Junction Network

Solution of Case Study 1

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Solution of Case Study 1 : Route Optimisation

Case 1 :

The improvement factor $F_N(A) = C_D / C_T = 1/2 = 0.5$

From the diagram we find for $F_N(A) = 0.5$ and A = 20 that the optimal number of circuits N = 21

The route congestion $B_R = 0.13$, and the mean of the overflow traffic

$$m = B_R \times A = 0.13 \times 20 = 2.6$$

The cost for this arrangement would then be

$$\text{Cost} = N \times C_D + m \times C_T = 21 \times 1 + 2.6 \times 2 = 21 + 5.2 = 26.2$$

However, dimensioning of the route for B = 0.1 yields $N_D = 23$ without any traffic overflowing to the tandem, and the corresponding cost would then be

$$\text{Cost} = N_D \times C_D = 23 \times 1 = 23$$

which is a more economic solution.

Case 2 :

A similar argument leads to $N_D = 26$, with a corresponding cost of

$$\text{Cost} = N_D \times C_D = 26 \times 1 = 26$$

which is still slightly better than the overflow arrangement which would cost 26.2 as in the previous case.

Case 3 :

Dimensioning the route for B = 0.01 gives $N_D = 30$, with a corresponding cost of

$$\text{Cost} = N_D \times C_D = 30 \times 1 = 30$$

For this case, alternative routing is the better solution.

Case 4 :

The same reasoning as for Case 3.

SOLUTION :

A	**C_D**	**C_T**	**B**		**N**	**B_R**	**m**	**v**	**Cost**
20.	1.	2.	0.10	➔	23	0.08	-	-	**23**
20.	1.	2.	0.05	➔	26	0.04	-	-	**26**
20.	1.	2.	0.01	➔	21	0.13	2.62	7.1	**26.2**
20.	1.	1.2	0.01	➔	13	0.41	8.20	15.5	**22.8**