

# USE OF CHANGEABLE-MESSAGE SIGNS BY PORT AUTHORITY

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The evolution of changeable signs was caused by the rapid growth of traffic after World War II. Because of lack of materials, roadway construction was limited during the war. After the war, our first project was reversing a short tunnel that carried traffic eastbound from the George Washington Bridge across Manhattan to the Bronx. After a sports event at Yankee Stadium or Polo Ground, several thousand cars would leave New York for New Jersey. Therefore, the tunnel was reversed by a very primitive method of sliding one sign in front of another. For several years, the pattern in the tunnel was 2 lanes eastbound, 1 lane eastbound and 1 lane westbound, and 2 lanes westbound; occasionally, we reversed the tunnel lanes 3 times in 1 hour.

In 1957, we added another 2-lane tunnel to the existing 2 tubes of the Lincoln Tunnel to provide greater capacity between New York and New Jersey. That was the first 3-tube tunnel in the world. It provided the flexibility in the tunnel's traffic-handling capabilities, for traffic lanes in the center tube can be reversed, as demand requires, to provide 2 lanes in 1 direction or 1 lane in either direction.

The problem in New Jersey was simple, for we could just "cone off" 1 tube or lane as required because the entrances to the 3 tunnels were adjacent. In New York, however, we were required to divert traffic on city streets several blocks from the tunnels. To place police at 17 locations appeared to be an impossible undertaking that would cause confusion in that the police officer would have to segregate tunnel-bound traffic from normal street traffic. We worked out a system of blank-out and changeable signs that were erected at key intersections and directed the motorists to use the proper tunnel. In New Jersey, a drum sign is used that tells the motorist that the center tube is operating eastbound toward New York. Revolving the sign gives a DO NOT ENTER message, which indicates that the tube is operating westbound toward New Jersey.

In 1962, the opening of the lower level of the George Washington Bridge required that equipment be installed for diverting traffic. We have used all types of changeable signs to accomplish several traffic patterns. First, we do not allow gas trucks and other hazardous cargo on the lower level. Second, there is currently no direct connection between certain roadways in New Jersey because this would produce an imbalance of traffic between lower and upper levels. Changeable signs divert traffic to the less congested level. Drum diversion signs are installed on the New Jersey side to balance the traffic pattern. We also use what we call a flip sign. Normally this sign,

which we make in our sign shop, accommodates a temporary situation during repairs to the roadways or a temporary congested condition.

Blank-out arrows and x's were used recently to establish an exclusive bus lane in New Jersey on the expressway leading to the Lincoln Tunnel. Similar blank-out arrows and x's are used at the Holland Tunnel to indicate open and closed tollbooths. Immediately adjacent to those tollbooths is a signalized intersection. Confusion is eliminated by using the signs to differentiate between a traffic signal and a tollbooth.

An additional use of blank-out signs is to detour traffic from its normal routing when an accident, slippery roadway, or other incident makes it necessary to do so. The detour route is fully signed to bring traffic back to its normal routing.

We are now installing a computer-controlled surveillance and diversion system at John F. Kennedy International Airport and Newark Airport. At Kennedy Airport all the equipment is installed to divert traffic to the least congested roadway automatically by a computer and surveillance system of sensors and blank-out signs. By using a sign to divert traffic within the terminal area, we attempt to direct the traffic past a parking lot as soon as possible to relieve congestion on the terminal roadways.

They say that anything can happen in the New York-New Jersey area, and usually it does. From northern New Jersey to Manhattan, motorists have 3 choices for crossing the river: the Holland Tunnel, the Lincoln Tunnel, or the George Washington Bridge. A stoppage on the arterial system in New Jersey or on one of the river crossings can cause considerable delay. To better serve the public, we installed a matrix sign on the New Jersey Turnpike to inform the motorist of any blockade to or on the crossing. This sign can display 14 different messages and is controlled at the Holland Tunnel. The messages displayed on the sign are also displayed on the console. We surveyed the effectiveness of this sign and found that it diverted more than 400 vehicles per hour to the Holland Tunnel during construction at the Lincoln Tunnel.

New standards state that "variable signs should conform with the same shapes and colors and be of the same dimensions as standard signs provided in the manual." Our experience with variable signs leads us to believe that this requirement will make a variable sign ineffective. Most variable signs are used on highways having high-density traffic composed mostly of commuters. We have found that, to divert traffic of this type, emphasis of some type must be incorporated in the sign. The new Manual of Uniform Traffic Control Devices for Street and Highways prohibits this. There is a difference between a red-orange arrow and a yellow arrow. I suppose both of these arrows now in use will not be in accordance with the new manual. I understand that there will be a period for conversion to the new standards, but what happens if a motorist stops in compliance with a red arrow, which is a prohibitive movement?

There are advantages to each type of changeable-message sign. The major advantage of the matrix sign is the unlimited number of various messages it can convey.

The drum type of sign is limited to 4 messages per drum. The number of drums, of course, is limited by the size of the sign. We have found that on overhead signs 3 or 4 drums are the maximum number that can be used on account of the height restriction. Another disadvantage of the drum sign, in our opinion, is the maintenance factor. The unused faces collect dirt when the drum is revolved, and it has been impossible to keep the unused faces clean unless a very rigid preventive maintenance program can be instituted. One advantage of the drum sign, however, is that one can change colors on the various drums and can comply with the new manual, which states that the message should follow the standard colors for directional signs. As I said before, we have found that the standard-color requirement is an ineffective requirement because a different color should be displayed when one is trying to change the normal traffic pattern. This fact was pointed out recently to the National Joint Committee on Uniform Traffic Control Devices but received no consideration whatsoever. I think that we in the Port Authority have enough if not more experience in this area than any other jurisdiction in this country.

About the only advantage of the manual flip sign is that it can be produced very quickly and is inexpensive. In my opinion, it is not the most effective sign because in commuter traffic there is nothing on this sign that draws attention. The biggest disadvantage to those types of signs is that they are not changed promptly. On many

occasions I have had to radio to the facility management that a flip sign is not showing the proper message for which it is intended.

The blank-out sign has a disadvantage of not being prominent enough especially when there is direct sunlight on it. The only effective blank-out signs that we have are those that use an orange-red grid and, as previously stated, do not comply with the new manual because a red arrow indicates a prohibited turn.