

A STUDY OF FREEWAY TRAFFIC INFORMATION  
REPORTED VIA COMMERCIAL RADIO

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## ABSTRACT

The procedures used by three Houston radio stations in broadcasting freeway traffic information and the nature of the traffic information broadcasted were evaluated to obtain a better understanding of the application of commercial radio to freeway communications. The results of the study strongly suggest that commercial radio using current practices in the Houston area would not be satisfactory for providing real-time freeway traffic information to motorists. A major change in procedural policies would be required prior to the adoption of this system for the application that is being considered.

## DISCLAIMER

The opinions, findings, and conclusions expressed or implied in this report are those of the authors and not necessarily those of the Texas Highway Department or of the Federal Highway Administration.



## SUMMARY

The study reported herein was undertaken to gain additional insight into the application of commercial radio to freeway communications. The report contains an evaluation of the procedures used by three Houston radio stations in broadcasting freeway traffic information and the accuracy, reliability, and timeliness of the traffic broadcasts. Interviews were held with personnel from the three radio stations to determine their broadcast procedures. In addition, traffic incidents that occurred on the Gulf Freeway during peak periods were compared to the traffic information monitored over the radio.

The results of this study strongly suggest that commercial radio using current practices in the Houston area would not be satisfactory for providing real-time freeway traffic information to motorists. A major change in procedural policies would be required prior to the adoption of this system for the application that is being considered.

Specific findings are as follows:

1. Of the 110 observed accidents on the study section of the Gulf Freeway, 52 percent were not reported by any of the stations. In addition, 24 percent were reported by 1 station, 17 percent by 2 of the stations, and 7 percent by all 3 stations.
2. Only 3 of the 104 stalled vehicles observed were reported by the radio stations. The average duration of the stalls was about 10 minutes, compared to 13 minutes for the vehicles involved in accidents.

3. The average time to report an accident after it was observed was 21.3 minutes for station A, 24.5 minutes for station B, and 26.9 minutes for station C.
4. No radio reports were monitored that indicated whether an accident, previously reported, had been cleared.
5. Little information was broadcasted which indicated the length of freeway affected by an incident.
6. Radio reports of traffic incidents were generally correct as to location.

#### Recommendation for Implementation

The use of commercial radio offers a good alternative for providing the freeway driver with real-time traffic information as a complement to visual forms of communication such as changeable message signs. It is recommended that:

1. The State assume the leadership in developing procedures to effectively utilize commercial radio as a complement to changeable message signs to provide the driver with "on-the-spot" freeway information. It is anticipated that such information will increase the safety and operation of a freeway corridor. However, ways must be sought to minimize the time between the actual occurrence of an incident and the radio traffic broadcast.
2. Studies should be initiated to evaluate the feasibility of induction radio for use as part of a real-time freeway information system. The State should consider experimentation of prototype systems in the field as well as laboratory studies.

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## INTRODUCTION

### Background

An earlier project report (1) has suggested that commercial radio could play an important role as part of an effective real-time freeway information system for urban areas, provided the information broadcasted is accurate, reliable, and timely. The procedures used by three Houston radio stations in broadcasting freeway traffic information and the nature of the traffic information were evaluated to obtain a better understanding of the application of commercial radio to freeway communications.

The Gulf Freeway in Houston was selected as the study side because of the existing research and surveillance facilities. Since the installation of the television system, the Houston Police Department has maintained a patrolman and a base station police radio in the control center to detect and report traffic incidents that occur on this section of freeway during the peak periods. Information relating to the occurrence of the incidents is also recorded on log sheets. This surveillance provided the opportunity to evaluate the responses of radio stations in the Houston area to the incidents on the freeway.

For the purposes of this study, the broadcasts of three local radio stations that provided peak period traffic bulletins were monitored with magnetic voice recorders. The tapes were later transcribed, and traffic information relating to the Gulf Freeway study section was recorded on prepared data forms. The following information was noted:

Whether the station did broadcast information about the incident

- . The extent of the information broadcasted
- . The time of the broadcast (or broadcasts) relating to the specific incident
- . Whether the station did broadcast information when the incident had been cleared or removed

The data were then compared to that recorded while viewing the television monitors.

In order to evaluate the provision of traffic information to the motoring public, personnel from the three radio stations were interviewed by representatives of the Texas Transportation Institute and the Texas Highway Department. A basic set of questions was prepared to make the interviews as consistent as possible. In addition, an interview was held with law enforcement personnel in the dispatcher's office of the Houston Police Department.

## RESULTS

### Broadcast Procedures

Basically, all three stations which were monitored in Houston rely on traffic information provided by the Houston Police Department, although there are slight variations as to how the information is placed on the air. Telephone calls requesting the services of the police and calls from other police officers in the field are directed to the dispatch office. Those calls received relating to traffic accidents or other situations which cause traffic congestion during the peak periods are noted, and the information is given to an officer who has the responsibility of relaying this to the radio stations. It is important to note that information received by the police dispatcher is the only

information that is relayed to the radio stations by the police; consequently, traffic incidents not requiring police aid or investigation would not normally be available for broadcast by the radio stations.

A schematic of the normal broadcast process is shown in Figure 1. Two basic methods of obtaining traffic information are utilized by the radio stations in Houston. One method involves telephoning the officer who has the responsibility of relaying traffic information that he has received. The radio station personnel generally telephone whenever the station is ready to broadcast the information.

In the second method, the police officer takes the initiative. When the officer has recorded a sufficient number of incidents, he signals the radio stations by pressing a button located at the base of a microphone. Exactly one minute from this signal, the officer broadcasts the available information to the radio station. Information is given at approximately half hour intervals. However, when a major incident occurs, the reports may be given at more frequent intervals. Four radio stations in Houston utilize this method, while the other stations telephone the officer directly.

The radio stations then take one of three actions. Some stations broadcast the information live as it is being received. Others record the information and then play the recorded tape on the air as soon as a convenient opportunity arises. Other stations utilize the traffic information that they receive, but the radio announcer himself makes the broadcast. The three radio stations which were monitored use the following procedures:

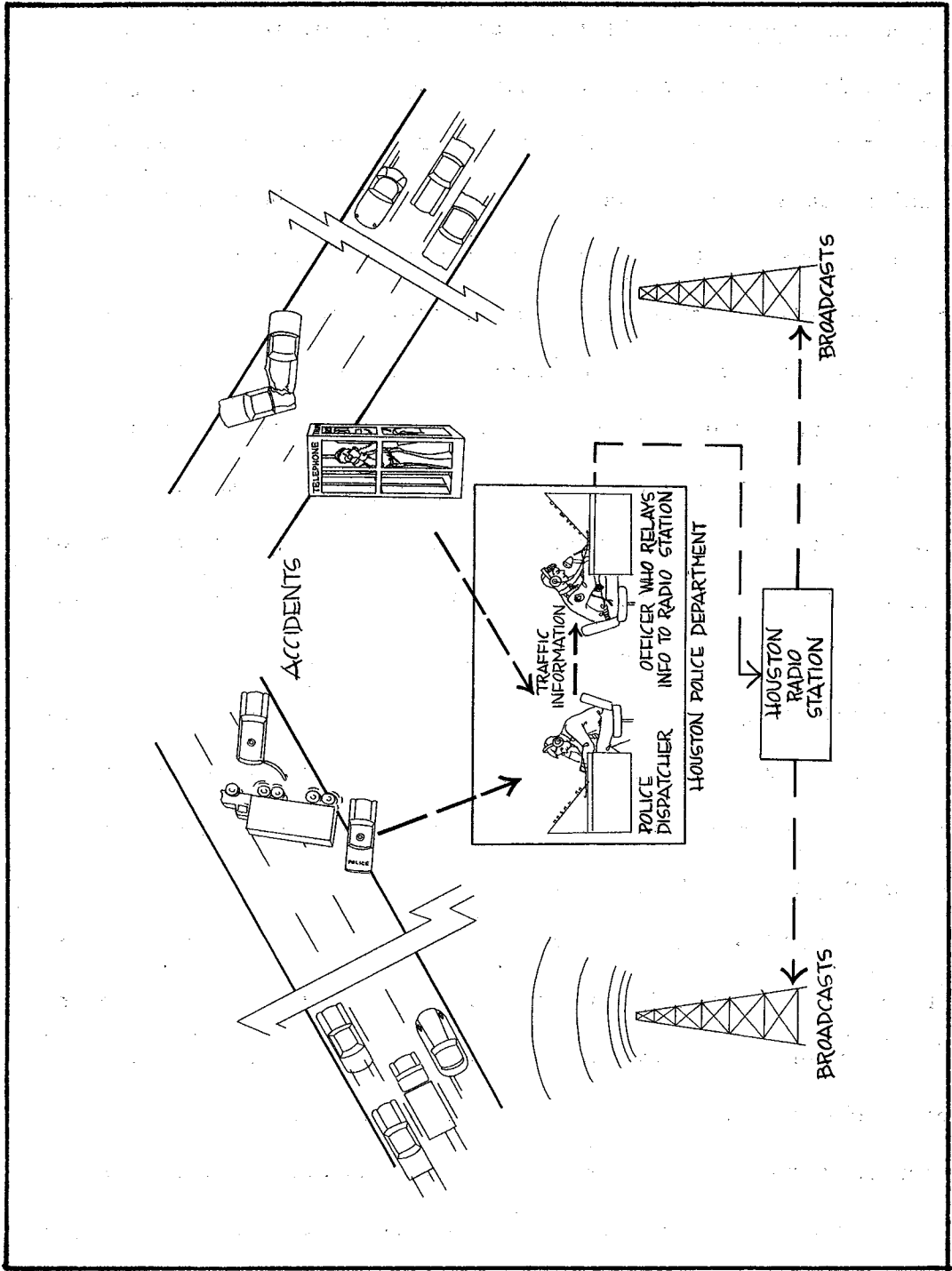


FIGURE 1 — SCHEMATIC OF TRAFFIC INFORMATION TRANSFER

Station A - calls the officer when it is ready to broadcast traffic information. The information is taped and played on the air as soon as possible.

Station B - calls the officer when they are ready to broadcast. However, this station utilizes its own personnel to broadcast on the air.

Station C - uses procedures comparable to Station A.

### Traffic Broadcasts

A summary of the traffic reports by the three radio stations is presented in Table 1. A total of 214 incidents were observed within the Gulf Freeway surveillance area during the study period; these included 110 accidents and 104 stalls. The analysis revealed that a relatively low percentage of the observed accidents was actually broadcasted. The reporting of the three monitored stations revealed the following:

- . Station A reported 19 percent of the accidents
- . Station B reported 26 percent of the accidents
- . Station C reported 35 percent of the accidents

Further analysis revealed these percentages:

- . 52 percent of the accidents were not reported by any of the stations
- . 24 percent of the accidents were reported by only 1 station
- . 17 percent of the accidents were reported by 2 stations
- . 7 percent of the accidents were reported by 3 stations

Although the effects of stalled vehicles during the peak periods could be as adverse as some of the accidents, stalled vehicles were very rarely reported by the monitored radio stations (only 3 reports of 104 stalls). The average duration of a stall was about 10 minutes, which

TABLE 1  
TRAFFIC REPORTS OF INCIDENTS

Station	Accidents Reported		Stalls Reported	
	Number	Percent of Total <u>a/</u>	Number	Percent of Total <u>b/</u>
A	21	19	3	3
B	29	26	0	0
C	38	35	0	0

a/ Number of accidents observed = 110

b/ Number of stalls observed = 104

can be compared to the 13-minute duration of an accident on the roadway.

#### Relative Time of Radio Reports

In addition to the probability of incident reports by the radio stations, it was also important to determine the time of the reports relative to the occurrence of the incidents. The ideal situation would be that the radio stations report the incident immediately after it occurs. If the motorist is informed as early as possible, he is afforded more decision time in which to respond to the information and to choose an alternate route if necessary.

A summary of the reports by the three radio stations is presented in Table 2. The results show that the average time of the initial broadcasts after the accidents were observed on the freeway was 21.3, 24.5, and 26.9 minutes for Station A, B, and C, respectively. The earliest report time was 1 minute, whereas the latest time of the initial broadcast was 98 minutes. The average number of broadcasts by the stations per reported accident was about 1.3.

Results of the accident reports, with respect to the duration of accidents on the roadway for Stations A, B, and C, are tabulated in Tables 3, 4, and 5. The results indicate that there is no relationship between the duration of accidents and the response time of the radio stations to broadcast the information. There was a wide variability in the response time of each radio station.

The delay by the radio stations to report freeway traffic accidents appears to be due to two major reasons. The first is the delay involved between the time the police dispatcher's office receives the information and the time this information is relayed to the radio stations.

TABLE 2

SUMMARY OF RADIO REPORTS  
OF ACCIDENTS

Station	Percent of Accidents Reported	Average Time to Report an Accident (min.)	Range of Reporting Times (min.)	Average Number of Broadcasts Per Accident Reported
A	19	21.3	8-44	1.3
B	26	24.5	1-98	1.2
C	35	26.9	3-58	1.3



TABLE 3

## REPORTS OF ACCIDENTS BY STATION A

Duration of Accidents on Roadway (min)	Total Number of Accidents	Total Number of Accidents Reported by Station A	Average Time to Report an Accident (min)	Standard Deviation (min)	Range of Report Times (min)	Average Number of Reports for the Same Accident	Average Time between Additional Reports (min)
<4	29	4	23	7.6	15-30	2.0	18
5-8	24	4	26	16.6	10-44	1.7	16
9-12	12	4	19	9.3	11-31	1.0	--
13-16	12	2	15	9.9	8-22	1.5	33
17-55	33	7	21	9.7	9-33	1.3	38

Overall Average Reporting Time for Station A = 21.3 min.

TABLE 4  
REPORTS OF ACCIDENTS BY STATION B

Duration of Accidents on Roadway (min)	Total Number of Accidents	Total Number of Accidents Reported by Station A	Average Time to Report an Accident (min)	Standard Deviation (min)	Range of Report Times (min)	Average Number of Reports for the Same Accident	Average Time between Additional Reports (min)
<4	29	4	15	7.4	9-26	1.0	--
5-8	24	4	25	10.1	17-40	1.0	--
9-12	12	4	31	14.3	13-48	1.0	--
13-16	12	7	22	12.2	6-45	1.0	--
17-55	33	10	27	26.9	1-98	1.2	38

Overall Average Reporting Time for Station B = 24.5 min.

TABLE 5

## REPORTS OF ACCIDENTS BY STATION C

Duration of Accidents on Roadway (min)	Total Number of Accidents	Total Number of Accidents Reported by Station C	Average Time to Report an Accident (min)	Standard Deviation (min)	Range of Report Times (min)	Average Number of Reports for the Same Accident	Average Time between Additional Reports (min)
<4	29	5	23	9.7	10-34	1.4	13
5-8	24	8	29	16.8	9-58	1.3	45
9-12	12	6	21	10.4	3-34	1.0	--
13-16	12	5	31	14.3	13-49	1.4	26
17-55	33	14	28	13.4	8-40	1.4	17

Overall Average Reporting Time for Station C = 26.9 min.

Based on the interviews with the radio stations and the police department personnel, it appears that a delay of one half hour is not uncommon. The other major reason is that a station transmits reports when its normal scheduling permits, and often this increases the delay.

#### Accuracy and Reliability of Radio Reports

An analysis of the locations of incidents reported by the radio stations and the locations observed by the surveillance center revealed the following:

- . Radio reports of traffic incidents were generally correct as to location
- . Little information was broadcasted which indicated the length of freeway affected by an incident
- . No radio reports were monitored that indicated whether an accident, previously reported, had been cleared

#### FINDINGS

The results of this study strongly suggest that commercial radio using current practices in the Houston area would not be satisfactory for providing real-time freeway traffic information to motorists. A major change in procedural policies would be required prior to the adoption of this system for the application that is being considered. Specific findings are as follows:

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#### REFERENCES

1. Dudek, C. L. and Cummings, D. Application of Commercial Radio to Freeway Communications - A Study of Driver Attitudes. Texas Transportation Research Report 139-3.

