

### 3.2 Commercial Vehicle Travel

The commercial vehicle trip generation and distribution models maintain a standard “four-step” or “trip-based” model system approach. These models create trip matrices in two trip categories: 2 axle commercial vehicle trips, and 3+ axle commercial vehicle trips.

Commercial vehicle trip rates based on surveys of commercial vehicles in the Sacramento region<sup>7</sup>, and surveys of commercial vehicle trip generation from the San Francisco Bay Area. Trip rates are shown in Table 3-3. Because of the relatively sparse data available for commercial vehicles, no “production/attraction” distinction is made.

Friction factors for 3-axle commercial vehicle trips were taken from the *Quick Response Freight Manual*<sup>8</sup>. For 2-axle trucks, 3+ commercial vehicle friction factors were derived from the Chicago Area Transportation Study factors, which compared reasonably well with the available local data. Friction factors are shown in Figure 3-7. Trip distribution was calculated using congested midday travel times, using a simple gravity model.

Because no “production/attraction” distinction is made in trip generation, all trip interchanges by time period are forced to be symmetrical in SACSIM, and time-of-travel proportions are applied as flat factors. Table 3-4 shows the time-of-travel factors used.

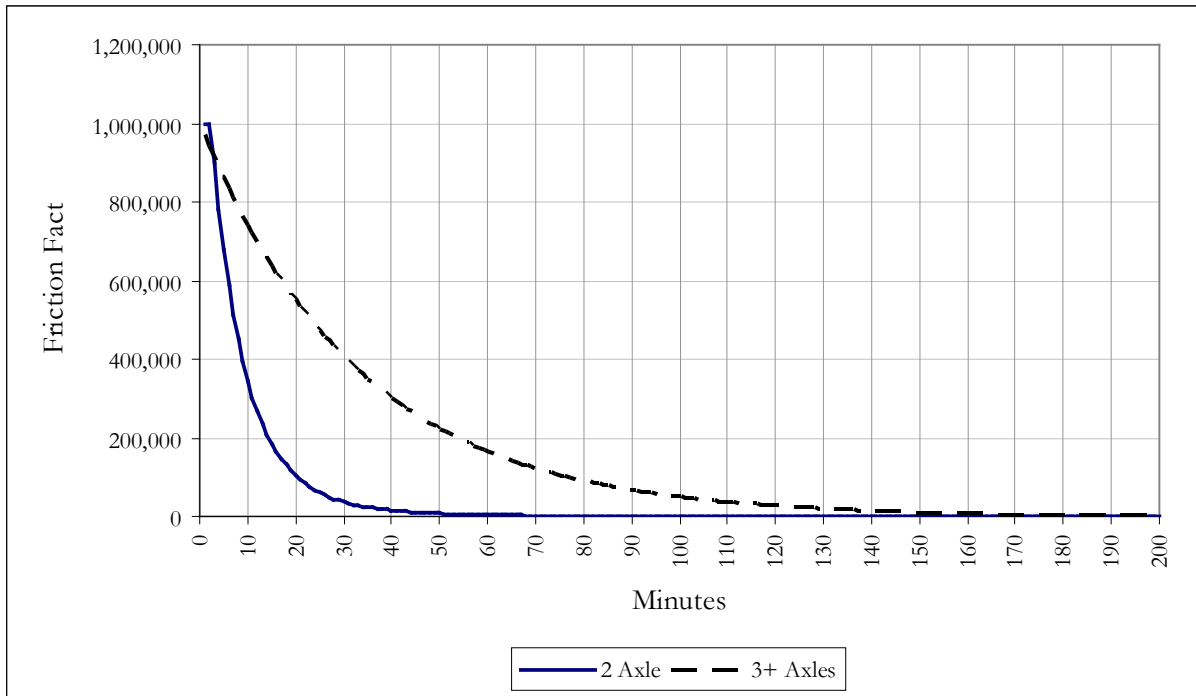
**Table 3-3 Commercial Vehicle Trip Rates**

<b>Variable</b>	<b>2-Axles</b>	<b>3+ Axles</b>
<i>Household</i>		
Single Family	0.28	0.003
MF 2-4	0.23	0.003
MF 5+	0.17	0.003
<i>Employment</i>		
Retail	0.68	0.045
Office	0.4	0.057
Medical	0.4	0.057
Education	0.4	0.057
Manufacture/Other	0.4	0.11
Source: SACOG 2020.		

<sup>7</sup> SACOG, “Commercial Vehicle Activity Survey Report: Phase One Project Report”, July 23, 1998.

<sup>8</sup> FHWA (by Cambridge Systematics), “Quick Response Freight Manual”, September 1996.

Figure 3-7 SACSIM Commercial Vehicle Friction Factors



Source: SACOG 2020.

Table 3-4 SACSIM Commercial Vehicle Times-of-Travel

SACSIM Time Period	2 Axle	3+ Axle
AM Hour 7:00-7:59	8%	10%
AM Hour 8:00-8:59	8%	10%
AM Hour 9:00-9:59	4%	3%
Midday (10:00-14:59)	38%	30%
PM Hour (15:00-15:59)	5%	3%
PM Hour (16:00-16:59)	5%	3%
PM Hour (17:00-17:59)	5%	3%
Evening (18:00-19:59)	9%	12%
Night (20:00-6:59)	21%	27%

Source: SACOG 2020.