



Salahaddin University
College of Engineering
Architectural Engineering Department
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Estimation and Specifications

ESTIMATION AND SPECIFICATION FACTORS THAT DETERMINE VARIATION IN ESTIMATION

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VARIATION FACTORS IN ESTIMATING

1. Time

- 👍 We base our estimate on the cost of existing projects that were built in the past
- 👍 Price-level changes over time
- 👍 We need to project costs of future projects
- 👍 Many organizations publish construction cost data on regular basis:
 - 👉 US Department of Commerce
 - 👉 US Department of Labor
 - 👉 ENR
 - 👉 Turner Construction Company
 - 👉 Handy-Whitman Utilities

2. LOCATION

👉 Some factors affecting cost in different locations are:

1. Transport cost
2. Taxes
3. Labor supply and local productivity
4. Codes and local inspection

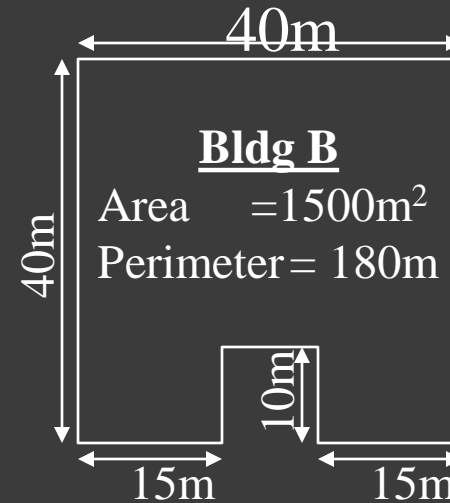
3. Size

- As the quantity built increases, the unit cost decreases,

$$\text{Size Factor} = \frac{\text{Proposed Size}}{\text{Comparison Size}}$$

- UCM = Unit Cost Multiplier

4. Shape



Wall height = 3 m

Bldg. A

Wall cost = $\$40 \times 160 \times 3 = \$19,200$
= **$\$12.80 / \text{m}^2$** of floor area

Bldg B

Wall cost = $\$40 \times 180 \times 3 = \$21,600$
= **$\$14.40 / \text{m}^2$** of floor area

5. "Learning Effect"

- ❖ Increased productivity by doing repeated work.

6. Other Factors

- ❖ Hard to quantify but should be evaluated
 - Quality
 - Soil condition
 - Weather Condition
 - Competition
 - Productivity

The architect works closely with the client in order to clearly understand their user needs.

The architect then produces a **Design Program**.

This is a written document that spells out the characteristics that the new building must have in order to satisfy the identified needs.

Working with the client, the architect will also...

*...identify the **budget** (maximum cost) for the project, divided into individual **cost elements**, such as site services, parking and roadways, landscaping, foundations, structure, building envelope, etc)*

During *Design Development* a cost estimate is prepared to ensure that the design is within the established budget.

Also, the project schedule is reviewed to make sure that it can still be achieved.

The **Contract Documents** stage is when working drawings and specifications are produced.

These documents use a combination of graphics (drawings) and written information (notes, schedules and specifications) describe the building **thoroughly and precisely enough** that it will be possible to construct it.

*In order to describe the building thoroughly and precisely enough that it will be possible to construct it, the architect and consultants must carry out an enormous amount Of **Detail Design.***

Detail Design is the design of the many construction details of the building, such as...

...the way that the materials and components of the building envelope are joined together to create a continuous air and vapor barrier.

...the arrangement, size and shape of stairs, ramps, elevators and other parts of the building's circulation system.

The Contract Documents will be used by potential constructors to prepare quotations - to tender competing bids - setting out the price they would charge to construct the building.

*Once a constructor has been selected, the documents will form part of a legal agreement – a **contract** – between the constructor and the client/owner.*

Portions of the documents will be used by each of the many sub-trades that carry out specific parts of the work (concrete forming and pouring, structural steel erection, carpentry, plumbing, electrical work, etc).

The constructor will use the contract documents to coordinate and schedule the work of the sub-trades so that everything is done safely and on-time.

During the **Construction** stage of the project, the architect will make periodic site visits to review and report on the progress of the work, and to help resolve any problems that come up.

At this time, the architect will use the Contract Documents to verify that the work has been done correctly.

QUESTIONS?