Ramp Metering

Description

Ramp metering is the use of traffic signals at freeway on-ramps to control the rate of vehicles entering the freeway, temporarily storing it on the ramps. Using this technique for operational improvements helps to optimize freeway flow and minimize congestion.

Ramp metering is best used on freeway segments with high volume traffic to manage portal entries so that the freeway can be regulated during peak periods of congestion, typically AM and PM commuter hours. Ramp metering has been a proven operations strategy for improving overall freeway corridor performance and is not meant to work by itself or just in one location of a corridor.

Specific Locations and Conditions

Caltrans is designing and constructing ramp metering along I-80 between State Route 37 in Vallejo to the Yolo County Line. Exact locations and project designs are still under development.

Cost

The cost of the detectors and ramp meter for each entry ranges from $100 to $250 thousand but does not include communications.

PROS	CONS
• Ramp metering reduces the number of acceleration – deceleration cycles and smoothes traffic flow anywhere from 2-55%. • Main line peak period delay is reduced. • Main line average speed can increase 13 -26%. • Reduction in main line crashes by as much as 50%. • Can improve travel time by 15-60%. • Increases main line. • Emission reduction due to reduced delay.	• Wait times at on-ramps can cause significant back up on to arterials. • Arterial signals are sometimes coordinated with ramp meters to prevent traffic queues. • Potential diversion of trips to local roads is sometimes frustrating to residents if the local roads are not designed to manage the additional vehicles. • On-going communication costs. • Public acceptance needed before implementation.

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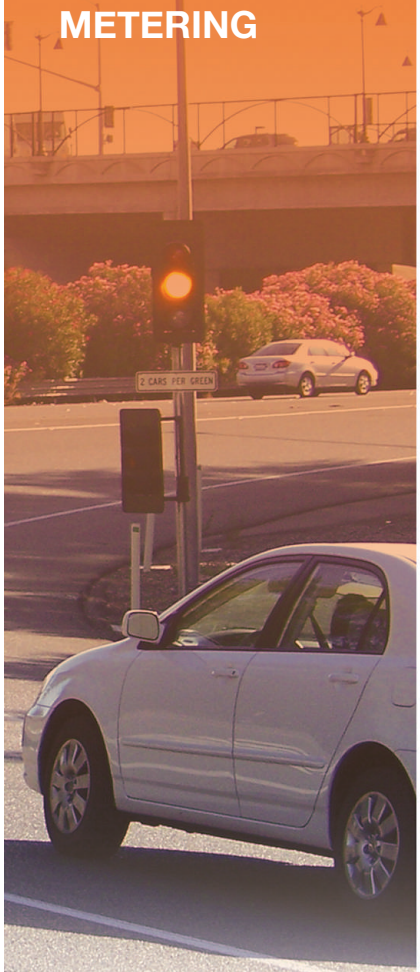
FREQUENTLY ASKED QUESTIONS ABOUT RAMP METERING



Why use Ramp Metering?

Ramp metering has a proven record for reducing congestion, travel times and accidents. Without ramp meters, multiple cars try to merge simultaneously. Drivers on the freeway slow down to allow the cars to enter and these slower speeds quickly cause backups. They have been used successfully in the Bay area, additionally, they decrease traffic idling on the freeway resulting in fewer vehicle emissions overall.

How does ramp metering work?

They are essentially traffic signals that reduce disruption to the interstate traffic by controlling the flow of merging traffic and alleviating bottlenecks. Slowing down merging traffic reduces accidents that occur when vehicles merge onto the freeway.

Where has it been used in the Bay area?

- Since 2003 Ramp meters have operated on six EB onramps on Ala-580. Peak travel times were reduced by 60%.
- In Pleasanton from Foothill Rd. (west of I-680) to Greenville Road (west of Altamont Pass) decreased travel times by 33%.
- SM-101 from Route 92 to the Santa Clara County Line experienced a 30% reduction in peak period congestion.

Does ramp metering give any benefit to those who are slowed at freeway entrance ramps?

Accidents often occur when multiple vehicles merge on to the freeway at the same time. Ramp metering reduces accidents by up to 30%. A short wait on the ramp allows drivers to increase their average speed on the freeway and shorten their overall freeway travel times.

What are the challenges in successfully implementing Ramp Metering?

One of the single biggest challenges with ramp metering is the possibility for on-ramp traffic queues to extend and impede traffic on adjacent arterials.

In addition to the use of queue detectors, a written agreement between Caltrans and the local agencies on operating parameters will help outline procedures to mitigate potential negative impact. An existing MOU between Caltrans and San Mateo County should be used as an example of a best practice example and similar documents should be a key component of ramp metering implementation.

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