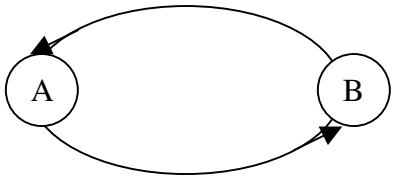
Pauta Pregunta 1 Auxiliar CI43A, 16/11/2004



Datos:

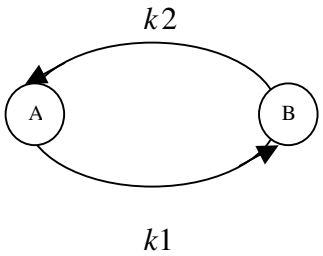
$\lambda_1 = 250$ Ton/día $\quad K_1 = 25$ Ton/veh $\quad \mu_A^- = \mu_B^- = 12$ Ton/h

$\lambda_2 = 800$ Ton/día $\quad K_2 = 20$ Ton/veh $\quad \mu_A^+ = \mu_B^+ = 8$ Ton/h

$\eta = 0.85$ $\qquad tv = 1 + \frac{4 \cdot k}{100}$ (en horas)

a) Calcular el tamaño de flota requerida para operar con

i) *Flota única*



Frecuencia:

$$f = Max\left(\frac{\lambda 1}{k1}, \frac{\lambda 2}{k2}\right) = Max(10,40) = 40 \text{ veh/día (corresponde a frecuencia 2)}$$

$$\Rightarrow k_2 = K_2 = 20\, ton/veh$$

$$\Rightarrow k1 = \lambda 1 \bullet \frac{k2}{\lambda 2} = 250 \bullet \frac{20}{800} = 6{,}25 \text{ Ton/veh}$$

Tiempos de Ciclo:

$$tc = k_1\left(\frac{1}{\mu_1^+} + \frac{1}{\mu_1^-}\right) + tv(k_1) + k_2\left(\frac{1}{\mu_2^+} + \frac{1}{\mu_2^-}\right) + tv(k_2)$$

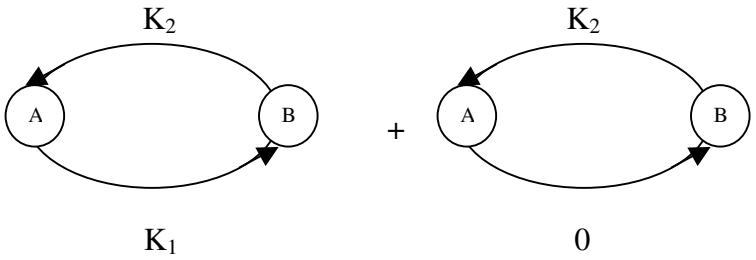
$$tc = 8.5\, h$$

Luego:

$$\eta B = f \bullet tc = \frac{40\,ton/dia}{24\,h/dia} \bullet 8.5\,h = 14.2$$

$$B = \frac{14.2}{0{,}85} = 16.7 \rightarrow 17\,veh$$

ii) Flotas combinadas



Con $f = f_{min}$ Con $f' = f_{max}-f_{min}$

Frecuencias:

$$f = f\min = Min\left(\frac{\lambda 1}{k1}, \frac{\lambda 2}{k2}\right) = Min\left(\frac{250}{25}, \frac{800}{20}\right) = Min(10,40) = 10 \text{ veh/ día}$$

$$f' = \frac{\lambda 2}{k2} - \frac{\lambda 1}{k1} = 40 - 10 = 30 \text{ veh/dia}$$

Tiempos de Ciclo:

<u>Flota 1</u> (Plena carga)

$$tc = k1\left(\frac{1}{\mu_1^+} + \frac{1}{\mu_1^-}\right) + tv(k1) + k2\left(\frac{1}{\mu_2^+} + \frac{1}{\mu_2^-}\right) + tv(k2)$$

$$tc = 13.2\ h$$

<u>Flota 2</u>

$$tc' = tv(0) + k2\left(\frac{1}{\mu_2^+} + \frac{1}{\mu_2^-}\right) + tv(k2)$$

$$tc' = 7\ h$$

Luego:

$$\eta B = f \bullet tc = \frac{10}{24} \bullet 13.2 = 5.5$$

$$B = \frac{5.5}{0.85} = 6.47 \rightarrow 7\ veh$$

$$\eta B' = f' \bullet tc' = \frac{30}{24} \bullet 7 = 8.75$$

$$B' = \frac{8.75}{0.85} = 10.3 \rightarrow 11\ veh$$

Flota Total = 7+11 = 18 *veh*

b) Calcular el número de sitios requeridos para carga/descarga de ambos productos.

El número de sitios S debe satisfacer:

$$\eta_c S = f\left[\frac{k}{\mu} + t_p\right]$$

Flota única

En A:

$$\eta_c S_A = \frac{40}{24}\left[\frac{20}{12} + \frac{6.25}{8} + \frac{15}{60}\right] = 4.5 \Rightarrow S_A = 5, \eta_c = 0.90$$

En B:

$$\eta_c S_B = \frac{40}{24}\left[\frac{20}{8} + \frac{6.25}{12} + \frac{15}{60}\right] = 5.45 \Rightarrow S_B = 6, \eta_c = 0.91$$

Flota combinada

En A:

$$\eta_c S_A = \frac{10}{24}\left[\frac{20}{12} + \frac{25}{8} + \frac{15}{60}\right] + \frac{30}{24}\left[\frac{20}{12} + \frac{15}{60}\right] = 4.5 \Rightarrow S_A = 5, \eta_c = 0.90$$

En B:

$$\eta_c S_B = \frac{10}{24}\left[\frac{20}{8} + \frac{25}{12} + \frac{15}{60}\right] + \frac{30}{24}\left[\frac{20}{8} + \frac{15}{60}\right] = 5.45 \Rightarrow S_B = 6, \eta_c = 0.91$$

Propuesto: ¿Por qué dio el mismo resultado?