a. الحفر footing excavations: يدوي او ميكانيك يقاس بال m^3
   a. اعمال التربيع blinding layer: يقاس بال m^2 مع ذكر مادة التربيع وسمكها
   b. صب خرسانة الأساس foundation concrete
   يجب ذكر نسبة الخبط – عادية بال m^3 ويجب ذكر السمك اذا كان بال m^2
   او درجة الخرسانة – مسلحة بال m^3
   c. البناء بالطابوق Bricks work under d.p.c تحت مستوى مانع الرطوبة بال m^3 او بال m^2 بعد ذكر سمك الجدار
   d. صب خرسانة مانع الرطوبة damp proof course (D.P.C.) m^2 مع ذكر السمك او m طول مع ذكر السمك والعرض.
   e. اعادة دفن جوانب الاسس earth filling: بال m^3
4. البناء بالطابوق (كتل خرسانية concrete bricks, ثرموستون Thermal stone, طابوق جيري limestone bricks) فوق مستوى مانع الرطوبة بال m^3او m^2 مع ذكر السمك.
5. صب خرسانة السقف slab, الاعمدة columns, الاعتاب beams: بال m^3 او m^2 مع ذكر السمك
6. صب خرسانة لمردات الماء (الستارة) parapet wall: بال m^2 او m طول مع ذكر الارتفاع (السمك)
7. انهاءات الجدران finishing:
   a. البياض gypsum plastering من الداخل m^2
   b. اللبخ بمونة الاسمنت plastering with cement mortar من الخارج (احياناً للداخل) m^2
   c. الصبغ painting, النثر sprinkling, التغليف covering m^2
   d. التغليف بالكاشي السيراميكي (الفرفوري) Ceramic Tiles m^2
8. انهاءات السقوف:
   a. البياض m^2
   b. السقوف الثانوية m^2
9. انهاءات الارضيات floors اعمال الكاشي tiles application:
   a. الكاشي الموزائيك والمرمر marble and mosaic Tiles m^2
   b. صب خرسانة صقيلة fair face concrete m^2
10. التسطيح roofing طبقات التسطيح roofing layers:
   a. بالبلاطات الخرسانية concrete tiles(80×80×4) cm
   b. مادة مانع الرطوبة (الزفت) asphalt+ طبقة تهوير (تراب نظيف) soil+ مادة مالئة للمسامات (ماستك) mastic
11. الابواب والشبابيك: بال m^2

❖ *Calculating the length dimension under Damp proof course D. P. C. level*

حساب طول الأعمال تحت طبقة مانع الرطوبة

$Z = (w_2 - w_1) / 2$

$Y = (w_3 - w_1) / 2$

$X = w_4 - w_1 / 2$

- *(L + 2Z) for the length of footing excavation, broken bricks and foundation concrete.*

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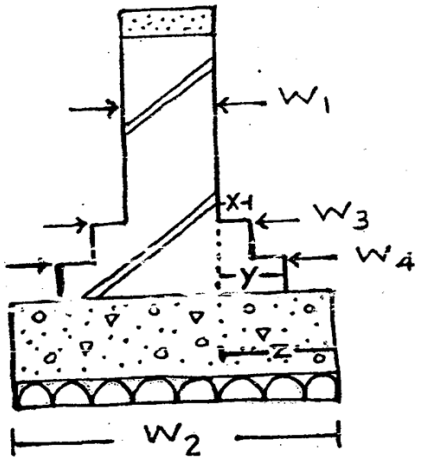
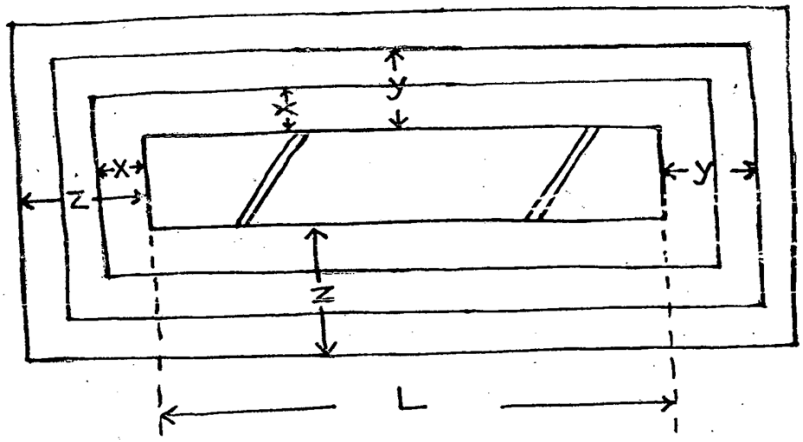
- ***(L + 2X) and (L + 2Y) for the length of bricks work and cement mortar under D P C for each step***

<u>Note that this method used for the plans which each angle included in it is right angle and also for the walls which have straight lines</u>



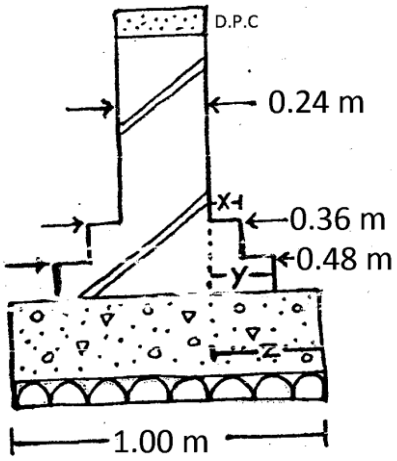
Section



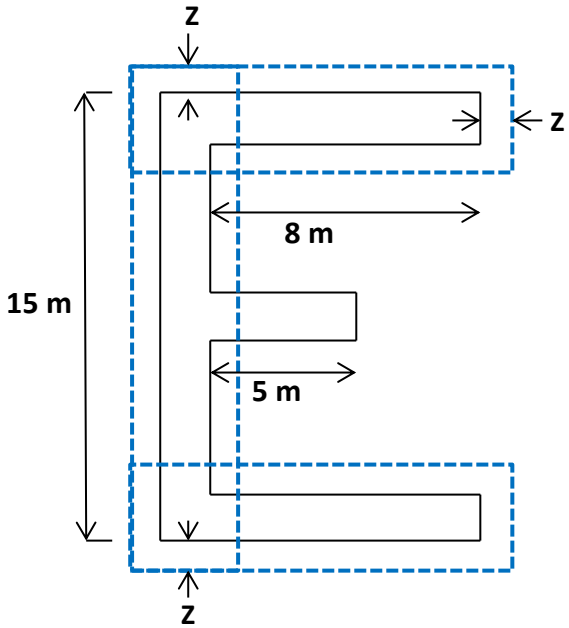
Top View

Ex/ for the plan and section of the wall shown below, calculate the following: -

1. **the length of footing excavation**
2. **the length of bricks work under D.P.C for each step**



Section



Plan

<u>Solution:</u>

Z = (1-0.24) / 2 = 0.38 m
Y = (0.36-0.24) /2 = 0.06 m
X = (0.48-0.24) /2 = 0.12 m

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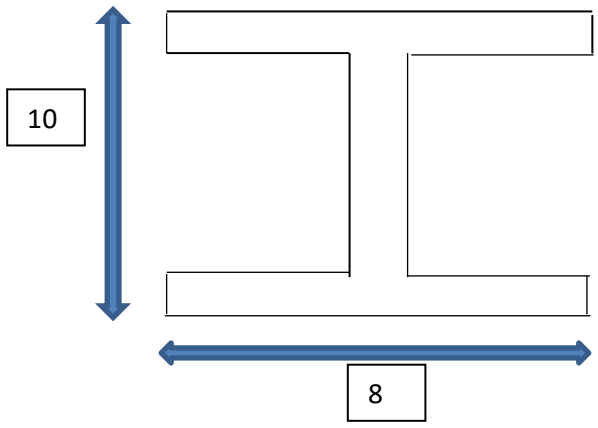
1- The length of footing excavation = 15+ (2×0.38) + 2(8+0.38-0.38) + 5 + 0.38 – 0.38 = 36.75 m

2-

- ✓ **The length of bricks work at the first step (0.48) = 15 + (0.12 × 2) + 2(8 + 0.12 – 0.12) + 5 + 0.12 – 0.12 = 36.24 m**
- ✓ **The length of bricks work at the second step (0.36) = 15 + (0.06 × 2) + 2(8 + 0. 06 – 0. 06) + 5 + 0. 06 – 0. 06 = 36.12 m**
- ✓ **The length of the wall (0.24 step) = 15 + (2×8) + 5 = 36 m**

H.W

The same section as the example shown above with different section as the following: Find
1- The length of footing excavation
2- The length of bricks work under D.P.C for each step



❖ *Examples of Bill of Quantities*

Calculate all the construction work items for the room plan and section A-A shown next page from the foundation to the roof wall, taking into consideration the following specifications:

1- Using resistant salt type of cement in all underground works
2- The cement mortar in all brick wall is (1:3)
3- Plastering with gypsum is used for all the interiors, and also finishing all the walls and slab with painting using emulsion (water paint)
4- Painting the external side of the walls and the parapet wall (from inside and outside) with the cement paint.
5- Using plastering with cement for the exteriors finishing and the roof walls.
6- Tile skirting with 0.12 m using the same type of mosaic tiles used for the floor.
7- Plastering with gypsum the doors and windows internal edges with 0.1 m width, also plastering with cement the external edges with the same width.

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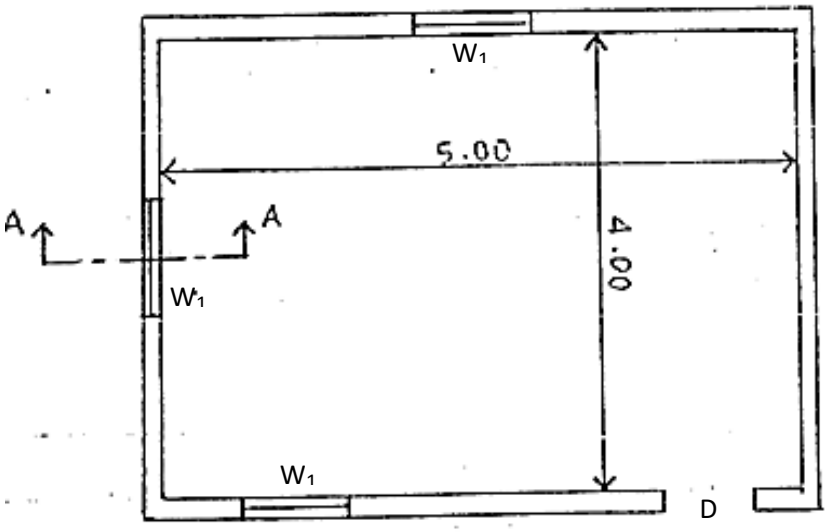

- PLAN -

4 x 5 m Room
with roof

Note that: there are three windows with 1.0 m width and 1.5 m height With one door of 1.0 m width and 2.1 m height