

Guidelines on establishing requirements for high-priority warning signals (ECE-TRANS-WP.29-1091-Add.1e)

Detail of High-priority warnings in guidelines

E. High-priority warnings should elicit timely responses or decisions

53. High-priority warnings should allow drivers sufficient opportunity to perform an appropriate avoidance response.

54. In-vehicle high-priority warning systems increase a driver's opportunity to avoid threats. Timely responses are critical for collision avoidance. Earlier warnings, in some situations, may provide drivers with more time to respond appropriately to successfully avoid a situation; however, they may become a nuisance if they are frequent and unnecessary (Lee et al., 2002). This might cause drivers to deactivate the system. The timing of warnings needs to account for driver perception-response times, as well as the need to limit the occurrence of false alarms. The criteria for triggering a warning requires a balance between the goal of providing greater protection and the occurrence of false or nuisance alarms (Lerner et al., 1996).

55. In the case of emergency braking responses, drivers that are fully expecting a hazard have an estimated median reaction time of 0.6 to 0.65 seconds. Drivers responding to unexpected but common hazards, such as brake lights, have an estimated median brake reaction of 1.15 seconds, **while drivers responding to complete surprise events have an estimated median brake reaction time of 1.4 seconds.** (Campbell et al., 2007). Less information is available on the time to execute steering avoidance manoeuvres. Research suggests that greater time margins are needed to warn drivers for steering avoidance manoeuvres (e.g., > 1.2 seconds; Uno and Hiramatsu, 1997).

Examples

56. Good: A FCW signal comes on with sufficient time for most drivers to detect the warning, choose an avoidance response and take action.

57. Bad: A FCW warns the driver too late, when it is no longer possible to avoid or mitigate the collision. Or, it warns the driver too early, and the signal becomes a nuisance.