



# TRAFFIC TIPS

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## COMPREHENSIVE SERVICES

*Hubbell, Roth & Clark, Inc., is a professional organization providing comprehensive engi-*

*neering services. Our Transportation and Traffic Engineering expertise allow us to address problems of urban traffic congestion, traffic safety, and highway design. We provide assistance in transportation planning, design and operations. Other services of the firm include:*

- Municipal Engineering
- Civil and Site Engineering
- Wastewater Treatment
- Underground Storage Tank Replacement Engineering
- Water Treatment and Distribution
- Industrial Waste Treatment
- Industrial Engineering
- Storm Water Control
- Surveying and Mapping
- Electrical Engineering
- Street and Parking Lot Lighting

## Everything You Always Wanted To Know About Traffic Signal Timing & Progression

Traffic signal timing and continuous flow of traffic through adjacent signalized intersections (progression) are the two most noticeable attributes of traffic signals outside of the signals themselves. Properly timed traffic signals reduce congestion and promote traffic safety. Improperly timed traffic signals are probably the most irritating experiences for motorists. If drivers have to stop at every signal they come to, they become very frustrated. What most drivers don't know is why the traffic engineer does what he does when he times signals. The factors considered in traffic signal timing and progression are:

### Traffic Signal Timing

Traffic signal timing takes into account the number of lanes and the volume of traffic on each approach.

Ambers and all reds are used to end right of way on one road before assigning it to another road. These are called the change (clearance) interval.

The change interval is the same length for each road regardless of the length of the green for that road.

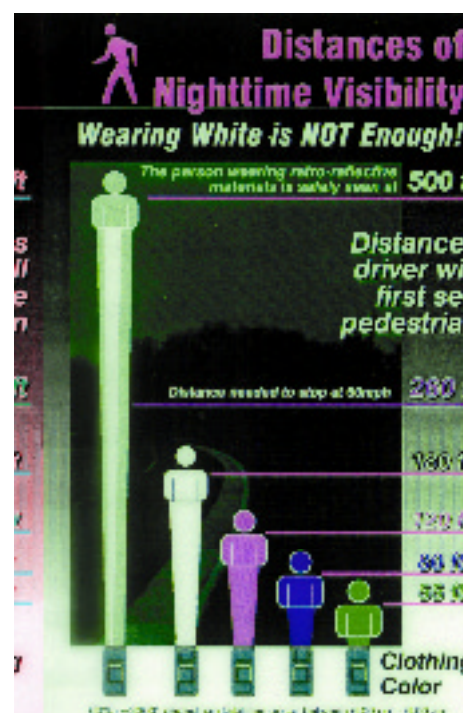
Change interval time is NOT green time. It is time for vehicles in the

intersection to clear the intersection and for approaching vehicles to STOP.

Every time a left turn signal is added to an intersection, time must be taken away from the through movements to provide green and clearance interval time for the left turns.

If pedestrian signals operate every cycle, the length of the green must be long enough to allow pedestrians to safely cross. Sometimes, this requires more time than is warranted by vehicle traffic on the

### Pedestrian Safety



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cross street.

*Cycle length* is the length of time in seconds that it takes to time all of the green and change intervals (phases) at the intersection.

A *phase* is the operation of the green and change intervals for a particular movement. (e.g. - signals for through traffic operate as a phase, signals for a left turn operate as a phase, etc.)

Short cycle lengths do not operate well with heavy traffic. Using longer cycle lengths during heavy traffic periods helps reduce congestion up to intersection capacity limits.

When traffic demand exceeds intersection capacity, not all of the traffic can get through the intersection every cycle. This results in congestion and backups. Traffic engineers try to equalize backups wherever possible.

### Traffic Signal Progression

Progression is a time - distance relationship.

The cycle length used will directly affect progression. For example, it takes 80 seconds to drive 1 mile at 45 MPH. Therefore, an 80-second cycle gives excellent progression if the signals are 1 mile or 1/2 mile apart.

During peak traffic periods when long cycle lengths must be used, progression usually is possible in only 1 direction. Traffic engineers try to maintain progression in the direction of heaviest traffic.

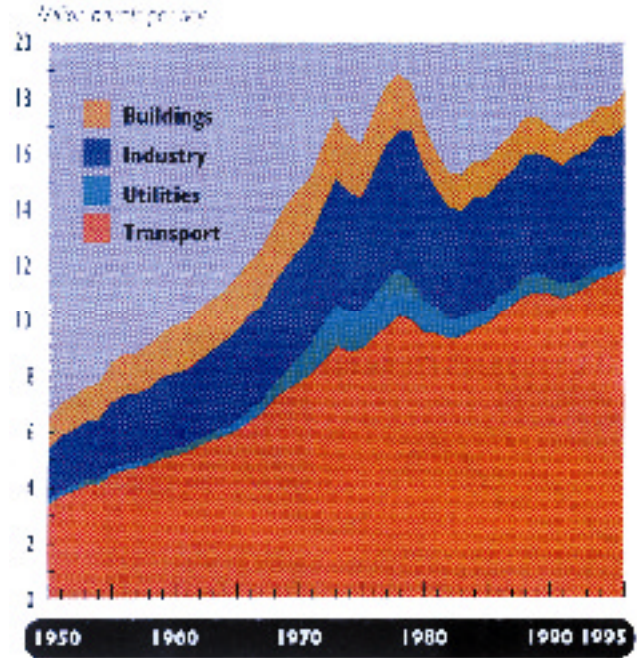
The effectiveness of progression breaks down when

traffic demand exceeds roadway capacity.

Progression depends on the type of road. For instance, progression is easier to maintain on a 5-lane road than on a 2-lane road. A boulevard provides better progression than a 5-lane road because each direction of travel can be timed independently, like a one-way street. Progression on one-way streets is easier to achieve because traffic signal spacing is less of a constraint.

Progression is usually based on the posted speed limit on the road.

Figure 9.  
Transportation's Share of U.S. Petroleum Use:  
1950-96



Source: U.S. Department of Energy, Energy Information Administration, Annual Energy Review, AER FACTS '96 (Washington, D.C., 1997), Table 1.1.

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