Jainarine Singh

H.W 5

3-9 Prepare a composite (weighted) index for housing Construction costs in 2008, using the following data:



In = $\frac{W1\left(\frac{Cn1}{Ck1}\right)+W2\left(\frac{Cn2}{Ck2}\right)+W2\left(\frac{Cn2}{Ck2}\right)}{W1+W2+W3}$ x Ik

In = $\frac{0.70\left(\frac{62}{41}\right)+0.05\left(\frac{57}{38}\right)+0.25\left(\frac{53}{33}\right)}{0.70+0.05+0.25}$ x 100

In = $\frac{0.70\left(1.51\right)+0.05\left(1.5\right)+0.25\left(1.6\right)}{1}$ x 100

In = 1.057+ 0.075+ 0.4 x100 =

In = 1.532 x 100 = 153.2

In = 153.2

3-16 400 pounds of copper go into a 2,000 square-foot, newly constructed house. Today’s price of copper is $3.50 per pound. If the cost of copper is expected to increase 4.5% per year into the foreseeable future, what is the cost of copper going to be in a new 2,400 square foot house 10 years from now. Assume the cost capacity factor for increases of copper in houses equals 1.0. (3.4)

CA = 400x 3.50 = 1400

4.5% per year for 10 years = (4.5/100 x 3.50 +3.50) x 10 = 36.5

CB = 1400 (36.5/3.5)^1

1400 x 10.4 = 14600

3-17 The structural engineering design section within the engineering department of a regional electrical utility corporation has developed several standard designs for a group of similar transmission line towers. The detailed design for each tower is based on one of the standard designs. A transmission line project involving 50 towers has been approved. The estimated number of engineering hours needed to accomplish the ﬁrst detailed tower design is 126. Assuming a 95% learning curve,

a. What is your estimate of the number of engineering hours needed to design the eighth tower and to design the last tower in the project?

b. What is your estimate of the cumulative average hours required for the ﬁrst ﬁve designs? (

Zu = K ($U^{n})$

Z8 = 126($8^{log0.95/log2})$

Z8 = 126 x 0.857 = 107.982hrs

Total time to produce 50 towers =

T50 = 126 $\sum\_{u=1}^{50}u^{-0.074}$

T50 = 126 x 40.22 = 5067.72

Estimate for the first 5 design =

C5= T50/5 = 5067.72 /5 = 1013.5

3-19 In a learning curve application, 846.2 work hours are required for the third production unit and783.0 work-hours are required for the ﬁfth production unit. Determine the value of n (and therefore s) in Equation (3-5)

C3 = Tx /3

846.2 = Tx/3

Tx = 846.2 x 3 = 2538.6

Tx = 783 x 5 = 3915