Introduction to Transportation Systems

PART III:

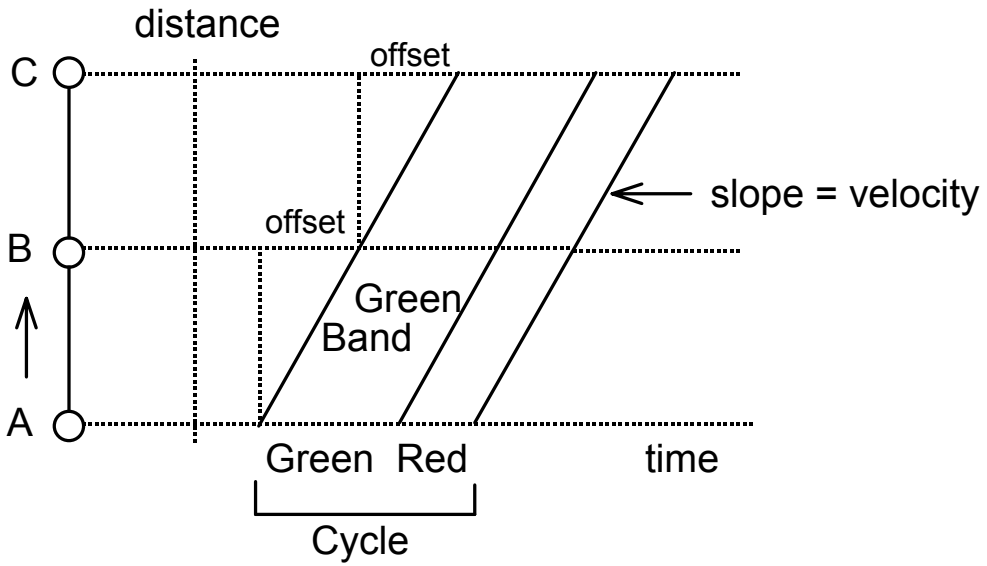
TRAVELER TRANSPORTATION

Chapter 26:

Traffic Signals and Other Control Measures

Traffic Light Synchronization

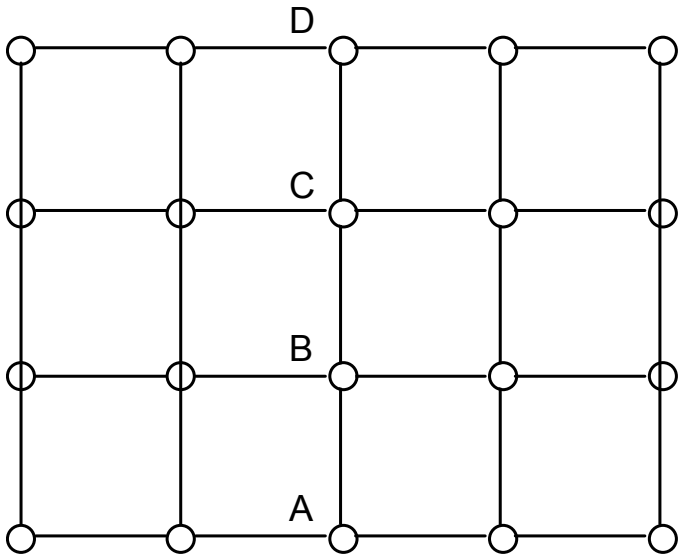
Space-Time Diagram



The *slope* of the line defining the green band is speed (the ratio of distance to time). If a car stays within that green band as it goes through traffic signals A, B and C, it will continue unopposed by a red light.

Figure 26.1

Grid Network



- We consider the design of “splits” -- dividing the total cycle time (the time between the start of consecutive reds) between the red and green.
- We consider “offsets” -- the time between light A and light B turning green.
- The question is how to design the splits and the offsets in the two directions optimally.

Figure 26.2

Optimizing Traffic Light Settings

But what is optimal?

- One might consider the total amount of time spent *stopped* at red lights for vehicles in the system, considering both directions.
- An alternative measure is the number of times that individual vehicles need to stop.
- Simply optimizing the total time in the system is another approach.

Traffic Light Synchronization -- Levels of Sophistication

The “Minus-One” Alternative --

Mystic Valley Parkway, Medford, MA, U.S.

Street Sign

Figure 26.3

Traffic Light Synchronization -- Levels of Sophistication: 2

- Static Synchronization
- Time-of-Day Settings
- Pre-Defined Plans
- Dynamic Systems

Other Traffic Control Ideas

- Ramp Metering
- Dedicated Bus Lanes
- Reversible Lanes
- High-Occupancy Vehicle Lanes
- High-Occupancy Toll Lanes
- Traffic Calming

CLASS DISCUSSION

- Use of these various ideas in your city?

  Issues:

  - Do they work?
  - Public acceptance?
  - Who gains and who loses?