

Glossary of Terms

Actuated Signals: Vary the amount of green time allocated to each phase based on traffic demand. Can operate either in a fully actuated mode, semi-actuated mode, or coordinated mode.

Advance Stop Lines: Vehicle stop lines moved 5 to 10 m (15 to 30 ft) further back from the pedestrian crossing than the standard 1.2 m (4 ft) distance to improve visibility of through bicyclists and crossing pedestrians for motorists who are turning right.

All-way Stop control: Requires that vehicles approaching the intersection from all directions come to a stop prior to entering the intersection.

Americans with Disabilities Act (ADA): Law passed in 1990 that prohibits discrimination and ensures equal opportunity and access for persons with disabilities (<http://www.fta.dot.gov/civilrights/12325.html>).

Auxiliary Lane: A lane added in advance of (and sometimes carried through) an intersection for a limited distance to facilitate speed change (acceleration or deceleration), added capacity (throughput), separate turning or weaving.

Back-of-Queue: The maximum backward extent of queued vehicles during a typical cycle.

Before and After Study: Crash frequencies at a site are compared before and after implementation of a treatment.

Benefit-Cost Ratio (BCR) Method: First the present worth of benefits and costs is calculated. Then the ratio of present worth of benefits over present worth of costs is calculated. If the ratio is greater than 1.0, the project is economically justified.

Bicycle Box: Advance stop lines are placed on the approach to a signalized intersection, typically in the rightmost lane, at a location upstream from the normal stop line location. These create a dedicated space for bicyclists—a bicycle box—to occupy while waiting for a green indication.

Capacity: The maximum sustainable flow rate at which vehicles can pass through a given point in an hour under prevailing conditions; it is often estimated based on assumed values for saturation flow, and width of lanes, grades, and lane use allocations, as well as signalization conditions.

Change and Clearance Interval: The amount of time, in seconds, based on speed and corresponding to distance, provided for vehicles to either stop at or clear an intersection (refer to ITE Recommended Practice).

Crash Modification Factor (CMF): The ratio of expected crash frequency at a location with a countermeasure divided by the expected crash frequency at the location without the countermeasure.

Critical Phase: One phase of a set of phases that occur in sequence and whose combined flow ratio is the largest for the signal cycle.

Cut-through Median: A median on which the pedestrian path is at the same grade as the adjacent roadway.

Curb Extensions (also known as “Bulbouts” or “Neckdowns”): Involve extending the sidewalk or curb line into the street, reducing the effective street width.

Curb Ramp: A ramp leading from a sidewalk to a street to provide access for people who use wheelchairs and scooters.

Cycle Length: The time allotted or used for one complete sequence of signal indications.

Decision Sight Distance: The distance needed for a driver to detect an unexpected or otherwise difficult-to-perceive information source or condition in a roadway environment that may be visually cluttered, recognize the condition or its potential threat, select an appropriate speed and path, and initiate and complete the maneuver safely and efficiently.

Delay: The additional travel time experienced by a driver, passenger, bicyclist, or pedestrian beyond that is required to travel at the desired speed, including stop and start-up time.

Detectable Warning: A surface of truncated domes built in or applied to walking surfaces to alert visually impaired pedestrians of the presence of the vehicular travel way and to provide physical cues to assist pedestrians in detecting the boundary from sidewalk to street.

Detectors (also called Sensors): Inform the signal controller that a motor vehicle, pedestrian, or bicycle is present at a defined location on the approach to an intersection or within a signal system.

Dilemma Zone: Length of roadway in advance of an intersection wherein drivers may be indecisive and respond differently to the onset of a yellow signal.

Dilemma Zone Detection System: Uses detectors placed at one or more locations on an intersection approach to extend the green and prevent the onset of yellow while approaching vehicles are in the dilemma zone.

Disability Glare: The glare that results when stray light is superimposed in the eye on top of the retinal image of the object of interest, altering the apparent brightness of that object and the background in which it is viewed.

Dropped Lane: A through lane that becomes a left- or right-turn lane at an intersection.

Effective Green Time: The amount of usable time available to serve vehicular movements during a phase of a cycle.

Empirical Bayes (EB) Method: Calculates expected crash frequencies through a combination of observed and predicted crash frequencies. The predicted crash frequencies are derived through the development of a safety performance function (SPF).

Exclusive Pedestrian Signal Phase: Allows pedestrians to cross in all directions at an intersection at the same time, including diagonally. Sometimes called a “Barnes dance” or “pedestrian scramble.”

Far-side Transit Stop: A transit stop located downstream of an intersection.

Forgiving Roadway: An information-driven concept predicated on meeting the expectations of road users—motorists, bicyclists, and pedestrians—and assuring that they get needed information, when it is required, in an explicit and usable format, in sufficient time to react.

Fully-actuated Signals: Traffic signals that recognize users on all approaches.

Gap Reduction: A predetermined, constant time (often fraction of a second) which is subtracted from the maximum extension or passage time beginning at a point after the initial or minimum green has timed out.

Highway Safety Manual (HSM): An American Association of State Highway Transportation Officials (AASHTO) document that provides tools to practitioners to conduct quantitative safety analyses.

Human Factors Research: Deals with human physical, perceptual, and cognitive abilities and characteristics and how they affect our interactions with tools, machines, and workplaces.

Illuminance: The amount of light incident on the pavement surface from the lighting source.

Intersection Count: Number of vehicles entering a signalized intersection. This is often counted by turning movement and direction of travel.

Intersection Sight Distance: The distance required for a driver without the right of way to perceive and react to the presence of traffic signal indications, conflicting vehicles, and pedestrians.

Lagging Pedestrian Interval: Retiming the signal splits so that the pedestrian WALK signal begins a few seconds after the vehicular green for turning movement.

Leading Pedestrian Interval: Retiming the signal splits so that the pedestrian WALK signal begins a few seconds before the vehicular green. While the vehicle signals are in "All Red," this allows pedestrians to establish their presence in the crosswalk before the turning vehicles, thereby enhancing the pedestrian right-of-way.

Light Level: Represents the intensity of light output on the pavement surface. Reported in units of lux (metric) or footcandles (U.S. Customary).

Lost Time: The unused portion of a vehicle phase that occurs twice during a phase: at the beginning when vehicles are accelerating from a stopped position, and at the end when vehicles decelerate in anticipation of the red indication; often calculated as the sum of start-up loss and clearance interval.

Luminance: The amount of light reflected from the pavement toward the driver's eyes.

Manual on Uniform Traffic Control Devices (MUTCD): A compilation of national standards for all traffic control devices, including traffic signals.

Maximum Green Time: The maximum limit to which the green time can be extended for a phase in the presence of a call from a conflicting phase.

Near-side Transit Stop: A transit stop located upstream of an intersection.

Pedestrian Hybrid Beacon (PHB): A special type of traffic control device used to warn and control traffic at an unsignalized location to assist pedestrians in crossing a street or highway at a marked crosswalk.

Pedestrian Signal Detector: Devices to help pedestrians, including those with visual or mobility impairments, activate the pedestrian phase, such as pushbuttons or other passive detection devices.

Permissive-only Left-Turn Phasing (also called "Permitted-Only" Phasing): Signal phasing that allows two opposing approaches to time concurrently, with left turns allowed after motorists yield to conflicting traffic and pedestrians.

Positive Guidance: Concept that focuses on understanding and making allowances for how road users—primarily motorists—acquire, interpret, and apply information in the driving task.

Potential for Safety Improvement (PSI): The difference between expected crashes (obtained from the Empirical Bayes method) and predicted crashes (obtained from safety performance functions).

Preemption: Primarily related to the transfer of the normal control (operation) of traffic signals to a special signal control mode for the purpose of servicing railroad crossings, emergency vehicle passage, mass transit vehicle passage, and other special tasks, the control of which requires terminating normal traffic control to serve the special task.

Presence Detection: Alerts the controller to waiting vehicles during the red interval and calls for additional green time (passage or extension) for moving vehicles during the green interval.

Pre-timed Signals: Traffic signals that are programmed to give green indications to movements based on a predetermined allocation of time. Operate with fixed cycle lengths and green splits, and in turn can operate either in an isolated or coordinated mode.

Priority: The preferential treatment of one vehicle class (such as a transit vehicle, emergency service vehicle, or a commercial fleet vehicle) over another vehicle class at a signalized intersection without causing the traffic signal controllers to drop from coordinated operations.

Progression: The movement of vehicle platoons from one signalized intersection to the next.

Prohibited Left-Turn Movements: A scenario under which left-turning drivers are required to divert to another facility or turn in advance of or beyond the intersection via a geometric treatment such as a jughandle or a downstream median U-turn.

Protected-only Left-Turn Phasing: Signal phasing that provides a separate phase for left-turning traffic and allowing left turns to be made only on a green left arrow signal indication, with no pedestrian movement or vehicular traffic conflicting with the left turn.

Protected-Permissive Left-Turn (PPLT) Phasing: A combination of protected and permissive left-turn phasing.

Public Rights of Way Accessibility Guidelines (PROWAG): Guidelines developed specifically for pedestrian facilities in the public right-of-way that address conditions and constraints that exist in the public right-of-way.

Pulse Detection: A type of detection located well upstream of the intersection to provide inputs to the controller regarding approaching vehicles.

Queue Storage Ratio: The proportion of the available queue storage distance that is occupied at the point in the cycle when the back-of-queue position is reached.

Ramped Median: A median on which the pedestrian path is raised to the grade of the top of the curb.

Red Clearance Interval: Optional interval that follows the yellow change interval and precedes the next conflicting green interval. Provides additional time following the yellow change interval before conflicting traffic is released.

Red Light Running: When a motorist enters an intersection when the red signal is displayed and as a consequence sometimes collides with another motorist, pedestrian, or bicyclist who is legally within the intersection.

Red-Red Flashing Operation: A mode of flashing operation in which all approaches receive a flashing red indication. Typically used where traffic volumes on all approaches are roughly the same.

Red-Yellow Flashing Operation: A mode of flashing operation in which the minor street receives a flashing red indication and the major street receives a flashing yellow indication. Used in situations where traffic is very light on the minor street.

Ring-and-Barrier Structure: Signal phasing that prohibits conflicting movements (e.g., eastbound and southbound through movements) from timing concurrently while allowing non-conflicting movements (e.g., northbound and southbound through movements) to time together.

Road Safety Audit (RSA): A formal safety performance examination of an existing or future road or intersection by an independent audit team that considers the safety of all road users and qualitatively estimates and reports on road safety issues and opportunities for safety improvement.

Road Safety Management Process: Systematically identifying deficient locations from safety perspectives and addressing safety problems of these locations.

Roundabout: A circular intersection with design features that promote safe and efficient traffic flow.

Safety Performance Function: An equation that presents the mathematical relationship between crash frequency and volume for a reference group.

Safety Effectiveness Evaluation: The process of developing quantitative estimates of how a countermeasure, project, or a group of projects has affected crash frequencies or severities.

Semi-actuated Signals: Traffic signals that use various detection methods to identify roadway users on the minor approaches and/or major approach left-turn lanes.

Signal Interval: The part of the signal cycle during which signal indications do not change.

Signal Phase: The right-of-way, yellow change, and red clearance intervals in a cycle that are assigned to an independent traffic movement or combination of traffic movements.

Signal Phasing: The sequence of individual signal phases or combinations of signal phases within a cycle that define the order in which various pedestrian and vehicular movements are assigned the right-of-way.

Split Phasing: Signal phasing that consists of having two opposing approaches time consecutively rather than concurrently (i.e., all movements originating from the west followed by all movements from the east).

Small Target Visibility (STV): The level of visibility of an array of targets on the roadway. Determined by the average of three components: the luminance of the targets and background, the adaptation level of adjacent surroundings, and the disability glare.

Stopping Sight Distance: The distance along a roadway required for a driver to perceive and react to an object in the roadway and to brake to a complete stop before reaching that object.

System Detection: A collection of vehicular data such as count, speed, occupancy, queue length used by the controller to order and recall special override timing plans, traffic responsive timing plans, and adaptive signal control.

Traffic Demand: For an intersection, traffic demand represents the arrival pattern of vehicles.

Traffic Signals: Electrically operated traffic control devices that provide indication for roadway users to advance their travels by assigning right-of-way to each approach and movement.

Traffic Signal Controller: Acts as the “brain” of a traffic signal, changing signal indications based on user needs. The controller determines when the indication for the approach will change and how much time will be given to each movement.

Traffic Signal Heads: Informs roadway users of when their movement can proceed through the intersection. Signal heads vary in configuration, shape, and size depending on the movement for which they are used.

Traffic Volume: For an intersection, traffic volume is generally measured as the number of vehicles that pass through the intersection over a specific period of time.

Uniformity: Represents the ratio of either the average-to-minimum light level (E_{avg}/E_{min}) or the maximum-to-minimum light level (E_{max}/E_{min}) on the pavement surface.

Variable Initial: A volume-density feature used to improve intersection efficiency by using each pulse detector actuation during the red interval, typically on the major through approach, to incrementally alter the minimum green time in order to clear the accumulated queue for each cycle.

Variable Lane Use Treatments: Individual lane assignments at a signalized intersection are changed by time of day.

Veiling Luminance: Produced by stray light from light sources within the field of view. This stray light is superimposed in the eye on top of the retinal image of the object of interest, which alters the apparent brightness of that object and the background in which it is viewed.

Volume-to-Capacity (v/c) Ratio (also called degree of saturation): Represents the sufficiency of an intersection to accommodate the vehicular demand.

Yield-to-Bus Law: A law requiring all motorists to yield to buses pulling away from a bus stop in order to reduce transit/vehicle conflicts.