Vehicle Scheduling

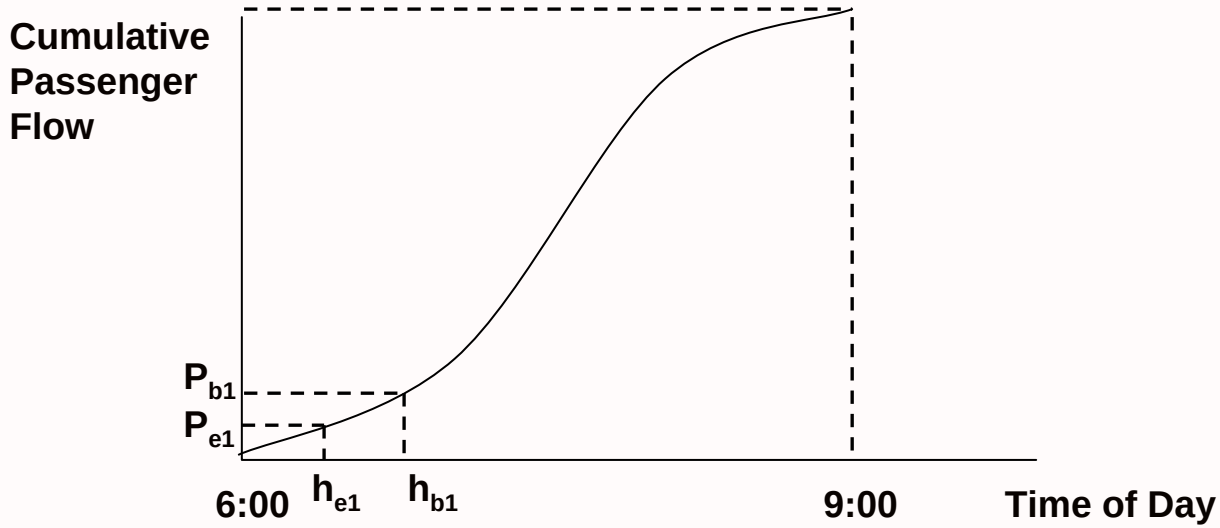
Outline

1. Timetable Development
2. Fleet Size

Timetable Development

Can translate frequency into timetable by specifying headways as:

- **equal -- appropriate if demand is uniformly distributed across period**
- **balanced load -- appropriate if there is substantial variation in demand over period**
- **clockface or not -- do headways repeat every hour**



Timetable Development

If we have N departures in peak period:

- **equal headway solution:**

$$H = \frac{\text{Peak Period}}{N}$$

- **balanced load solution:**

$$\text{Pass Load / Departure} = \frac{\text{Total Passenger Flow}}{N}$$

Fleet Size Requirement

Salzborn's Fleet Size Theorem:

Given:

l(k,t,s) **= # of departures from terminal *k* by time *t* following schedule *s***

a(k,t,s) **= # of arrivals at terminal *k* by time *t* following schedule *s***

and:

d(k,t,s) **= *l(k,t,s)* - *a(k,t,s)*, deficit function at terminal *k* at time *t* following schedule *s***

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Fleet Size Requirement

Salzborn's Fleet Size Theorem:

Then:

***N(s),* the minimum size fleet to serve schedule *s*, is given by:**

$$N(s) = \sum_{k \in T} \max_{t} (d(k,t,s))$$

for *T* terminals

Also, *N(s)* ≥ Max # of trips in simultaneous operation.

Fleet Size Required

The deficit function, or minimum required fleet size, may be reduced by:

- **shifting departure and/or arrival times**
- **adding deadhead trips between terminals**