

Table 5. Train accident rates from FRA data.

	Statistic	1997-2016
Mainline	Total Non-Yard (Mainline) Train Miles	12.92×10^9
	Non-Yard Accident Rate (/train mile)	2.42×10^{-6}

The mainline accident frequencies¹⁹ from Table 5 were then multiplied by the total number of annual train miles estimated for the example route (Table 3) to arrive at the yearly accident frequency (accidents per year) used in the calculations for the route. A summary of the calculated annual accident rate for the example route is provided in Table 6.

Table 6. Calculated annual accident frequencies for the example ETS mainline route.

Route	Estimated Total Annual Route Length (train miles/yr)	Accident Frequency (accident/train mile)	Calculated Annual Accident Frequency (accident/yr)
Route 1	82,855	2.42×10^{-6}	2.01×10^{-1}

3.1.2 Derailment Probability for LNG DOT-113 Cars

The train accident values shown above provide an estimate of the frequency that a train accident will occur somewhere along the example ETS route. However, a train accident doesn't necessarily lead to a condition where an LOC of an LNG DOT-113 may occur. Therefore, it was assumed that only train accidents leading to the derailment of cars could potentially result in an LOC. The 20-year accident data was analyzed to determine the probability that a train accident will lead to a derailment of any of the rail cars for one of two cases: (1) mainline movement with train speeds from 25 mph up to 50 mph, and (2) mainline movement with train speeds equal or less than 25 mph. As listed in Table 7, the calculated derailment probabilities were found to be 64.0% for mainline movement with train speeds less than or equal to 25 mph and 53.2% for mainline movement with train speeds between 25 mph and 50 mph. These are the probabilities of at least one car being derailed in a train accident; however, this probability does not guarantee that the derailment will involve LNG DOT-113s. The calculation of the probability that an accident-leading-to-derailment involves LNG DOT-113s is addressed in the next section.

¹⁹ Note that the terms frequency and rate are used interchangeably.