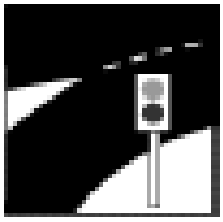
ODOT Region 1

Frequently Asked Questions

Ramp Meters

Ramp meters increase freeway speeds and volume as crashes, travel times decrease



Relieving congestion is accomplished by doing much more than just building more travel lanes. The Oregon Department of Transportation uses an array of tools from its Intelligent Transportation Systems unit to reduce bottlenecks and improve safety on the state's highways. One tool: ramp meters.

Ramp meters have come a long way since 1963, when a police officer stood at an on-ramp to the Eisenhower Expressway (I-290) in Chicago and waved his arms to regulate cars merging onto the roadway. There now are more than 4,000 ramp meters in cities across the U.S., according to a 2005 study by the U.S. Department of Transportation's Intelligent Transportation Systems Section.

The goal of ramp meters has remained the same during the past 50 years: reduce bottlenecks and improve the overall flow of traffic. Doing so saves travelers time and improves fuel consumption.

What are ramp meters?
Ramp meters look and operate like traffic signals, only with two phases—green and red—to regulate traffic moving onto highways. They are placed on highway on-ramps. ODOT's can operate around the clock, based on feedback.

Ramp meters allow vehicles to enter the highway one or two at a time. This avoids situations where large groups of vehicles join traffic all at once, causing traffic flow to slow down behind the merge point.

How do ramp meters improve traffic flow?
By regulating the number of cars and trucks that enter a highway at one time, traffic flow is smoother, increasing the total number of vehicles that can make it through a corridor and reducing freeway travel times.

This can only be done by metering flow from on-ramps that are upstream from known bottlenecks (for example, U.S. 26 eastbound on-ramps west of the Vista Ridge Tunnels).

When are ramp meters used?

- Ramp meters are most effective when turned on before congestion begins. (Waiting for congestion to occur before turning on ramp meters is not a solution to traffic backups.)

- As soon as traffic volumes pick up, ramp meters are activated so free-flowing traffic is extended for as long as possible
- The ramp meter system responds to actual traffic conditions. Ramp meters are not turned off the instant highway speeds rise again. Often highway traffic clears precisely because of the benefits provided by ramp meters. Through the use of traffic cameras, ODOT can watch free-flowing traffic become congested minutes after turning off a meter prematurely. Just as meter operators respond to the queues on the ramp, they also respond to highway traffic volumes. As the highway starts to clear, metering rates are increased accordingly to let as many cars as possible onto the roadway without causing congestion

Benefits of ramp meters

Ramp meters decrease congestion and improve the flow of highway traffic by producing higher average speeds and increased capacity. As idling decreases, better air quality and fuel performance also result. Safety is a key benefit of using ramp meters, causing a decline in congestion-related crashes.

A major study of ramp meters was undertaken by the Minnesota Department of Transportation a few years ago. MDOT studied the effects of turning off all its 430 ramp meters in the Twin Cities area for a six-week period. (For more, go to: http://www.dot.state.mn.us/rampmeterstudy/. The results, which were released in 2001, found that ramp meters produced:

- **A 9% increase in freeway volume.**
- **A 7% increase in freeway speeds**
- **A 22% decrease in freeway travel times**
- **A 26% decrease in crashes, including a 14.6% decrease in rear-end crashes, a 200% decrease in side-swipe crashes and a 60% decrease in "run off the road" crashes**

Portland ramp meters

ODOT first installed ramp meters in the Portland metro area in 1981 along a 6-mile section of Interstate 5 between Portland and the Washington state line. Prior to the installation of the northbound I-5 ramp meters, the afternoon peak hour average speed was 16 mph. Fourteen months after installation, the average speed for the same time period was about 40 mph.

In 2001, ODOT turned on ramp meters during the weekend on eastbound U.S. 26 (Sunset Highway) between Helvetia Road and the Highway 217 interchange. Highway congestion significantly decreased. At Cornell Road or Murray Boulevard, for example, the average speed during the weekend peak prior to ramp metering was approximately 30 mph. After ramp metering was implemented, the average speed increased to 55 mph or more during the weekend peak periods. Even where speeds did not increase very

much, volume increased. That means the highway can accommodate more vehicles on the corridor with ramp meters than without.

There now are more than 140 ramp meters in the Portland metro area.

Ramp meter negatives
Motorists must wait in line before getting the “green” light to merge onto highways. In some cases, vehicles waiting in a ramp-meter lineup might back up to local streets.

ODOT balances the need for ramp metering with the impacts to traffic on local streets. Studies have found that time saved in reaching a destination outweighs the additional time spent waiting on the ramp at the meter. For longer trips along a highway corridor, the positive impact of ramp meters is even greater.

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