

Ramp Control on Freeways in California

G. L. RUSSELL, California Division of Highways

ABRIDGMENT

•IN January 1969, three freeway ramp control projects were operating in California.

Harbor Freeway

The major project is on the 8-lane Harbor Freeway in Los Angeles. Traffic volume is about 190,000 vehicles per day. The control section is 5 miles long and includes six on-ramps. Five ramps are controlled by preprogrammed traffic signals and one ramp is simply closed during the peak period, from 3:30 to 5:30 p. m. During the rest of the day (and night), the signals remain green. Input from the controlled ramps was reduced by about 1500 vehicles during the two hours but input from the mainline upstream was increased by about 1000. Net diversion to the city street system was only about 500 in 2 hours.

Freeway speeds have increased from about 20 mph to about 40 mph. Freeway users are saving about 1000 vehicle hours per day against a loss, or increased travel time, for diverted or delayed ramp traffic of about 130 vehicle hours. The effect of the added load on streets is too small to notice or measure.

Capacity (7200-7500 vph) was not increased, but throughput upstream of bottlenecks was increased. Nonrecurrent incidents affect the system about one day out of two, but most of them are cleared up soon enough to avoid spoiling the whole operation. It is planned to go to traffic-responsive control in order to take advantage of the unused capacity downstream of incidents when they occur.

Some unusual techniques being employed are (a) preferential treatment for buses—they are allowed to bypass ramp queues and to make left turns where other traffic is not; (b) storage of queued vehicles on a frontage road—it is carried back across an intervening major thoroughfare by timing the intersection signal so that the intersection itself remains clear; (c) two-abreast release of vehicles at the ramp signal at one location increases storage room and makes possible high metering rates.

Total cost of the Harbor Freeway project was \$52,000. Annual operating cost is nominal (electricity and signal maintenance); annual benefits about 200,000 vehicle hours.

Hollywood Freeway

The Hollywood Freeway project consists of one metered ramp and one ramp that is closed by barricades during the peak period. The metered ramp is operated by a pretimed signal. Travel time savings are about 450 vehicle hours per day, consisting of 500 hours savings for freeway users upstream of the bottleneck less 50 hours for loss to diverted or delayed ramp traffic.

Chula Vista Project

Four ramps on 3.2 miles of a 4-lane freeway in Chula Vista are being controlled. Peak-hour input from these four ramps was reduced by 580 vehicles, and input to the mainline upstream of the control section was increased by 540 vehicles. Speed on the freeway increased from 26 mph to 43 mph for the higher volume. Traffic on parallel

streets increased 225 vehicles. Controllers were designed and fabricated in the district shop. Total cost of the project was less than \$5,000. This project was surveyed, designed, and executed by three men on the regular district traffic department staff in addition to their other duties.