

(Input Data)

- Set of Supplier = 3
- Set of port = 1
- Set of warehouses = 3
- Set of Customer = 2
- Set of Transportation Mode = 3 (Sea, rail, road)
- Purchasing Cost for each supplier (\$/unit) (340W)
 $C_1^p = 75, 85, 92$, $C_2^p = 73, 79, 86$, $C_3^p = 78, 84, 91$
- Ordering Cost for each supplier (\$)
 $O_1 = 4.1, 4.3, 4.5$, $O_2 = 3.2, 3.4, 3.6$, $O_3 = 2.9, 3.1, 3.3$
- Inventory Holding Cost (\$/unit)
 $H_o = 3.5, 4, 4.5$
- Transportation Cost (\$/km)
 $TC_{sea} = 0.8, 1.0, 1.2$
 $TC_{rail} = 1.2, 1.4, 1.6$
 $TC_{road} = 1.5, 1.8, 2.3$
- Transfer Cost Matrix (\$/unit):
 TrC_{mn} = Transfer cost from mode "m" to mode "n"

	Sea	Rail	Road
Sea	1.2	0.9	0.7
Rail	0.9	1.0	1.1
Road	0.7	1.1	0.6
- Custom Clearance Cost (\$/unit):
 CC_{ij} = Custom clearance cost while moving from
supplier "i" to port "
 $CC_{11} = 1.1 * C_1^p$, $CC_{21} = 1.1 * C_2^p$, $CC_{31} = 1.1 * C_3^p$

- Transfer Time Matrix (Hrs./container):

TrT_{mn} = Transfer Time from mode

"m" to mode "n"

	Sea	Rail	Road
Sea	0.7	0.17	0.17
Rail	0.17	0.4	0.12
Road	0.17	0.12	0.1

- Custom Clearance Time (Hrs./container):

CCT_{ij} = Customer Clearance Time from supplier

"i" to port "j"

$CCT_{11} = 4, CCT_{21} = 4, CCT_{31} = 4$

- Maximum Capacity of Supplier "i" (Units):

S_i = Maximum Capacity of i^{th} supplier

$S_1 = 230000, 248000, 252000, S_2 = 153500, 175000, 182000,$

$S_3 = 190500, 210000, 218500$

- Capacity of warehouse "k" (Units):

CAP_{w_k} = Capacity of k^{th} warehouse

$CAP_{w_1} = 175000, 192500, 210000,$

$CAP_{w_2} = 215500, 235000, 254000,$

$CAP_{w_3} = 199500, 268500, 242600$

- Velocity of mode "m": (Adapted from: [202])

Mode	Velocity (km/hr)
Sea	35
Rail	60
Road	90

- Capacity of mode "m":

Mode	Capacity / Carrier
Sea	9300000* units
Rail	9300** units
Road	620 units

*Panamax ship having an average capacity of 15000 TEUs

**15 containers each having a capacity of 620 units per container are permissible per train CO₂ emissions (grams/km) (Adapted from: [85])

- For Sea: 6.04
- For Rail: 17
- For Road: 50

- Demand of Customers

D1 = 298500, 299800, 305000

D2 = 320000, 322500, 323500

- Defect Rate of Supplier "i" (Units):

$D_1 = 0.003 * S_1$, $D_2 = 0.002 * S_1$, $D_3 = 0.001 * S_1$

