



Introduction to Transportation Systems



PART III: TRAVELER TRANSPORTATION

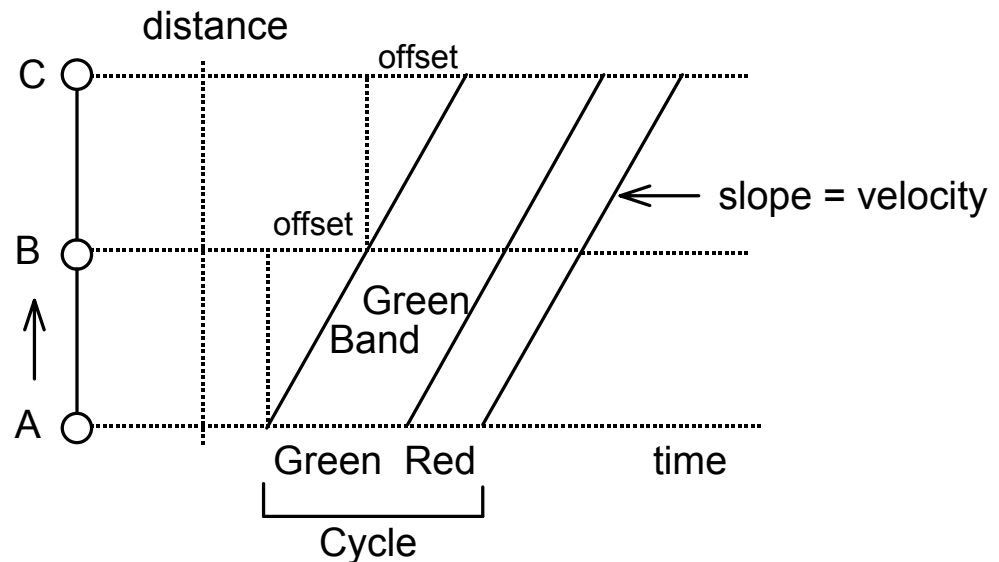


Chapter 26:

Traffic Signals and Other Control Measures

Traffic Light Synchronization

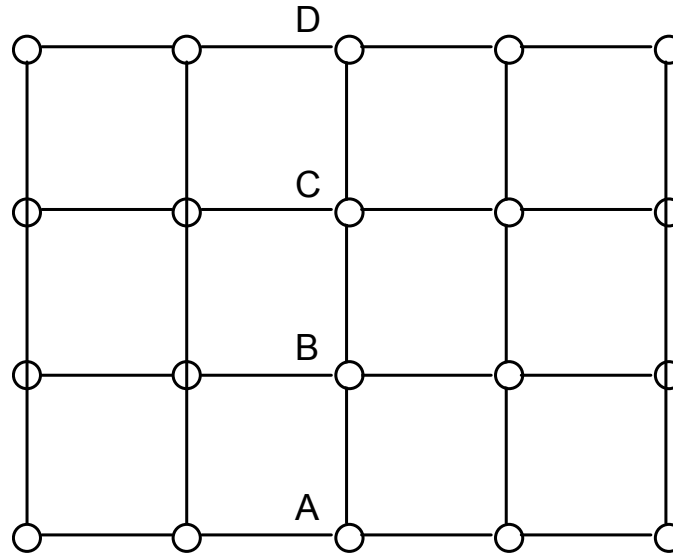
Space-Time Diagram



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?