Urban Freeway Corridor Control Model

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In recent years, on-ramp control and freeway redesign to improve freeway traffic operations have received considerable attention. Concurrently, work has been under way to develop coordinated control and design systems to improve street operations. However, only a few studies have used an integrated approach to control and design both a freeway and an adjacent street network (i.e., an urban freeway cooridor). Inasmuch as corridor control and design systems have already been implemented in some locations and are planned in others, it would be most appropriate to have a methodology available that simultaneously considered all pertinent corridor control and design variables, such as ramp-metering rates, traffic signal timings, quantity of traffic to be diverted, and corridor geometry. The objectives of this study are (a) to develop such methodology and (b) to apply the methodology to corridor control optimization.

A fixed-time methodology is developed to provide insight into the interactions among various corridor de-

Figure 1. Freeway corridor research overview.

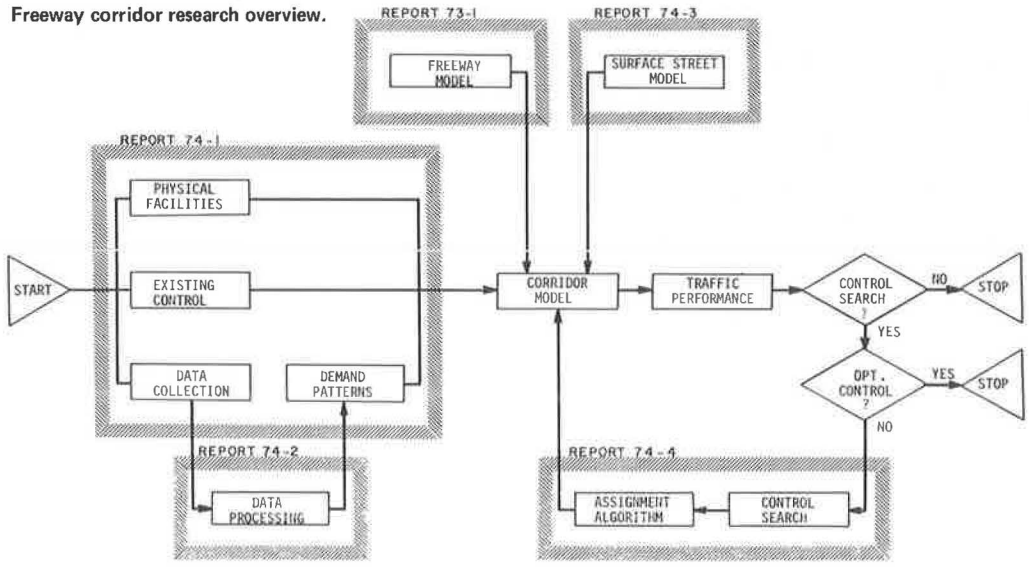

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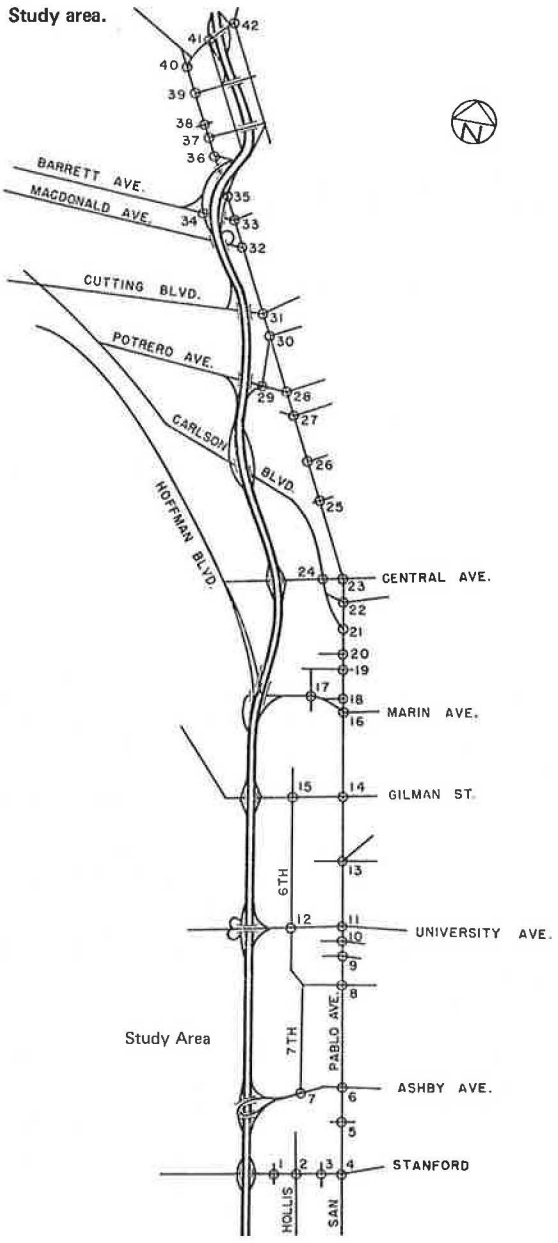
Figure 2. Study area.



sign, demand, and control variables. This methodology, after computerization, is used to evaluate possible corridor control strategies and to select the optimum. The resulting computer model, corridor model with queuing analysis, version 1, including control CORQ1C, combines two existing simulation models with a decision model. The decision model, based on a linear programming technique, selects an optimum corridor control strategy and predicts the resulting traffic diversion (Figure 1).

This methodology is then applied to the determination of optimum fixed-time corridor control strategies by using data from a section of the northbound Eastshore Freeway corridor (I-80) in the San Francisco Bay area (Figure 2).

Such research is expected to provide optimum corridor control strategies and to simulate improved use of existing facilities by balancing traffic against available capacity throughout a corridor system.