RAMP METERING

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RAMP METERING

What do you want to hear?

CLASS OBJECTIVES

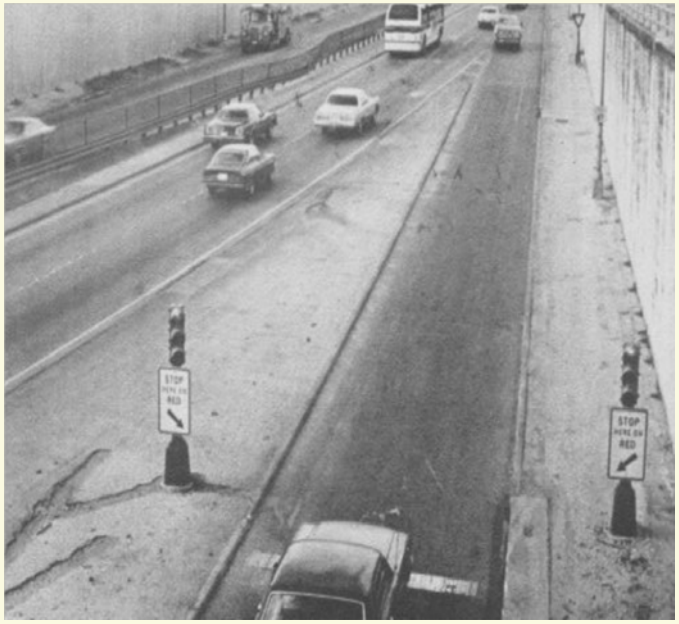
- What is ramp metering?
- Why do we meter ramps?
- Operations
- HOV preferential lanes

WHAT IS RAMP METERING?

- **Ramp metering is *not necessarily* a solution to congestion!**
- Ramp metering is a traffic management strategy, which uses traffic signals and accompanying equipment and techniques to manage onramp flow onto the freeway system.

HISTORY

- First ramp meter, Eisenhower Expressway (I-290), Chicago 1963
- In California
  - 1967, 1st meter at 5/14 Interchange
  - 1968, Chula Vista
  - SFO Bay Bridge Mainline metering 1972

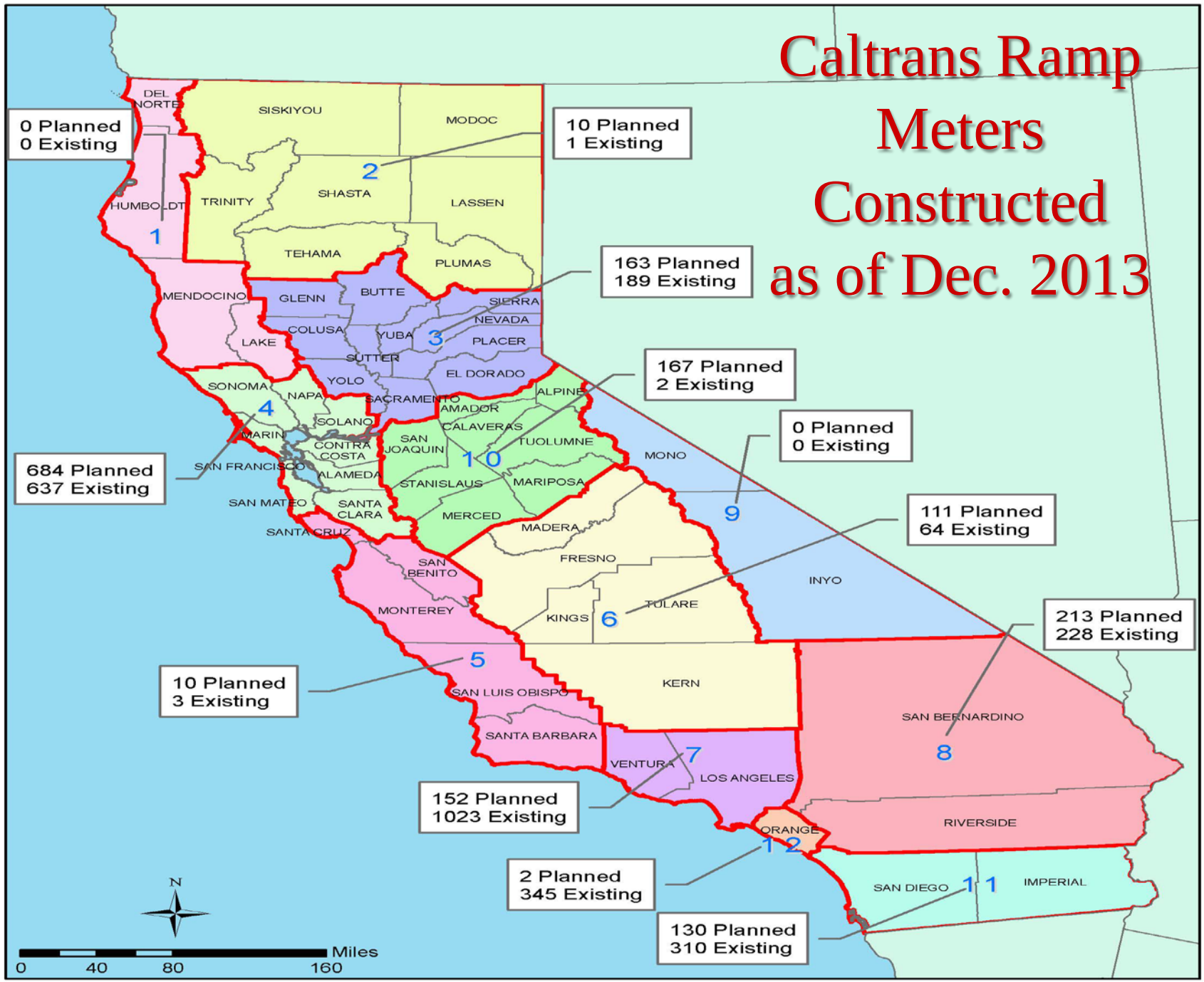


TODAY

- Ramp meters in North America
  - 28 metropolitan areas (as of January, 2015)
    - Portland, Seattle, Denver, Long Island, Minneapolis, LA, Oakland, Sacramento, Atlanta, etc.
- Over **4,536+** existing and 1,718 planned meters nationwide as of January, 2015
- As of January 2015, California has 2,802 existing, and 1,642 planned ramp meters

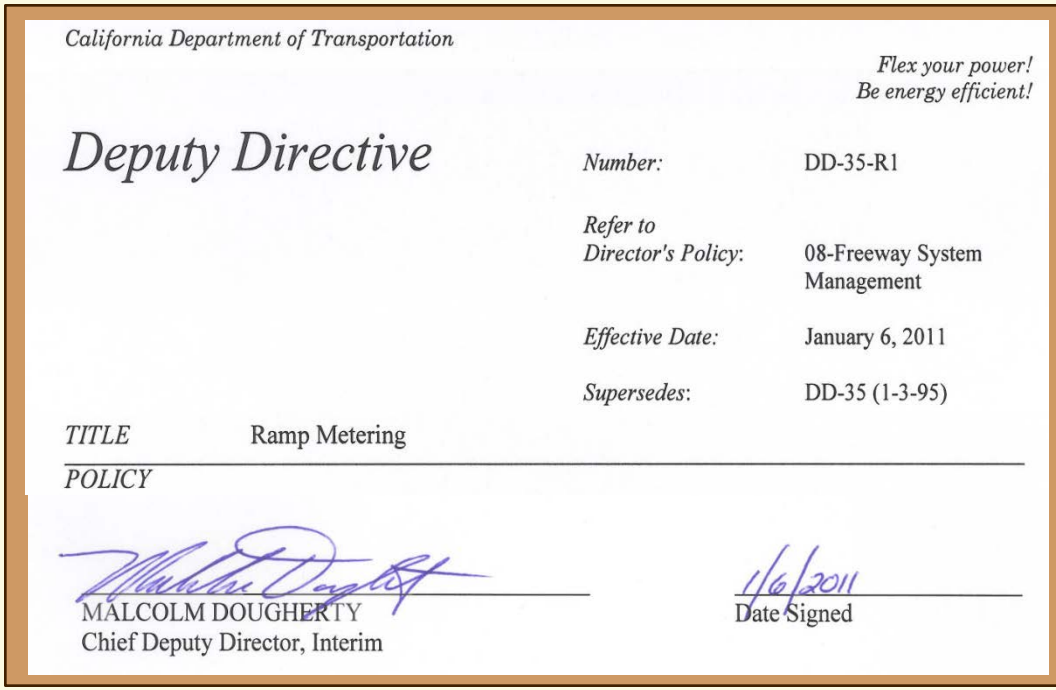
Ramp Metering in the United States

Caltrans Ramp Meters Constructed as of Dec. 2013



POLICY DD-35-R1

- Caltrans "is committed to implementing ramp metering as an effective traffic management strategy…"
- "Provisions for ramp metering shall be included in any project that proposes additional capacity… regardless of funding source."
- RMDP updated biennially
- HOV preferential lane, CHP enforcement pad, and maintenance vehicle pad shall be installed



California Department of Transportation

Flex your power!
Be energy efficient!

Deputy Directive

Number: DD-35-R1

Refer to Director's Policy: 08-Freeway System Management

Effective Date: January 6, 2011

Supersedes: DD-35 (1-3-95)

TITLE Ramp Metering

POLICY

MALCOLM DOUGHERTY
Chief Deputy Director, Interim

1/6/2011
Date Signed

RAMP METERING BENEFITS

Reduce Congestion: Breaks up platoons

- Meters work like dams
- Meters prevent flooding of the downstream bottlenecks by managing the upstream ‘flow’

RAMP METERING BENEFITS

Utilize Capacity of Corridor (Remember this!)

- Route
  - Different ramp
  - Frontage road
  - Surface street
- Time
  - Earlier
  - Later
  - Not at all

RAMP METERING BENEFITS

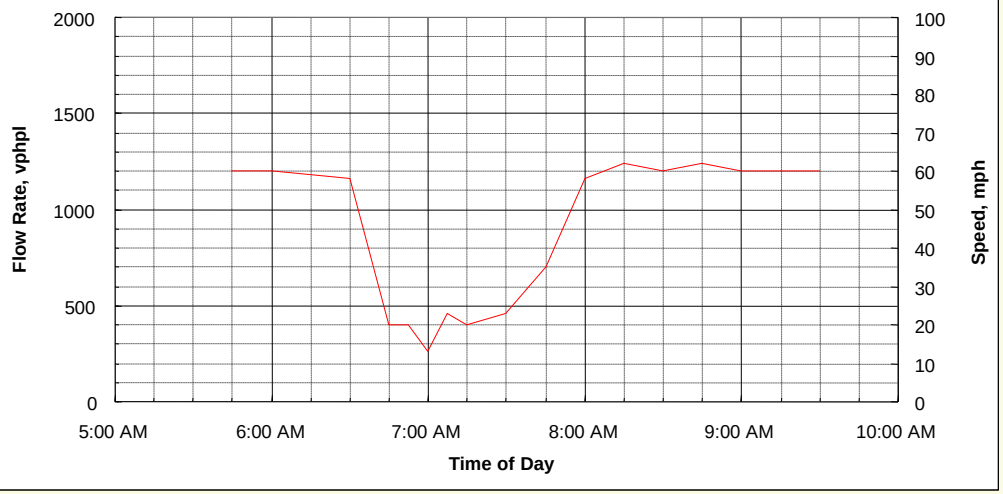
Encourage Modal Shift

RAMP METERING BENEFITS

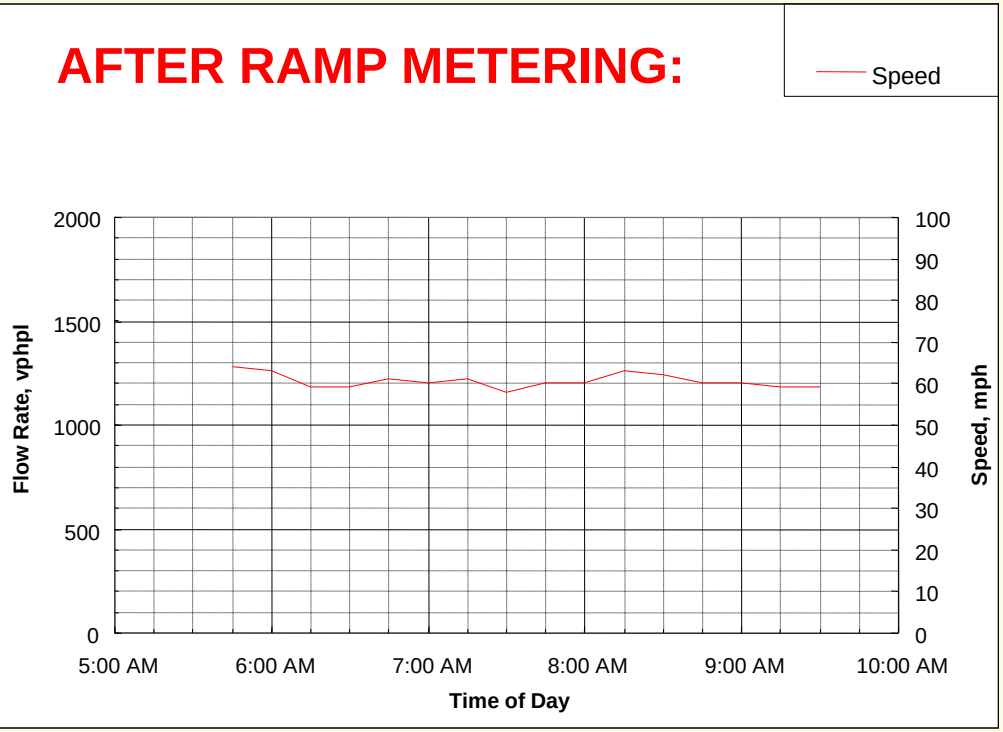
California Projects:

San Diego WB 94 Study

BEFORE RAMP METERING:



AFTER RAMP METERING:



RAMP METERING BENEFITS

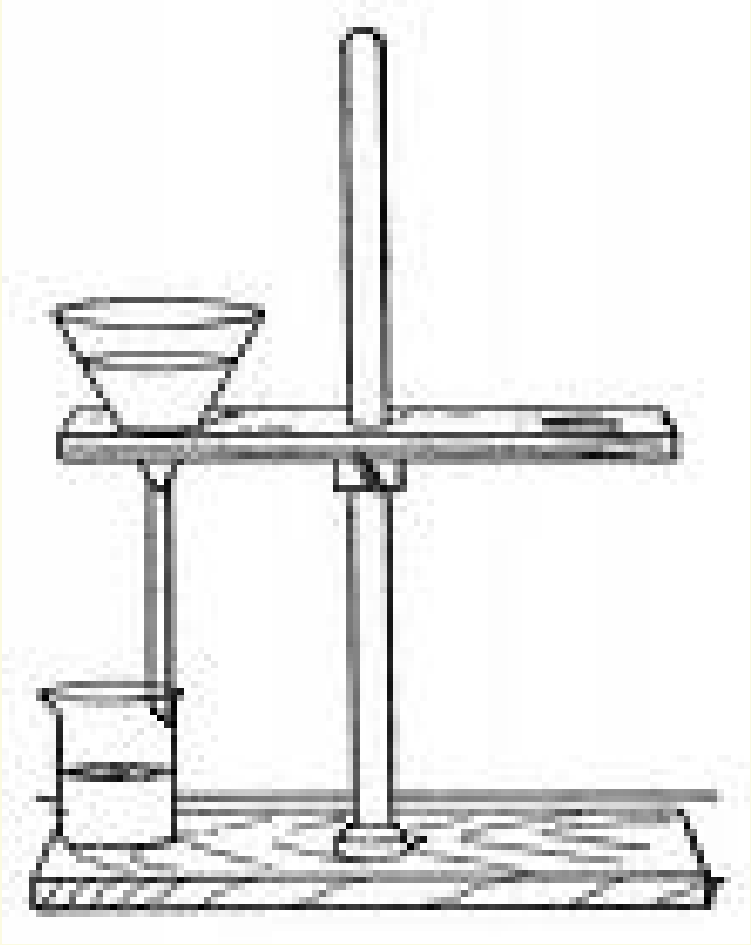
Real Projects: The Minnesota ramp meters turn-off Study

Along 210 miles of freeway, 430 meters were studied for a period of 6 weeks.
http://www.dot.state.mn.us/rampmeter/study.html

Measure of Effectiveness	Average Change
Freeway Travel Time	+22%
Freeway Travel Speed	-7%
Freeway Throughput	-9%
Travel Time Reliability	-91%
Crashes	+26%
B/C for RM Systems	15:1
Motorist Perception	Less safe

CLASS DEMO

Ramp Metering Demonstration



QUIZ !

- List three of the benefits of ramp metering?
- How does ramp metering improve safety?
- What did MnDOT do to measure the benefits of ramp metering?

TYPES OF OPERATION

- Traffic responsive
  - Real-time
  - Adjusts to local freeway flow conditions
  - More maintenance (mainline loops)

TYPES OF OPERATION

- Centrally controlled
  - Send info to and receive commands from the TMC
  - Corridor management (ARM)

TYPES OF OPERATION

- Fixed rate
  - Stand-alone
  - Doesn’t operate based upon freeway conditions

HOV PREFERENTIAL LANES

- 733 Statewide, 40 % of RM Locations
- Metered vs. Non-metered

HOV PREFERENTIAL LANES

- Ramp Metering Design Manual requires HOV preferential lanes be provided at all new installations
- Pros:
  - Encourage carpooling
  - Encourage transit usage
  - Form an HOV lane system, together with mainline HOV lanes, and park & ride lots
  - Enhance overall system efficiency by mobilizing more people while reducing number of vehicles

HOV PREFERENTIAL LANES

- Cons
  - HOV demand too high
  - HOV demand too low
  - Mixed flow lane demand too high
  - HOV merging concerns, when non-metered
- Onramp HOV preferential lane removal is a design exception!

METERING RATE

- Mainline volume
- On-ramp volume
- Storage length

Effective ramp metering strategies involve a trade-off between:

Mainline bottleneck activation vs. onramp back-up

CONTACT LIST

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RAMP METERING

Have you learned what you want to learn?