

COST ESTIMATION & PLANT ECONOMICS

Methaonol Plant Capacity=100 TPD

Cost in 1971=Rs 3.6×10^8 ; Cost index ,year 1971=132[4]

Cost index,year 2002=402

Fixed capital investment= $3.6 \times 10^8 \times 402/132$ i.e,FCI=Rs. 10.96×10^7 This is nothing but the present cost of the plant.

Using Peter & Timmerhaus

Estimation of total investment cost:

a. Direct cost:

A. i.Purchased equipment cost(PEC)

Taking a 25% FCI,PEC=Rs. 2.74×10^8

ii. Installation cost

Taking a 35% PEC,this is= 0.822×10^8

iii. Instrumentation & Control cost

Taking a 15% PEC,this cost=Rs. 0.411×10^8

iv Piping,installed cost

Taking a 50% PEC,this is= 1.37×10^8 Rs

v. Electrical & installed cost

Taking a 25%PEC, this is=Rs. 0.685×10^8

B. Building,process,auxillary

Taking a 45% PEC,this is= 1.233×10^8 Rs.

C. Services- facilities & yard improvement

Taking a 75%,this is = 2.055×10^8 Rs.

D. Land

Taking a 6%,this is = 0.1644×10^8 Rs.

Then Total Direct cost= 9.4804×10^7 Rs. Which is around 86% of FCI

b. Indirect costs

A. Engineering & supervision cost:

Taking a 15% of D.C. this is= 1.42206×10^8 Rs.

B. Construction expenses & contractor's fee;

Taking a 10%,this= 0.94804×10^8

C. Fixed Capital Investment=Direct cost+ Indirect cost

i.e, new FCI= 12.7273×10^8 Rs.

D. Working capital

Taking 15% TCI, WC= 0.15 TCI

Total Capital Investment,TCI=FCI+WC

Solving,TCI= 14.975×10^8

WC= 2.246×10^8

Estimation of Total Product Cost:

1. **Manufacturing Cost**=Direct Product cost+ Fixed charges + Plant overhead cost

A. Fixed Charges:

Depreciation= 1.30972×10^8 Rs.

Local taxes-taking a 2.55 of FCI, is = 0.318×10^8 Rs.

Insurance – taking a 0.7% of FCI, is = 0.089×10^8 Rs.

Rent = 0.13974×10^7 Rs.

Then total Fixed Charges= 1.85646×10^8 Rs.

B. **Diect Production cost**: We know FC is about 10-20% of TPC.Taking a 15%,TPC= 12.3764×10^8 Rs.

Raw materials-taking a 25% of TPC, is= 3.0941×10^8 Rs.

Operating labour- taking a 15% of TPC, is = 1.856×10^8
 Direct supervisory & clerical labour-taking a 15% ,is = 0.278×10^8 Rs.
 Utilities –taking a 15% of TPC,is= $Rs.1.856 \times 10^8$
 Maintenance & repairs-taking a 5%,is = 0.6364×10^8
 Operating supplies-taking a 15%,is = 0.0955×10^8
 Laboratory charges-taking a 15% of OL,is= 0.2784×10^8 Rs.

Total Direct Production cost= 8.0944×10^8 Rs. Which is about 60.54% of TPC

C. Plant Overhead Costs:

Taking a 8% of TPC, this is= 0.99×10^8 Rs..

Therefore total manufacturing cost= 10.9409×10^8 Rs.

2. General Expenses = Administrative cost+ Distribution & selling cost + research development cost

Administrative cost-taking a 4% of TPC,is= 0.495×10^8
 Distribution & Selling cost- taking a 12% of TPC,is = 1.485×10^8 Rs.
 Research & Development cost- a 5% of TPC= 0.61882×10^8 Rs.
 Then General Expenses= 2.599×10^8 Rs.

3. Total Product Cost = Manufacturing cost + General Expenses = 13.5399×10^8 Rs.
 This is greater than the assumed value(12.3764×10^8)

PROFIT ANALYSIS:

A. Earnings:

Total gross earnings= Total income – TPC = 1.2×10^9 Rs.
 Calculation of total income:
 Annual working days=340
 Annual methanol production =100 tonnes
 Wholesale price of methanol = Rs.85/kg
 Annual total income= 2.55×10^9 Rs.

B. Annual Rate of Return=gross profit/TCI =48.4 %

Gross profit = gross earnings – tax
 Tax = 30% of gross earnings

C. Pay-back period = $100/R.O.R = 2$ years