# Preliminary Estimating Problem

**Problem 1:** The M-Supreme Oil Co. has estimated the cost of a 5,000 barrels/hr refinery and a 8,500 barrel/hr refinery to be $16,000,000 and $23,500,000 respectively. If the major costs are related to the barrels/hr capacity, find:

a) Cost-capacity exponent,
b) Cost of a 6,000 barrels/hr refinery
c) Cost of a 7,500 barrels/hr refinery.

**Problem 2:** Another approach that M-Supreme can take is to calculate the refinery's cost using factor estimating. M-Supreme has estimated that the purchase cost of equipment identified in the schematic drawings will be $4,200,000 for a 6,000 barrels/hr refinery and $5,050,000 for a 7,500 barrels/hr refinery. At this level of design, they also estimate from experience that an additional 23% equipment purchase cost will be required in the completed design to purchase equipment not yet identified. Based on M-Supreme's experience, the following is the estimated cost distribution for crude-oil refineries:

| Description of Component | % of Total |
|---|---|
| Purchased equipment | 23 |
| Installation of purchased equipment | 15 |
| Piping (installed) | 10 |
| Electrical | 7 |
| Instrumentation/controls installed | 2 |
| Building | 3 |
| Site improvements | 4 |
| Service facilities | 5 |
| Land | 3 |
| Engineering/supervision | 10 |
| Construction overhead | 12 |
| Contractor's fee | 6 |
| Total | 100 |

For each of the two (2) alternatives, find the following:

a) Percentage of purchased equipment for each component.
b) Each component's estimated costs and the refinery's total cost.
c) Cost-capacity exponent calculated from these estimated costs.