

## Abridgment

# Driver Response to a Highway Advisory Radio System in New Braunfels, Texas

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Field studies were conducted in New Braunfels, Texas, to test the effectiveness of a highway advisory radio (HAR) system in diverting freeway traffic destined to a special event (the annual Wurstfest celebration) from the primary arterial routes to an alternate arterial route. Three types of HAR messages were tested. Origin-destination data were collected and a questionnaire was administered to determine driver reactions and attitudes to the HAR route diversion and to identify factors that influenced the drivers' decisions to divert. The findings of the questionnaire study are summarized. The results indicated no differences in response to the three message types. Drivers less familiar with the area were more apt to divert when they heard a message. A high percentage (42 percent) of the drivers interviewed stated that they did not see the advance sign for HAR. Only 56 percent of those who saw the sign tuned to the station. A comparison of HAR tuning and diversion revealed that 67 percent of the drivers interviewed who tuned to HAR diverted to the alternate route.

The Texas Transportation Institute (TTI), in cooperation with the Texas State Department of Highways and Public Transportation (TSDHPT), San Antonio District, and the city of New Braunfels, Texas, conducted field studies in New Braunfels to test the use of a highway advisory radio (HAR) system for diverting traffic during special events. These studies were conducted in conjunction with the annual Wurstfest celebration in New Braunfels. The use of HAR messages to divert freeway traffic from primary arterial routes to a less-congested one was investigated.

A questionnaire was administered by the TSDHPT; then we evaluated it to determine driver attitudes and reactions to the HAR route diversion and to identify factors that influenced the drivers' decisions to divert. Some of the findings of the questionnaire and study are summarized in this paper. Details are included in a report by Dudek and Huchingson (1).

New Braunfels is approximately 35 miles northeast of San Antonio on I-35. Wurstfest, an annual 10-day folk festival, is held at Landa Park, which is located near the downtown area. The event attracts people from several cities in Texas, and most arterial routes in New Braunfels that lead from the freeway to Landa Park become highly congested on weekends during the event. City officials speculated that large percentages of traffic came from cities northeast of New Braunfels that use southbound I-35. Therefore, the HAR study was designed to divert southbound I-35 traffic bound for the Wurstfest.

Figure 1 shows the location of Landa Park relative to I-35 and the New Braunfels exits. Southbound I-35 drivers can take any one of five freeway exits (numbered 1 through 5 in Figure 1) to New Braunfels: US-81, Loop 337, Frontage Road, Seguin Avenue, and Walnut Avenue.

Landa Street, west of Landa Park, intersects Walnut Avenue, which runs directly to I-35. The Walnut Avenue route was selected as the recommended alternate route for this study because it is usually the least congested and leads to convenient parking areas. However, its location after four exits created a somewhat different diversion approach than would normally be expected. The more-common approach is to divert drivers to an alternate route upstream from their intended exit ramps.

In contrast to other reported studies of spe-

cial-event diversion (2,3), Landa Park does not have a central parking facility. Motorists must use private lots, shopping centers, or on-street parking facilities scattered near the park.

## METHOD

The HAR system was operated from a site near radio station FM 306 (see Figure 1). The antenna was mounted on an existing sign support located near the freeway lanes on a fill section. The transmitting equipment (transmitter, tape playback unit, etc.) was placed in the trunk of a vehicle parked at the bottom of the fill section. The system was developed so that it could operate by using power from the car battery. However, power problems developed during the study, and it was necessary to use a portable generator. The generator power resulted in a higher-quality radio signal. The signal was stronger and extended considerably farther than when the car battery was used.

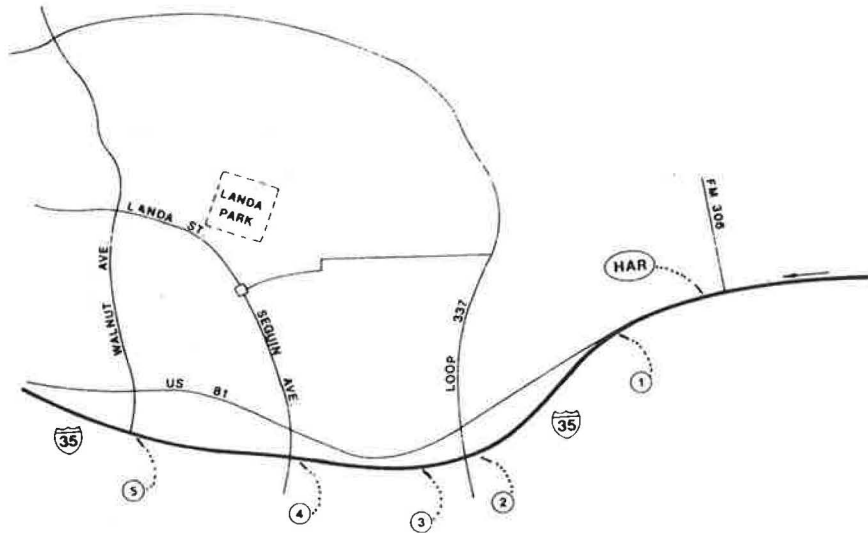
White-on-blue 48x48-in (1.2x1.2-m) radio zone signs were posted on the freeway about 0.75 mile (1.2 km) on either side of the antenna at the limits of the primary radio reception area. Southbound motorists were advised to tune to the 530 AM station by a trailer-mounted advance sign located approximately 1.25 miles (2.1 km) upstream from the antenna. The sign message, WURSTFEST/RADIO TRAFFIC ADVISORY/TUNE 530/1/2 MILE, was composed of individualized letter/number white-on-blue reflectorized panels that had 10-in (25.4-cm) D-series letters. The sign was covered by using four 4x8-ft (1.2x2.4-m) sheets of plywood hooked to the top of the sign trailer when no radio message was being broadcast.

Questionnaires were developed for drivers who took the recommended route and for those on other routes. Questions were included to determine the driver's destination, planned route, familiarity with New Braunfels, type of radio equipment, and experience with the advisory sign and message broadcast signal. In addition, drivers who did not divert were asked open-ended questions about their disregard of the route information presented by HAR and about additional information that would have influenced their choice of route. Drivers on the diversion route were asked to list problems they encountered and the reasons they took the route.

## RESULTS

A total of 1973 vehicles was observed during the two nights during which this study was conducted. Questionnaires were mailed to owners of 1461 of the vehicles. Responses were received from 424 motorists. The effective return rate (number of questionnaires returned as a percentage of the observed number of drivers) averaged 22 percent over the study and was relatively stable. On the average, 85 percent of the drivers who returned the questionnaire went to the Wurstfest. This percentage was fairly constant throughout the study. All subsequent data discussed in this paper are based on the number of responding drivers who were destined for Wurstfest.

Figure 1. Wurstfest study area.



Advance Sign

Successful operation of an HAR system is in part affected by the advance sign. Failure of motorists to read the sign will affect the size of the system's audience. As shown below, only 58 percent of the Wurstfest-bound respondents who drove through the radio zone while a message was being broadcast saw the sign. Thus, a large percentage (42 percent) of the potential audience was not aware of the HAR system.

<u>Driver</u>	<u>Response (%)</u>		
	<u>Saw Advance Sign</u>	<u>Tuned to HAR</u>	<u>Diverted</u>
Total bound for Wurstfest	58	33	22
Bound for Wurstfest that saw advance sign	-	56	38
Bound for Wurstfest that tuned to HAR	-	-	67

The reasons for this disappointing result are not known. The project staff felt that the sign placement on the first night of the study within a right horizontal curve did not provide sufficient sight distance. The sign was moved to a tangent section on the second night. However, a larger percentage of respondents saw the sign before it was moved than saw it afterwards.

Tuning to HAR

During the two study days, only 56 percent of the drivers interviewed who saw the advance sign and only 33 percent of the total Wurstfest-bound audience tuned to the HAR station.

The data revealed that a large percentage of the drivers who did not tune to the station after having read the advance sign were simply apathetic toward the system. Of the 72 percent who indicated a degree of apathy, 31 percent preferred to listen to the music that was on their radios, 24 percent stated that they did not need the information, and 17 percent did not want to tune to the HAR station. Only 11 percent of those interviewed stated that they did not understand the message on the advance sign.

Diversion

The data show that 67 percent of those drivers interviewed who had tuned to the HAR station diverted. As shown above, this is 22 percent of the total bound for the Wurstfest.

The relationship between the driver's familiarity with New Braunfels and willingness to tune to the HAR station is shown below. The results indicate that the degree of driver familiarity did not have any effect on the driver's decision to tune to the HAR station.

<u>Driver's Familiarity</u>	<u>Response (%)</u>	
	<u>Tuned to HAR</u>	<u>Diverted to Walnut Avenue</u>
Within last month	31	15
Within last 18 months	34	21
Within last 5 years	35	28
None	34	31

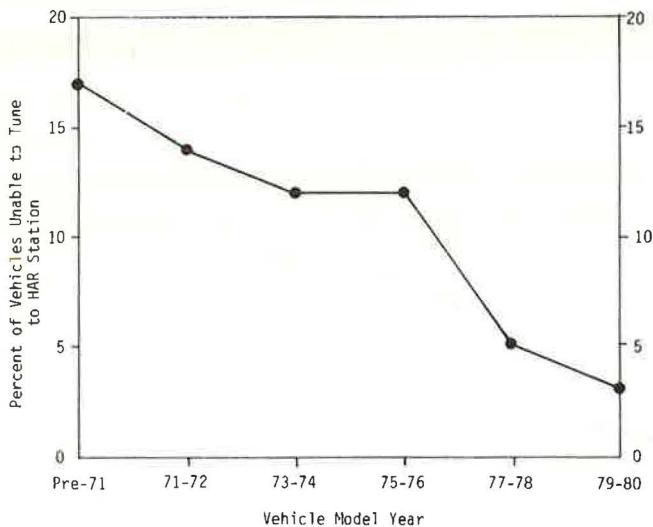
The above tabulation also demonstrates the relationship between driver familiarity and diversion rate.

In general, the diversion rate increased as the driver familiarity with the area decreased. A similar trend was documented in diversion studies conducted by TTI in Dallas (3). In particular, it should be noted that drivers who were very familiar (i.e., those who had been in New Braunfels within the last month) had a low diversion rate (15 percent), especially when their willingness to tune to the HAR station is considered (31 percent). As driver familiarity decreased, this difference diminished so that nearly all the very unfamiliar drivers that tuned to the station also diverted (31 percent diverted of 34 percent that tuned to the station).

Radio Reception

During this study, some respondents were unable to receive an acceptable HAR signal on their AM car radios. This difficulty was analyzed in relation to the type of antenna (aerial or wire in windshield), the model year of the vehicle, and the installation of the radio (i.e., whether factory-installed). Data analysis indicated that the use of a wire antenna in the windshield seemed to have no effect on the reception characteristics. A similar study in Minneapolis (4) also concluded that windshield antennas had no effect on tuning and reception

Figure 2. HAR reception related to age of vehicle.



characteristics of AM car radios. The comparison of the model year and the percentage of vehicles unable to tune to the station is shown in Figure 2. There was a general trend toward improved reception at the 530-kHz frequency in the newer vehicles.

Drivers that did receive the HAR message were

asked to rate the signal reception in comparison with that of their regular radio station. The results show that 35 percent of the drivers interviewed rated the HAR signal to be weaker than commercial AM broadcasts but only 6 percent rated the HAR signal to be inferior.

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## Motorists' Needs for Information on Services

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A comprehensive review and analysis of the state of the art on motorists' needs for information on travel-related goods and services and on means to satisfy these information needs have been made. Information needs and potential information-transmission means are identified. Problems associated with the design and implementation of service information systems are delineated. A number of existing services information systems are analyzed and a conceptual prototype system that uses existing technology is developed. This system is designed to overcome the information-presentation problems associated with the elimination and control of billboards.

Information concerning goods and services that may be needed during travel represents an important part of the total of motorists' information needs. The satisfaction of these needs is required by the driver for the safe, convenient, and comfortable completion of his or her trip. In the historical development of the total highway information system, this class of needs has traditionally been satisfied by private signing erected on or adjacent to the highway right-of-way.

For instance, a standard text on motel management (1) published just prior to the enactment of the Highway Beautification Act of 1965 (P.L. 89-285, October 22, 1965) stated, "This medium [outdoor display advertising] is probably the most important single promotion method for motels."

Only with the large-scale construction of limited-access highways did traffic engineers begin to consider the need for public signing for services. The 1948 edition of the Manual on Uniform Traffic Control Devices (MUTCD) (2) does not mention signing

for services. The concept was introduced for the Interstate system when the separate Interstate signing manual (3) was published and extended to non-Interstate expressways and freeways when the 1961 edition of MUTCD was adopted (4). These provisions were continued and extended to the conventional system in the 1978 edition of MUTCD (5).

Service signing as covered by MUTCD is restricted to the following six classes: gasoline (and associated services), food, lodging, telephone, hospital, and camping. Miscellaneous goods and services that may be required by the traveler are not included in the MUTCD list.

Traditionally, information transmission concerning brand identification of services has been the role of private signing adjacent to the highway right-of-way. However, the 1958 Bonus Law (23 C.F.R., Part 750, Subpart B, Sections 750.151-705.155, May 12, 1975) and the Highway Beautification Act of 1965 have placed actual or potential limitations on the role that private signing can play.

Since the availability of commercial advertising was reduced by these legal restrictions, Congress recognized a corresponding obligation to provide information about necessary motorist services. Exceptions to the prohibition against commercial advertising were made for certain categories of signs (e.g., on-premise signs) and for certain types of roadside areas (commercial and industrial). In addition, public agencies were authorized to assume