

# Capital cost estimation

The following information may be useful in estimating costs for your project.

## 1. Cost Indices

The cost index approach enables estimates of costs of an installation if a similar installation exists and the cost of the installation is known. There are two elements to the estimation

### a. Updating the cost to current values.

This involves multiplying the cost of the original installation by a cost index to update to the present day:

$$C_2 = C_1 \left( \frac{I_2}{I_1} \right) \quad 1$$

$C_2$  = Cost in year 2,  $C_1$  = cost in year 1,  $I_2$  = Index for year 2,  $I_1$  = index for year 1.

A suitable cost index is given in table 1.

### b. Multiplying by a factor to account for the different capacities of the two installations.

$$C_2 = C_1 \left( \frac{S_2}{S_1} \right)^n \quad 2$$

$C_1, C_2$  = cost of plants 1 & 2,  $S_1, S_2$  = capacity of plants 1 & 2  $n$  = capacity index.

For a complete installation,  $n$  is often in the range 0.6 - 0.67 when it is known as the 6/10ths or the two-thirds rule. In the absence of other information, assume a value of  $n$  in this range.

Combining equations (1) and (2) gives:

$$C_2 = C_1 \frac{I_2}{I_1} \left( \frac{S_2}{S_1} \right)^n \quad 3$$

This provides a useful way of providing a preliminary estimate of the capital cost of an installation.

## 2. Factorial Methods.

If the costs of the major equipment are available, the factorial method enables the estimation of the installed cost by multiplying the delivered cost of the equipment by a factor. In the process industries, this factor is known as a “Lang” factor and that term will be used here.

$$C_T = F_L \sum C_E \quad 4$$

where  $C_T$  = total installed cost,  $F_L$  = “Lang” factor,  $\sum C_E$  = sum of delivered costs of major equipment.

The Lang factor typically ranges between about 3 and 5. The value of the Lang factor depends on the complexity of the installation.

**Table 1: Cost Index**

Year	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997
Index	51	73	100	106	111	117	122	127	131	137

[Source: “The Cost Engineer”, 35 (2), 5-6, (March 1997)]