

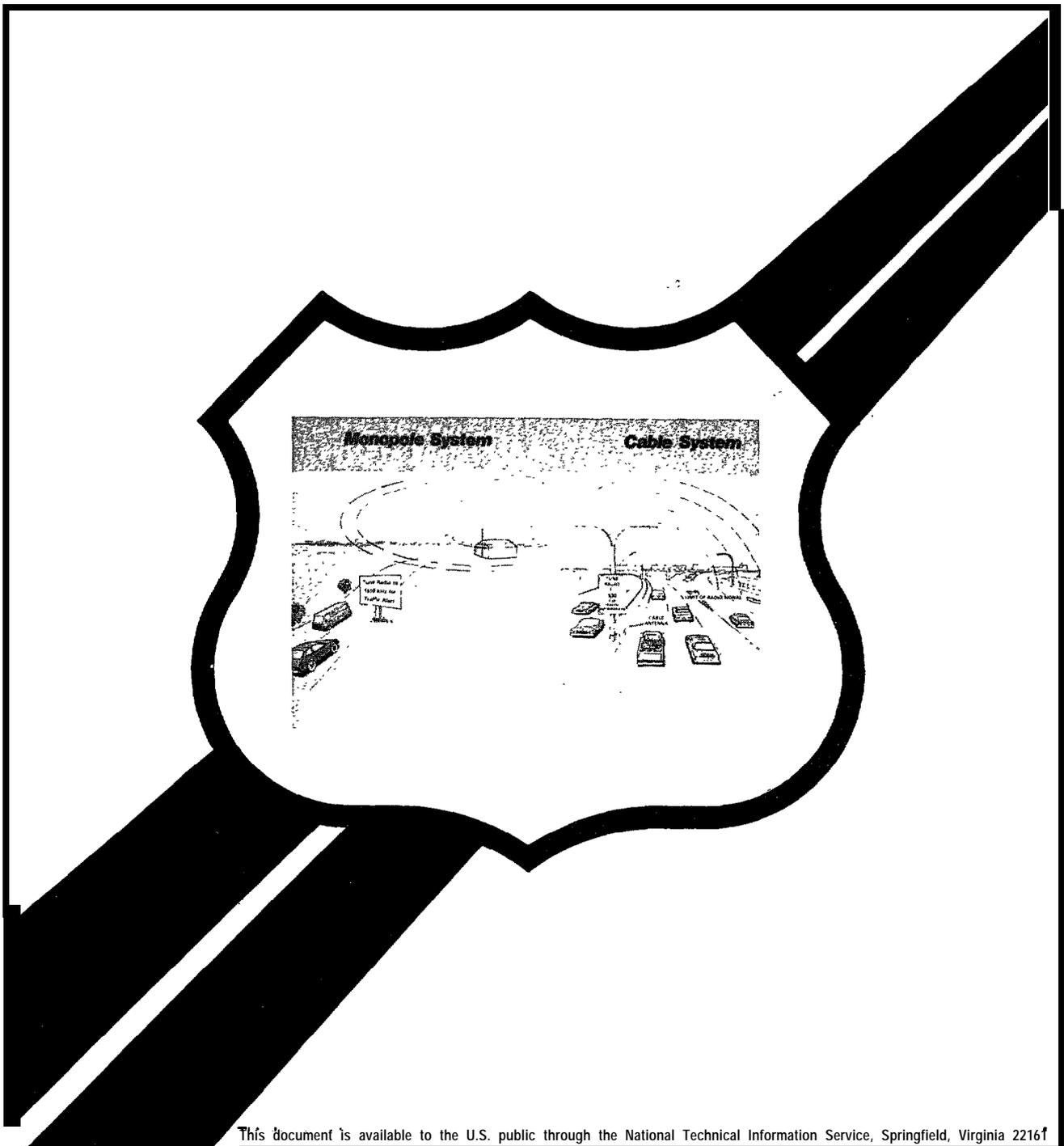
HIGHWAY ADVISORY RADIO MESSAGE DEVELOPMENT GUIDE

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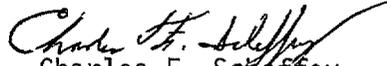
U.S. Department
of Transportation
**Federal Highway
Administration**



FOREWORD

This report presents guidelines for the development of messages or, "audio signs", for Highway Advisory Radio (HAR). The report provides an overview of HAR, message development principles, and application oriented examples. Also included in Appendix B of the report are some basic HAR operating considerations. This report is written in a non-technical format for users of HAR systems and will be a useful addition for the HAR operations community. The report should be of interest to highway and/or traffic engineers either planning to use or currently using HAR.

Distribution of this report is by FHWA memorandum with two copies of the report for each regional office, one for each division office and one for each State highway agency. Direct distribution is being made to the division office with sufficient copies to provide one report for each State agency.


Charles F. Scherfey
Director, Office of Research

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16. Abstract <p>Highway Advisory Radio (HAR) provides traffic operating agencies with the capability to communicate traffic and travel related information to motorists using the vehicle AM radio receiver. This report presents recommended HAR message development principles. Included are a set of programming principles for constructing messages and examples of messages which apply the principles to specific situations. The examples include: construction zones, lane blockages, route diversions, special events including parking control, inclement weather advisories, and tourist information.</p> <p>Specifically, guidelines are provided for message content, format, length, load, and delivery style. The guidelines are based on a research program which included a survey of the techniques currently employed by operational HAR systems. The report also emphasizes message construction procedures and the common pitfalls to be avoided</p>		14. Sponsoring Agency Code T-0470	
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I. OVERVIEW

1. WHAT IS HIGHWAY ADVISORY RADIO(HAR)?

HAR is a special radio tool that can be used by highway field personnel to give motorists up-to-the minute travel information via their AM radios.

The system is used by State and local governments, and government affiliated agencies such as airport and park authorities. HAR operates as a Travelers Information Station (TIS) and is licensed by the Federal Communications Commission (FCC). HAR can provide warnings, advisories, and directions, or other non-commercial material of importance to motorists.

HAR messages are transmitted from low-power roadside transmitters. The messages are typically less than a minute. Drivers approaching an HAR site are advised of its existence by advance highway signs which tell the motorists where to set the tuning dial to receive the message.

The location of an HAR transmitter is restricted by FCC Rules and Regulations to the immediate vicinity of air, train, and bus transportation terminals, public parks and historical sites, bridges, tunnels, and any intersection of a Federal Interstate Highway with any other Interstate, Federal, State, or local highway.

HAR messages are generally recorded for continuous repetition. The message length is adjusted to permit the driver to receive the messages at least twice while passing through the stations' coverage zone. Agencies operating HAR must monitor and maintain the system as well as change the message content as the roadway conditions change. The message origination point may be at a location which is remote from the transmitter. In this case, a dedicated telephone line is required between the origination point and the HAR transmitter site.

2. HOW MAY HAR BE APPLIED?

HAR has several useful applications. Some specific examples of current applications are:

- A. Maintenance/construction zones
- B. Traffic advisories (e.g., accidents, lane blockage, etc.)
- C. Route diversion
- D. Special events (including parking control)
- E. Weather advisory
- F. Tourist information (e.g., gas, food, and lodging)

Note: . Parking and routing advisories at airports, train and bus terminals are normally handled by the Travelers' Information Service and message development for these specific applications are not addressed in this guide.

A list of HAR users (1980) exclusive of Federal government agencies is shown in the Appendix A.

A. Maintenance/Construction

HAR serves to supplement, not replace, standard traffic control devices used in highway work zones. The traffic control devices must perform the function of warning and controlling traffic through the work zone. HAR should be used for the unusual situations that occur which cannot be handled by the static traffic control devices (e.g., presence of traffic queues, requirements for diversion, etc.). HAR is not recommended if standard work zone signs are already doing an effective job or if the HAR message only repeats the messages on the signs.

In practice, the trend is to install HAR upstream from major decision points so that drivers can use alternate routes when the need arises. For example, placement of a HAR system upstream from a loop freeway allows the agency to route traffic around construction on the primary radial freeway when congestion becomes excessive due to lane closure(s) or an accident. During these times, the messages can be very specific. However, in the absence of any congestion and diversion requirements, the messages broadcast must be general in nature.

B. Traffic Advisories

The accuracy of the information included in a broadcast is dependent upon the agency's surveillance capabilities. The information can only be as specific as the real time data an agency can collect on the affected sections of roadway. For example, when an accident occurs, the agency, through its surveillance technique (e.g., closed-circuit television, human spotters, etc.) must determine the nature and scope of the problem, and then provide this specific information to motorists (e.g., MAJOR ACCIDENT AT ROWLAND AVENUE, OVERTURNED TRUCK AHEAD, LEFT TWO LANES ARE BLOCKED AHEAD, etc.). If accurate visual surveillance is not available, the messages provided must be more general in nature (e.g., HEAVY CONGESTION AHEAD). Driver credibility is adversely affected by transmitting erroneous and repetitive information.

C. Route Diversion

Route diversion is a special case of other applications namely, maintenance/construction, traffic advisories, special events, and weather. Specific route diversion information can be broadcast when the agency is certain that the recommended route is better than the intended route. This again requires that some form of surveillance, either visual or electronic, be available. Without any knowledge about the alternate route conditions, at best, the agency can only advise drivers to "take an alternate route".

D. Special Events

Experience has shown that drivers, particularly unfamiliar drivers, are looking for help in finding a good route to special events (e.g., ballgames, state fairs, festivals, etc.). Experiments have shown that

drivers are receptive to taking the routes recommended by messages on HAR or special signs. In addition to routing, drivers also desire information concerning the availability of suitable and convenient parking,

E. Weather Advisory

The movement and extent of weather systems are difficult to predict. When the roadway is covered with snow or the freeway is flooded, it is easy to tell drivers what the conditions are. However, as storm systems are developing, it is extremely difficult to predict how much accumulation or where the problem will be. During these times the agency can only report weather forecasts which are general in nature.

F. Tourist Information

To provide drivers with gas, food and lodging information the agency must establish some form of communications network with the companies that offer these services. As in the previous HAR applications, the specific information broadcast on HAR is limited by the agency's knowledge of the situation and by the FCC Rules and Regulations (see p. 26-27).

3. HOW CAN HAR BE EFFECTIVE?

To be effective, the HAR messages must be designed and broadcast such that they provide drivers with correct and proper information from which good driving and routing decisions can be made.

Good quality equipment in itself will not insure that the HAR system is effective. Of extreme importance is the quality of the message. Message quality refers to the manner in which the important information is put together in the messages for the drivers. Well designed messages are essential for effective HAR systems.

4. HOW ARE HAR MESSAGES DEVELOPED?

Generally, the operating agency assigns one person the responsibility to develop and prepare HAR messages. Although the task outwardly appears to be an easy one, there are many principles and guidelines that should be followed to develop effective messages.

In practice, the designated individual prepares a draft of the message and requests a review and comments from other individuals involved in the project. After making changes, the message is "tested" by reading it aloud to other members of the agency staff, who in some cases are not familiar with the project, or are not familiar with the highway area where the HAR is installed. This is one way of getting a reaction to a message prior to broadcast from colleagues considered to be unfamiliar drivers.

It may be necessary to make changes to the message several times before a good message is prepared.

Taping the message is another important activity. The characteristics and importance of a good radio broadcast voice are discussed later in this report. Sometimes an agency may find someone with good speaking characteristics right in the office, or at least within the agency. Otherwise, it may be necessary to obtain help from local radio, television announcers or disc jockeys.

Many groups are now working very closely with the public information or public relations divisions within the highway agencies. The experience that individuals within these divisions have in working with the motoring public and the press can be extremely helpful in both developing and taping messages.

Traffic engineers have considerable experience in informing and routing traffic with highway signs. In many highway related HAR applications, a traffic engineer is designated as the responsible person for the messages. A traffic engineer should always be involved with the development, taping, and broadcasting of the messages.

5. HOW WILL THIS REPORT HELP IN DEVELOPING EFFECTIVE HAR MESSAGES?

This report presents several principles and guidelines for preparing HAR messages to achieve optimum driver understanding and recall. A brief summary of how messages are normally prepared is also presented. Example messages incorporating the principles and guidelines are presented for the following applications: maintenance/construction zones, traffic advisories, route diversion, special events, weather advisory, and tourist information. Basic HAR operating considerations including the use of advance signing is discussed in the Appendix B.

II.MESSAGE DEVELOPMENT

The following principles and guidelines are intended to acquaint highway field personnel with the basic principles of HAR message development. The information presented is based upon laboratory and field research as well as actual field experience. It includes guidelines for message construction, methods of presentation, style, length, and loading.

1. WHAT GUIDELINES ARE USEFUL IN DEVELOPING HAR MESSAGES?

General

A. Be concise.

HAR messages should only contain the minimum number of words needed to convey the roadway situation. The language style should be concise. This is particularly important for diversion type messages especially where as many as 10 or more pieces of information must be recalled by drivers.

Drivers prefer short messages rather than long, wordy, conversational-style messages. They are also more likely to recall the important information if there are no "dead words" in the message.

Example of a good concise message:

- o ATTENTION EASTBOUND INTERSTATE 10 TRAFFIC
- o CONSTRUCTION ON INTERSTATE 610 OVERPASS
- o EXPECT CONGESTION AND DELAY AHEAD(13 WORDS)

Example of an acceptable extended message given sufficient broadcast time:

- o ATTENTION EASTBOUND INTERSTATE 10 TRAFFIC
- o THIS IS THE (State) HIGHWAY ADVISORY RADIO
- o THERE IS CONSTRUCTION ON THE BRIDGE OVER INTERSTATE 610 JUST AHEAD
- o EXPECT TRAFFIC CONGESTION AND DELAY IN DRIVING TIME
- o PLEASE FOLLOW ROADWORK SIGNS AND MARKINGS
- o THANK YOU FOR DRIVING SAFELY (41 WORDS)

The latter message is expressed in sentence format rather than brief phrases. It also includes the identification of the source of the message and a polite sign-off message, both desirable but optional. The words JUST AHEAD are added to aid visitors who may not know that they are approaching an intersection with Interstate 610.

Example of an unacceptable wordy message:

- o ATTENTION ALL TRAFFIC HEADED EAST ON INTERSTATE 10
- o THIS IS YOUR (State) HIGHWAY ADVISORY RADIO COMING TO YOU FROM TRAFFIC CONTROL HEADQUARTERS, 1610 KILOHERTZ ON YOUR DIAL

- o YOU ARE ADVISED THAT THERE IS CONSTRUCTION UNDERWAY ON THE BRIDGE SPANNING INTERSTATE 610 IN SOUTHWEST (Name) COUNTY
- o THIS CONSTRUCTION IS CAUSING TRAFFIC CONGESTION AND WILL RESULT IN SOME DELAY IN YOUR TRAVEL TIME ON INTERSTATE 10
- o BE ALERT FOR ALL ROADWORK SIGNS INSTALLED ALONG THE INTERSTATE AND OTHER TRAFFIC GUIDANCE DEVICES SUCH AS CONES, ARROW BOARDS, AND TEMPORARILY-INSTALLED PAVEMENT MARKINGS
- o PLEASE DRIVE SAFELY AND THANK YOU FOR LISTENING TO THE (State) HIGHWAY ADVISORY RADIO SYSTEM FOR TIMELY TRAFFIC REPORTS (103 WORDS)

The last message has a conversational language structure with many needless phrases. For example, the station frequency is unnecessary since the driver has already tuned to the station (having previously read it on a road sign). A geographical location is unnecessary; the expression "JUST AHEAD" will suffice. The types of traffic control devices need not be detailed, and the fact that they were erected temporarily is obvious. Thanking the driver for listening sounds commercial and possibly annoying. The radio listener may encounter the HAR system several times and unusually wordy messages may prompt the listener to change stations.

A distinction should be made between a wordy message and a long message. A wordy message uses many words to make only a few points (e.g., those points in the concise message above). A long message could be wordy, but it may also have a large number of points that need to be communicated. Some of the specific examples of HAR applications given in a later section of the report may at first appear wordy but in fact they are transmitting a variety of information needed by many if not all drivers.

The guidelines given in this section relate principally to situations where there has been an accident or event necessitating diversion to an alternate route. Sometimes the route is described in the message.

B. When the driver must recall information to negotiate a route, keep the message as simple as practical. Messages containing a "smorgasbord" of information may be longer because motorists are only concerned with facts applying to their travel route.

An example of a fairly long, smorgasbord-type message is one providing tourist information (see HAR example on page 27). The HAR message may list a variety of different types of facilities such as service stations, restaurants, and motels. Any given listener is not attempting to recall all the information. Rather they are searching for one or a few specific pieces of relevant information. Hence, the recall requirements are minimal.

Similarly, other example messages given in Chapter III will not require the recall of much information. The message may present a problem and then a simple advisory message. Only the details of the advisory may require recall.

C. Tell drivers what they need to know. Avoid broadcasting "interesting" but unnecessary information.

Drivers want to know (1) what the problem is, (2) an advisory as to what they should do about it, and (3) one good reason for doing what the message says (e.g., avoid delay or congestion, save time). If drivers are instructed to exit the facility and take an alternate route, then the advisory message will necessarily provide a series of street, highway or route names and may include turning movements.

D. Let the driver know when the message has ended and is starting over.

A HAR message will recycle possibly several times within a particular driver's broadcast zone. A brief, 3-5 second non-verbal sound should be played between cycles. This may be a recognizable alerting sound (pulsating beep) or combinations of unique tones. The unique sound will also serve as a symbol of upcoming HAR messages and may assist drivers entering a broadcast zone to verify that they are properly tuned to the designated HAR frequency.

Message Construction

A. Begin a message by getting the driver's attention.

Note in the previous example messages the first word should be ATTENTION followed by the name of a destination group identified by the name of a major facility and the word TRAFFIC. The direction of traffic should be identified since it is at times possible that traffic from both directions could be listening to the HAR station.

B. State the problem's severity, but be brief. Remember drivers are more concerned about what they should do.

Give no more details regarding the problem than is necessary to describe the severity. For example, THERE IS A MAJOR ACCIDENT is better than THERE HAS BEEN A SEMI-TRAILOR TRUCK OVERTURNED BLOCKING SEVERAL LANES OF TRAFFIC. Both message descriptions tell the driver traffic is going to be slow and delayed. However, the second message phrase contains too much non-essential information. Therefore, the first phrase is preferred. It will alert drivers to pay attention to the next part of the message (i.e., what they should do).

C. Allow time for drivers to think about the problem before they must concentrate on the other more important part of the message.

While the problem is "soaking in", avoid making the very next portion of the message something important that must be recalled such as where to exit. Allow the driver a brief period of time to think about the problem. An effective approach is to give a positive reason prior to the instructions as to what to do. The following is an example:

- o MAJOR ACCIDENT AHEAD
- o TO AVOID MAJOR DELAY
- o EXIT AT BANDERA

The expression YOU ARE ADVISED TO prior to EXIT AT BANDERA is an acceptable alternative.

D. Give at least one good reason for following the advisory.

While the words ACCIDENT or CONSTRUCTION are good reasons to exit, a more positive incentive for taking a diversion route is recommended (e.g., TO AVOID MAJOR DELAY, TO AVOID 20 MINUTES DELAY, TO SAVE 15 MINUTES, or TO AVOID HEAVY CONGESTION). MAJOR ACCIDENT and MAJOR DELAY imply to the driver a delay of 20 minutes or more.

E. Tell the driver where the accident or roadwork is. This helps the driver to make decisions about exiting or diverting.

The location of the accident or roadwork may also be given if appropriate (e.g., ACCIDENT AT BURT ROAD). The information is useful to local drivers in making decisions about exiting or diverting.

Non-local drivers are not familiar with street names. Therefore, for these drivers the location of the accident or roadwork should be given relative to a major highway route (e.g., INTERSTATE 20) or well known landmark, (e.g., DOWNTOWN).

When the specific location of the incident is not known; simply stating ACCIDENT AHEAD would be sufficient. The important point to remember is to get the information to the drivers as quickly as possible.

F. Make sure the drivers hear the important parts of the message twice. The important part of the message is the information which must be recalled to successfully negotiate the intended route of travel.

A message advising drivers to divert should be repeated while each driver is within the broadcast area. A message involving a sequence of turning movements and streets need not be repeated in its entirety. Rather, only the turning movements and streets need to be repeated. These are what the driver is learning. The following illustrates two approaches.

Approach #1

- o ATTENTION WESTBOUND INTERSTATE 410 TRAFFIC
- o THERE IS A MAJOR ACCIDENT AHEAD
- o TO AVOID MAJOR DELAY
- o EXIT AT FREDERICKSBURG, AND TAKE THE FOLLOWING ROUTE
- o TURN RIGHT ON FREDERICKSBURG,
- o AND CONTINUE TO WURZBACH
- o TURN LEFT ON WURZBACH
- o AND THEN CONTINUE TO EVERS
- o TURN LEFT AGAIN ON EVERS
- o AND PROCEED BACK TO INTERSTATE 410 WEST

Approach #2

- o ATTENTION WESTBOUND INTERSTATE 410 TRAFFIC
- o THERE IS A MAJOR ACCIDENT AHEAD
- o TO AVOID MAJOR DELAY,
- o EXIT AT FREDERICKSBURG, AND TAKE THE FOLLOWING ROUTE
- o TURN RIGHT ON FREDERICKSBURG,
- o THEN TURN LEFT ON WURZBACH
- o AND THEN TURN LEFT AGAIN ON EVERS,
- o AND PROCEED BACK TO INTERSTATE 410 WEST.

I REPEAT,

- o EXIT AT FREDERICKSBURG, AND TAKE THE FOLLOWING ROUTE:
- o TURN RIGHT ON FREDERICKSBURG,
- o THEN LEFT ON WURZBACH
- o AND THEN LEFT AGAIN ON EVERS,
- o AND PROCEED BACK TO INTERSTATE 410 WEST.

Note that the names, FREDERICKSBURG, WURZBACH, and EVERS are repeated. Difficult street names are sometimes not understood the first time when driving in traffic noise.

Diversion Considerations

A. Give specific instructions to unfamiliar drivers.

Unfamiliar drivers need specific instructions as to what they should do to avoid a traffic problem, rather than being left to their own interpretation of the situation. Instructions should be very explicit when describing a diversion route if the drivers are expected to be unfamiliar with the area.

B. Be sure the speaker clearly pronounces street names, and raises the voice when giving names and turn directions (left, right).

C. Make sure the diversion message does not exceed eight units of information. Ninety percent of unfamiliar drivers will be able to recall HAR messages of six to eight units of information with sufficient accuracy to follow the diversion route without error.

Many diversion situations will require that drivers follow a loop freeway around or in a city to avoid a problem on the radial freeway. In these instances, all that is necessary is to tell the motorist to take the specific loop,

A six unit message would be one describing a diversion route with three street names and three turning movements. For example:

- EXIT AT JACKSON AND TAKE THE FOLLOWING ROUTE:
- TURN RIGHT// ON JACKSON
 (1 unit) (1 unit)
- THEN LEFT//ON SAN PEDRO
 (1 unit) (1 unit)
- AND PROCEED BACK TO INTERSTATE 410 EAST (2 units)

The last line. is considered two units-one stated (Interstate 410) and one implied (turn right).

Note that after the drivers have completed the diversion route and returned to the interstate from which they had exited, it is not necessary to tell them to "turn right on to the interstate". Drivers know the direction they were initially headed (in a relative sense) and most will not turn left in the opposite and incorrect direction.

An eight-unit message would be one describing a diversion route with four street names and four turning movements. Most diversion routes will be a "]" pattern (i.e., to the right, left, left, and right again). Drivers expect to be diverted first away from the interstate, then parallel to it in the same direction, and then back to it. Therefore, the major recall process will relate to recalling the names of the three streets, where they will exit, turn parallel, and turn back respectively. Note this is a recognition task rather than a recall task since they will see the names on the street signs.

D. Trailblaze routes requiring ten or more units of information.

Diversion routes requiring ten or more units of information would usually not be broadcast. As a rule, complex routes should be avoided. However, when the necessity arises, drivers should be encouraged to exit the freeway by the HAR message, and then be guided along the diversion route with trailblazers. Never try to broadcast the instructions for the entire route when the diversion route requires ten or more units of information.

E. Use route describers for unfamiliar drivers. Landmarks and traffic signals at intersections and en route are recommended on long and complex routes. Drivers generally welcome a prominent feature visible a block or more upstream from a turn.

The agency must inspect the diversion route and be sure that street signs are not down where turns will be made. Even if they are in place street signs are often small and difficult to see at a lead distance sufficient for drivers to be in the correct lane for turns.

There are often major landmarks at or near the corner where the turn will be required. These may be seen a block or more upstream from the intersection. Examples of landmarks are service stations, restaurants, and water towers. Prominent landmarks along the route may also merit

mention (e.g., universities, hospitals, or cemeteries). Turns at T-intersections do not require mention of landmarks since recall of the turn direction will suffice.

Another technique often used to describe a turn intersection is to mention the number of traffic signals (for example, LANDA STREET IS THE THIRD STOP LIGHT). Again, the agency must check the route in advance to be sure that all traffic signals are in operation.

F. Do not use the number of traffic signals in the advisory message whenever one or more signals is inoperative or flashing. When the turn is at the first traffic signal, tell the driver. It is also useful to provide the correct lane, especially when there are no advance signs and street signs are small.

G. Use freeway exit numbers when available.

When freeway exits are numbered, using an exit number in the message can be effective. When there are multiple exits into a city a count of the exits may also be useful (e.g., THE THIRD EXIT IN THE CITY OF ARDMORE).

Here are some examples of the use of landmarks, traffic signals, and exit numbers.

<u>Landmarks</u> at <u>Intersections</u>	TURN RIGHT ON WALNUT AND CONTINUE TO LANDA STREET WHICH IS AT THE GULF STATION. THEN TURN LEFT AND . . TURN LEFT ON BOYER AND CONTINUE TO WOODLAWN. THERE IS A FEDMART ON THE CORNER. TURN LEFT ON WOODLAWN.
<u>Traffic Signals</u> at <u>Intersections</u>	TURN LEFT ON MAIN STREET AND GO TO THE FOURTH STOP LIGHT, BABCOCK.
<u>Landmarks en</u> <u>Route</u>	TURN LEFT ON WURZBACH AND CONTINUE PAST THE MEDICAL COMPLEX TO EVERS ROAD. THERE IS AN EXXON STATION ON THE LEET AT EVERS.
<u>Exits</u>	TAKE EXIT 9 AND THE FOLLOWING ROUTE: TAKE THE WALNUT EXIT, WHICH IS FIFTH NEW BRAUNSFEL EXIT.

Note: Local agencies must decide if the words STREET, AVENUE, BOULEVARD, ROAD, etc. merit mention in the message. To save message time, omission of these words is normally recommended. However, if the word has common local meaning or if omission would be confusing (e.g., MAIN STREET), the word may be mentioned. In most instances, the arterial designation may be omitted especially when it is mentioned the second time in a sequence.

- H. Familiar drivers do not need to be told directions of turns. A savings in message length and broadcast time may be achieved by mentioning only the names of the streets at which turning movements are required. Directions of turns are obvious and somewhat redundant.

Whenever an HAR message is given on a facility where 85 percent or more of the drivers are known to be local drivers, the message may be simplified without loss of information by eliminating the directions of turns. In particular, local drivers are largely familiar with the major intersections along the facility and with major arterials parallel to the facility that might be used for a diversion route. Here is an example.

- o EXIT AT FREDERICKSBURG AND TAKE THE FOLLOWING ROUTE:
- o FREDERICKSBURG TO WURZBACH
- o WURZBACH TO EVERS
- o AND EVERS BACK TO INTERSTATE 410 WEST

In this example, it was presumed that most drivers know that Wurzbach runs parallel to I-410 and that it is to the right when drivers are traveling westbound on I-410.

Legal Requirements

- A. The Federal Communications Commission (FCC) requires that the HAR station call sign be transmitted.

The FCC requires that the HAR station call sign be transmitted at the end of each complete transmission. In places where continuous, frequent, or extended broadcasts are made, the call sign must be transmitted at least once every 30 minutes.

- B. It is not necessary to identify the agency broadcasting an HAR message with each message.

HAR broadcast time is usually at a premium. The advance HAR signs serve to inform the driver that the information broadcasted is coming from a reliable, authoritative source. Thus stating the agency name with each message is not necessary. It reduces the amount of time available for the more important information.

The FCC call sign requirement, using a repeated short message, places an added burden on the agency in terms of message development. The agency must either broadcast the call sign every 30 minutes or include it within the repeated message. Some agencies include the call sign as part of the short message and also feel it necessary to include the agency name. An example is as follows: THIS IS STATION KOOXX HIGHWAY ADVISORY RADIO OPERATED BY THE (State)DEPARTMENT OF TRANSPORTATION.

Vocal Characteristics

The announcer delivering the HAR message should have a good speaking voice that can be heard clearly against a background of traffic noise. Prerecorded tapes are recommended when the traffic situation can be anticipated (e.g., for special events). Whenever a diversion route has been established in advance, a tape recording is also recommended. In some instances, the exact diversion route may need to be slightly altered due to contingencies such as a sign down, heavy traffic on the planned route, etc. It may be necessary that a new message be constructed when the need arises and the amateur must be qualified to deliver a "live" message. The following are guidelines for speaker selection and delivery.

A. Voice Qualities

The announcer may be either male or female with an average to low-pitched voice. The style of delivery should sound official. Good speaker characteristics are as follows:

- o Clear enunciation without obvious dialect.
- o Ability to speak loudly and at a moderately fast rate.
- o Ability to modulate the pitch of the voice so as not to speak in a monotone.

When operational personnel are assigned to tape HAR messages, they should be selected on the basis of voice quality and delivery and be trained to speak in a consistent style.

B. Delivery Style

The message should be delivered in a calm, matter of fact, and dignified manner--much like the captain on a commercial aircraft. Since the names of streets and turn directions are the information drivers will need to recall, these words should be stressed in delivery. Each syllable of a proper name should be carefully enunciated. Go over the message in advance, so as not to stumble over words or to mispronounce street names. Consistency of delivery is also important. Many agencies get personnel from their public information or public affairs department to record the messages.

C. Pause

There should be a brief (1-second) pause after each statement. For example, after the ATTENTION statement; after mention of the problem (e.g., ACCIDENT); after the effect of the problem if it is a separate statement like HEAVY CONSTRUCTION IN DOWNTOWN AREA; and after stating to exit and take a given route.

If the phrase TO AVOID MAJOR DELAY is employed, there is only a slight (1/2 second) pause before the exit statement. If the message is lengthy and involves repetition of street names after their first mention, the announcer may read without noticeable pauses between phrases.

There should be a 2-second pause upon recycling the message or repetition of message, (i.e., before the statement I REPEAT, and before repeating the ATTENTION statement).

When delivering a diversion message to familiar drivers (which is a listing of street names), there should be a 1/2-second pause between names. For example,

AND TAKE THE FOLLOWING ROUTE: (1 second)
FREDERICKSBURG TO WURZBACH(1/2 second)
WURZBACH TO EVERS (1/2 second)
AND EVERS BACK TO INTERSTATE 410 WEST (2 seconds)

D. Speed of delivery

The appropriate speed of delivery for radio messages is about 175 words per minute. Any delivery speed below 110 words per minute tends to sound "dragged out". For some listeners, a very slow reader is annoying. It is more effective to speak more rapidly and insert pauses prior to key words as described above.

Speaking too rapidly (over 200 words per minute) may also "lose" a segment of the driving population. There may be regional differences in acceptable speaking speeds and the agency should take local standards into consideration.

2. HOW ARE HAR MESSAGES DEVELOPED?

The steps in developing HAR messages are as follows:

- A. Identify the situation
- B. Analyze the situation
- C. Identify key message factors
- D. Select message style
- E. Decide on salutation
- F. Decide how to broadcast call letters
- G. Prepare draft message
- H. Check message time and length
- I. Check message content
- J. Finalize message content
- K. Select speaker
- L. Record and check tapes

A. Identify the Situations

As a general rule HAR messages are pretaped and stored for future use. It is important, therefore, to determine and list all of the situations for which the HAR will be used. As an example, for traffic control during special events, it may be necessary to have a pretaped message for situations when (1) diversion is not warranted, (2) diversion to alternate routes is recommended because of congestion on the primary route resulting from heavy traffic, and (3) an accident occurs on the primary route.

It is not always possible to predict and be prepared for all situations. Sometimes it is necessary to broadcast live when an unpredictable emergency situation arises. Even then, agencies may choose to quickly develop and tape a message rather than broadcast live.

B. Analyze the Situations

The next step is to analyze the situations so that decisions can be made about the type of response expected of the drivers. It is generally necessary to review plans, maps and traffic data. It is oftentimes necessary to collect additional field data. Field inspections of the primary facilities and potential diversion routes will help make decisions about the adequacy of the routes, problems that could arise, and whether additional signs or traffic control devices should be installed.

In the above special traffic control problem, the situation of diversion to alternate routes requires a thorough study of the potential congestion on the primary and alternate routes. Decisions need to be made about whether one or more alternate routes will be used . . . can the traffic signals be coordinated to accommodate the extra traffic . . . will it be necessary to install trailblazer signs . . . and a multitude of other operational issues. The situation when an accident occurs must also be thoroughly analyzed.

C. Identify Key Message Factors

Thorough analysis of the situation will help to identify the key message factors---diversion route (street names and turns), route descriptors (e.g., shopping centers, restaurants), potential delay on the primary route, etc., --that will be incorporated into the message.

D. Select Message Style

The message style should then be selected. Appropriate message style was discussed on page 13 and is illustrated with message examples in Section III of this report.

E. Decide on Salutation

Decisions must be made about whether the agency's name will be broadcast and how this will be accomplished.

F. Decide on How to Broadcast Call Letters

The agency must decide how the station call letters will be broadcast. It is sometimes possible to broadcast the call letters every 30 minutes using a separate tape. Some agencies, however, incorporate the call letters into the message and repeat the call letters each time the message is broadcast. This practice needlessly lengthens the message and is of little interest to the driver.

G. Prepare Draft Message

Now that the message elements are defined, a first-cut message draft can be prepared. Arrange the message elements in an appropriate logical order as previously illustrated.

H. Check Message Time and Length

The message can then be read and the time checked to determine whether the message is short enough to be broadcast at least twice while drivers are within the broadcast zone of the HAR station. If not, the message must be shortened by deleting optional, nonessential information.

I. Check Message Content

After the message is revised, it can be given to selected staff members in the agency to obtain their views about whether the information is clear and understandable. Check to see whether they would be able to recall the information given in the message.

J. Finalize Message Content

Revisions to improve clarity can be made and the message is ready for final typing.

K. Select Speaker

An individual with good speaking characteristics should be selected to record the message.

L. Record and Check Tapes

It is sometimes necessary to record the message several times to obtain a good quality taped message with the proper voice inflections and broadcast time. After recording, the tapes should be played back and checked for clarity and quality. Each tape should then be logged as to title, application and broadcast time.

III. EXAMPLE MESSAGES

HAR APPLICATIONS

The following are examples of messages for six potential HAR applications:

- A. maintenance/construction zones
- B. traffic advisories (e.g., accidents, delays, lane blockages)
- C. route diversion
- D. special events (including parking control)
- E. weather advisory
- F. tourist information (e.g., food, gas, and lodging)

Having reviewed some examples of current messages being employed in these and other applications, the following presents procedures and potential pitfalls in designing for these applications. Several examples are provided for each of the above applications.

Many of the messages are very lengthy and may not be practical for the typical HAR installation. Broadcast of these messages is contingent upon having a long HAR transmission range. Remember drivers must hear the relevant parts of the message at least two times. Also, the station call letters must as a minimum be broadcast every thirty minutes. The example messages were developed based on the premise that, if the agency decides to broadcast all the information shown, the message provided would be quite effective. It should be noted that the phrases in parenthesis are optional and the words in brackets are alternative message phrases.

A. Maintenance/Construction

Maintenance/construction zone messages overlap with those given for (b) traffic advisories and (c) route diversion. The messages may include effects of construction such as lane blockage and delay and, where appropriate, detour advisories. The simplest maintenance zone message would be one where there was normal traffic flow except for reduced lane widths at several locations.

Example 1. Intermittent Lane Width Reduction - No Specific Action

- o ATTENTION EASTBOUND INTERSTATE 10 TRAFFIC
- o (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters)**
- o ROADWAY MAINTENANCE IS JUST AHEAD
- o ROADWAY AHEAD IS BEING MAINTAINED OR RESURFACED
- o LANE WIDTH AND REDUCED AT SOME LOCATIONS
- o (PLEASE FOLLOW ROADWORK SIGNS AND OBEY THE POSTED SPEED LIMITS)
- o (THANK YOU FOR DRIVING SAFELY)

** - When the symbol "(Call Letters)" appears in this and subsequent examples, it means that, by federal regulation, the HAR station's call letters must be broadcast at least once every 30 minutes.

Example 2. Congestion Due to Bridge Construction - No Specific Action

- o ATTENTION EASTBOUND INTERSTATE 10 TRAFFIC
- o (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters))
- o THERE IS CONSTRUCTION ON THE BRIDGE OVER INTERSTATE 610
- o EXPECT TRAFFIC CONGESTION AND A DELAY OF (X) MINUTES
- o (PLEASE FOLLOW ROADWORK SIGNS AND PAVEMENT MARKINGS)
- o (THANK YOU FOR DRIVING SAFELY)

Note: If the construction work continues beyond the hour of darkness the third line may be modified as follows:

- o THERE IS CONSTRUCTION DAY AND NIGHT ON THE BRIDGE OVER INTERSTATE 610

Example 3. Bridge Construction with Single Lane Blockage and Traffic Merging

- o ATTENTION INTERSTATE 10 EASTBOUND TRAFFIC
- o (THIS IS THE (State) HIGHWAY ADVISORY RADIO STATION (Call Letters))
- o THERE IS CONSTRUCTION ON THE BRIDGE OVER INTERSTATE 610
- o LEFT [RIGHT] LANE IS TEMPORARILY CLOSED
- o (TRAFFIC MUST MERGE INTO THE LEFT [Right] LANE)
- o REDUCE SPEED TO _____ MPH [OR "AND SLOW DOWN"]
- o (WE REGRET ANY INCONVENIENCE)

Example 4. Bridge Construction with Single or Two-lane Blockage and Detour of Wide Load Vehicles Only

- o ATTENTION INTERSTATE 10 EASTBOUND TRAFFIC
- o (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters))
- o THERE IS CONSTRUCTION ON THE BRIDGE OVER INTERSTATE 610.
- o ONE [TWO]LANES[S] IS [ARE]TEMPORARILY CLOSED
- o ALL VEHICLES OVER 8 FEET WIDE MUST FOLLOW THE POSTED DETOUR ROUTE*
- [R] o (SIGNS ON THE DETOUR WILL GUIDE YOU BACK TO THE INTERSTATE)
- o ALL OTHER VEHICLES SHOULD STAY ON THE INTERSTATE
- o (TRAFFIC WILL MERGE INTO THE LEFT (Right) LANE)
- o REDUCED SPEED TO _____ MPH [OR "SLOW DOWN"]
- o (WE REGRET ANY INCONVENIENCE)
- [R] o I REPEAT...ALL VEHICLES,...

If the detour route is a frontage road, substitute FRONTAGE ROAD for POSTED DETOUR ROUTE.

[R] NOTE: All major advisories should be repeated. The lines marked [R] should be given again after their first announcement prior to the closing message.

Example 5. Roadway Construction with All Lanes Blocked and All Traffic Detours

- o ATTENTION EAST BOUND INTERSTATE 10 TRAFFIC
- o (THIS IS THE (State) HIGHWAY ADVISORY RADIO STATION (Call Letters))
- o ROADWAY CONSTRUCTION AHEAD
- [R] o ALL EAST BOUND LANES ARE TEMPORARILY CLOSED
- [R] o ALL TRAFFIC MUST DETOUR AT THE HANOVER STREET EXIT
- [R] o (PLEASE FOLLOW DETOUR ROUTING SIGNS TO RETURN TO THE INTERSTATE)

- [R] I REPEAT ALL VEHICLES

- o (PLEASE FOLLOW THE GUIDE SIGNS AND OBEY THE POSTED SPEED LIMIT)
- o (WE REGRET ANY INCONVENIENCE)

Example 6. Roadway Construction - Compound Routes with Lane Closed - Stay on the Highway Message

- o ATTENTION EAST BOUND US 59 AND SOUTH BOUND INTERSTATE 410 TRAFFIC
- o (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters))
- o ROADWORK IS UNDERWAY
- o CERTAIN LANES ARE CLOSED AND TRAFFIC IS SLOW THROUGH THE WORK ZONES
- o ON US 59 ROADWAY CLOSURES ARE BETWEEN 25th AND 22nd STREETS
- o ON INTERSTATE 410 THE CLOSURES ARE BETWEEN SOUTHWEST DRIVE AND HUNTSVILLE HIGHWAY
- o BE PREPARED TO STOP AT ANY TIME
- o THERE IS ALSO A DETOUR ON US 59 BETWEEN HOLLYWOOD DRIVE AND VICTORY BOULEVARD
- o THIS DETOUR IS TO A SPECIAL ROADWAY PARALLEL TO US 59
- o TRAVELERS GOING THROUGH (City) SHOULD STAY ON US 59 OR INTERSTATE 410
- o NOTE: EXITING WILL NOT SAVE TIME; THERE IS OTHER ROADWORK ON ADJOINING ROADWAYS
- o (PLEASE OBEY ALL SIGNS, SIGNALS, AND FLAGMEN IN THE WORK ZONES)
- o (SIGNS WILL DIRECT YOU TO THE PROPER LANES)
- o (WE REGRET ANY INCONVENIENCE)

The above application deals with a situation of multiple roadwork sites, with traffic advised to endure rather than divert. The facility is a compound route carrying two route numbers at the time of the HAR advisory, but later forming into different routes each with roadwork on it.

Whenever there are more than one or two worksites on either route it is recommended that the locations be omitted, particularly when the objective is to keep traffic on the primary route.

B. Traffic Advisories

This section provides examples of traffic advisories related to accidents resulting in detours. Delays and lane blockages could also be an effect of an accident or could be due to construction and maintenance as illustrated in the previous section.

This set of messages differs from those in the previous Section primarily in the statement of the problem. In terms of the advisory or action statement the driver may be advised to continue on the interstate if the accident is minor and not obstructing lanes of traffic. If one or more lanes are blocked the advisory may be for either wide-loads or all traffic to detour.

Example 1, Minor Accident on Roadway Shoulder-Congestion, But No Specific Action

- o ATTENTION EASTBOUND INTERSTATE 10 TRAFFIC
- o (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters))
- o THERE IS A MINOR ACCIDENT OFF THE ROADWAY
- o EXPECT TRAFFIC CONGESTION AND A DELAY OF (X) MINUTES
- o (REDUCE SPEED AND WATCH FOR EMERGENCY VEHICLES)
- o (THANK YOU FOR DRIVING SAFELY)

Example 2. Major Accident on Bridge (or Roadway) - Single Lane Blockage With Detour of Wide-Loads Only to Marked Route

- o ATTENTION EASTBOUND INTERSTATE 10 TRAFFIC
- o (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters))
- o MAJOR ACCIDENT AHEAD ON THE BRIDGE OVER INTERSTATE 610
- o ONE LANE IS TEMPORARILY CLOSED
- o ALL VEHICLES OVER 8 FEET WIDE MUST FOLLOW THE POSTED DETOUR ROUTE
- o SIGNS ON THE DETOUR WILL GUIDE YOU BACK TO THE INTERSTATE
- o ALL OTHER VEHICLES SHOULD STAY ON THE INTERSTATE
- o (TRAFFIC WILL MERGE INTO THE LEFT (Right) LANE)
- o (PLEASE REDUCE SPEED AND LOOK OUT FOR EMERGENCY VEHICLES)
- o (THANK YOU FOR DRIVING SAFELY)

Example 3. Major Accident Ahead - All lanes Blocked and All Traffic Detours to Marked Route

- o ATTENTION EASTBOUND INTERSTATE 10 TRAFFIC (OR TRAFFIC ON INTERSTATE 10 AND US 59)
- o (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters))
- o MAJOR ACCIDENT AHEAD
- o ALL LANES ARE BLOCKED
- [R] o ALL TRAFFIC MUST DETOUR AT THE HANOVER STREET EXIT

- [R] I REPEAT. . .ALL TRAFFIC

- o (SIGNS ON THE DETOUR ROUTE WILL GUIDE YOU BACK TO THE INTERSTATE BEYOND THE ACCIDENT)*
- o (PLEASE FOLLOW THE GUIDE SIGNS AND OBEY THE POSTED SPEED LIMIT)
- o (WE REGRET ANY INCONVENIENCE)

*If the frontage road is the detour route, this line should be:

TAKE THE FRONTAGE ROAD AND REENTER THE INTERSTATE BEYOND THE ACCIDENT

If there is a distinctive trailblazer symbol making a detour this should be mentioned here;

FOLLOW THE ROUTE SIGNS MARKED WITH A (Symbol). THEY WILL GUIDE YOU
BACK TO THE INTERSTATE BEYOND THE ACCIDENT

C. Route Diversion - No Marked Routes

Research has found that drivers can recall and follow successfully an HAR description of a detour route when the route given is a logical one, namely, right turn, left turn, left turn, (1)" pattern) or left, right, right, (1)" pattern). The last turn back onto the interstate need not be given.

The names and turns must be given twice. The following illustrates a message where names are given again immediately after their first mention.

Example 1. Optional Route Diversion - "]" Pattern with Names Repeated

```
0 ATTENTION EASTBOUND INTERSTATE 10 TRAFFIC
0 (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters))
0 THERE IS A MAJOR ACCIDENT AHEAD
0 TO AVOID MAJOR DELAY, EXIT AT RONSTADT AND TAKE THE FOLLOWING
  ROUTE:
0
0 THEN LEFT ON BOARDWALK AND CONTINUE TO WILSHIRE
0 THEN TURN LEFT AGAIN ON WILSHIRE AND PROCEED BACK TO INTERSTATE 10
0 (PLEASE DRIVE SAFELY [or WE REGRET ANY INCONVIENCE])
```

Example 2. Optional Route Diversion - "]" Pattern with Action Statement Repeated

The following is the same message without immediate repetition of names but with repetition of the action portion of the message:

```
0 ATTENTION EASTBOUND INTERSTATE 10 TRAFFIC
0 (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters))
0 THERE IS A MAJOR ACCIDENT AHEAD
0 TO AVOID MAJOR DELAY, EXIT AT RONSTADT AND TAKE THE FOLLOWING
  ROUTE:
[R] 0 TURN RIGHT ON RONSTADT
0 THEN TURN LEFT ON BOARDWALK
0 AND THEN LEFT AGAIN ON WILSHIRE
0 AND PROCEED BACK TO INTERSTATE 10 EASTBOUND
```

[R] I REPEAT. . .

Example 3. Optional Route Diversion - Long Distance "]" Pattern

Whenever the driver is diverted a long distance in a city where there are turns at unfamiliar intersections, the use of landmarks is recommended.

- o ATTENTION EASTBOUND INTERSTATE 10 TRAFFIC
- o (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters)**
- o THERE IS A MAJOR ACCIDENT AHEAD
- [R] o TO AVOID MAJOR DELAY EXIT AT ST. CHARLES AND TAKE THE FOLLOWING ROUTE:
- o TURN RIGHT ON ST. CHARLES AND GO TO THE SECOND STOP LIGHT, NEW YORK AVENUE
- o TURN LEFT ON NEW YORK, PAST THE COLUMBIA MEDICAL CENTER, TO VENTNOR AVENUE
- o NOTE: A MAC DONALD'S RESTAURANT IS ON THE RIGHT CORNER
- o TURN LEFT ON VENTNOR AND RETURN TO INTERSTATE 80.
- o (WE REGRET ANY INCONVENIENCE)

[R] I REPEAT....TO AVOID....

D. Special Events

A particular type of diversion may involve advising traffic headed for a special event to divert and take a short cut to the parking lot for the event. Another application is directing traffic to shuttle bus parking rather than their driving to insufficient parking at the special event facility.

Example 1. Shuttle Bus Parking

- o ATTENTION FOOTBALL FANS HEADED FOR(Name) STADIUM
- o (THIS IS (State) HIGHWAY INFORMATION RADIO STATION (Call Letters)**
- o AUTO PARKING NEAR THE STADIUM IS LIMITED DUE TO CONSTRUCTION WORK
- o IT IS MUCH EASIER TO PARK EITHER AT THE CMC CENTER PARKING LOT OR THE NORTH CAMPUS PARKING LOT
- o FROM THESE LOCATIONS A SHUTTLE BUS TO (Name) STADIUM RUNS EVERY 15 MINUTES UNTIL 30 MINUTES PRIOR TO GAME TIME.
- o BUS FARE IS 50 CENTS PER PERSON; PARKING IS FREE
- [R] o TO REACH THE CIVIC CENTER PARKING LOT TAKE BUSINESS ROUTE 64 SOUTH
- o TO THE GEORGETOWN EXIT AND TURN RIGHT ON GEORGETOWN. TURN RIGHT
- o AGAIN ON AUSTIN STREET AND PROCEED TO THE CIVIC CENTER PARKING LOT.
- o THIS ROUTE IS MARKED WITH SIGNS.

[R] I REPEAT....To REACH....

- [R] o TO REACH THE NORTH CAMPUS PARKING LOT, TAKE LOOP 610 EASTBOUND FROM INTERSTATE 10 EXIT AT CAMPUS DRIVE.
- o TURN RIGHT ON CAMPUS DRIVE AND DRIVE 3 BLOCKS TO THE PARKING LOT.

[R] I REPEAT....TO REACH....

- o (WE REGRET ANY INCONVENIENCE, BUT YOU CAN SAVE TIME AND MONEY BY USING THESE PARKING LOTS AND TAKING THE SHUTTLE BUS).
- o THANK You.

Example 2. Short Cut to a Parking Lot

- o ATTENTION SOUTH BOUND CENTRAL FREEWAY TRAFFIC HEADED FOR (Name) STADIUM
- o HEAVY CONGESTION IN DOWNTOWN (City) AND ON INTERSTATE 25 EASTBOUND TO (Name) STADIUM
- o TO SAVE 30 MINUTES TRAVEL TIME, TAKE THE FOLLOWING ROUTE :
- [R] o EXIT AT HAGMAN STREET AND TURN LEFT ON HAGMAN
- o CONTINUE FOR ABOUT THREE MILES. PASS THROUGH FIVE STOP LIGHTS
- o PROCEED PAST (Name) STADIUM ON HAGMAN AND TURN RIGHT INTO THE MAIN PARKING LOT
- [R] I REPEAT.....EXIT AT....
- o (YOU WILL SAVE 30 MINUTES TRAVEL TIME BY TAKING THE HAGMAN ROUTE TO (Name) STADIUM)
- o (PLEASE DRIVE SAFELY)

E. Weather Advisory

A general purpose weather advisory message is difficult to specify because there are so many possible weather conditions. Probably the most effective usage of HAR will be for situations in which the highway ahead is closed due to snow accumulation or other weather factors and all motorists are required to either hold up or reroute. Other HAR usages include: reminding drivers how to drive safely in snow, ice, and blizzard conditions; what provisions to take in the vehicle; what to do if stranded: etc.

Some agencies include within the HAR message, a telephone number to call in which a prerecorded message provides the current conditions on local roadways. If at all practical, it is better that HAR provide this service. If the HAR message recommends that drivers remain in a city upstream of the closed road, then a local radio station call number or phone number should be given so they might learn when the road would be opened again.

Example 1. Road Closed by Snowdrifts - Stay Where You Are

- o ATTENTION WESTBOUND INTERSTATE 90 TRAFFIC
- o (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters))
- o INTERSTATE 90 WEST IS CLOSED TO THRU TRAFFIC BETWEEN (City A) and (City B)
- o SNOWFALL AND HIGH WINDS HAVE CAUSED DRIFTING SNOW AND VISIBILITY
- o DRIVERS HEADED WESTBOUND TO (City C) ARE ADVISED TO REMAIN IN (City D)
- o WHILE IN (City D) TURN YOUR RADIO TO LOCAL STATIONS 1190 OR 1390 AM
- o THESE STATIONS WILL INFORM YOU OF WHEN INTERSTATE 90 WEST TO (City C) WILL BE REOPENED.
- o (WE REGRETTTHIS INCONVENIENCE)

Example 2. Road Closed by Snowdrifts - Detour to Alternate

- o ATTENTION WESTBOUND INTERSTATE 90 TRAFFIC
- o (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters))
- o INTERSTATE 90 WEST IS CLOSED TO THRU-TRAFFIC BETWEEN (City A) AND (City B)
- o SNOW AND HIGH WINDS HAVE CAUSED DRIFTING SNOW AND LIMITED VISIBILITY
- o WESTBOUND TRAFFIC HEADED FOR (City C) MUST TAKE ALTERNATE ROUTE, us 40
- o ALL WESTBOUND INTERSTATE 90 TRAFFIC MUST EXIT AT THE NEXT INTERCHANGE AND DETOUR ONTO ALTERNATE ROUTE, US 40 WEST
- o SIGNS ON THE DETOUR ROUTE WILL GUIDE YOU TO (City C) AND POINTS WEST
- o ROADS AND TRAVEL INFORMATION ON CURRENT CONDITIONS AND ON OTHER ALTERNATE ROUTES IN THE AREA MAY BE RECEIVED BY CALLING (TELEPHONE NO. XXX-XXXX in City C). AGAIN, THE (City C) PHONE NUMBER IS Xxx-xXxX.

Note: Often a local telephone number is given to inform drivers of current conditions on various alternate routes paralleling or intersecting the Interstate. However, it is important that drivers know without phoning, that the designated detour route is open and negotiable. The HAR agency should assume responsibility for knowing the best route rather than expecting drivers on the Interstate to individually call a local telephone number. Telephone usage should be in regard to other possible routes, not the detour itself.

Example 3. Safe Driving in Snow - No Detour Required

The following is an introductory message given principally when no specific emergency action is required, but acquaints the visitor with requirements for driving on snow-covered roadways. Several message options (A thru J) are given which may be added to the basic message if they are applicable. The agency should briefly describe the nature of the hazardous condition, (e.g., snow-packed and icy spots; gusting crosswinds). Unfamiliar drivers may need an instantaneous education in hazardous driving.

Introductory Message

- o ATTENTION WESTBOUND INTERSTATE 90 TRAFFIC.
- o (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call Letters)).
- o THIS RADIO SERVICE WAS DEVELOPED TO AID MOTORISTS TRAVELING ON INTERSTATE 90 BETWEEN (City A) AND (City B).
- o (STAY TUNED FOR ADVISORIES ON ROADWAY CONDITIONS WHICH COULD AFFECT YOUR TRAVEL PLANS.)
- o ALTERNATE ROUTES WILL BE ADVISED SHOULD INTERSTATE 90 WEST BE CMSED.

Option A - Special Provisions

- AT THIS TIME OF YEAR MOTORISTS TRAVELING THROUGH (State) SHOULD ALWAYS HAVE FRONT AND REAR CHAINS. (ALSO, MAKE SURE YOUR VEHICLE IS IN GOOD OPERATING CONDITION BEFORE YOU START.)
- HIGHWAY PATROLS ARE ON THE HIGHWAY.
- IN THE EVENT OF A BREAKDOWN, DO NOT LEAVE YOUR VEHICLE. KEEP WARM, USE YOUR HAZARD FLASHER LIGHTS, AND PARK OFF THE HIGHWAY.
- (IF AVAILABLE, USE A CB RADIO)

Option B - Driving on Ice

- AT THIS TIME OF YEAR, MOTORISTS TRAVELING THROUGH (State) SHOULD ADJUST TO THE BAD WEATHER BY DRIVING SLOWER. ALLOW A GREATER DISTANCE BETWEEN YOUR VEHICLE AND THE ONE AHEAD.
- LEAVE AT LEAST TWO CAR LENGTHS BETWEEN VEHICLES OR ONE CAR LENGTH FOR EACH 10 MPH OF SPEED.
- REMEMBER IT TAKES LONGER TO STOP. TO STOP YOUR VEHICLE ON ICE, PUMP YOUR BRAKES AT REGULAR INTERVALS. I REPEAT NEVER APPLY THE BRAKES QUICKLY AND HOLD THEM. PUMP THE BRAKES TO STOP ON ICE.

Option C - Black Ice

- BE ALERT FOR ICE ON BRIDGES, OVER PASSES, AND AREAS SHADED BY TREES. DURING PERIODS OF FREEZING AND THAWING, A COAT OF BLACK ICE IS FORMED. THE SURFACE OF THE ICE WILL MELT FIRST LEAVING A FILM OF WATER.
- REMEMBER SURFACES ARE MORE SLIPPERY AT 30 DEGREES THAN AT ZERO DEGREES.

Option D - Skidding Safely

- TO TELL HOW SLIPPERY THE ROAD IS, TOUCH YOUR BRAKES LIGHTLY. SEE WHETHER YOUR VEHICLE SLOWS DOWN OR BEGINS TO SWERVE SIDeways [OR SKID]. IF YOUR VEHICLE STARTS TO SKID, TURN IN THE DIRECTION THE REAR END OF THE VEHICLE IS MOVING.
- EASE YOUR FOOT OFF THE GAS UNTIL YOU REGAIN CONTROL.

Option E - Snow Plow Alert

- BE ALERT FOR SLOW VEHICLES REMOVING SNOW FROM THE INTERSTATE
- THEY WILL HAVE FLASHING AMBER LIGHTS OR YOU MAY SEE ONLY A CLOUD OF SNOW.
- WHEN PASSING A SNOW PLOW, DRIVE SLOWLY AND WATCH OUT FOR THE PLOW BLADE. ALWAYS GIVE THE PLOW THE RIGHT OF WAY. THEY ARE CLEARING THE ROAD FOR YOUR SAFETY AND CONVENIENCE.

Option F - Becoming Stranded

- IF YOUR VEHICLE SHOULD BREAK DCWN DURING A WINTER STORM, DO NOT PANIC.
- STAY IN YOUR VEHICLE.
- RUN THE ENGINE, BUT BE SURE TO LEAVE A WINDOW OPEN SLIGHTLY TO AVOID CARBON MONOXIDE POISONING.
- ONLY RUN THE ENGINE FOR ABOUT 20 MINUTES EACH HOUR.

- LEAVE YOUR FLASHER LIGHTS ON AND, LEAVE THE INSIDE DOME LIGHT ON SO WORK CREWS CAN SEE YOU.
- IF YOUR ENGINE IS STOPPED, KEEP YOUR BODY WARM BY EXERCISING IN YOUR VEHICLE.
- KEEP ACTIVE, BUT DO NOT OVER EXERT INDIGGING OUT OF A SNOW DRIFT.

Option G - Chain Law

- (State) HAS A CHAIN LAW IN EFFECT DURING HAZARDOUS DRIVING CONDITIONS
- IF YOU DO NOT HAVE A FOUR WHEEL DRIVE VEHICLE, YOU MUST HAVE TIRE CHAINS OR SNOW TIRES.
- TO PUT ON TIRE CHAINS EITHER EXIT THE INTERSTATE OR DRIVE ON TO AN EMERGENCY PARKING LANE.
- TURN ON YOUR EMERGENCY FLASHERS AND NEVER STAND IN A TRAFFIC LANE WHILE PUTTING ON OR REMOVING CHAINS.

Option H - Ground Blizzards

- WINTER WINDS MAY RESULT IN BLIZZARD CONDITIONS ACROSS (State's) HIGH PLAINS.
- IF CAUGHT IN A BLIZZARD, DRIVE SLOWLY, STAY CALM, AND WATCH OUT FOR OTHER VEHICLES.
- IT IS ADVISED TO KEEP DRIVING VERY SLOWLY.
- IF YOU MUST STOP, BE SURE YOU ARE WELL OFF THE ROADWAY.
- IF YOU CANNOT SEE THE LANE MARKINGS, LOOK AT THE LITTLE POSTS ALONG THE SIDE OF THE ROAD. THESE POSTS WILL GUIDE YOU IN STAYING ON THE ROADWAY.

Option I - Strong Winds

- THERE ARE STRONG AND GUSTY CROSSWINDS ON INTERSTATE 90 WEST BETWEEN (City A) AND (City B).
- THESE WINDS MAYBE HAZARDOUS AND CAUSE A LOSS OF CONTROL OF LARGE VEHICLES.
- DRIVERS PULLING TRAILERS OR DRIVING RECREATIONAL VEHICLES ARE ADVISED TO WAIT IN (City A) UNTIL THE WINDS SUBSIDE.

Option J - Uncertain Hazardous Locations

- BE ALERT FOR HAZARDOUS DRIVING CONDITIONS AHEAD, THERE ARE STRONG AND GUSTY CROSSWINDS AS WELL AS BLOWING SNOW AND ICY SPOTS IN ISOLATED AREAS ON INTERSTATE 90 WEST TO (City B).
- CONDITIONS MAY VARY THROUGHOUT THIS SECTION.
- THE POSTED SPEED LIMITS WILL BE ENFORCED.

F. Tourist Information

Another useful application for HAR involves providing tourist or roadside services (e.g., gasoline? food, and lodging). Static interstate signs may tell the tourists that such facilities exist, but the driver may be interested in specific facilities available such as types of service stations, types of food served and whether there are motels. This type of information is useful for planning ahead 5 to 10 miles (8 to 16 km) upstream of a city.

Sometimes a new city bypass route will carry the tourist traffic while the tourist facilities still remain on an older business route. The commercial signs may not be visible from the interstate. Many visitors may also wish to have information on the nearest hospital or how to get to a ball park. Static signs may tell the driver where to exit for a hospital? but other major traffic generators and sports arenas are often not signed (e.g., a high school football stadium, school, or a baseball park). An HAR may be appropriate also when there is an extended (one week or more) event such as a state fair or folk festival. The special event section (D) above dealt with one day events. These applications all provide useful information on directions to follow which would otherwise require stopping at a commercial business to ask directions. Often the business may give unreliable information or not know the answer.

The more common use of HAR is as a substitute for sight seeing information at a national park or at a historical site with local attractions. Directional information is often included in these messages.

Example 1. Tourist Information - Gas, Food, and Lodging on the Interstate

- o ATTENTION EASTBOUND INTERSTATE 25 TRAFFIC
- o (THIS IS (State) HIGHWAY INFORMATION RADIO STATION (Call Letters)
- o (City) HAS A POPULATION 12,000, AND IS NESTLED IN THE FOOTHILLS OVER LOOKING LAKE (Name)
- o AT (City A) THERE ARE SERVICE STATIONS, RESTAURANTS, AND MOTELS. THE NEXT SERVICE STOP ON EASTBOUND INTERSTATE 25 IS AT (City B) WHICH IS 30 MILES AHEAD.
- o SERVICE STATIONS ARE LOCATED NEAR THE (City A) EXIT (ALL ARE OPEN 24 HOURS DAILY).
- o FASTECOD RESTAURANTS ARE OPEN FROM 6 A.M. UNTIL 12 MIDNIGHT. THE (City) TRUCK STOP IS OPEN ALL NIGHT.
- o ALL MOTELS CURRENTLY HAVE VACANCIES.
- o THE CITY OF (City A) WELCOMES YOU TO COME AND VISIT. (REMEMBER TO TUNE TO THE (State) HIGHWAY INFORMATION RADIO FOR INFORMATION AT (City B) AND OTHER CITIES ON INTERSTATE 25 EASTBOUND.)

Example 2. Tourist Information - Gas, Food, and Lodging on the Business Route

- o ATTENTION EASTBOUND INTERSTATE 25 TRAFFIC.
- o (THIS IS (State) HIGHWAY INFORMATION RADIO STATION (Call Letters))
- o AT (City), THERE ARE SERVICE STATIONS, RESTAURANTS, AND A MOTEL ON THE BUSINESS ROUTE, BUT THERE ARE NO SERVICES ON INTERSTATE 25 WHICH BYPASSES (City) TO THE EAST.
- o TO REACH THE GAS, FOOD, AND LODGING, YOU ARE INVITED TO EXIT AT US 69 EASTBOUND AND CONTINUE 2 MILES ON US 69 TO THE BUSINESS DISTRICT.
- o US 69 EASTBOUND WILL REJOIN INTERSTATE 25 ON THE OTHER SIDE OF (City A).

Example 3. Tourist Information - Summer Tourist City

- o ATTENTION EASTBOUND INTERSTATE 25 TRAFFIC
- o (THIS IS THE (Name) INFORMATION RADIO WELCOMING VISITORS TO A SUMMER TIME IN THE BEAUTIFUL (Name) MOUNTAINS.)
- o JUST AHEAD IS HISTORIC (City) A POPULAR TOURIST ATTRACTION WITH INTERESTING SHOPS AND MUSICAL SHOWS. THE BOYHOOD HOME OF PRESIDENT (Name) IS 3 MILES FROM DOWNTOWN.
- o BE SURE TO STOP AT THE (City) INFORMATION CENTER FOR A MAP AND INFORMATION. THE INFORMATION CENTER IS OPEN FROM 8 TO 5 DAILY.
- o PUBLIC PARKING IS AVAILABLE DOWNTOWN WITHIN WALKING DISTANCE OF SHOPS, RESTAURANTS, AND MAJOR ATTRACTIONS.
- [R] o TO REACH THE CHAMBER OF COMMERCE PARKING LOT, TAKE THE SECOND EXIT IN (City) TURN RIGHT ON MAIN STREET, AND CONTINUE TO THE
- o THIRD STOPLIGHT. THE PARKING LOT IS ON THE RIGHT AND HAS A LARGE SIGN IN FRONT.

[R] I REPEAT....TO REACH....

- o BUS SERVICE IS AVAILABLE TO ALL HISTORICAL SITES INCLUDING THE BOYHOOD HOME OF PRESIDENT (Name), OUR 44th PRESIDENT.
- o REMEMBER THE BEST WAY TO VISIT (City) IS EITHER ON FOOT OR BY BUS, SO LEAVE YOUR VEHICLES PARKED IN OUR FREE PARKING LOT IN DOWNTOW (City).
- o STAY TUNED TO THE (Name) INFORMATION RADIO WHILE DRIVING ON INTERSTATE 25 EAST. WE WILL TELL YOU ABOUT OTHER INTERESTING SITES AND PLACES TO VISIT.

Note: Tourist Information - State and National Parks

Messages similar to the above may also be used in National and State parks. These messages should include directions to a visitors' center in the park. An HAR system should not attempt to use the radio service to describe all major sites in the park. Site descriptions can be obtained in other ways such as audio tapes played in the visitors' center or at a look-out point near the site itself. Using the HAR to provide sight-seeing information is satisfactory, but it may discourage local drivers from listening to the radio when, in fact, other useful information of a non-routine nature may also be transmitted over the HAR.

Types of information which should be given on a park radio include the following:

- a. Vehicles not permitted on a road or trail due to steep grade.
- b. How to drive steep grades (Gear down and pull over to allow brakes to cool off, etc.)
- c. Roads closed and detours (see Weather Advisory Messages).
- d. Special contingencies (such as forest fires, lost children, grizzly bears) which drivers should be alerted for.

Example 4. Tourist Information - Directions to a Special Event or Facility

- ATTENTION FOOTBALL FANS HEADED TO THE HIGH SCHOOL DISTRICT 3A CHAMPIONSHIP GAME AT (City A).
- (THIS IS (State) HIGHWAY ADVISORY RADIO STATION (Call letters))
- THE FASTEST ROUTE TO (Name) FOOTBALL STADIUM IS THE HIGHWAY 6 BYPASS.
- [R] | ○ EXIT AT BRIARCREST BOULEVARD
- SOUTHBOUND TRAFFIC SHOULD TURN RIGHT ON BRIARCREST
- NORTH BBOUND TRAFFIC SHOULD TURN LEET ON BRIARCREST
- THE STADIUM IS ABOUT 3 BLOCKS ON THE LEFT
- VISITORS SHOULD DRIVE PAST THE STADIUM, TURN LEFT AT THE FIRSTSTREET AND PROCEED TO THE PARKING LOT

- [R] | I REPEAT....EXIT AT....

- VEHICLES MAY NOT PARK ON THE SIDES OF BRIARCREST
- VIOLATORS WILL BE TICKETED
- (THE CITY OF (Name) WELCOMES ALL VISITORS TO THE GAME)
- (PLEASE DRIVE SAFELY AND BEST OF LUCK TO YOUR TEAM).

APPENDIX A

STATUS OF HAR IN THE UNITED STATES (1980)

STATE	LOCATION	CURRENT STATUS	STATION LICENSING	STATION TYPE		FREQUENCY		TYPES OF INFORMATION PROVIDED
				CABLE	MONOPOLE	530 kHz	1610 kHz	
Colorado	Dumont, I-70 Dillon, I-70	Removed	Experimental		X		X	Weather Advisory, Alternate Routing
Idaho	Elk City	Relocated	Experimental		X		X	Construction and Maintenance
New York	Lake Placid	Inactive	TIS (temp)		X		X	Olympic Parking and Routing
Pennsylvania	Walt Whitman U.S. 202 I-95 South I-95 North Schuylkill Exp. (I-676)	Removed	Experimental	X			X	Traffic Info. into Phil.
		Inactive	Part 15	X			X	Traffic Info. into Phil.
			Part 15	X			X	Traffic Info. into Delaware
			Part 15	X			X	Traffic Info. into New Jersey
			Part 15	X			X	Traffic Info. into Phil.
Texas	Chambers County I-10 (2 Sta.)	To be Relocated	TIS		X		X	Construction and Maintenance
Wyoming	Walcott Junction, and Laramie on I-80	Inactive	Part 15	X			X	Weather Advisory
Virginia	Bells Rd. Int. I-64/360 Int. Belvidere St. @ Toll Plaza Downtown Expressway	Relocated	TIS (temp)		X		X	Construction and Maintenance
					X		X	
					X		X	
					X		X	
Arizona	Sky Harbor Int. Airport; Phoenix	Active	TIS		X		X	Airport Park and Routing
California	Los Angeles Int. and Sacramento Metro Airports	Active Active	Experimental	X			X	Airport Park and Routing
					X		X	
Florida	Sarasota-Mantee Tampa Int. Airports	Active Active	TIS TIS		X		X	Airport Park and Routing
Kentucky	Cinn. Int. Airport (2 Stations) and Louisville Standiford Airport	Active	TIS		X		X	Airport Park and Routing
		Active	TIS		X		X	
Massachusetts	Logan Airport	Active	TIS		X		X	Airport Park and Routing
Missouri	Kansas City Int. Airport	Active	TIS		X		X	Airport Park and Routing
Minnesota	Minn./St. Paul Int. Airport	Active	TIS		X		X	Airport Parking Lot Construction
Oklahoma	Tulsa Airport	Active	TIS		X		X	Airport Parking and Routing
Texas	Houston Int. Airport Houston Hobby Airport	Active	TIS		X		X	Airport Park and Routing
		Active	TIS		X		X	Airport Park and Routing
Illinois	Upper and Lower Section of Edens Exp.	Active	TIS		X		X	Construction and Maintenance

STATE	LOCATION	CURRENT STATUS	STATION LICENSING	STATION TYPE		FREQUENCY		TYPES OF INFORMATION PROVIDED
				CABLE	MONOPOLE	530 kHz	1610 kHz	
Ohio	I-75 in Hamilton County (Cinn. Area) Columbus	Active	TIS		X		X	Construction and Maintenance
		Active	TIS		X	X		Unknown
Virginia	Fredricksburg Quantico, I-95 and Rt. 637 Hampton Roads Tunnel	Active	TIS		X		X	Construction and Maintenance
		Active	TIS		X	X		Traffic and Routing
Alabama	I-59, Steele U.S. 231 and I-59	Active	TIS		X		X	Unknown
		Active	TIS		X		X	Unknown
Georgia	I-75 North and South approaches	Active	TIS		X	X		Traffic and Routing through Atlanta
Iowa	I-80, Walnut Junct. Rt. 301 and I-80	Active	Experimental		X		X	General Information, Construction and Maintenance
Minnesota	I-35W, Minn.	Active	TIS	X			X	Traffic and Routing Info.
Oklahoma	Turley	Active	TIS		X		X	Unknown
Tennessee	Gatlinburg (5 stations)	Active	TIS		X		X	Traffic and Routing
Washington	Snoqualmie Pass, I-90	Active	TIS		X		X	Weather Advisories
Washington, D.C.	Potomac River	Experimental	TIS		X	X		Boating Advisories
California	Los Angeles Airport	Planned	TIS		X	X		Expansion to Include Freeways
Michigan	Pontiac, Silverdome	Planned	TIS		X		X	Stadium Park and Routing
Minnesota	I-94 between Minneapolis and St. Paul	Planned	TIS		X		X	Construction and Maintenance
New Jersey	I-80 Reconstruction	Planned	TIS		X			Construction and Maintenance
New York	George Washington Bridge	Planned	TIS	X		X		Routing Information
	Long Island Corridor	Planned	TIS	X	X			Traffic, Routing, Hazards (IMIS Project)
Nevada	Las Vegas Airport	Planned	TIS		X			Airport Park and Routing
Tennessee	Knoxville	Planned	TIS		X		X	Construction and Maintenance
Texas	Dallas-Ft. Worth Int. Airport	Planned	TIS		X		X	Airport Park and Routing
Wisconsin	Milwaukee Airport	Planned	TIS		X			Airport Park and Routing
West Virginia	I-77 Charleston to Beckley (4 stations)	Planned	TIS		X		X	Construction and Maintenance
Virginia	I-95 and U.S. 30 I-95 and Rt. 207 I-95 and U.S. 50	Planned	TIS		X	X	X	Construction and Maintenance

APPENDIX B

BASIC BAR OPERATING INSTRUCTIONS

WHAT GUIDELINES ARE USEFUL IN OPERATING AN HAR SYSTEM?

The following guidelines are intend to acquaint highway field personnel with basic HAR operating instructions.

DO EVERYTHING POSSIBLE TO MAINTAIN DRIVER CREDIBILITY

An important consideration in a successful HAR system is to develop and maintain credibility--drivers faith in the system. Drivers view these systems as furnishing them with reliable, accurate, and up-to-date information. Precautions must be taken to insure that these driver expectations are met. Therefore, operating an HAR will require extra care and time to insure the right messages are displayed at the proper time. It cannot be assumed that this is being accomplished without monitoring the operation while messages are broadcast. Drivers will have negative attitudes about a system that (1) broadcasts information contrary to existing conditions, (2) broadcasts information that is not understood or cannot be heard in ample time to make the appropriate maneuvers, (3) recommends a course of action that is not significantly better than their intended action, or (4) often tells them something they already know. Once drivers lose faith in the system, do not expect them to respond appropriately in the future.

It is important that the information broadcast is reliable. A relevant question to ask is: "Can the drivers disprove the information given?" If they can, don't expect the drivers to respond to information they know is incorrect. Repeatedly giving erroneous information is one way of losing driver confidence. Although it is sometimes enticing to broadcast information that exceeds the surveillance capabilities, this practice should be avoided. Also, the operator must change the messages when conditions change. Extreme care must be exercised to assure that the proper message is presented. When no useful information is available to be broadcast, the station should be shut down.

What is broadcast is directly related to the amount of information available to the agency. The message must be concise, accurate, timely, and reliable so that credibility is maintained. To maintain credibility, the type of information that can be broadcast must be tailored to the roadway surveillance system. Roadway surveillance systems can range from an observer sitting in a car watching one section of freeway to detectors and television cameras situated over many sections of freeway.

USE ADVANCE ROAD SIGN TO ALERT DRIVERS TO HAR BROADCASTS

- A. Make the driver aware that localized HAR service exists, is operational and provides useful information.

An advance sign is an essential part of an HAR system. It makes the driver aware that the HAR service is available and provides useful information. Currently two types of operational approaches are used.

1. Continuous broadcast - When a message is broadcast 24 hours each day static signs are normally used. Flashers are activated only for emergency message broadcasts.
2. Emergency broadcast - Messages are broadcast only when an emergency exists. Three types of signs can be used. The first type of sign consists of a static sign with flashing beacons. Its copy contains the wording "WHEN FLASHING" as a part of the sign message. The flashers are used to inform the driver of the HAR station's operational status.

The second sign alternative is a changeable message sign. This sign is activated when an HAR message is broadcast. To obtain greater driver attention, the message on the changeable message signs can be flashed.

The third alternative involves a transportable advance sign. This sign is used for only a short period of time (e.g., 1 to 3 hours). One example is a sports event. When HAR is not operating these signs can be covered with a drop cloth or other material.

- B. Make the advance sign highly visible. Do not expect that all drivers will see the advance sign the first time they pass it.

The advance sign must be highly visible and conspicuous, particularly for unfamiliar drivers. Locally, familiar drivers passing an advance sign several times eventually become aware of the sign. One field study found that only 58 percent of drivers passing a large static advance HAR sign for the first time had seen the sign even though it was favorably located.

Dynamic moving elements attract attention and tell the driver that the information is current and important. A static sign with flashing beacon or a changeable message sign makes a sign more conspicuous.

- C. Locate the advance sign far enough upstream from the broadcast zone to give the drivers time to tune their car radios to the station (i.e., 530 kHz or 1610 kHz).

FHWA recommends that the advance sign should be located about a mile (1.6km) upstream from the beginning of the radio broadcast zone. This advance notice will allow sufficient time to turn on the radio and/or to tune the indicated frequency. Most agencies seem to adhere to the 1 mile (1.6km) guideline although some believe that this is too far from the radio zone, particularly in urban areas where the speeds are much slower. A distance of 1/2 mile (0.8km) appears to be a good guideline in urban areas.

- D. Make the sign's copy legible and brief. It should not be more than 4 lines long.

A brief message in a character size which can be easily read within the available driver reading time is recommended. Reading time is based upon sight distance, geometrics, and prevailing traffic volumes and speeds. The sign should not contain more than 4 lines of message.

- E. Select terminology appropriate to the urgency of the information broadcast. The expressions TRAFFIC ALERT, TRAFFIC ADVISORY, and TRAFFIC INFORMATION imply different degrees of urgency.

If the radio message concerns major traffic conditions downstream from the driver which will necessitate speed reductions or detouring, the expression TRAFFIC ALERT should be used since it implies to the driver a high degree of urgency.

TRAFFIC ADVISORY implies a lower degree of urgency and may be used for HAR messages such as special events. TRAFFIC INFORMATION implies a very low degree of urgency. For many it implies tourist information.

- F. Design a brief message recognizing that the driver may not be thinking about his radio.

The word RADIO must be used to get the driver to understand and react to the rest of the message. An example set of messages are as follows:

RADIO TRAFFIC ALERT	TRAFFIC ALRRT	TRAFFIC ALERT
TUNE TO 530 AM	TUNE RADIO TO 530 AM	TUNE RADIO
1 MILE	1 MILE	TO 530 AM 1 MILE

It is recommended that AM be placed on the sign because many automobile radios are now equipped with FM. The driver may be listening to FM and may not remember to change to AM.

The word INFORMATION is now very commonly abbreviated INFO and no major reduction in understanding will result from use of the abbreviation.

- G. State the type of information broadcast on the sign.

The driver needs to know what type of information is being broadcast, (e.g. ,traffic, weather, tourist, etc.). Substitute these for TRAFFIC in the advance sign where applicable.

- H. For special event traffic control, the special event or facility used for the event should be on the top line.

A message appropriate for directing traffic to a special event should always begin with the name of the event or facility. The choice of event versus facility will depend upon the relative prominence of each. The following are typical examples:

ASTRODOME	OCTOBER FEST
TRAFFIC INFO	TRAFFIC INFO
TUNE RADIO	TUNE RADIO
TO 530 AM	TO 530 AM

I. Use two signs to advise drivers to tune to the HAR station.

It is desirable that a second sign with approximately the same message be installed at the beginning of the broadcast zone. The advance mileage on the second sign should be omitted. Some drivers may have missed the first sign or failed to see or remember the radio frequency. The second sign would be particularly necessary if a major entry ramp to the interstate existed downstream from the one mile (1.61 km) advance sign. There is no need for a sign at the end of the broadcast zone except when more than one station is situated on the highway.

Studies of Highway Advisory Radio Messages for Route Diversion

CONRAD L. DUDEK, R. DALE HUCHINGSON, AND R. QUINN RRACKETT

A series of in situ controlled field studies were conducted to establish the effectiveness of highway advisory radio (HAR) message characteristics in aiding motorists to negotiate diversion routes. The research investigated the effects of language style, message load, manner of message repetition, use of landmarks and other route descriptors, and driver familiarity with the street system. Drivers listened to simulated HAR messages while on a metropolitan Interstate and were then requested to negotiate complex diversion routes by recalling the information given. Recommendations for designing HAR messages are based on the study findings.

Motorist information systems perform a critical role in the successful operation of real-time corridor control system in metropolitan areas. Flexible systems can provide information that enables drivers to use the highway system more efficiently and safely. One method that provides the flexibility to transmit a variety of information is the highway advisory radio (HAR). A HAR system is composed of a low-frequency, low-power (10- to 50-W) transmitter and an antenna that can be positioned beside a roadway to give driver up-to-the-minute travel information via their AM radios. The number and types messages are limited only by motorist information needs and processing capability.

In previous research (1), the Texas Transportation Institute investigated certain characteristics of HAR messages in the laboratory with the objective of developing design criteria for these messages. The laboratory findings dealt with subjects' ability to recall information under various message conditions and with subject preferences. Prior to recommending design criteria, it was first necessary to validate previous findings by investigating these message characteristics under actual driving conditions.

The experimental protocol for the series of studies reported in this paper involved selecting drivers who were generally unfamiliar with a particular diversion route. With a test administrator in the car, they would drive on a local Interstate through a metropolitan area and receive a tape-recorded HAR message. The message advised of an accident ahead and a diversion route. They would then attempt to recall pertinent guidance information in the message and drive the diversion route. The administrator recorded any errors in following the route (e.g., missed turns, turning too soon, etc). In addition, the administrator asked post-test questions, as applicable.

There were four major HAR route-diversion studies conducted in San Antonio, Texas, during summer 1980. The first was concerned with two issues: message load and language style. The second study dealt with the effects of repeating either the entire route description or parts of the description. The third study dealt with the effects of mentioning in the message easily observable landmarks, traffic signals, and businesses along the route. It was hypothesized that these route descriptors would aid the drivers by assuring them that they were still on the correct diversion route. The final study was concerned with message criteria for drivers already familiar with the street system in the area. It was assumed that familiar drivers would require less information in the message in order to follow the diversion route. [Note, these studies were part of a Federal Highway Administration (FHWA) human factors research project (2).]

STUDY MESSAGE LOAD AND LANGUAGE STYLE

The first study was a joint investigation of two major variables in message design that were previously defined and investigated in the laboratory (1). These variables were message load and language style. A brief introduction to the meaning of these concepts is necessary.

Message Load

Message load, as used in this research, refers to the number of informational elements that must be recalled by the driver to successfully negotiate the route. For example, if the diversion route involved exiting the Interstate and following a parallel arterial to the right of the Interstate, the message would require, at a minimum, eight units of information:

1. Where to exit (the street name);
2. Which direction, left or right, to turn on the street;
3. Name of the parallel arterial;
4. Direction of turn--left or right;
5. Name of the return street;
6. Direction of turn;
7. Name of the Interstate; and
8. Direction of turn to reenter and continue in the original direction.

Note that message load refers here to a demand on the driver. It is possible that some of the above-listed information could be partly implied in the message without actually stating it (e.g., reentering the Interstate). Some feel that the direction of turns, although stated, are also fairly obvious given the initial turn direction from the Interstate. Nevertheless, the diversion route requires knowing eight units of stated or implied information.

Message load has been used also to refer to all information given, including the problem that necessitates diversion. In this research, only information needed to negotiate the route was included in the assessment of units of information.

Figure 1 presents the routes selected for this research. Note that a six-unit problem requires negotiating only three turns and recalling only three streets: Jackson-Keller, San Pedro, and I-410. The eight-unit problem has four turns and three street names plus 1-410--a total of eight pieces of information to be learned. Similarly, the 10-unit problem has 5 turns and 5 legs, including I-410.

The experimental question was, Could a driver listen to a radio message and then recall the information sufficiently well to negotiate these routes without error, or would the longer (8- and 10-unit) routes require recall of too much information?

Language Style

In previous research (1), it was found that recalling the route was improved by simplifying the language in the message. Rather than using a long, wordy message with complete sentences and many adjectives, it was better to use a terse message that contained only the information that needed to be recalled. The wordy message was termed "conversational", an intermediate level was termed "short form", and the briefest language style was called "staccato".

In the first study, nine messages were investigated that involved three language styles in combination with three levels of message load.

Method

Subjects

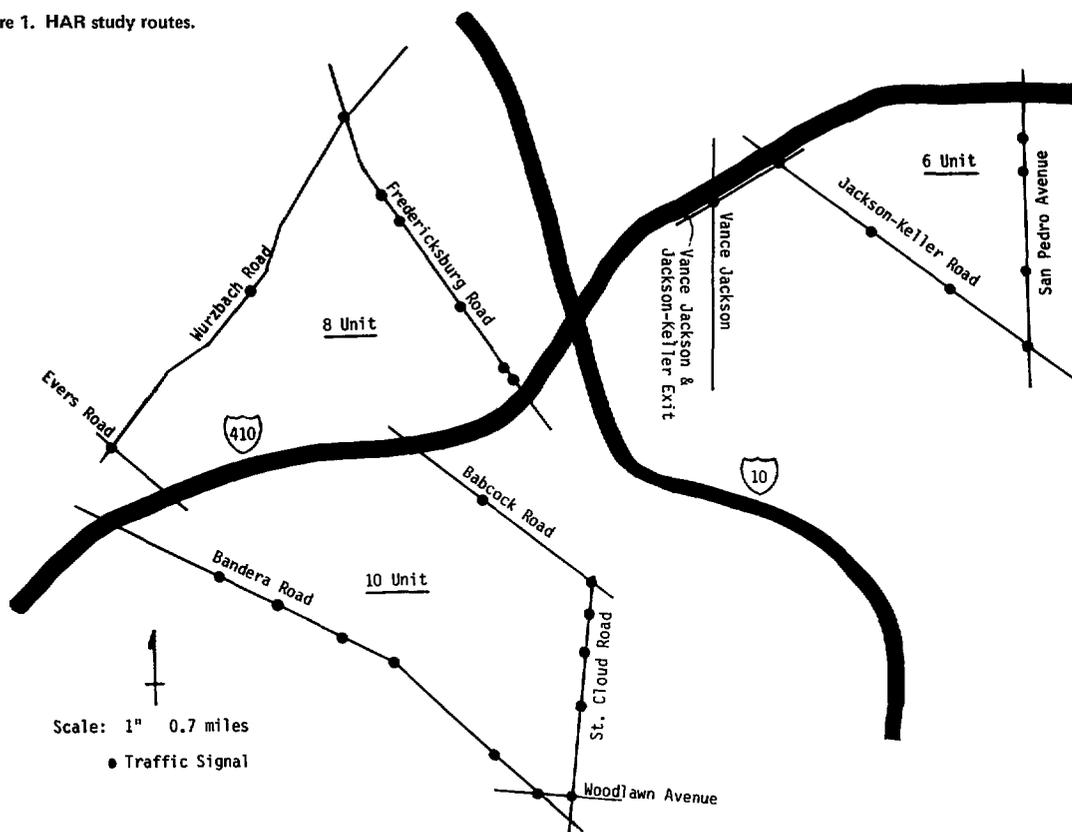
Fifty-four drivers were recruited from the San Antonio area. Each stated they were unfamiliar with the roadway system in the section of the city selected for the study. The subjects were selected to be representative of the current driving population with respect to age, sex, education, and years of driving experience.

Messages

Figures 2 and 3 present examples of messages played to the driver in study 1. Figure 2 presents three messages, all in the short-form language style. Note that they deal with the 6-, 8-, and 10-unit problems shown previously in Figure 1. The route description was repeated in each message.

Figure 3 also presents examples of language style, all for the six-unit problem. Note the key differences. For example, the staccato message states "overtaken truck ahead"; the short form states "there is an overturned truck ahead"; and the conversational style states the same plus "on Interstate 410 ahead". The conversational style also states "you are advised to exit, etc.", rather than merely "exit and take Jackson-Keller". There are other interesting but unessential words and phrases.

Figure 1. HAR study routes.



Experimental Design and Procedure

The drivers were assigned to three groups of 18 each. Each group was matched with respect to the above-mentioned demographic characteristics. Each group received messages in one of the language styles and drove three test routes that involved 6-, 8-, and 10-unit problems. The order of test routes was counterbalanced across drivers. After completing the three routes, the administrator played taped messages of all three language styles and subjects were to rank the language styles in order of preference.

Results

The table below gives the findings of the first study (note, F = frequency and % = percentage of subjects making an error):

Language Style	Message Load							
	6 Unit		8 Unit		10 Unit		Total	
	F	%	F	%	F	%	F	%
Staccato	1	6	2	11	8	44	11	41
Short form	2	11	3	17	2	11	7	26
Conversational	2	11	1	6	6	33	9	33
Total	5	18	6	22	16	60	27	100

The data given represent both frequencies of error in route negotiation and conversion of frequencies to percentages. One of the 18 drivers making an error is equivalent to approximately a 6 percent error (rounded to the nearest whole number).

It may be noted that 16 of the 27 errors (60 percent) occurred with the 10-unit problem whereas, by chance, only 9 (33 percent) would have occurred on this course. Chi-square tests found that the distribution exceeded chance probability ($p < 0.05$).

It was concluded that the 10-unit problem was more conducive to errors.

The percentage differences in language style, shown in the total column, did not differ significantly. For the 6- and 8-unit problems, errors were about the same for each style; however, for the 10-unit problem, the short form had only 2 errors while the other language styles had 14 total errors.

The table below gives the results of the preference study:

Language Style	No. of Subjects			Avg. Ranking Points
	1st Choice	2nd Choice	3rd Choice	
Staccato	17	18	19	2.04
Short form	23	21	10	1.76
Conversational	14	14	25	2.20

Twenty-three of the 54 drivers rated the short form the best style while only 10 rated it the poorest language style. The expected value in each cell was 18. Although it would be likely for drivers to prefer the language style that they had heard in the test messages, it is clear that a number of drivers preferred the short form that they had not previously heard and followed. The data provide some support for the short form and dislike for the conversational style. Because brevity in messages permits the HAR system to recycle more times within the broadcast area, the use of a terse message style is recommended.

STUDY 2: MESSAGE REPETITION

In previous research (1), a new concept was invented to describe repeating part of a message. The concept of "internal redundancy" refers to repeating the street name immediately after it is first men-

tioned in a message. Figure 4 (top) illustrates internal redundancy in a short-form version of the 10-unit problem. Note that the names Bandera, Woodlawn, St. Cloud, and Babcock are each given twice in the message.

The other technique for mentioning street names twice would be simply to give them once and then state "I repeat" and give them a second time. Figure 4 (bottom) illustrates this form of repetition, termed "external redundancy".

Method

Subjects

Eighteen drivers who had not participated in study 1 were selected for participation. They were unfamiliar with the street system and were comparable in age, sex, education, and driving experience to subjects in study 1.

Messages

The messages illustrated in Figure 4 were all in short-form language Style. Messages were all in the

Figure 2. Example of message load.

SIX Units

. ATTENTION EASTBOUND INTERSTATE 410 TRAFFIC
 . THERE IS AN OVERTURNED TRUCK AHEAD
 . TO AVOID MAJOR DELAY,
 . EXIT AT JACKSON-KELLER,
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT ON JACKSON-KELLER,
 . THEN TURN LEFT ON SAN PEDRO,
 . AND PROCEED BACK TO INTERSTATE 410 WEST,
 REPEAT,
 . EXIT AT JACKSON-KELLER,
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT ON JACKSON-KELLER,
 . THEN LEFT ON SAN PEDRO,
 . AND PROCEED BACK TO INTERSTATE 410 WEST.

Eight Units

. ATTENTION WESTBOUND INTERSTATE 410 TRAFFIC
 . THERE IS A MAJOR ACCIDENT AHEAD
 . TO AVOID MAJOR DELAY,
 . EXIT AT FREDERICKSBURG,
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT ON FREDERICKSBURG,
 . THEN LEFT ON WURZBACH,
 . THEN TURN LEFT AGAIN ON EVERS
 . AND PROCEED BACK TO INTERSTATE 410 WEST
 I REPEAT,
 . EXIT AT FREDERICKSBURG,
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT ON FREDERICKSBURG,
 . THEN LEFT ON WURZBACH,
 . AND THEN LEFT AGAIN ON EVERS,
 . AND PROCEED BACK TO INTERSTATE 410 WEST,

Ten Units

. ATTENTION EASTBOUND INTERSTATE 410 TRAFFIC
 . THE FREEWAY IS BLOCKED AHEAD
 . TO AVOID MAJOR DELAY,
 . EXIT AT BANDERA,
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT BANDERA,
 . THEN LEFT ON WOODLAWN
 . THEN LEFT ON ST. CLOUD
 . THEN LEFT AGAIN ON BABCOCK
 . AND PROCEED BACK TO INTERSTATE 410 EAST.
 I REPEAT,
 . EXIT AT BANDERA,
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT ON BANDERA,
 . THEN LEFT ON WOODLAWN,
 . THEN LEFT ON ST. CLOUD,
 . AND THEN LEFT AGAIN ON BABCOCK,
 . AND PROCEED BACK TO INTERSTATE-410 EAST.

internal-redundant format and data were compared with that in study 1, which employed the external-redundant format. The advisory portion of the message (beginning with the word "Exit") consisted of only about two-thirds as many words as the completely repeated advisory in study 1.

Experimental Design and Procedure

Each of the 18 subjects drove a 6-, 8-, and 10-unit course as had the drivers in study 1. Procedures were identical except for the message being internally redundant.

Results

The table below gives the frequency of errors committed by the 18 subjects as compared with their counterparts in study 1 who heard the message with

Figure 3. Example of message style (six-unit diversion route).

Staccato

. ATTENTION EASTBOUND INTERSTATE 410 TRAFFIC
 . OVERTURNED TRUCK AHEAD
 . TO AVOID MAJOR DELAY,
 . EXIT AT JACKSON-KELLER,
 . TURN RIGHT ON JACKSON-KELLER,
 . TURN LEFT ON SAN PEDRO,
 . BACK TO INTERSTATE 410 WEST.
 REPEAT,
 . EXIT AT JACKSON-KELLER,
 . TURN RIGHT ON JACKSON-KELLER,
 . LEFT ON SAN PEDRO,
 . BACK TO INTERSTATE 410 WEST.

Short Form

. ATTENTION EASTBOUND INTERSTATE 410 TRAFFIC
 . THERE IS AN OVERTURNED TRUCK AHEAD
 . TO AVOID MAJOR DELAY,
 . EXIT AT JACKSON-KELLER,
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT ON JACKSON-KELLER,
 . THEN LEFT ON SAN PEDRO,
 . AND PROCEED BACK TO INTERSTATE 410 EAST
 I REPEAT
 . EXIT AT JACKSON-KELLER,
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT ON JACKSON-KELLER
 . THEN LEFT ON SAN PEDRO,
 . AND THEN LEFT AGAIN ON EVERS,
 . AND PROCEED BACK TO INTERSTATE 410 EAST.

Conversational

. ATTENTION EASTBOUND INTERSTATE 410 LOP
 . THERE IS AN OVERTURNED TRUCK ON INTERSTATE 410 AHEAD.
 . TO AVOID MAJOR DELAY,
 . YOU ARE ADVISED TO EXIT AT JACKSON-KELLER ROAD
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT ON JACKSON-KELLER ROAD
 . AND CONTINUE TO SAN PEDRO AVENUE
 . THEN TURN LEFT
 . AND DRIVE BACK TO INTERSTATE 410
 . TO CONTINUE YOUR EASTBOUND TRIP
 I REPEAT,
 . YOU ARE ADVISED TO EXIT AT JACKSON-KELLER
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT ON JACKSON-KELLER
 . AND CONTINUE TO SAN PEDRO AVENUE
 . THEN TURN LEFT
 . AND DRIVE BACK TO INTERSTATE 410
 . TO CONTINUE YOUR EASTBOUND TRIP.

complete repetition of the route description:

Type of Redundance	No. of Errors by Message Load			Total Errors
	6 Unit	8 Unit	10 Unit	
Internal	1	1	2	4
External	2	3	2	7
Total errors	3	4	4	11

It may be recalled that the fewest errors in study 1 also occurred with the short form and, hence, substantial improvement was not possible. The differences in errors were not statistically significant. The only conclusion possible from the study is that the techniques of redundancy were equally effective under the conditions of investigation.

STUDY 3: MESSAGE ROUTS DESCRIPTORS

In describing to others a particular route within a metropolitan area, a person often mentions landmarks or prominent environmental features that can be seen at a great distance and can be used either to confirm that one is on the correct route or to prepare the driver to turn. Examples of landmarks are a store, service station, or hospital. Also, the

Figure 4. Examples of internal and external redundancy in an HAR message for a 10-unit problem.

Example - Internal Redundancy
 . ATTENTION EASTBOUND INTERSTATE 410 TRAFFIC
 . THE FREEWAY IS BLOCKED AHEAD
 . TO AVOID MAJOR DELAY,
 . EXIT AT BANDERA
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT ON BANDERA
 . AND CONTINUE TO WOODLAWN
 . TURN LEFT ON WOODLAWN,
 . AND CONTINUE TO ST. CLOUD
 . THEN TURN LEFT ON ST. CLOUD
 . AND CONTINUE TO BABCOCK
 . AND THEN TURN LEFT AGAIN ON BABCOCK
 . AND PROCEED BACK TO INTERSTATE 410 EAST

Example - External Redundancy
 . ATTENTION EASTBOUND INTERSTATE 410 TRAFFIC
 . THE FREEWAY IS BLOCKED AHEAD
 . TO AVOID MAJOR DELAY,
 . EXIT AT BANDERA,
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT AT BANDERA
 . TURN LEFT AT WOODLAWN
 . LEFT AT ST. CLOUD
 . LEFT AGAIN AT BABCOCK
 . AND PROCEED BACK TO INTERSTATE 410 EAST
 I REPEAT,
 . EXIT AT BANDERA,
 . AND TAKE THE FOLLOWING ROUTE:
 . TURN RIGHT AT BANDERA
 . TURN LEFT AT WOODLAWN
 . LEFT AT ST. CLOUD
 . LEFT AGAIN AT BABCOCK
 . AND PROCEED BACK TO INTERSTATE 410 EAST

Figure 5. Message with route descriptors.

10-Unit Route
 . ATTENTION EASTBOUND INTERSTATE 410 TRAFFIC
 . THE FREEWAY IS BLOCKED AHEAD
 . TO AVOID MAJOR DELAY,
 . EXIT AT BANDERA
 . AND TAKE THE FOLLOWING ROUTE;
 . TURN RIGHT ON BANDERA
 . AND CONTINUE TO THE SIXTH TRAFFIC LIGHT, WOODLAWN
 . THERE IS A WESTERN AUTO STORE ON THE LEFT AT WOODLAWN
 . TURN LEFT ON WOODLAWN
 . AND CONTINUE TO ST. CLOUD
 . TURN LEFT ON ST. CLOUD AND GO THE THE FOURTH TRAFFIC LIGHT, BABCOCK
 . THE MORNINGSIDE MANOR REST HOME IS ON THE LEFT JUST BEFORE BABCOCK
 . AT BABCOCK TURN LEFT AGAIN AND PROCEED BACK TO INTERSTATE 410 EAST

number of traffic lights through which the driver passes before turning is a commonly used descriptor.

In this study, the 10-unit problem was modified to include two landmarks and two traffic light notations. The 10-unit problem was selected because study 1 found a high percentage of errors and, hence, a need for improvement.

Method

Subjects

Eighteen new drivers were recruited for participation. They matched the previous subjects in demographic characteristics and were unfamiliar with the roadway system.

Messages

Figure 5 presents the message given with route descriptors. It is a modification of the 10-unit message from study 1. It necessarily had the complete sentence structure of conversational style but has added information that could aid in route negotiation.

Experimental Design and Procedure

The procedure was the same as the previous studies except for the content of the message given.

Results

The table below shows that only 2 of the 18 subjects with the route descriptor message made an error:

Message	Subjects Who Made Errors	
	NO.	Percent
Route descriptors	2	11
Short form	2	11
Conversational	6	33
Staccato	9	44

This performance equalled the best performance in study 1 (the short form). A succession of binomial tests found that it was significantly better than the staccato and conversational messages in study 1 ($p < 0.05$). This finding was interesting, since the message was substantially longer than previous messages. It appears that the landmarks and number of traffic lights did help in negotiating a long route.

Several subjects reported some difficulty in counting numbers of traffic lights and were confused when the traffic lights were flashing rather than operational.

STUDY 4: DRIVER FAMILIARITY AND TURN DESCRIPTORS

Previous HAR studies (3) have shown that unfamiliar

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drivers must be told the names of streets at which they must turn and also the direction of turn (i.e., left or right). However, often times a vast majority of drivers are local commuters who are intimately familiar with the major streets in an area where they might be diverted.

A HAR message could be greatly simplified and shortened if the direction of turning movements was omitted from the message. Given that drivers expect to be diverted first away, then parallel, and finally back to the Interstate, the only information they would really need would be a listing of the streets where they should turn. It was postulated that familiar drivers could negotiate a 10-unit diversion route given a message such as "Take the following route: Bandera to Woodlawn, to St. Cloud, to Babcock, and back to Interstate 410 East".

Method

The method was the same as previous studies. Eighteen drivers were selected who stated they were highly familiar with the street system in the area near the study routes. They were tested on the 8- and 10-unit routes. The route description gave only the names of streets with no mention of direction of turn.

Results

The table below gives the frequency of errors in comparison with the best performance for an 8- and 10-unit problem in study 1 with unfamiliar drivers:

<u>Familiarity</u>	<u>No. of Errors by Message Load</u>	
	8 Unit	10 Unit
Familiar drivers-- no turns given	0	2
Unfamiliar drivers given turns	1	2

Only 1 of the 18 drivers made an error (and that on the 10-unit problem) while negotiating a familiar route, even without the message mentioning turns. In study 1, no group exceeded this performance, although a binomial test found no significant differences in error frequency.

It was concluded that familiar drivers may be given briefer messages that do not include turn direction. They generally do not encounter problems in following a route that requires as many as five turns and five street names.

CONCLUSIONS AND RECOMMENDATIONS

The results of four driver-performance studies indicated that error frequency was generally low with HAR descriptions of diversion routes. The frequency of drivers making errors reached its peak on trials

with a 10-unit message load. However, it was demonstrated that performance even at this level could be improved by employing a short-form language style in the message and by adding landmarks and other route descriptors.

Recommendations are as follows:

1. Although language style was not found to be critical, a terse message style was preferred by drivers. Unnecessary wordiness is inefficient in communicating messages in a HAR system.
2. If unfamiliar drivers are diverted, the routes should not exceed four turns and four names, including the Interstate (eight-unit problems).
3. The description of the diversion route should be repeated at least once, either with internal or external redundancy or with both.
4. Prominent landmarks may be mentioned in a HAR message whenever there is a risk the driver may not see the place to turn. The number of traffic lights is useful but should be avoided whenever any of the lights are flashing.
5. When the driving population is known to be largely commuters or highly familiar with the area, the route description may be shortened by omitting turn directions.

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