



Basics of a Preemption Event at a Traffic Signal Controller

A Preemption event is the transfer of normal operations at a traffic signal controller to a preemption state to service an emergency vehicle. A preemption event is typically requested by a special method of actuation, commonly an optical emitter installed on an emergency vehicle.

A TS2 traffic signal controller will generally respond to a preemption request by the following steps:

- **ACTIVE MINIMUMS** - The traffic signal controller will continue to time any active minimum greens or pedestrian clearance times (although there are options to reduce these times).
- **CLEARANCES** – At this point the traffic signal controller leaves normal operations. The traffic signal controller will transition into a yellow and all red sequence. This will allow any vehicles trapped in the intersection after the sudden transition to clear the intersection. In most controllers the yellow and red clearance times of the currently active phase are used, longer times can be assigned, if desired.
- **DWELL PHASES** - The controller will then activate the green indication for the Dwell Phases that received the preemption request. The Dwell Phases will be active until the Minimum Duration time has been satisfied, unless there is still a preemption request active. There is also an option to limit the maximum amount of time that the Dwell Phases can be serviced.

Some traffic signal controllers have the option to continue to cycle through non conflicting phases during the Dwell Phase, this is typically utilized at intersections adjacent to moveable bridges or active railroad.

- **EXIT CLEARANCE** – At the end of the Dwell Phases the traffic signal controller will transition into a yellow and all red clearance.
- **EXIT PHASES** – The traffic signal controller will then enter the phase sequence under normal operations at predetermined Exit Phases. The Exit Phases are typically the highest volume approaches and this is intended to clear the queues that built up during the Dwell Phases. The traffic signal controller will return to normal operations once the green indication for the Exit Phases has begun.

Most traffic signal controllers have priorities when responding to a preemption event. The preemption priority is represented by a numerical system with a lower number being a higher priority for the traffic signal controller to service. Typically, Priorities 1 and 2 are reserved for railroad operations, Priorities 3 to 6 are for emergency vehicle preemption, and Priorities 7 to 10 are for low priority (used for plow preemption or transit signal priority). Some traffic signal controllers can be set to a first come first served basis.

While responding to a preemption request, the traffic signal controller will commonly drop out of any active coordination programming. As such the controller will typically need to transition into coordination after returning to normal operation.

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