

Appendix A: Analysis of Truck Stopping Distances

The Transportation Safety Board Engineering Branch analyzed truck stopping distances. Using computer simulations, the Engineering Branch determined, for various speeds, the critical distance from which a driver must see a train to be able to react, start braking, and brake to a stop clear of a crossing. The analysis covered scenarios with all the truck's brakes working and with only the tractor brakes working, on good and poor pavement. Most drivers perceive a problem and react within a range of 3 to 4.5 seconds in situations of complex or inconspicuous stimuli. For this occurrence, although a conservative time of 3.75 seconds was used, the driver's reaction time was likely longer because it was after midnight, he was fatigued, the road and the crossing were unfamiliar, and the train and signals were obscured by fog.

Highway 23 was in good condition. At 20 km/h on good pavement, with a normal perception and reaction time (2.5 seconds) and effective brakes, the driver would have had to have seen the train a minimum of 16 metres (52 feet) from the crossing to have stopped clear of it. (See Table A-1.)

At the same speed on good pavement, with a slow perception and reaction time (3.75 seconds), but with ineffective trailer brakes, the driver would have had to have seen the train a minimum of 25 metres (82 feet) from the crossing to have stopped clear of the crossing. This is the scenario that approximates the conditions of the accident.

Table A-1 Comparison of Truck Stopping Distances on Good Pavement, Distances Shown in Metres with Feet in Parentheses

Vehicle Speed (km/h)	Full Brakes				Ineffective Trailer Brakes			
	Perception and Reaction Times							
	Normal (2.5 seconds)		Slow (3.75 seconds)		Normal (2.5 seconds)		Slow (3.75 seconds)	
60	60	(197)	81	(265)	80	(262)	100	(330)
50	48	(156)	65	(213)	61	(201)	79	(258)
40	36	(118)	50	(164)	45	(147)	59	(192)
30	25	(83)	36	(118)	30	(100)	41	(134)
20	16	(52)	23	(75)	18	(60)	25	(83)
10	8	(25)	11	(36)	8	(25)	11	(36)