The Estimating Process
Conceptual Estimates

Week 2
Construction Estimation, Planning and Control

The Process (Chapter 3)

- Preliminary workload assessment
- Workload breakdown
- Preliminary work-plan
- Gather expertise around: material suppliers, vendors, contractors etc.
- Laying down expectations
- Establishment of estimate work plan, staffing requirements
- Iterate

Checks

- Reasonableness
- Compare with similar projects
- Compare with industry standard estimates
  - $/sq-ft, $/pupils, $/capacity

Risk Analysis

- Why do it?
  - To assign contingency
- What are the methods?
  - Expected risk (Max Risk x probability)
  - % of base price
  - Simulate different possibilities: explore “what-if” scenarios: CrystalBall software
- Sensitivity Analysis

Conceptual Estimates

- Based on primary function
  - Hospitals: cost/bed
  - Schools: cost/sq-ft
- Based on area/volume
- Modified for:
  - Time
  - Location
  - Capacity
  - Size

Broad Scope Estimates

Unit Cost (UC) forecast = \( \frac{A + 4B + C}{6} \)

A = Minimum unit cost of previous projects
B = Average unit cost of previous projects
C = Maximum unit cost of previous projects
Cost Index

• Used to update historical cost data
• Take into account inflation (i)
• Base year Jan 1, 1913
• Page 437 of RS Means (See announcements for latest ENR construction cost index)

Adjustment: Time

• \( I(2005 + n) = I(2005)(1+i)^n \)
• \( I(2005) = 7518.28 \ i = 3.0\% (0.03) \)

Cost(Year B) =
\[ \text{Cost(Year A)} \times \left( \frac{\text{Index B}}{\text{Index A}} \right) \]

Adjustment: Location

• To adjust for local differences
• RS Means page 458
• 4993: 92.2

Cost(City B) =
\[ \text{Cost(City A)} \times \left( \frac{I(\text{City B})}{I(\text{City A})} \right) \]

Adjustment: Process Unit Capacity

Cost(Process Unit B) = Cost(Process Unit A) 
\times \left[ \frac{C(\text{Project B})}{C(\text{Project A})} \right]^a 
\[ C() = \text{Process unit capacity} \]
\[ a = \text{Slope of cost capacity curve} \]

Relationship of plant cost vs unit production assumed linear over narrow capacity ranges

Adjustment: Unit cost for size

• Unit cost goes down for higher outputs
• Use historical data to build linear relationship
  - \( Y = mX + c \)
  - \( Y: \text{Cost per unit} \ X: \text{Number of units} \)
  - For given \((x_1,y_1)\) and \((x_2,y_2)\) calculate \(m\) and \(c\)