

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: August 1, 1978

Forwarded to:

Honorable Karl S. Bowers
Acting Administrator
Federal Highway Administration
400 7th Street, SW.
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

H-78-55

About 2:19 p.m. on July 21, 1977, a dump truck loaded with 17 tons of stone was eastbound on U.S. Route 50 near Chantilly, Virginia, when it violated a red traffic signal at an intersection and struck a northbound automobile on Virginia Route 28. The automobile's four occupants were killed.

The isolated intersection has single-point vehicle detection on each approach and in the left-turn slots on U.S. Route 50. The actuated controller is capable of varying the cycle length and the green and red intervals within the cycle in response to traffic demand. Clearance is provided by a 6-second yellow interval.

As the driver approached the intersection, the traffic signal changed from red to green to yellow in a short time period, probably near the 15 1/2 seconds minimum possible. The driver stated that the signal had changed rapidly and that he had thought it was malfunctioning.

The major objectives of signal timing and phasing are to provide safe and efficient traffic movements. Clearance intervals are an essential part of signal timing. Yellow is used to warn traffic that a green interval will terminate, and should be set long enough to allow a motorist to safely bring his vehicle to a stop, or if he is too close to stop, to proceed safely through the intersection. On high-speed approaches with single-point detection, this often requires long yellows. Recent research indicates that long yellow clearances may be hazardous because many drivers will drive through the yellow when they could have comfortably stopped. ^{1/} The research also indicates that the use of shorter yellow

1/ Tammen, Johnson, Kinzel and Mimiaga, "Clearance Intervals--A Literature Review and Appraisal," Federal Highway Administration Contract DOT FH-11-8783, March 1977.

clearance intervals with second or all-way red clearances generally will reduce accidents at hazardous locations, because it reduces the abuse of the yellow clearance interval and decreases the number of vehicles entering on red after the signal for the cross street has turned to green.

The Commonwealth of Virginia and other States are usually guided by the Manual on Uniform Traffic Control Devices (MUTCD). However, the MUTCD does not provide sufficient guidance in the setting of clearance intervals. The MUTCD states that the yellow change interval should have a range of 3 to 6 seconds, that the longer intervals are appropriate to higher approach speeds, and that the yellow interval may be followed by a short, all-way red clearance interval.

The importance of the proper setting of the yellow clearance interval and use of all-way red clearance intervals in reducing accidents is not universally recognized. Research in this field, such as that being done under Federal Highway Administration (FHWA) Contract DOT-FH-11-8783, should be widely disseminated to those responsible for signal design and operations to better insure nationwide uniformity and safer intersection design.

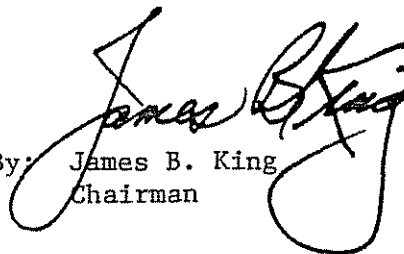
Related to the use of clearance intervals is the problem of detector placement at high-speed, isolated intersections. Single-point detection allows limited options in control strategy. Multiple-point detection allows many more options and can provide for safer operation of high-speed, isolated intersections. The Safety Board recognizes that the FHWA has sponsored research in vehicle detector placement for high-speed, isolated, traffic-actuated intersection control, published in May 1977 (FHWA RD-7731), and research, not yet completed, on intersection control to improve traffic operations and reduce accidents (DOT-FH-11-8783). The latter report deals with the length of yellow and all-way red clearances and has been distributed to FHWA regional and division offices and to each State highway agency. However, no formal workshops have been scheduled to instruct those personnel responsible for signal design and operations in the application of the results of the study.

In the past, the FHWA has sponsored workshops and seminars in traffic engineering subjects. Similar courses should be given to traffic engineers responsible for the design and operation of traffic signals to explain applications of the research findings in the above reports. Such training will insure more rapid adoption of the research results and provide for safer intersection design.

Therefore, the National Transportation Safety Board recommends that the Federal Highway Administration:

Sponsor regional seminars to inform and train personnel responsible for traffic signal design and operation regarding the research results promulgated in reports FHWA RD-7731 and DOT FH-11-8783. (Class II, Priority Action) (H-78-55)

KING, Chairman, McADAMS, HOGUE, and DRIVER, Members, concurred in the above recommendation.


By: James B. King
Chairman

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