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**Analysis of the WLTP in-use driving behaviour database with respect
to acceleration and deceleration phases**

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1 Introduction¹

Driving conditions have a large influence on particle generation for brake and tyre wear processes. From the survey of the available literature it appears that different driving conditions in experimental investigation of particle emissions from brake and tyre wear is one of the reasons why different - or even sometimes- contradictory conclusions are reported. In particular, during hard accelerations or decelerations ultrafine particles can be generated due to the high temperatures reached in brakes and tyres. The question is whether these conditions are within the range of the driving conditions that can be considered “normal/typical” or should be considered as “extreme” with a low occurrence frequency.

In addition, there are already standardized test conditions used by the industry in designing brake systems as well as tyres.

In order to harmonize future studies on particles from brake and tyre wear and improve the comparability of the relative results, the definition of “normal” or “typical” driving patterns and in particular of typical accelerations/decelerations has been identified by PMP group as an important working item.

The proposed approach is to use activity data collected in the framework of other projects in order to investigate typical acceleration / deceleration frequency distributions. The main objectives of this activity are to compare “typical/normal driving conditions” derived by existing datasets like the WLTP vehicle activity database with the industry standards, as well as to reach, if possible, a shared definition of normal, severe, extreme or infrequent conditions. This will narrow down the range of driving conditions to be taken into consideration as far as non-exhaust particle emissions are concerned and will improve the comparability of future studies.

This report describes the results of a detailed analysis of the WLTP in-use database. The results are provided in this report and in dedicated ACCESS databases.

2 Explanations for the ACCESS databases

The data with the frequency distributions and other information is provided in four ACCESS databases:

The database “car_cycles_final.accdb contains the following tables:

1. TB_brake – phases with brake engagement,
2. TB_daily distance – the daily driven distances with dates,
3. TB_IDsource – information about the country and number of dataset,
4. TB_short_trips – information about the short trips,
5. TB_stop_phases – information about the stop phases,
6. TB_trip_info – information about single trips,

¹ This text was copied from PMP 35-02



7. TB_trip_info_IDroad – information about single trips, separated for urban, rural and motorway,
8. TB_v_kl_a_int_kl_EU – joint v, a frequency distributions per vehicle and cycle (trip), EU countries,
9. TB_v_kl_a_int_kl_IDroad_EU – joint v, a frequency distributions per vehicle and road category, EU countries,
10. TB_v_kl_a_int_kl_nonEU – joint v, a frequency distributions per vehicle and cycle (trip), non EU countries,
11. TB_v_kl_countries – vehicle speed frequency distributions per country,
12. TB_v_kl_countries_IDveh – vehicle speed frequency distributions per vehicle,
13. TB_v_kl_vma_kl_EU – joint v, v*a frequency distributions per vehicle and cycle (trip), EU countries,
14. TB_v_kl_vma_kl_nonEU – joint v, v*a frequency distributions per vehicle and cycle (trip), non EU countries,
15. TB_vehicle_all – technical data of the vehicles

The database car_cycles_acc_phases.accdb contains the table TB_acc with the acceleration phases, the database car_cycles_cruise_phases.accdb contains the table TB_cruise with the cruise phases and the database car_cycles_dec_phases.accdb contains the table TB_dec with the deceleration phases.

List of parameter:

- _kl – indicates binned parameter (eg v_kl – speed bin),
- a – vehicle acceleration in m/s^2 ($a_i = (v_{i+1} - v_i)/3.6$),
- a_int – $a*10$ in order to get intergers for binned acceleration values,
- a2 – vehicle acceleration in m/s^2 ($a2_i = (v_{i+1} - v_{i-1})/2/3.6$),
- dhour – hour of the day (1 – between 0:00 and 1:00 am),
- dist, sdist – distance in m,
- dur, sdur – duration in s
- ID – primary key for the combination of IDsourc/IDsource2, IDveh and IDcycle,
- IDcycle – trip number,
- IDperiod - 1 - on peak, 2 - off peak, 3 – weekend,
- IDroad – road category indicator 1 – motorway, 2 – rural, 3 – urban,



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- IDroadcalc6 – WLTP speed category indicator for short trips, 1 – $v_{\max} \leq 60$ km/h, 2 – $60 \text{ km/h} < v_{\max} \leq 80$ km/h, 3 – $80 \text{ km/h} < v_{\max} \leq 110$ km/h, 4 – $v_{\max} > 110$ km/h,
 - IDsource – ID for the country,
 - IDsource2 – used, when more than one dataset for a country exists,
 - IDveh – vehicle number,
 - IDweekday – weekday indicator (1 – Sunday, 7 – Saturday),
 - n_acc – number of acceleration phase per trip,
 - n_brake – number of brake engagement phase per trip,
 - n_dec – number of deceleration phase per trip,
 - n_module – number of short trip per trip,
 - n_stop – number of stop phase per trip,
 - RPA – relative positive acceleration – sum of $v \cdot a$ for $a > 0.1 \text{ m/s}^2$ divided by the distance driven,
 - v – vehicle speed in km/h,
 - vma – $v \cdot a$ in m^2/s^3 , $vma = v \cdot a / 3.6$,
 - vma2 $v \cdot a^2$ in m^2/s^3 , $v \cdot a^2 = v \cdot a^2 / 3.6$,



3 Description of the WLTP database

The WLTP in-use driving behaviour database consists of driving behaviour data from five different regions in the world (see Table 1). The data from Europe and the major part of the US data is customer data and thus reflects the practical use of the vehicles in real traffic. The data from India, Japan and Korea is not customer data. Vehicles, routes and driving times were chosen in order to reflect representative driving in these countries.

Region	Mileage in km	Duration in h	No of short trips
Europe	432,572	8,003	200,813
India	73,694	1,824	17,358
Japan	49,868	1,255	55,944
Korea	32,399	790	26,972
USA	155,160	2,557	65,551
Total	743,694	14,430	366,638

Table 1: Overview of the WLTP in-use driving behaviour database

The European data was collected in Belgium, France, Germany, Italy, Poland, Slovenia, Spain, Sweden and UK. The total number of vehicles is 146. The US customer data was collected in Atlanta, Denver, Los Angeles, San Diego and San Francisco. The number of vehicle models is 5.

The technical data of the vehicles is shown in Table 2 to Table 7.

source	campagn	IDveh	engine	cap	Pn	kerb mass	GVM	n_rated	n_idle	category	Transmission type	number of gears
				cm ³	kW							
Belgium	1	1	diesel	2188	85.0	1660	2180	4000	850	M1	manual	6
Belgium	1	2	diesel	1896	50.0	1121	1621	4000	900	M1	manual	5
Belgium	1	3	diesel	1896	77.0	1320	1800	4000	750	M1	manual	5
Belgium	1	4	diesel	2698	132.0	1600	2100	4250	750	M1	automatic	
Belgium	1	5	diesel	1398	50.0	960	1360	4000	750	M1	manual	5
Belgium	1	6	diesel	1998	85.0	1431	1900	4000	750	M1	manual	5
Belgium	1	7	diesel	1997	66.0	1125	1600	4000	800	M1	manual	5
Belgium	1	8	Petrol	1360	55.0	925	1325	5500	750	M1	manual	5
Belgium	1	9	diesel	1997	66.0	1423	1970	4000	850	M1	manual	5
Belgium	1	10	Petrol	1149	55.0	1090	1540	5000	750	M1	manual	5
Belgium	1	11	diesel	2231	130.0	1585	2100	3600	850	M1	manual	6
Belgium	2	3	diesel	2400	120.0	1851	2505	4000	750	M1	manual	6
Belgium	2	4	diesel	1560	80.0	1045	1513	4000	800	M1	manual	5
Belgium	2	5	diesel	1560	80.0	1560	2040	4000	800	M1	manual	5
Belgium	2	6	diesel	1560	80.0	1560	2040	4000	800	M1	automatic	6
Belgium	2	7	diesel	1600	80.0	1357	1875	4000	800	M1	manual	5
Belgium	2	8	diesel	1461	81.0	1290	1779	4000	850	M1	manual	6
Belgium	2	11	diesel	1461	81.0	1290	1779	4000	850	M1	manual	6
Belgium	2	15	diesel	1896	77.0	1473	1980	4400	750	M1	manual	5
Belgium	2	16	Petrol hybrid	1798	73.0	1495	1805	5200	900	M1	CVT	
Belgium	2	17	Petrol hybrid	1400	73.0	1495	1805	5200	900	M1	CVT	
Belgium	2	18	diesel	1422	59.0	1150	1590	4200	900	M1	manual	5



Table 2: Technical data of the vehicles measured in Belgium

source	campaign	IDveh	engine	cap	Pn	kerb mass	GVM	n_rated	n_idle	category	Transmission type	number of gears
				cm ³	kW	kg	kg	min-1	min-1			
France	1	1	Diesel	1868	51.0	1023	1423	4600	950	M1	Manual	5
France	1	2	Petrol	1361	55.0	860	1260	5500	950	M1	Manual	5
France	1	3	Petrol	1361	55.0	860	1260	5500	850	M1	Manual	5
France	1	4	Petrol	1124	44.0	825	1225	6200	850	M1	Manual	5
France	1	5	Petrol	1360	55.0	860	1360	5500	900	M1	Manual	5
France	1	6	Petrol	1762	66.0	1170	1670	5500	800	M1	Manual	5
France	1	7	Petrol	1997	100.0	1595	2075	6000	700	M1	Manual	5
France	1	8	Diesel	1997	66.0	1300	1880	4000	800	M1	Manual	5
France	1	9	Petrol	2946	152.0	1520	2070	6000	850	M1	Automatic	4
France	1	10	Diesel	1997	80.0	1485	2100	4000	800	M1	Manual	5
France	2	11	Diesel	1560	80.0	1235	1715	4000	800	M1	Manual	5
France	2	12	Diesel	1997	100.0	1410	1890	4000	800	M1	Manual	6
France	2	13	Diesel	1530	80.0	1560	2040	4000	800	M1	Automatic	6
France	2	14	Diesel	1530	80.0	1560	2040	4000	800	M1	Automatic	6
France	2	15	Diesel	2721	150.0	1725	2275	4000	700	M1	Automatic	6
France	2	16	Diesel	1530	80.0	1560	2040	4000	800	M1	Automatic	6
France	2	17	Diesel	1997	100.0	1505	1985	4000	750	M1	Manual	6
France	2	18	Petrol	1587	80.0	1145	1606	5750	750	M1	Manual	5
France	2	19	Petrol	1997	103.0	1240	1970	6000	700	M1	Manual	5
France	2	20	Diesel	1997	100.0	1505	2005	4000	800	M1	Manual	6
France	2	21	Petrol	1360	65.0	1045	1513	5250	750	M1	Manual	5
France	2	22	Diesel	1997	100.0	1380	1860	4000	750	M1	Manual	6
France	2	23	Diesel	1560	80.0	1235	1970	4000	800	M1	Manual	5
France	2	24	Petrol	1360	65.0	1045	1513	5250	800	M1	Manual	5
France	2	25	Diesel	1560	80.0	1235	1970	4000	800	M1	Manual	5
France	2	26	Petrol	1587	80.0	1145	1606	5750	800	M1	Manual	5
France	2	27	Diesel	1997	100.0	1505	2005	4000	800	M1	Manual	6
France	2	28	Petrol	1360	65.0	1045	1513	5250	800	M1	Manual	5
France	2	29	Petrol	1587	80.0	1145	1606	5750	800	M1	Manual	5
France	2	30	Diesel	1997	100.0	1505	2005	4000	800	M1	Manual	6
France	2	31	Petrol	1360	65.0	1045	1513	5250	800	M1	Manual	5
France	2	32	Petrol	1360	65.0	1045	1513	5250	800	M1	Manual	5
France	2	33	Petrol	1587	80.0	1145	1606	5750	750	M1	Manual	5
France	2	34	Diesel	1560	80.0	1235	1970	4000	800	M1	Manual	5
France	2	35	Diesel	1560	80.0	1125	1593	4000	750	M1	Manual	5
France	2	36	Diesel	1560	80.0	1125	1593	4000	800	M1	Manual	5
France	2	37	Petrol	1997	103.0	1240	1970	6000	750	M1	Manual	5
France	2	38	Diesel	1560	80.0	1125	1593	4000	800	M1	Manual	5
France	2	39	Petrol	1997	103.0	1240	1970	6000	800	M1	Manual	5
France	2	40	Diesel	1560	80.0	1125	1593	4000	800	M1	Manual	5
France	2	41	Diesel	1560	80.0	1125	1593	4000	800	M1	Manual	5
France	2	42	Diesel	1560	80.0	1125	1593	4000	750	M1	Manual	5

Table 3: Technical data of the vehicles measured in France



source	campagn	IDveh	engine	cap	Pn	kerb mass	GVM	n_rated	n_idle	category	Transmission type	number of gears
				cm ³	kW	kg	kg	min-1	min-1			
Germany	1	3	DIESEL	2993	200.0	1635	2115	4000	700	M1	manual	6
Germany	1	5	Petrol	1300	70.0	945	1450	5250	750	M1	Manual	5
Germany	1	6	Petrol	998	50.0	775	1140	6000	850	M1	Manual	5
Germany	1	7	DIESEL	1560	66.0	1180	1580	4000	800	M1	Manual	5
Germany	1	13	Petrol	1998	100.0	1177	1580	6000	700	M1	Manual	5
Germany	1	14	Petrol	1598	64.0	1250	1890	5400	800	M1	Manual	5
Germany	1	15	DIESEL	1896	77.0	1452	2030	4000	850	M1	Manual	5
Germany	1	16	DIESEL	1364	55.0	905	1255	4000	800	M1	manual	5
Sweden	1	1	Diesel	2400	129.0	1690	2190	4000	700	M1	Automatic	5
Sweden	1	2	Diesel	1560	80.0	1394	1850	4000	800	M1	Manual	5
Sweden	1	3	Petrol/Hybrid	1798	73.0	1495	1900	5200	1000	M1	CVT	
Sweden	1	4	Petrol	1999	107.0	1574	2050	6000	800	M1	Manual	5
Sweden	1	5	Diesel	1560	80.0	1394	1850	4000	800	M1	Manual	5
Sweden	1	6	Petrol/Hybrid	1798	73.0	1495	1900	5200	900	M1	CVT	
Sweden	1	8	Diesel	2685	115.0	1930	3500	3800	700	N1	Manual	5
Sweden	1	9	petrol	2685	115.0	1930	3500	5000	650	N1	Manual	5
Italy	1	1	DIESEL	2900	106.0	1978	2470	3800	850	M1	Manual	6
Italy	1	2	Petrol	1600	75.0	1205	1655	5600	750	M1	Manual	6
Italy	1	4	DIESEL	2497	100.0	2027	2550	4400	800	M1	Manual	5
Italy	1	8	DIESEL	1968	55.0	1227	1650	4200	850	M1	Manual	6
Italy	1	9	DIESEL	1896	77.0	1335	1755	4000	850	M1	Manual	6
Italy	1	10	DIESEL	2148	125.0	1530	2000	3800	800	M1	Manual	5
Italy	1	11	DIESEL	1968	55.0	1227	1650	4200	800	M1	Manual	6
Italy	1	12	DIESEL	1422	51.0	1103	1530	4000	900	M1	Manual	5
Slovenia	1	18	Petrol	1400	55.0	1156	1575	5400	750	M1	Manual	5
Slovenia	1	20	Petrol	1598	78.0	1234	1720	5750	750	M1	Manual	5
Slovenia	1	21	DIESEL	2188	114.0	1968	2520	4000	800	M1	Automatic	5
Slovenia	1	22							750	M1		
Slovenia	1	23	Petrol	1598	83.0	1215	1720	6000	700	M1	Manual	5
Slovenia	1	24	DIESEL	1968	103.0	1454	1954	4000	800	M1	Manual	6
Slovenia	1	25	Petrol	1332	70.0	955	1355	6000	650	M1	Manual	5
Slovenia	1	26	Petrol	1149	55.0	1090	1490	5500	650	M1	Manual	5
Slovenia	1	27	DIESEL	1500	85.0	1255	1715	3750	850	M1	Manual	5
Slovenia	1	28	DIESEL	1800	66.0	1280	1750	3800	900	M1	Manual	5
Slovenia	1	29	Petrol	1596	74.0	1226	1750	5500	750	M1	Manual	5
Slovenia	1	30	DIESEL	1995	74.0	1560	2000	4300	900	M1	Manual	5
Slovenia	1	31	DIESEL	1995	130.0	1435	1915	4000	850	M1	Manual	6
Slovenia	1	32	DIESEL	2200	114.0	1502	1900	3500	800	M1	Manual	6
Slovenia	1	33	DIESEL	1896	95.0	1396	1900	4000	850	M1	Manual	6
Slovenia	1	34	DIESEL	1461	60.0	1205	1650	4000	800	M1	Manual	5
Slovenia	1	35	DIESEL	1910	89.0	1568	2000	3500	800	M1	Manual	6

Table 4: Technical data of the vehicles measured in Germany, Sweden, Italy and Slovenia



source	campagn	IDveh	engine	cap	Pn	kerb mass	GVM	n_rated	n_idle	category	Transmission type	number of gears
				cm ³	kW	kg	kg	min-1	min-1			
UK	1	1	Diesel	2200	63.0	1580	2600	3500	800	N1	Manual	5
UK	1	2	Diesel	2198	62.0	1800	2800	3500	800	N1	Manual	5
UK	1	3	Diesel	2200	63.0	1580	2600	3500	800	N1	Manual	5
UK	1	4	Diesel	2200	63.0	1580	2600	3500	800	N1	Manual	6
UK	1	5	Diesel	2200	63.0	1580	2600	3500	800	N1	Manual	5
UK	1	6	Diesel	2000	84.0	1877	2900	3500	800	N1	Manual	6
UK	1	7	Diesel	2148	80.0	2015	3500	3800	850	N1	Manual	6
UK	1	8	Diesel	2148	80.0	2180	3500	3800	850	N1	Automatic	5
UK	1	9	Diesel	2148	80.0	2180	3500	3800	850	N1	Automatic	5
UK	1	10	Diesel	2400	84.0	2034	3600	3500	800	N1	Manual	6
UK	1	11	Diesel	2400	84.0	2034	3600	3500	800	N1	Manual	6
UK	1	12	Diesel	1750	55.0	1415	2040	4000	850	N1	Manual	5
UK	2	1	DIESEL	3000	202.0	1820	2275	4000	700	M1	automatic	6
UK	2	2	Petrol	1108	40.0	840	1255	5000	750	M1	Manual	5
UK	2	3	Petrol	1798	88.0	1391	1920	6000	800	M1	Manual	5
UK	2	4	Diesel	1870	80.0	1350	1940	4000	800	M1	Manual	6
UK	2	5	Petrol	2522	165.0	1392	1843	6000	800	M1	Manual	6
UK	2	6	DIESEL	1997	85.0	1557	2070	3750	800	M1	Manual	6
UK	2	7	Petrol	1242	80.0	966	1415	5800	750	M1	Manual	5
UK	2	8	Diesel	1753	85.0	1391	1848	3800	900	M1	Manual	5
UK	2	9	Petrol	1596	74.0	1255	1721	6000	750	M1	Automatic	4
UK	2	10	DIESEL	1995	110.0	1525	1970	4000	850	M1	manual	6
Poland	1	1	DIESEL	1248	66.0	1310	1768	4000	800	M1	Manual	6
Poland	1	2	Petrol	1362	66.0	1155	1613	5600	800	M1	Manual	5
Poland	1	3	DIESEL	1896	66.0	1270	1780	4000	900	M1	Manual	5
Poland	1	4	DIESEL	1560	80.0	1489	2040	4000	800	M1	Manual	5
Poland	1	5	Petrol	998	50.0	865	1180	6000	850	M1	Manual	5
Poland	1	6	Diesel	1910	84.0	1410	1845	4000	850	M1	Manual	5
Poland	1	7	Petrol	1598	81.0	1055	1550	6000	700	M1	Manual	5
Poland	1	8	Diesel	2494	86.0	1750	2800	3600	700	N1	Manual	5
Poland	1	9	Petrol	1149	55.0	950	1345	5500	750	M1	Manual	5
Spain	1	1	DIESEL	1896	77.0	1125	1591	4000	850	M1	Manual	5
Spain	1	2	Petrol	1364	103.0	920	1378	4900	800	M1	Manual	6
Spain	1	3	Diesel	1995	105.0	1385	1810	4000	850	M1	Manual	6
Spain	1	5	Petrol	1390	92.0	1403	1970	5000	700	M1	Manual	6
Spain	1	6	Diesel	1560	80.0	1344	1970	4000	750	M1	Manual	5
Spain	1	7	Diesel	1560	66.0	1504	2065	4000	750	N1	Manual	5
Spain	1	8	DIESEL	2402	85.0	2034	3500	3500	800	N1	Manual	6
Spain	1	9	DIESEL	1753	55.0	1392	1955	4000	850	N1	Manual	5
Spain	1	10	DIESEL	2402	85.0	1865	3500	3500	800	N1	Manual	6

Table 5: Technical data of the vehicles measured in UK, Poland and Spain



source	campagn	IDveh	engine	cap cm ³	Pn kW	kerb_mass kg	GVM kg	nRated min-1	n_idle min-1	category	Transmission type	number of gears
USA	1	1801	Petrol	4511	250.0	2225	2880	6500	550	M1	automatic	6
USA	1	1802	Petrol	3189	184.0	2170	2880	6300	700	M1	automatic	6
USA	1	1803	Petrol	4511	250.0	2225	2880	6500	550	M1	automatic	6
USA	1	1804	Petrol	4511	331.0	2355	2880	6000	550	M1	automatic	6
USA	1	1805	Petrol	3189	184.0	2160	2880	6300	700	M1	manual	6
Japan	1	1	Petrol	1490	75.0	1040	1315	5600	700	M1	Automatic	4
Japan	1	2	Petrol	990	51.0	860	1135	8000	700	M1	Automatic	4
Japan	1	3	Petrol	2350	121.0	1560	1945	7500	600	M1	Automatic	4
Japan	1	4	Petrol	1339	73.0	1140	1415	6000	750	M1	Automatic	5
Japan	1	5	Diesel	2980	96.0	2050	2490	3600	700	M1	Automatic	4
Japan	1	6	Diesel	2950	125.0	2210	2595	3600	750	M1	Automatic	4
Japan	1	7	Petrol	1496	81.0	1020	1295	6000	650	M1	Manual	5
Japan	1	8	Petrol	658	40.0	700	920	6500	800	M1	Manual	5
Japan	1	9	Petrol	997	51.0	840	1115	6000	750	M1	Manual	5
Japan	1	10	Petrol	1998	116.0	1440	1715	6500	650	M1	Manual	5
Japan	1	11	Petrol	1998	162.0	1180	1400	8000	750	M1	Manual	6
Japan	1	12	Petrol	660	32.0	920	1380	5900	900	N1	Automatic	3
Japan	1	13	Petrol	1790	66.0	1310	2225	5000	700	N1	Automatic	4
Japan	1	14	Petrol	1990	81.0	1580	2995	5200	850	N1	Automatic	4
Japan	1	15	Diesel	2180	58.0	1380	2295	4250	650	N1	Automatic	4
Japan	1	16	Diesel	2990	67.0	1700	3115	4000	650	N1	Automatic	4
Japan	1	17	Diesel	2980	100.0	1920	2850	3400	800	N1	Automatic	4
Japan	1	18	Petrol	650	31.0	800	1260	5500	1050	N1	Manual	5
Japan	1	19	Petrol	1990	88.0	1550	2965	5200	700	N1	Manual	5
Japan	1	20	Petrol	657	37.0	880	1340	6000	900	N1	Manual	5
Japan	1	21	Petrol	1789	66.0	1210	2225	5000	750	N1	Manual	5
Japan	1	22	Diesel	2180	57.0	1350	2265	4250	700	N1	Manual	5
Japan	1	23	Diesel	1998	54.0	1160	1570	4500	750	N1	Manual	5
Japan	1	24	Diesel	2835	69.0	1790	3455	4000	800	N1	Manual	5
Korea	1	1	Petrol	1591	121.0	1545	2025	6200	650	M1	Automatic	
Korea	1	2	Petrol	1998	165.0	1735	2235	6200	600	M1	Automatic	
Korea	1	3	Petrol	2656	192.0	1960	2460	6000	650	M1	Automatic	
Korea	1	4	Diesel	1991	151.0	2345	2900	3800	800	M1	Automatic	
Korea	1	5	Diesel	2902	192.0	2945	3500	3800	800	N1	Automatic	
Korea	1	6	Diesel	2497	174.0	3035	3500	3800	800	N1	Automatic	
Korea	1	7	Diesel	2497	126.0	1955	2800	3800	750	N1	Automatic	
Korea	1	8	Diesel	2497	126.0	1950	2800	3800	750	N1	Manual	5

Table 6: Technical data of the vehicles measured in USA, Japan and Korea



source	campagn	IDveh	engine	cap cm ³	Pn kW	kerb mass kg	GVM kg	n _{rated} min-1	n _{idle} min-1	category	Transmission type	number of gears
India	1	1	Diesel	2498	83.2	1830	2475	3800	750	M1	manual	5
India	1	2	Diesel	442	6.8	670	1250	3600	1000	N1	manual	4
India	1	3	Petrol	624	26.0	635	935	5500	1150	M1	manual	4
India	1	4	Diesel	2179	103.0	2225	2850	4000	850	M1	manual	5
India	1	5	Diesel	702	11.3	815	1550	3200	850	N1	manual	4
India	1	6	Petrol	1248	55.9	1130	1572	5150	850	M1	manual	5
India	1	7	CNG	796	35.0	795	1140	6200	900	M1	manual	5
India	1	8	Petrol	998	49.0	880	1320	6200	900	M1	manual	5
India	1	9	Diesel	2523	46.3	1725	2750	3200	850	N1	manual	5
India	2	10	DIESEL	1248	68.2	1210	1670	4000	850	M1	MANUAL	5
India	2	11	PETROL	1368	65.9	1180	1619	6000	850	M1	MANUAL	5
India	2	12	Petrol	1172	50.2	1090	1520	6000	850	M1	MANUAL	5
India	2	13	Petrol	1198	66.0	1055	1430	6200	750	M1	Manual	5
India	2	14	Petrol	1086	49.0	895	1360	5500	750	M1	Manual	5
India	2	15	Petrol	1197	58.8	1033	1515	5200	700	M1	Manual	5
India	2	16	DIESEL	1248	55.2	1080	1505	4000	900	M1	MANUAL	5
India	2	17	petrol	996	50.0	870	1275	6200	850	M1	Manual	5
India	2	18	Diesel	1500	65.0	1250	2500	3700	800	N1	Manual	5
India	2	19	PETROL	1496	66.0	930	1430	5600	850	M1	MANUAL	5
India	2	20	Diesel	1598	77.0	1220	1760	4400	800	M1	Manual	5
India	3	21	Diesel	2596	45.0	1700	2850	3600	800	N1	Manual	5
India	3	22	Diesel	1947	29.1	1350	2450	2900	850	N1	Manual	4
India	3	23	Diesel	2523	46.3	1725	2750	3200	850	N1	Manual	5
India	3	24	Diesel	2523	46.3	1670	2330	3200	900	M1	Manual	5
India	3	25	Diesel	442	6.8	670	1250	3600	1000	M1	Manual	4
India	3	26	Diesel	909	18.4	950	1800	4000	1050	N1	Manual	4
India	3	27	PETROL	796	25.0	785	1350	5000	900	M1	MANUAL	4
India	3	28	Diesel	441	6.5	597	1100	3600	1000	N1	Manual	4
India	3	29	Diesel	871	12.5	800	1810	3000	1250	N1	Manual	5
India	3	30	Diesel	702	11.3	815	1550	3200	850	N1	manual	4
India	3	31	Diesel	611	8.0	685	1110	3000	1100	M1	Manual	5

Table 7: Technical data of the vehicles measured in India

The data consists of vehicle speed, engine speed (not for all vehicles), date and time of the day and trip number with a sample rate of 1 Hz. The acceleration was calculated using the following two approaches:

- $a_i = (v_{i+1} - v_i)/3.6$,
- $a_i = (v_{i+1} - v_{i-1})/2/3.6$,

The second approach was used for the further analysis within the WLTP development work.

The following indicators were assigned to the datasets:

- trip number,
- short trip number within a trip (a short trip consists of consecutive datasets with $v \geq 1$ km/h),
- acceleration (consecutive datasets with $a > 0.1389$ m/s²),



- deceleration (consecutive datasets with $a < -0.1389 \text{ m/s}^2$),
- cruise (consecutive datasets with $-0.1389 \text{ m/s}^2 \leq a \leq 0.1389 \text{ m/s}^2$).

4 Mileage statistics, number of monitoring days etc.

The total mileage of the data is almost 800 000 km. 4.7% of this mileage is related to trips below 3000 m. These trips were disregarded for the analysis of acceleration and deceleration distributions. Another 5.8% of the total mileage belongs to trips with faulty sections (jumps in vehicle speed etc.). This data was also excluded from the analysis. The remaining total mileage is 714 198 km. The distribution to the different countries, measurement campaigns and vehicles are shown in the following tables.

source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
Belgium	1	1	695,008	10,580,901	11,275,909	6.2%	93.8%	100.0%
Belgium	1	2	360,564	1,627,357	1,987,921	18.1%	81.9%	100.0%
Belgium	1	3	873,234	3,450,207	4,323,441	20.2%	79.8%	100.0%
Belgium	1	4	1,185,395	8,444,481	9,629,875	12.3%	87.7%	100.0%
Belgium	1	5	345,443	7,529,967	7,875,410	4.4%	95.6%	100.0%
Belgium	1	6	1,748,777	6,708,826	8,457,604	20.7%	79.3%	100.0%
Belgium	1	7	634,975	5,521,359	6,156,335	10.3%	89.7%	100.0%
Belgium	1	8	273,452	1,263,662	1,537,114	17.8%	82.2%	100.0%
Belgium	1	9	865,965	1,304,847	2,170,812	39.9%	60.1%	100.0%
Belgium	1	10	1,249,634	5,882,231	7,131,865	17.5%	82.5%	100.0%
Belgium	1	11	1,217,593	7,396,033	8,613,626	14.1%	85.9%	100.0%
		sum	9,450,040	59,709,871	69,159,911	13.7%	86.3%	100.0%

Table 8: Mileage statistics for the 1st measurement campaign in Belgium

source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
Belgium	2	3	99,411	341,468	440,879	22.5%	77.5%	100.0%
Belgium	2	4	876,044	7,255,949	8,131,993	10.8%	89.2%	100.0%
Belgium	2	5	1,168,281	8,176,237	9,344,519	12.5%	87.5%	100.0%
Belgium	2	6	596,370	6,404,553	7,000,922	8.5%	91.5%	100.0%
Belgium	2	7	1,104,110	5,556,734	6,660,844	16.6%	83.4%	100.0%
Belgium	2	8	488,002	3,482,624	3,970,627	12.3%	87.7%	100.0%
Belgium	2	11	1,120,036	7,876,325	8,996,362	12.4%	87.6%	100.0%
Belgium	2	15	1,498,189	9,024,533	10,522,722	14.2%	85.8%	100.0%
Belgium	2	16	667,126	5,410,450	6,077,575	11.0%	89.0%	100.0%
		sum	7,617,569	53,528,873	61,146,442	12.5%	87.5%	100.0%

Table 9: Mileage statistics for the 2nd measurement campaign in Belgium



source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
France	1	1	85,598	12,392,738	12,478,336	0.7%	99.3%	100.0%
France	1	2	5,979	3,553,889	3,559,868	0.2%	99.8%	100.0%
France	1	3	3,603	3,658,216	3,661,819	0.1%	99.9%	100.0%
France	1	4	19,107	5,878,712	5,897,819	0.3%	99.7%	100.0%
France	1	5		380,078	380,078	0.0%	100.0%	100.0%
France	1	6		1,215,052	1,215,052	0.0%	100.0%	100.0%
France	1	7		1,194,370	1,194,370	0.0%	100.0%	100.0%
France	1	8	149,906	22,672,706	22,822,612	0.7%	99.3%	100.0%
France	1	9	22,367	3,625,435	3,647,802	0.6%	99.4%	100.0%
France	1	10	107,641	7,235,325	7,342,966	1.5%	98.5%	100.0%
		sum	394,201	61,806,520	62,200,721	0.6%	99.4%	100.0%

Table 10: Mileage statistics for the 1st measurement campaign in France



source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
France	2	11		2,669,624	2,669,624	0.0%	100.0%	100.0%
France	2	12		1,701,514	1,701,514	0.0%	100.0%	100.0%
France	2	13	36,061	1,563,417	1,599,478	2.3%	97.7%	100.0%
France	2	14	3,946	3,890,786	3,894,732	0.1%	99.9%	100.0%
France	2	15		829,576	829,576	0.0%	100.0%	100.0%
France	2	16		2,386,082	2,386,082	0.0%	100.0%	100.0%
France	2	17	317,335	5,111,997	5,429,332	5.8%	94.2%	100.0%
France	2	18		2,460,312	2,460,312	0.0%	100.0%	100.0%
France	2	19	109,543	1,875,128	1,984,671	5.5%	94.5%	100.0%
France	2	20		1,301,514	1,301,514	0.0%	100.0%	100.0%
France	2	21		1,244,894	1,244,894	0.0%	100.0%	100.0%
France	2	22		3,346,884	3,346,884	0.0%	100.0%	100.0%
France	2	23		2,279,044	2,279,044	0.0%	100.0%	100.0%
France	2	24		229,095	229,095	0.0%	100.0%	100.0%
France	2	25		10,080,286	10,080,286	0.0%	100.0%	100.0%
France	2	26	25,606	571,879	597,485	4.3%	95.7%	100.0%
France	2	27		1,005,312	1,005,312	0.0%	100.0%	100.0%
France	2	28		287,020	287,020	0.0%	100.0%	100.0%
France	2	29	3,642	1,026,138	1,029,780	0.4%	99.6%	100.0%
France	2	30	66,500	1,732,496	1,798,996	3.7%	96.3%	100.0%
France	2	31		271,601	271,601	0.0%	100.0%	100.0%
France	2	32	20,697	1,397,916	1,418,613	1.5%	98.5%	100.0%
France	2	33		1,480,057	1,480,057	0.0%	100.0%	100.0%
France	2	34		1,407,382	1,407,382	0.0%	100.0%	100.0%
France	2	35	11,649	2,757,923	2,769,572	0.4%	99.6%	100.0%
France	2	36		778,980	778,980	0.0%	100.0%	100.0%
France	2	37		2,050,289	2,050,289	0.0%	100.0%	100.0%
France	2	38		1,825,916	1,825,916	0.0%	100.0%	100.0%
France	2	39		309,001	309,001	0.0%	100.0%	100.0%
France	2	40	5,073	1,904,617	1,909,690	0.3%	99.7%	100.0%
France	2	41		303,540	303,540	0.0%	100.0%	100.0%
France	2	42		1,265,118	1,265,118	0.0%	100.0%	100.0%
		sum	600,053	61,345,337	61,945,390	1.0%	99.0%	100.0%

Table 11: Mileage statistics for the 2nd measurement campaign in France



source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
Germany	1	3	10,555	550,295	560,851	1.9%	98.1%	100.0%
Germany	1	5		855,355	855,355	0.0%	100.0%	100.0%
Germany	1	6		5,408,646	5,408,646	0.0%	100.0%	100.0%
Germany	1	7		3,714,933	3,714,933	0.0%	100.0%	100.0%
Germany	1	13		4,529,883	4,529,883	0.0%	100.0%	100.0%
Germany	1	14		1,340,459	1,340,459	0.0%	100.0%	100.0%
Germany	1	15	26,867	3,545,617	3,572,485	0.8%	99.2%	100.0%
Germany	1	16		1,365,867	1,365,867	0.0%	100.0%	100.0%
		sum	37,422	21,311,056	21,348,479	0.2%	99.8%	100.0%

Table 12: Mileage statistics for the measurement campaign in Germany

source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
Sweden	1	1	11,011	3,041,721	3,052,732	0.4%	99.6%	100.0%
Sweden	1	2	345,187	4,649,537	4,994,724	6.9%	93.1%	100.0%
Sweden	1	3	641,990	8,746,254	9,388,244	6.8%	93.2%	100.0%
Sweden	1	4	90,414	2,619,761	2,710,175	3.3%	96.7%	100.0%
Sweden	1	5		991,567	991,567	0.0%	100.0%	100.0%
Sweden	1	6	229,668	1,903,914	2,133,583	10.8%	89.2%	100.0%
Sweden	1	8	263,770	6,187,522	6,451,292	4.1%	95.9%	100.0%
Sweden	1	9	37,770	7,703,420	7,741,190	0.5%	99.5%	100.0%
		sum	1,619,809	35,843,697	37,463,506	4.3%	95.7%	100.0%

Table 13: Mileage statistics for the measurement campaign in Sweden

source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
Italy	1	1	42,056	11,203,091	11,245,147	0.4%	99.6%	100.0%
Italy	1	2		2,728,103	2,728,103	0.0%	100.0%	100.0%
Italy	1	4	14,041	4,996,380	5,010,421	0.3%	99.7%	100.0%
Italy	1	8	162,732	7,609,511	7,772,243	2.1%	97.9%	100.0%
Italy	1	9	38,525	2,029,296	2,067,821	1.9%	98.1%	100.0%
Italy	1	10	5,442	11,684,759	11,690,201	0.0%	100.0%	100.0%
Italy	1	11		805,203	805,203	0.0%	100.0%	100.0%
Italy	1	12	185,390	15,058,585	15,243,975	1.2%	98.8%	100.0%
		sum	448,186	56,114,928	56,563,114	0.8%	99.2%	100.0%

Table 14: Mileage statistics for the measurement campaign in Italy



source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
Slovenia	1	18		3,665,658	3,665,658	0.0%	100.0%	100.0%
Slovenia	1	20		5,304,304	5,304,304	0.0%	100.0%	100.0%
Slovenia	1	21		100,671	100,671	0.0%	100.0%	100.0%
Slovenia	1	22		221,553	221,553	0.0%	100.0%	100.0%
Slovenia	1	23	11,743	2,387,904	2,399,648	0.5%	99.5%	100.0%
Slovenia	1	24	8,275	4,749,449	4,757,724	0.2%	99.8%	100.0%
Slovenia	1	25	7,893	3,493,542	3,501,435	0.2%	99.8%	100.0%
Slovenia	1	26		158,603	158,603	0.0%	100.0%	100.0%
Slovenia	1	27	5,847	2,918,779	2,924,626	0.2%	99.8%	100.0%
Slovenia	1	28	8,679	3,512,056	3,520,735	0.2%	99.8%	100.0%
Slovenia	1	29	72,355	2,276,532	2,348,887	3.1%	96.9%	100.0%
Slovenia	1	30		900,339	900,339	0.0%	100.0%	100.0%
Slovenia	1	31		1,591,009	1,591,009	0.0%	100.0%	100.0%
Slovenia	1	32		4,531,976	4,531,976	0.0%	100.0%	100.0%
Slovenia	1	33	7,472	5,609,110	5,616,582	0.1%	99.9%	100.0%
Slovenia	1	34		1,138,332	1,138,332	0.0%	100.0%	100.0%
Slovenia	1	35	67,985	2,898,992	2,966,977	2.3%	97.7%	100.0%
		sum	190,250	45,458,810	45,649,060	0.4%	99.6%	100.0%

Table 15: Mileage statistics for the measurement campaign in Slovenia

source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
UK	1	1		1,086,829	1,086,829	0.0%	100.0%	100.0%
UK	1	2		1,126,848	1,126,848	0.0%	100.0%	100.0%
UK	1	3		1,258,906	1,258,906	0.0%	100.0%	100.0%
UK	1	4	17,462	1,381,461	1,398,923	1.2%	98.8%	100.0%
UK	1	5	100,314	1,205,487	1,305,801	7.7%	92.3%	100.0%
UK	1	6	28,862	1,425,611	1,454,473	2.0%	98.0%	100.0%
UK	1	7	13,729	1,485,377	1,499,106	0.9%	99.1%	100.0%
UK	1	8	139,499	801,332	940,831	14.8%	85.2%	100.0%
UK	1	9	18,677	648,891	667,568	2.8%	97.2%	100.0%
UK	1	10		924,538	924,538	0.0%	100.0%	100.0%
UK	1	11	113,568	1,799,934	1,913,502	5.9%	94.1%	100.0%
UK	1	12		479,200	479,200	0.0%	100.0%	100.0%
		sum	432,110	13,624,414	14,056,524	3.1%	96.9%	100.0%

Table 16: Mileage statistics for the N1 measurement campaign in UK



source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
UK	2	1	27,122	689,331	716,453	3.8%	96.2%	100.0%
UK	2	2		1,842,033	1,842,033	0.0%	100.0%	100.0%
UK	2	3		601,572	601,572	0.0%	100.0%	100.0%
UK	2	4		1,592,012	1,592,012	0.0%	100.0%	100.0%
UK	2	5		1,040,938	1,040,938	0.0%	100.0%	100.0%
UK	2	6	93,082	2,470,723	2,563,805	3.6%	96.4%	100.0%
UK	2	7	6,246	2,624,960	2,631,206	0.2%	99.8%	100.0%
UK	2	8		917,345	917,345	0.0%	100.0%	100.0%
UK	2	9		321,659	321,659	0.0%	100.0%	100.0%
UK	2	10		4,327,764	4,327,764	0.0%	100.0%	100.0%
		sum	126,449	16,428,338	16,554,787	0.8%	99.2%	100.0%

Table 17: Mileage statistics for the M1 measurement campaign in UK

source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
Poland	1	1	82,375	1,156,572	1,238,946	6.6%	93.4%	100.0%
Poland	1	2		650,039	650,039	0.0%	100.0%	100.0%
Poland	1	3		854,034	854,034	0.0%	100.0%	100.0%
Poland	1	4	3,406	1,713,148	1,716,553	0.2%	99.8%	100.0%
Poland	1	5	3,947	1,737,554	1,741,501	0.2%	99.8%	100.0%
Poland	1	6	5,532	1,604,259	1,609,791	0.3%	99.7%	100.0%
Poland	1	7	66,617	1,375,371	1,441,988	4.6%	95.4%	100.0%
Poland	1	8	118,387	2,489,112	2,607,499	4.5%	95.5%	100.0%
Poland	1	9	25,100	658,526	683,626	3.7%	96.3%	100.0%
		sum	305,364	12,238,615	12,543,979	2.4%	97.6%	100.0%

Table 18: Mileage statistics for the measurement campaign in Poland

source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
Spain	1	1		308,340	308,340	0.0%	100.0%	100.0%
Spain	1	2		254,330	254,330	0.0%	100.0%	100.0%
Spain	1	3	19,407	140,321	159,727	12.1%	87.9%	100.0%
Spain	1	5		254,180	254,180	0.0%	100.0%	100.0%
Spain	1	6	24,389	1,602,712	1,627,101	1.5%	98.5%	100.0%
Spain	1	7		99,186	99,186	0.0%	100.0%	100.0%
Spain	1	8	18,504	2,424,776	2,443,280	0.8%	99.2%	100.0%
Spain	1	9	3,574	2,193,374	2,196,948	0.2%	99.8%	100.0%
Spain	1	10	8,904	1,780,287	1,789,190	0.5%	99.5%	100.0%
		sum	74,778	9,057,506	9,132,284	0.8%	99.2%	100.0%

Table 19: Mileage statistics for the measurement campaign in Spain



source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
35	1	1801	1919560.33	39906328.2	41,825,889	4.6%	95.4%	100.0%
35	1	1802	503253.338	19553827.4	20,057,081	2.5%	97.5%	100.0%
35	1	1803	719997.315	36406958.3	37,126,956	1.9%	98.1%	100.0%
35	1	1804	730131.515	19968589.2	20,698,721	3.5%	96.5%	100.0%
35	1	1805		2819185.65	2,819,186	0.0%	100.0%	100.0%
			3,872,943	118,654,889	122,527,831	3.2%	96.8%	100.0%

Table 20: Mileage statistics for the measurement campaign in USA

source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
Japan	1	1	411,880	2,948,296	3,360,176	12.3%	87.7%	100.0%
Japan	1	2		534,763	534,763	0.0%	100.0%	100.0%
Japan	1	3		1,205,650	1,205,650	0.0%	100.0%	100.0%
Japan	1	4	13,481	3,236,944	3,250,425	0.4%	99.6%	100.0%
Japan	1	5	153,491	600,942	754,432	20.3%	79.7%	100.0%
Japan	1	6	246,747	686,248	932,995	26.4%	73.6%	100.0%
Japan	1	7	92,595	2,266,004	2,358,599	3.9%	96.1%	100.0%
Japan	1	8	17,000	3,293,233	3,310,233	0.5%	99.5%	100.0%
Japan	1	9	42,595	3,322,839	3,365,434	1.3%	98.7%	100.0%
Japan	1	10	35,733	3,028,567	3,064,299	1.2%	98.8%	100.0%
Japan	1	11	55,300	3,195,639	3,250,940	1.7%	98.3%	100.0%
		sum	1,068,821	24,319,124	25,387,945	4.2%	95.8%	100.0%

Table 21: Mileage statistics for the M1 measurement campaign in Japan



source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
Japan	1	12		1,207,749	1,207,749	0.0%	100.0%	100.0%
Japan	1	13	111,344	688,167	799,511	13.9%	86.1%	100.0%
Japan	1	14		1,219,027	1,219,027	0.0%	100.0%	100.0%
Japan	1	15		1,213,488	1,213,488	0.0%	100.0%	100.0%
Japan	1	16		691,973	691,973	0.0%	100.0%	100.0%
Japan	1	17	28,480	3,570,877	3,599,358	0.8%	99.2%	100.0%
Japan	1	18	463,835	3,019,834	3,483,669	13.3%	86.7%	100.0%
Japan	1	19		721,134	721,134	0.0%	100.0%	100.0%
Japan	1	20	54,587	2,264,605	2,319,192	2.4%	97.6%	100.0%
Japan	1	21	99,710	3,289,856	3,389,565	2.9%	97.1%	100.0%
Japan	1	22	555,829	2,921,925	3,477,755	16.0%	84.0%	100.0%
Japan	1	23	69,155	2,334,917	2,404,072	2.9%	97.1%	100.0%
Japan	1	24	97,543	3,022,607	3,120,149	3.1%	96.9%	100.0%
		sum	1,480,483	26,166,161	27,646,644	5.4%	94.6%	100.0%

Table 22: Mileage statistics for the N1 measurement campaign in Japan

source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
Korea	1	1	825,102	3,668,655	4,493,756	18.4%	81.6%	100.0%
Korea	1	2	952,776	3,417,172	4,369,948	21.8%	78.2%	100.0%
Korea	1	3	897,834	3,651,007	4,548,841	19.7%	80.3%	100.0%
Korea	1	4	641,578	3,701,622	4,343,200	14.8%	85.2%	100.0%
Korea	1	5	758,963	3,862,515	4,621,478	16.4%	83.6%	100.0%
Korea	1	6	743,076	3,773,475	4,516,551	16.5%	83.5%	100.0%
Korea	1	7	317,389	3,818,804	4,136,192	7.7%	92.3%	100.0%
Korea	1	8	149,067	4,343,438	4,492,505	3.3%	96.7%	100.0%
		sum	5,285,783	30,236,688	35,522,471	14.9%	85.1%	100.0%

Table 23: Mileage statistics for the measurement campaign in Korea

source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
India	1	1	270,935	4,458,720	4,729,655	5.7%	94.3%	100.0%
India	1	2	207,159	2,481,910	2,689,069	7.7%	92.3%	100.0%
India	1	3	568,974	1,274,082	1,843,055	30.9%	69.1%	100.0%
India	1	4	496,737	1,510,255	2,006,992	24.8%	75.2%	100.0%
India	1	5	1,110,176	2,711,641	3,821,817	29.0%	71.0%	100.0%
India	1	6	257,165	1,195,556	1,452,721	17.7%	82.3%	100.0%
India	1	7	872,342	698,479	1,570,821	55.5%	44.5%	100.0%
India	1	8	684,836	798,601	1,483,438	46.2%	53.8%	100.0%
India	1	9	207,197	1,781,277	1,988,474	10.4%	89.6%	100.0%
		sum	4,675,521	16,910,520	21,586,041	21.7%	78.3%	100.0%

Table 24: Mileage statistics for the 1st measurement campaign in India



source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
India	2	10	557,938	2,303,252	2,861,190	19.5%	80.5%	100.0%
India	2	11		3,175,282	3,175,282	0.0%	100.0%	100.0%
India	2	12	331,015	530,486	861,501	38.4%	61.6%	100.0%
India	2	13	530,643	2,517,012	3,047,655	17.4%	82.6%	100.0%
India	2	14	1,443,370	10,780,148	12,223,518	11.8%	88.2%	100.0%
India	2	15	481,994	835,494	1,317,489	36.6%	63.4%	100.0%
India	2	16	246,343	2,904,214	3,150,557	7.8%	92.2%	100.0%
India	2	17		1,604,472	1,604,472	0.0%	100.0%	100.0%
India	2	18	1,599,378	6,070,314	7,669,692	20.9%	79.1%	100.0%
India	2	19	452,263	3,140,799	3,593,062	12.6%	87.4%	100.0%
India	2	20	1,060,491	2,667,660	3,728,151	28.4%	71.6%	100.0%
		sum	6,703,435	36,529,134	43,232,569	15.5%	84.5%	100.0%

Table 25: Mileage statistics for the 2nd measurement campaign in India

source	campaign	IDveh	distance in m			distance share		
			not ok	ok	total	not ok	ok	total
India	3	21	85,887	829,234	915,121	9.4%	90.6%	100.0%
India	3	22	75,787	885,486	961,274	7.9%	92.1%	100.0%
India	3	23	282,336	1,707,842	1,990,178	14.2%	85.8%	100.0%
India	3	24	186,788	417,870	604,658	30.9%	69.1%	100.0%
India	3	25	158,494	2,486,723	2,645,217	6.0%	94.0%	100.0%
India	3	26	271,517	334,274	605,791	44.8%	55.2%	100.0%
India	3	27		2,237,353	2,237,353	0.0%	100.0%	100.0%
India	3	28	203,420	511,757	715,177	28.4%	71.6%	100.0%
India	3	29	41,198	479,635	520,833	7.9%	92.1%	100.0%
India	3	30	265,621	3,555,753	3,821,373	7.0%	93.0%	100.0%
India	3	31	653,895	1,467,664	2,121,559	30.8%	69.2%	100.0%
		sum	2,224,943	14,913,590	17,138,533	13.0%	87.0%	100.0%

Table 26: Mileage statistics for the 3rd measurement campaign in India

The number of monitoring days and the key parameters of the daily travelled distances are summarised in Table 27 to Table 31. More detailed information can be found in table "TB_daily_distance" in the Access database.

There are big differences between the countries as well as between different measurement campaigns. The lowest average daily distance is found for Poland (30 km), the highest for the UK (188 km, N1 vehicle).



source	campaign	ldveh	n_days	minimum daily distance in km	average daily distance in km	maximum daily distance in km	standarddev in km
Belgium	1	1	142	1.6	53.8	410.1	51
Belgium	1	2	56	1.5	26.4	156.1	31
Belgium	1	3	140	1.1	18.2	84.0	15
Belgium	1	4	128	1.9	43.7	295.9	53
Belgium	1	5	85	1.6	60.4	157.0	47
Belgium	1	6	116	7.4	59.3	194.4	37
Belgium	1	7	64	1.6	71.2	194.3	55
Belgium	1	8	51	1.5	28.6	161.6	36
Belgium	1	9	44	6.1	48.1	155.3	34
Belgium	1	10	185	1.9	26.8	150.9	22
Belgium	1	11	103	1.2	72.8	271.4	54
Belgium	2	3	8	4.5	66.1	114.4	46
Belgium	2	4	70	1.2	119.7	745.4	128
Belgium	2	5	72	1.4	135.2	687.4	146
Belgium	2	6	64	1.1	119.3	1096.7	156
Belgium	2	7	75	1.0	97.5	447.0	118
Belgium	2	8	44	1.1	103.1	594.8	129
Belgium	2	11	78	6.2	122.2	723.0	110
Belgium	2	15	82	1.3	138.1	716.0	130
Belgium	2	16	53	1.8	120.5	603.4	121

Table 27: Number of monitoring days and key parameters of the daily distances



source	campaign	ldveh	n_days	minimum daily distance in km	average daily distance in km	maximum daily distance in km	standarddev in km
France	1	1	195	1.3	67.5	895.1	110
France	1	2	72	3.4	51.6	817.0	95
France	1	3	119	2.9	34.1	141.3	25
France	1	4	145	1.4	44.2	315.7	40
France	1	5	21	2.1	23.5	249.6	53
France	1	6	28	7.5	47.5	151.4	40
France	1	7	42	6.2	30.8	253.2	51
France	1	8	275	1.2	85.3	781.3	113
France	1	9	44	3.0	91.3	584.9	125
France	1	10	94	1.5	81.9	666.1	135
France	2	11	25	1.7	97.9	556.3	155
France	2	12	38	3.8	48.2	282.2	55
France	2	13	28	4.2	59.0	376.6	72
France	2	14	47	2.0	85.3	829.8	167
France	2	15	19	10.1	49.2	192.7	55
France	2	16	31	11.1	78.0	451.0	95
France	2	17	33	3.1	166.8	366.4	75
France	2	18	23	2.9	103.8	721.2	192
France	2	19	30	4.8	69.0	215.3	52
France	2	20	33	2.5	46.4	485.0	88
France	2	21	30	1.4	42.7	127.0	32
France	2	22	28	3.1	120.1	553.9	140
France	2	23	35	2.1	65.2	214.9	46
France	2	24	31	1.5	13.0	34.8	7
France	2	25	81	1.7	128.5	871.6	168
France	2	26	15	4.2	41.9	209.2	65
France	2	27	21	1.2	48.6	149.5	31
France	2	28	23	9.7	15.2	45.7	9
France	2	29	26	5.9	41.2	168.8	36
France	2	30	26	1.8	71.6	276.8	54
France	2	31	25	3.8	11.6	39.9	8
France	2	32	31	2.8	47.6	125.0	33
France	2	33	29	5.2	51.7	365.6	64
France	2	34	25	8.5	58.9	333.2	62
France	2	35	32	4.7	86.6	411.8	88
France	2	36	20	2.2	41.1	151.4	34
France	2	37	32	9.3	70.9	536.8	125
France	2	38	23	1.1	86.1	351.8	70
France	2	39	21	3.9	22.0	104.9	23
France	2	40	22	1.9	89.5	557.9	157
France	2	41	25	2.6	17.4	89.9	18
France	2	42	24	6.6	55.2	230.6	60

Table 28: Number of monitoring days and key parameters of the daily distances



source	campaign	ldveh	n_days	minimum daily distance in km	average daily distance in km	maximum daily distance in km	standarddev in km
Germany	1	3	92	1.1	11.4	66.9	12
Germany	1	5	71	1.5	16.6	71.3	11
Germany	1	6	76	1.7	76.2	217.8	48
Germany	1	7	81	1.3	50.6	149.4	35
Germany	1	13	88	1.6	55.9	500.0	79
Germany	1	14	72	2.1	25.2	67.4	18
Germany	1	15	97	3.6	39.6	119.5	23
Germany	1	16	31	1.2	47.0	423.4	74
Sweden	1	1	58	1.4	66.7	491.4	77
Sweden	1	2	50	4.0	102.3	376.0	79
Sweden	1	3	55	2.8	179.7	627.0	139
Sweden	1	4	35	1.9	109.9	858.0	151
Sweden	1	5	27	1.5	40.7	112.3	28
Sweden	1	6	50	3.2	44.6	186.0	32
Sweden	1	8	32	27.4	256.6	493.0	140
Sweden	1	9	39	94.7	274.9	427.1	88
Italy	1	1	85	2.2	137.3	394.8	84
Italy	1	2	80	1.1	35.1	103.5	19
Italy	1	4	151	1.1	38.1	269.9	51
Italy	1	8	73	1.2	110.7	413.3	83
Italy	1	9	21	9.1	101.0	231.3	62
Italy	1	10	48	14.4	246.3	747.9	208
Italy	1	11	10	12.9	91.9	211.2	83
Italy	1	12	162	1.0	97.8	457.1	73
Slovenia	1	18	90	3.4	44.8	265.6	44
Slovenia	1	20	96	1.1	59.5	408.4	64
Slovenia	1	21	6	1.3	19.1	48.9	18
Slovenia	1	22	16	1.5	18.6	37.9	12
Slovenia	1	23	68	1.0	36.8	364.5	58
Slovenia	1	24	112	1.2	45.8	275.4	51
Slovenia	1	25	117	1.3	36.5	276.6	39
Slovenia	1	26	86	1.0	5.9	27.0	5
Slovenia	1	27	101	1.2	34.6	160.1	26
Slovenia	1	28	56	1.5	70.3	244.6	49
Slovenia	1	29	123	1.4	27.3	149.3	29
Slovenia	1	30	87	1.2	15.7	241.2	31
Slovenia	1	31	71	1.5	29.8	96.2	29
Slovenia	1	32	94	3.5	54.2	314.7	50
Slovenia	1	33	96	1.9	63.0	266.1	50
Slovenia	1	34	41	2.5	31.4	126.3	33
Slovenia	1	35	103	1.2	36.8	163.1	38

Table 29: Number of monitoring days and key parameters of the daily distances



source	campaign	ldveh	n_days	minimum daily distance in km	average daily distance in km	maximum daily distance in km	standarddev in km
UK, N1	1	1	3	236.0	362.6	482.0	123
UK, N1	1	2	6	91.7	187.8	263.7	59
UK, N1	1	3	5	45.9	253.3	434.3	179
UK, N1	1	4	6	159.6	234.5	381.2	83
UK, N1	1	5	6	66.4	219.0	397.1	163
UK, N1	1	6	10	61.1	146.0	278.2	73
UK, N1	1	7	6	41.8	272.0	337.8	113
UK, N1	1	8	19	26.7	68.9	104.4	22
UK, N1	1	9	13	2.6	62.9	131.7	37
UK, N1	1	10	5	155.6	186.3	222.8	24
UK, N1	1	11	9	169.8	215.5	299.0	44
UK, N1	1	12	10	38.1	49.0	59.4	7
UK, M1	2	1	30	7.2	29.5	74.3	20
UK, M1	2	2	51	2.1	38.6	70.6	20
UK, M1	2	3	33	1.2	21.2	156.9	28
UK, M1	2	4	31	1.9	53.0	344.0	61
UK, M1	2	5	44	1.6	26.3	253.4	38
UK, M1	2	6	56	1.5	48.9	142.0	26
UK, M1	2	7	58	3.4	46.7	125.5	30
UK, M1	2	8	49	1.1	22.2	68.7	15
UK, M1	2	9	30	1.4	15.3	37.1	10
UK, M1	2	10	41	1.8	111.0	231.5	78
Poland	1	1	61	1.4	25.7	255.0	50
Poland	1	2	64	2.5	12.8	46.3	9
Poland	1	3	35	1.2	28.8	188.5	35
Poland	1	4	77	4.1	25.6	79.0	18
Poland	1	5	54	3.5	35.0	131.4	35
Poland	1	6	69	3.0	28.1	67.0	16
Poland	1	7	69	1.5	28.5	192.3	38
Poland	1	8	53	6.1	56.7	354.6	58
Poland	1	9	43	3.3	24.9	136.9	23
Spain	1	1	7	11.9	44.6	102.5	42
Spain	1	2	9	31.8	53.4	65.3	30
Spain	1	3	23	1.2	9.9	25.1	8
Spain	1	5	12	1.8	22.1	45.0	16
Spain	1	6	31	3.8	55.4	510.0	122
Spain	1	7	3	49.4	55.0	60.6	32
Spain	1	8	25	54.6	112.3	214.4	46
Spain	1	9	33	11.1	76.5	204.8	46
Spain	1	10	28	1.1	66.6	210.4	54

Table 30: Number of monitoring days and key parameters of the daily distances



source	campaign	ldveh	City	n_days	minimum daily distance in km	average daily distance in km	maximum daily distance in km	standarddev in km
USA	1	1801	Atlanta	3347	32.2	412.4	1320.7	187.1
USA	1	1802	Denver	1316	7.1	74.6	177.1	38.9
USA	1	1802	Los Angeles	658	4.7	75.2	440.0	82.8
USA	1	1802	San Diego	1291	4.1	74.1	473.4	86.2
USA	1	1802	San Francisco	951	6.8	289.2	763.9	182.6
USA	1	1803	Denver	1763	22.4	360.6	1029.3	190.0
USA	1	1803	Los Angeles	801	2.0	139.1	392.5	97.4
USA	1	1803	San Diego	1673	15.8	222.9	566.8	120.8
USA	1	1803	San Francisco	695	3.0	212.2	512.1	146.4
USA	1	1804	Denver	1306	1.5	61.9	167.3	38.6
USA	1	1804	Los Angeles	811	1.1	76.9	288.9	72.3
USA	1	1804	San Diego	1736	13.5	194.0	679.2	106.9
USA	1	1804	San Francisco	768	3.5	192.7	391.5	111.0
USA	1	1805	San Diego	1559	5.0	58.9	134.1	33.6

Table 31: Number of monitoring days and key parameters of the daily distances

5 Overview of results for different regions

The following tables provide an overview of the most important distributions of this analysis split up into different regions and road categories. It includes vehicle speed (without stop phases), acceleration, deceleration, stop phase duration, short trip distance, brake phase duration, number of brake phases per km and $v \cdot a_{\text{pos}}$ (vehicle speed multiplied by acceleration for $a > 0,1 \text{ m/s}^2$) distributions.

The US data could not be included, because it does not allow the split into different road categories.



Europe	cum freq	vehicle speed in km/h	acceleration duration in s	acceleration in m/s ²	deceleration duration in s	deceleration in m/s ²	stop duration (number weighted) in s	short trip distance (number weighted) in m	brake phase duration in s	number of brake events per km	v*a_pos in m ² /s ³
motorway	5%	47.4	<= 2	<=0.1	<= 2	-0.11	<=2	<=50	1.0	0.01	2.3
	10%	77.3	<= 2	<=0.1	<= 2	-0.12	<=2	<=50	1.0	0.01	2.7
	25%	101.2	<= 2	<=0.1	<= 2	-0.16	2.4	104	1.3	0.02	3.2
	50%	114.8	3.6	0.13	3.5	-0.23	6.2	4,290	2.5	0.04	5.2
	75%	126.0	6.7	0.29	6.2	-0.40	13.8	22,858	4.6	0.12	9.4
	90%	132.4	11.5	0.55	10.6	-0.66	30.2	51,913	7.8	1.35	15.0
rural	5%	14.5	<= 2	<=0.1	<= 2	-0.12	<=2	<34	1.0	0.03	1.1
	10%	25.5	<= 2	<=0.1	<= 2	-0.14	<=2	34	1.0	0.04	1.5
	25%	44.6	2.3	<=0.1	2.3	-0.19	2.3	337	1.9	0.08	2.3
	50%	64.7	4.4	0.22	4.3	-0.33	5.9	1,736	3.4	0.18	4.4
	75%	84.9	8.2	0.48	7.8	-0.58	18.2	6,836	5.6	0.44	7.9
	90%	103.7	13.6	0.86	12.9	-1.05	36.9	15,546	8.3	0.89	12.7
urban	5%	1.7	<= 2	<=0.1	<= 2	-0.12	<=2	<=50	1.0	0.12	0.4
	10%	4.6	<= 2	<=0.1	<= 2	-0.15	<=2	<=50	1.0	0.22	0.7
	25%	14.0	2.6	0.13	2.6	-0.22	2.3	69	1.9	0.53	1.3
	50%	28.3	4.7	0.32	4.7	-0.41	5.8	264	3.3	1.02	2.8
	75%	42.4	8.0	0.66	7.8	-0.76	18.5	782	5.2	1.74	5.5
	90%	53.6	12.2	1.05	11.7	-1.24	38.6	1,818	7.5	2.65	8.8
95%	60.2	15.1	1.28	14.5	-1.55	55.0	3,270	9.0	3.36	11.2	

Table 32: Overview of the most important distributions for Europe

India	cum freq	vehicle speed in km/h	acceleration duration in s	acceleration in m/s ²	deceleration duration in s	deceleration in m/s ²	stop duration (number weighted) in s	short trip distance (number weighted) in m	brake phase duration in s	number of brake events per km	v*a_pos in m ² /s ³
motorway	5%	9.1	<= 2	<=0.1	<= 2	-0.11	<=2	<=50	1.0	not enough data for the calculation	0.7
	10%	19.6	<= 2	<=0.1	<= 2	-0.13	<=2	<=50	1.0		1.0
	25%	32.8	2.2	<=0.1	2.2	-0.17	2.1	107	1.5		1.6
	50%	55.0	4.0	0.15	3.8	-0.27	6.2	1,839	2.7		2.5
	75%	69.8	7.7	0.32	6.7	-0.48	17.9	15,894	4.5		4.9
	90%	79.4	13.1	0.56	10.7	-0.86	50.8	42,630	6.9		8.1
rural	5%	6.2	<= 2	<=0.1	<= 2	-0.12	<=2	<=50	1.0		0.4
	10%	11.6	<= 2	<=0.1	<= 2	-0.13	<=2	<=50	1.0		0.7
	25%	23.3	2.5	<=0.1	2.4	-0.18	2.1	233	1.6		1.2
	50%	37.0	4.3	0.19	4.0	-0.30	5.9	2,558	2.8		2.2
	75%	50.7	7.8	0.38	6.7	-0.57	17.3	9,304	4.3		4.3
	90%	62.4	12.6	0.63	10.1	-1.01	57.9	22,050	6.1		7.2
urban	5%	1.7	<= 2	<=0.1	<= 2	-0.12	<1.9	<=50	1.0		0.2
	10%	4.7	<= 2	<=0.1	<= 2	-0.13	<1.9	<=50	1.0		0.4
	25%	13.1	2.4	<=0.1	2.3	-0.19	1.9	111	1.4		0.8
	50%	25.0	4.1	0.21	3.9	-0.32	6.2	576	2.6		1.8
	75%	38.6	7.4	0.40	6.8	-0.57	21.0	1,620	4.2		3.7
	90%	54.1	11.7	0.64	10.5	-0.94	51.3	4,206	6.4		6.4
95%	65.2	15.0	0.80	13.2	-1.21	74.0	7,912	7.9	8.4		

Table 33: Overview of the most important distributions for India



Japan	cum freq	vehicle speed in km/h	acceleration duration in s	acceleration in m/s ²	deceleration duration in s	deceleration in m/s ²	stop duration (number weighted) in s	short trip distance (number weighted) in m	brake phase duration in s	number of brake events per km	v*a_pos in m ² /s ³
motorway	5%	2.1	<= 2	<=0.1	<= 2	-0.12	<=2	<=50	1.0	0.02	0.3
	10%	5.6	<= 2	<=0.1	<= 2	-0.13	<=2	<=50	1.0	0.04	0.7
	25%	20.9	<= 2	<=0.1	<= 2	-0.18	2.8	<=50	1.0	0.07	1.8
	50%	62.8	<= 2	0.18	2.0	-0.28	6.1	143	1.6	0.11	2.9
	75%	81.2	4.0	0.38	4.1	-0.48	15.8	1,097	3.0	0.28	5.7
	90%	94.0	7.4	0.67	7.4	-0.77	34.3	11,840	5.6	1.16	9.2
rural	5%	6.8	<= 2	<=0.1	<= 2	-0.12	<=2	<=50	1.0	0.17	1.0
	10%	15.4	<= 2	<=0.1	<= 2	-0.13	<=2	77	1.0	0.23	1.2
	25%	34.4	<= 2	<=0.1	<= 2	-0.18	4.7	368	1.8	0.41	1.5
	50%	47.5	3.2	0.18	3.1	-0.30	12.6	934	4.1	0.60	2.7
	75%	55.3	7.9	0.46	7.4	-0.64	27.8	2,061	7.6	0.92	4.8
	90%	61.5	15.2	0.86	14.0	-1.24	49.4	3,946	10.2	1.44	7.5
urban	5%	1.7	<= 2	<=0.1	<= 2	-0.13	1.0	<=50	1.0	0.49	0.5
	10%	4.6	<= 2	<=0.1	<= 2	-0.15	1.7	<=50	1.0	0.67	0.9
	25%	13.7	<= 2	0.15	<= 2	-0.23	6.1	82	1.3	1.03	1.5
	50%	28.4	3.1	0.34	3.2	-0.42	19.5	244	2.6	1.56	3.0
	75%	43.1	5.8	0.67	6.4	-0.75	40.5	661	4.8	2.40	5.4
	90%	53.5	9.6	1.07	11.0	-1.20	59.9	1,213	7.6	3.76	8.1
95%	59.5	12.3	1.34	14.0	-1.48	72.5	1,694	9.2	4.80	9.9	

Table 34: Overview of the most important distributions for Japa

Korea	cum freq	vehicle speed in km/h	acceleration duration in s	acceleration in m/s ²	deceleration duration in s	deceleration in m/s ²	stop duration (number weighted) in s	short trip distance (number weighted) in m	brake phase duration in s	number of brake events per km	v*a_pos in m ² /s ³
motorway	5%	2.6	<= 2	<=0.1	<= 2	-0.11	1.0	<=50	1.0	not enough data for the calculation	0.2
	10%	6.0	<= 2	<=0.1	<= 2	-0.13	1.4	<=50	1.0		0.5
	25%	15.5	2.5	<=0.1	2.4	-0.17	3.2	86	1.5		1.3
	50%	46.0	4.3	0.17	4.0	-0.27	6.2	344	2.7		2.4
	75%	73.9	7.5	0.33	6.9	-0.45	12.3	4,392	4.4		4.6
	90%	85.7	12.1	0.55	11.1	-0.74	24.1	24,400	7.2		7.2
rural	5%	10.0	<= 2	<=0.1	<= 2	-0.12	<= 2	46	1.0		1.0
	10%	18.8	<= 2	<=0.1	<= 2	-0.14	2.2	126	1.2		1.3
	25%	33.7	2.9	0.10	2.7	-0.20	6.2	541	2.3		1.9
	50%	48.6	5.4	0.24	4.7	-0.35	16.9	1,575	3.7		3.6
	75%	60.6	9.9	0.48	8.0	-0.69	43.5	3,435	5.9		6.0
	90%	73.1	16.1	0.79	13.4	-1.24	69.7	7,943	9.3		8.6
urban	5%	1.2	<= 2	<=0.1	<= 2	-0.12	1.3	<25	1.0		0.4
	10%	3.6	<= 2	<=0.1	<= 2	-0.15	2.8	25	1.1		0.7
	25%	12.6	3.1	0.13	2.9	-0.22	6.6	112	2.0		1.3
	50%	27.2	5.6	0.31	5.2	-0.41	21.9	322	3.7		2.8
	75%	40.5	9.7	0.59	9.5	-0.77	51.4	698	6.5		4.9
	90%	50.2	14.8	0.92	14.2	-1.19	87.1	1,166	9.2		7.0
95%	56.4	18.0	1.13	17.3	-1.47	102.2	1,654	10.6	8.5		

Table 35: Overview of the most important distributions for Korea



6 Vehicle speeds – average speeds and distributions

The key parameters (duration, distance driven, stop duration, average and maximum speeds) for all vehicles are shown in the following tables (Table 32 to Table 38). There are significant differences between the individual vehicles (drivers) within a country, but there are also significant differences between the countries, even within Europe. The measurement campaigns in Poland and Spain are dominated by urban traffic conditions, while the campaign in Italy has a high influence of rural and motorway traffic.

This is also reflected in the country related vehicle speed distributions, shown in Figure 1 and Figure 2.

The results for India, Japan and Korea are shown for comparison. It has to be considered, that this data is not customer data, but results from well-designed measurement campaigns dedicated to be representative for these countries. Interestingly enough, the results for Japan and Korea are close to those for Poland and Spain.

The stop percentages in the Indian results are significantly lower than for the rest.

More detailed information is provided in the corresponding database tables (TB_v_kl_countries, TB_v_kl_countries_IDveh).

source	campaign	IDveh	number of short trips	duration in h	stop duration in h	distance in km	vmax in km/h	average speed in km/h	stop percentage
Belgium	1	1	2,434	123.5	15.9	7,546.0	189.8	61.1	12.9%
Belgium	1	2	1,098	35.6	3.3	1,453.6	121.4	40.8	9.1%
Belgium	1	3	2,436	59.7	9.7	2,519.6	150.4	42.2	16.2%
Belgium	1	4	4,008	117.4	16.0	5,597.5	143.9	47.7	13.6%
Belgium	1	5	2,813	91.0	10.5	5,102.3	138.1	56.1	11.5%
Belgium	1	6	3,247	135.5	14.3	6,829.8	134.2	50.4	10.6%
Belgium	1	7	1,496	76.1	7.7	4,486.9	150.5	58.9	10.1%
Belgium	1	8	1,155	31.6	4.1	1,300.1	137.9	41.1	13.0%
Belgium	1	9	1,096	32.2	4.5	1,479.2	133.1	45.9	14.1%
Belgium	1	10	4,559	97.3	23.4	3,058.7	144.1	31.4	24.0%
Belgium	1	11	2,243	119.6	9.9	6,408.1	148.6	53.6	8.3%
Belgium	2	3	164	6.0	0.6	252.0	108.0	42.1	10.2%
Belgium	2	4	2,256	94.1	11.0	5,067.2	152.1	53.8	11.6%
Belgium	2	5	2,229	85.7	12.2	4,316.9	153.2	50.4	14.2%
Belgium	2	6	1,608	81.6	9.1	4,514.9	185.9	55.4	11.1%
Belgium	2	7	2,621	88.9	12.3	3,990.7	149.6	44.9	13.8%
Belgium	2	8	780	34.3	3.6	1,892.9	148.5	55.2	10.4%
Belgium	2	11	2,880	108.0	12.9	5,582.6	153.4	51.7	11.9%
Belgium	2	15	2,675	101.2	11.9	5,546.9	161.9	54.8	11.8%
Belgium	2	16	1,422	60.5	8.6	2,694.0	144.5	44.6	14.2%
Belgium	1		sum	919.7	119.3	45,781.8		49.8	13.0%
Belgium	2		sum	660.1	82.0	33,858.0		51.3	12.4%

Table 36: Key parameters of the vehicles monitored in Belgium



source	campaign	IDveh	number of short trips	duration in h	stop duration in h	distance in km	vmax in km/h	average speed in km/h	stop percentage
France	1	1	7,854	282.1	42.1	12,892.0	158.1	45.7	14.9%
France	1	2	3,532	90.1	18.3	3,671.8	165.6	40.7	20.3%
France	1	3	2,995	96.3	12.6	4,070.1	155.4	42.3	13.1%
France	1	4	5,589	157.9	26.6	6,331.6	163.8	40.1	16.8%
France	1	5	357	11.9	1.7	476.4	138.3	40.1	14.7%
France	1	6	1,387	37.2	5.6	1,338.1	140.1	36.0	15.1%
France	1	7	1,776	40.7	10.4	1,298.7	166.9	31.9	25.7%
France	1	8	10,517	456.0	54.6	23,307.5	169.8	51.1	12.0%
France	1	9	2,066	80.5	12.1	3,732.5	174.5	46.4	15.0%
France	1	10	3,632	145.6	19.1	7,465.8	161.2	51.3	13.1%
France	2	11	683	36.0	3.4	2,737.6	167.0	76.1	9.5%
France	2	12	741	38.3	7.8	1,737.9	155.3	45.4	20.3%
France	2	13	1,046	36.2	6.3	1,556.9	137.6	43.0	17.3%
France	2	14	1,992	78.6	9.7	4,034.5	170.1	51.3	12.3%
France	2	15	787	21.3	3.1	839.7	144.3	39.5	14.8%
France	2	16	868	40.6	3.2	2,418.9	148.4	59.5	8.0%
France	2	17	1,288	98.1	6.8	5,522.3	155.6	56.3	6.9%
France	2	18	930	35.6	3.4	2,497.6	141.3	70.2	9.5%
France	2	19	833	36.9	4.1	2,002.6	174.8	54.2	11.2%
France	2	20	660	28.1	2.9	1,532.7	185.9	54.6	10.2%
France	2	21	532	26.2	2.6	1,282.4	151.6	48.9	9.8%
France	2	22	1,308	64.0	9.6	3,401.7	171.0	53.2	15.0%
France	2	23	1,472	53.1	7.2	2,415.4	134.0	45.5	13.7%
France	2	24	869	18.4	3.8	393.2	86.2	21.3	20.8%
France	2	25	2,427	174.6	23.2	10,190.5	142.9	58.4	13.3%
France	2	26	469	14.4	2.6	629.6	149.4	43.7	18.2%
France	2	27	428	19.4	1.7	1,033.9	168.2	53.4	8.9%
France	2	28	1,054	18.5	5.1	351.0	104.9	19.0	27.6%
France	2	29	787	25.7	2.7	1,071.8	113.3	41.7	10.3%
France	2	30	830	31.9	3.5	1,780.8	192.7	55.8	10.8%
France	2	31	973	15.0	3.6	293.9	99.5	19.5	24.1%
France	2	32	992	37.1	7.7	1,476.9	127.2	39.8	20.7%
France	2	33	717	32.4	4.6	1,518.9	140.9	46.8	14.1%
France	2	34	1,470	41.3	5.5	1,474.8	131.8	35.7	13.2%
France	2	35	1,503	54.2	7.9	2,825.8	139.9	52.1	14.6%
France	2	36	554	19.1	4.0	823.5	160.4	43.1	20.7%
France	2	37	1,009	48.9	10.0	2,198.3	149.4	45.0	20.5%
France	2	38	668	38.5	2.8	1,896.8	118.1	49.2	7.2%
France	2	39	401	15.4	4.7	463.4	131.5	30.0	30.4%
France	2	40	1,097	41.7	10.5	1,994.8	144.1	47.8	25.1%
France	2	41	1,188	23.2	10.1	418.8	133.2	18.1	43.6%
France	2	42	750	29.0	7.0	1,325.9	158.5	45.8	24.3%
France	1		sum	1398.2	203.1	64,584.5		46.2	14.5%
France	2		sum	1291.8	191.0	64,142.5		49.7	14.8%



Table 37: Key parameters of the vehicles monitored in France

source	campaign	IDveh	number of short trips	duration in h	stop duration in h	distance in km	vmax in km/h	average speed in km/h	stop percentage
Germany	1	3	1,282	32.5	10.4	941.6	183.1	28.9	32.0%
Germany	1	5	1,592	41.4	8.2	1,178.6	150.6	28.5	19.8%
Germany	1	6	1,835	99.2	9.1	5,713.3	151.6	57.6	9.2%
Germany	1	7	1,611	72.1	8.0	3,992.0	156.3	55.4	11.0%
Germany	1	13	2,761	111.3	13.5	4,863.2	165.2	43.7	12.1%
Germany	1	14	2,272	52.6	8.8	1,787.0	170.1	34.0	16.8%
Germany	1	15	2,285	78.1	11.4	3,790.9	190.1	48.5	14.6%
Germany	1	16	770	30.9	5.0	1,457.3	146.7	47.2	16.2%
Germany			sum	518.1	74.4	23,723.8		45.8	14.4%
Sweden	1	1	1,747	76.1	11.7	3,206.5	134.3	42.1	15.4%
Sweden	1	2	1,629	94.5	8.7	4,609.8	155.8	48.8	9.3%
Sweden	1	3	2,086	167.0	13.1	8,671.5	132.7	51.9	7.8%
Sweden	1	4	1,018	47.8	5.6	2,358.1	137.2	49.3	11.8%
Sweden	1	5	728	28.4	3.6	1,045.3	130.1	36.8	12.8%
Sweden	1	6	1,531	54.6	8.5	1,989.8	127.2	36.5	15.6%
Sweden	1	8	6,602	238.6	43.3	7,882.0	142.3	33.0	18.2%
Sweden	1	9	12,798	385.2	83.5	10,621.1	133.1	27.6	21.7%
Sweden	1		sum	1092.2	178.1	40,384.1		37.0	16.3%
Italy	1	1	3,507	178.8	15.3	11,500.3	173.2	64.3	8.5%
Italy	1	2	992	63.8	11.2	2,758.4	146.1	43.3	17.6%
Italy	1	4	5,113	161.2	38.0	5,595.9	149.6	34.7	23.6%
Italy	1	8	2,076	124.6	10.9	7,853.8	160.1	63.0	8.8%
Italy	1	9	726	35.5	3.6	2,088.4	149.9	58.8	10.1%
Italy	1	10	2,319	162.0	13.3	11,538.0	162.4	71.2	8.2%
Italy	1	11	292	15.1	2.0	826.9	143.9	54.9	13.4%
Italy	1	12	4,607	241.2	24.1	15,313.2	167.3	63.5	10.0%
Italy			sum	982.3	118.5	57,474.9		58.5	12.1%
Slovenia	1	18	2,596	95.6	12.7	4,025.0	156.0	42.1	13.3%
Slovenia	1	20	1,278	96.1	8.3	5,432.7	142.0	56.5	8.6%
Slovenia	1	21	135	3.8	0.9	100.9	132.1	26.4	23.0%
Slovenia	1	22	283	8.7	2.7	298.2	144.1	34.4	31.4%
Slovenia	1	23	823	41.3	5.4	2,422.9	174.5	58.6	13.0%
Slovenia	1	24	3,387	116.1	19.5	5,001.2	188.2	43.1	16.8%
Slovenia	1	25	1,890	77.0	12.0	3,832.0	157.1	49.7	15.6%
Slovenia	1	26	976	22.8	9.0	437.3	100.8	19.2	39.3%
Slovenia	1	27	2,687	86.8	17.5	3,492.2	146.9	40.2	20.2%
Slovenia	1	28	2,343	85.3	14.4	3,790.5	170.3	44.5	16.9%
Slovenia	1	29	3,794	89.5	21.3	2,397.6	165.3	26.8	23.8%
Slovenia	1	30	820	26.6	5.3	1,101.1	149.0	41.5	19.9%
Slovenia	1	31	1,567	45.7	11.8	1,949.2	185.7	42.6	25.9%
Slovenia	1	32	3,495	119.8	21.3	5,038.9	194.7	42.1	17.8%
Slovenia	1	33	1,777	103.3	10.9	5,839.6	161.2	56.5	10.5%
Slovenia	1	34	606	28.6	3.4	1,285.7	163.5	44.9	11.7%
Slovenia	1	35	1,864	68.7	15.1	3,359.7	153.1	48.9	22.0%
Slovenia			sum	1115.8	191.5	49,804.8		44.6	17.2%



Table 38: Key parameters of the vehicles monitored in Germany, Sweden, Italy and Slovenia

source	campaign	IDveh	number of short trips	duration in h	stop duration in h	distance in km	vmax in km/h	average speed in km/h	stop percentage
UK, N1	1	1	88	14.9	1.8	1,087.8	131.0	72.9	12.2%
UK, N1	1	2	218	18.6	1.5	1,127.0	102.0	60.4	7.9%
UK, N1	1	3	245	20.2	2.4	1,265.6	133.2	62.5	11.8%
UK, N1	1	4	707	37.9	11.3	1,386.8	110.0	36.6	29.8%
UK, N1	1	5	210	18.3	2.7	1,230.8	134.9	67.3	14.8%
UK, N1	1	6	839	37.9	9.8	1,426.3	117.3	37.6	25.8%
UK, N1	1	7	545	26.4	3.5	1,520.6	116.4	57.5	13.1%
UK, N1	1	8	2,112	64.9	23.8	1,154.9	70.1	17.8	36.7%
UK, N1	1	9	1,979	43.0	11.5	797.8	74.6	18.5	26.8%
UK, N1	1	10	609	26.9	9.4	931.0	151.9	34.6	35.0%
UK, N1	1	11	1,306	53.7	19.0	1,800.4	149.5	33.5	35.5%
UK, N1	1	12	1,589	44.3	24.3	485.8	101.5	11.0	54.8%
UK, N1			sum	407.3	121.1	14,214.9		34.9	29.7%
UK, M1	1	1	496	17.6	2.2	748.2	146.3	42.6	12.8%
UK, M1	1	2	1,199	54.1	6.9	1,919.0	105.9	35.5	12.8%
UK, M1	1	3	452	17.7	2.5	669.6	142.8	37.9	13.9%
UK, M1	1	4	352	29.9	2.4	1,617.5	138.9	54.1	8.0%
UK, M1	1	5	606	27.3	3.4	1,082.6	122.2	39.6	12.6%
UK, M1	1	6	2,558	82.9	16.0	2,708.3	154.0	32.7	19.3%
UK, M1	1	7	579	54.9	4.8	2,683.5	139.0	48.9	8.7%
UK, M1	1	8	790	26.4	4.2	1,052.3	121.9	39.9	15.8%
UK, M1	1	9	350	10.4	1.4	354.4	116.0	34.1	13.8%
UK, M1	1	10	2,234	89.9	12.7	4,424.5	148.0	49.2	14.1%
UK, M1			sum	411.0	56.6	17,259.9		42.0	13.8%
Poland	1	1	1,276	41.2	8.6	1,422.1	142.4	34.5	20.9%
Poland	1	2	1,629	34.0	10.4	757.2	138.7	22.3	30.6%
Poland	1	3	1,192	33.8	6.9	959.2	98.0	28.4	20.3%
Poland	1	4	3,294	78.5	22.1	1,964.0	136.2	25.0	28.2%
Poland	1	5	1,691	59.5	12.6	1,884.3	111.8	31.7	21.1%
Poland	1	6	3,403	78.7	20.7	1,931.6	108.1	24.5	26.3%
Poland	1	7	2,631	67.2	16.2	1,871.1	134.1	27.9	24.1%
Poland	1	8	4,007	93.9	21.1	2,886.5	146.9	30.7	22.4%
Poland	1	9	1,786	43.4	15.4	987.2	139.4	22.8	35.5%
Poland			sum	530.1	133.9	14,663.2		27.7	25.3%
Spain	1	1	174	6.3	1.2	311.7	132.1	49.3	19.7%
Spain	1	2	248	8.0	2.2	265.2	107.8	33.1	27.3%
Spain	1	3	375	6.0	3.4	66.2	113.0	11.1	56.3%
Spain	1	5	304	8.5	2.1	265.4	131.6	31.2	25.1%
Spain	1	6	1,294	36.7	9.0	1,470.6	150.0	40.1	24.6%
Spain	1	7	245	5.9	2.7	110.4	106.1	18.8	45.7%
Spain	1	8	2,452	83.9	21.7	2,573.2	115.9	30.7	25.9%
Spain	1	9	3,765	106.8	40.1	2,517.7	141.4	23.6	37.6%
Spain	1	10	1,425	51.6	13.2	1,850.0	131.9	35.8	25.6%
Spain			sum	313.8	95.7	9,430.3		30.1	30.5%



Table 39: Key parameters of the vehicles monitored in UK, Poland and Spain

source	campaign	IDveh	IDdriver	number of short trips	duration in h	stop duration in h	distance in km	vmax in km/h	average speed in km/h	stop percentage
USA	1	1801	4	2,843	110.8	16.8	5886.5	151.0	53.1	15.2%
USA	1	1801	6	1,626	61.2	9.4	3157.8	164.1	51.6	15.3%
USA	1	1801	10	4,785	142.1	37.7	5615.4	157.3	39.5	26.5%
USA	1	1801	17	2,075	74.5	11.6	3531.3	138.7	47.4	15.6%
USA	1	1801	21	1,166	30.9	7.8	1114.6	150.1	36.1	25.3%
USA	1	1801	29	1,598	51.2	8.6	2089.2	133.3	40.8	16.8%
USA	1	1801	31	5,507	141.3	27.6	5487.8	149.9	38.8	19.5%
USA	1	1801	32	3,655	95.2	19.5	3633.3	145.8	38.2	20.5%
USA	1	1801	35	3,181	118.1	20.0	5721.1	150.7	48.5	16.9%
USA	1	1801	44	3,748	125.2	21.0	5180.9	142.5	41.4	16.8%
USA	1	1802	12	903	44.2	4.0	2746.1	137.4	62.2	9.1%
USA	1	1802	16	1,611	42.0	11.0	1608.1	177.8	38.3	26.3%
USA	1	1802	24	1,333	55.6	5.8	3274.4	144.0	58.9	10.5%
USA	1	1802	26	2,626	123.3	13.9	8757.6	162.2	71.0	11.2%
USA	1	1802	37	1,724	57.8	9.3	3102.7	170.2	53.6	16.1%
USA	1	1803	7	2,774	101.3	16.7	3975.5	138.4	39.2	16.5%
USA	1	1803	13	1,727	72.3	11.5	4068.0	146.6	56.3	15.9%
USA	1	1803	14	650	47.8	4.0	3407.2	161.3	71.4	8.4%
USA	1	1803	18	680	20.9	3.0	972.3	140.9	46.6	14.2%
USA	1	1803	22	573	47.8	2.8	3854.1	167.1	80.7	5.8%
USA	1	1803	23	1,344	57.9	9.9	3101.5	159.5	53.5	17.1%
USA	1	1803	25	1,394	66.7	7.4	4045.2	148.7	60.6	11.0%
USA	1	1803	28	1,859	60.8	10.7	2606.1	146.7	42.8	17.6%
USA	1	1803	30	1,592	63.0	9.1	3116.8	183.7	49.4	14.5%
USA	1	1803	33	494	15.2	2.1	734.8	137.4	48.3	13.9%
USA	1	1803	34	1,023	49.3	8.6	2523.7	143.3	51.2	17.4%
USA	1	1803	39	1,459	39.6	7.6	1391.0	133.6	35.1	19.1%
USA	1	1803	40	154	6.7	1.0	337.7	134.9	50.7	15.2%
USA	1	1803	41	754	19.7	3.2	812.0	133.8	41.2	16.2%
USA	1	1803	42	1,343	38.2	7.0	1453.9	141.6	38.0	18.2%
USA	1	1803	43	431	13.0	1.9	720.9	134.0	55.6	15.0%
USA	1	1804	1	1,092	34.4	5.6	1548.5	149.3	45.0	16.2%
USA	1	1804	2	829	18.7	4.5	541.4	131.9	29.0	24.0%
USA	1	1804	3	518	24.3	3.1	1524.1	179.3	62.7	12.9%
USA	1	1804	5	1,031	46.8	5.5	2797.0	158.8	59.8	11.6%
USA	1	1804	8	839	42.9	5.0	2509.8	159.0	58.5	11.7%
USA	1	1804	9	243	12.2	1.1	676.9	143.7	55.5	9.1%
USA	1	1804	11	420	17.4	3.0	822.7	135.0	47.3	17.0%
USA	1	1804	15	636	33.5	3.3	2239.2	163.8	66.8	9.7%
USA	1	1804	19	558	13.9	2.9	627.9	151.1	45.1	20.6%
USA	1	1804	20	1,488	77.3	8.9	5209.0	157.3	67.4	11.5%
USA	1	1804	27	549	14.5	4.0	447.8	143.6	30.8	27.8%
USA	1	1804	45	364	11.5	1.7	566.8	147.8	49.4	14.4%
USA	1	1805	36	1,348	58.7	9.7	2898.8	142.6	49.4	16.6%
				sum	2,400	388.7	120,438		50.2	16.2%

Table 40: Key parameters of the vehicles monitored in the US



source	campaign	IDveh	number of short trips	duration in h	stop duration in h	distance in km	vmax in km/h	average speed in km/h	stop percentage
Japan, M1	1	1	4,350	98.7	32.5	2,179.2	114.8	22.1	32.9%
Japan, M1	1	2	1,041	25.5	8.7	534.8	117.7	20.9	34.2%
Japan, M1	1	3	1,243	38.5	12.6	1,207.8	129.6	31.4	32.6%
Japan, M1	1	4	1,121	65.5	7.3	3,259.1	116.3	49.8	11.1%
Japan, M1	1	5	1,546	33.3	11.2	715.1	104.9	21.5	33.8%
Japan, M1	1	6	905	29.4	9.4	897.3	122.8	30.5	32.1%
Japan, M1	1	7	4,406	98.6	29.5	2,370.2	127.7	24.0	29.9%
Japan, M1	1	8	5,319	129.4	41.8	3,371.8	125.7	26.0	32.3%
Japan, M1	1	9	5,251	130.5	39.0	3,404.0	126.1	26.1	29.9%
Japan, M1	1	10	4,614	114.8	35.7	3,144.6	147.1	27.4	31.1%
Japan, M1	1	11	4,910	121.2	38.5	3,228.4	149.6	26.6	31.7%
Japan, M1	1		sum	885.6	266.2	24,312.2		27.5	30.1%
Japan, N1	1	12	1,033	34.8	9.7	1,207.7	106.1	34.7	27.8%
Japan, N1	1	13	1,271	32.9	9.7	755.6	116.9	23.0	29.7%
Japan, N1	1	14	1,064	37.0	11.1	1,219.0	134.0	32.9	30.0%
Japan, N1	1	15	1,153	36.3	11.2	1,213.5	119.4	33.4	30.9%
Japan, N1	1	16	876	26.7	7.4	692.0	86.4	25.9	27.9%
Japan, N1	1	17	1,381	74.3	9.2	3,598.8	114.6	48.5	12.4%
Japan, N1	1	18	4,361	102.3	32.4	2,347.5	101.9	22.9	31.7%
Japan, N1	1	19	1,105	29.6	9.0	721.1	91.3	24.4	30.4%
Japan, N1	1	20	3,821	96.5	29.0	2,345.7	116.6	24.3	30.0%
Japan, N1	1	21	4,636	121.4	36.7	3,316.3	125.3	27.3	30.2%
Japan, N1	1	22	4,296	102.9	33.0	2,400.4	120.7	23.3	32.1%
Japan, N1	1	23	4,120	101.6	31.8	2,418.2	114.2	23.8	31.3%
Japan, N1	1	24	4,136	109.7	32.0	3,180.7	130.6	29.0	29.1%
Japan, N1	1		sum	906.1	262.3	25,416.6		28.1	28.9%
Korea	1	1	4,193	135.0	38.5	3,967.7	113.6	29.4	28.5%
Korea	1	2	4,895	142.7	40.7	3,961.7	116.9	27.8	28.5%
Korea	1	3	4,108	132.3	38.1	4,079.7	165.3	30.8	28.8%
Korea	1	4	4,646	126.7	35.8	3,918.8	135.2	30.9	28.3%
Korea	1	5	4,074	140.6	36.9	3,946.7	108.3	28.1	26.3%
Korea	1	6	4,156	133.1	37.1	4,228.5	152.6	31.8	27.8%
Korea	1	7	3,947	129.9	34.3	3,938.3	110.7	30.3	26.4%
Korea	1	8	4,182	148.3	39.4	4,310.4	111.1	29.1	26.5%
Korea	1		sum	1088.5	300.8	32,351.9		29.7	27.6%

Table 41: Key parameters of the vehicles monitored in Japan and Korea



source	campaign	IDveh	number of short trips	duration in h	stop duration in h	distance in km	vmax in km/h	average speed in km/h	stop percentage
India	1	1	1,708	114.2	6.1	4,323.3	146.0	37.9	5.3%
India	1	2	765	75.3	2.3	2,531.2	63.3	33.6	3.1%
India	1	3	956	47.8	6.8	1,677.4	108.1	35.1	14.1%
India	1	4	1,154	52.4	7.8	1,783.0	102.4	34.0	14.8%
India	1	5	1,420	102.8	11.8	3,332.3	66.5	32.4	11.5%
India	1	6	304	26.6	2.8	693.0	86.8	26.0	10.6%
India	1	7	515	27.7	2.7	1,066.8	89.9	38.6	9.6%
India	1	8	477	22.4	3.3	819.6	102.7	36.7	14.7%
India	1	9	902	44.9	3.4	1,637.3	92.7	36.5	7.6%
India	1		sum	514.0	46.9	17,863.8		34.8	9.1%
India	2	10	279	65.6	2.2	2,302.0	100.0	35.1	3.4%
India	2	11	91	55.8	0.7	3,171.8	105.3	56.8	1.3%
India	2	12	52	12.4	0.5	517.2	91.5	41.6	3.9%
India	2	13	789	64.5	4.2	2,596.3	121.5	40.2	6.4%
India	2	14	3,146	252.7	31.8	11,131.8	115.2	44.0	12.6%
India	2	15	2,176	26.9	0.9	829.3	96.0	30.8	3.5%
India	2	16	1,154	80.1	9.6	3,010.0	91.0	37.6	12.0%
India	2	17	780	45.3	5.6	1,604.5	90.1	35.4	12.4%
India	2	18	3,619	191.2	28.0	7,015.0	106.0	36.7	14.6%
India	2	19	1,469	90.3	6.2	3,450.8	120.3	38.2	6.9%
India	2	20	1,804	86.4	8.2	3,290.0	112.6	38.1	9.5%
India	2		sum	971.4	98.1	38,918.7		40.1	10.1%
India	3	21	231	19.9	1.3	811.8	90.8	40.8	6.4%
India	3	22	163	23.9	1.6	933.5	77.9	39.0	6.8%
India	3	23	901	44.8	3.4	1,624.8	92.7	36.3	7.6%
India	3	24	548	25.8	2.8	525.2	51.4	20.4	10.7%
India	3	25	763	75.7	2.3	2,522.5	59.8	33.3	3.0%
India	3	26	556	27.4	3.3	519.0	44.0	18.9	12.0%
India	3	27	935	57.1	5.5	2,232.5	85.0	39.1	9.5%
India	3	28	81	11.7	0.1	433.3	58.0	37.1	0.8%
India	3	29	397	15.8	2.2	517.8	73.6	32.8	14.1%
India	3	30	1,421	114.0	11.1	3,720.9	66.5	32.6	9.7%
India	3	31	519	56.4	3.7	1,747.1	59.2	31.0	6.6%
India	3		sum	472.4	37.2	15,588.4		33.0	7.9%

Table 42: Key parameters of the vehicles monitored in India

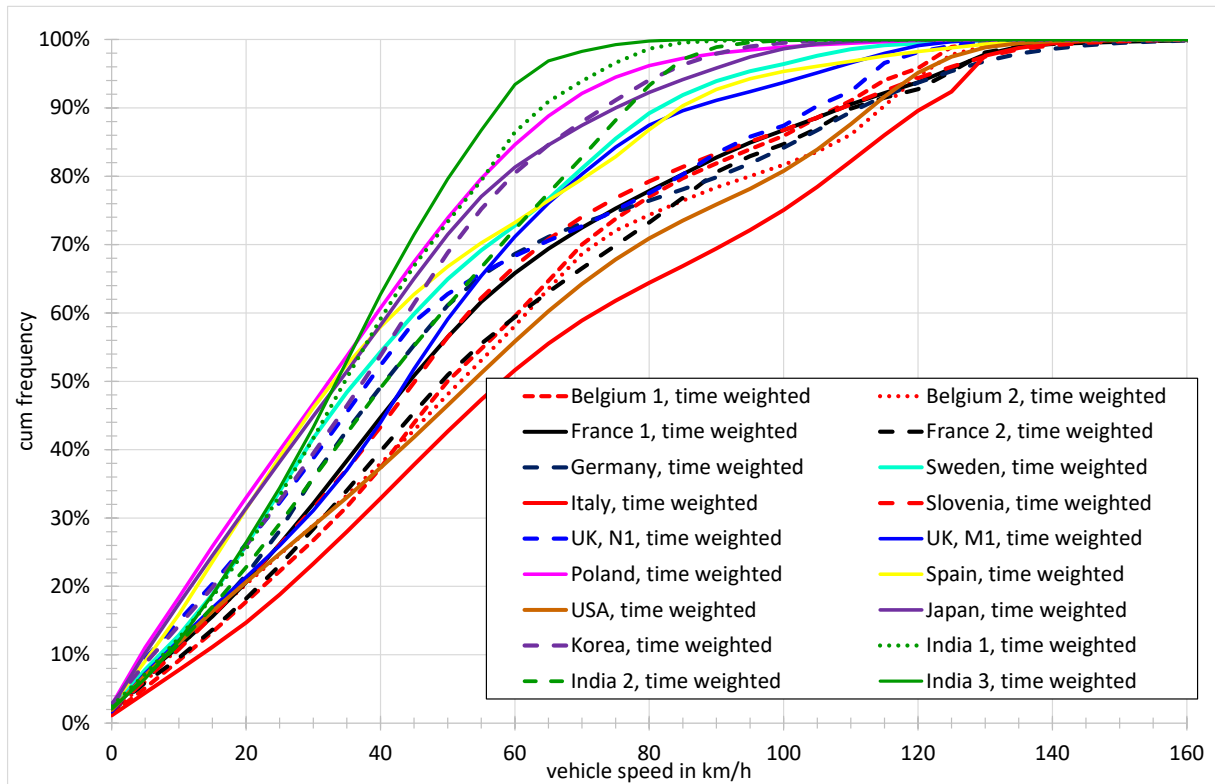


Figure 1: Time weighted vehicle speed distribution curves (without stop times) for the different countries

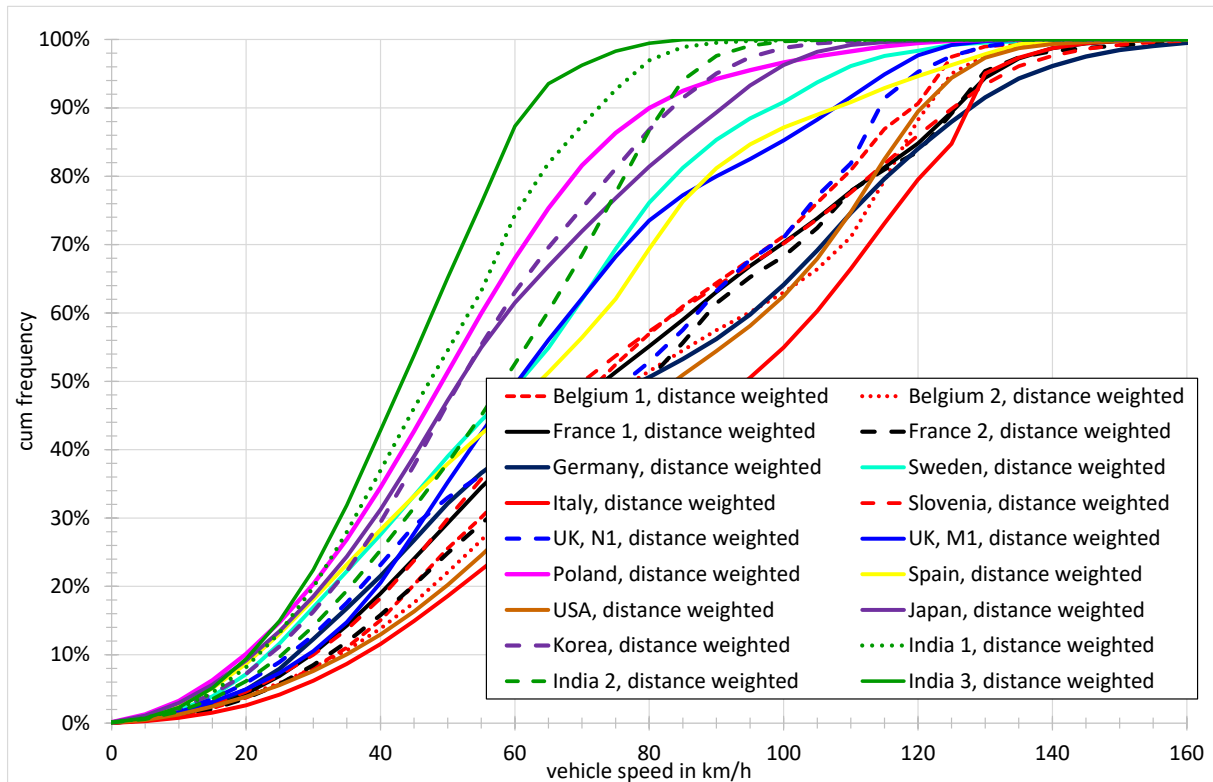


Figure 2: Distance weighted vehicle speed distribution curves (without stop times) for the different countries

7 Vehicle speeds in Europe, urban, rural, motorway

The customer datasets Belgium 1, France 1, France 2, Germany, Italy, Slovenia, UK M1, Poland and Spain came along with road category indicators for urban, rural and motorway. The key parameters of these datasets with respect to mileage, driving time and average speeds per vehicle are summarised in Table 39 to Table 47.

Road category specific vehicle speed distributions for individual vehicles are shown in Figure 3 to Figure 21. The data for Belgium are quite inhomogeneous and show high percentages of saturated and/or congested traffic, especially on motorways.



IDveh	distance in m				distance share			time in s				time share			v_ave with stops in			p_stop			v_ave without stops		
	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban
1	4,757,620	1,613,381	542,606	6,913,607	68.8%	23.3%	7.8%	163,514	144,475	94,569	402,558	40.6%	35.9%	23.5%	104.7	40.2	20.7	2.5%	11.0%	30.4%	107.4	45.2	29.7
2	189,530	863,800	382,644	1,435,974	13.2%	60.2%	26.6%	12,661	70,494	41,390	124,545	10.2%	56.6%	33.2%	53.9	44.1	33.3	4.4%	9.0%	7.8%	56.3	48.5	36.1
3	547,212	1,563,755	391,226	2,502,193	21.9%	62.5%	15.6%	18,469	143,917	45,787	208,173	8.9%	69.1%	22.0%	106.7	39.1	30.8	0.6%	15.7%	14.4%	107.3	46.4	35.9
4	1,750,938	2,621,320	850,423	5,222,681	33.5%	50.2%	16.3%	63,515	223,218	112,747	399,480	15.9%	55.9%	28.2%	99.2	42.3	27.2	2.5%	11.7%	19.0%	101.8	47.9	33.5
5	4,096,462	629,738	241,509	4,967,709	82.5%	12.7%	4.9%	194,801	76,370	45,378	316,549	61.5%	24.1%	14.3%	75.7	29.7	19.2	4.7%	20.5%	17.2%	79.5	37.3	23.2
6	541,336	5,766,032	463,562	6,770,929	8.0%	85.2%	6.8%	20,792	382,852	67,467	471,111	4.4%	81.3%	14.3%	93.7	54.2	24.7	1.3%	7.3%	20.1%	95.0	58.5	31.0
7	2,208,946	1,891,320	371,578	4,471,844	49.4%	42.3%	8.3%	74,034	153,676	41,415	269,125	27.5%	57.1%	15.4%	107.4	44.3	32.3	0.6%	10.4%	19.4%	108.1	49.5	40.1
8	321,050	662,709	311,104	1,294,862	24.8%	51.2%	24.0%	11,636	58,150	41,817	111,603	10.4%	52.1%	37.5%	99.3	41.0	26.8	2.3%	14.7%	10.4%	101.7	48.1	29.9
9	9,549	1,182,361	250,273	1,442,184	0.7%	82.0%	17.4%	308	80,882	27,182	108,372	0.3%	74.6%	25.1%	111.6	52.6	33.1	0.0%	10.5%	11.7%	111.6	58.8	37.5
10	688,995	1,520,116	815,879	3,024,991	22.8%	50.3%	27.0%	43,190	193,125	92,684	328,999	13.1%	58.7%	28.2%	57.4	28.3	31.7	9.6%	25.9%	12.6%	63.5	38.3	36.2
11	1,158,460	3,227,829	303,747	4,690,036	24.7%	68.8%	6.5%	50,528	224,440	49,545	324,513	15.6%	69.2%	15.3%	82.5	51.8	22.1	2.2%	6.1%	21.2%	84.4	55.2	28.0
sum	16,270,097	21,542,362	4,924,550	42,737,009	38.1%	50.4%	11.5%	653,448	1,751,599	659,981	3,065,028	21.3%	57.1%	21.5%	89.6	44.3	26.9	3.3%	12.1%	18.0%	92.7	50.4	32.8

Table 43: Key parameters for the dataset Belgium 1, separated in road categories (urban, rural, motorway)

IDveh	distance in m				distance share			time in s				time share			v_ave with stops in			p_stop			v_ave without stops		
	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban
1	4,195,633	4,875,571	3,817,131	12,888,335	32.6%	37.8%	29.6%	128,893	317,000	569,230	1,015,123	12.7%	31.2%	56.1%	117.2	55.4	24.1	0.5%	6.2%	23.0%	117.8	59.0	31.3
2	801,020	1,455,706	1,413,543	3,670,268	21.8%	39.7%	38.5%	24,546	88,503	211,368	324,417	7.6%	27.3%	65.2%	117.5	59.2	24.1	1.7%	10.3%	26.6%	119.6	66.0	32.8
3	558,205	1,990,599	1,520,175	4,068,979	13.7%	48.9%	37.4%	18,873	126,765	199,681	345,319	5.5%	36.7%	57.8%	106.5	56.5	27.4	0.7%	8.6%	16.6%	107.3	61.8	32.8
4	972,720	2,823,020	2,533,746	6,329,486	15.4%	44.6%	40.0%	29,403	176,967	360,817	567,187	5.2%	31.2%	63.6%	119.1	57.4	25.3	0.1%	7.3%	22.7%	119.2	61.9	32.7
5	149,607	167,963	158,267	475,836	31.4%	35.3%	33.3%	4,425	8,895	29,055	42,375	10.4%	21.0%	68.6%	121.7	68.0	19.6	0.0%	2.2%	20.2%	121.7	69.5	24.6
6	210,818	434,086	692,305	1,337,209	15.8%	32.5%	51.8%	6,900	25,679	100,874	133,453	5.2%	19.2%	75.6%	110.0	60.9	24.7	0.0%	4.9%	18.6%	110.0	64.0	30.3
7	289,693	272,151	735,721	1,297,565	22.3%	21.0%	56.7%	8,409	14,253	123,551	146,213	5.8%	9.7%	84.5%	124.0	68.7	21.4	1.2%	2.6%	30.0%	125.6	70.6	30.6
8	6,537,093	11,751,342	5,013,931	23,302,366	28.1%	50.4%	21.5%	203,584	683,385	752,632	1,639,601	12.4%	41.7%	45.9%	115.6	61.9	24.0	0.6%	3.7%	22.4%	116.2	64.3	30.9
9	1,105,071	1,684,570	941,448	3,731,088	29.6%	45.1%	25.2%	34,006	98,938	155,094	288,038	11.8%	34.3%	53.8%	117.0	61.3	21.9	2.0%	4.4%	24.1%	119.4	64.1	28.8
10	3,014,088	2,976,386	1,473,274	7,463,747	40.4%	39.9%	19.7%	93,963	179,919	248,320	522,202	18.0%	34.5%	47.6%	115.5	59.6	21.4	1.1%	2.8%	24.6%	116.8	61.3	28.3
sum	17,833,947	28,431,393	18,299,540	64,564,880	27.6%	44.0%	28.3%	553,002	1,720,304	2,750,622	5,023,928	11.0%	34.2%	54.8%	116.1	59.5	24.0	0.8%	5.2%	22.9%	117.0	62.7	31.1

Table 44: Key parameters for the dataset France 1, separated in road categories (urban, rural, motorway)



IDveh	distance in m				distance share			time in s				time share			v_ave with stops in			p_stop			v_ave without stops		
	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban
11	1,800,158	695,594	241,604	2,737,356	65.8%	25.4%	8.8%	50,864	39,381	38,856	129,101	39.4%	30.5%	30.1%	127.4	63.6	22.4	0.1%	5.1%	25.3%	127.5	67.0	30.0
12	630,602	673,509	433,341	1,737,452	36.3%	38.8%	24.9%	20,697	43,244	73,139	137,080	15.1%	31.5%	53.4%	109.7	56.1	21.3	0.4%	4.1%	34.7%	110.1	58.5	32.7
13	319,044	801,787	435,567	1,556,397	20.5%	51.5%	28.0%	9,565	43,415	76,077	129,057	7.4%	33.6%	58.9%	120.1	66.5	20.6	0.0%	4.0%	25.4%	120.1	69.3	27.6
14	1,120,788	1,859,681	1,053,198	4,033,668	27.8%	46.1%	26.1%	31,820	101,985	147,287	281,092	11.3%	36.3%	52.4%	126.8	65.6	25.7	0.9%	3.8%	19.5%	128.0	68.2	32.0
15	175,822	358,909	304,774	839,504	20.9%	42.8%	36.3%	5,681	19,248	51,612	76,541	7.4%	25.1%	67.4%	111.4	67.1	21.3	0.0%	4.0%	20.4%	111.4	69.9	26.7
16	701,668	1,336,999	379,755	2,418,422	29.0%	55.3%	15.7%	20,806	74,170	51,222	146,198	14.2%	50.7%	35.0%	121.4	64.9	26.7	0.4%	5.8%	14.1%	121.9	68.9	31.1
17	1,422,281	3,279,415	820,186	5,521,882	25.8%	59.4%	14.9%	48,287	197,446	107,034	352,767	13.7%	56.0%	30.3%	106.0	59.8	27.6	0.0%	2.1%	18.6%	106.1	61.0	33.9
18	802,736	1,385,900	308,583	2,497,219	32.1%	55.5%	12.4%	23,360	54,009	50,741	128,110	18.2%	42.2%	39.6%	123.7	92.4	21.9	0.3%	1.4%	22.4%	124.1	93.7	28.2
19	292,125	1,390,238	319,963	2,002,327	14.6%	69.4%	16.0%	9,024	82,266	41,472	132,762	6.8%	62.0%	31.2%	116.5	60.8	27.8	0.9%	7.2%	21.2%	117.6	65.5	35.2
20	509,542	667,322	355,557	1,532,420	33.3%	43.5%	23.2%	13,474	37,446	50,031	100,951	13.3%	37.1%	49.6%	136.1	64.2	25.6	0.0%	2.3%	18.7%	136.1	65.7	31.5
21	133,960	950,638	197,500	1,282,098	10.4%	74.1%	15.4%	5,513	62,965	25,630	94,108	5.9%	66.9%	27.2%	87.5	54.4	27.7	0.2%	5.8%	21.1%	87.6	57.7	35.2
22	1,117,712	1,583,893	699,536	3,401,141	32.9%	46.6%	20.6%	33,443	94,790	99,373	227,606	14.7%	41.6%	43.7%	120.3	60.2	25.3	1.5%	5.9%	26.0%	122.2	63.9	34.3
26	87,480	320,215	221,732	629,427	13.9%	50.9%	35.2%	2,565	15,320	32,733	50,618	5.1%	30.3%	64.7%	122.8	75.2	24.4	0.0%	2.6%	24.0%	122.8	77.2	32.1
27	243,652	567,591	222,499	1,033,743	23.6%	54.9%	21.5%	8,304	33,487	27,817	69,608	11.9%	48.1%	40.0%	105.6	61.0	28.8	4.0%	3.9%	16.2%	110.0	63.5	34.4
28		30,753	319,770	350,523	0.0%	8.8%	91.2%	0	1,937	63,941	65,878	0.0%	2.9%	97.1%		57.2	18.0		7.4%	27.5%		61.7	24.8
29	4,756	720,236	346,519	1,071,511	0.4%	67.2%	32.3%	159	43,945	48,063	92,167	0.2%	47.7%	52.1%	107.7	59.0	26.0	0.0%	1.7%	17.5%	107.7	60.0	31.5
30	550,142	967,422	262,935	1,780,499	30.9%	54.3%	14.8%	15,672	63,600	34,615	113,887	13.8%	55.8%	30.4%	126.4	54.8	27.3	0.6%	5.9%	21.9%	127.2	58.2	35.0
31		13,560	279,925	293,485	0.0%	4.6%	95.4%	0	881	52,697	53,578	0.0%	1.6%	98.4%		55.4	19.1		0.5%	23.7%		55.7	25.1
32		1,118,318	358,334	1,476,652	0.0%	75.7%	24.3%	0	67,993	62,439	130,432	0.0%	52.1%	47.9%		59.2	20.7		4.1%	34.7%		61.8	31.7
33	45,595	1,161,152	311,853	1,518,599	3.0%	76.5%	20.5%	1,343	71,189	42,805	115,337	1.2%	61.7%	37.1%	122.2	58.7	26.2	0.0%	8.4%	21.2%	122.2	64.1	33.3
34	228,379	316,380	929,518	1,474,277	15.5%	21.5%	63.0%	7,001	16,410	124,727	148,138	4.7%	11.1%	84.2%	117.4	69.4	26.8	0.7%	3.3%	15.0%	118.3	71.8	31.5
35	219,843	1,971,574	633,827	2,825,243	7.8%	69.8%	22.4%	6,305	92,562	94,957	193,824	3.3%	47.8%	49.0%	125.5	76.7	24.0	1.8%	3.6%	24.8%	127.9	79.5	32.0
36	230,658	312,784	279,810	823,253	28.0%	38.0%	34.0%	9,101	20,933	37,505	67,539	13.5%	31.0%	55.5%	91.2	53.8	26.9	5.8%	16.6%	24.0%	96.8	64.5	35.3
37	572,360	962,778	662,370	2,197,508	26.0%	43.8%	30.1%	18,095	53,092	103,151	174,338	10.4%	30.5%	59.2%	113.9	65.3	23.1	0.1%	5.1%	30.8%	114.0	68.8	33.4
38		1,600,193	296,299	1,896,492	0.0%	84.4%	15.6%	0	94,643	43,479	138,122	0.0%	68.5%	31.5%		60.9	24.5		2.4%	16.4%		62.4	29.4
39	43,183	123,779	296,260	463,222	9.3%	26.7%	64.0%	1,449	7,843	45,906	55,198	2.6%	14.2%	83.2%	107.3	56.8	23.2	2.0%	6.1%	34.9%	109.5	60.5	35.7
40	219,003	1,379,533	395,662	1,994,198	11.0%	69.2%	19.8%	6,138	58,240	84,441	148,819	4.1%	39.1%	56.7%	128.4	85.3	16.9	0.0%	3.0%	41.1%	128.4	87.9	28.6
41		93,073	325,179	418,252	0.0%	22.3%	77.7%	0	4,621	78,092	82,713	0.0%	5.6%	94.4%		72.5	15.0		9.0%	45.1%		79.7	27.3
42	237,792	812,348	275,268	1,325,409	17.9%	61.3%	20.8%	9,101	42,752	51,580	103,433	8.8%	41.3%	49.9%	94.1	68.4	19.2	0.8%	7.9%	40.9%	94.8	74.3	32.5
sum	11,709,282	27,455,576	11,967,324	51,132,181	22.9%	53.7%	23.4%	357,767	1,539,813	1,841,422	3,739,002	9.6%	41.2%	49.2%	117.8	64.2	23.4	0.7%	4.5%	25.4%	118.6	67.2	31.4

Table 45: Key parameters for the dataset France 2, separated in road categories (urban, rural, motorway)



IDveh	distance in m				distance share			time in s				time share			v_ave with stops in			p_stop			v_ave without stops		
	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban
3	172,573	284,908	483,564	941,045	18.3%	30.3%	51.4%	5,917	13,916	85,593	105,426	5.6%	13.2%	81.2%	105.0	73.7	20.3	2.4%	8.1%	28.5%	107.6	80.2	28.5
5		297,158	880,931	1,178,089	0.0%	25.2%	74.8%	0	18,018	126,115	144,133	0.0%	12.5%	87.5%	59.4	25.1		7.5%	18.4%		64.2	30.8	
6	699,809	4,126,507	886,431	5,712,747	12.2%	72.2%	15.5%	25,647	191,900	135,971	353,518	7.3%	54.3%	38.5%	98.2	77.4	23.5	2.0%	2.5%	17.7%	100.2	79.4	28.5
7	1,228,390	1,917,121	846,144	3,991,654	30.8%	48.0%	21.2%	43,384	90,548	119,750	253,682	17.1%	35.7%	47.2%	101.9	76.2	25.4	1.9%	1.9%	16.8%	103.9	77.7	30.6
13	1,781,857	758,343	2,322,334	4,862,534	36.6%	15.6%	47.8%	55,213	39,723	299,706	394,642	14.0%	10.1%	75.9%	116.2	68.7	27.9	0.4%	3.1%	13.7%	116.6	70.9	32.3
14	18,568	738,331	1,029,452	1,786,350	1.0%	41.3%	57.6%	713	35,195	149,103	185,011	0.4%	19.0%	80.6%	93.8	75.5	24.9	8.1%	5.9%	17.1%	102.1	80.2	30.0
15	301,120	2,363,434	1,125,655	3,790,209	7.9%	62.4%	29.7%	10,164	108,410	159,431	278,005	3.7%	39.0%	57.3%	106.7	78.5	25.4	4.1%	4.1%	20.7%	111.2	81.9	32.0
16	395,063	572,952	489,070	1,457,085	27.1%	39.3%	33.6%	12,717	27,850	67,135	107,702	11.8%	25.9%	62.3%	111.8	74.1	26.2	0.4%	3.3%	20.1%	112.3	76.6	32.8
sum	4,597,379	11,058,753	8,063,581	23,719,714	19.4%	46.6%	34.0%	153,755	525,560	1,142,804	1,822,119	8.4%	28.8%	62.7%	107.6	75.8	25.4	1.4%	3.4%	17.9%	109.2	78.4	31.0

Table 46: Key parameters for the dataset Germany, separated in road categories (urban, rural, motorway)

IDveh	distance in m				distance share			time in s				time share			v_ave with stops in			p_stop			v_ave without stops		
	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban
1	5,903,638	3,938,883	1,656,625	11,499,146	51.3%	34.3%	14.4%	198,099	217,279	215,087	630,465	31.4%	34.5%	34.1%	107.3	65.3	27.7	0.4%	3.9%	15.2%	107.7	67.9	32.7
2	23,090	1,967,004	767,924	2,758,019	0.8%	71.3%	27.8%	860	121,470	86,976	209,306	0.4%	58.0%	41.6%	96.7	58.3	31.8	2.4%	3.1%	18.8%	99.1	60.1	39.2
4	863,354	2,200,651	2,530,502	5,594,506	15.4%	39.3%	45.2%	30,626	119,947	384,080	534,653	5.7%	22.4%	71.8%	101.5	66.0	23.7	0.5%	2.1%	23.0%	102.0	67.5	30.8
8	3,041,660	3,794,611	1,016,932	7,853,203	38.7%	48.3%	12.9%	99,261	206,882	130,844	436,987	22.7%	47.3%	29.9%	110.3	66.0	28.0	0.3%	3.2%	16.0%	110.6	68.2	33.3
9	777,948	949,604	360,665	2,088,217	37.3%	45.5%	17.3%	25,680	53,082	46,307	125,069	20.5%	42.4%	37.0%	109.1	64.4	28.0	0.1%	3.5%	17.5%	109.2	66.7	34.0
10	6,914,988	3,040,666	1,581,574	11,537,229	59.9%	26.4%	13.7%	217,329	151,461	202,019	570,809	38.1%	26.5%	35.4%	114.5	72.3	28.2	0.2%	2.4%	15.4%	114.8	74.1	33.3
11	318,712	309,623	198,471	826,806	38.5%	37.4%	24.0%	10,660	15,465	25,914	52,039	20.5%	29.7%	49.8%	107.6	72.1	27.6	0.1%	2.7%	17.9%	107.7	74.1	33.6
12	5,437,758	7,723,832	2,149,921	15,311,510	35.5%	50.4%	14.0%	183,592	376,396	288,283	848,271	21.6%	44.4%	34.0%	106.6	73.9	26.8	1.1%	4.1%	17.1%	107.8	77.0	32.4
sum	23,281,148	23,924,874	10,262,614	57,468,636	40.5%	41.6%	17.9%	766,107	1,261,982	1,379,510	3,407,599	22.5%	37.0%	40.5%	109.4	68.2	26.8	0.5%	3.4%	18.3%	109.9	70.6	32.8

Table 47: Key parameters for the dataset Italy, separated in road categories (urban, rural, motorway)



IDveh	distance in m				distance share			time in s				time share			v_ave with stops in			p_stop			v_ave without stops		
	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban
18	333,372	2,217,403	1,473,164	4,023,938	8.3%	55.1%	36.6%	11,336	124,599	201,936	337,871	3.4%	36.9%	59.8%	105.9	64.1	26.3	1.4%	3.5%	17.4%	107.3	66.4	31.8
20	699,537	3,955,058	777,775	5,432,370	12.9%	72.8%	14.3%	23,161	216,430	95,586	335,177	6.9%	64.6%	28.5%	108.7	65.8	29.3	0.6%	1.7%	15.6%	109.3	66.9	34.7
21		21,163	79,688	100,851	0.0%	21.0%	79.0%	0	1,137	12,157	13,294	0.0%	8.6%	91.4%		67.0	23.6		3.0%	21.9%		69.1	30.2
22	60,761	132,154	105,204	298,118	20.4%	44.3%	35.3%	2,389	6,078	19,295	27,762	8.6%	21.9%	69.5%	91.6	78.3	19.6	4.1%	3.7%	31.1%	95.4	81.3	28.5
23	990,056	1,009,971	422,617	2,422,644	40.9%	41.7%	17.4%	34,221	55,621	56,095	145,937	23.4%	38.1%	38.4%	104.2	65.4	27.1	1.4%	6.1%	22.7%	105.6	69.6	35.1
24	737,788	2,532,791	1,729,369	4,999,948	14.8%	50.7%	34.6%	23,407	131,376	253,628	408,411	5.7%	32.2%	62.1%	113.5	69.4	24.5	2.2%	4.8%	21.3%	116.1	72.9	31.2
25	603,546	2,322,096	905,752	3,831,394	15.8%	60.6%	23.6%	21,180	115,062	130,332	266,574	7.9%	43.2%	48.9%	102.6	72.7	25.0	1.8%	3.8%	21.2%	104.5	75.5	31.8
26		39,912	397,082	436,993	0.0%	9.1%	90.9%	0	2,872	71,841	74,713	0.0%	3.8%	96.2%		50.0	19.9		15.0%	34.1%		58.9	30.2
27	345,696	1,874,396	1,271,135	3,491,227	9.9%	53.7%	36.4%	12,777	91,818	195,647	300,242	4.3%	30.6%	65.2%	97.4	73.5	23.4	4.0%	5.1%	23.2%	101.4	77.5	30.5
28	668,718	2,131,727	989,412	3,789,857	17.6%	56.2%	26.1%	23,589	123,387	147,325	294,301	8.0%	41.9%	50.1%	102.1	62.2	24.2	1.5%	3.6%	23.5%	103.6	64.5	31.6
29	201,543	530,345	1,664,213	2,396,100	8.4%	22.1%	69.5%	6,917	32,286	263,227	302,430	2.3%	10.7%	87.0%	104.9	59.1	22.8	1.7%	5.1%	21.0%	106.7	62.3	28.8
30	320,080	329,443	451,397	1,100,920	29.1%	29.9%	41.0%	10,534	17,885	59,944	88,363	11.9%	20.2%	67.8%	109.4	66.3	27.1	0.6%	3.8%	18.3%	110.0	68.9	33.2
31	508,159	905,468	534,720	1,948,346	26.1%	46.5%	27.4%	16,449	40,905	95,395	152,749	10.8%	26.8%	62.5%	111.2	79.7	20.2	0.7%	6.2%	29.4%	112.0	85.0	28.6
32	733,591	2,677,253	1,627,024	5,037,868	14.6%	53.1%	32.3%	23,717	147,303	244,715	415,735	5.7%	35.4%	58.9%	111.4	65.4	23.9	1.9%	4.5%	22.1%	113.5	68.5	30.7
33	2,156,082	2,358,870	1,324,107	5,839,058	36.9%	40.4%	22.7%	70,784	109,469	180,968	361,221	19.6%	30.3%	50.1%	109.7	77.6	26.3	1.2%	1.6%	14.3%	111.0	78.8	30.7
34	308,731	521,380	455,400	1,285,512	24.0%	40.6%	35.4%	11,206	30,150	59,863	101,219	11.1%	29.8%	59.1%	99.2	62.3	27.4	0.6%	4.4%	14.9%	99.8	65.1	32.2
35	1,461,960	987,398	909,782	3,359,140	43.5%	29.4%	27.1%	49,353	47,570	132,404	229,327	21.5%	20.7%	57.7%	106.6	74.7	24.7	1.3%	3.5%	25.9%	108.0	77.4	33.4
sum	10,129,620	24,546,828	15,117,839	49,794,287	20.3%	49.3%	30.4%	341,020	1,293,948	2,220,358	3,855,326	8.8%	33.6%	57.6%	106.9	68.3	24.5	1.4%	3.7%	21.4%	108.5	70.9	31.2

Table 48: Key parameters for the dataset Slovenia, separated in road categories (urban, rural, motorway)



IDveh	distance in m				distance share			time in s				time share			v_ave with stops in			p_stop			v_ave without stops		
	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban
1	22,810	467,141	300,482	790,433	2.9%	59.1%	38.0%	848	27,991	36,669	65,508	1.3%	42.7%	56.0%	96.8	60.1	29.5	2.6%	4.2%	16.2%	99.4	62.7	35.2
2		268,348	1,696,024	1,964,372	0.0%	13.7%	86.3%	0	16,014	175,567	191,581	0.0%	8.4%	91.6%		60.3	34.8		1.9%	10.2%		61.5	38.7
3	53,472	235,446	385,387	674,306	7.9%	34.9%	57.2%	1,849	12,137	49,225	63,211	2.9%	19.2%	77.9%	104.1	69.8	28.2	1.2%	3.2%	14.1%	105.4	72.2	32.8
4	151,924	1,077,024	407,668	1,636,616	9.3%	65.8%	24.9%	4,960	60,094	40,870	105,924	4.7%	56.7%	38.6%	110.3	64.5	35.9	0.3%	1.6%	10.4%	110.6	65.6	40.1
5	168,697	310,101	625,403	1,104,200	15.3%	28.1%	56.6%	6,204	18,875	70,622	95,701	6.5%	19.7%	73.8%	97.9	59.1	31.9	0.7%	1.8%	10.7%	98.5	60.2	35.7
6	22,796	1,327,148	1,357,506	2,707,450	0.8%	49.0%	50.1%	823	80,256	203,733	284,812	0.3%	28.2%	71.5%	99.7	59.5	24.0	1.9%	3.7%	20.1%	101.7	61.8	30.0
7	17,237	1,775,811	890,205	2,683,252	0.6%	66.2%	33.2%	693	103,570	83,693	187,956	0.4%	55.1%	44.5%	89.5	61.7	38.3	0.6%	1.9%	6.9%	90.1	62.9	41.1
8	37,361	686,611	342,365	1,066,337	3.5%	64.4%	32.1%	1,458	40,016	48,633	90,107	1.6%	44.4%	54.0%	92.2	61.8	25.3	1.2%	3.8%	15.9%	93.4	64.2	30.1
9		129,324	284,923	414,246	0.0%	31.2%	68.8%	0	8,303	33,272	41,575	0.0%	20.0%	80.0%		56.1	30.8		2.0%	12.1%		57.2	35.1
10	63,183	3,372,240	1,003,791	4,439,214	1.4%	76.0%	22.6%	2,426	150,120	161,355	313,901	0.8%	47.8%	51.4%	93.8	80.9	22.4	2.3%	1.5%	20.0%	96.0	82.1	28.0
	537,479	9,649,194	7,293,753	17,480,427	3.1%	55.2%	41.7%	19,261	517,376	903,639	1,440,276	1.3%	35.9%	62.7%	100.5	67.1	29.1	1.0%	2.3%	14.7%	101.5	68.7	34.1

Table 49: Key parameters for the dataset UK, M1, separated in road categories (urban, rural, motorway)

IDveh	distance in m				distance share			time in s				time share			v_ave with stops in			p_stop			v_ave without stops		
	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban
1		851,665	611,450	1,463,115	0.0%	58.2%	41.8%	0	50,257	94,700	144,957	0.0%	34.7%	65.3%		61.0	23.2		4.3%	24.4%		63.7	30.8
2		135,708	620,844	756,552	0.0%	17.9%	82.1%	0	10,588	108,841	119,429	0.0%	8.9%	91.1%		46.1	20.5		14.2%	30.4%		53.8	29.5
3		314,134	663,685	977,819	0.0%	32.1%	67.9%	0	18,305	101,450	119,755	0.0%	15.3%	84.7%		61.8	23.6		3.2%	19.6%		63.8	29.3
4		549,762	1,412,919	1,962,681	0.0%	28.0%	72.0%	0	38,477	230,408	268,885	0.0%	14.3%	85.7%		51.4	22.1		12.5%	26.5%		58.8	30.0
5		731,782	1,151,899	1,883,682	0.0%	38.8%	61.2%	0	44,415	160,603	205,018	0.0%	21.7%	78.3%		59.3	25.8		4.8%	21.2%		62.3	32.8
6		394,415	1,536,291	1,930,706	0.0%	20.4%	79.6%	0	33,076	237,617	270,693	0.0%	12.2%	87.8%		42.9	23.3		16.8%	23.7%		51.6	30.5
7	47,966	767,286	1,056,841	1,872,093	2.6%	41.0%	56.5%	1,591	47,668	182,643	231,902	0.7%	20.6%	78.8%	108.5	57.9	20.8	0.6%	8.0%	24.3%	109.2	63.0	27.5
8	293,597	886,316	1,711,379	2,891,292	10.2%	30.7%	59.2%	10,155	54,847	257,851	322,853	3.1%	17.0%	79.9%	104.1	58.2	23.9	0.7%	7.6%	21.5%	104.9	63.0	30.4
9	20,117	200,847	765,676	986,639	2.0%	20.4%	77.6%	737	13,333	124,741	138,811	0.5%	9.6%	89.9%	98.3	54.2	22.1	2.3%	8.7%	29.6%	100.6	59.4	31.4
sum	361,680	4,831,913	9,530,985	14,724,578	2.5%	32.8%	64.7%	12,483	310,966	1,498,854	1,822,303	0.7%	17.1%	82.3%	104.3	55.9	22.9	0.8%	8.3%	24.3%	105.2	61.0	30.2

Table 50: Key parameters for the dataset Poland, separated in road categories (urban, rural, motorway)



IDveh	distance in m				distance share			time in s				time share			v_ave with stops in			p_stop			v_ave without stops		
	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	sum	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban	motorway	rural	urban
1	96,651	151,026	63,955	311,632	31.0%	48.5%	20.5%	3,704	6,647	11,738	22,089	16.8%	30.1%	53.1%	93.9	81.8	19.6	1.3%	3.2%	30.1%	95.2	84.5	28.1
2		171,327	93,789	265,117	0.0%	64.6%	35.4%	0	11,455	16,272	27,727	0.0%	41.3%	58.7%		53.8	20.7		12.5%	32.7%		61.5	30.8
3		19,552	46,454	66,006	0.0%	29.6%	70.4%	0	1,279	14,751	16,030	0.0%	8.0%	92.0%		55.0	11.3		10.8%	43.9%		61.7	20.2
5		143,930	121,326	265,256	0.0%	54.3%	45.7%	0	7,482	22,621	30,103	0.0%	24.9%	75.1%		69.3	19.3		4.0%	30.2%		72.2	27.7
6	758,623	238,402	473,249	1,470,274	51.6%	16.2%	32.2%	23,293	14,034	85,907	123,234	18.9%	11.4%	69.7%	117.2	61.2	19.8	1.4%	4.9%	26.4%	118.9	64.3	27.0
7		34,733	75,587	110,320	0.0%	31.5%	68.5%	0	1,886	16,466	18,352	0.0%	10.3%	89.7%		66.3	16.5		6.3%	41.1%		70.7	28.0
8		1,568,660	1,003,564	2,572,224	0.0%	61.0%	39.0%	0	94,030	196,621	290,651	0.0%	32.4%	67.6%		60.1	18.4		3.7%	32.1%		62.4	27.1
9	139,651	1,131,781	1,245,067	2,516,499	5.5%	45.0%	49.5%	4,990	63,578	293,778	362,346	1.4%	17.5%	81.1%	100.7	64.1	15.3	4.1%	4.2%	40.7%	105.0	66.9	25.7
10		1,324,390	525,165	1,849,555	0.0%	71.6%	28.4%	0	69,256	111,280	180,536	0.0%	38.4%	61.6%		68.8	17.0		2.8%	36.3%		70.8	26.7
sum	994,925	4,783,801	3,648,157	9,426,883	10.6%	50.7%	38.7%	31,987	269,647	769,434	1,071,068	3.0%	25.2%	71.8%	112.0	63.9	17.1	1.8%	4.1%	35.7%	114.0	66.6	26.5

Table 51: Key parameters for the dataset Spain, separated in road categories (urban, rural, motorway)

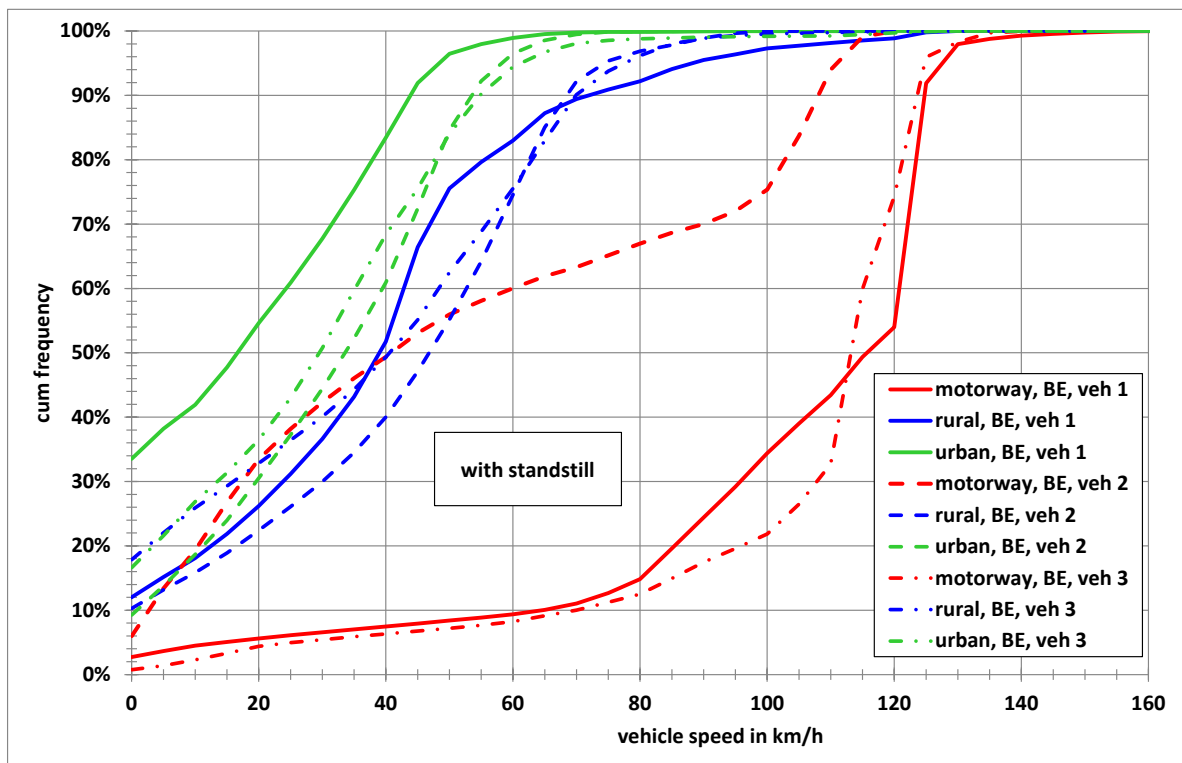


Figure 3: Vehicle speed distributions, single vehicles urban, rural, motorway, Belgium 1

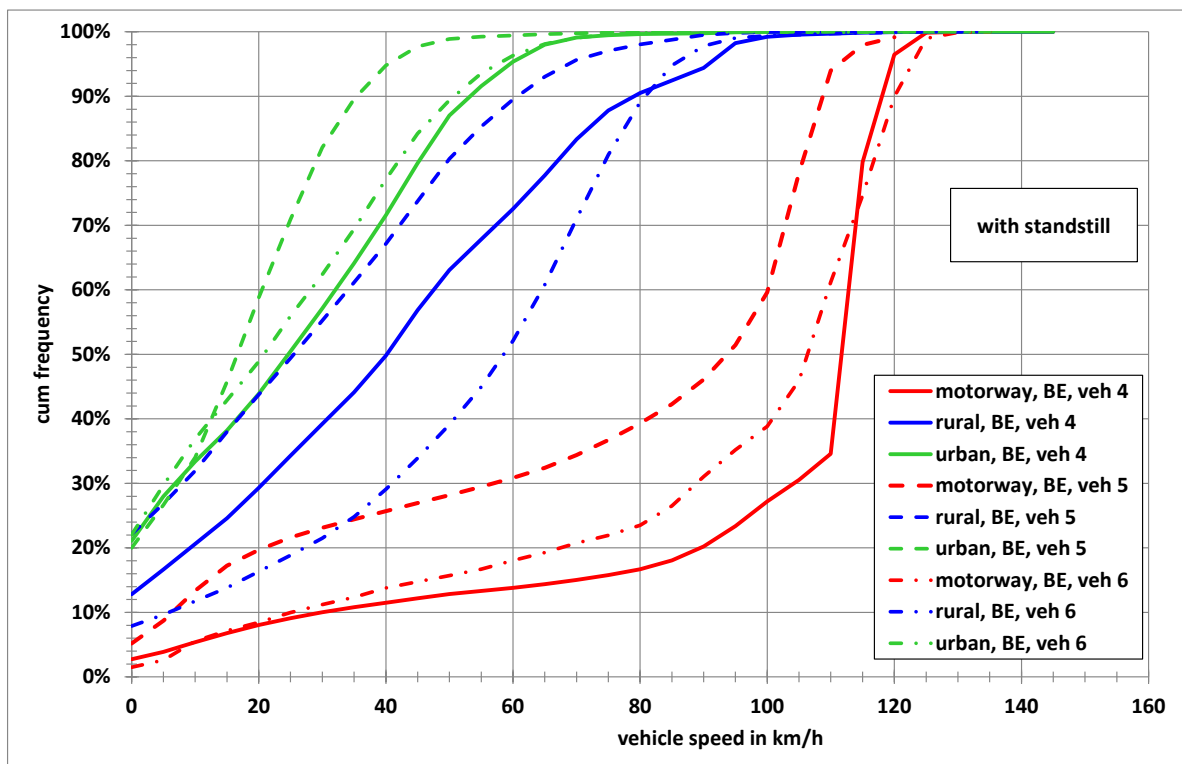


Figure 4: Vehicle speed distributions, single vehicles urban, rural, motorway, Belgium 1

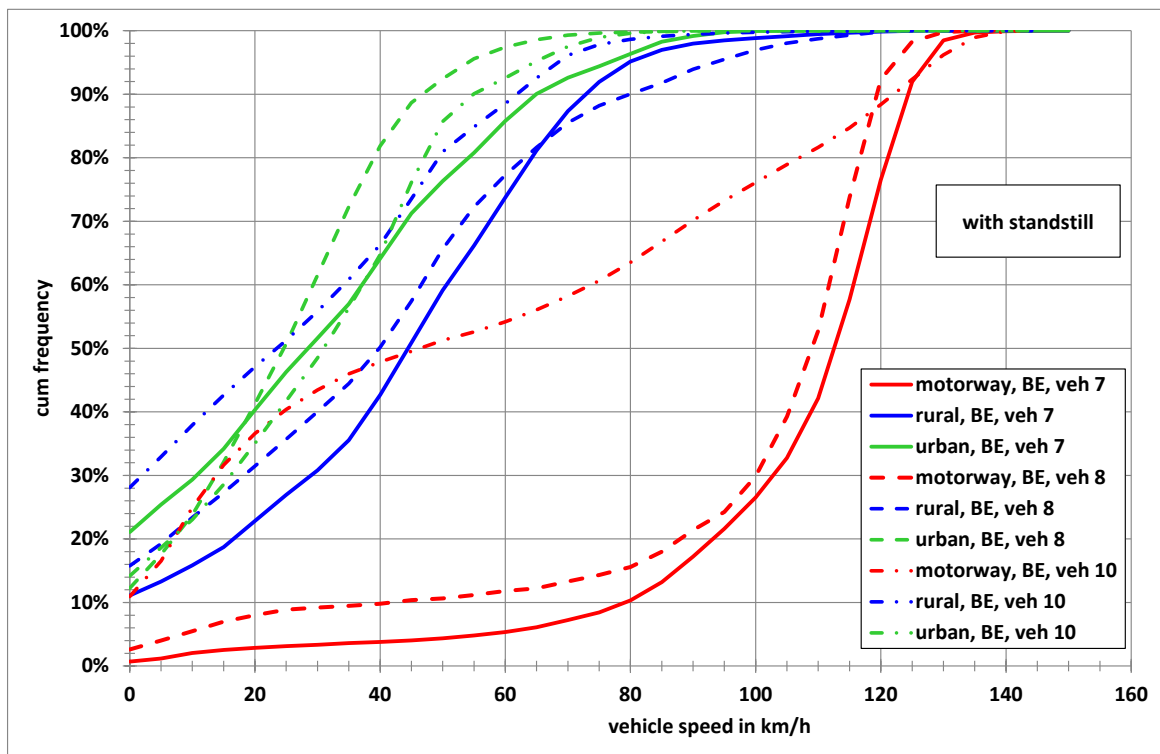


Figure 5: Vehicle speed distributions, single vehicles urban, rural, motorway, Belgium 1

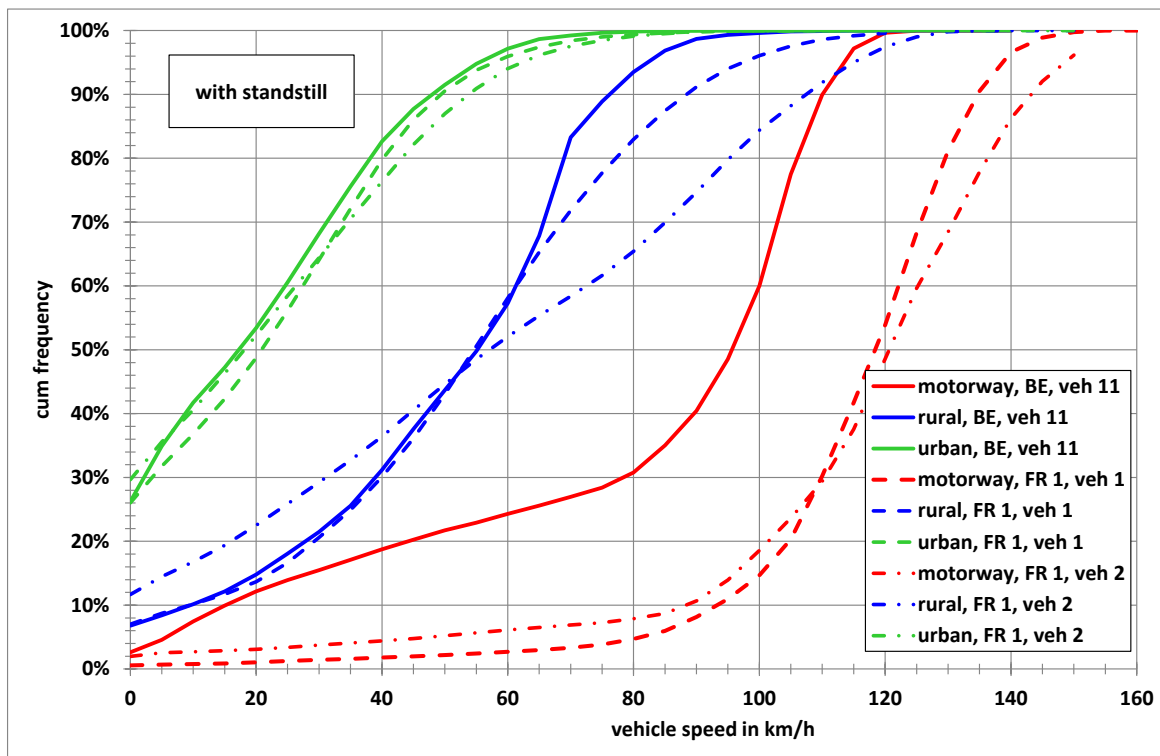


Figure 6: Vehicle speed distributions, single vehicles urban, rural, motorway, BE 1, FR 1

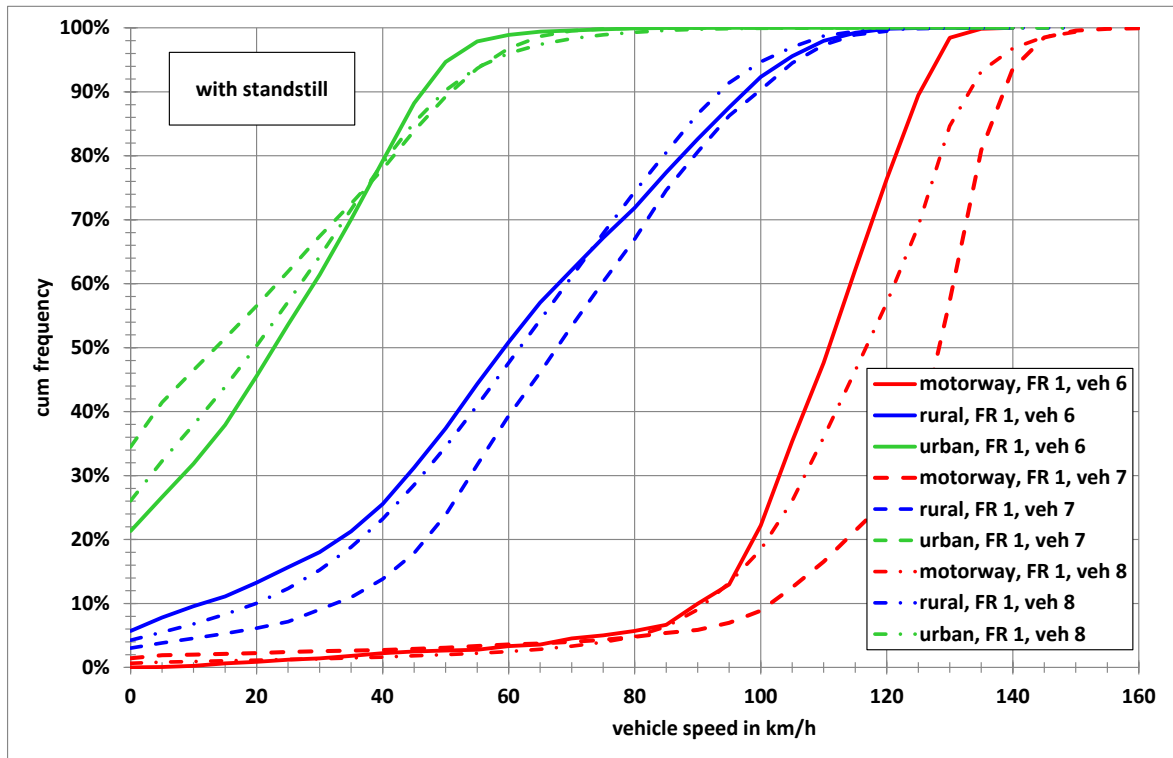


Figure 7: Vehicle speed distributions, single vehicles urban, rural, motorway, France 1

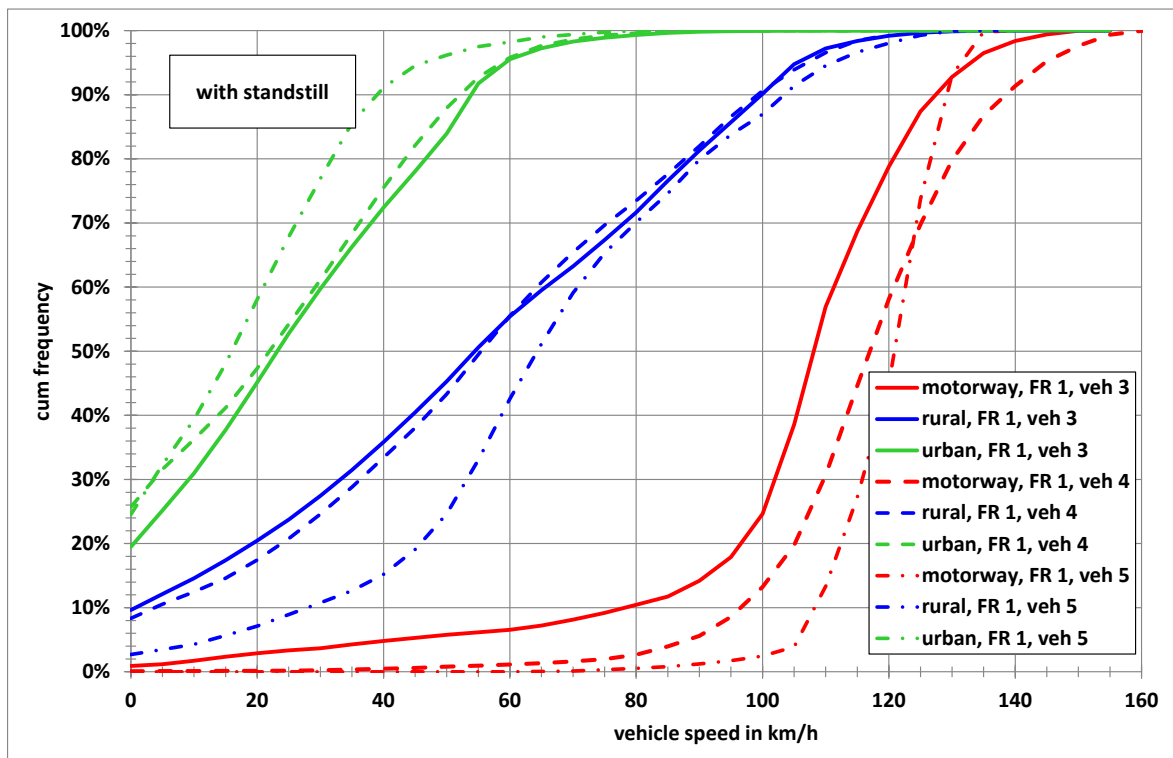


Figure 8: Vehicle speed distributions, single vehicles urban, rural, motorway, France 1

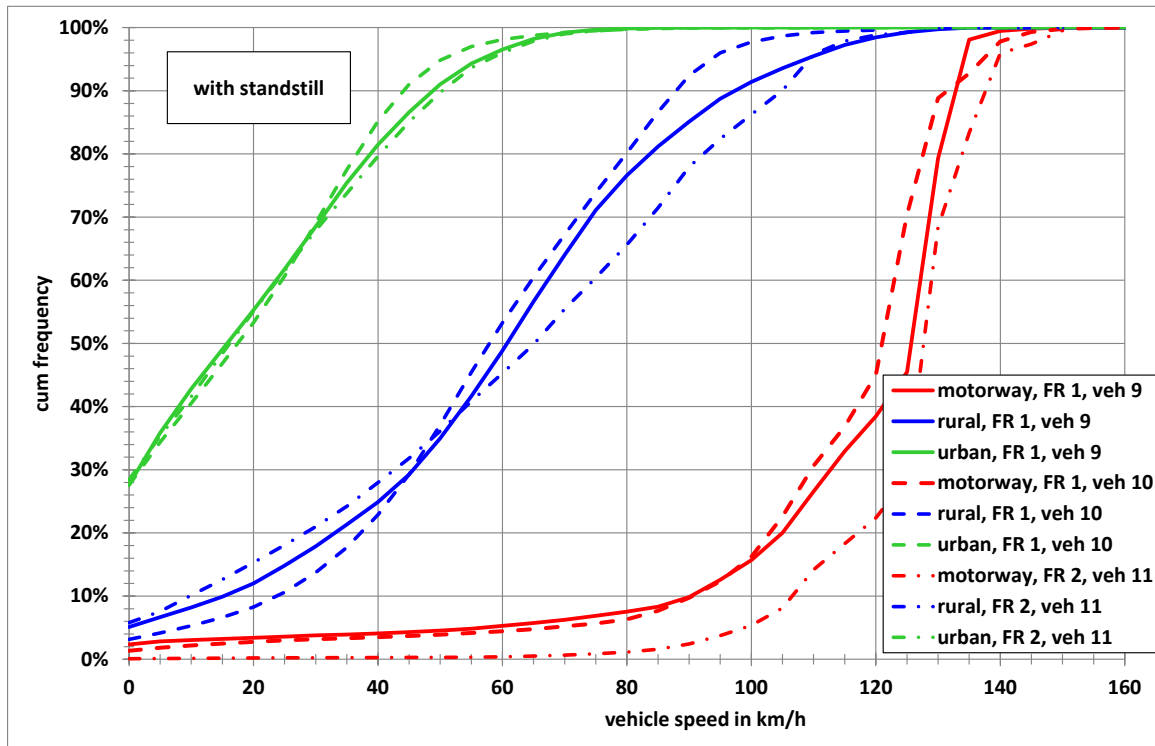


Figure 9: Vehicle speed distributions, single vehicles urban, rural, motorway, France 1

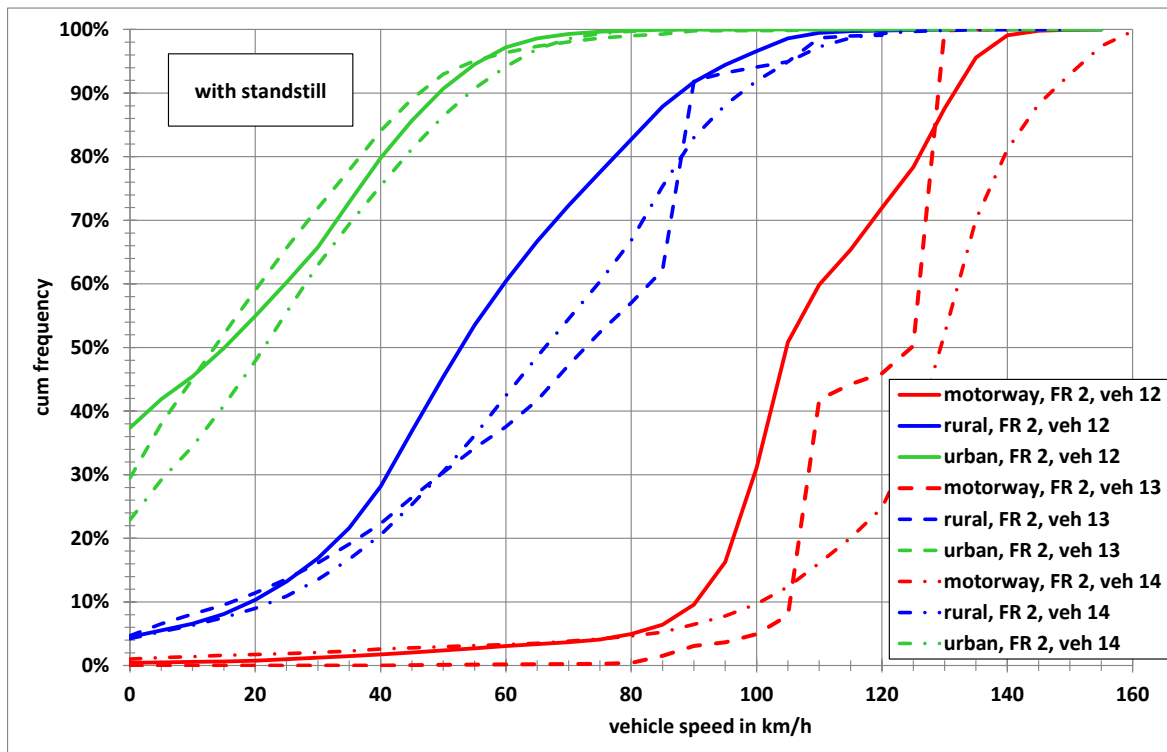


Figure 10: Vehicle speed distributions, single vehicles urban, rural, motorway, France 2

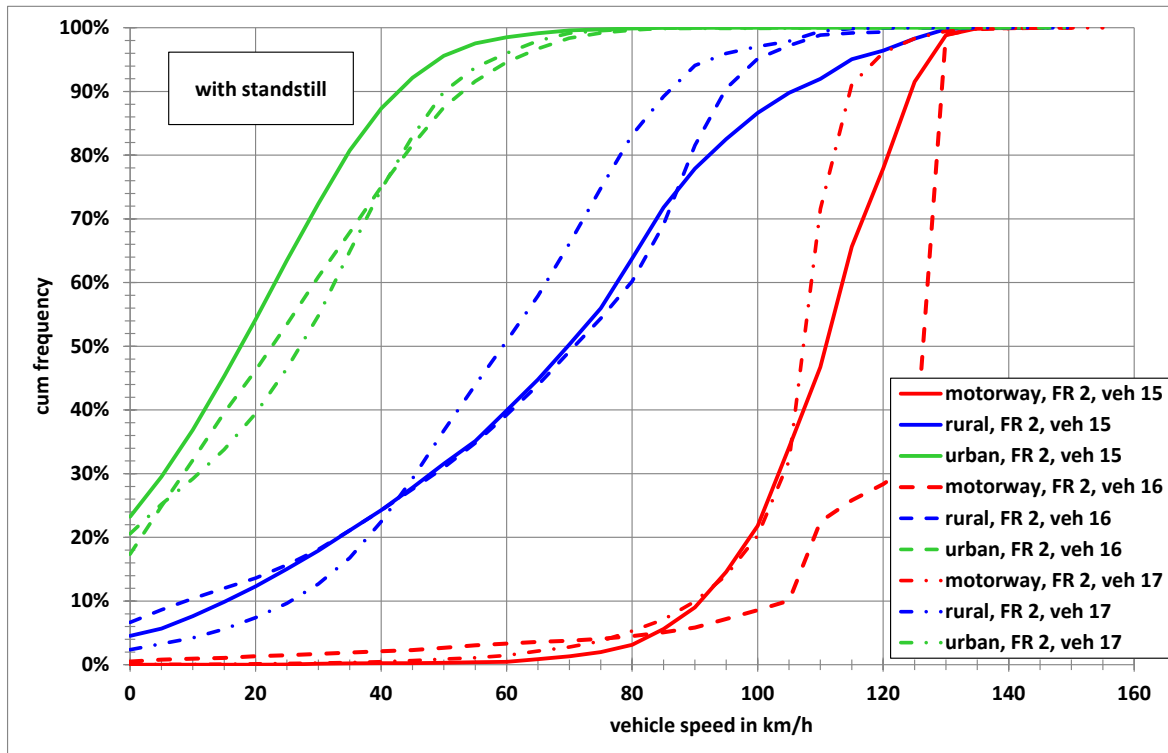


Figure 11: Vehicle speed distributions, single vehicles urban, rural, motorway, France 2

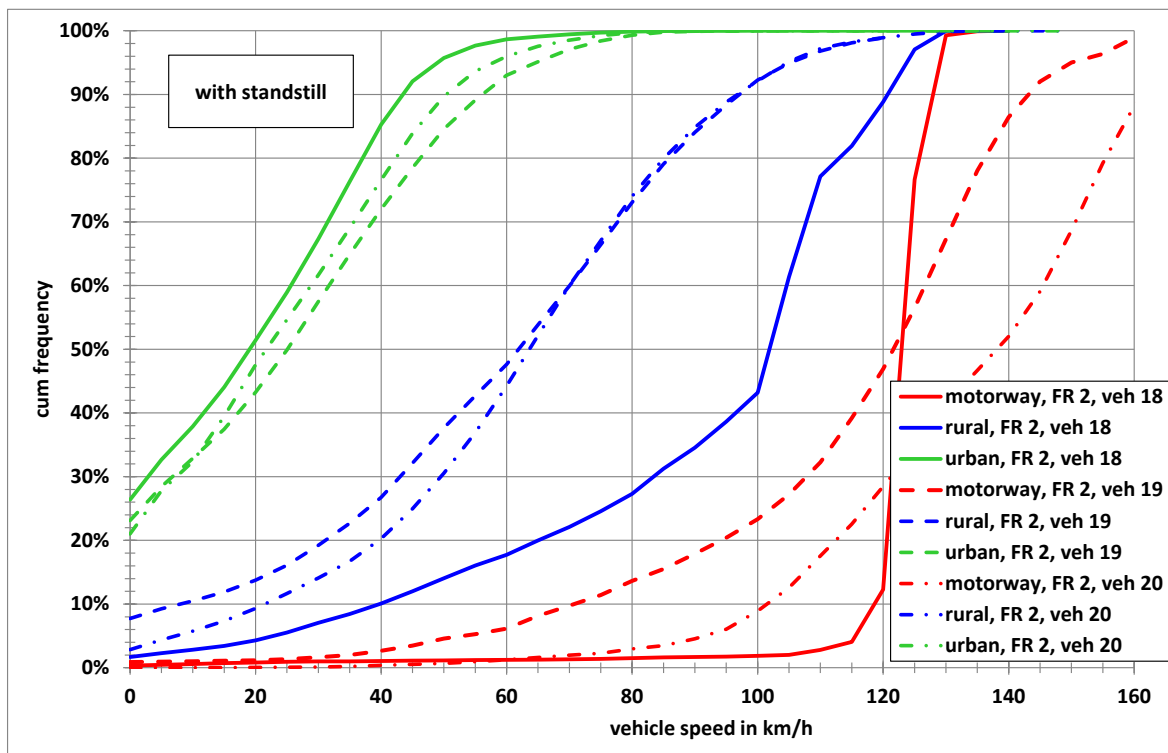


Figure 12: Vehicle speed distributions, single vehicles urban, rural, motorway, France 2

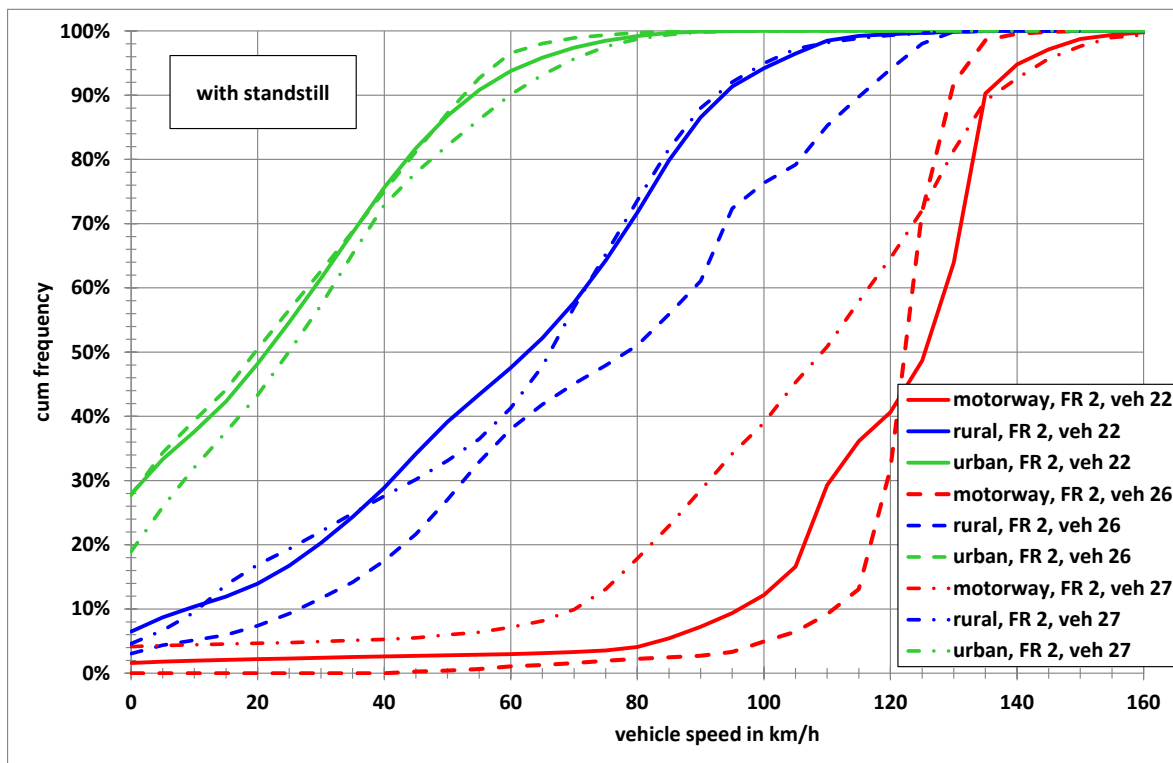


Figure 13: Vehicle speed distributions, single vehicles urban, rural, motorway, France 2

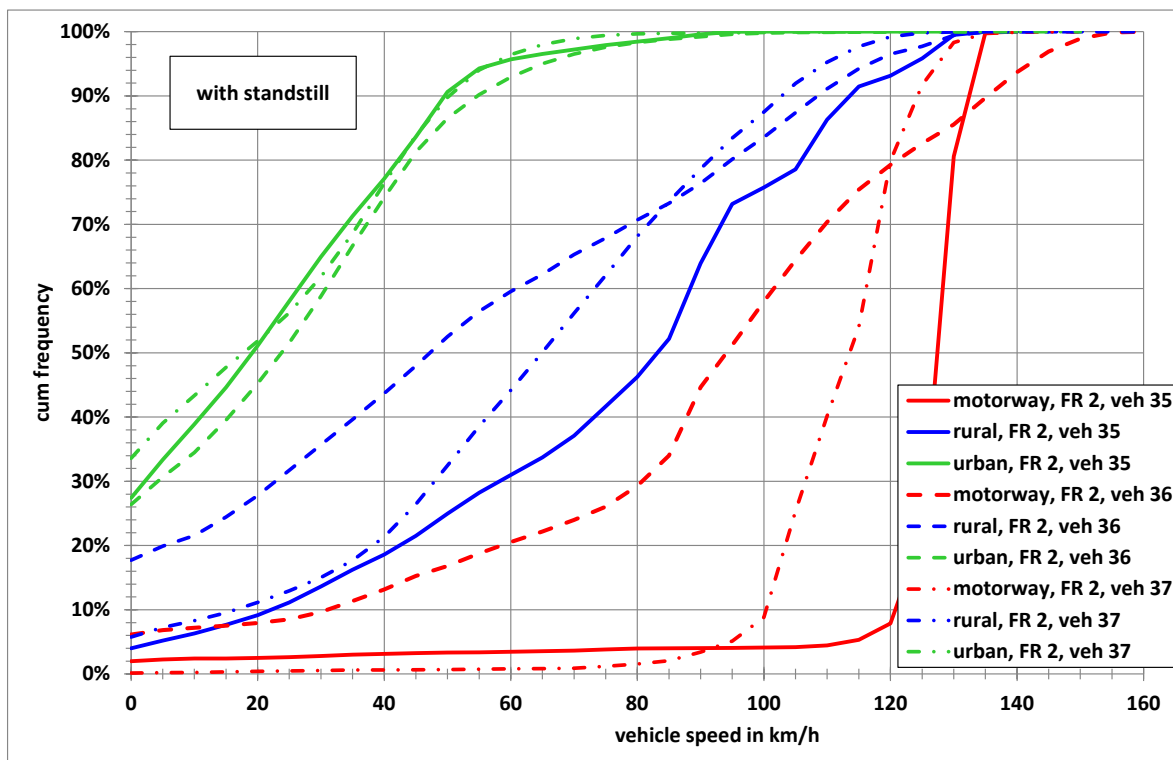


Figure 14: Vehicle speed distributions, single vehicles urban, rural, motorway, France 2

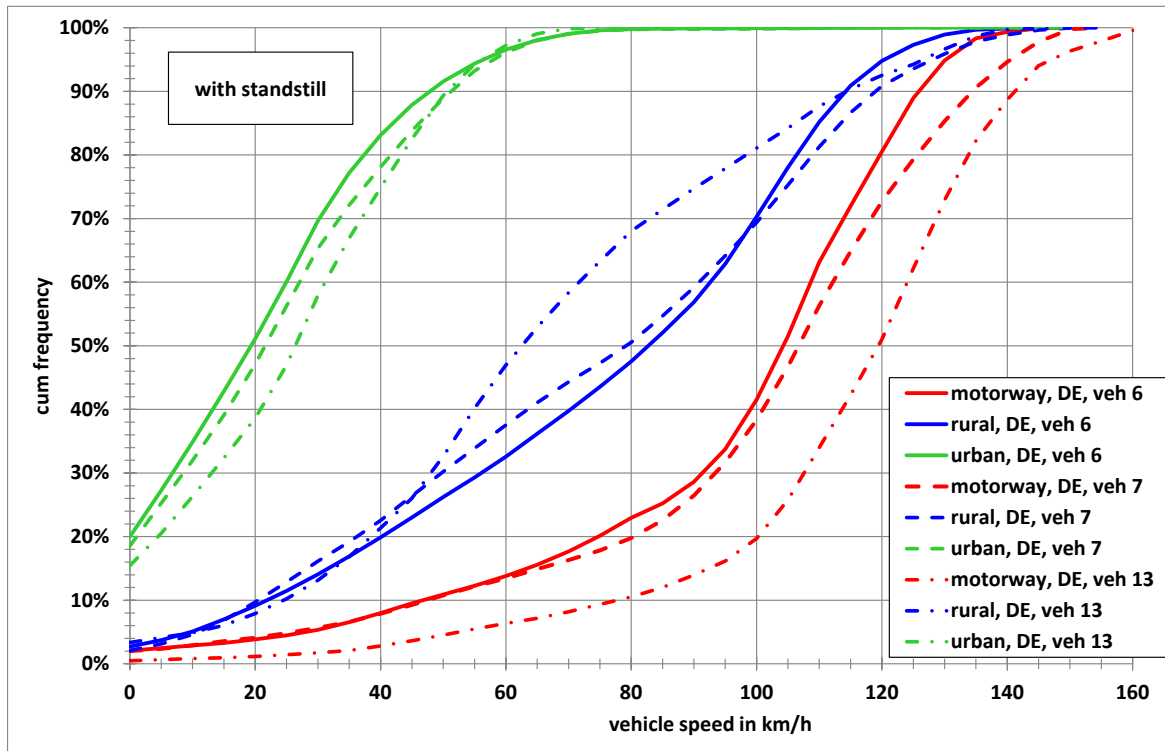


Figure 15: Vehicle speed distributions, single vehicles urban, rural, motorway, Germany

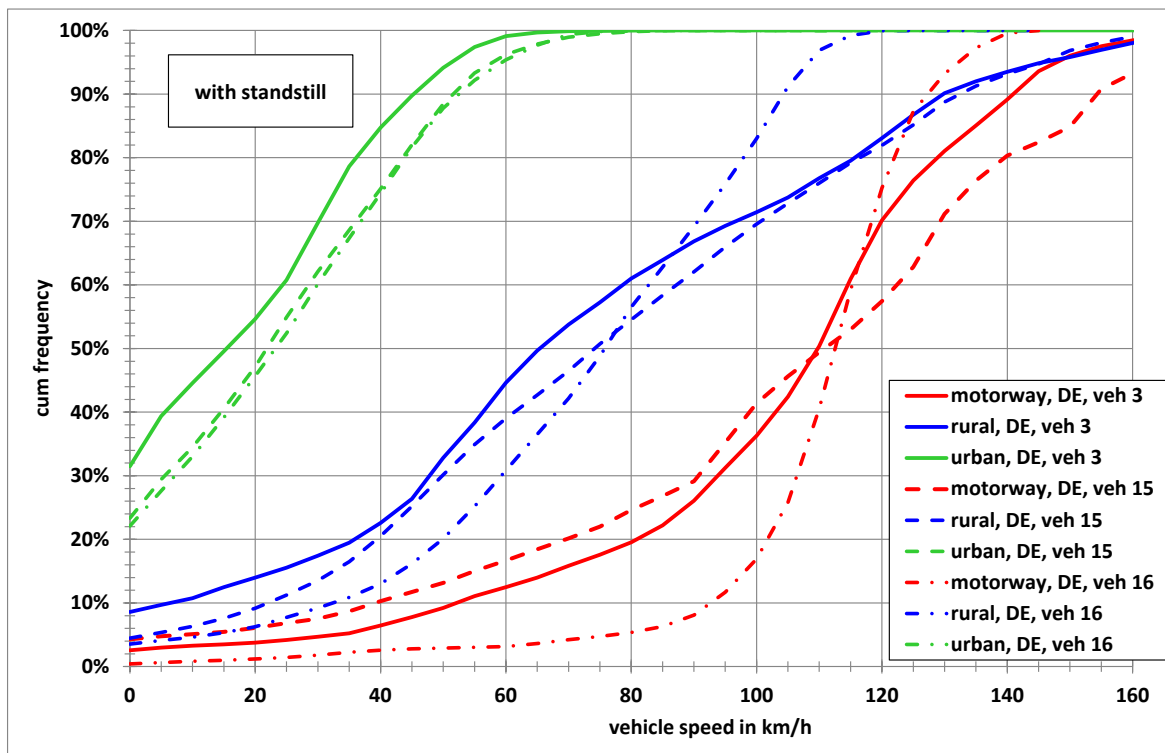


Figure 16: Vehicle speed distributions, single vehicles urban, rural, motorway, Germany

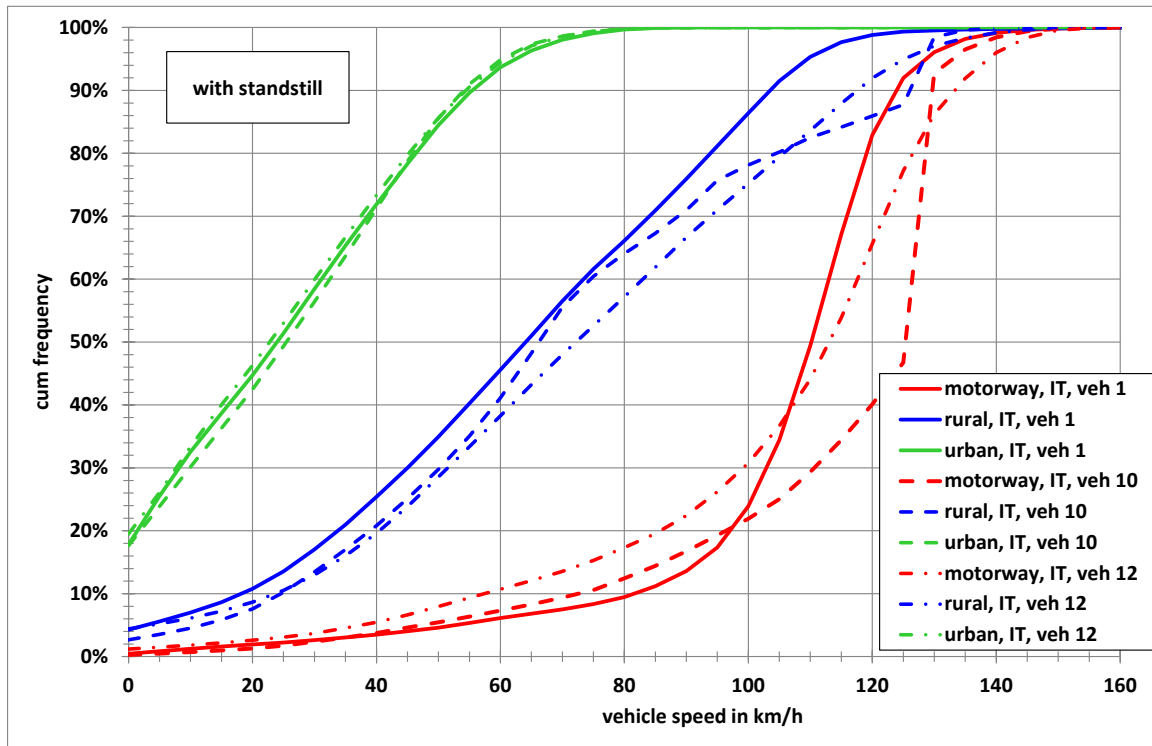


Figure 17: Vehicle speed distributions, single vehicles urban, rural, motorway, Italy

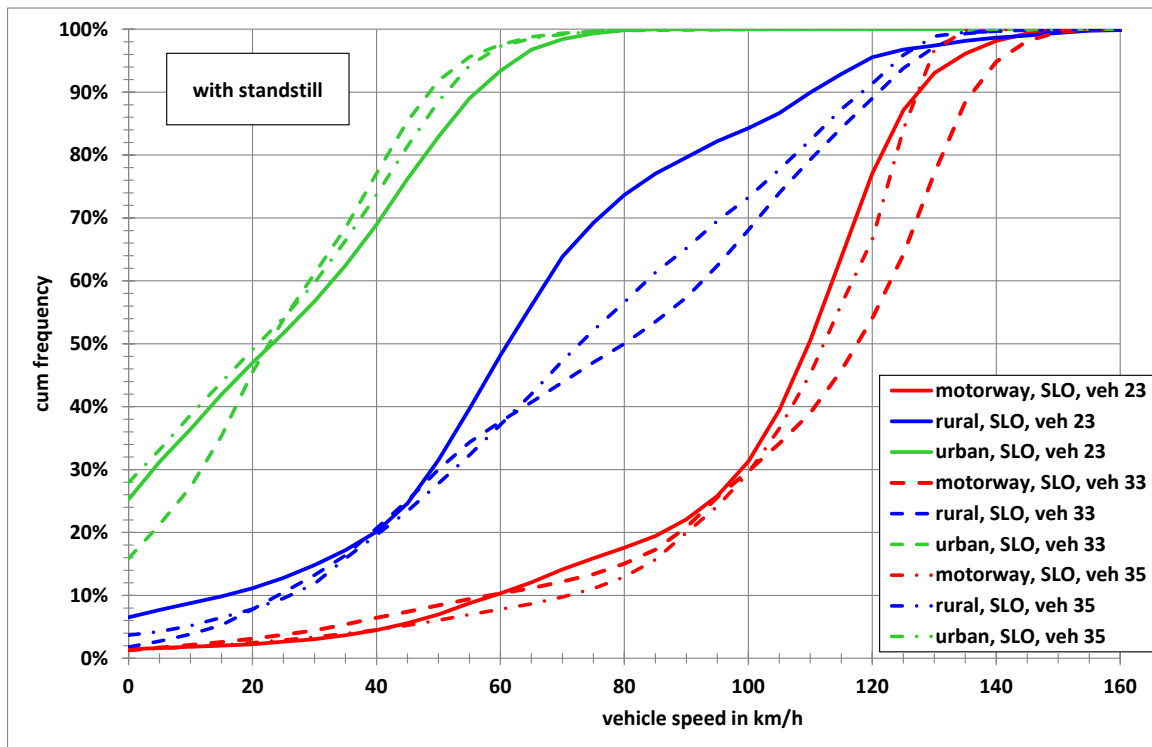


Figure 18: Vehicle speed distributions, single vehicles urban, rural, motorway, Slovenia

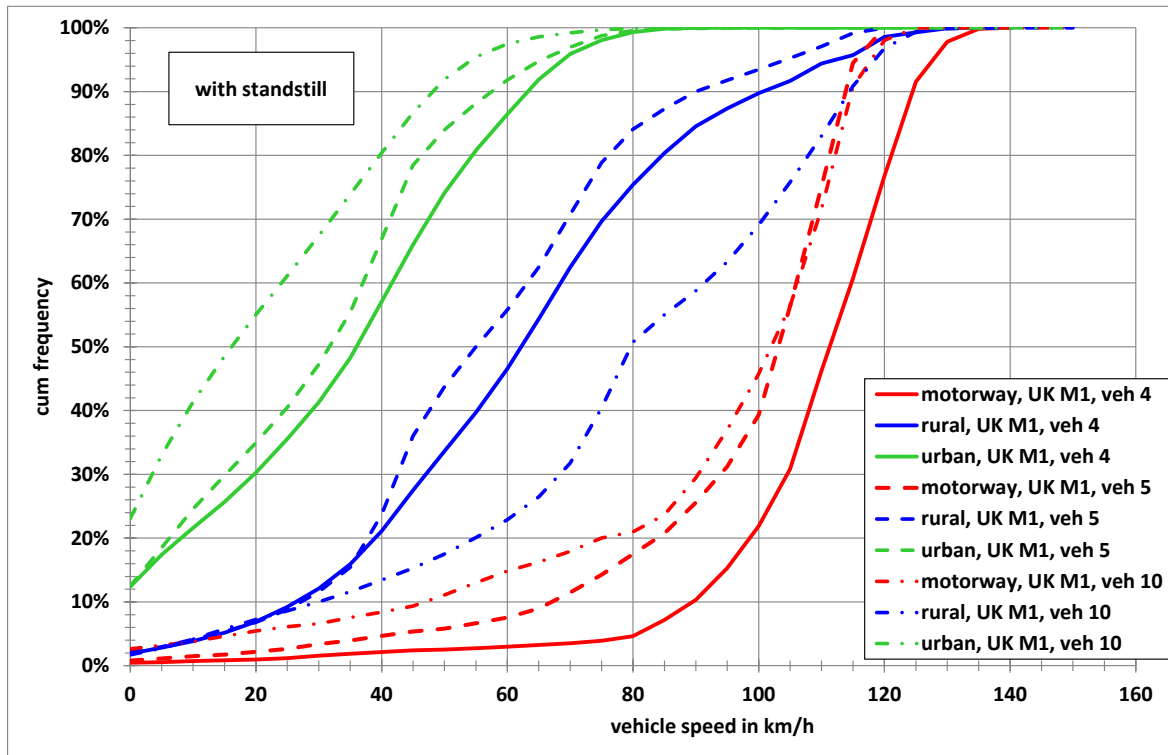


Figure 19: Vehicle speed distributions, single vehicles urban, rural, motorway, UK M1

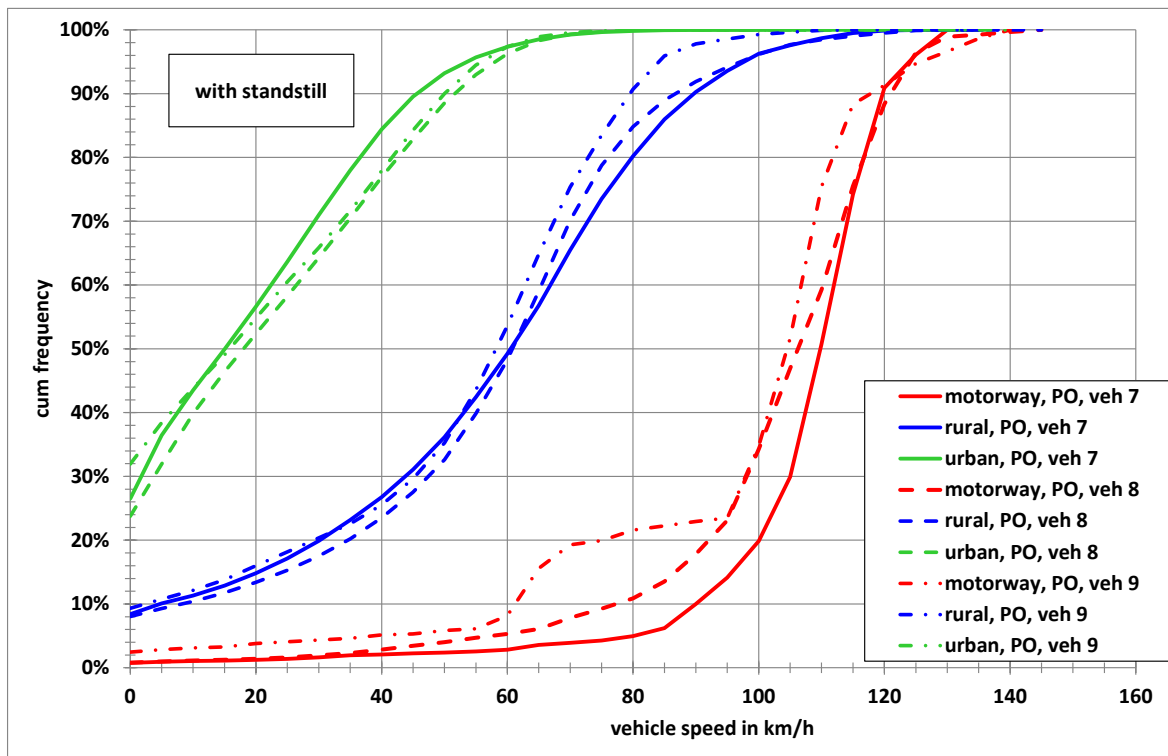


Figure 20: Vehicle speed distributions, single vehicles urban, rural, motorway, Poland

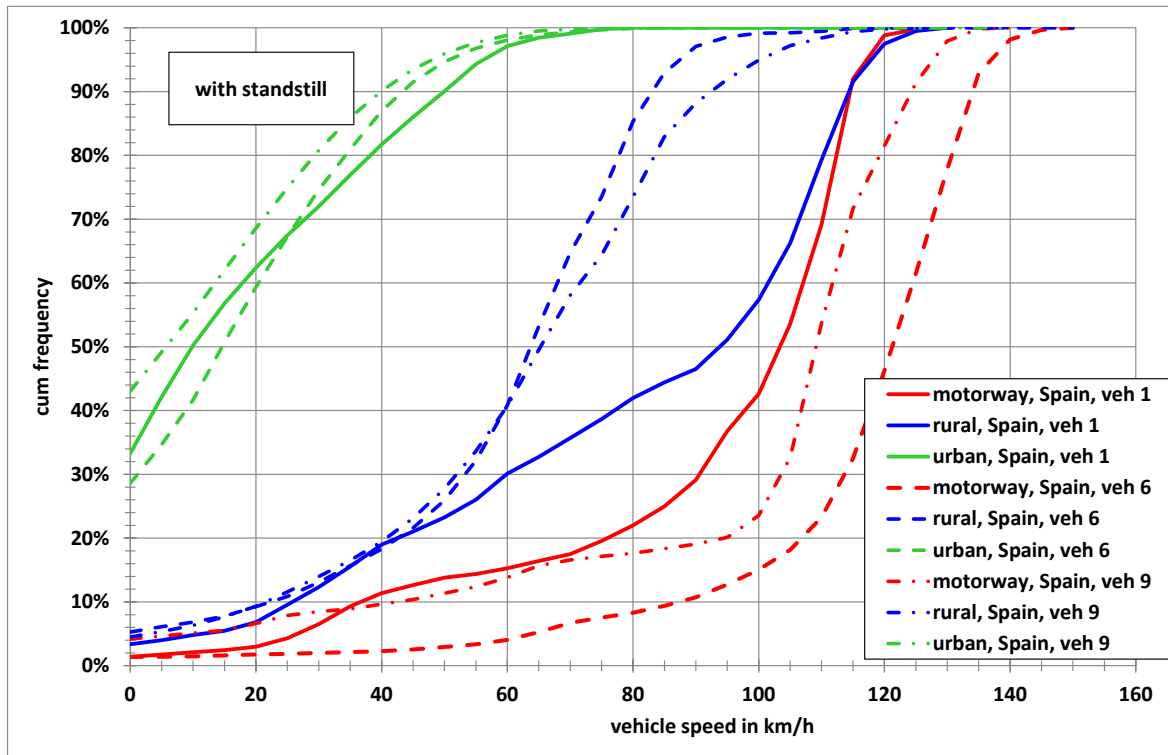


Figure 21: Vehicle speed distributions, single vehicles urban, rural, motorway, Spain



8 Short trip and stop phase analysis

8.1 Stop phases

In order to assess the structure of the in-use driving behaviour data with respect to the number of stops, the distances driven between the stops etc., the data was separated into stop periods and short trips. Stop periods are defined as connected time sequences with vehicle speeds below 1 km/h, short trips are connected time sequences with vehicle speeds ≥ 1 km/h.

Figure 22 to Figure 25 show the stop phase duration distributions for different regions and different countries within Europe, number weighted and duration weighted. Number weighted means that the percentages on the y-axis indicate the percentage of the whole number of stop phases with a duration of the corresponding x-axis value. Duration weighted means that the percentages on the y-axis indicate the percentage of the whole stop duration with a duration of the corresponding x-axis value.

From the results in Figure 25 can be concluded, that loading times are included in the stop phases.

Figure 26 shows the number weighted stop duration distributions for Europe, separated into three road categories.

Table 48 shows the number of stops in front of a short trip binned for its maximum speed separated for road categories in Europe.

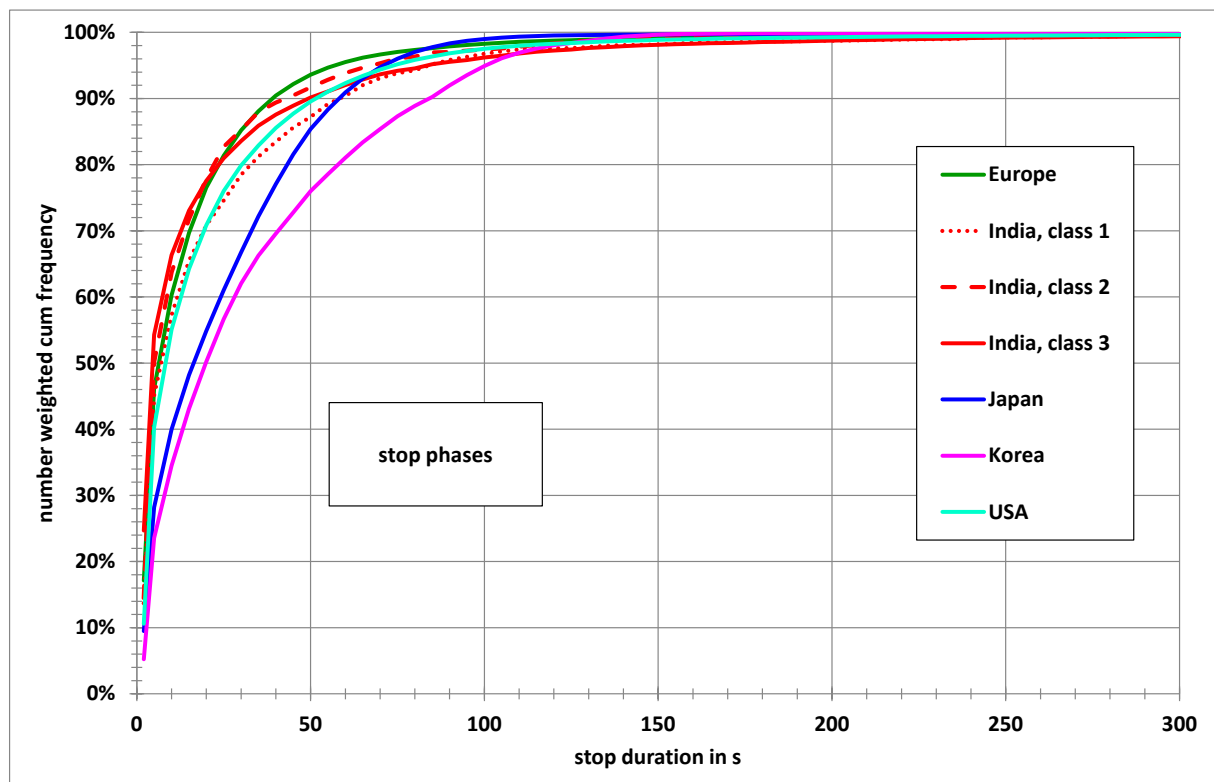


Figure 22: Stop duration distributions (number weighted) for different regions

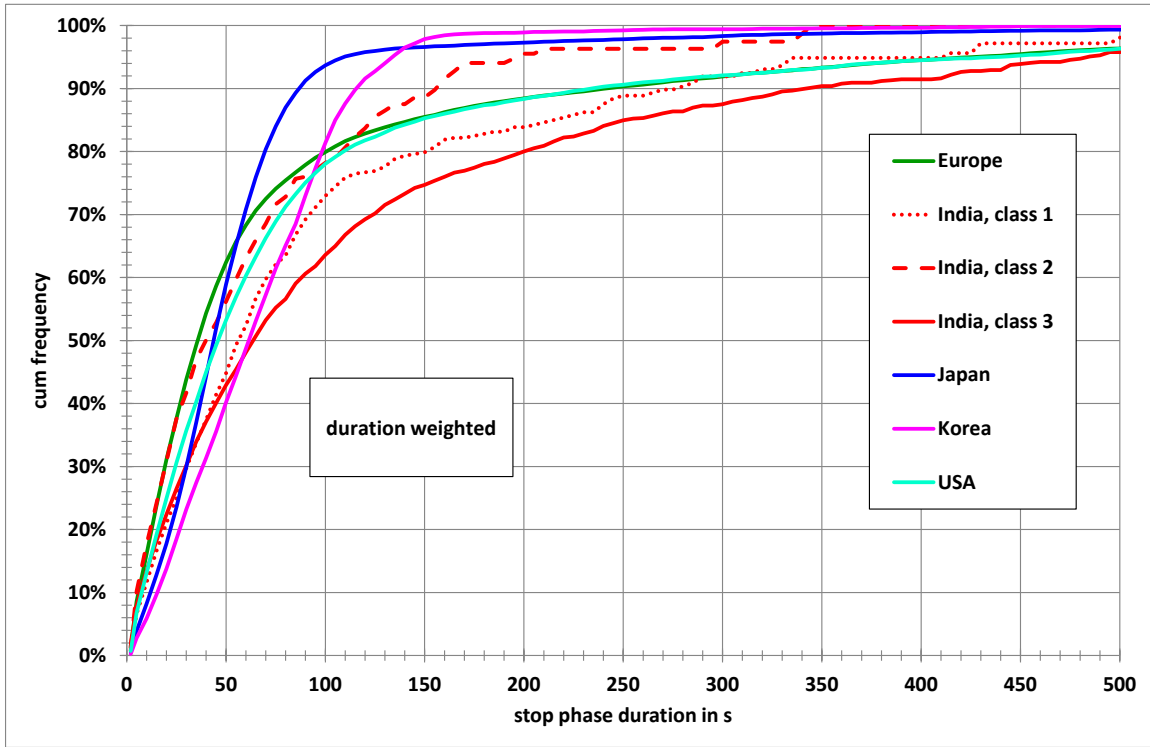


Figure 23: Stop duration distributions (time weighted) for different regions

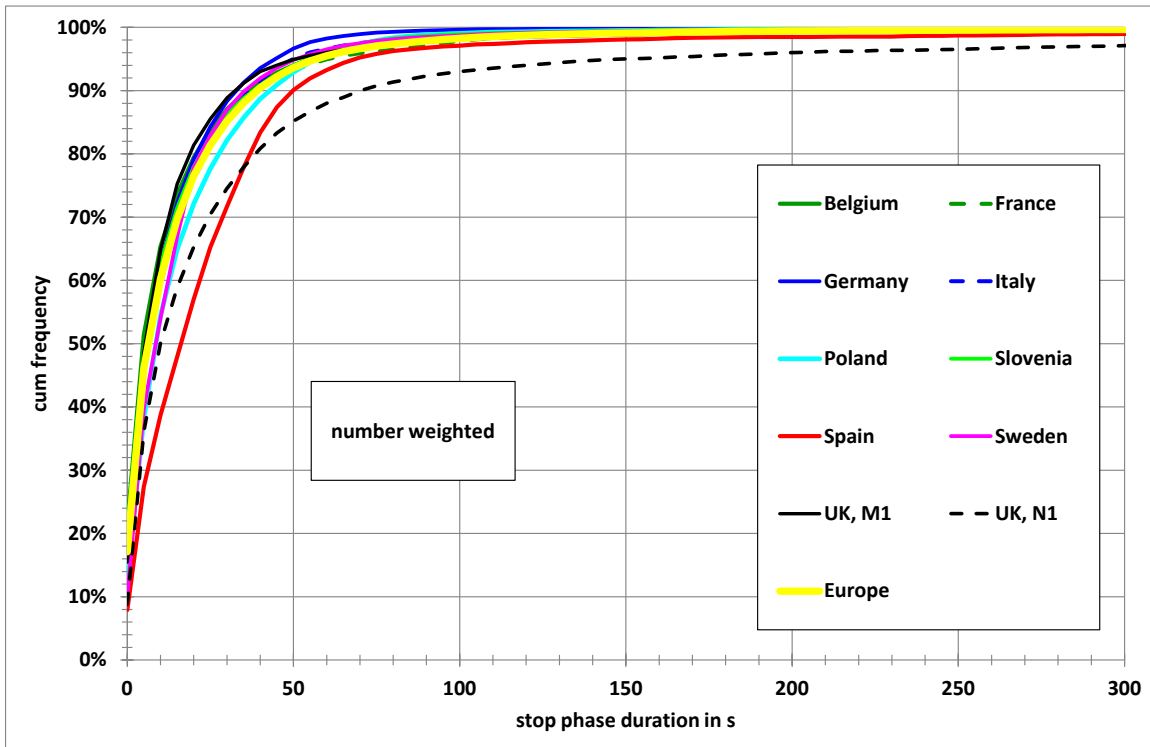


Figure 24: Stop duration distributions (number weighted) for different countries in Europe

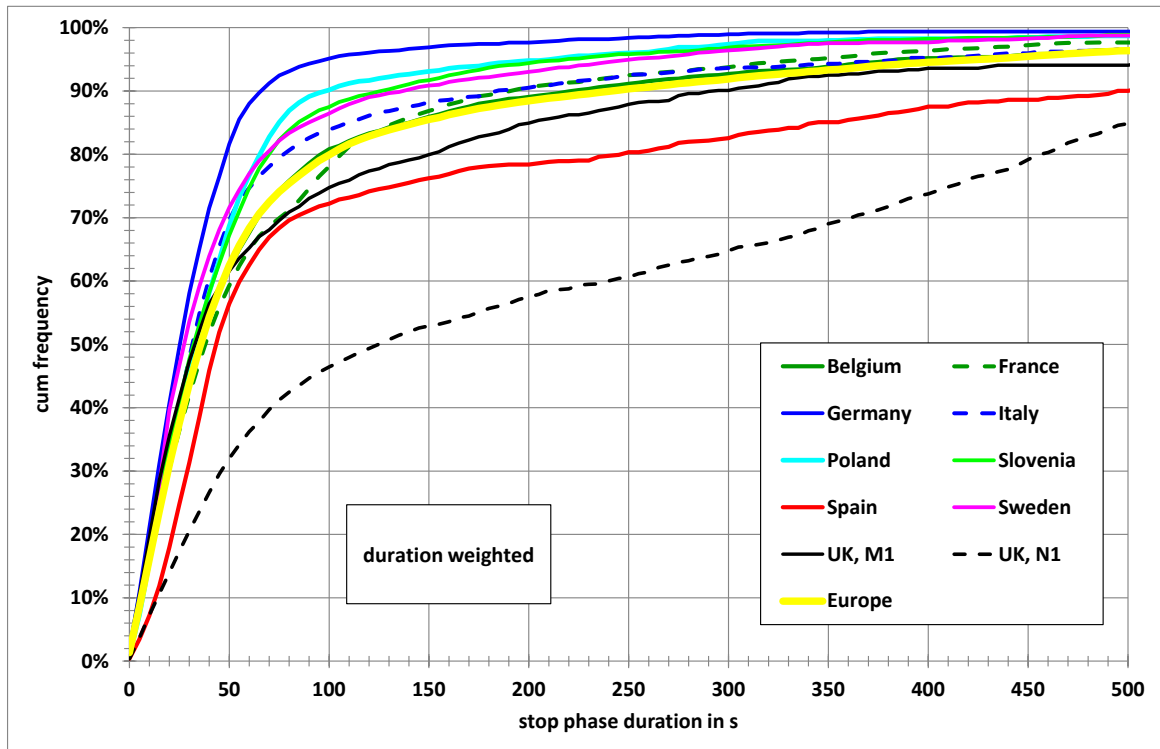


Figure 25: Stop duration distributions (time weighted) for different countries in Europe

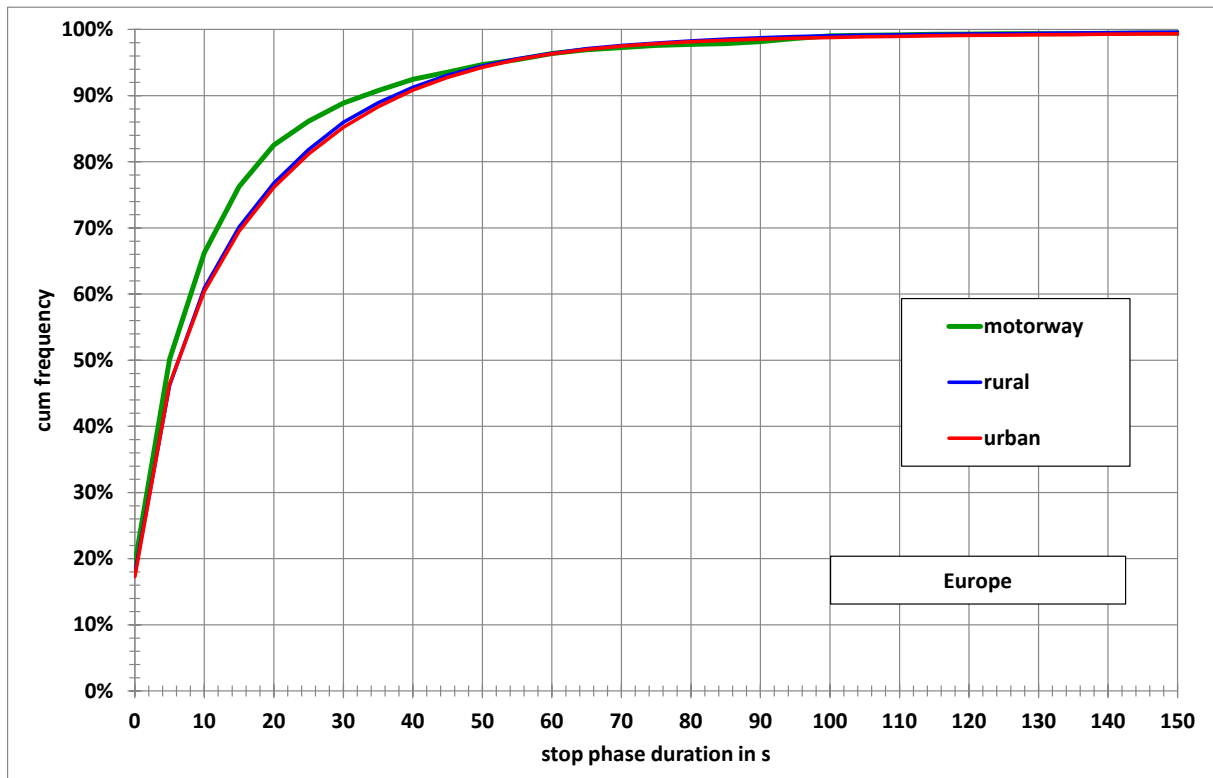


Figure 26: Stop duration distributions (number weighted) for different road categories in Europe



v_max in km/h	number of stops		
	motorway	rural	urban
5	881	6330	32909
15	495	2171	19674
25	175	1394	16240
35	98	1370	18838
45	69	1956	22486
55	60	2139	19177
65	30	2088	11419
75	35	3406	4540
85	58	3218	1640
95	60	3107	419
105	85	2183	99
115	214	1684	30
125	369	1194	20
135	547	783	2
145	302	255	
155	185	132	
165	55	44	
175	8	20	
185	14	7	
195	4		

Table 52: Number of stops in front of a short trip binned for its maximum speed separated for road categories in Europe

8.2 Short trips

Figure 27 to Figure 30 show the short trip distance distributions for different regions and different countries within Europe, number weighted and distance weighted. Number weighted means that the percentages on the y-axis indicate the percentage of the whole number of short trips with a distance of the corresponding x-axis value. Distance weighted means that the percentages on the y-axis indicate the percentage of the whole distance with a distance of the corresponding x-axis value.

Figure 31 and Figure 32 show number and distance weighted short trip distance distributions for Europe, separated for different road categories.

In order to assess the occurrence of creeping situations the short trips were binned with respect to their maximum speed and the distances were summed up per v_max bin and related to the total distance.

The results are shown for different regions, different countries within Europe and different road categories for some European countries in Table 49 to Table 60.

Distance weighted joint frequency distributions of average speed / maximum speed for short trips are shown in annex 1.

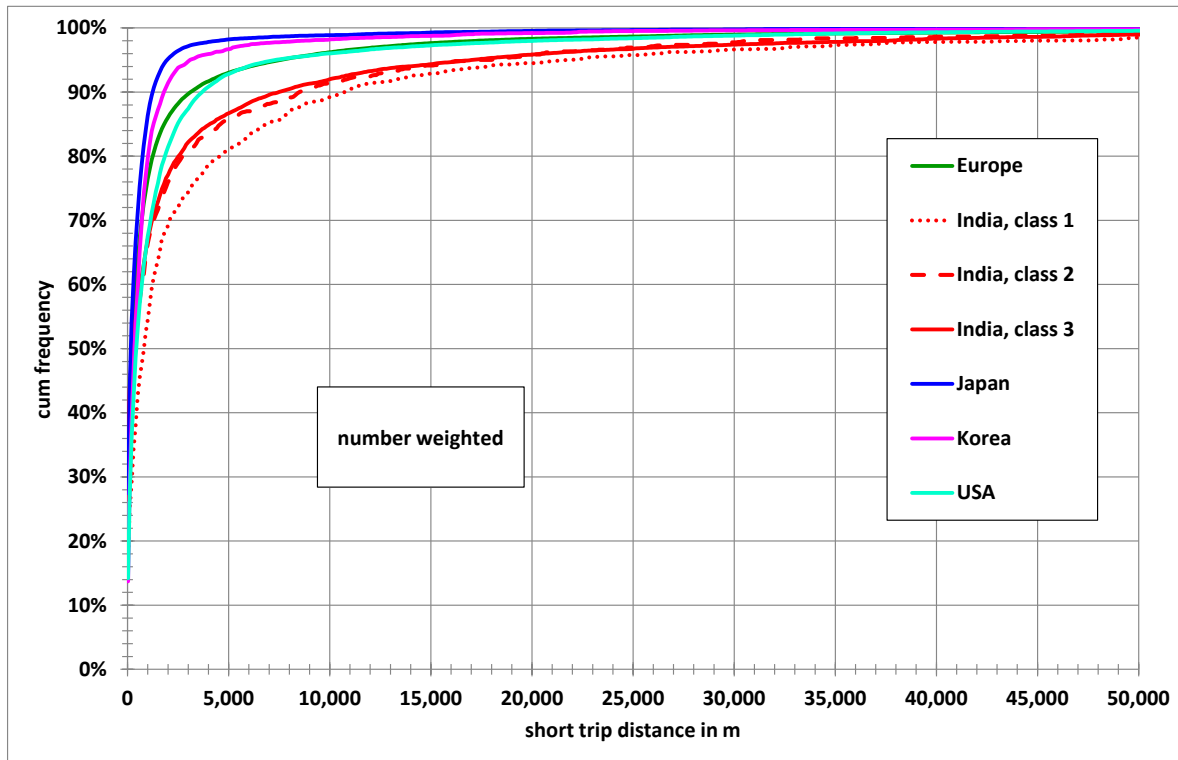


Figure 27: Short trip distance distributions (number weighted) for different regions

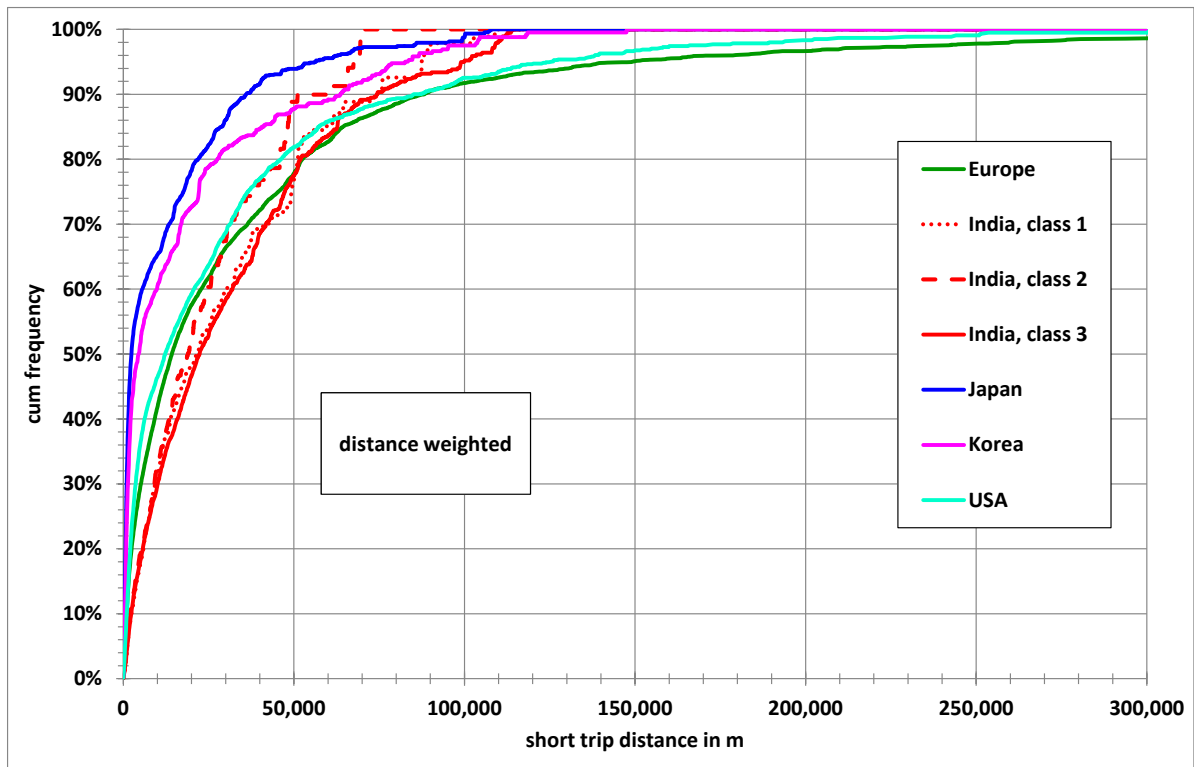


Figure 28: Short trip distance distributions (distance weighted) for different regions

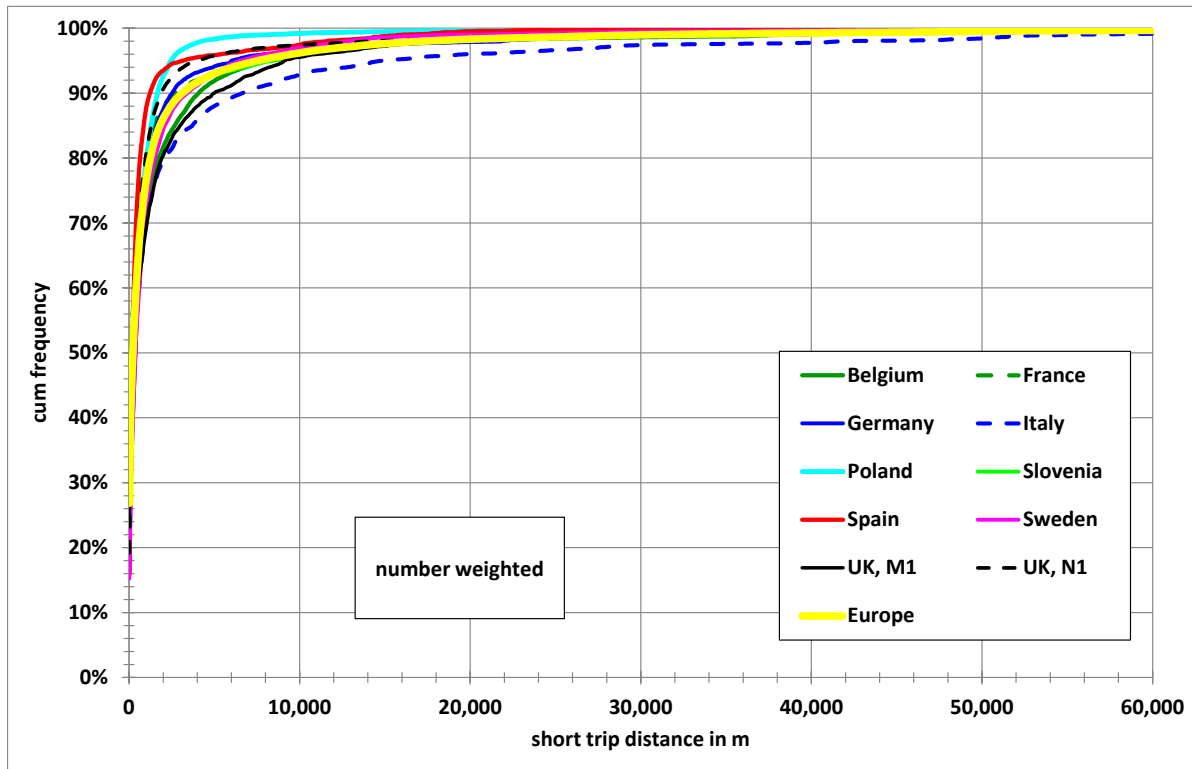


Figure 29: Short trip distance distributions (number weighted) for different countries in Europe

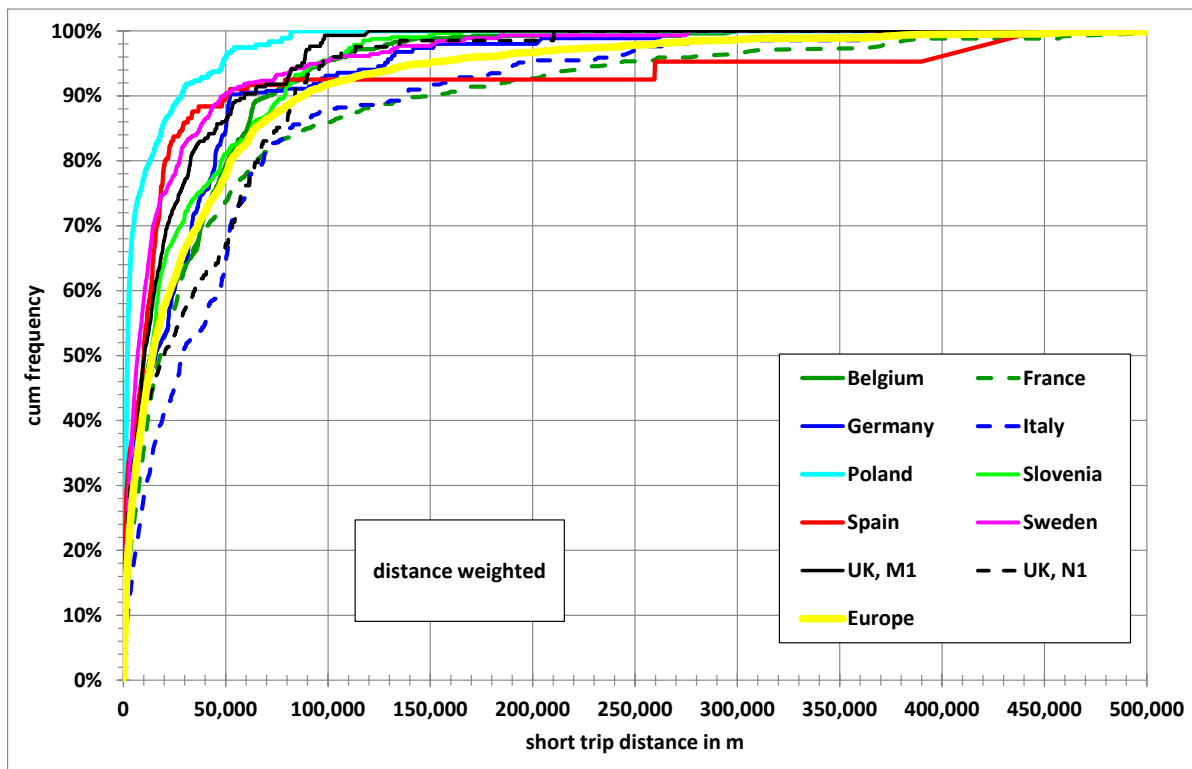


Figure 30: Short trip distance distributions (distance weighted) for different countries in Europe

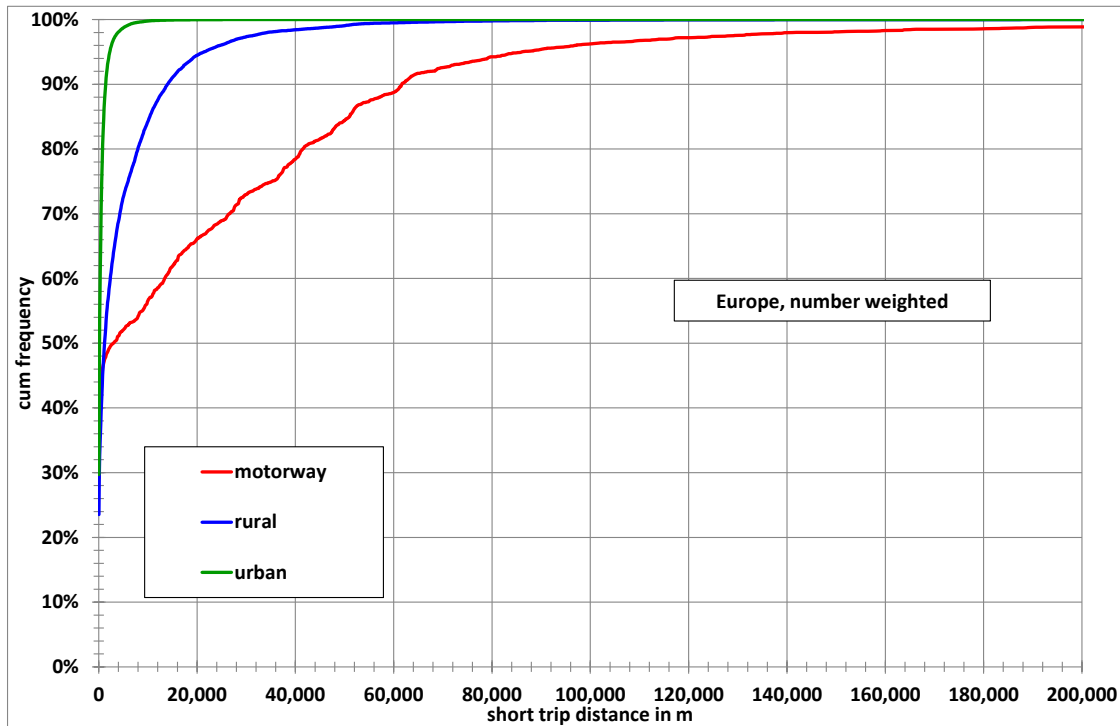


Figure 31: Number weighted short trip distance distributions for Europe, separated for road categories

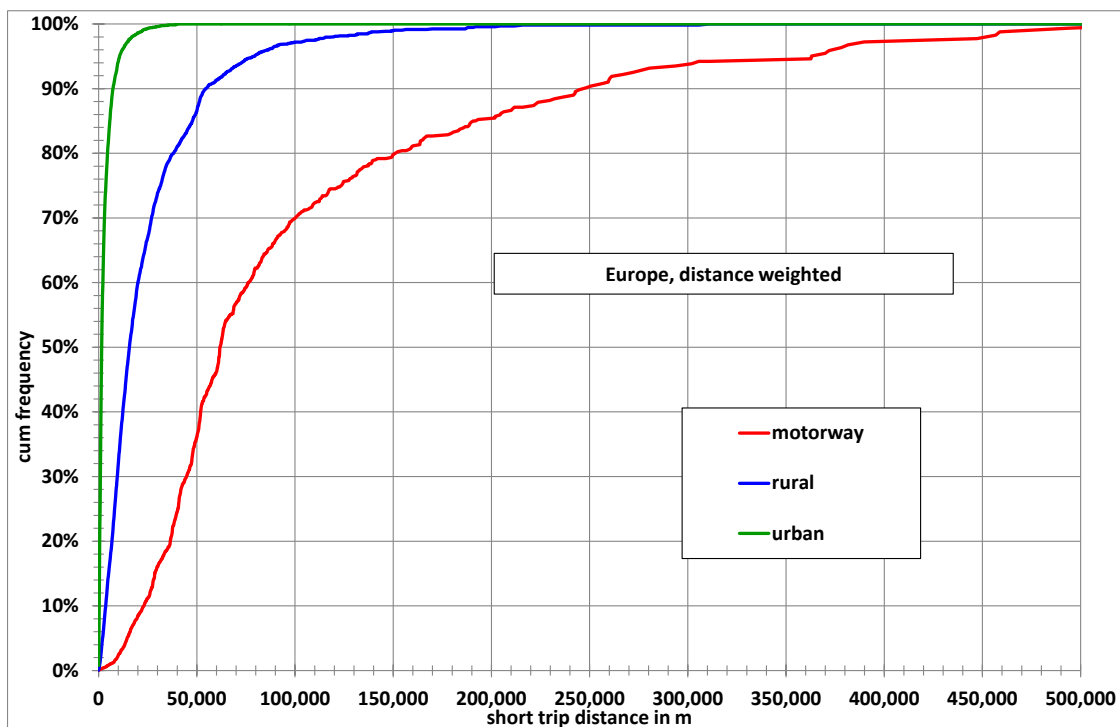


Figure 32: Distance weighted short trip distance distributions for Europe, separated for road categories



v_max in km/h	number of short trips						
	Europe	India, class 1	India, class 2	India, class 3	Japan	Korea	USA
5	47575	380	332	4365	12857	2741	5376
15	28789	197	196	1385	8964	2633	4882
25	23526	233	136	998	9143	3394	4598
35	26881	486	125	1302	9355	3841	5148
45	31773	508	148	1459	9663	5290	5802
55	27123	363	220	1139	9018	4917	6752
65	17145	127	185	882	5124	2480	7390
75	10757	22	87	749	1668	1291	6079
85	6812		37	640	555	801	4051
95	4826		4	285	341	326	2065
105	3018			78	293	183	1122
115	2309			9	148	69	994
125	1907			4	47	16	1072
135	1535				12	8	643
145	627			1	7		221
155	336					1	48
165	101					1	19
175	30						3
185	22						1
195	4						

Table 53: Number of short trips in different v_max bins for different regions

v_max in km/h	distanceshare						
	Europe	India, class 1	India, class 2	India, class 3	Japan	Korea	USA
5	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%
15	0.4%	0.2%	0.3%	0.3%	1.0%	0.6%	0.3%
25	0.8%	1.0%	0.6%	0.8%	2.8%	1.7%	0.6%
35	2.1%	5.2%	1.3%	2.3%	5.4%	3.5%	1.1%
45	4.7%	14.6%	3.3%	4.9%	10.6%	9.1%	2.1%
55	6.7%	48.2%	10.8%	7.0%	17.1%	14.4%	4.0%
65	6.9%	25.8%	27.6%	11.3%	15.7%	15.3%	7.3%
75	7.7%	5.0%	28.7%	17.5%	8.1%	14.4%	8.9%
85	8.6%		24.2%	28.4%	8.3%	12.7%	8.9%
95	8.7%		3.1%	19.8%	9.0%	9.4%	6.5%
105	7.6%			5.9%	11.3%	11.7%	5.4%
115	8.8%			0.7%	7.9%	3.7%	8.3%
125	10.9%			0.8%	1.8%	1.7%	16.8%
135	13.3%			0.0%	0.4%	1.4%	17.4%
145	6.9%			0.1%	0.2%	0.0%	8.4%
155	3.8%					0.1%	2.2%
165	1.2%					0.2%	1.2%
175	0.4%						0.2%
185	0.3%						0.2%
195	0.1%						
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 54: distance share of short trips in different v_max bins for different regions



v_max in km/h	number of short trips									
	Belgium	France	Germany	Italy	Poland	Slovenia	Spain	Sweden	UK, M1	UK, N1
5	11325	20893	1277	2054	2755	3254	714	2651	1643	1009
15	5048	7062	1543	2487	2868	3240	1402	2467	1282	1390
25	2796	5998	1283	1597	2135	2951	1670	3010	771	1315
35	2662	7322	2254	1646	2062	3072	1788	3730	798	1547
45	3466	9129	2447	1990	2227	4186	1577	3878	942	1931
55	3418	7493	2006	1885	2153	3827	1022	3490	973	856
65	2836	3974	1118	1441	1932	2332	470	2061	625	356
75	2834	2062	478	941	1213	1135	175	1257	434	228
85	1617	1434	200	647	573	655	173	1072	292	149
95	1073	1330	106	465	175	470	148	729	215	115
105	492	1015	42	419	54	281	92	383	164	76
115	343	820	82	379	34	272	33	192	88	66
125	423	554	123	280	17	308	18	68	77	39
135	297	447	136	269	10	294	4	22	27	29
145	77	169	84	150	4	120	3	3	7	10
155	27	74	77	87		67	1	1	1	1
165	4	28	24	16		29				
175	2	11	10	1		6				
185	2	8	5			7				
195		2	1			1				

Table 55: Number of short trips in different v_max bins for different countries in Europe

v_max in km/h	distance share									
	Belgium	France	Germany	Italy	Poland	Slovenia	Spain	Sweden	UK, M1	UK, N1
5	0.1%	0.1%	0.1%	0.1%	0.4%	0.1%	0.1%	0.1%	0.2%	0.2%
15	0.4%	0.3%	0.4%	0.3%	1.2%	0.4%	0.9%	0.4%	0.6%	0.6%
25	0.6%	0.7%	1.0%	0.4%	2.1%	0.9%	2.5%	1.2%	0.8%	1.4%
35	1.1%	1.9%	3.8%	0.9%	4.3%	2.1%	5.8%	3.5%	1.7%	4.1%
45	2.9%	4.3%	6.6%	2.0%	9.4%	5.5%	8.7%	6.4%	4.3%	10.9%
55	5.0%	6.2%	8.5%	3.2%	14.5%	8.0%	8.6%	9.9%	8.4%	7.2%
65	7.0%	5.5%	8.4%	4.6%	18.1%	7.4%	5.6%	8.7%	10.1%	4.6%
75	11.8%	5.2%	6.1%	5.4%	16.5%	6.1%	3.7%	10.4%	12.8%	4.1%
85	10.4%	7.0%	2.7%	5.4%	12.9%	7.3%	12.5%	17.0%	11.7%	5.5%
95	8.9%	9.2%	1.7%	5.1%	5.5%	7.7%	17.9%	14.4%	10.4%	11.0%
105	5.3%	9.6%	1.6%	6.6%	4.8%	5.6%	13.8%	11.3%	8.3%	9.8%
115	8.0%	11.1%	5.1%	10.0%	4.5%	6.1%	5.3%	9.3%	6.5%	11.3%
125	16.8%	10.2%	11.1%	10.8%	3.0%	10.7%	4.7%	3.9%	14.3%	13.7%
135	15.0%	13.5%	14.6%	24.2%	1.3%	14.4%	1.0%	2.3%	8.4%	11.4%
145	4.7%	8.8%	12.3%	12.1%	1.7%	7.1%	4.1%	0.8%	1.2%	3.8%
155	1.2%	4.0%	10.8%	7.4%		5.7%	4.7%	0.4%	0.1%	0.4%
165	0.3%	1.3%	3.5%	1.6%		2.9%				
175	0.4%	0.5%	0.7%	0.0%		0.8%				
185	0.1%	0.5%	0.8%			0.9%				
195	0.0%	0.1%	0.1%			0.2%				
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 56: distance share of short trips in different v_max bins for different countries in Europe



Belgium v_max in km/h	number of short trips			distance share		
	motorway	rural	urban	motorway	rural	urban
5	689	3993	3360	0.1%	0.1%	0.4%
15	477	1465	711	0.2%	0.3%	0.8%
25	171	858	454	0.3%	0.5%	1.8%
35	95	802	532	0.2%	1.0%	5.0%
45	70	1244	780	0.3%	3.4%	16.1%
55	56	1381	648	0.3%	7.4%	22.1%
65	29	1220	434	0.3%	10.7%	21.6%
75	34	1320	213	0.4%	18.9%	18.0%
85	57	848	66	2.1%	20.0%	8.7%
95	59	607	26	3.0%	19.4%	2.9%
105	78	216	14	5.7%	7.2%	2.0%
115	128	91	3	22.8%	3.7%	0.2%
125	132	73	4	28.4%	3.9%	0.4%
135	122	28		28.4%	3.1%	
145	18	2		5.1%	0.1%	
155	8	3		1.8%	0.2%	
165	2			0.4%		
185	1			0.2%		
	2226	14151	7245	100.0%	100.0%	100.0%
			distance share:	39.6%	51.9%	8.5%

Table 57: Number of short trips and distance share in different v_max bins for different road categories in Belgium

France v_max in km/h	number of short trips			distance share		
	motorway	rural	urban	motorway	rural	urban
5	200	2387	18126	0.0%	0.0%	0.4%
15	22	711	6299	0.0%	0.1%	1.2%
25	9	539	5442	0.0%	0.1%	2.7%
35	5	576	6740	0.0%	0.3%	7.4%
45	2	727	8398	0.0%	0.5%	17.3%
55	6	746	6740	0.0%	1.0%	24.4%
65	1	599	3374	0.0%	2.2%	18.8%
75	1	572	1489	0.0%	4.1%	13.0%
85	2	822	610	0.0%	9.8%	7.5%
95	1	987	342	0.0%	14.8%	5.2%
105	6	944		0.3%	17.1%	1.4%
115	32	765		3.0%	19.0%	0.5%
125	79	462	13	11.3%	14.0%	0.3%
135	156	290		30.8%	11.9%	0.0%
145	100	69		29.6%	3.7%	
155	57	17		15.6%	0.8%	
165	22	6		5.2%	0.2%	
175	7	4		1.8%	0.2%	
185	5	3		1.7%	0.1%	
195	2			0.5%		
	715	11226	57573	100.0%	100.0%	100.0%
			distance share:	22.9%	54.1%	23.0%

Table 58: Number of short trips and distance share in different v_max bins for different road categories in France



Germany v_max in km/h	number of short trips			distance share		
	motorway	rural	urban	motorway	rural	urban
5			1277			0.3%
15			1543			1.2%
25			1283			2.9%
35			2254			11.1%
45			2447			19.6%
55		2	2004		0.0%	25.2%
65		51	1067		1.0%	23.5%
75		180	298		4.0%	12.4%
85		119	81		3.4%	3.3%
95		105	1		3.7%	0.1%
105		42			3.4%	
115	5	77		1.9%	10.1%	
125	7	113	3	6.4%	20.8%	0.4%
135	26	110		20.9%	22.5%	
145	29	55		31.2%	13.4%	
155	24	53		27.9%	11.5%	
165	4	20		9.0%	3.8%	
175		10			1.5%	
185	3	2		2.1%	0.9%	
195	1			0.7%		
	99	939	12258	100.0%	100.0%	100.0%
			distance share:	19.3%	46.9%	33.8%

Table 59: Number of short trips and distance share in different v_max bins for different roadcategories in Germany

Italy v_max in km/h	number of short trips			distance share		
	motorway	rural	urban	motorway	rural	urban
5		3	2051	0.0%	0.0%	0.4%
15	1		2486	0.0%	0.0%	1.5%
25		1	1596	0.0%	0.0%	2.5%
35			1646	0.0%	0.0%	5.2%
45			1990	0.0%	0.0%	11.2%
55		4	1881	0.0%	0.0%	18.1%
65		38	1403	0.0%	0.4%	25.4%
75		324	617	0.0%	4.1%	21.1%
85		377	270	0.0%	7.3%	13.5%
95		445	20	0.0%	12.0%	0.7%
105	1	412	6	0.1%	15.7%	0.3%
115	34	345		3.9%	20.2%	0.0%
125	99	181		14.5%	11.7%	0.0%
135	145	123		42.8%	16.0%	
145	101	49		21.6%	7.8%	
155	62	25		13.5%	4.4%	
165	14	2		3.7%	0.3%	
175		1		0.0%	0.1%	
	457	2330	13966	100.0%	100.0%	100.0%
			distance share:	41.0%	41.5%	17.5%

Table 60: Number of short trips and distance share in different v_max bins for different roadcategories in Italy



Slovenia v_max in km/h	number of short trips			distance share		
	motorway	rural	urban	motorway	rural	urban
5		2	3252		0.0%	0.3%
15		2	3238		0.0%	1.3%
25		1	2950		0.0%	3.0%
35			3072			7.0%
45		1	4185		0.0%	18.2%
55		10	3817		0.1%	26.4%
65		94	2238		0.8%	23.3%
75		424	711		4.3%	13.0%
85		441	214		10.6%	6.8%
95	1	460	9	0.1%	15.4%	0.2%
105	1	273	7	0.0%	11.1%	0.4%
115	7	263	2	1.1%	11.8%	0.0%
125	42	266		11.2%	17.1%	
135	95	199		35.2%	14.7%	
145	48	72		20.8%	5.8%	
155	32	35		18.9%	3.7%	
165	13	16		7.4%	2.9%	
175	1	5		0.8%	1.2%	
185	5	2		3.3%	0.4%	
195	1			1.1%		
	246	2566	23695	100.0%	100.0%	100.0%
			distance share:	20.2%	49.6%	30.2%

Table 61: Number of short trips and distance share in different v_max bins for different roadcategories in Slovenia

UK, M1 v_max in km/h	number of short trips			distance share		
	motorway	rural	urban	motorway	rural	urban
5		2	1641		0.0%	0.5%
15		1	1281		0.0%	1.4%
25			771			1.9%
35		1	797		0.0%	4.0%
45			942			10.2%
55		2	971		0.0%	20.2%
65		22	603		0.5%	23.6%
75		105	329		5.4%	23.7%
85		157	135		11.8%	12.4%
95		202	13		17.8%	1.4%
105		159	5		14.8%	0.4%
115	7	78	3	15.1%	10.9%	0.2%
125	7	70		45.7%	23.4%	
135	4	23		35.0%	13.2%	
145		7			2.3%	
155	1			4.2%		
165	2			0.0%		
185	1			0.0%		
	22	829	7491	100.0%	100.0%	100.0%
			distance share:	3.1%	55.2%	41.7%

Table 62: Number of short trips and distance share in different v_max bins for different roadcategories in UK



Poland v_max in km/h	number of short trips			distance share		
	motorway	rural	urban	motorway	rural	urban
5	0	3	2752	0.0%	0.0%	0.5%
15	0	0	2868	0.0%	0.0%	1.9%
25	0	1	2134	0.0%	0.0%	3.2%
35	0	0	2062	0.0%	0.0%	6.6%
45	0	1	2226	0.0%	0.0%	14.5%
55	0	0	2153	0.0%	0.0%	22.5%
65	0	70	1862	0.0%	2.3%	26.8%
75	0	429	784	0.0%	16.5%	17.2%
85	0	361	212	0.0%	26.2%	6.5%
95	0	167	8	0.0%	16.1%	0.2%
105	0	52	2	0.0%	14.5%	0.1%
115	1	33		4.8%	13.2%	
125	2	15		18.0%	7.8%	
135	2	8		18.7%	2.4%	
145	3	1		58.5%	0.8%	
	8	1141	17063	100.0%	100.0%	100.0%
			distance share:	2.5%	32.9%	64.7%

Table 63: Number of short trips and distance share in different v_max bins for different roadcategories in Poland

Spain v_max in km/h	number of short trips			distance share		
	motorway	rural	urban	motorway	rural	urban
5		1	713		0.0%	0.3%
15			1402			2.4%
25			1670			6.6%
35			1788			15.1%
45			1577			22.5%
55		6	1016		0.2%	22.0%
65		13	457		0.5%	13.9%
75		61	114		2.4%	6.5%
85		111	62		16.7%	10.4%
95		146	2		34.8%	0.4%
105		92			27.1%	
115		33			10.4%	
125	3	15		15.8%	6.0%	
135		4			2.0%	
145	3			39.3%		
155	1			44.9%		
	7	482	8801	100.0%	100.0%	100.0%
			distance share:	10.5%	50.9%	38.6%

Table 64: Number of short trips and distance share in different v_max bins for different roadcategories in Spain



9 Acceleration phases

Acceleration phases are specified as consecutive time samples with $a > 0.5 \text{ km/h/s}$ or 0.1389 m/s^2 . The following key parameters of such phases were collected in a separate table (TB_acc) per vehicle and trip:

- Date,
- Time,
- Duration,
- Distance,
- v_{min} ,
- v_{ave} ,
- v_{max} ,
- stddev_v ,
- a_{min} ,
- a_{ave} ,
- a_{max} ,
- $v \cdot a_{\text{min}}$,
- $v \cdot a_{\text{ave}}$,
- $v \cdot a_{\text{max}}$.

In order to ease the calculation of duration and distance related distributions the results were binned for both values (2 seconds for the duration and 5 m for the distance). The analysis was performed for phases up to 60 km/h, v_{max} between 60 and 80 km/h and v_{max} above 80 km/h separately.

In some of the following figures individual vehicles are indicated by a combination of the country code, the campaign and the vehicle number. These numbers (ID_veh) are cross referenced in the following tables.



country	campaign	IDveh	ID_veh	category
Belgium	1	1	380001	M1
Belgium	1	2	380002	M1
Belgium	1	3	380003	M1
Belgium	1	4	380004	M1
Belgium	1	5	380005	M1
Belgium	1	6	380006	M1
Belgium	1	7	380007	M1
Belgium	1	8	380008	M1
Belgium	1	9	380009	M1
Belgium	1	10	380010	M1
Belgium	1	11	380011	M1
Belgium	2	3	1380003	M1
Belgium	2	4	1380004	M1
Belgium	2	5	1380005	M1
Belgium	2	6	1380006	M1
Belgium	2	7	1380007	M1
Belgium	2	8	1380008	M1
Belgium	2	11	1380011	M1
Belgium	2	15	1380015	M1
Belgium	2	16	1380016	M1
Belgium	2	17	1380017	M1
Belgium	2	18	1380018	M1

Table 65: Cross reference vehicle numbers, used in the following figures



country	campaign	IDveh	ID_veh	category
France	1	1	1390001	M1
France	1	2	1390002	M1
France	1	3	1390003	M1
France	1	4	1390004	M1
France	1	5	1390005	M1
France	1	6	1390006	M1
France	1	7	1390007	M1
France	1	8	1390008	M1
France	1	9	1390009	M1
France	1	10	1390010	M1
France	2	11	1400011	M1
France	2	12	1400012	M1
France	2	13	1400013	M1
France	2	14	1400014	M1
France	2	15	1400015	M1
France	2	16	1400016	M1
France	2	17	1400017	M1
France	2	18	1400018	M1
France	2	19	1400019	M1
France	2	20	1400020	M1
France	2	21	1400021	M1
France	2	22	1400022	M1
France	2	23	1400023	M1
France	2	24	1400024	M1
France	2	25	1400025	M1
France	2	26	1400026	M1
France	2	27	1400027	M1
France	2	28	1400028	M1
France	2	29	1400029	M1
France	2	30	1400030	M1
France	2	31	1400031	M1
France	2	32	1400032	M1
France	2	33	1400033	M1
France	2	34	1400034	M1
France	2	35	1400035	M1
France	2	36	1400036	M1
France	2	37	1400037	M1
France	2	38	1400038	M1
France	2	39	1400039	M1
France	2	40	1400040	M1
France	2	41	1400041	M1
France	2	42	1400042	M1

Table 66: Cross reference vehicle numbers, used in the following figures



country	campaign	IDveh	ID_veh	category
Germany	1	3	400003	M1
Germany	1	5	400005	M1
Germany	1	6	400006	M1
Germany	1	7	400007	M1
Germany	1	13	400013	M1
Germany	1	14	400014	M1
Germany	1	15	400015	M1
Germany	1	16	400016	M1
Sweden	1	1	420001	M1
Sweden	1	2	420002	M1
Sweden	1	3	420003	M1
Sweden	1	4	420004	M1
Sweden	1	5	420005	M1
Sweden	1	6	420006	M1
Sweden	1	8	420008	N1
Sweden	1	9	420009	N1
Italy	1	1	460001	M1
Italy	1	2	460002	M1
Italy	1	4	460004	M1
Italy	1	8	460008	M1
Italy	1	9	460009	M1
Italy	1	10	460010	M1
Italy	1	11	460011	M1
Italy	1	12	460012	M1
Slovenia	1	18	470018	M1
Slovenia	1	20	470020	M1
Slovenia	1	21	470021	M1
Slovenia	1	22	470022	M1
Slovenia	1	23	470023	M1
Slovenia	1	24	470024	M1
Slovenia	1	25	470025	M1
Slovenia	1	26	470026	M1
Slovenia	1	27	470027	M1
Slovenia	1	28	470028	M1
Slovenia	1	29	470029	M1
Slovenia	1	30	470030	M1
Slovenia	1	31	470031	M1
Slovenia	1	32	470032	M1
Slovenia	1	33	470033	M1
Slovenia	1	34	470034	M1
Slovenia	1	35	470035	M1

Table 67: Cross reference vehicle numbers, used in the following figures



country	campaign	IDveh	ID_veh	category
UK	1	1	480001	N1
UK	1	2	480002	N1
UK	1	3	480003	N1
UK	1	4	480004	N1
UK	1	5	480005	N1
UK	1	6	480006	N1
UK	1	7	480007	N1
UK	1	8	480008	N1
UK	1	9	480009	N1
UK	1	10	480010	N1
UK	1	11	480011	N1
UK	1	12	480012	N1
UK	2	1	1480001	M1
UK	2	2	1480002	M1
UK	2	3	1480003	M1
UK	2	4	1480004	M1
UK	2	5	1480005	M1
UK	2	6	1480006	M1
UK	2	7	1480007	M1
UK	2	8	1480008	M1
UK	2	9	1480009	M1
UK	2	10	1480010	M1
Poland	1	1	500001	M1
Poland	1	2	500002	M1
Poland	1	3	500003	M1
Poland	1	4	500004	M1
Poland	1	5	500005	M1
Poland	1	6	500006	M1
Poland	1	7	500007	M1
Poland	1	8	500008	N1
Poland	1	9	500009	M1
Spain	1	1	510001	M1
Spain	1	2	510002	M1
Spain	1	3	510003	M1
Spain	1	4	510004	M1
Spain	1	5	510005	M1
Spain	1	6	510006	M1
Spain	1	7	510007	N1
Spain	1	8	510008	N1
Spain	1	9	510009	N1
Spain	1	10	510010	N1

Table 68: Cross reference vehicle numbers, used in the following figures



country	campaign	IDveh	ID_veh	category
USA	1	1	1801	M1
USA	1	2	1802	M1
USA	1	3	1803	M1
USA	1	4	1804	M1
USA	1	5	1805	M1
Japan	1	1	410001	M1
Japan	1	2	410002	M1
Japan	1	3	410003	M1
Japan	1	4	410004	M1
Japan	1	5	410005	M1
Japan	1	6	410006	M1
Japan	1	7	410007	M1
Japan	1	8	410008	M1
Japan	1	9	410009	M1
Japan	1	10	410010	M1
Japan	1	11	410011	M1
Japan	1	12	410012	N1
Japan	1	13	410013	N1
Japan	1	14	410014	N1
Japan	1	15	410015	N1
Japan	1	16	410016	N1
Japan	1	17	410017	N1
Japan	1	18	410018	N1
Japan	1	19	410019	N1
Japan	1	20	410020	N1
Japan	1	21	410021	N1
Japan	1	22	410022	N1
Japan	1	23	410023	N1
Japan	1	24	410024	N1
Korea	1	1	430001	M1
Korea	1	2	430002	M1
Korea	1	3	430003	M1
Korea	1	4	430004	M1
Korea	1	5	430005	N1
Korea	1	6	430006	N1
Korea	1	7	430007	N1
Korea	1	8	430008	N1

Table 69: Cross reference vehicle numbers, used in the following figures



country	campaign	IDveh	ID_veh	category
India	1	1	520001	M1
India	1	2	520002	N1
India	1	3	520003	M1
India	1	4	520004	M1
India	1	5	520005	N1
India	1	6	520006	M1
India	1	7	520007	M1
India	1	8	520008	M1
India	1	9	520009	N1
India	2	10	1520010	M1
India	2	11	1520011	M1
India	2	12	1520012	M1
India	2	13	1520013	M1
India	2	14	1520014	M1
India	2	15	1520015	M1
India	2	16	1520016	M1
India	2	17	1520017	M1
India	2	18	1520018	N1
India	2	19	1520019	M1
India	2	20	1520020	M1
India	3	21	2520021	N1
India	3	22	2520022	N1
India	3	23	2520023	N1
India	3	24	2520024	M1
India	3	25	2520025	M1
India	3	26	2520026	N1
India	3	27	2520027	M1
India	3	28	2520028	N1
India	3	29	2520029	N1
India	3	30	2520030	N1
India	3	31	2520031	M1

Table 70: Cross reference vehicle numbers, used in the following figures



9.1 Duration distributions

Vehicle specific duration distributions for the different regions and for acceleration phases with $v_{max} \leq 60$ km/h are shown in Figure 31 to Figure 39.

Figure 40 to Figure 48 show the corresponding distributions for acceleration phases with v_{max} between 60 and 80 km/h and Figure 49 to Figure 55 shown the distributions for acceleration phases with v_{max} above 80 km/h.

Figure 56 shows a comparison of the average curves for Europe with the different v_{max} ranges.

The numbers in the legends are vehicle indicators according to Table 60 to Table 65.

Class 1 vehicles are vehicles with a rated power to kerb mass ratio (pmr) ≤ 22 W/kg, class 2 vehicles are vehicles with 22 W/kg $< pmr \leq 34$ W/kg and class 3 vehicles are vehicles with $pmr > 34$ W/kg.

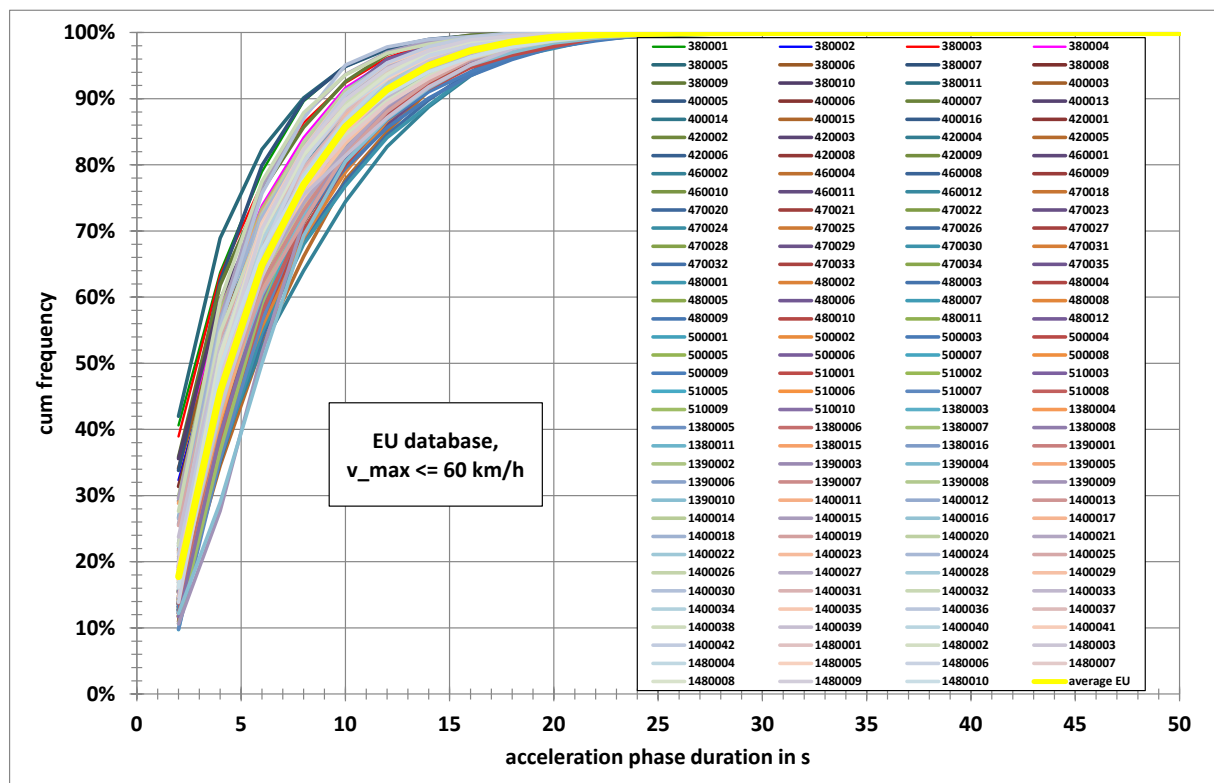


Figure 33: Acceleration phase duration distributions of the vehicles in Europe ($v_{max} \leq 60$ km/h)

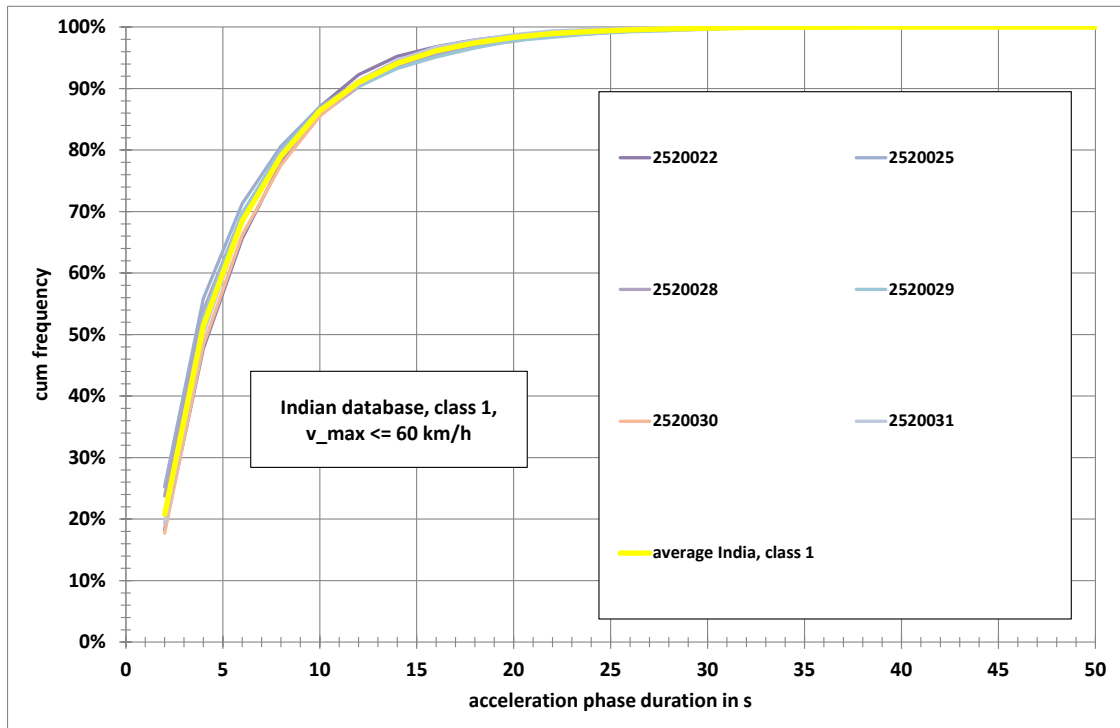


Figure 34: Acceleration phase duration distributions of class 1 vehicles in India ($v_{max} \leq 60$ km/h)

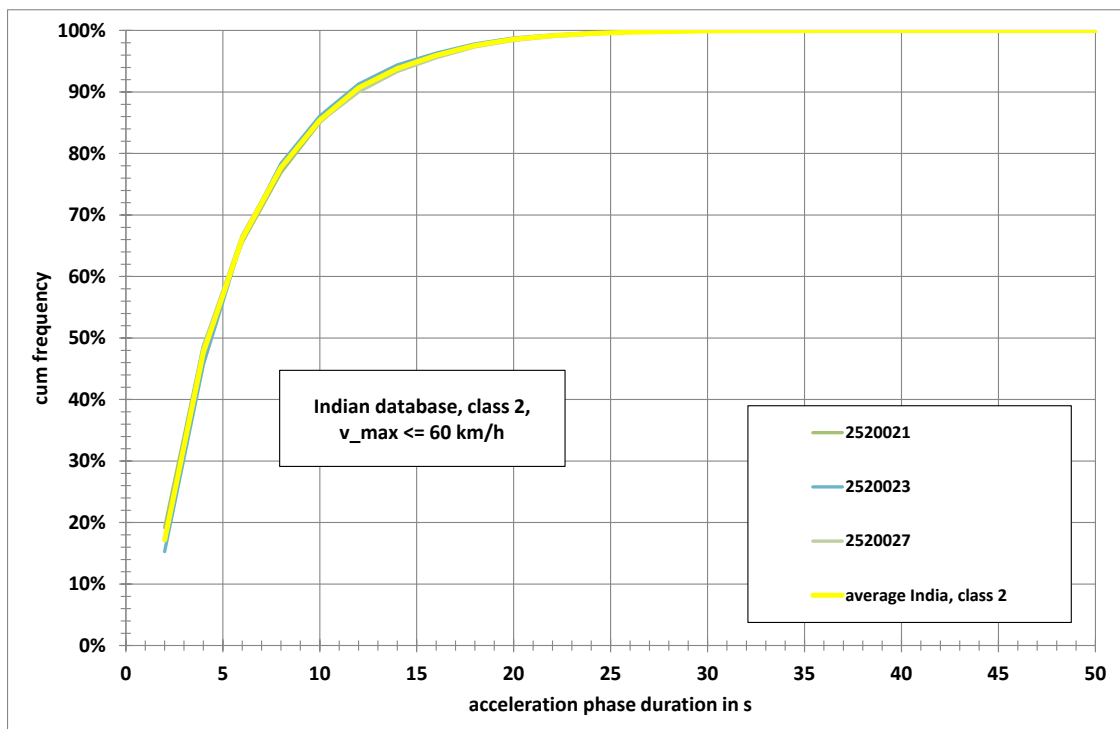


Figure 35: Acceleration phase duration distributions of class 2 vehicles in India ($v_{max} \leq 60$ km/h)

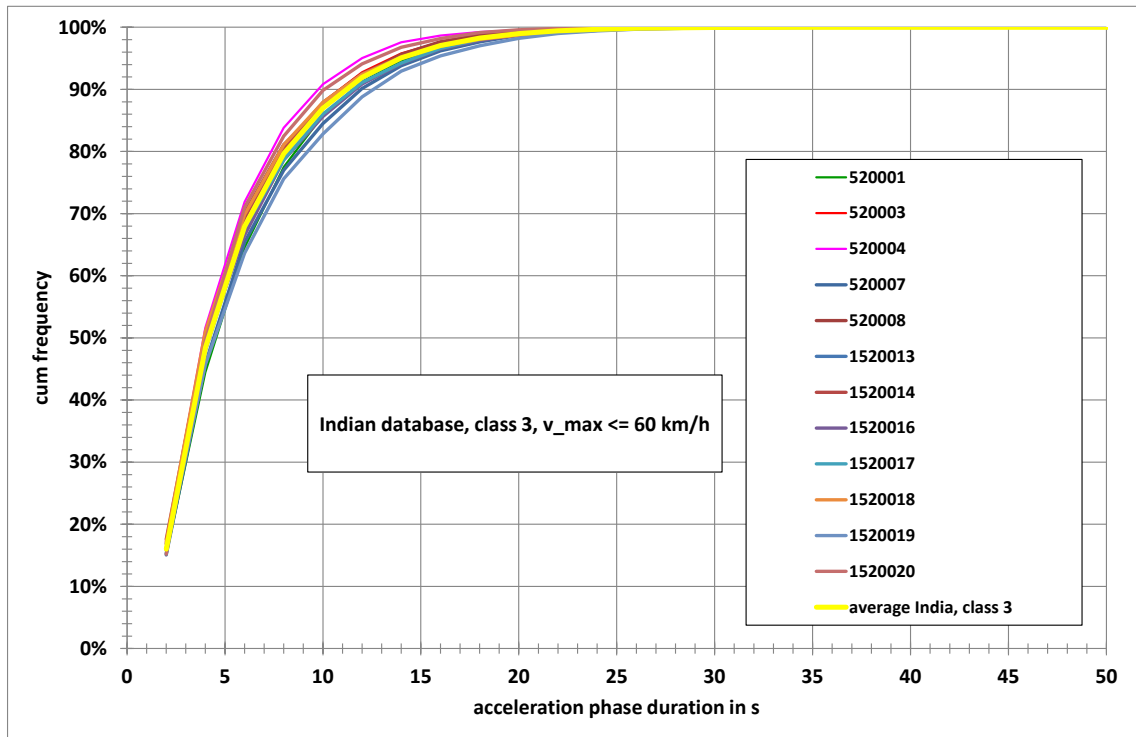


Figure 36: Acceleration phase duration distributions of class 3 vehicles in India ($v_{max} \leq 60$ km/h)

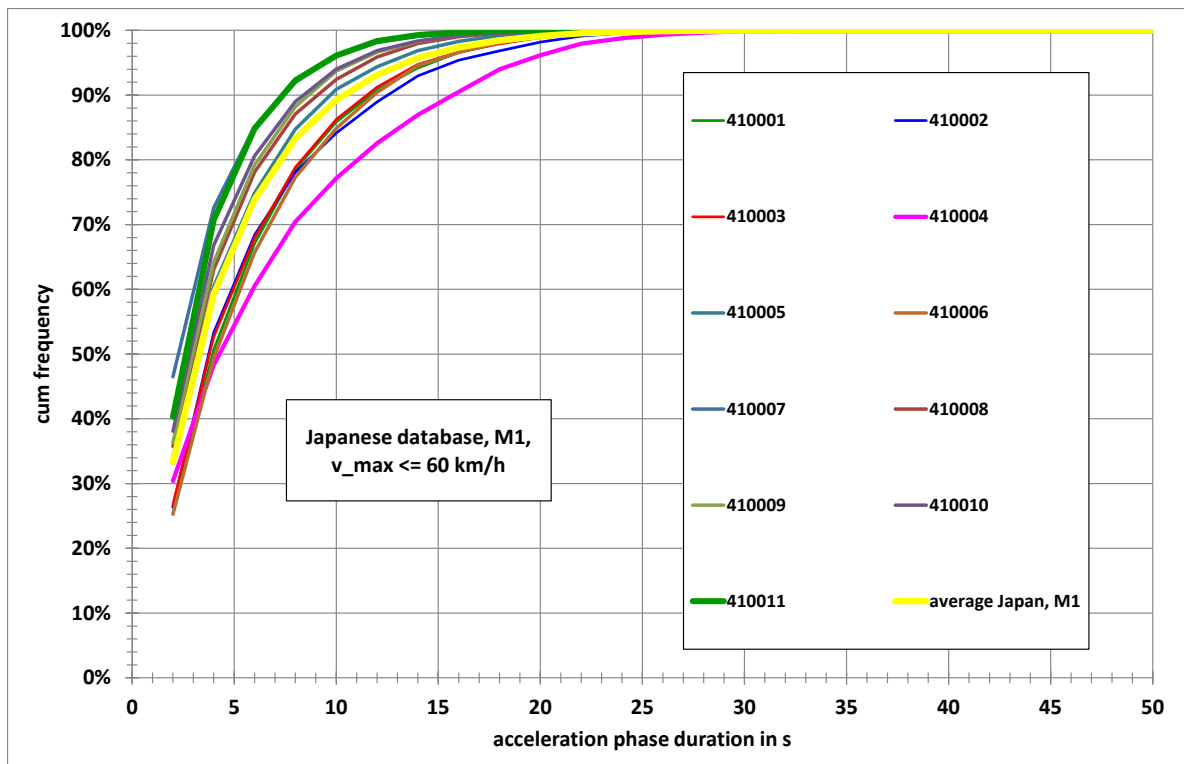




Figure 37: Acceleration phase duration distributions of M1 vehicles in Japan ($v_{max} \leq 60$ km/h)

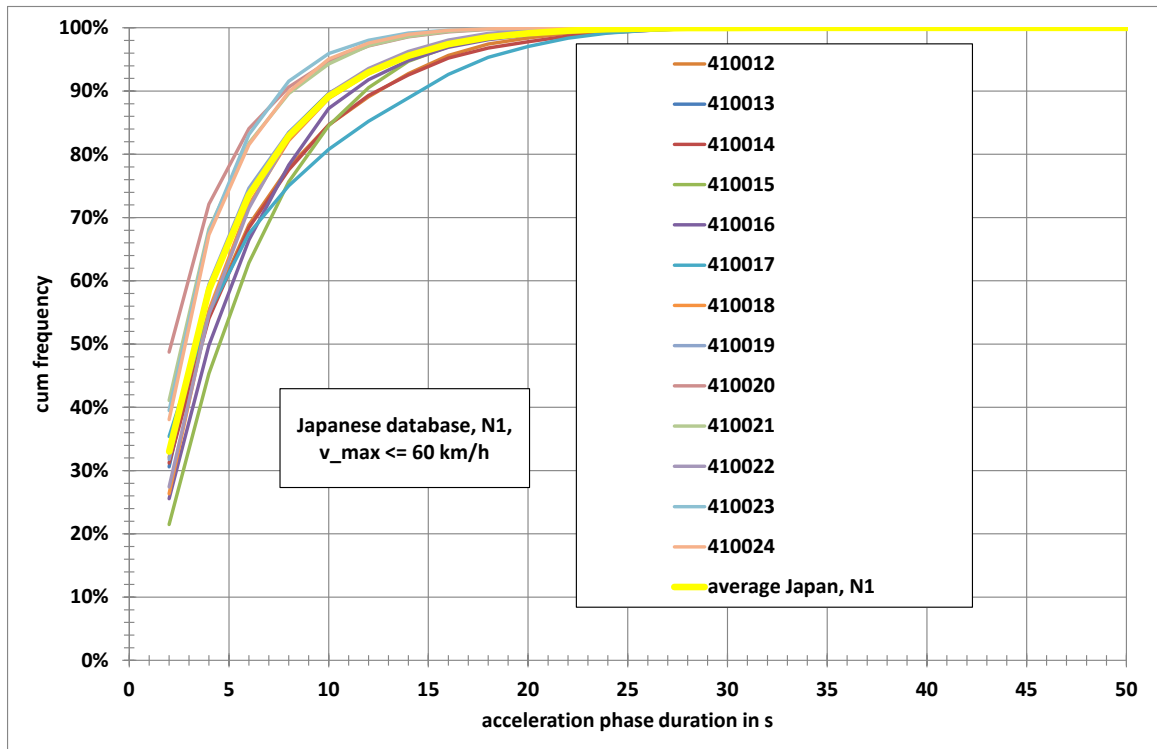


Figure 38: Acceleration phase duration distributions of N1 vehicles in Japan ($v_{max} \leq 60$ km/h)

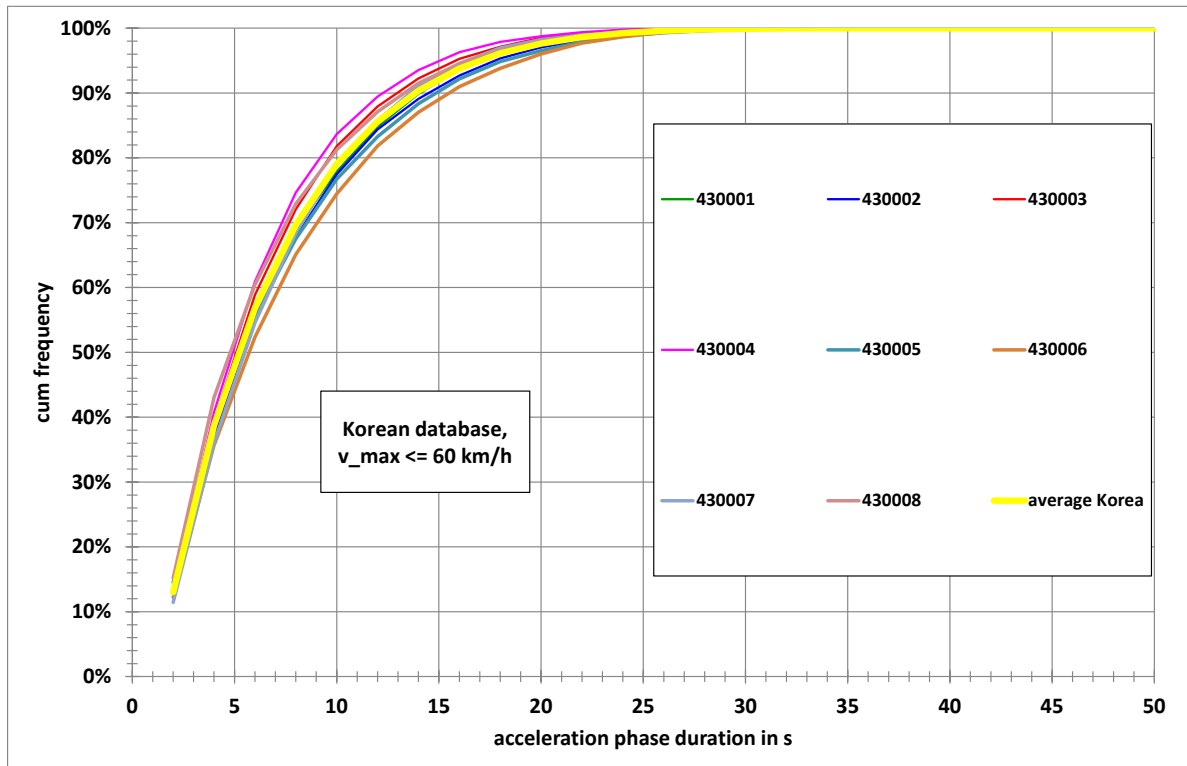


Figure 39: Acceleration phase duration distributions of the vehicles in Korea ($v_{max} \leq 60$ km/h)

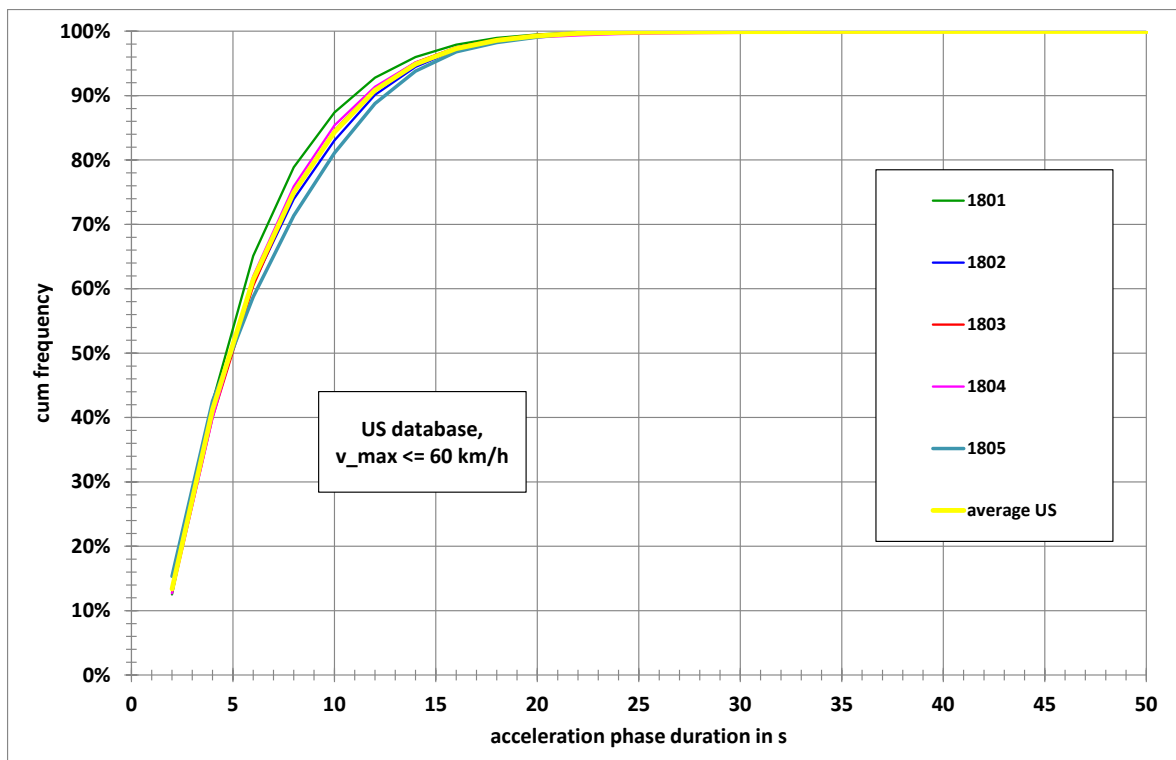




Figure 40: Acceleration phase duration distributions of the vehicles in USA ($v_{max} \leq 60$ km/h)

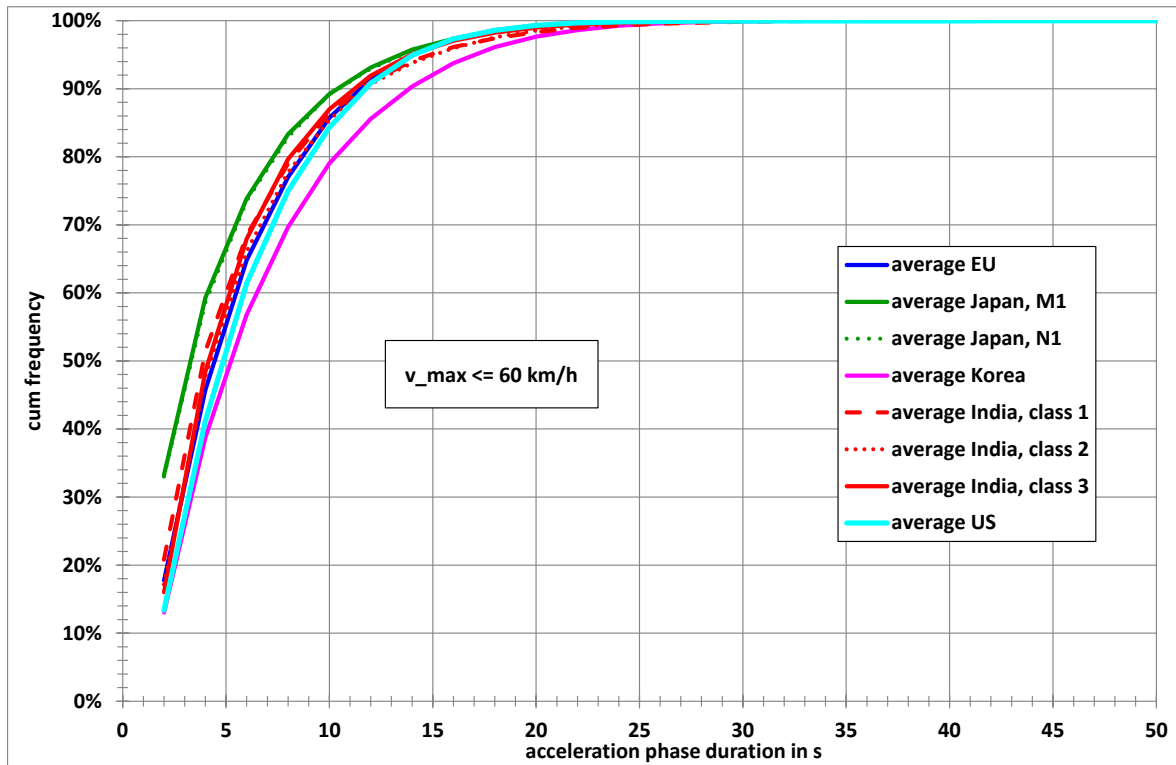


Figure 41: Acceleration phase duration distributions for the different regions ($v_{max} \leq 60$ km/h)

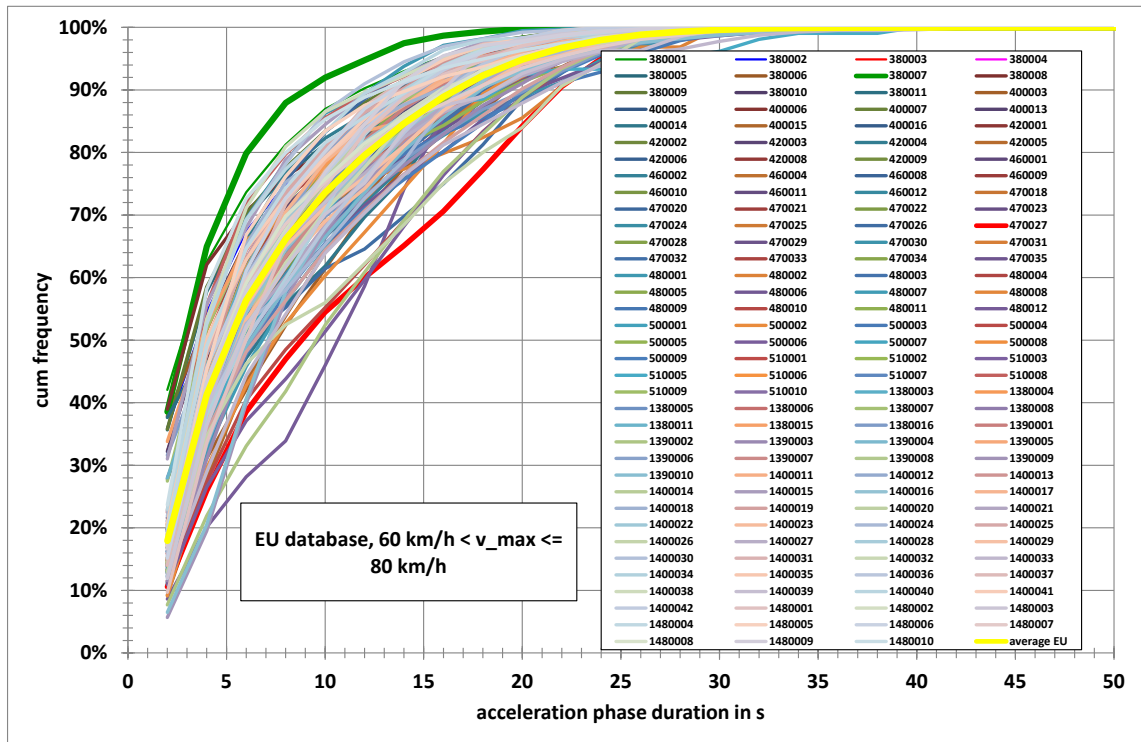


Figure 42: Acceleration phase duration distributions of the vehicles in Europe (60 km/h < v_max <= 80 km/h)

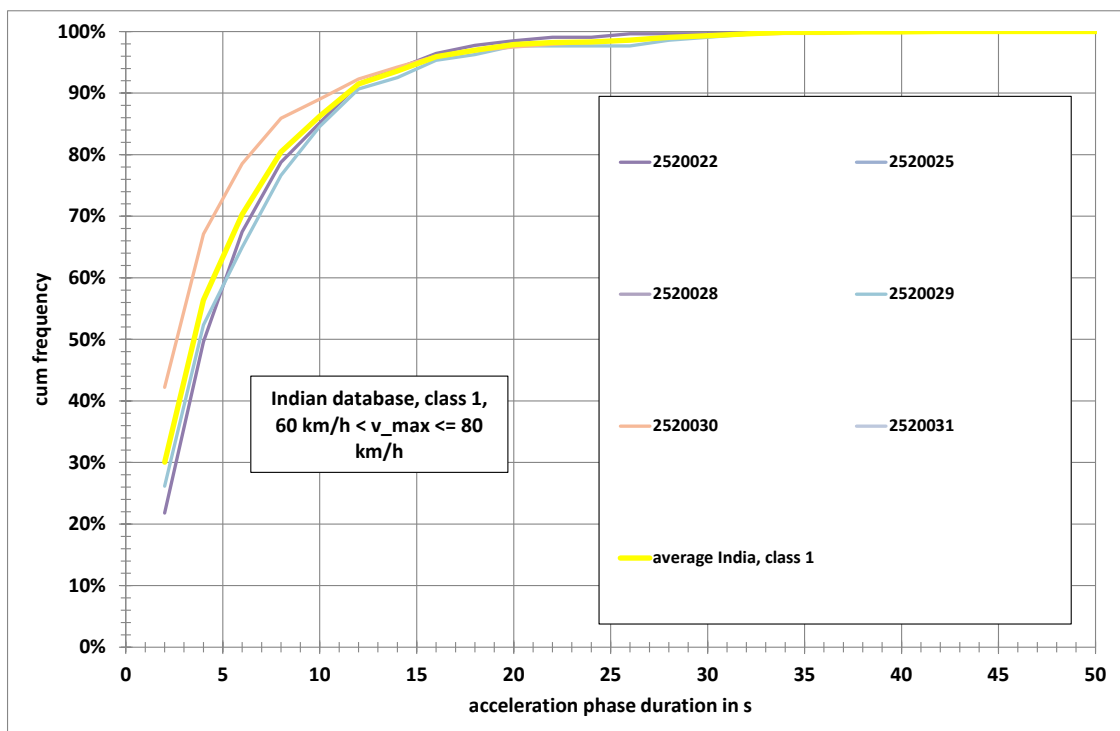


Figure 43: Acceleration phase duration distributions of class 1 vehicles in India (60 km/h < v_max <= 80 km/h)

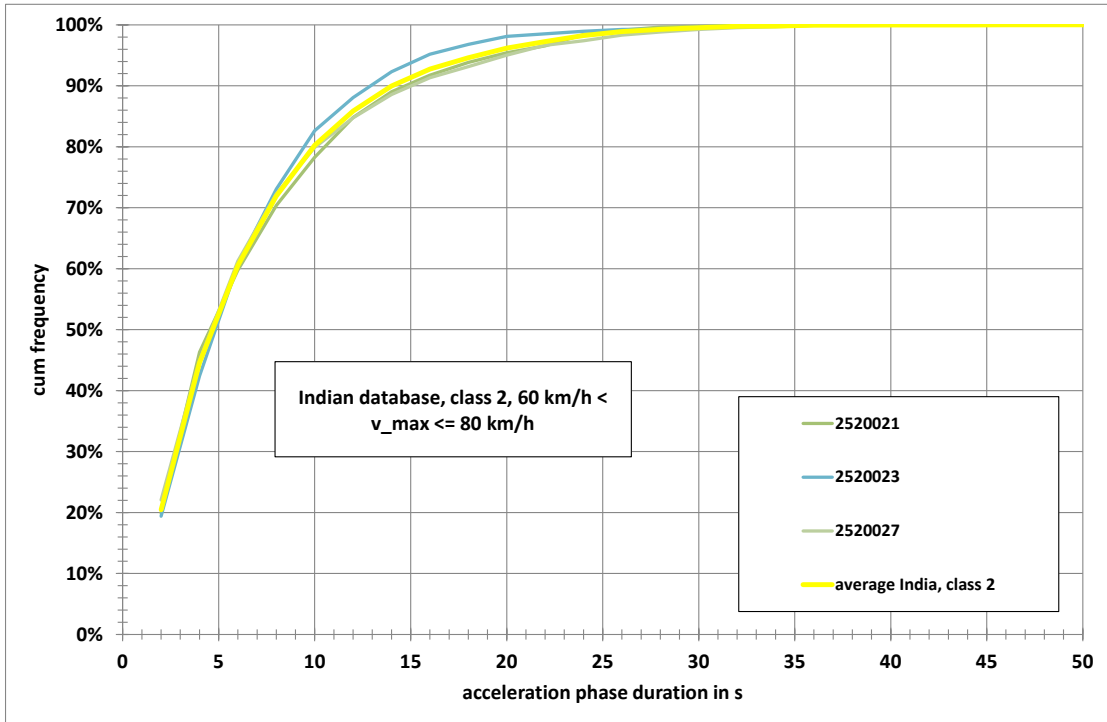


Figure 44: Acceleration phase duration distributions of class 2 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

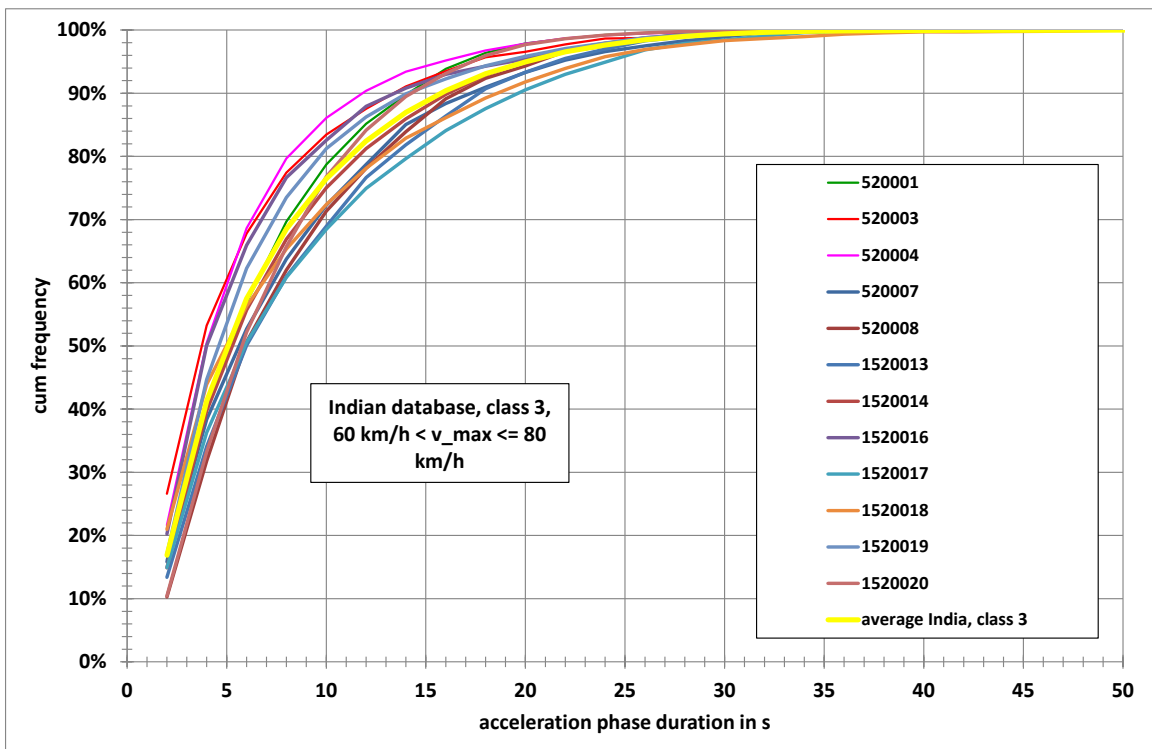


Figure 45: Acceleration phase duration distributions of class 3 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

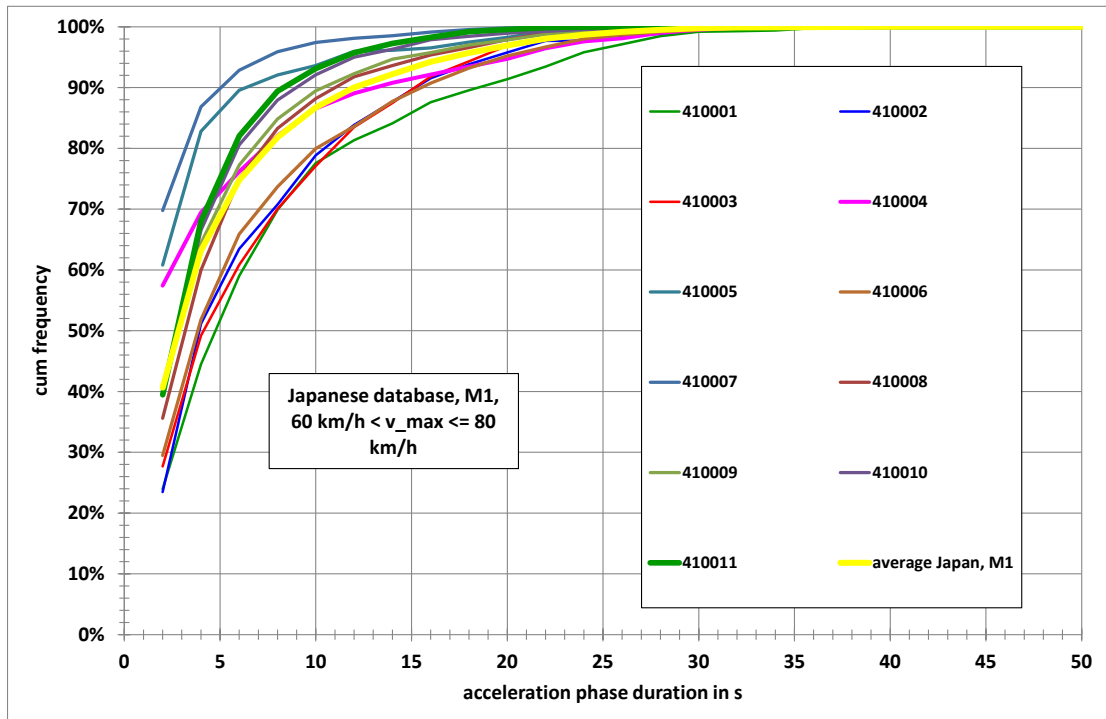


Figure 46: Acceleration phase duration distributions of M1 vehicles in Japan ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

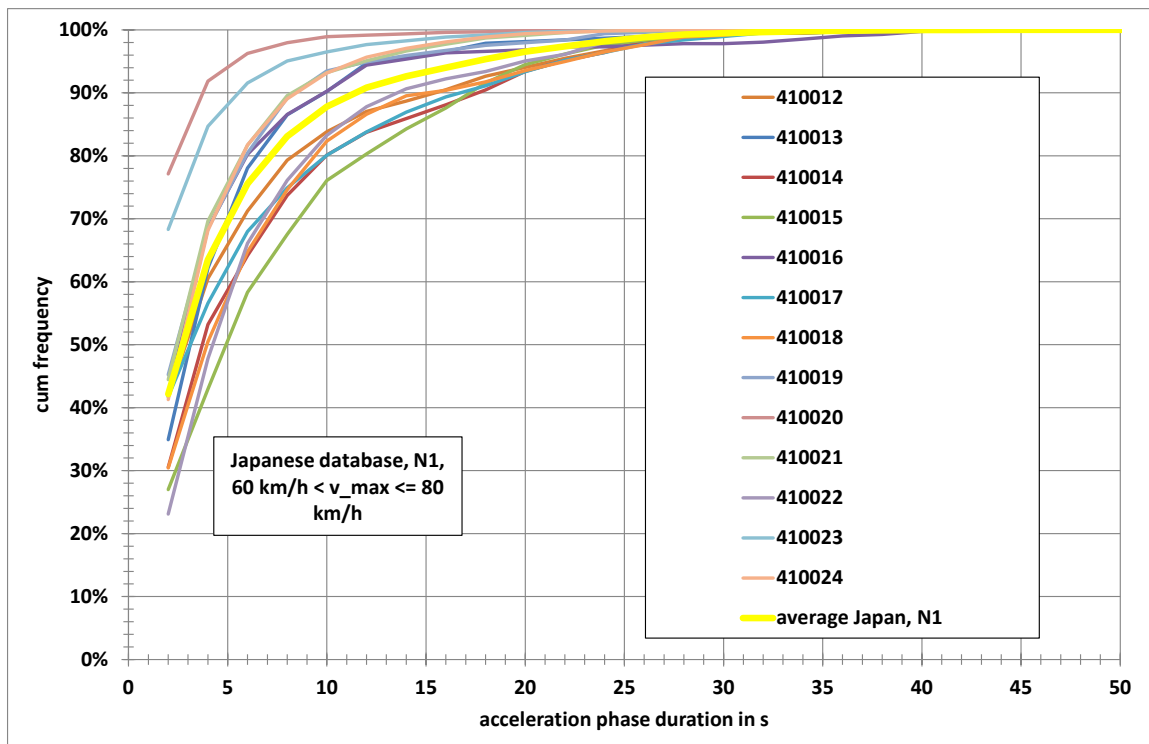


Figure 47: Acceleration phase duration distributions of N1 vehicles in Japan ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

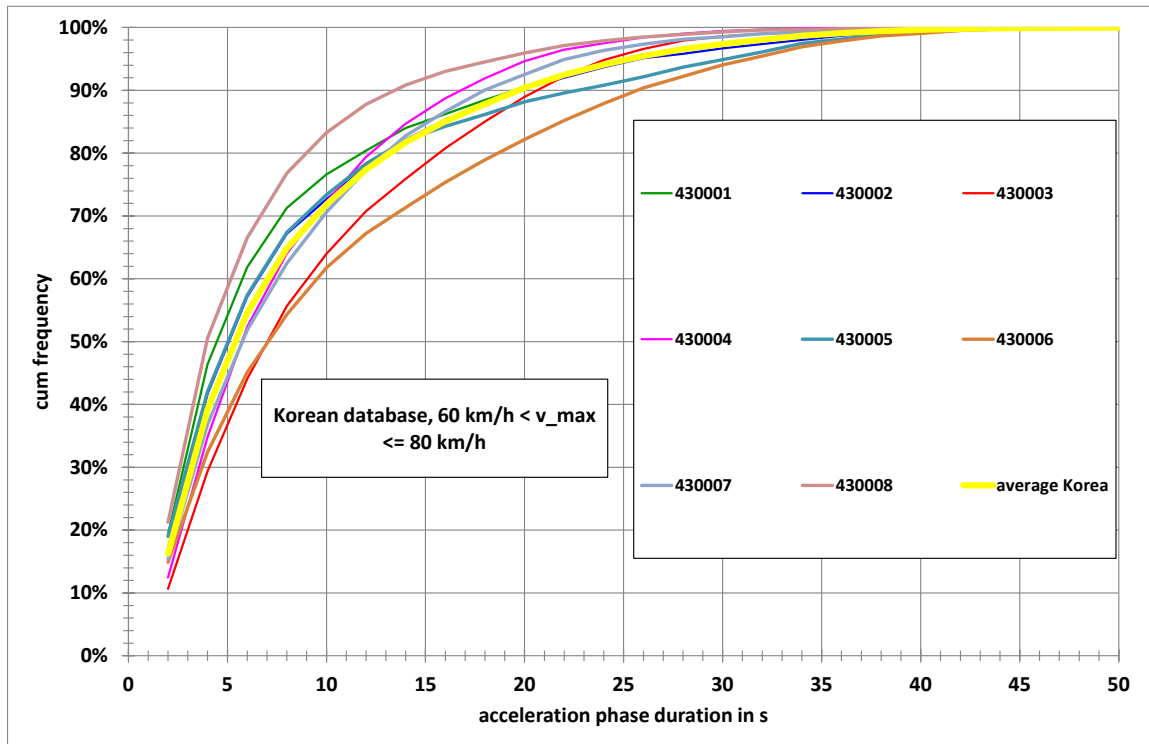


Figure 48: Acceleration phase duration distributions of the vehicles in Korea ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

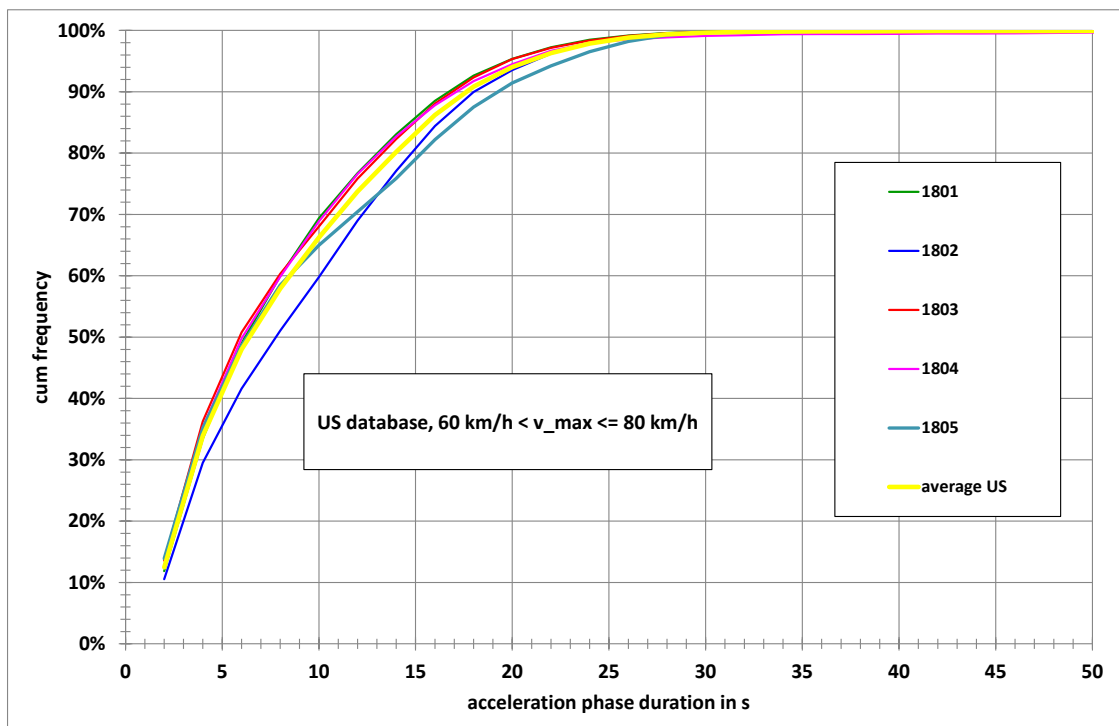


Figure 49: Acceleration phase duration distributions of the vehicles in USA ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

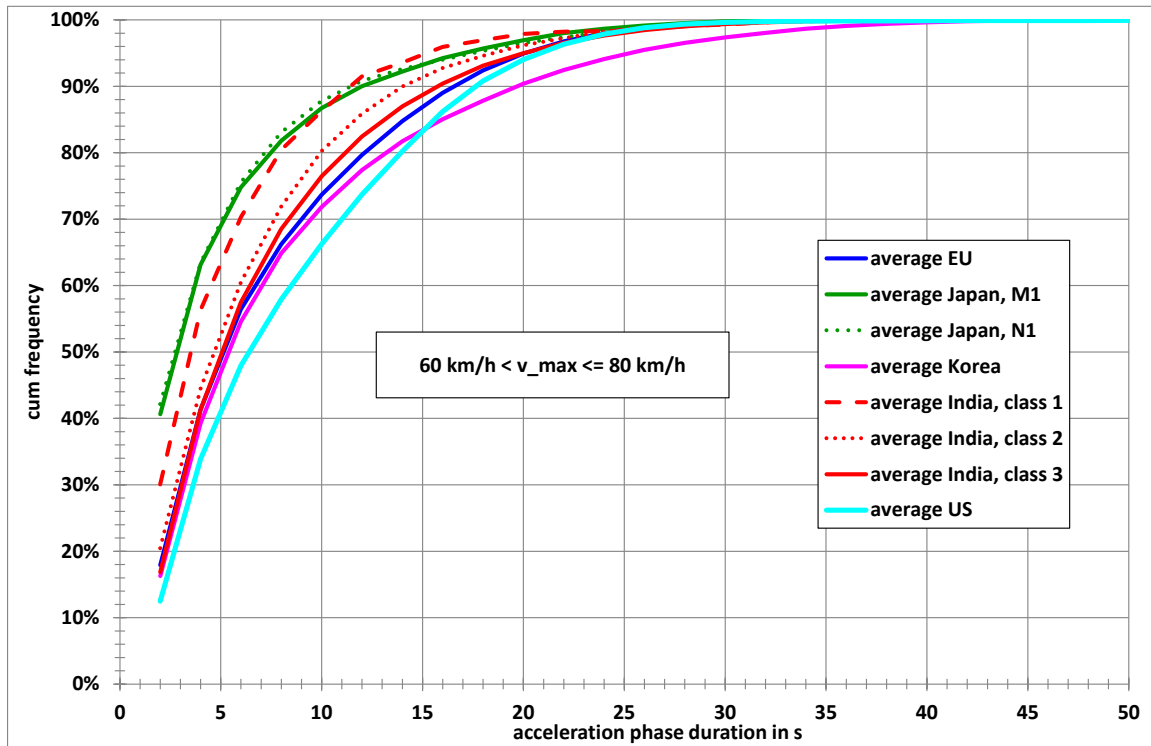


Figure 50: Acceleration phase duration distributions for the different regions ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

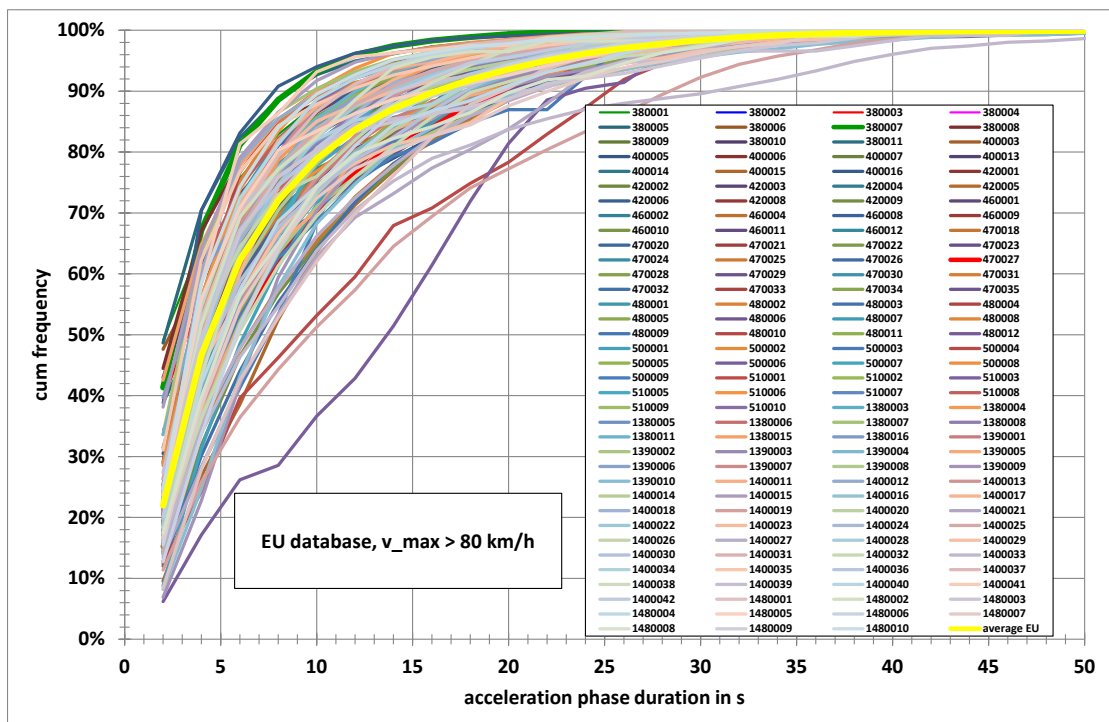


Figure 51: Acceleration phase duration distributions of the vehicles in Europe ($v_{\text{max}} > 80 \text{ km/h}$)

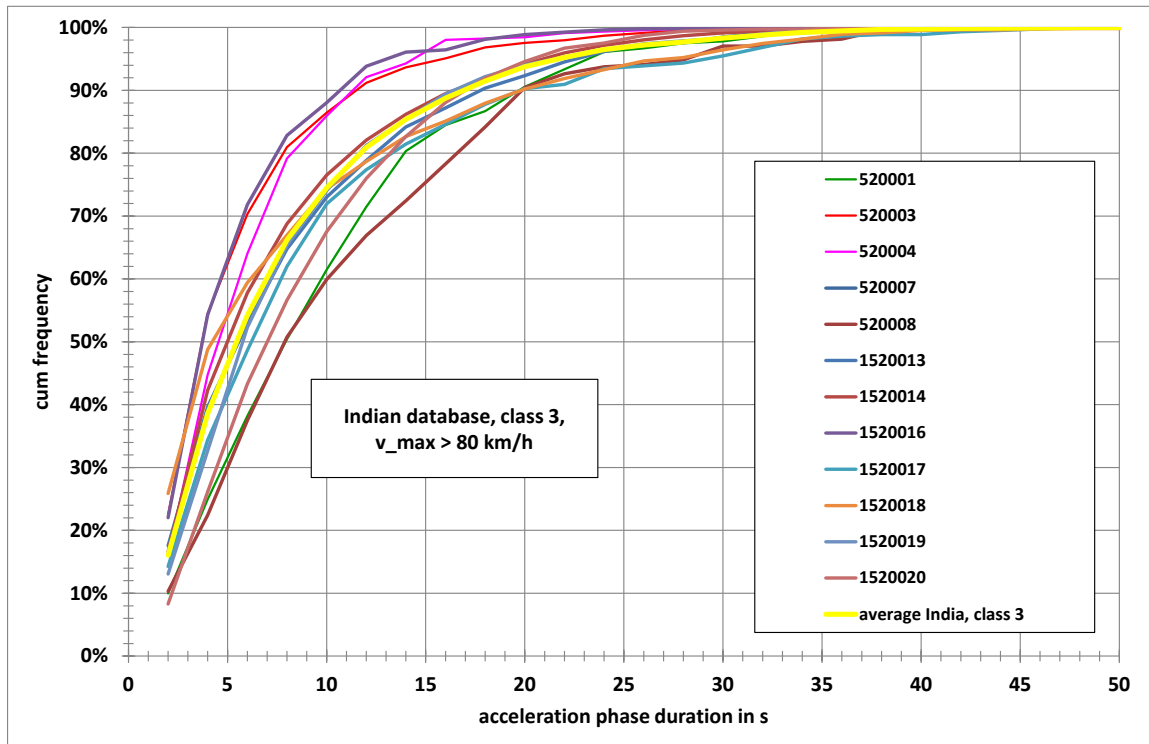


Figure 52: Acceleration phase duration distributions of class 3 vehicles in India ($v_{max} > 80$ km/h)

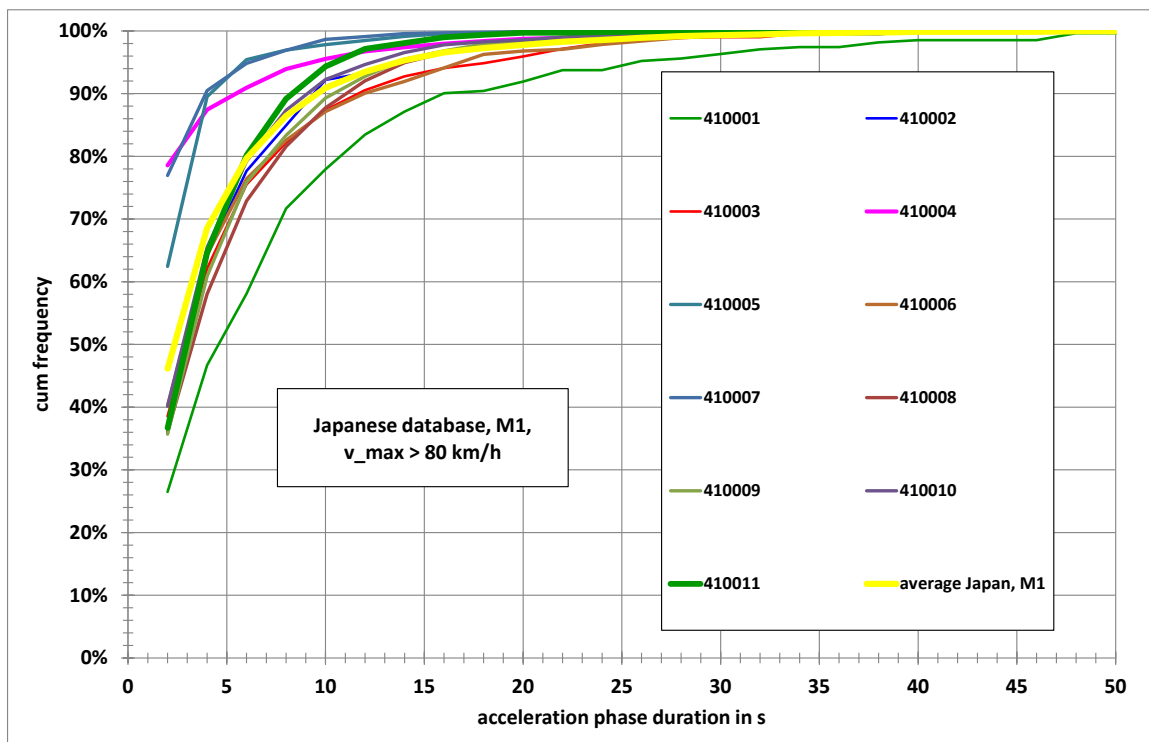


Figure 53: Acceleration phase duration distributions of M1 vehicles in Japan ($v_{max} > 80$ km/h)

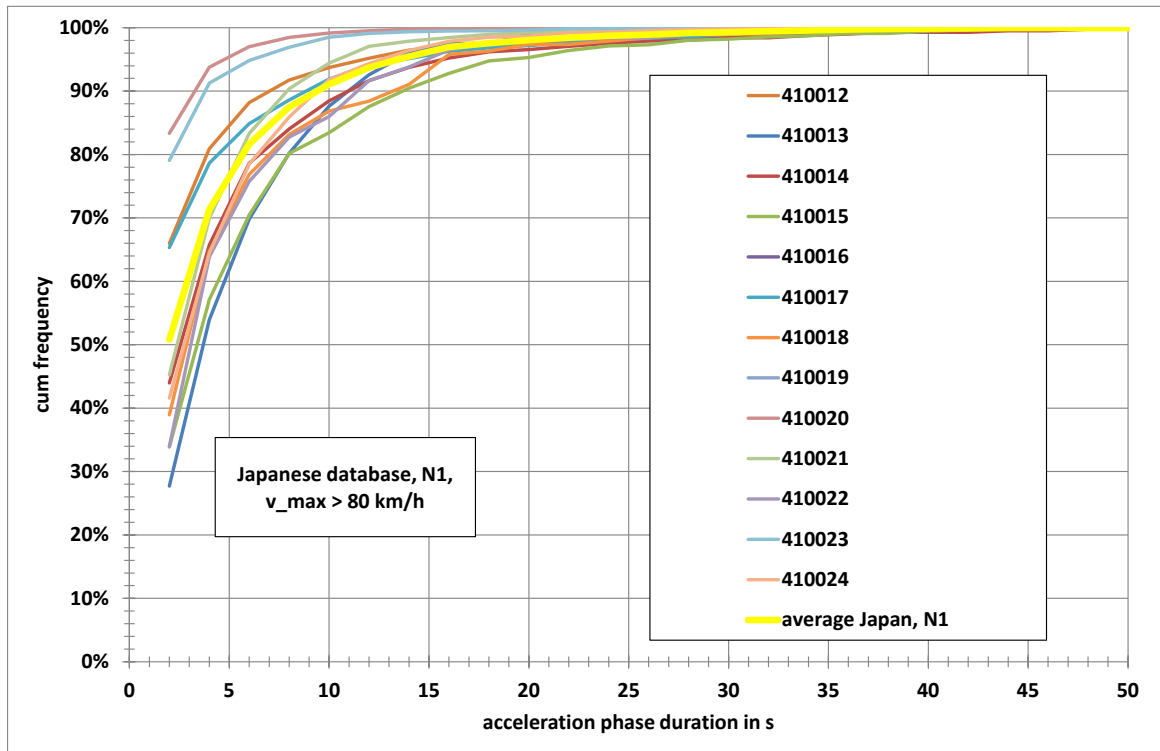


Figure 54: Acceleration phase duration distributions of N1 vehicles in Japan ($v_{max} > 80$ km/h)

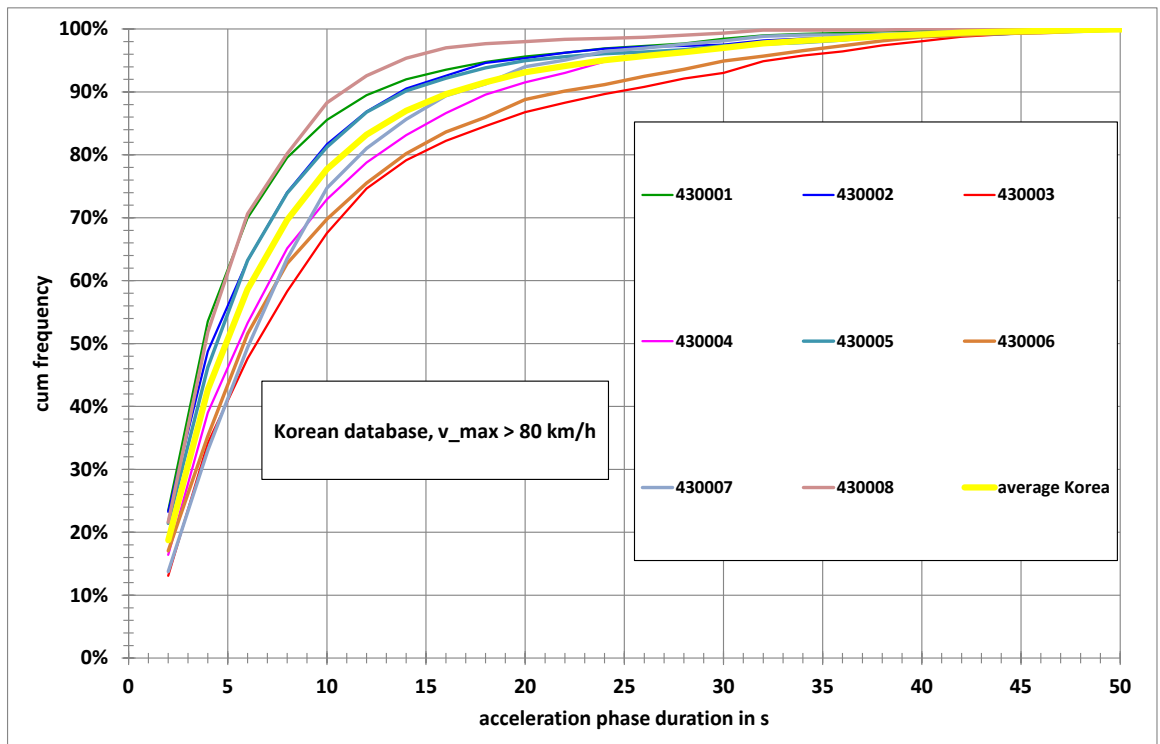


Figure 55: Acceleration phase duration distributions of the vehicles in Korea ($v_{max} > 80$ km/h)

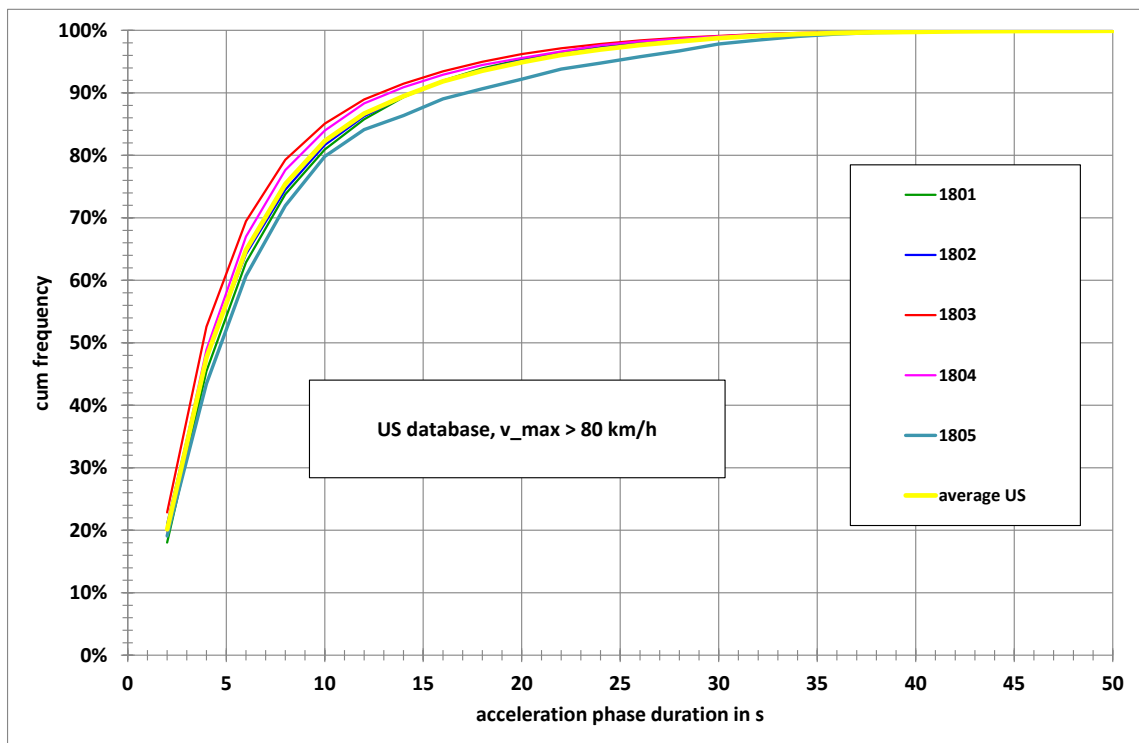


Figure 56: Acceleration phase duration distributions of the vehicles in USA ($v_{max} > 80$ km/h)

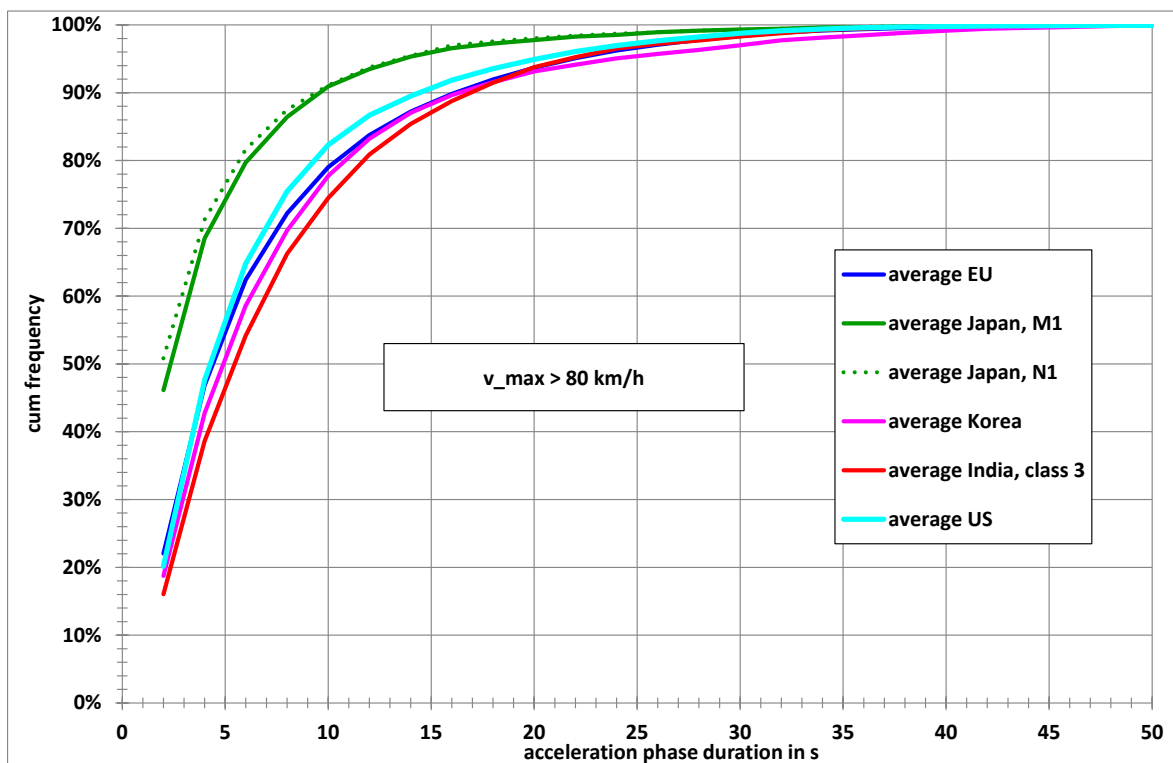


Figure 57: Acceleration phase duration distributions for the different regions ($v_{max} > 80$ km/h)

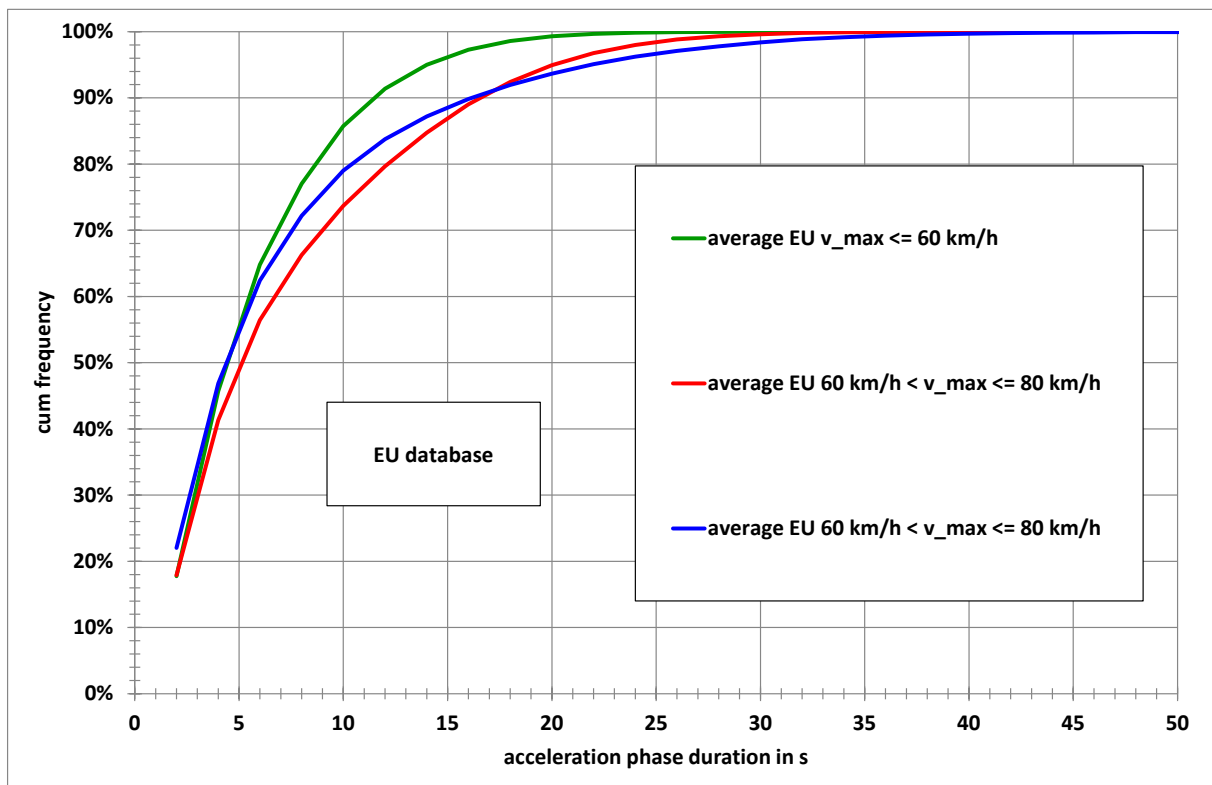


Figure 58: Acceleration phase duration distributions for short trips with different v_{max}

9.2 Distance distributions

Vehicle specific distance distributions for the different regions and for acceleration phases with $v_{max} \leq 60$ km/h are shown in Figure 57 to Figure 65.

Figure 66 to Figure 74 show the corresponding distributions for acceleration phases with v_{max} between 60 and 80 km/h and Figure 75 to Figure 80 shown the distributions for acceleration phases with v_{max} above 80 km/h.

Figure 81 shows a comparison of the average curves for Europe with the different v_{max} ranges.

The numbers in the legends are vehicle indicators according to Table 60 to Table 65.

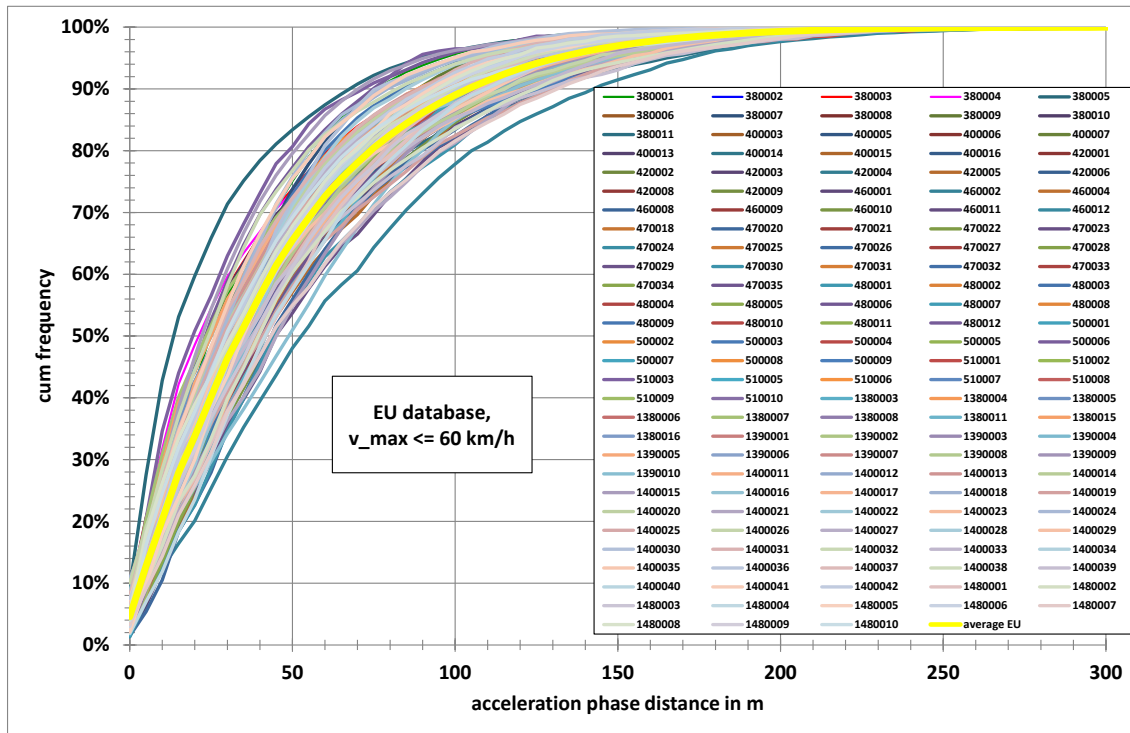


Figure 59: Acceleration phase distance distributions of the vehicles in Europe ($v_{max} \leq 60$ km/h)

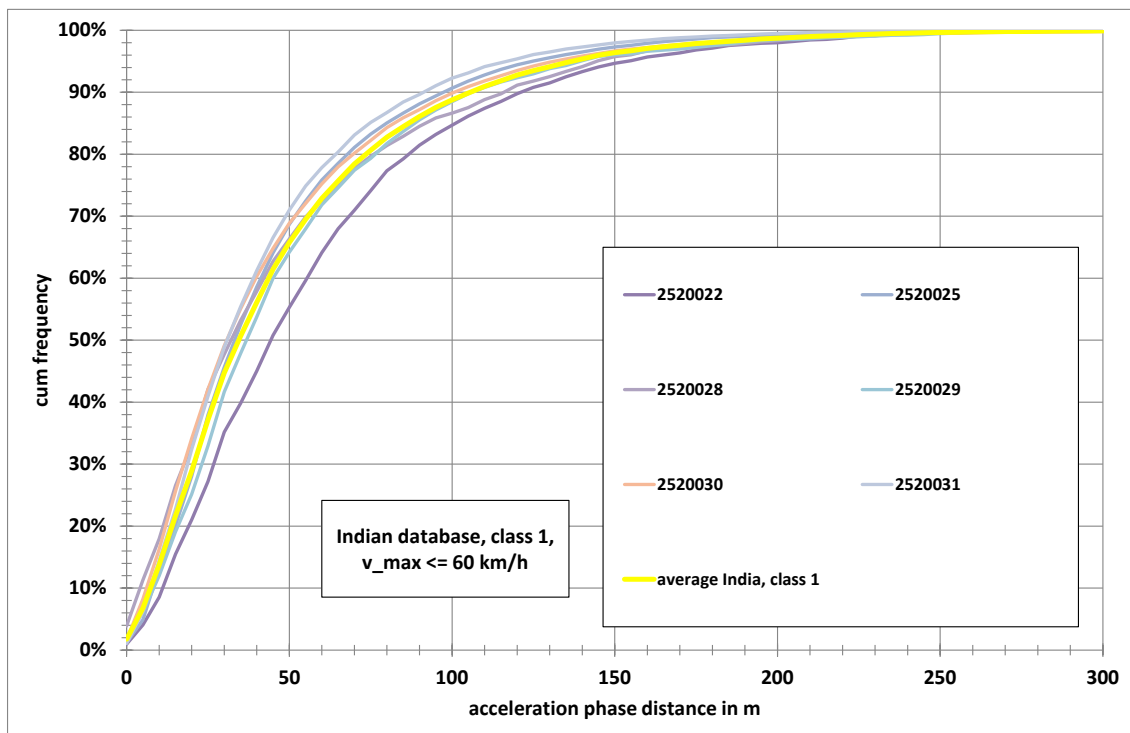


Figure 60: Acceleration phase distance distributions of class 1 vehicles in India ($v_{max} \leq 60$ km/h)

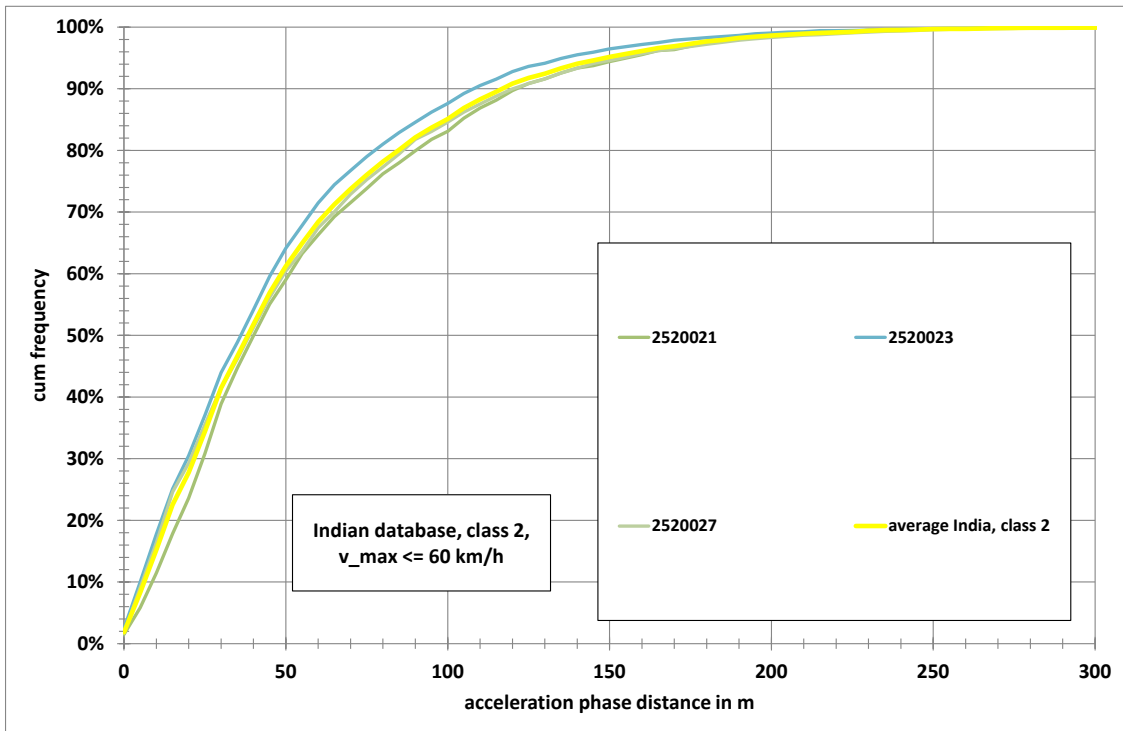


Figure 61: Acceleration phase distance distributions of class 2 vehicles in India ($v_{max} \leq 60$ km/h)

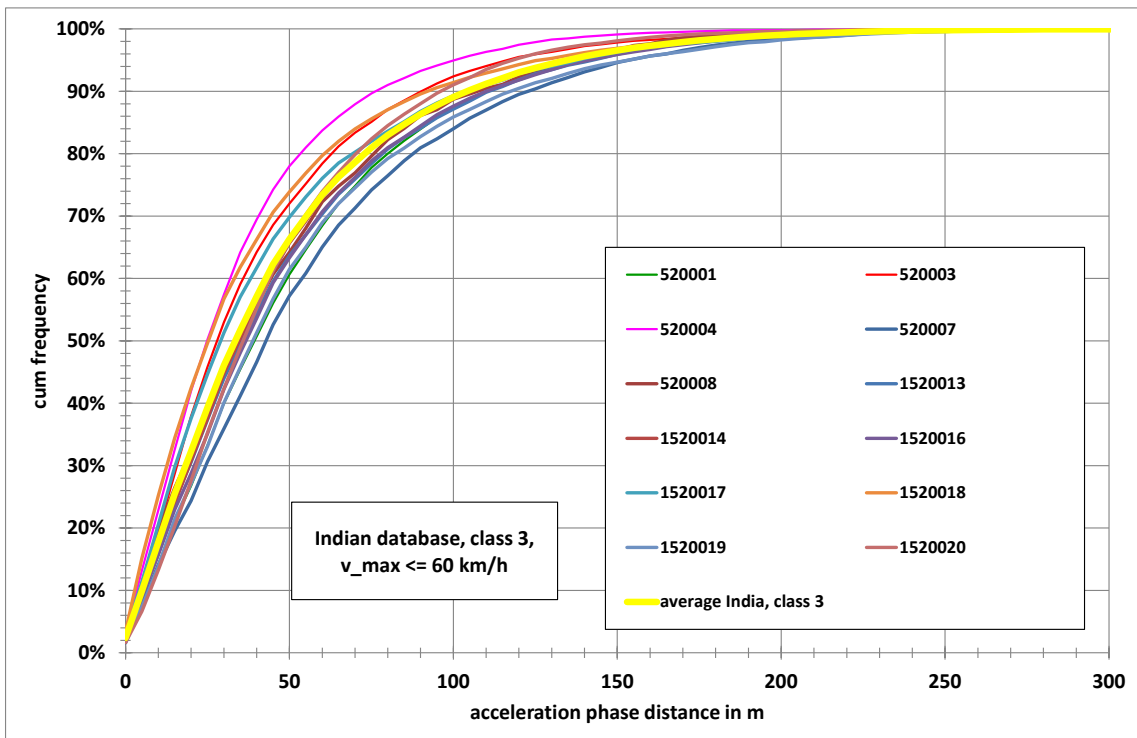


Figure 62: Acceleration phase distance distributions of class 3 vehicles in India ($v_{max} \leq 60$ km/h)

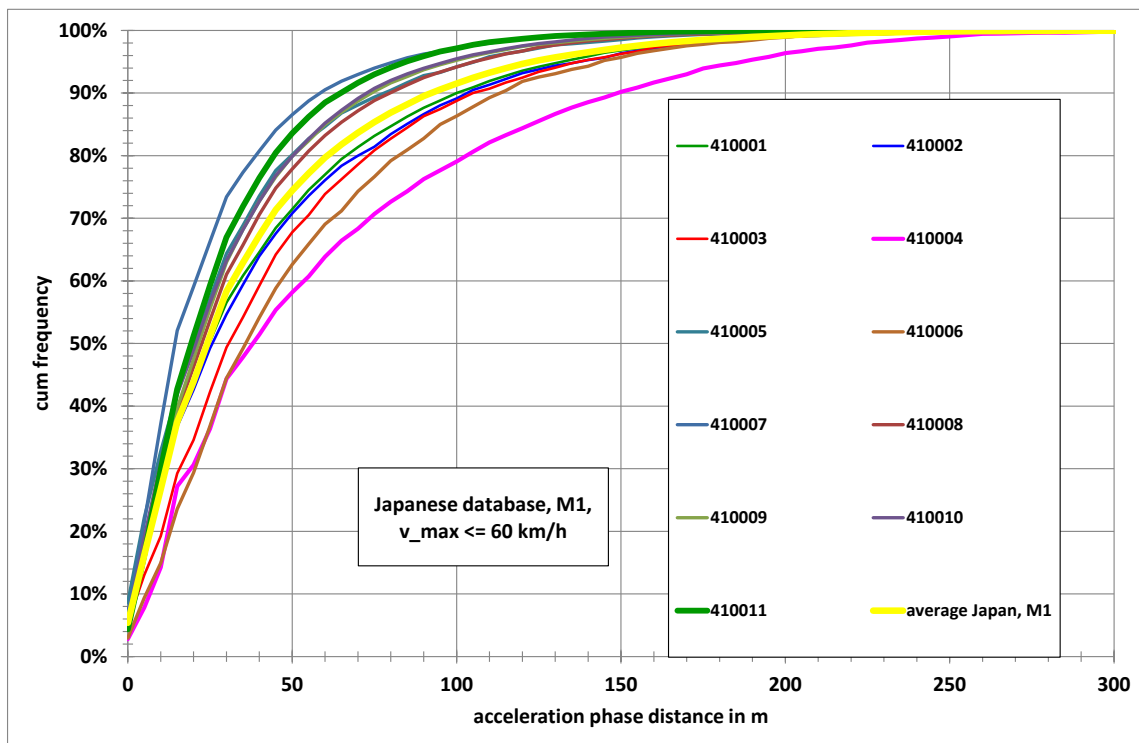


Figure 63: Acceleration phase distance distributions of M1 vehicles in Japan ($v_{max} \leq 60$ km/h)

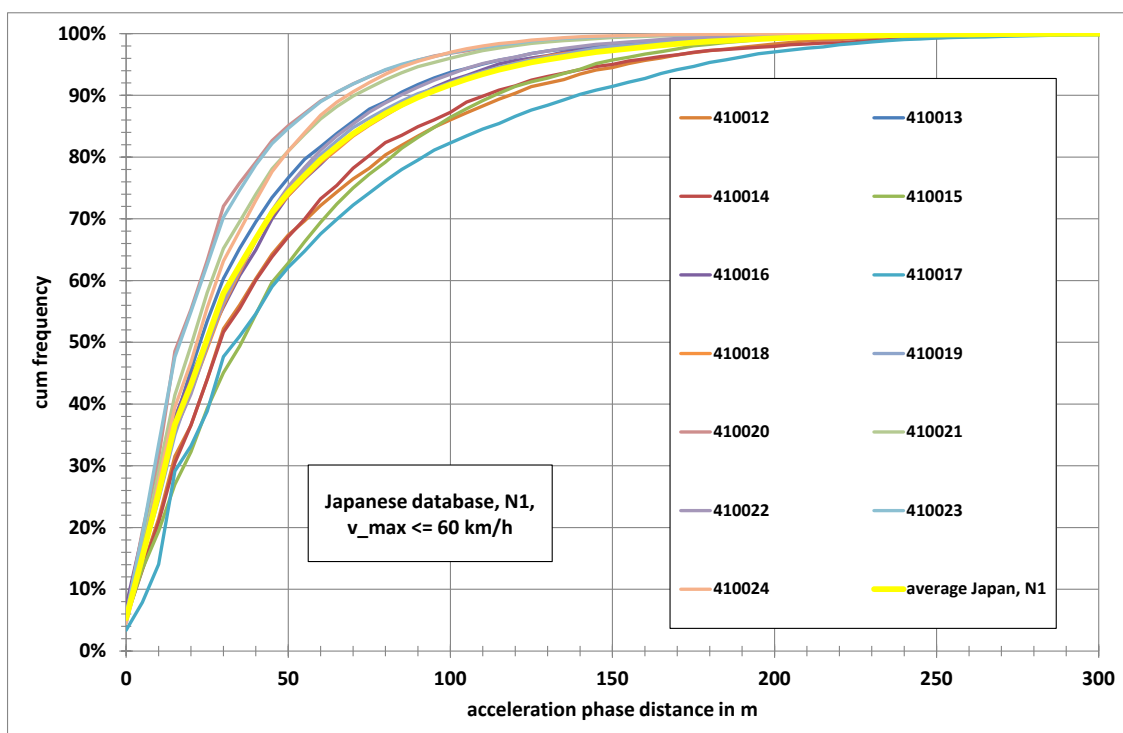


Figure 64: Acceleration phase distance distributions of N1 vehicles in Japan ($v_{max} \leq 60$ km/h)

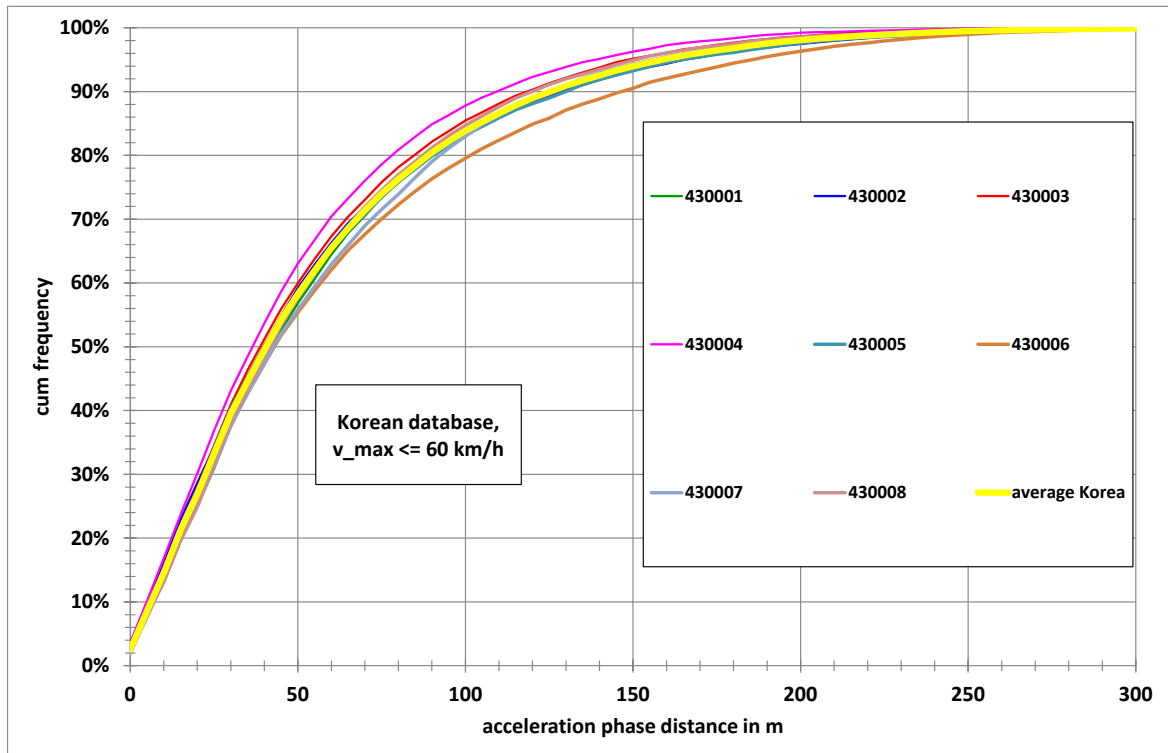


Figure 65: Acceleration phase distance distributions of the vehicles in Korea ($v_{max} \leq 60$ km/h)

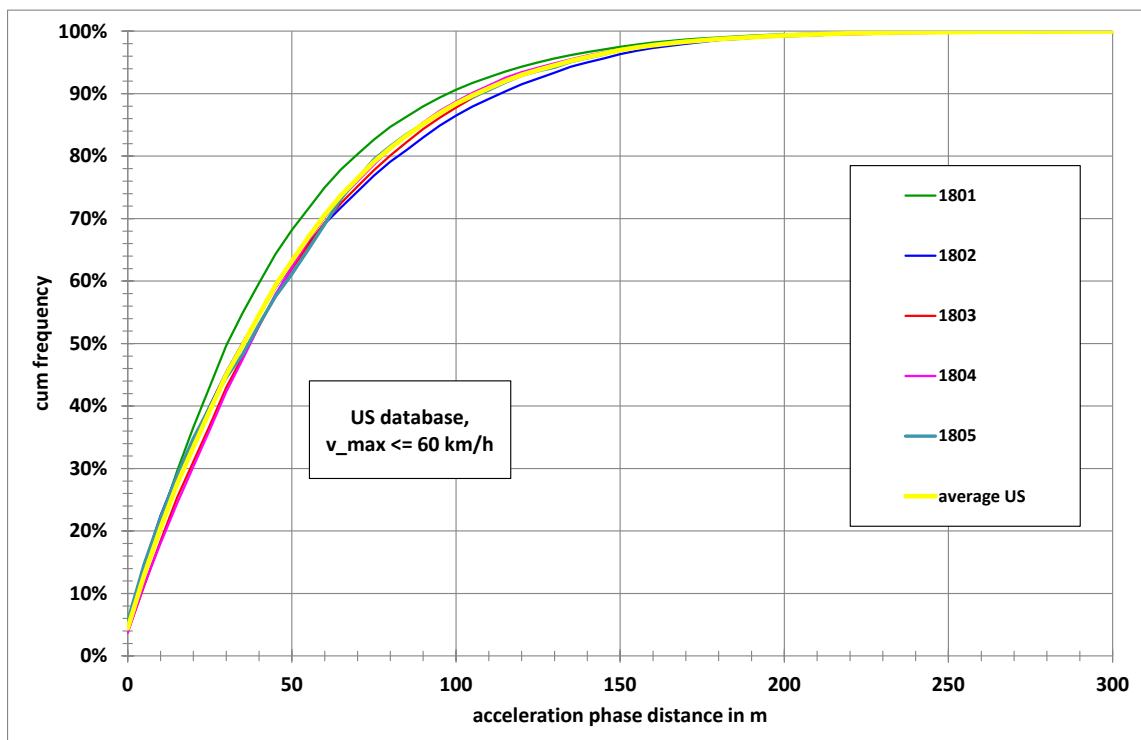


Figure 66: Acceleration phase distance distributions of the vehicles in USA ($v_{max} \leq 60$ km/h)

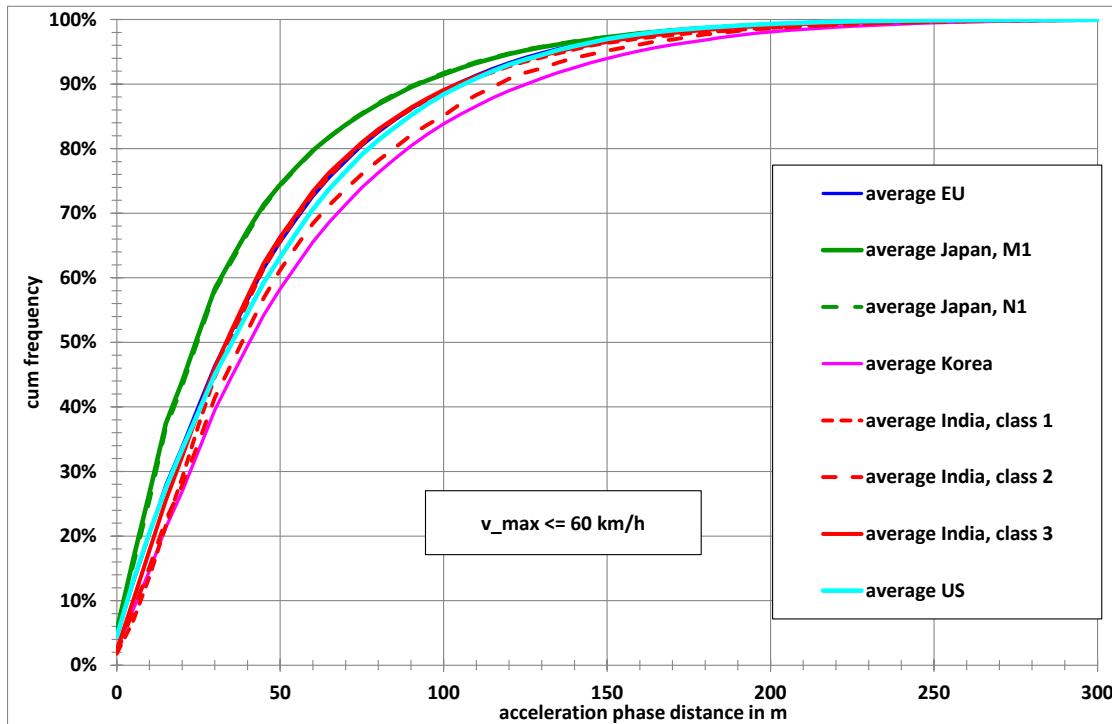


Figure 67: Acceleration phase distance distributions for the different regions ($v_{max} \leq 60$ km/h)

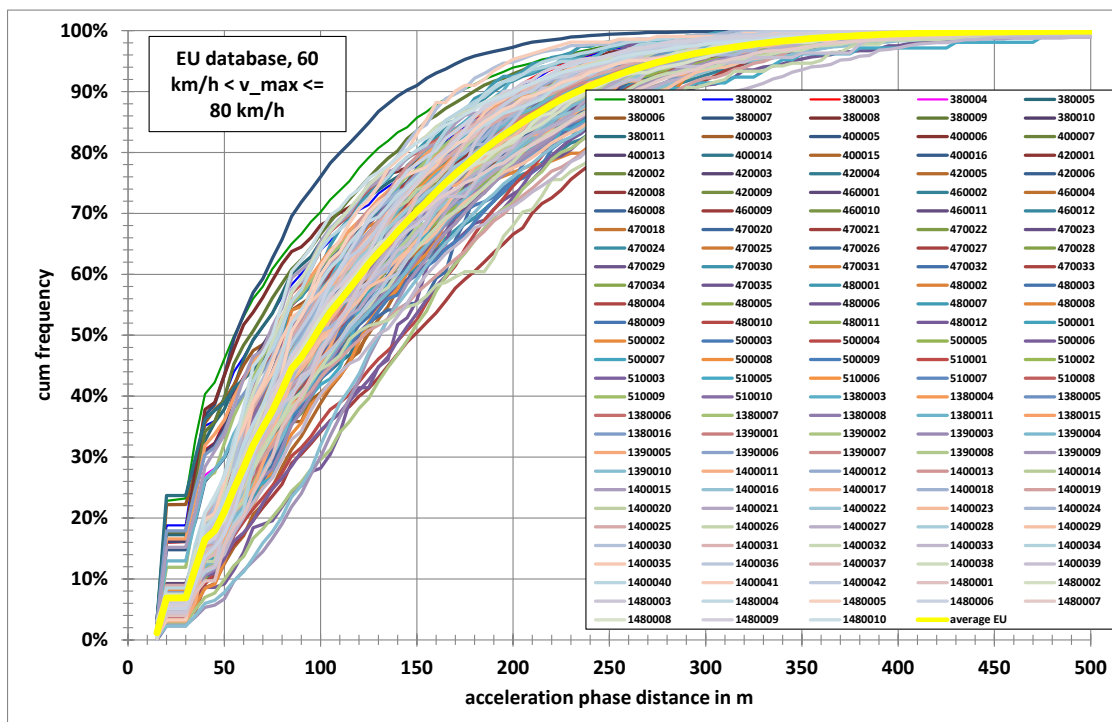


Figure 68: Acceleration phase distance distributions of the vehicles in Europe ($60 \text{ km/h} < v_{max} \leq 80 \text{ km/h}$)

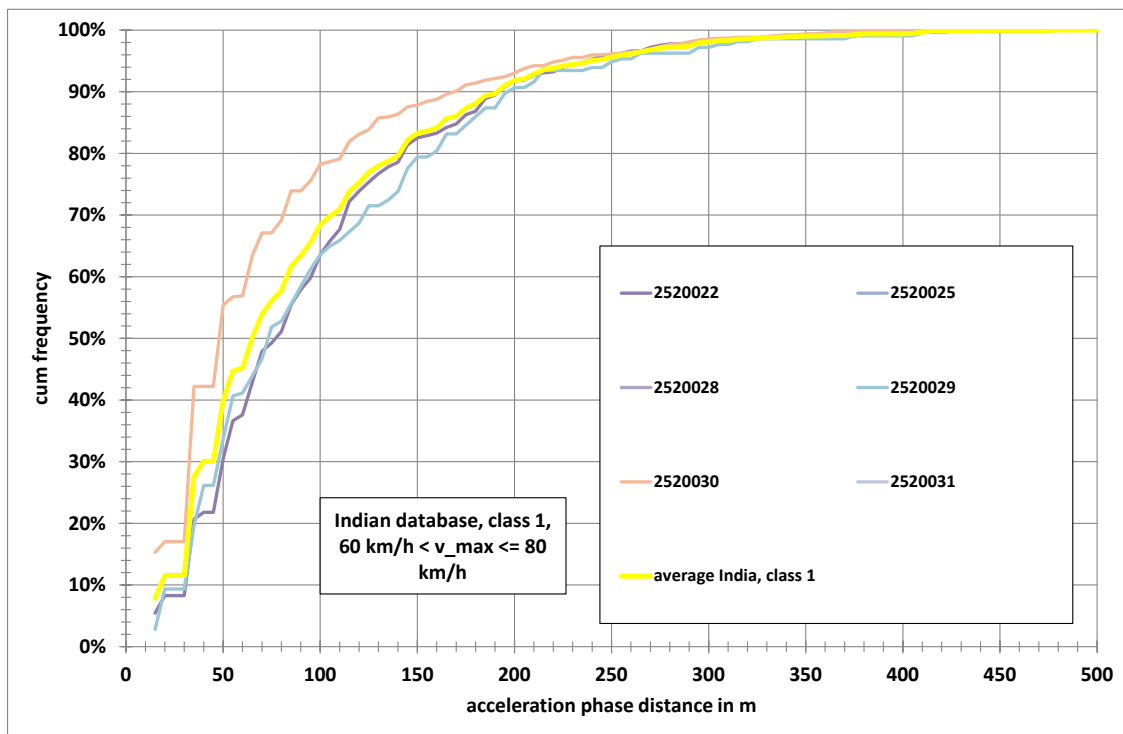


Figure 69: Acceleration phase distance distributions of class 1 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

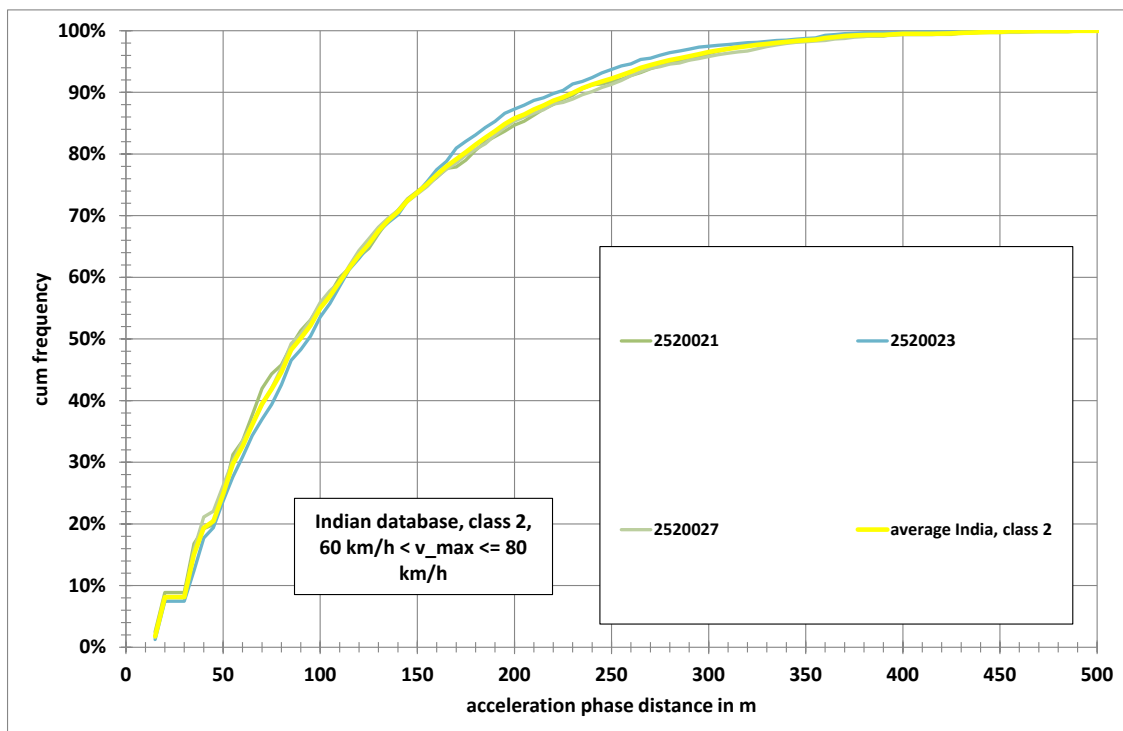


Figure 70: Acceleration phase distance distributions of class 2 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

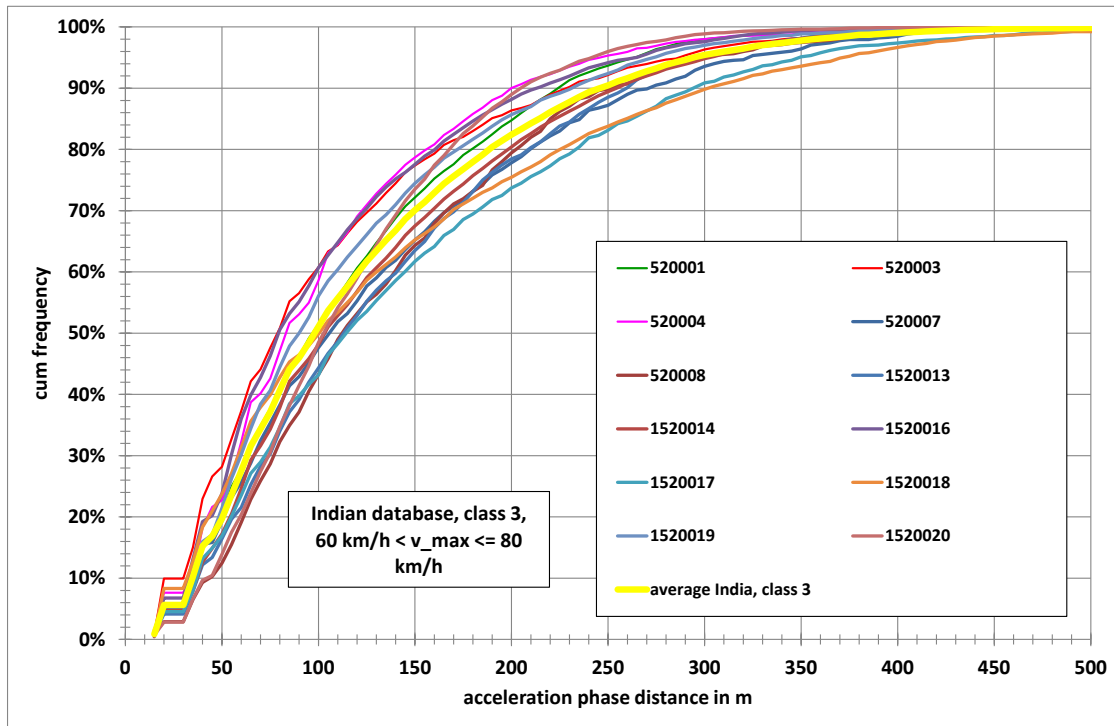


Figure 71: Acceleration phase distance distributions of class 3 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

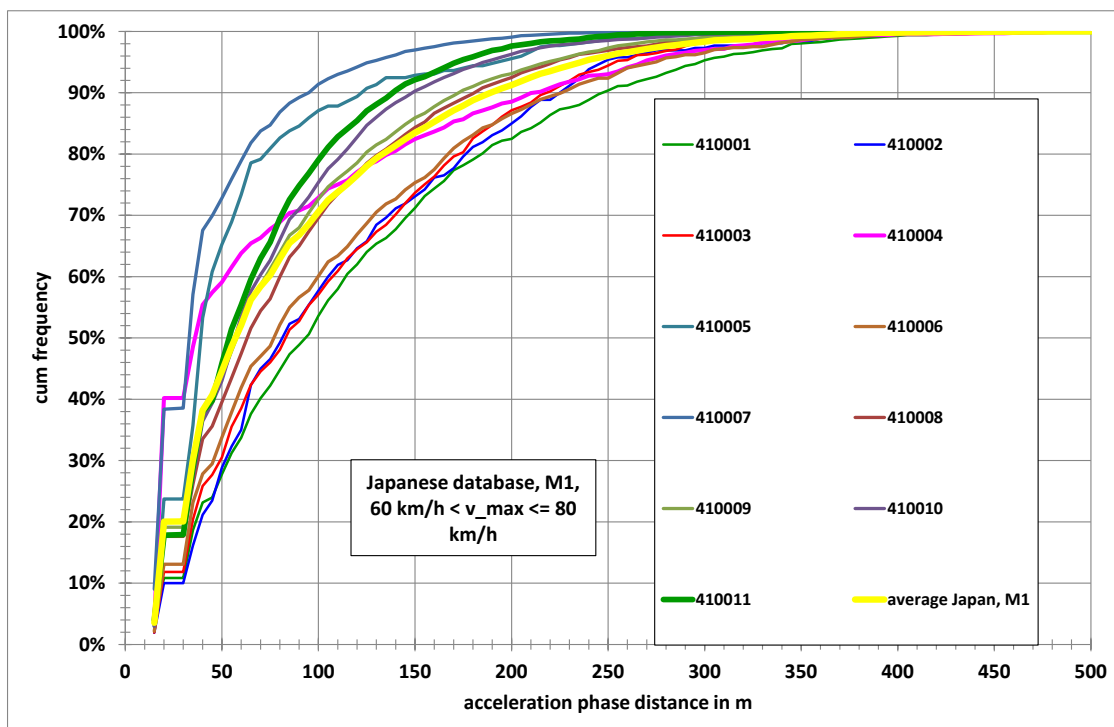


Figure 72: Acceleration phase distance distributions of M1 vehicles in Japan ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

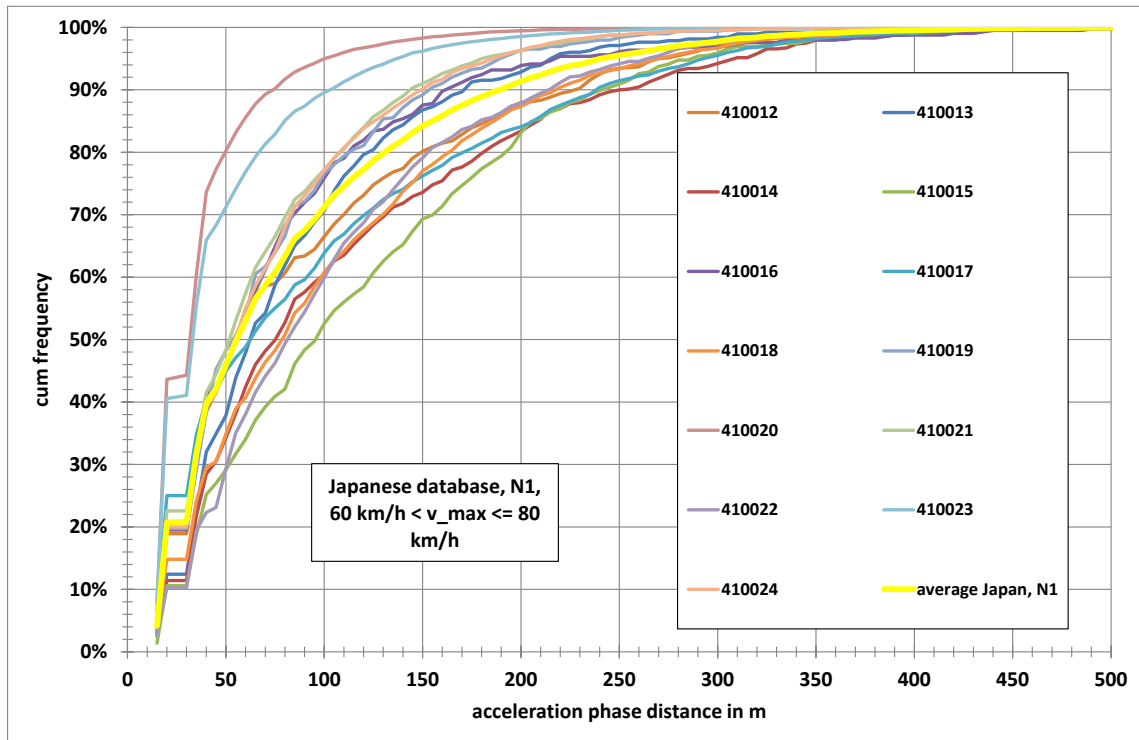


Figure 73: Acceleration phase distance distributions of N1 vehicles in Japan ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

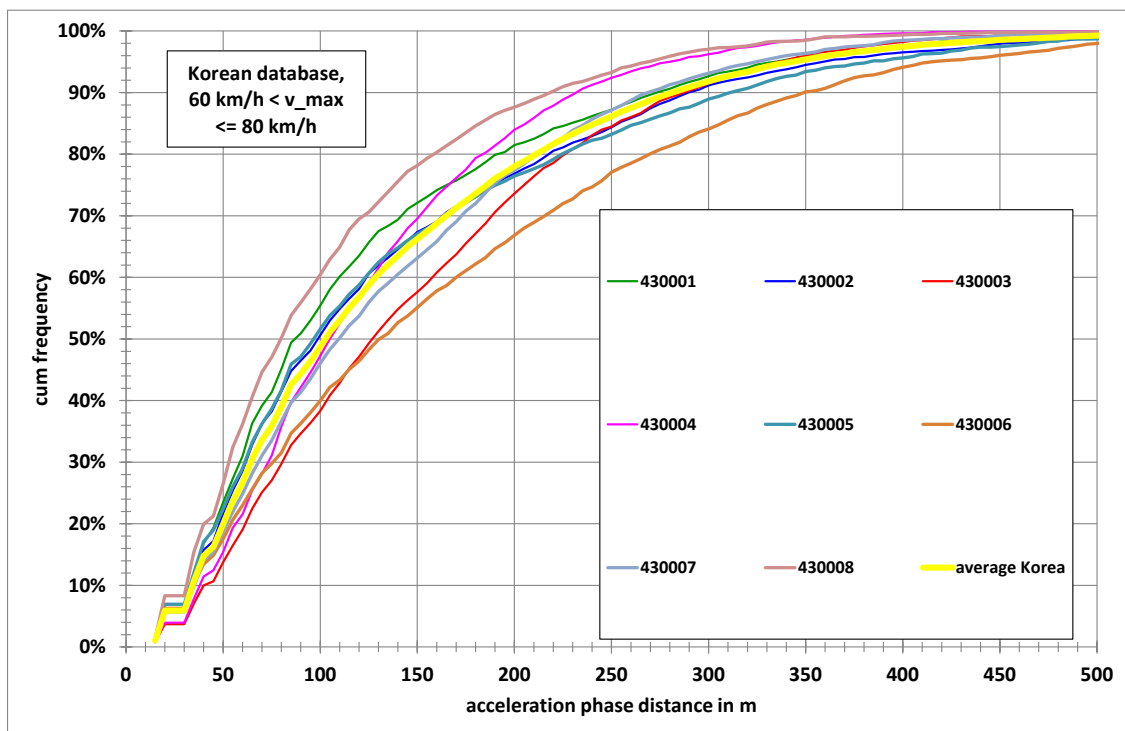


Figure 74: Acceleration phase distance distributions of the vehicles in Korea ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

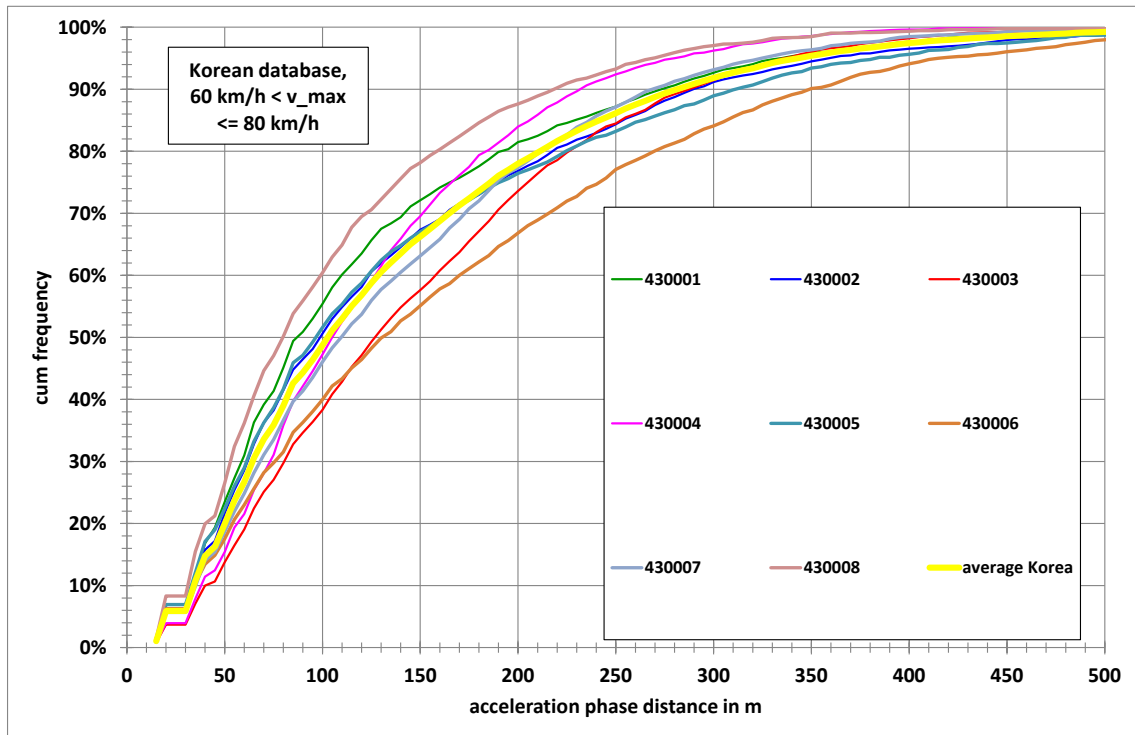


Figure 75: Acceleration phase distance distributions of the vehicles in USA (60 km/h < v_max <= 80 km/h)

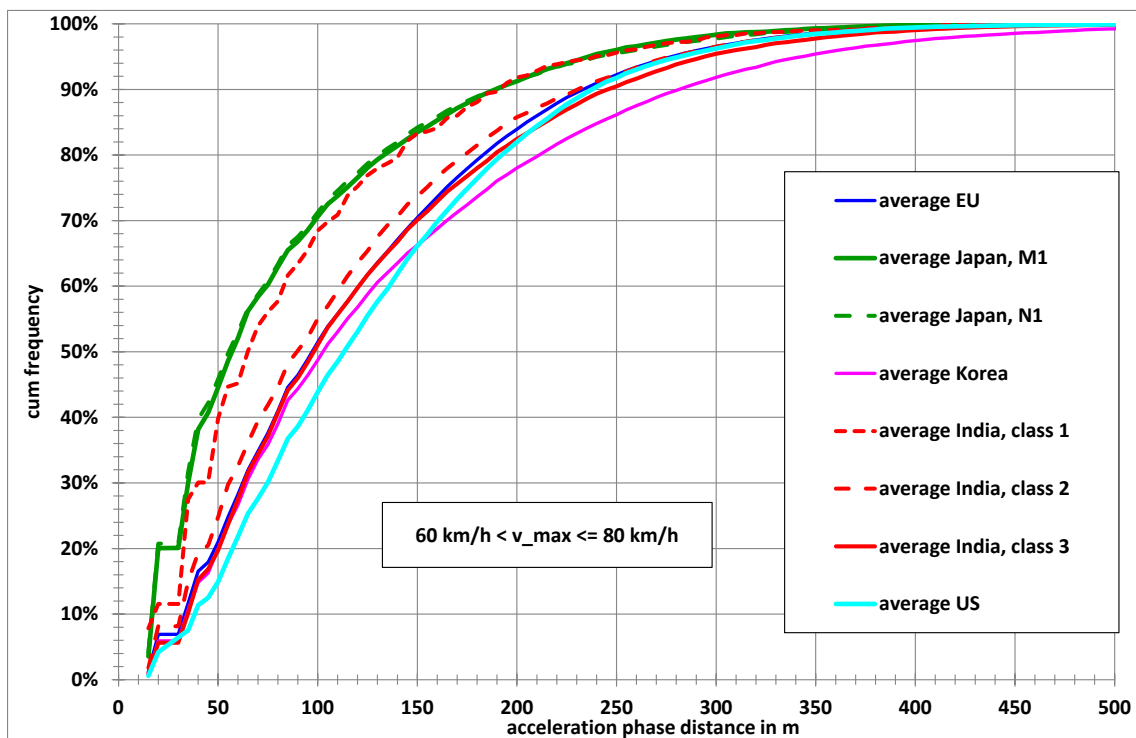


Figure 76: Acceleration phase distance distributions for the different regions (60 km/h < v_max <= 80 km/h)

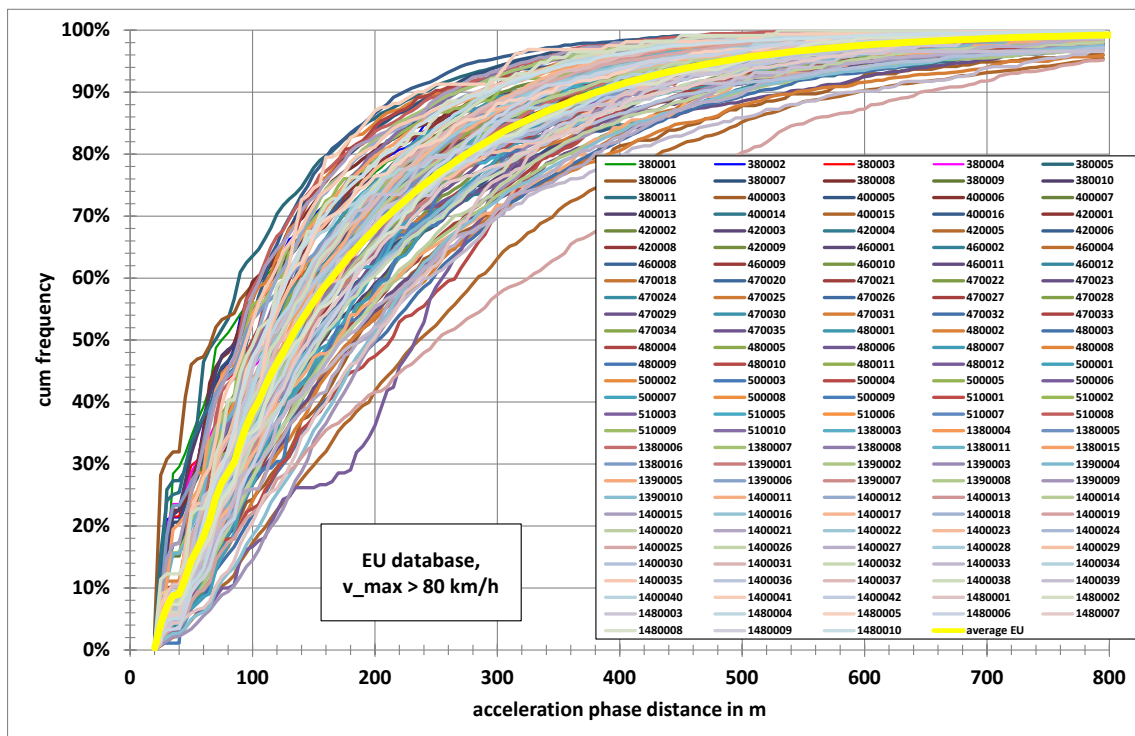


Figure 77: Acceleration phase distance distributions of the vehicles in Europe ($v_{max} > 80$ km/h)

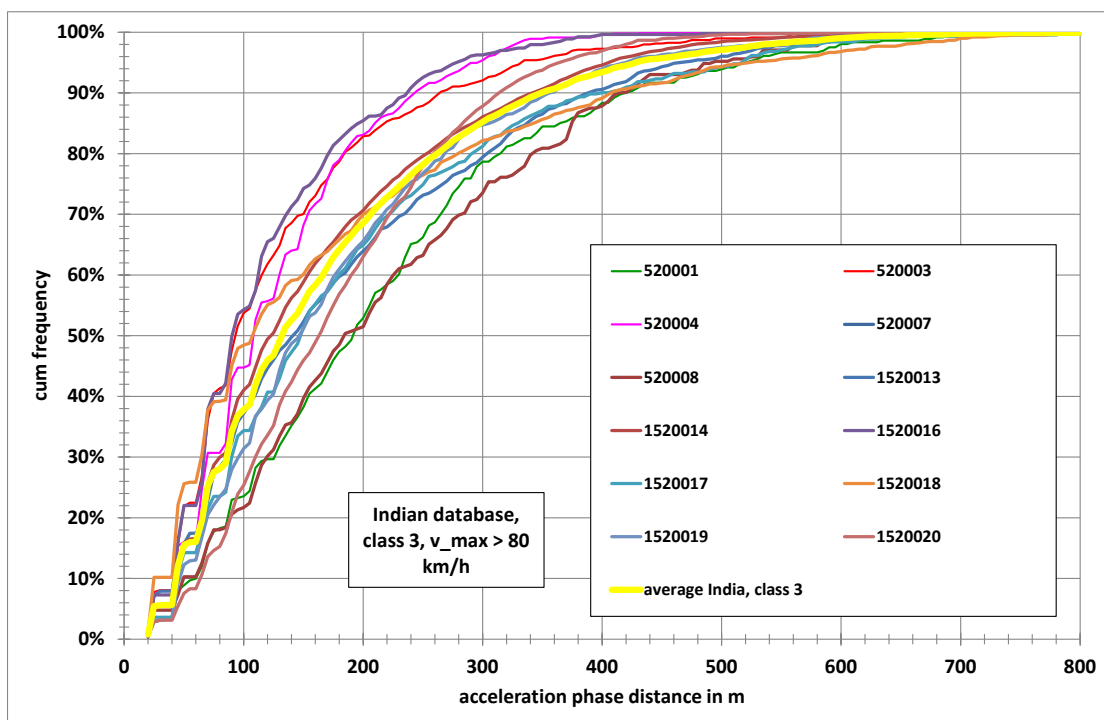


Figure 78: Acceleration phase distance distributions of class 3 vehicles in India ($v_{max} > 80$ km/h)

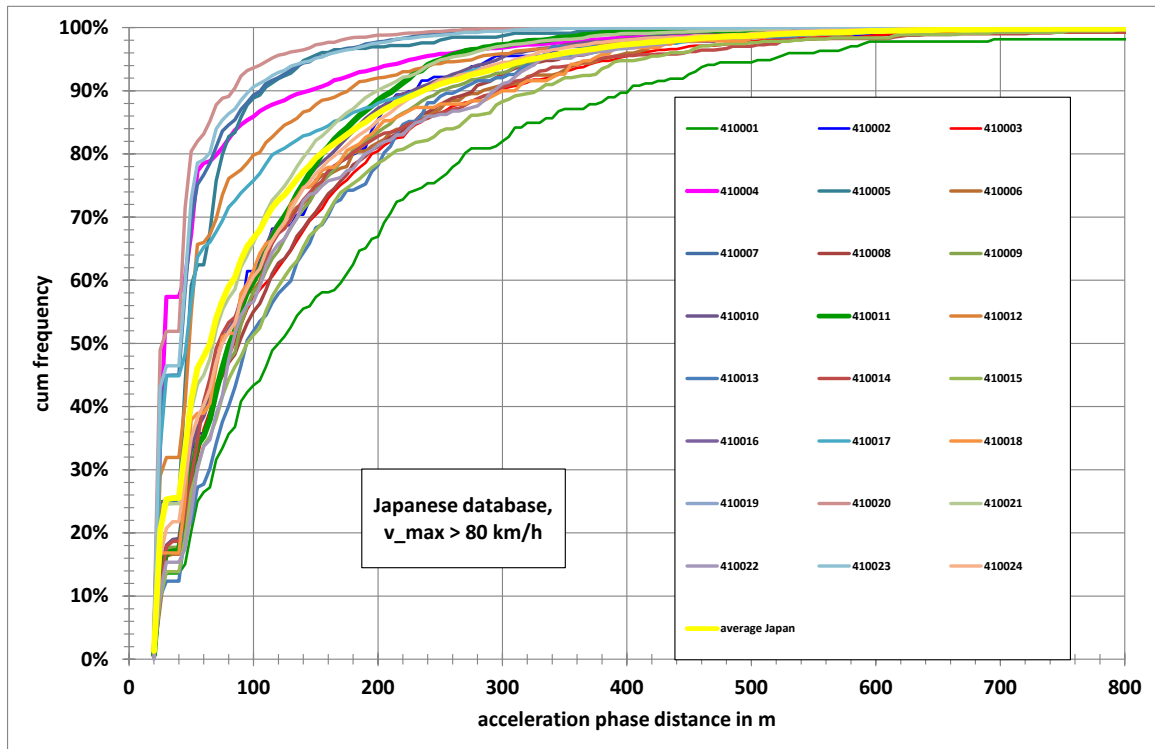


Figure 79: Acceleration phase distance distributions of the vehicles in Japan ($v_{max} > 80$ km/h)

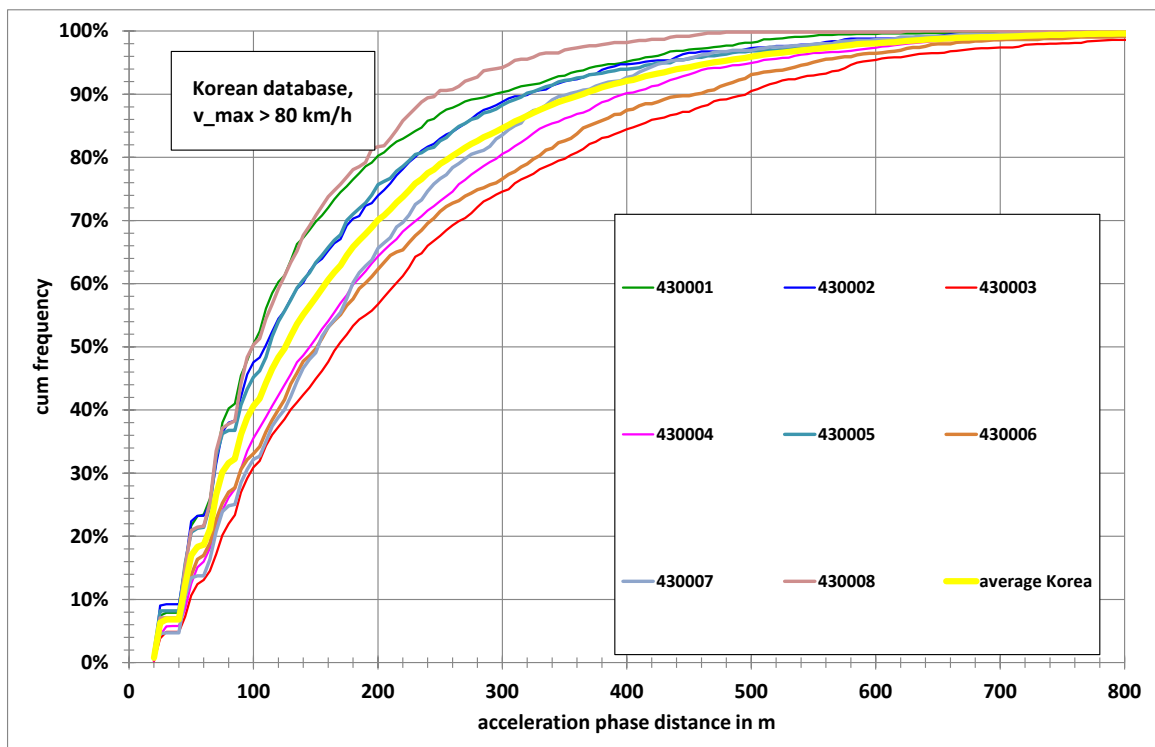


Figure 80: Acceleration phase distance distributions of the vehicles in Korea ($v_{max} > 80$ km/h)

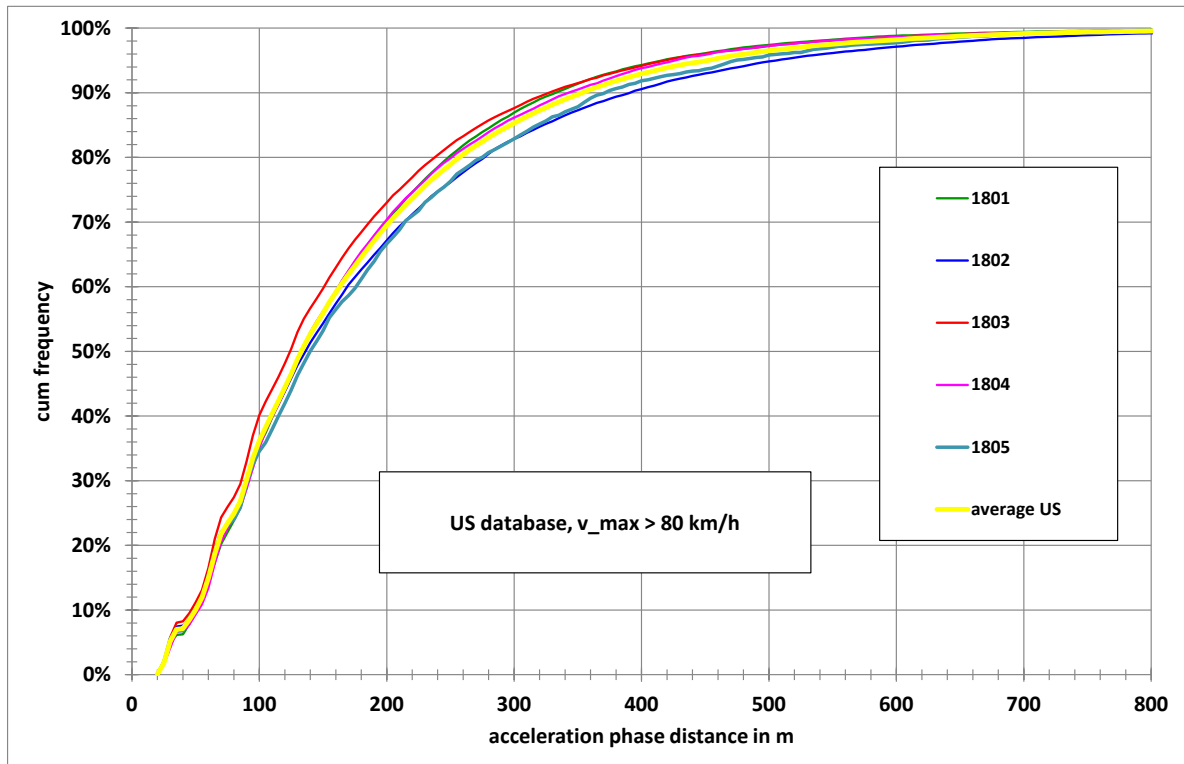


Figure 81: Acceleration phase distance distributions of the vehicles in USA ($v_{max} > 80$ km/h)

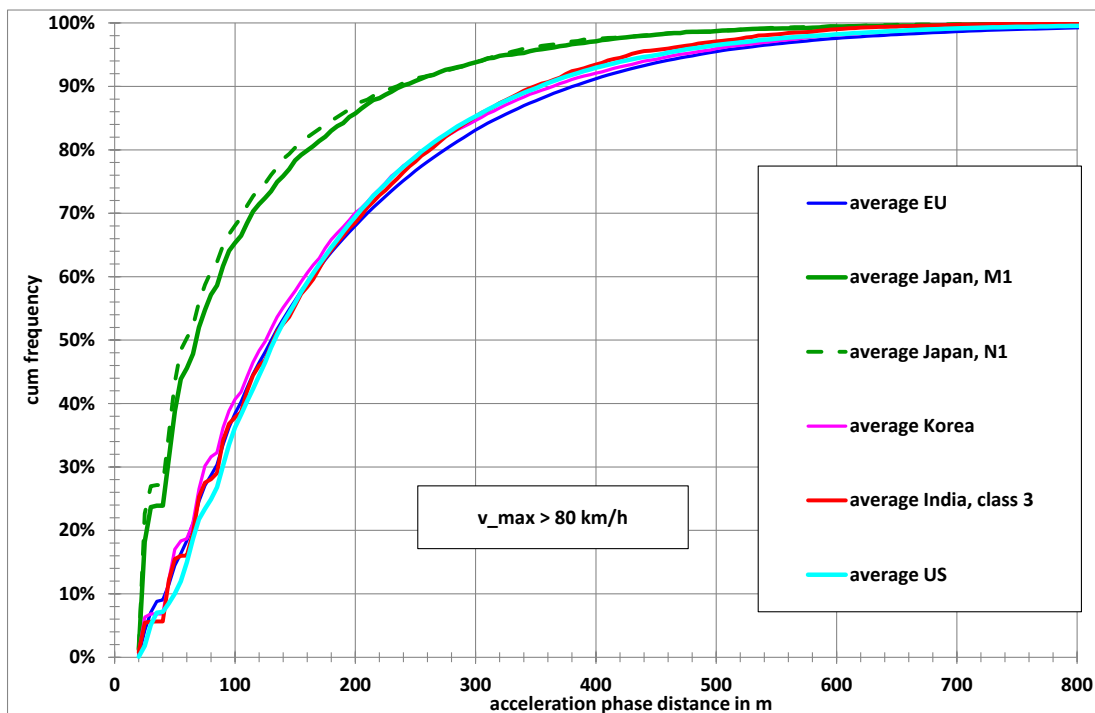


Figure 82: Acceleration phase distance distributions for the different regions ($v_{max} > 80$ km/h)

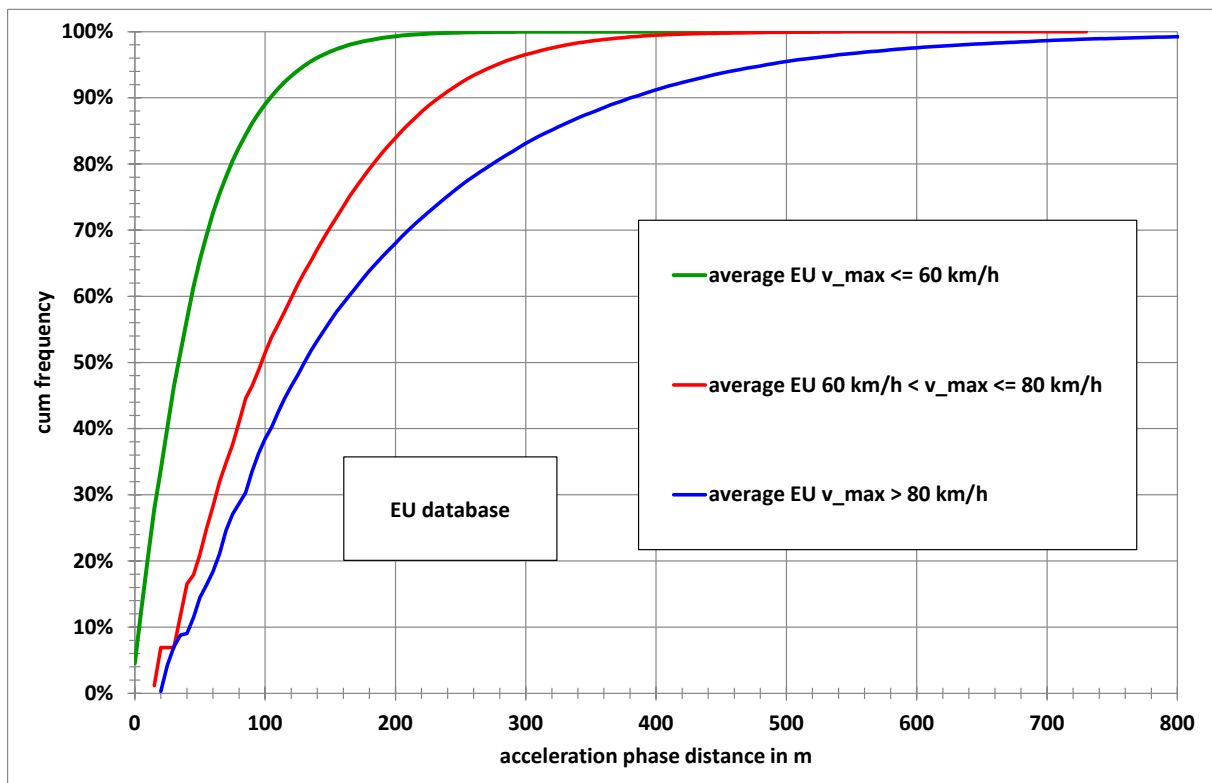


Figure 83: Acceleration phase distance distributions for short trips with different v_{max}

10 Deceleration phases

Deceleration phases are specified as consecutive time samples with a < -0.5 km/h/s or -0.1389 m/s². The following key parameters of such phases were collected in a separate table (TB_dec) per vehicle and trip:

- Date,
- Time,
- Duration,
- Distance,
- v_{min} ,
- v_{ave} ,
- v_{max} ,
- $stddev_v$,
- a_{min} ,
- a_{ave} ,
- a_{max} ,
- $v*a_{min}$,
- $v*a_{ave}$,
- $v*a_{max}$.



In order to ease the calculation of duration and distance related distributions the results were binned for both values (2 seconds for the duration and 5 m for the distance). The analysis was performed for phases up to 60 km/h, between 60 and 80 km/h and above 80 km/h separately.

10.1 Duration distributions

Vehicle specific duration distributions for the different regions and for deceleration phases with $v_{max} \leq 60$ km/h are shown in Figure 82 to Figure 90.

Figure 91 to Figure 99 show the corresponding distributions for deceleration phases with v_{max} between 60 and 80 km/h and Figure 100 to Figure 106 shown the distributions for deceleration phases with v_{max} above 80 km/h.

Figure 107 shows a comparison of the average curves for Europe with the different v_{max} ranges.

The numbers in the legends are vehicle indicators according to Table 60 to Table 65.

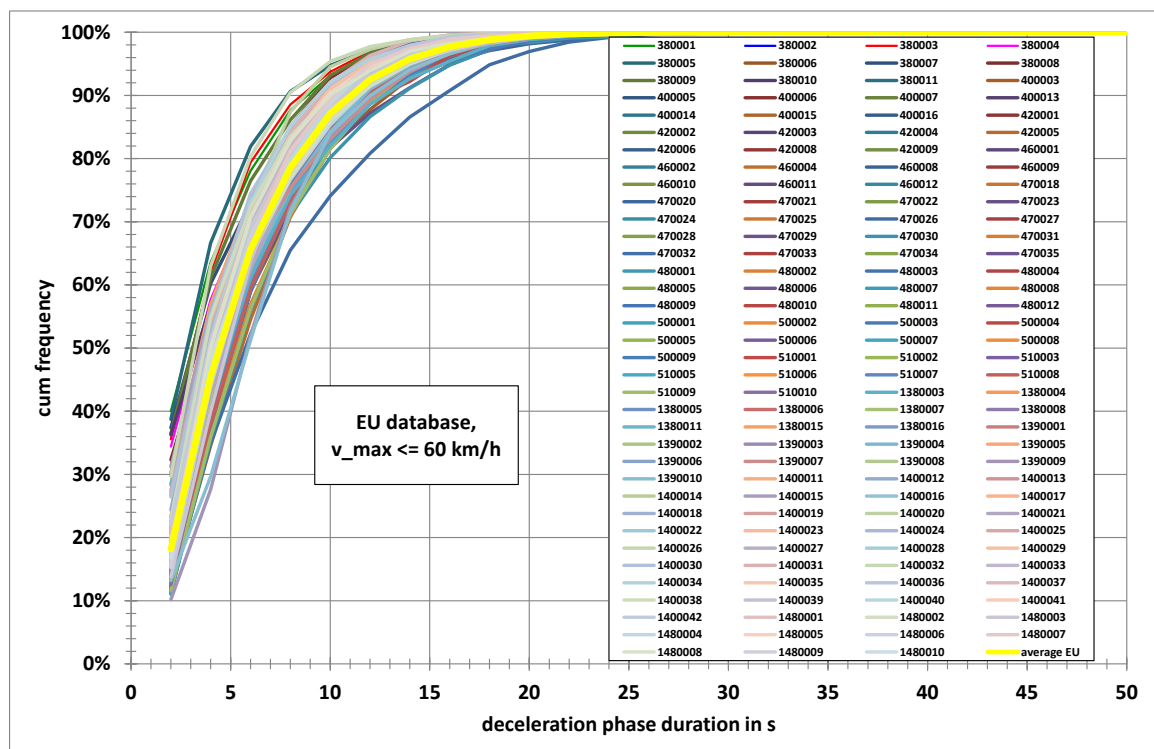


Figure 84: Deceleration phase duration distributions of the vehicles in Europe ($v_{max} \leq 60$ km/h)

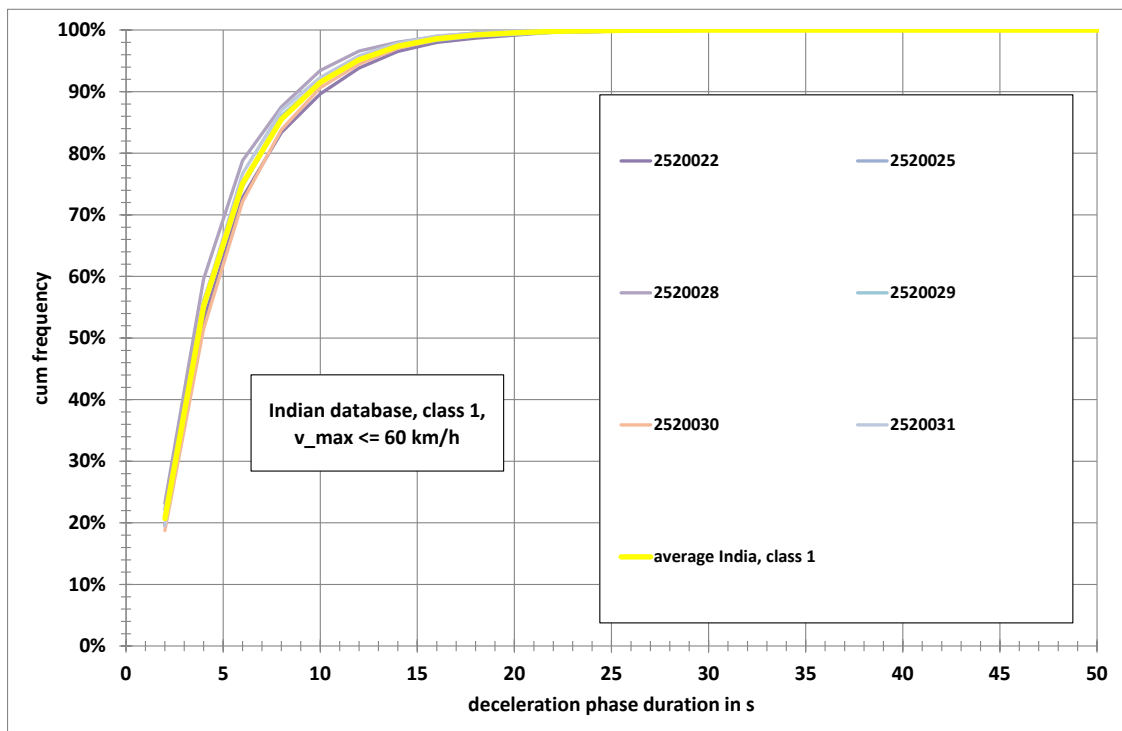


Figure 85: Deceleration phase duration distributions of class 1 vehicles in India ($v_{max} \leq 60$ km/h)

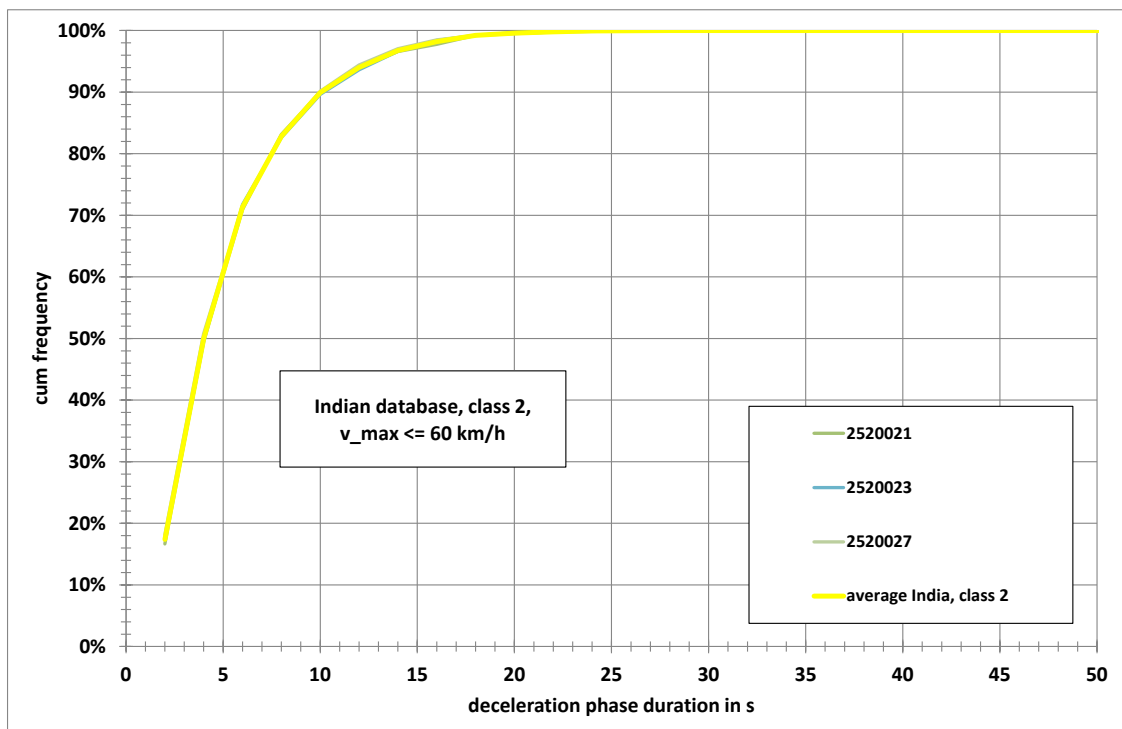


Figure 86: Deceleration phase duration distributions of class 2 vehicles in India ($v_{max} \leq 60$ km/h)

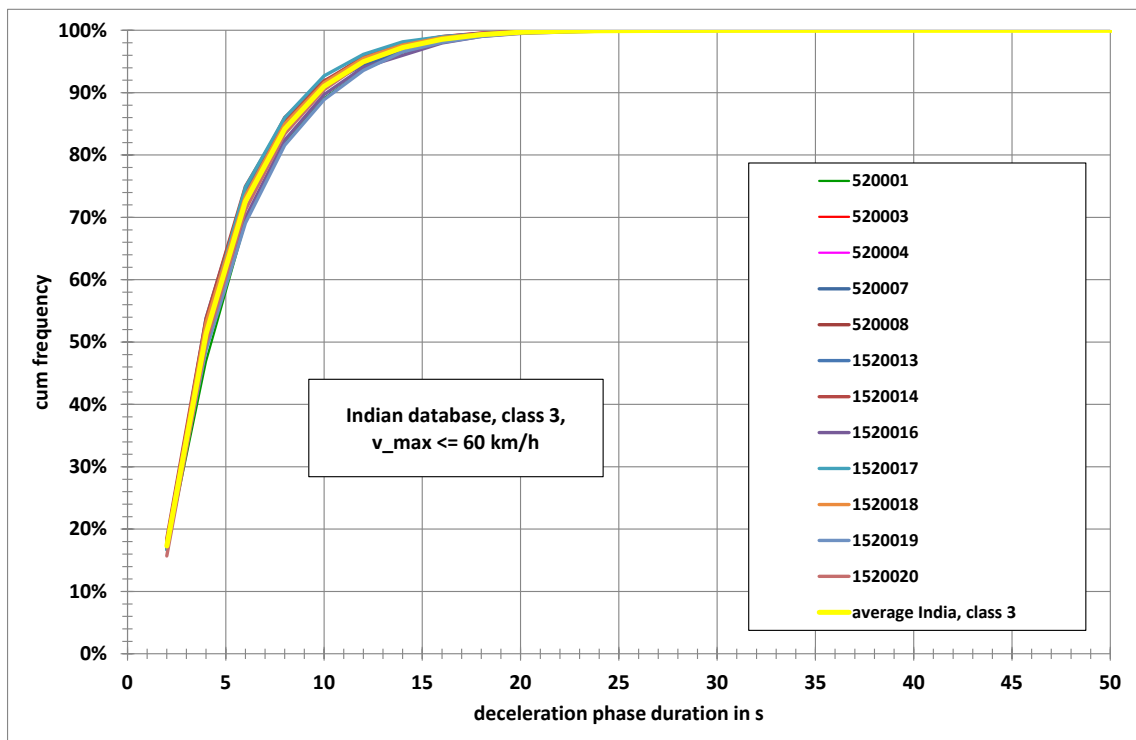


Figure 87: Deceleration phase duration distributions of class 3 vehicles in India ($v_{max} \leq 60$ km/h)

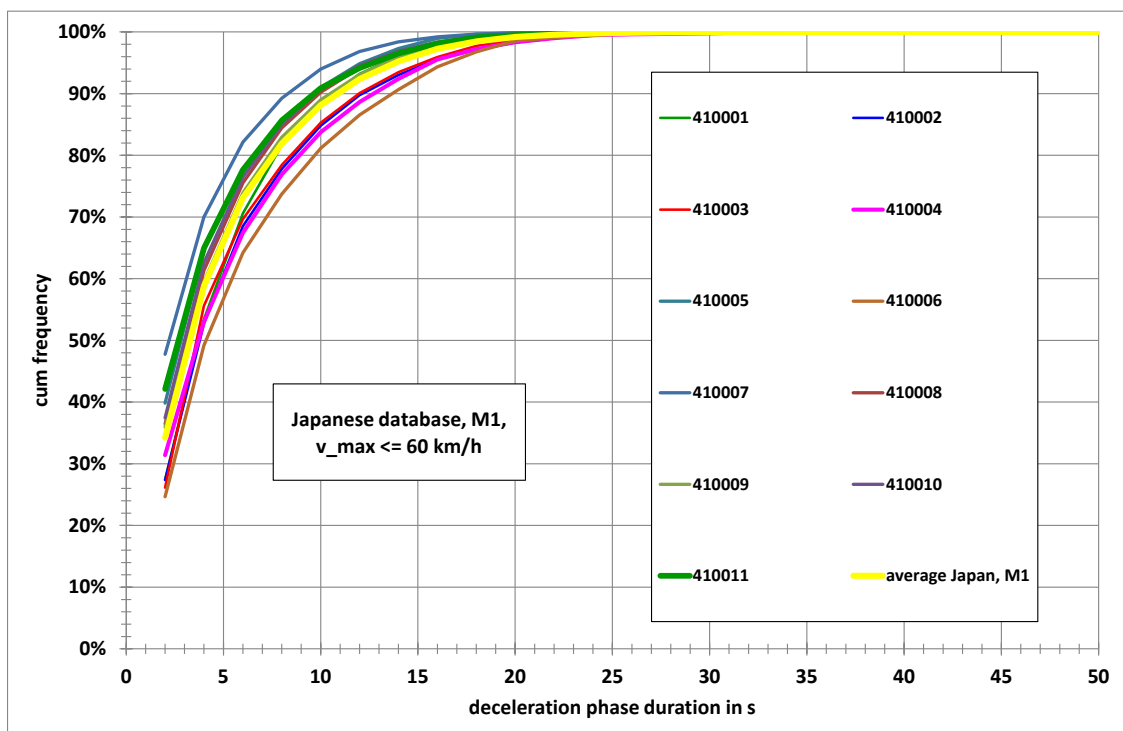


Figure 88: Deceleration phase duration distributions of M1 vehicles in Japan ($v_{max} \leq 60$ km/h)

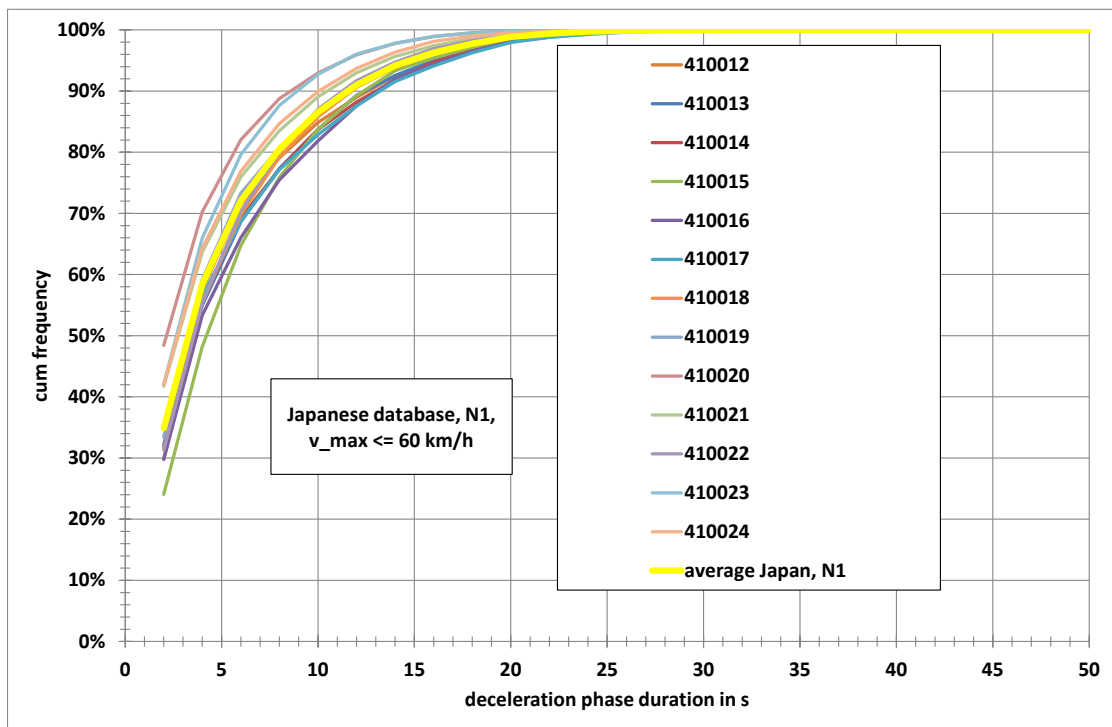


Figure 89: Deceleration phase duration distributions of N1 vehicles in Japan ($v_{max} \leq 60$ km/h)

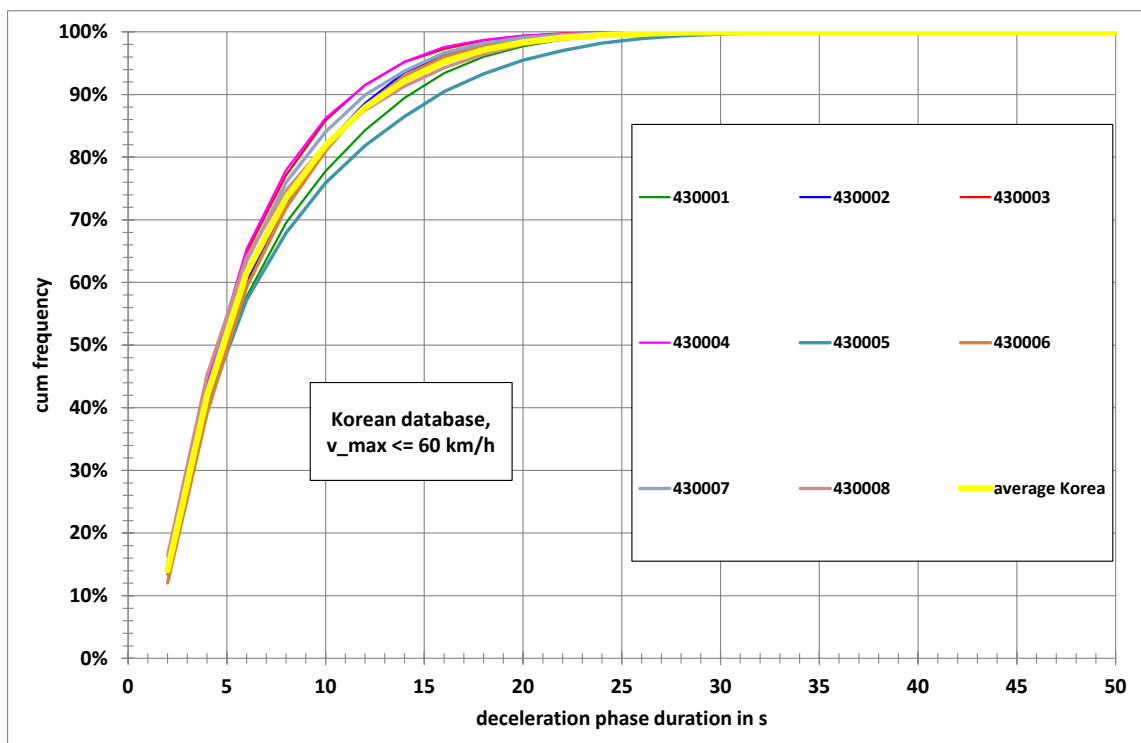


Figure 90: Deceleration phase duration distributions of the vehicles in Korea ($v_{max} \leq 60$ km/h)

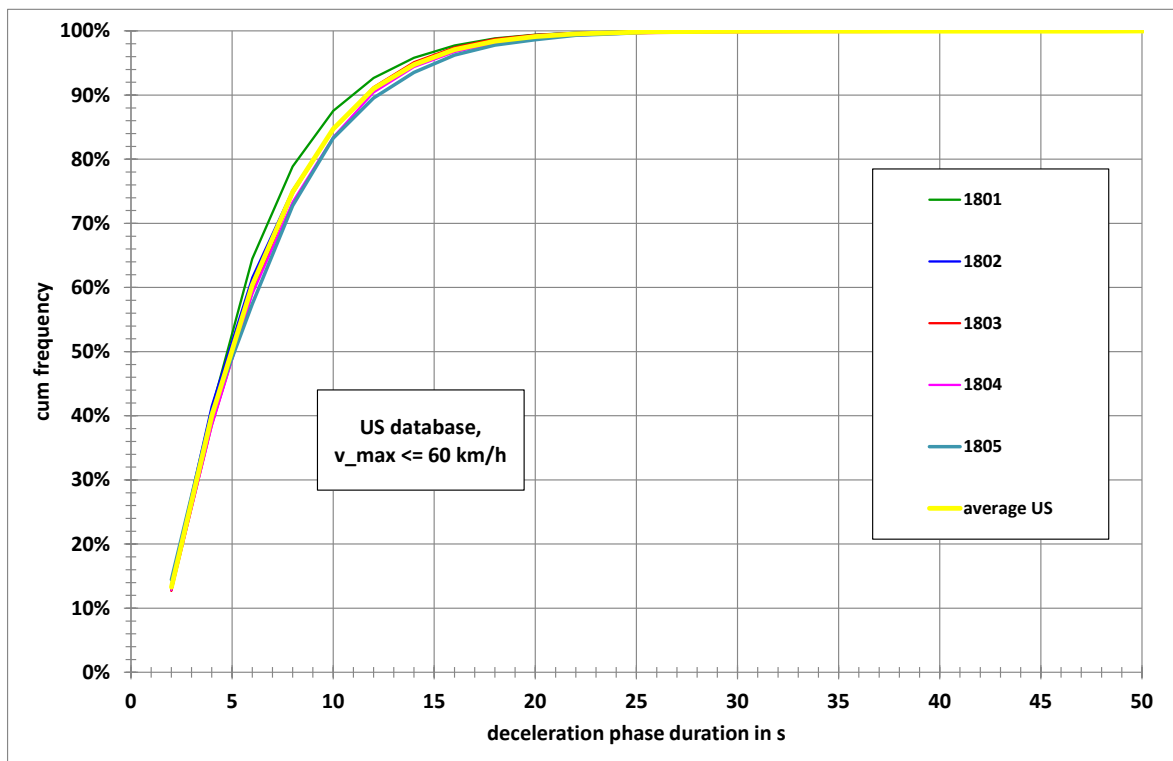


Figure 91: Deceleration phase duration distributions of the vehicles in USA ($v_{max} \leq 60$ km/h)

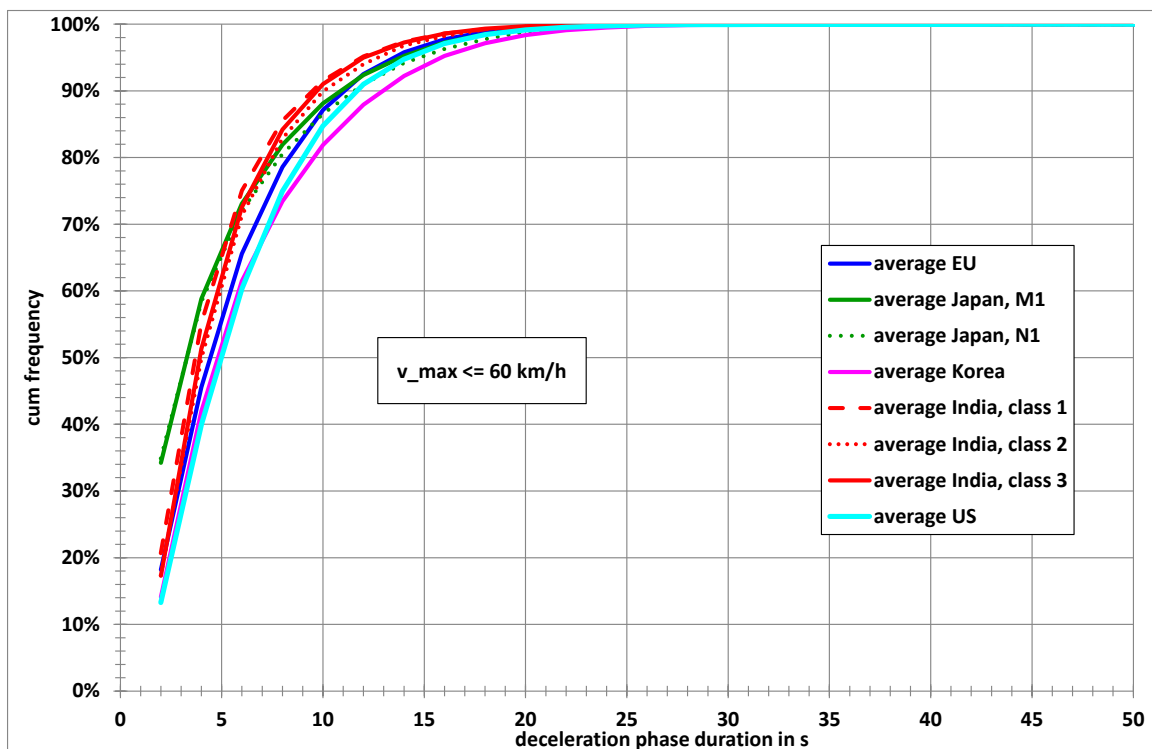


Figure 92: Deceleration phase duration distributions for the different regions ($v_{max} \leq 60$ km/h)

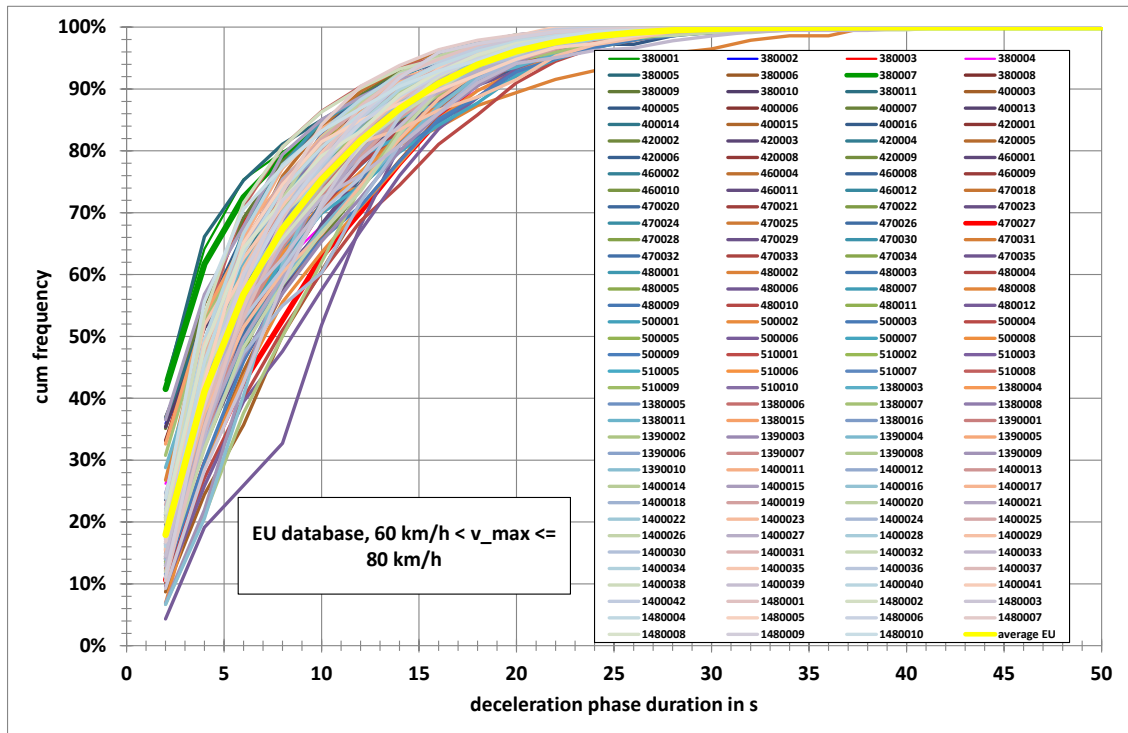


Figure 93: Deceleration phase duration distributions of the vehicles in Europe ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

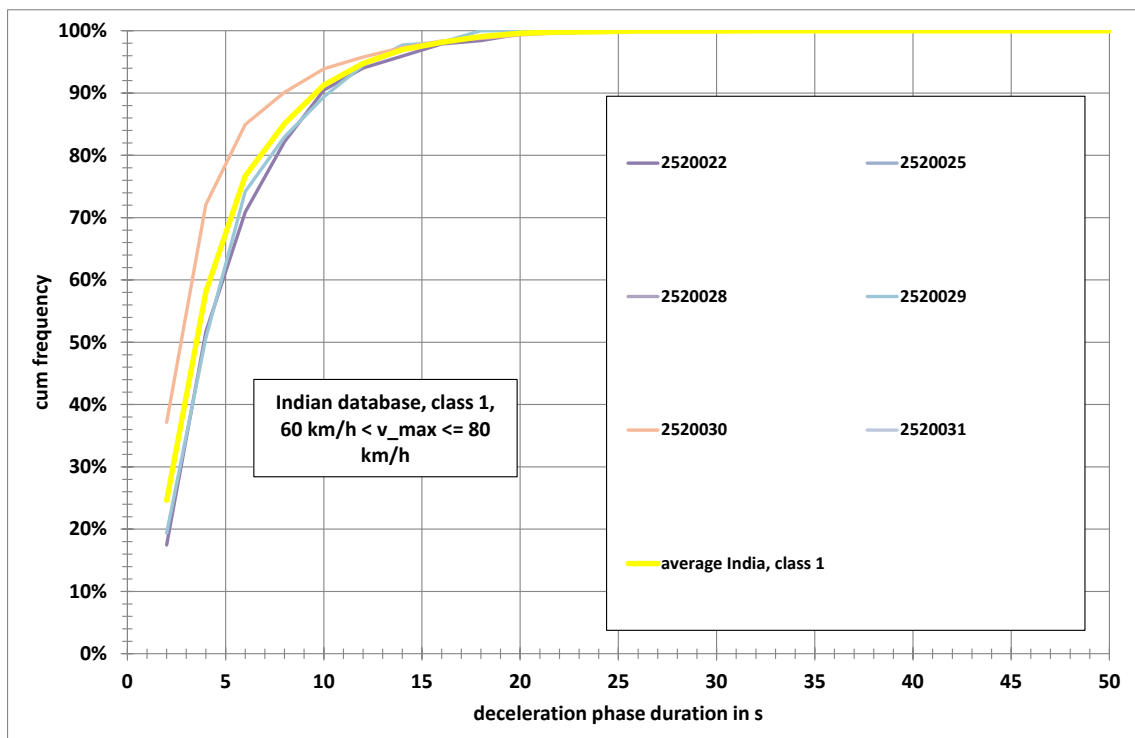


Figure 94: Deceleration phase duration distributions of class 1 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

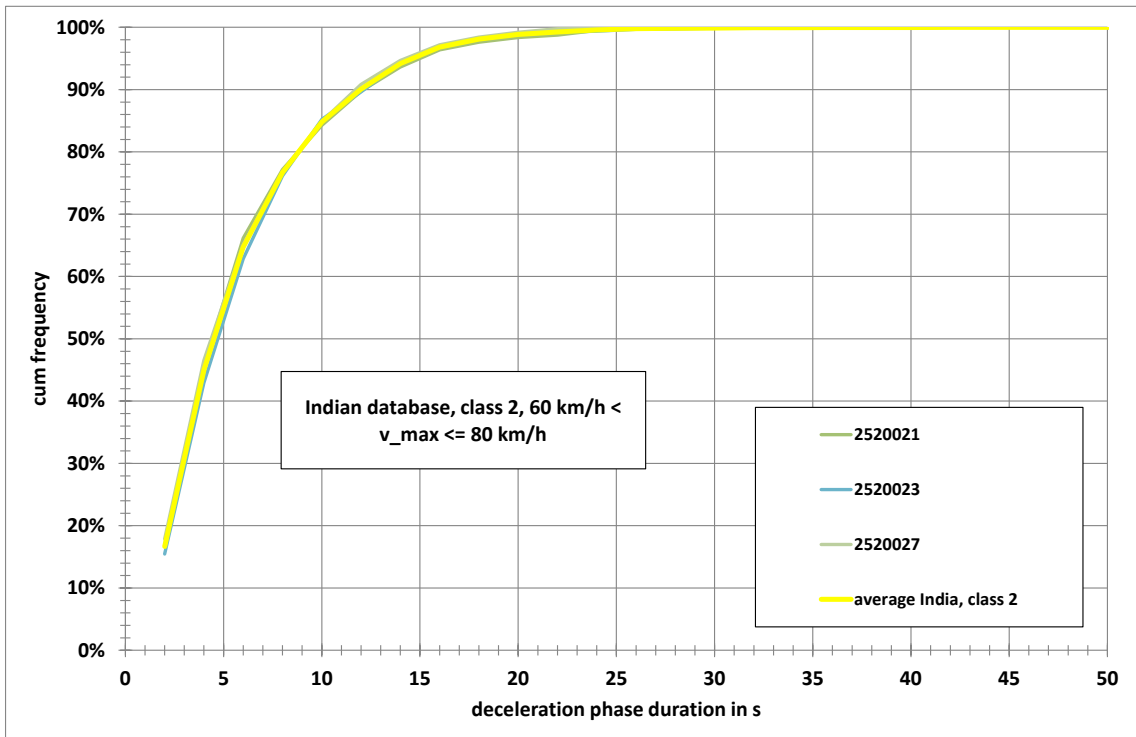


Figure 95: Deceleration phase duration distributions of class 2 vehicles in India (60 km/h < v_max <= 80 km/h)

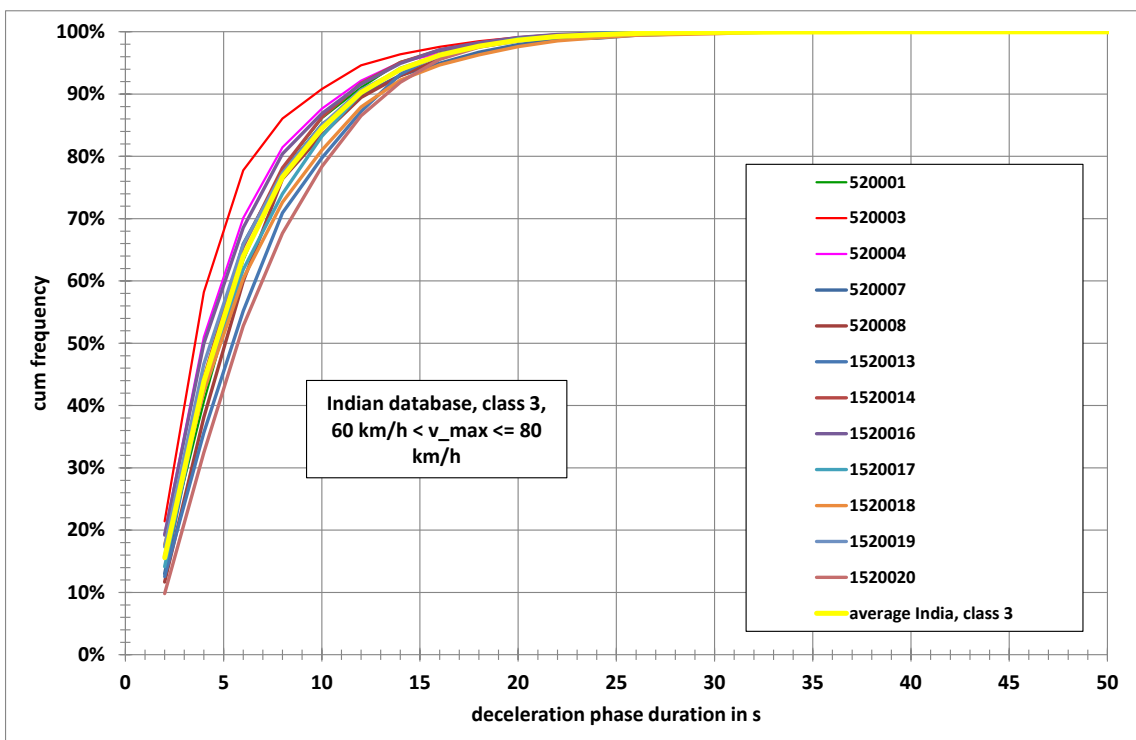


Figure 96: Deceleration phase duration distributions of class 3 vehicles in India (60 km/h < v_max <= 80 km/h)

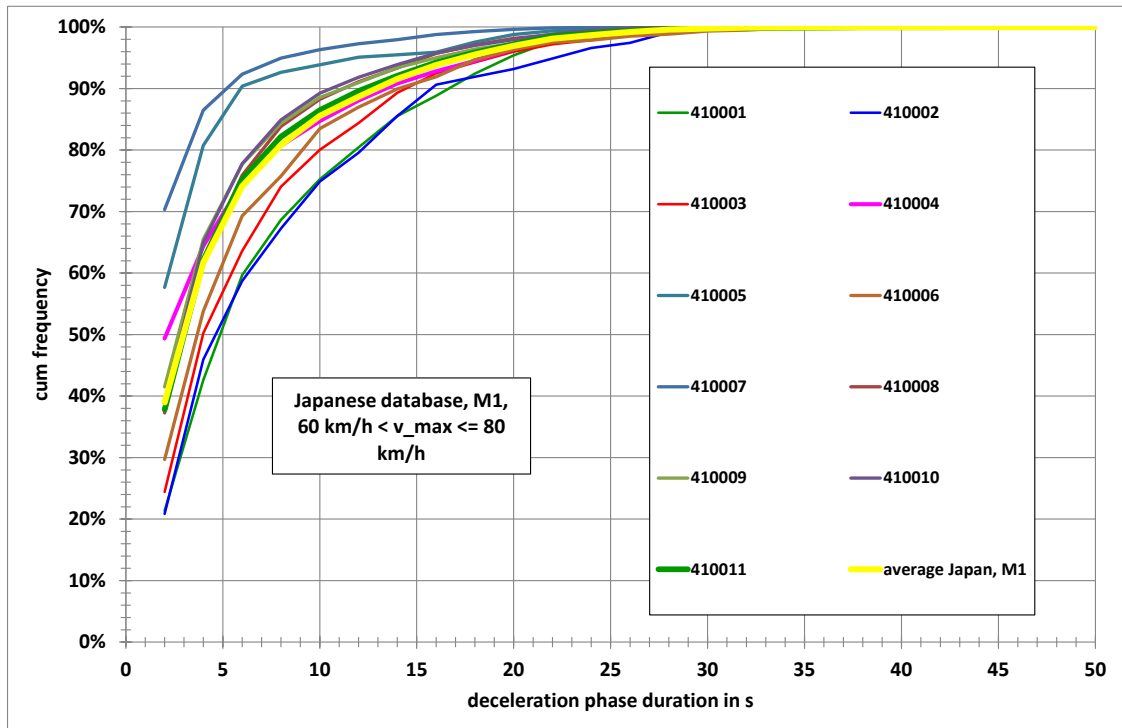


Figure 97: Deceleration phase duration distributions of M1 vehicles in Japan ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

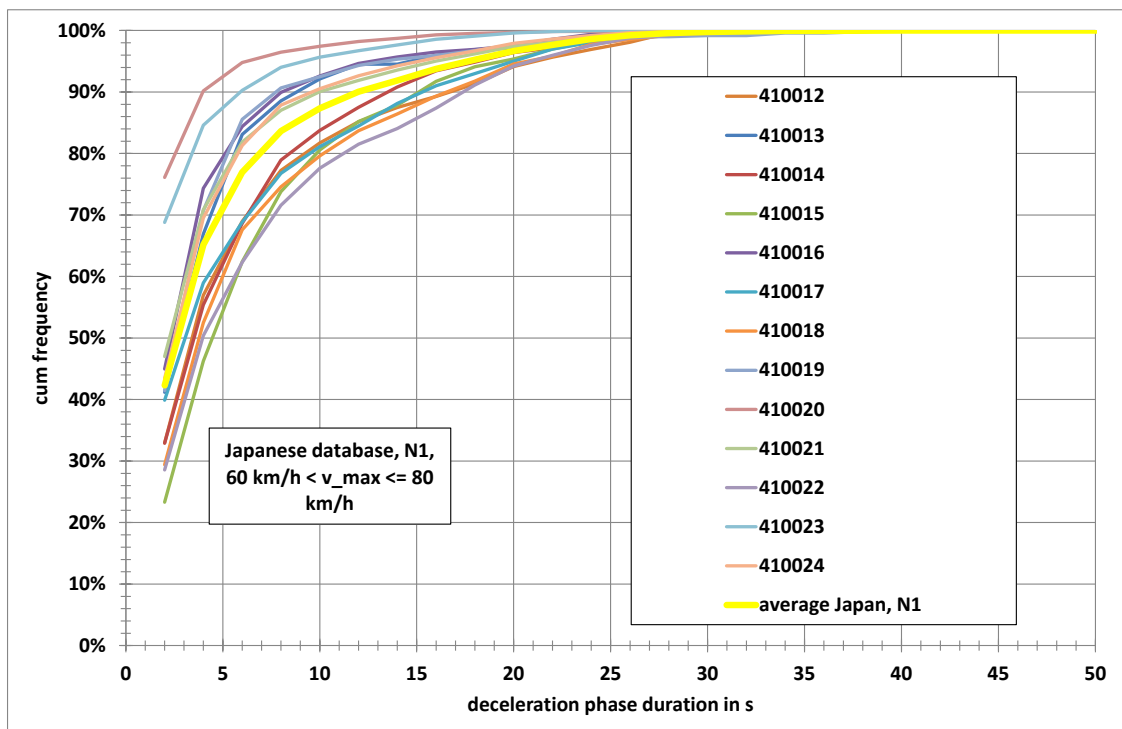


Figure 98: Deceleration phase duration distributions of N1 vehicles in Japan ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

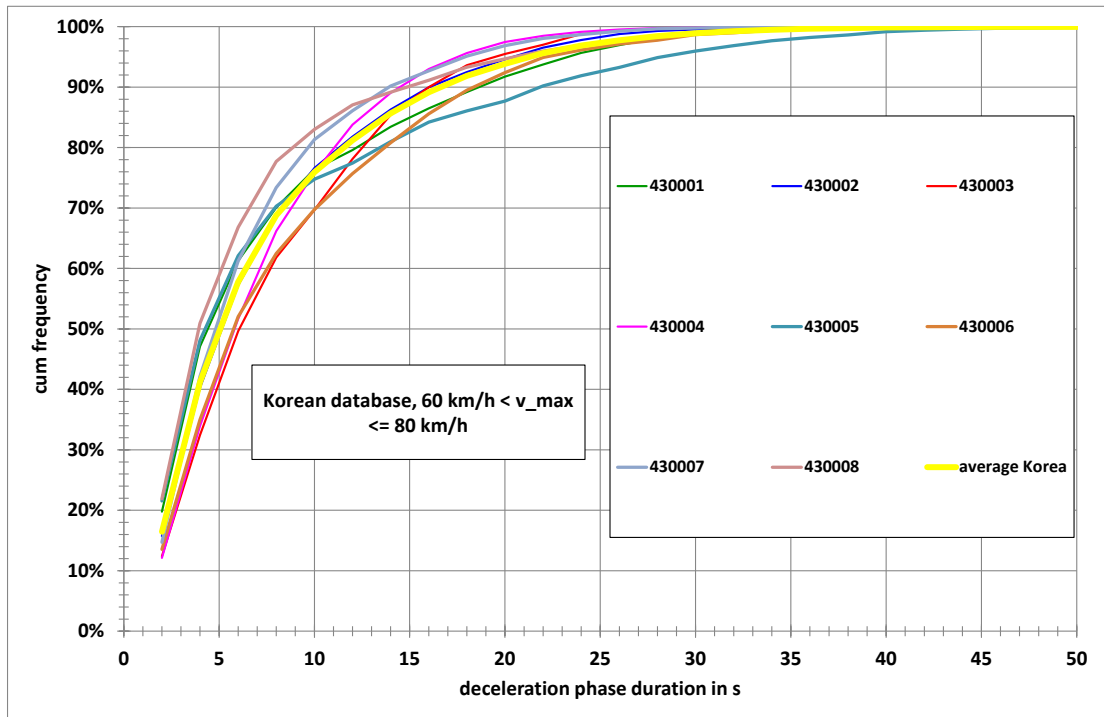


Figure 99: Deceleration phase duration distributions of the vehicles in Korea ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

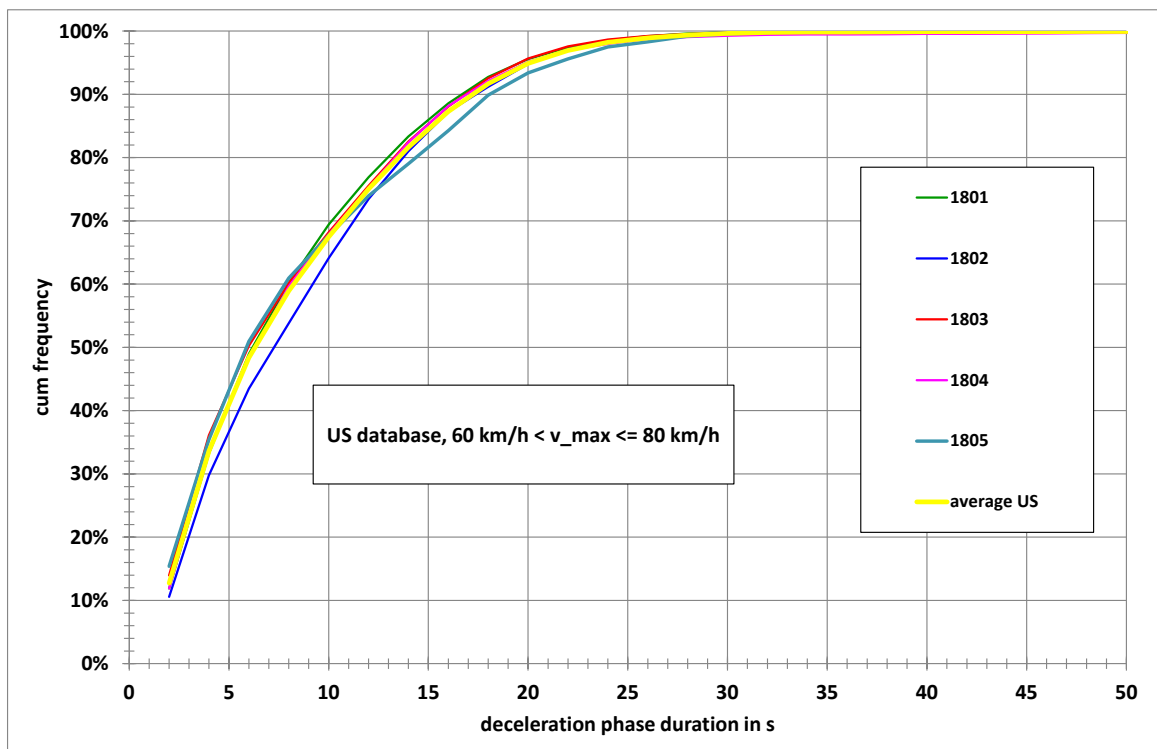


Figure 100: Deceleration phase duration distributions of the vehicles in USA ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

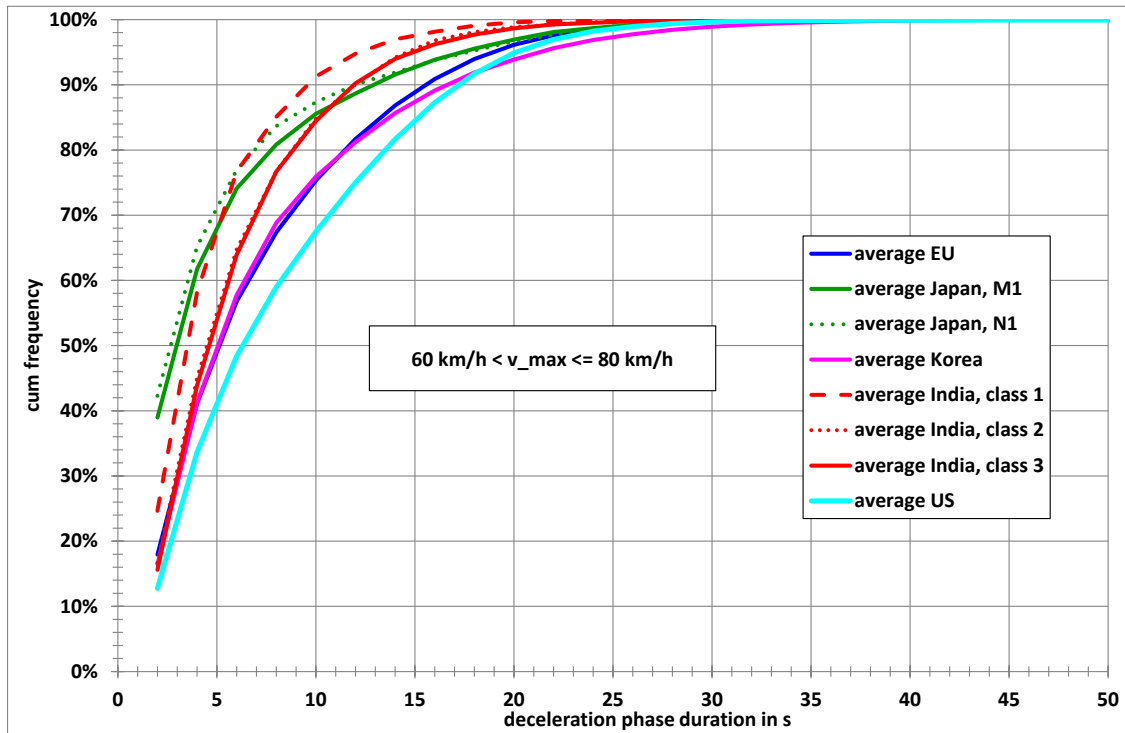


Figure 101: Deceleration phase duration distributions for the different regions ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

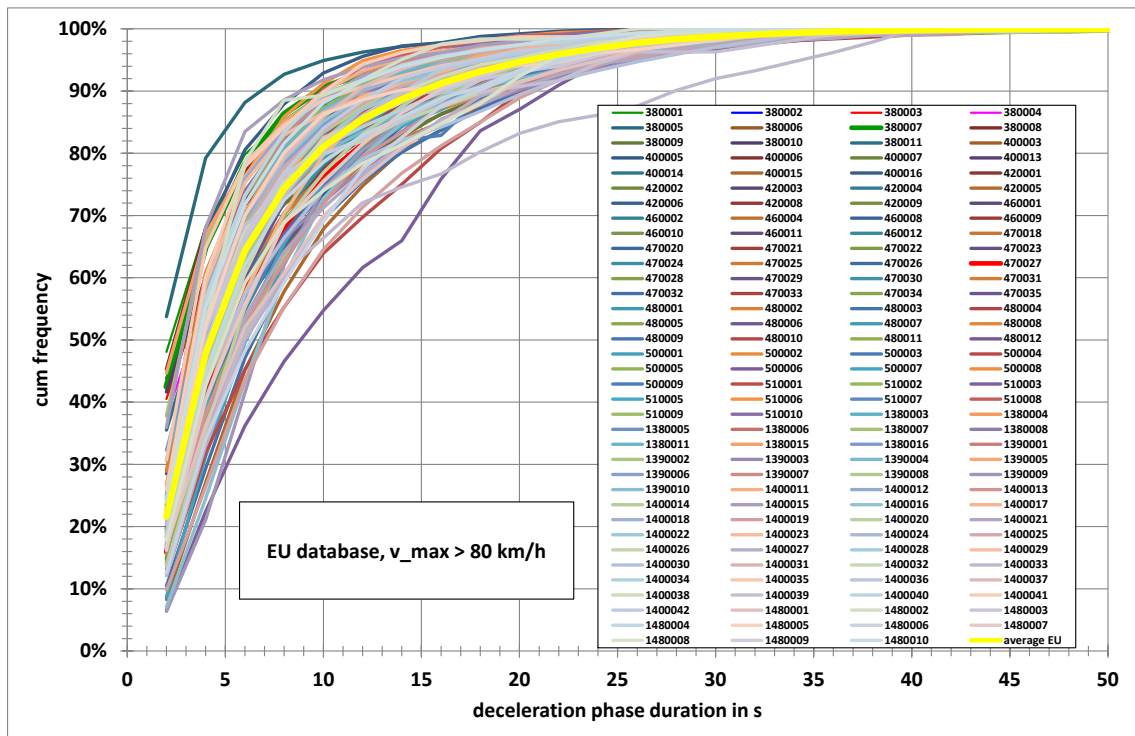


Figure 102: Deceleration phase duration distributions of the vehicles in Europe ($v_{\text{max}} > 80 \text{ km/h}$)

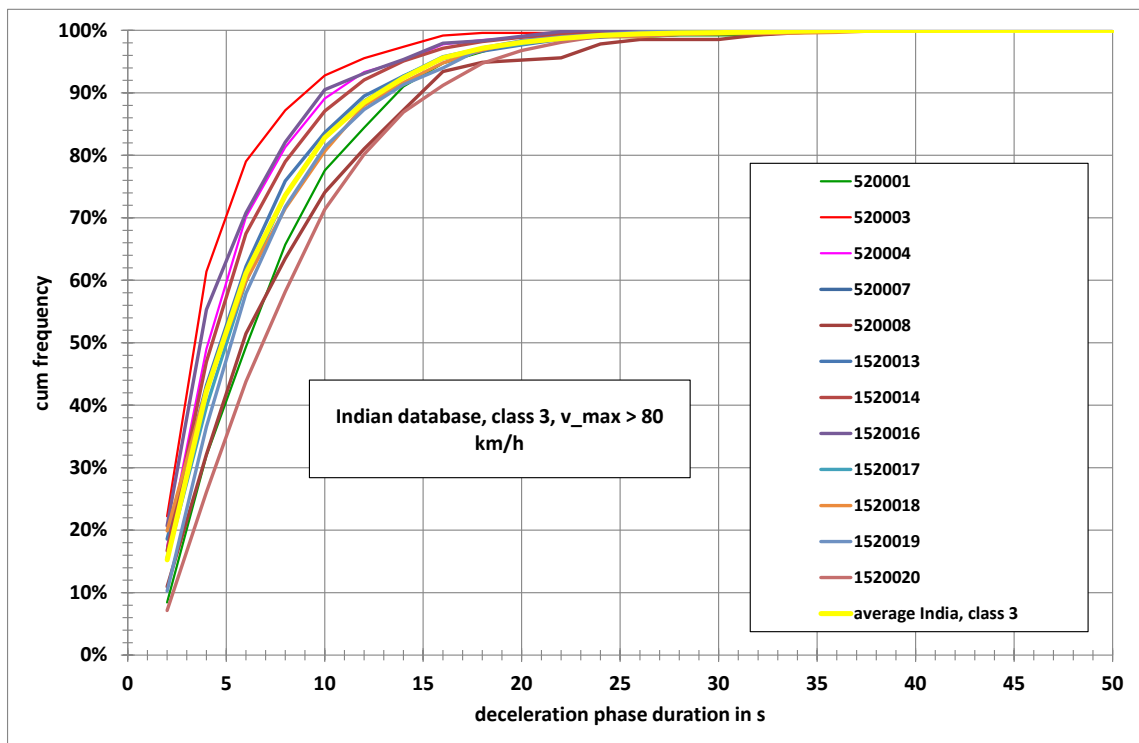


Figure 103: Deceleration phase duration distributions of class 3 vehicles in India ($v_{max} > 80$ km/h)

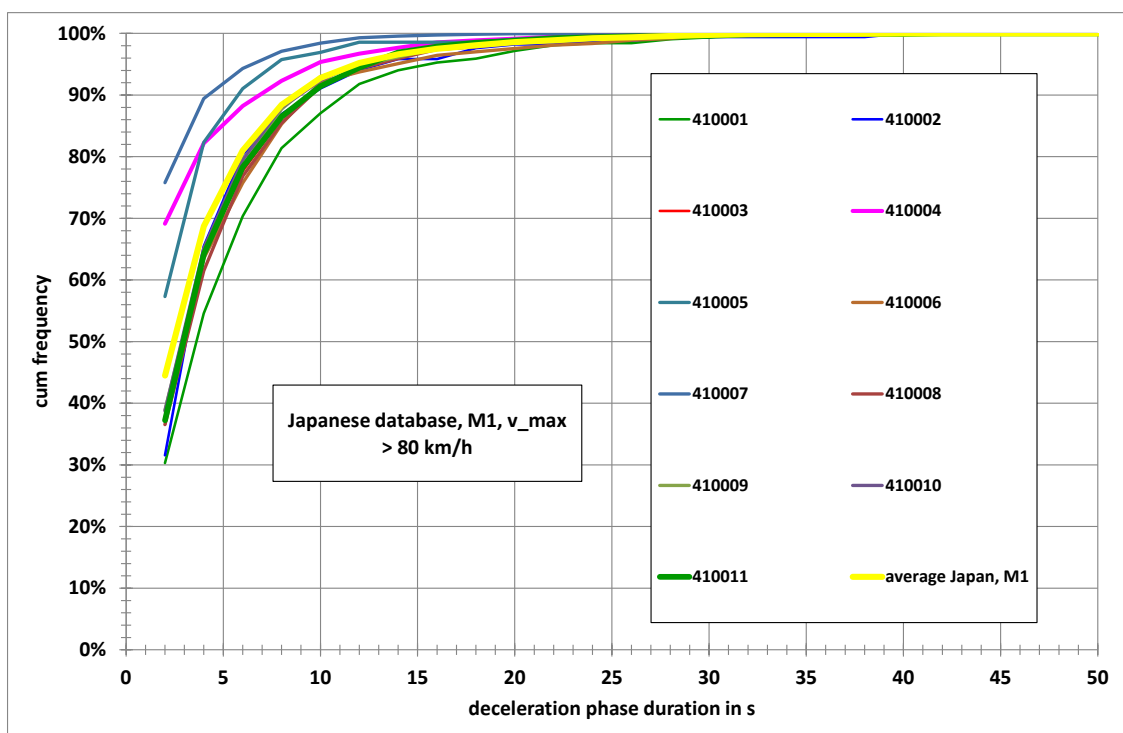


Figure 104: Deceleration phase duration distributions of M1 vehicles in Japan ($v_{max} > 80$ km/h)

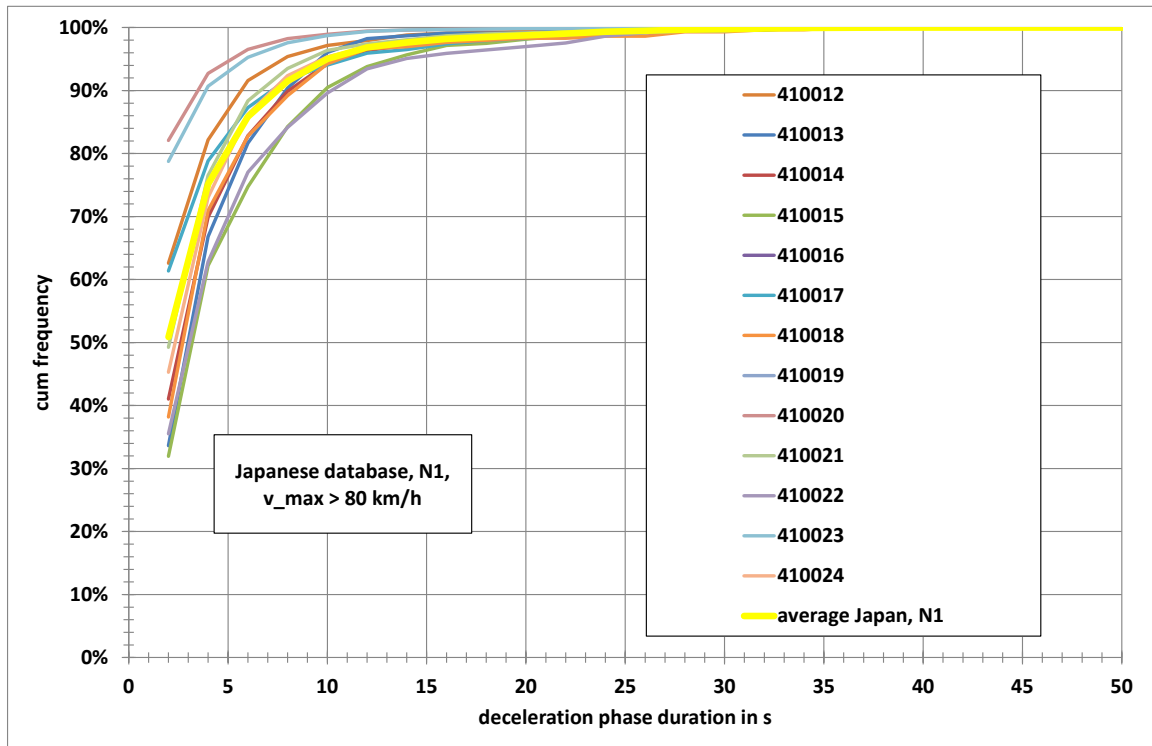


Figure 105: Deceleration phase duration distributions of N1 vehicles in Japan ($v_{max} > 80$ km/h)

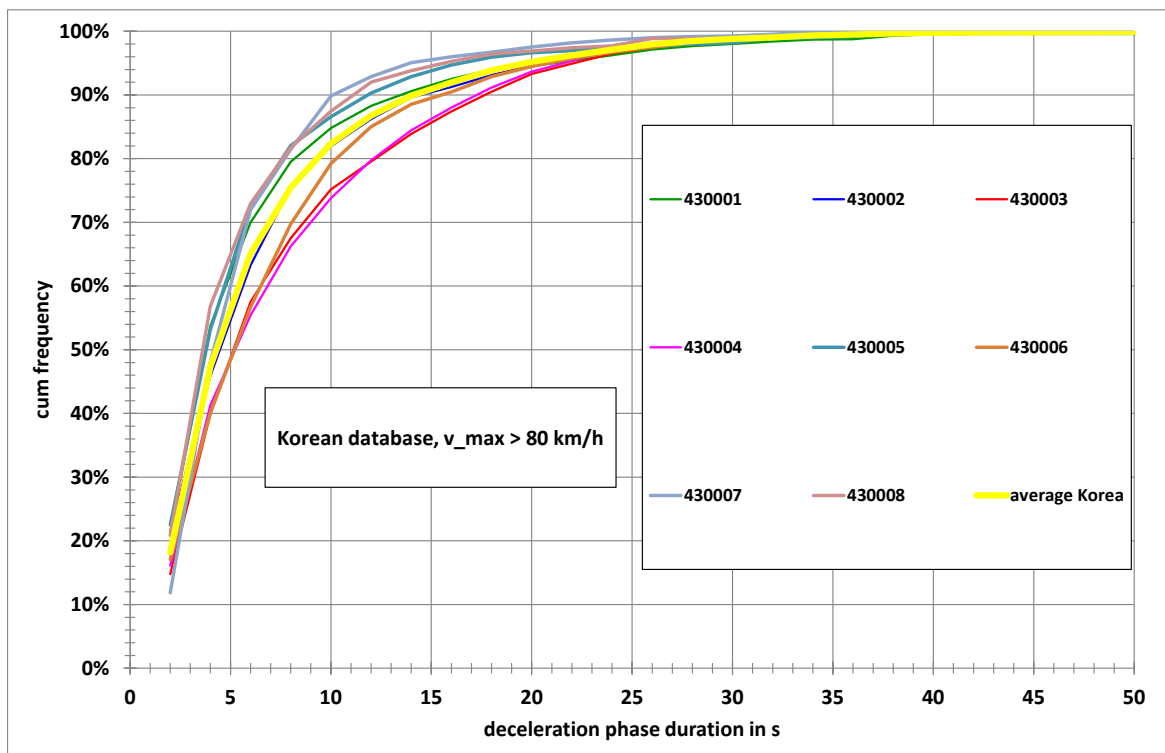




Figure 106: Deceleration phase duration distributions of the vehicles in Korea ($v_{max} > 80$ km/h)

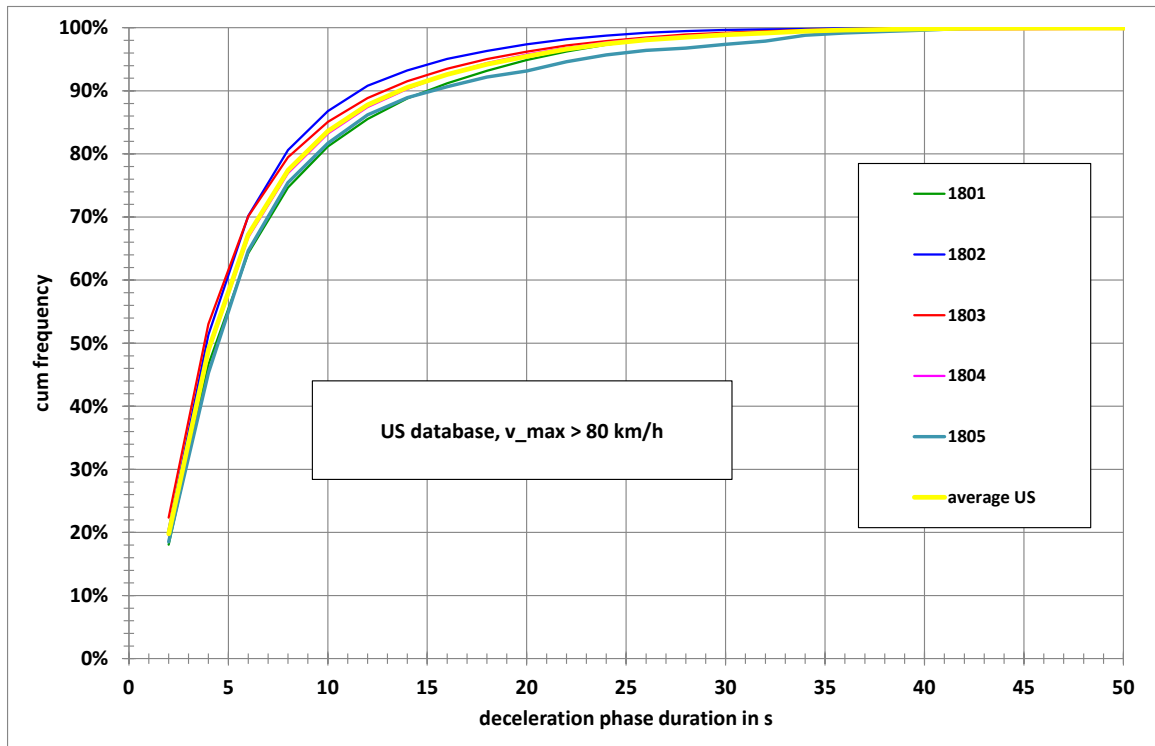


Figure 107: Deceleration phase duration distributions of the vehicles in USA ($v_{max} > 80$ km/h)

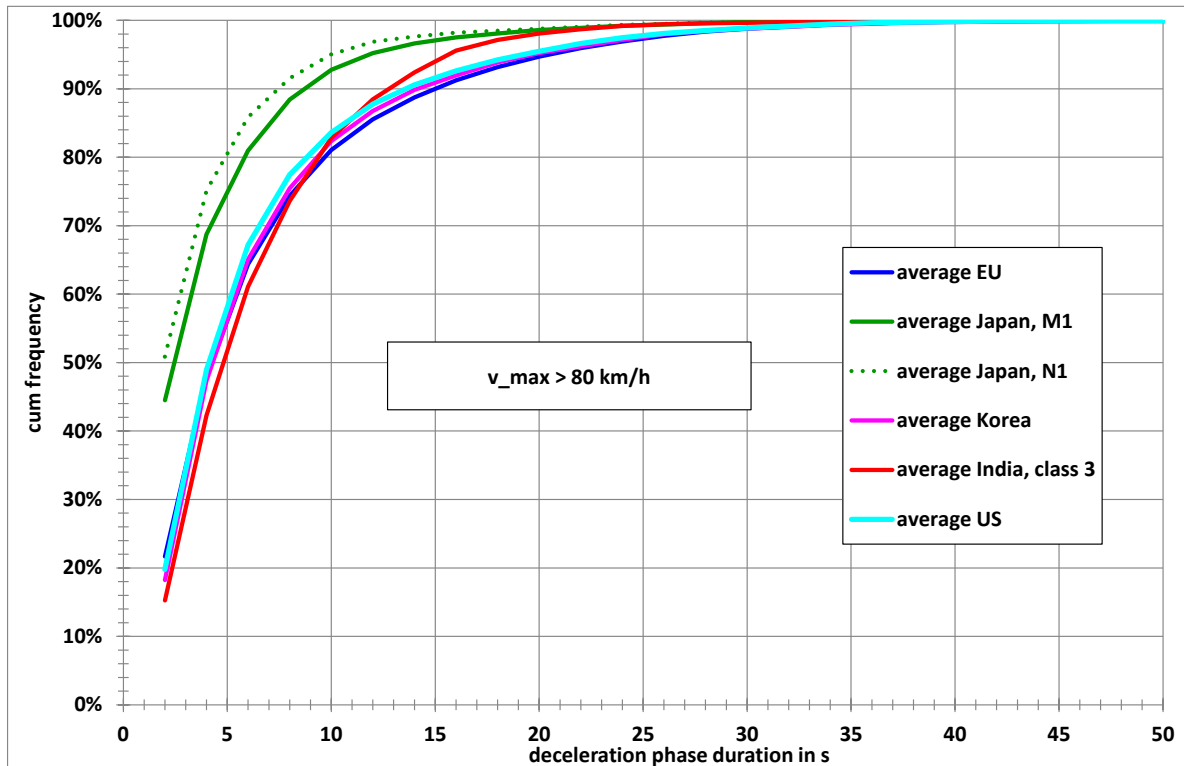


Figure 108: Deceleration phase duration distributions for the different regions ($v_{max} > 80 \text{ km/h}$)

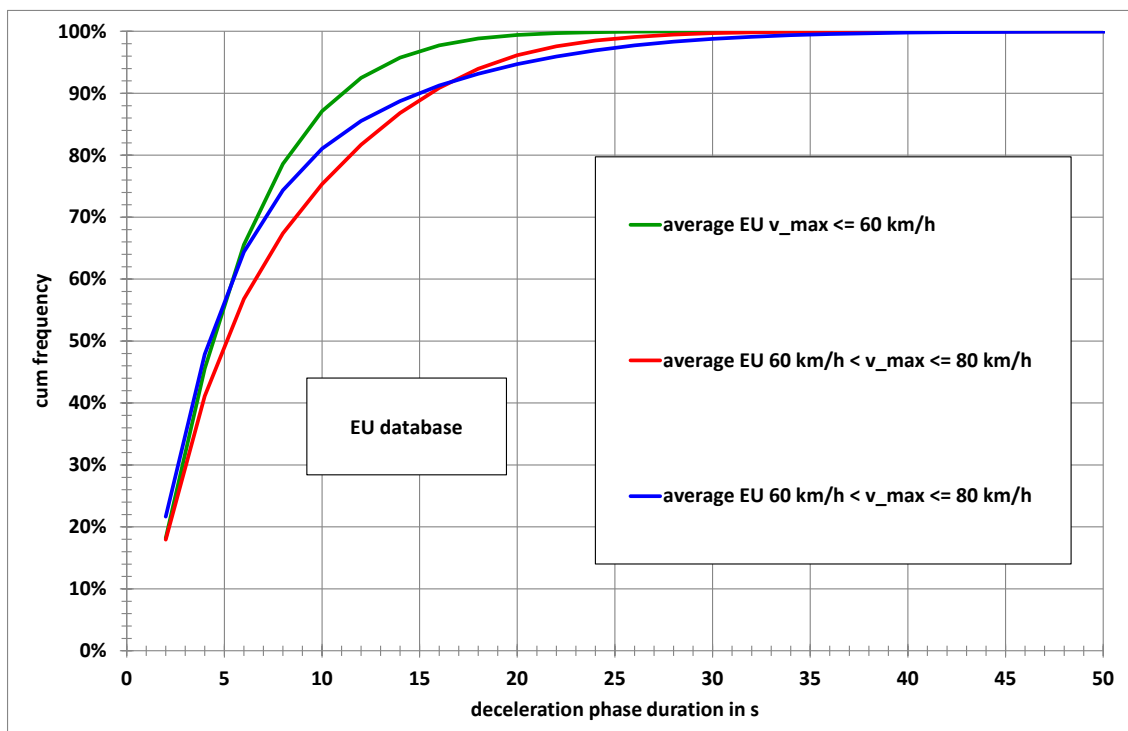


Figure 109: Deceleration phase duration distributions for short trips with different v_{max}



10.2 Distance distributions

Vehicle specific distance distributions for the different regions and for deceleration phases with $v_{max} \leq 60$ km/h are shown in Figure 108 to Figure 116.

Figure 117 to Figure 125 show the corresponding distributions for deceleration phases with v_{max} between 60 and 80 km/h and Figure 126 to Figure 132 shown the distributions for deceleration phases with v_{max} above 80 km/h.

Figure 133 shows a comparison of the average curves for Europe with the different v_{max} ranges.

The numbers in the legends are vehicle indicators according to Table 60 to Table 65.

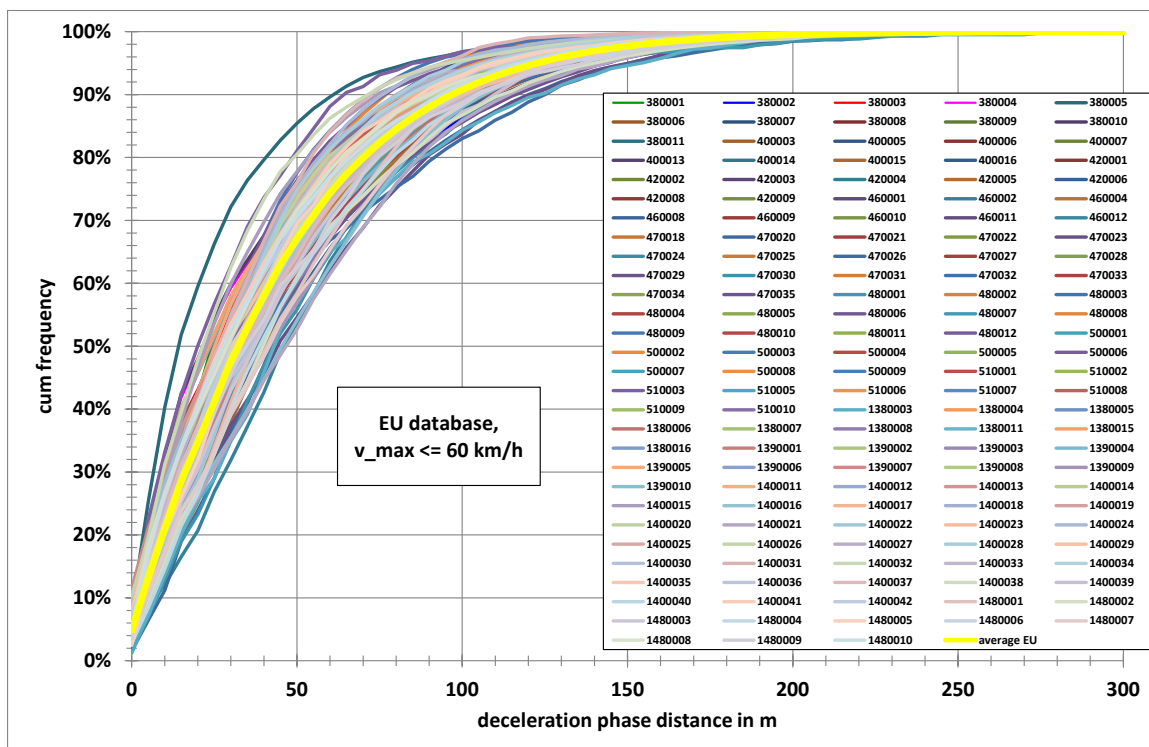


Figure 110: Deceleration phase distance distributions of the vehicles in Europe ($v_{max} \leq 60$ km/h)

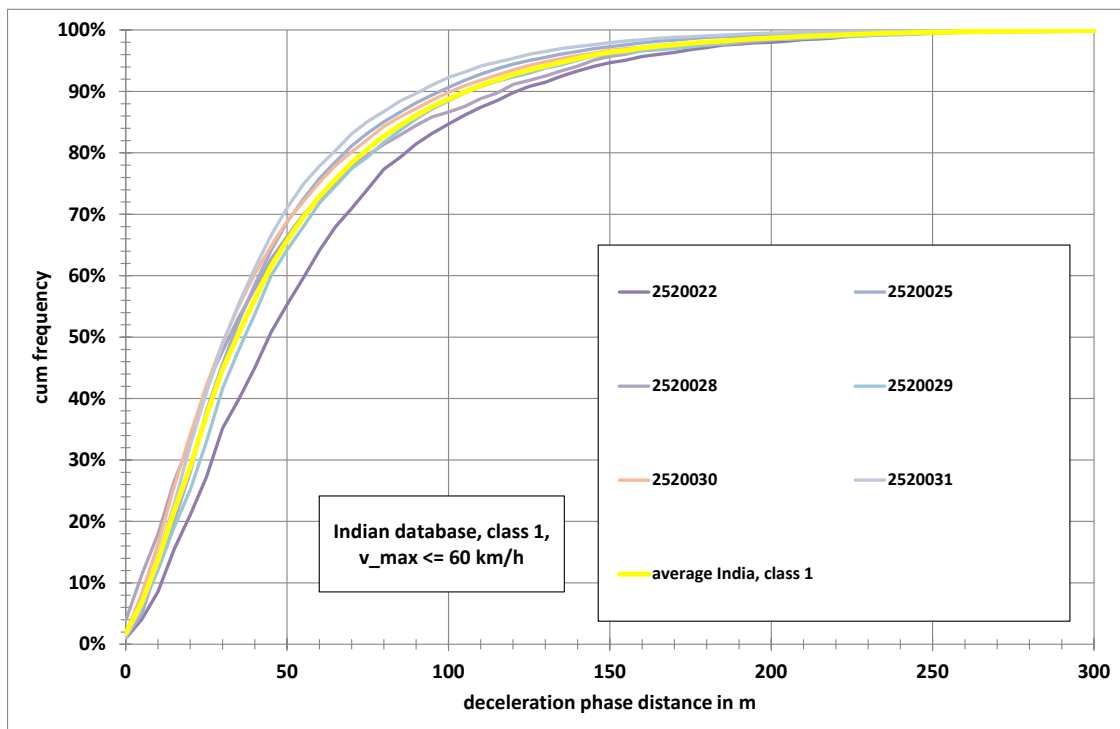


Figure 111: Deceleration phase distance distributions of class 1 vehicles in India ($v_{max} \leq 60$ km/h)

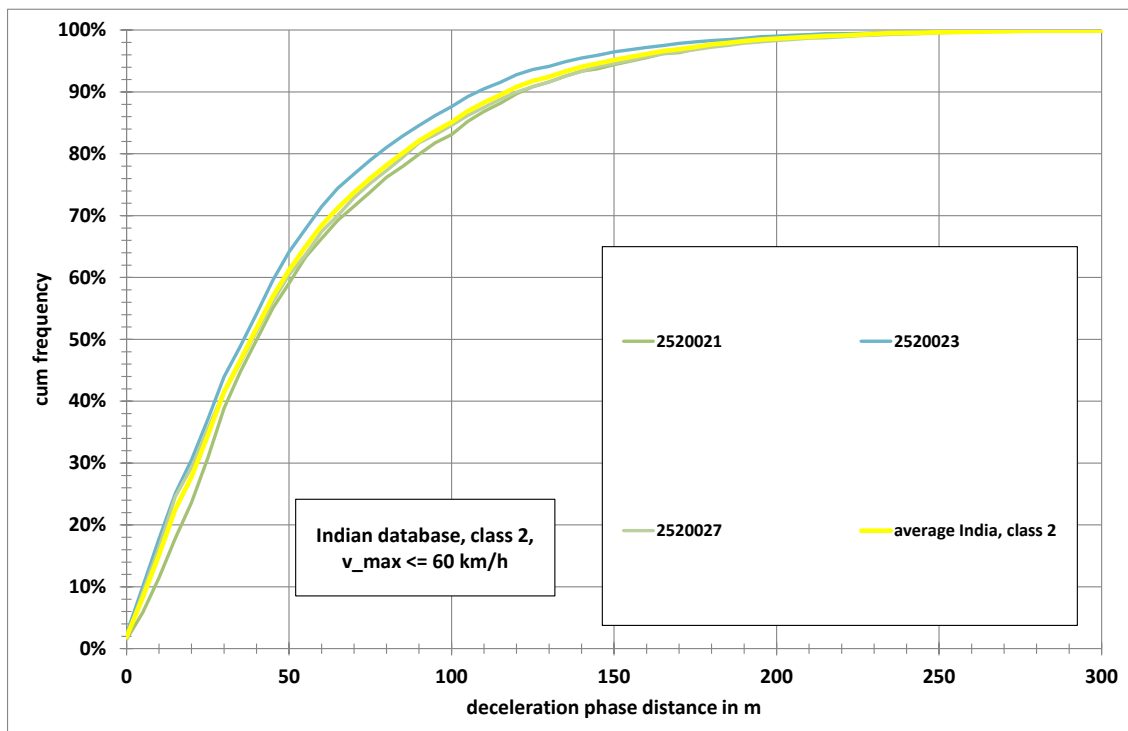


Figure 112: Deceleration phase distance distributions of class 2 vehicles in India ($v_{max} \leq 60$ km/h)

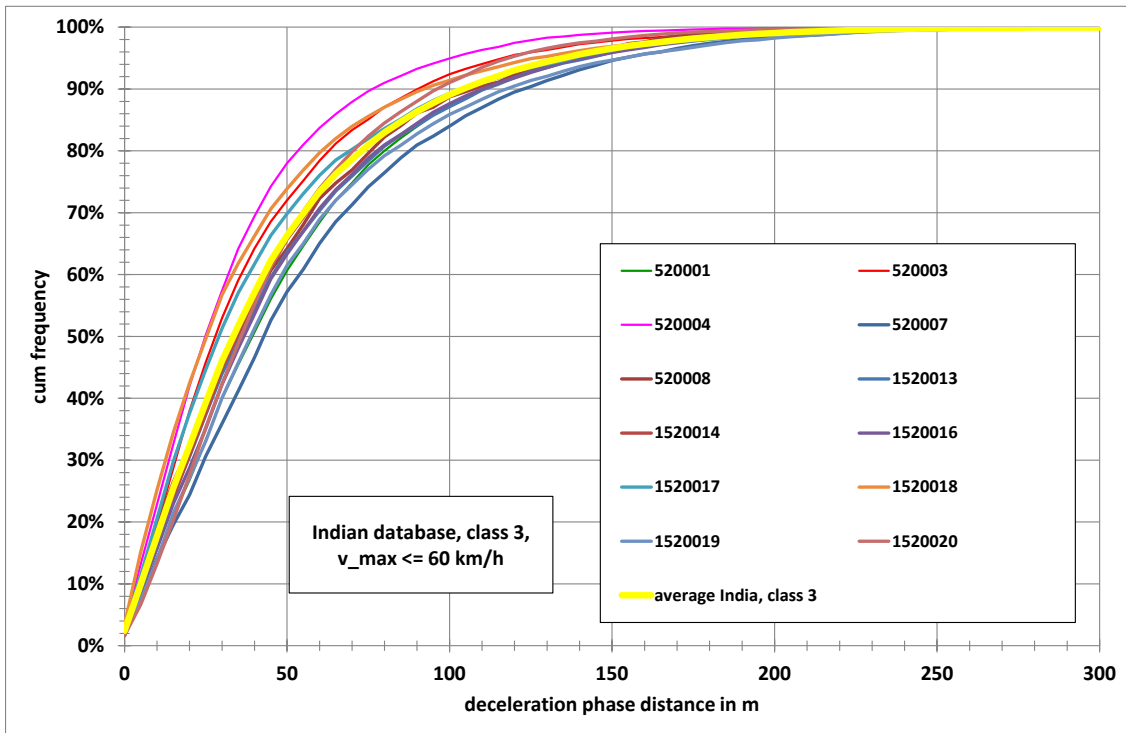


Figure 113: Deceleration phase distance distributions of class 3 vehicles in India ($v_{max} \leq 60$ km/h)

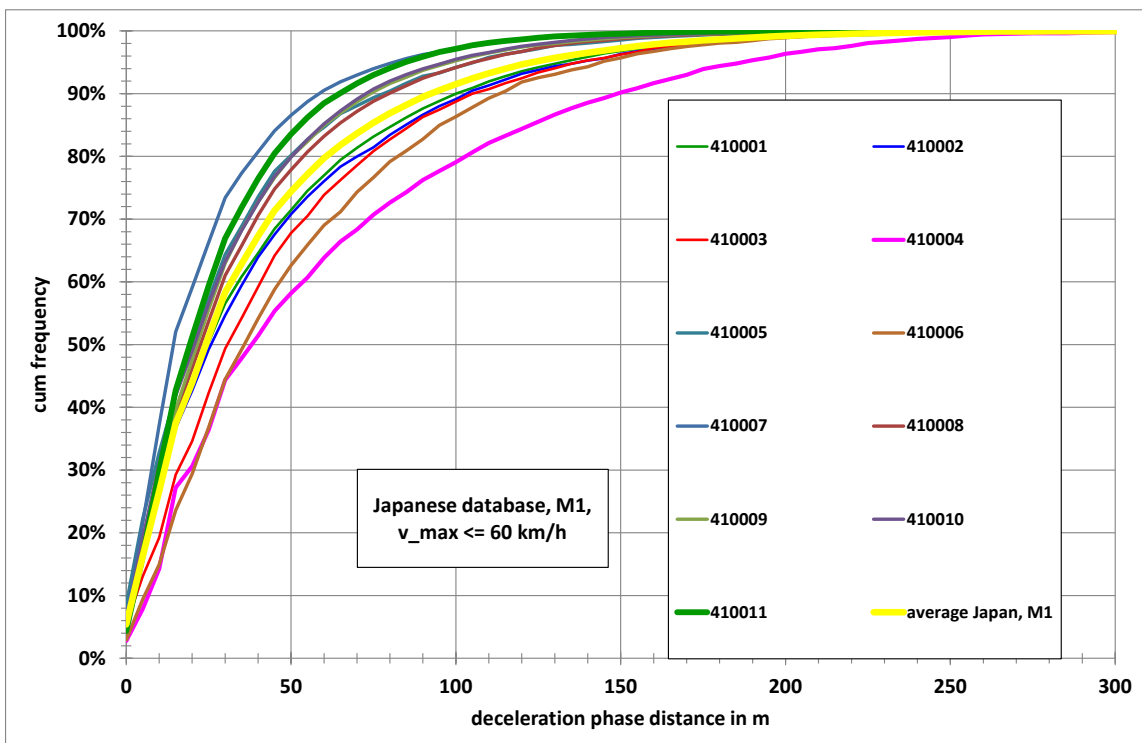




Figure 114: Deceleration phase distance distributions of M1 vehicles in Japan ($v_{max} \leq 60$ km/h)

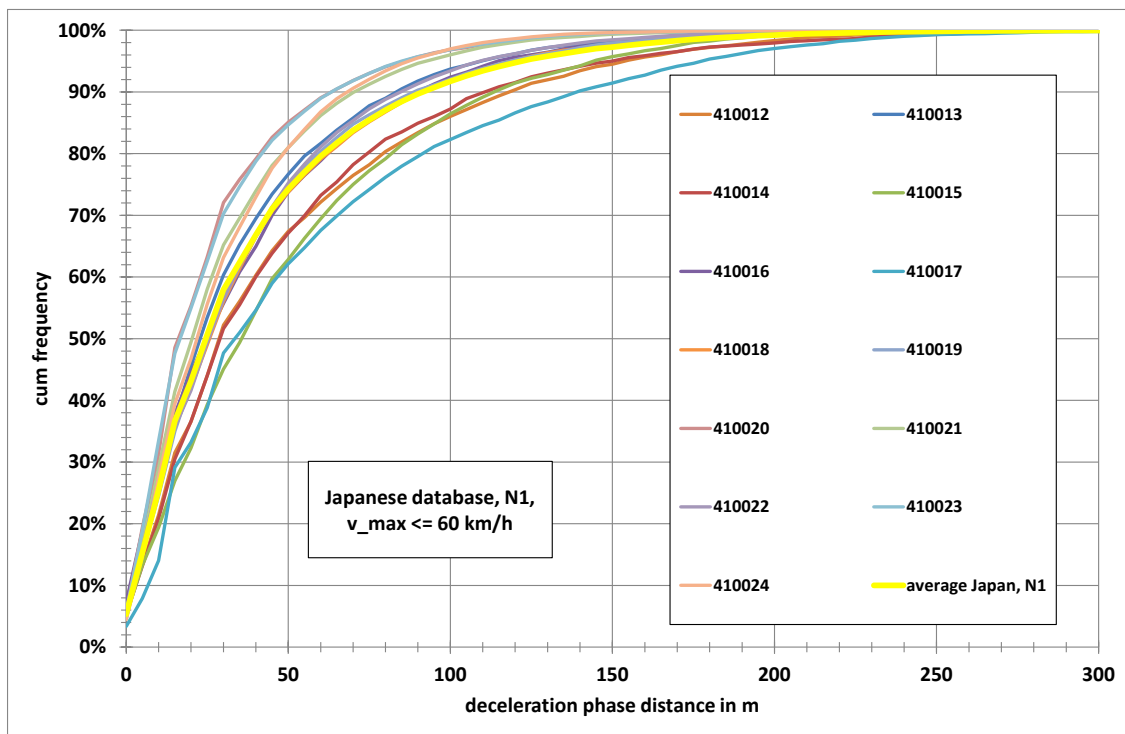


Figure 115: Deceleration phase distance distributions of N1 vehicles in Japan ($v_{max} \leq 60$ km/h)

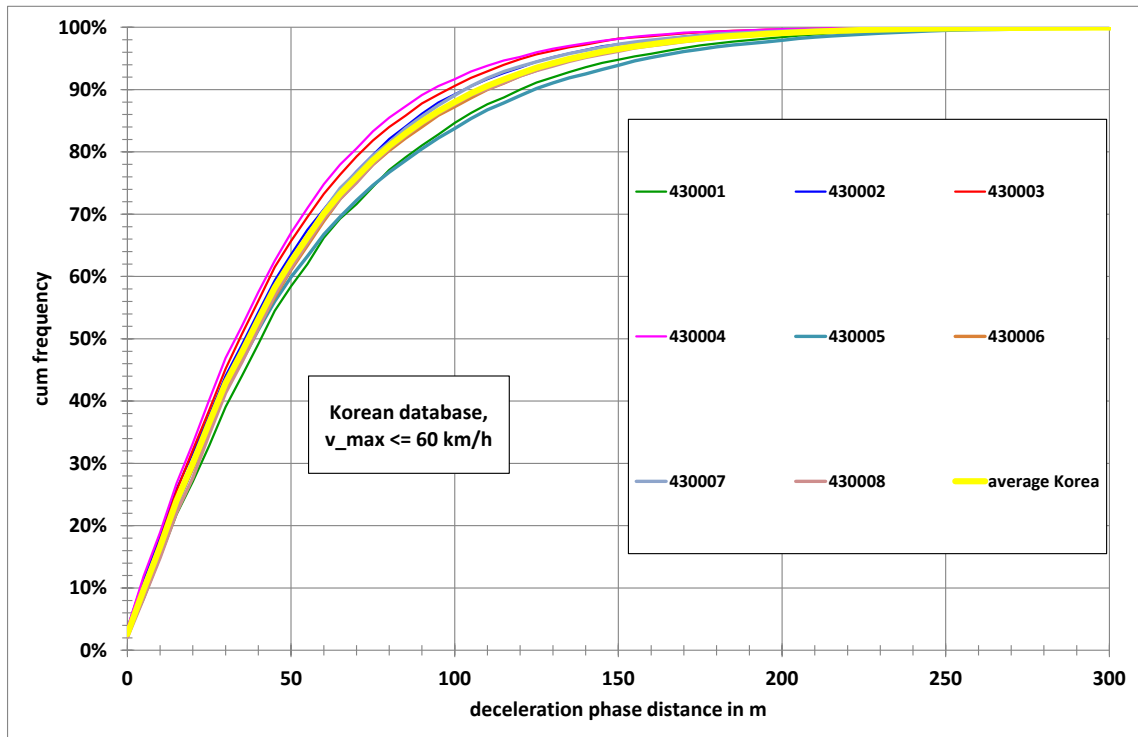


Figure 116: Deceleration phase distance distributions of the vehicles in Korea ($v_{max} \leq 60$ km/h)

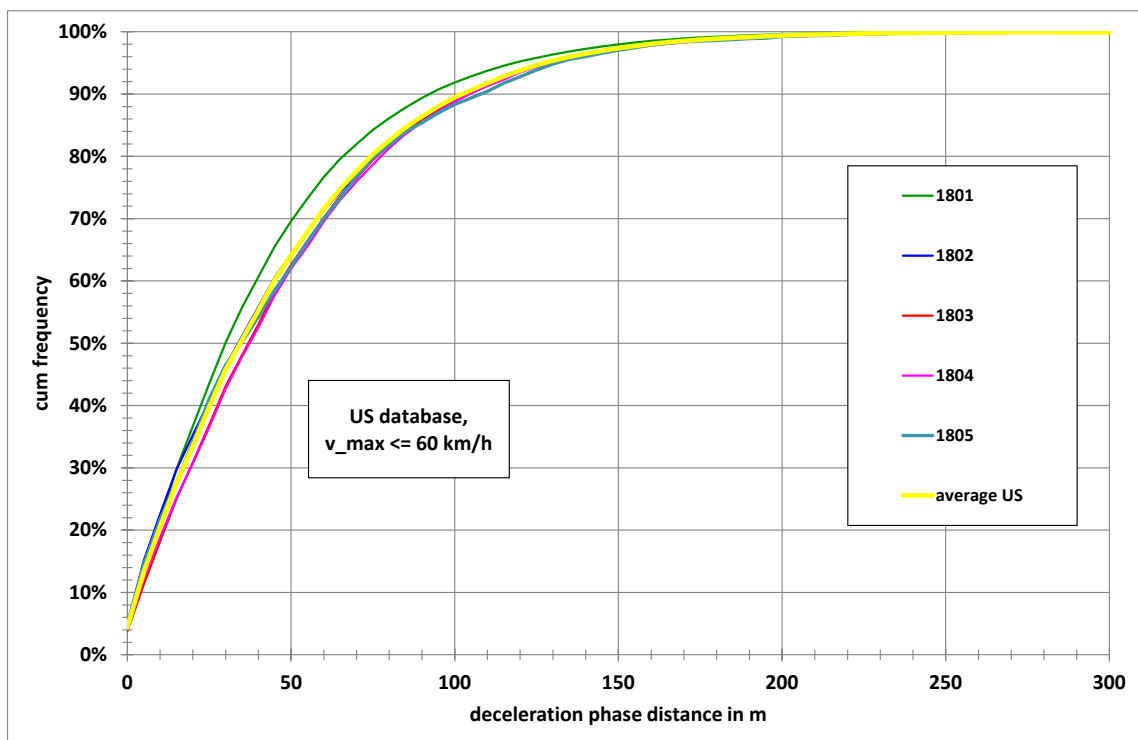


Figure 117: Deceleration phase distance distributions of the vehicles in USA ($v_{max} \leq 60$ km/h)

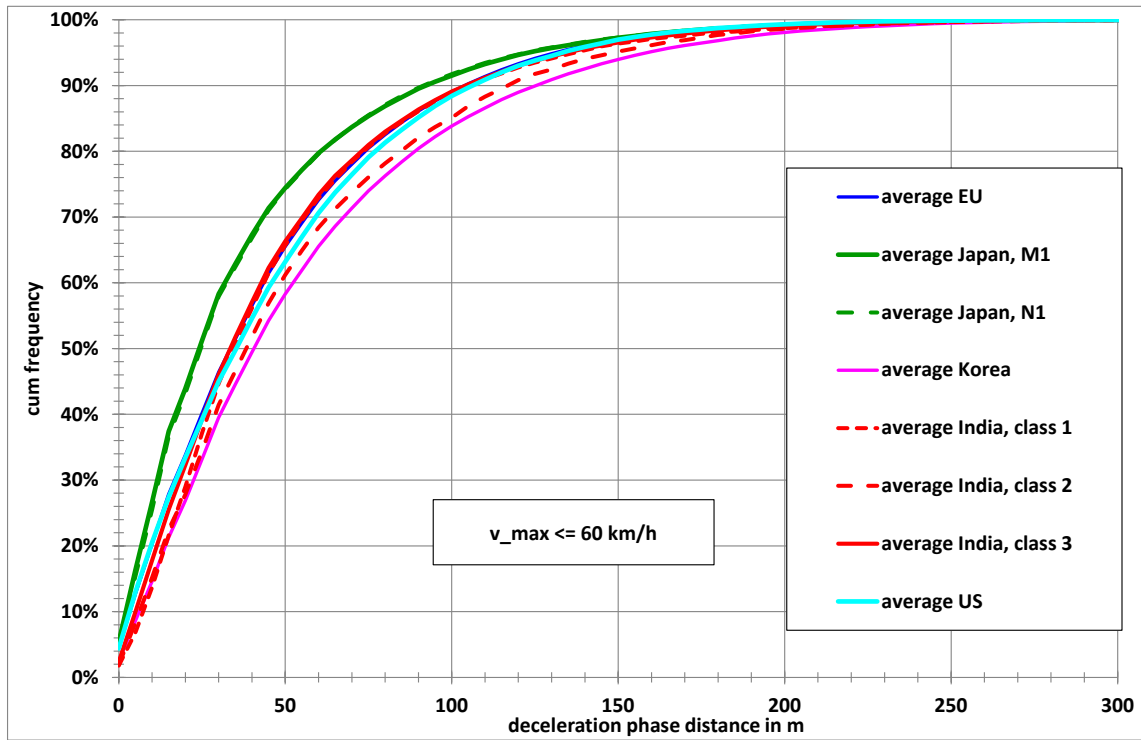


Figure 118: Deceleration phase distance distributions for the different regions ($v_{max} \leq 60$ km/h)

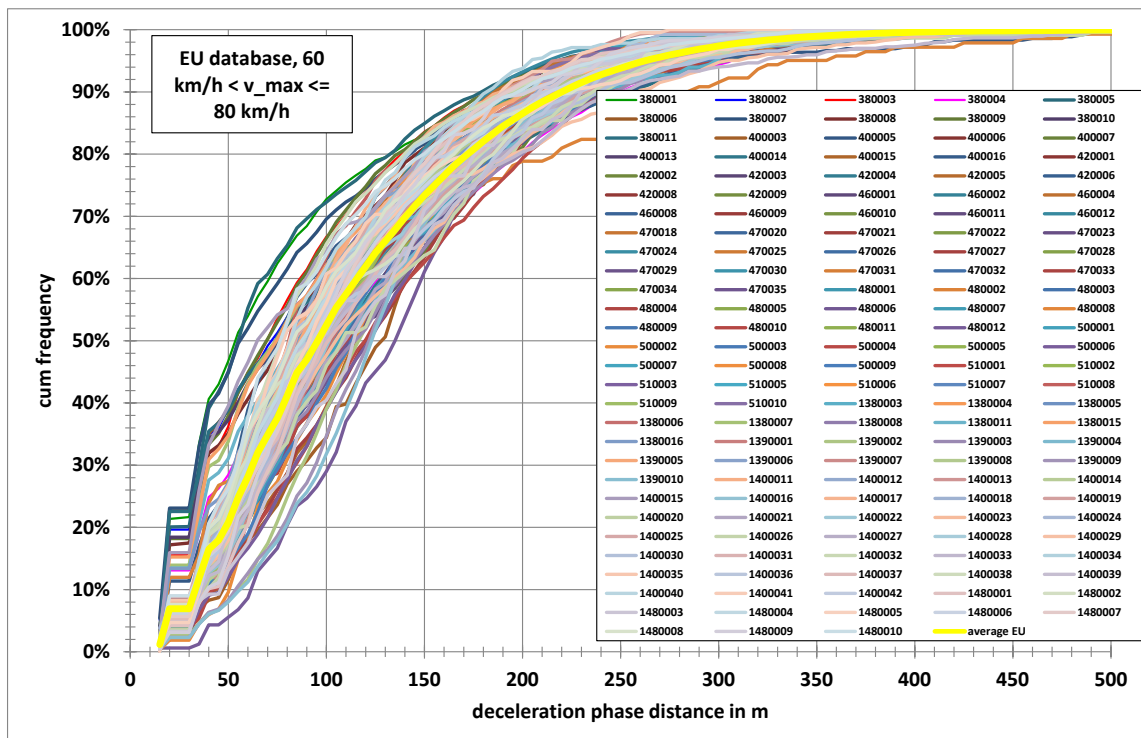


Figure 119: Deceleration phase distance distributions of the vehicles in Europe ($60 \text{ km/h} < v_{max} \leq 80 \text{ km/h}$)

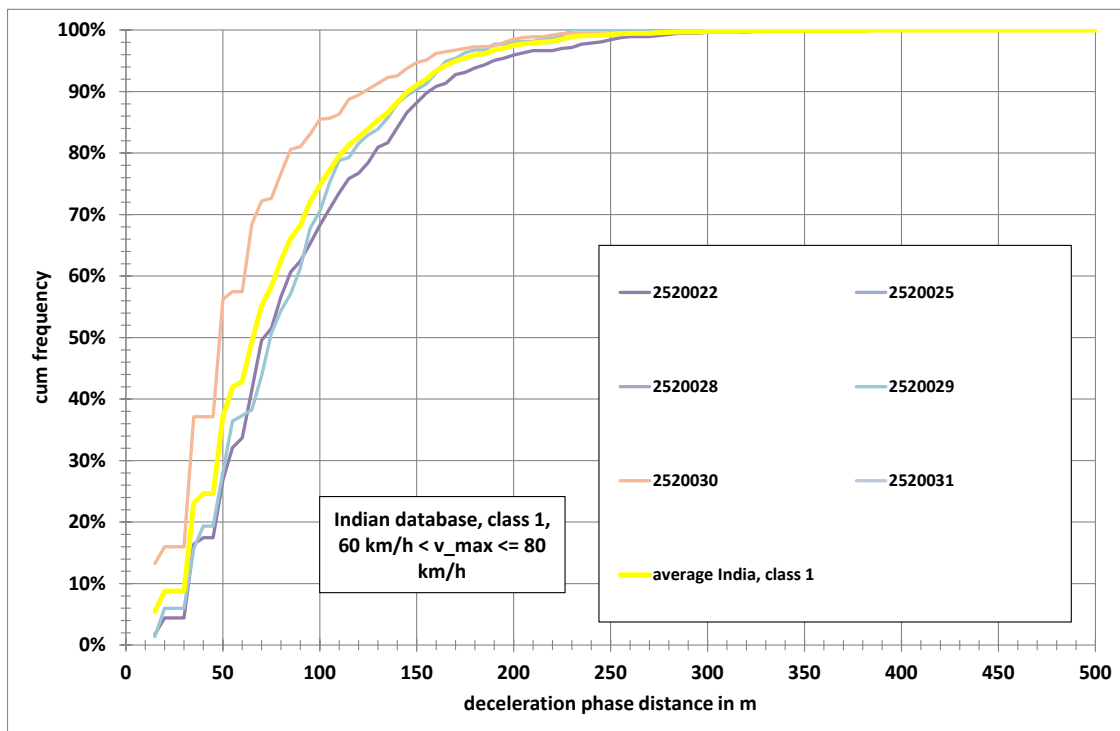


Figure 120: Deceleration phase distance distributions of class 1 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

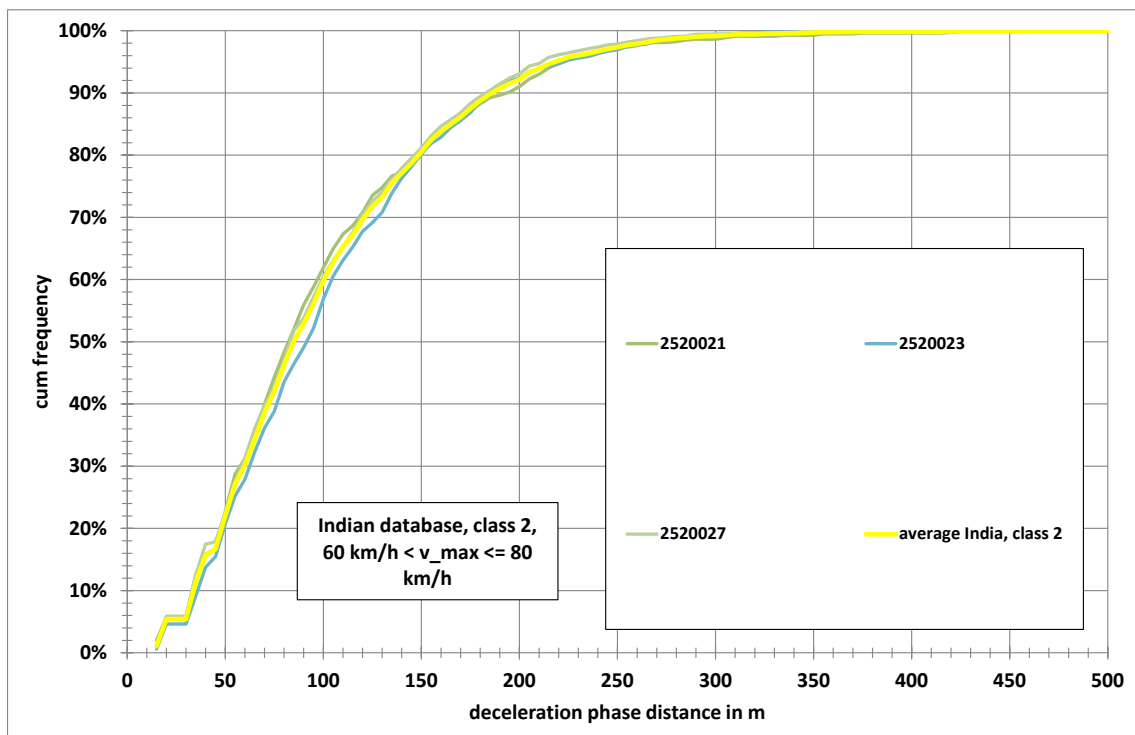


Figure 121: Deceleration phase distance distributions of class 2 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

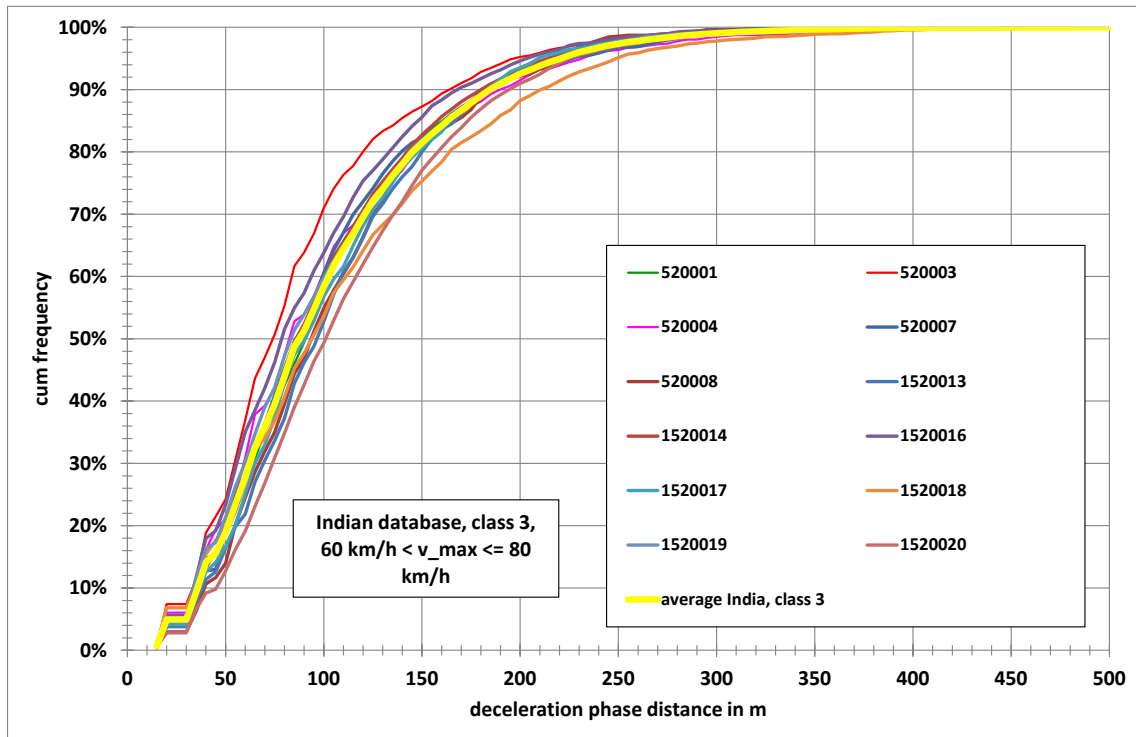


Figure 122: Deceleration phase distance distributions of class 3 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

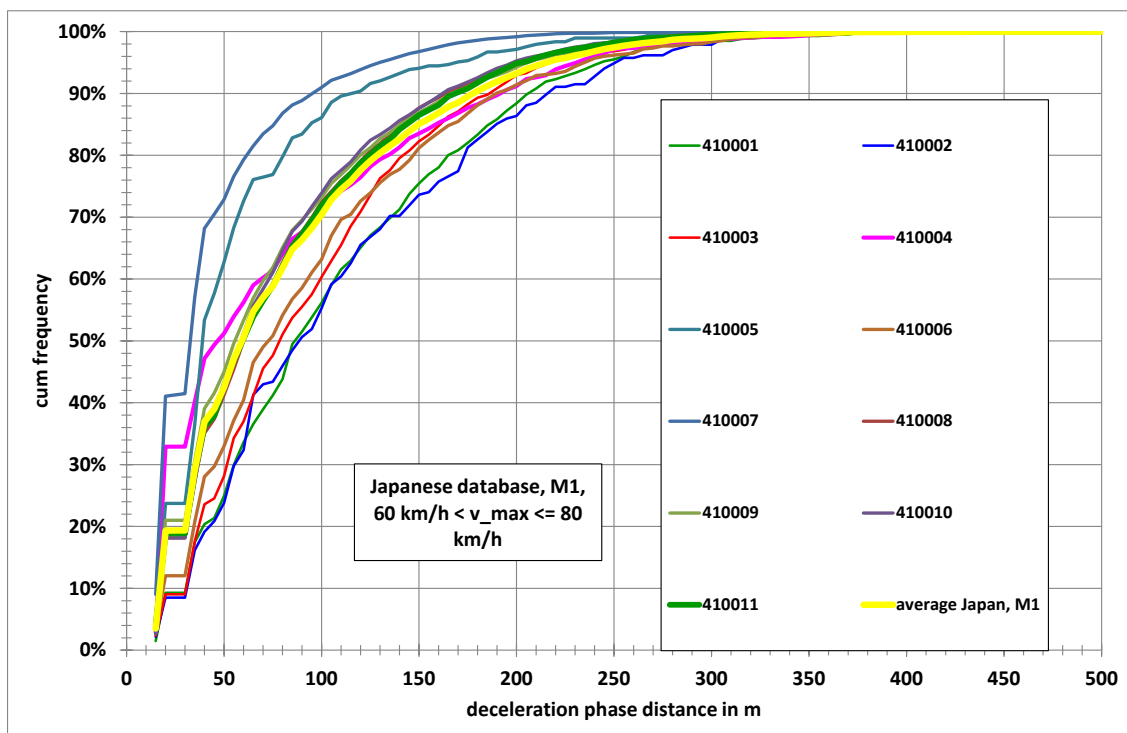


Figure 123: Deceleration phase distance distributions of M1 vehicles in Japan ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

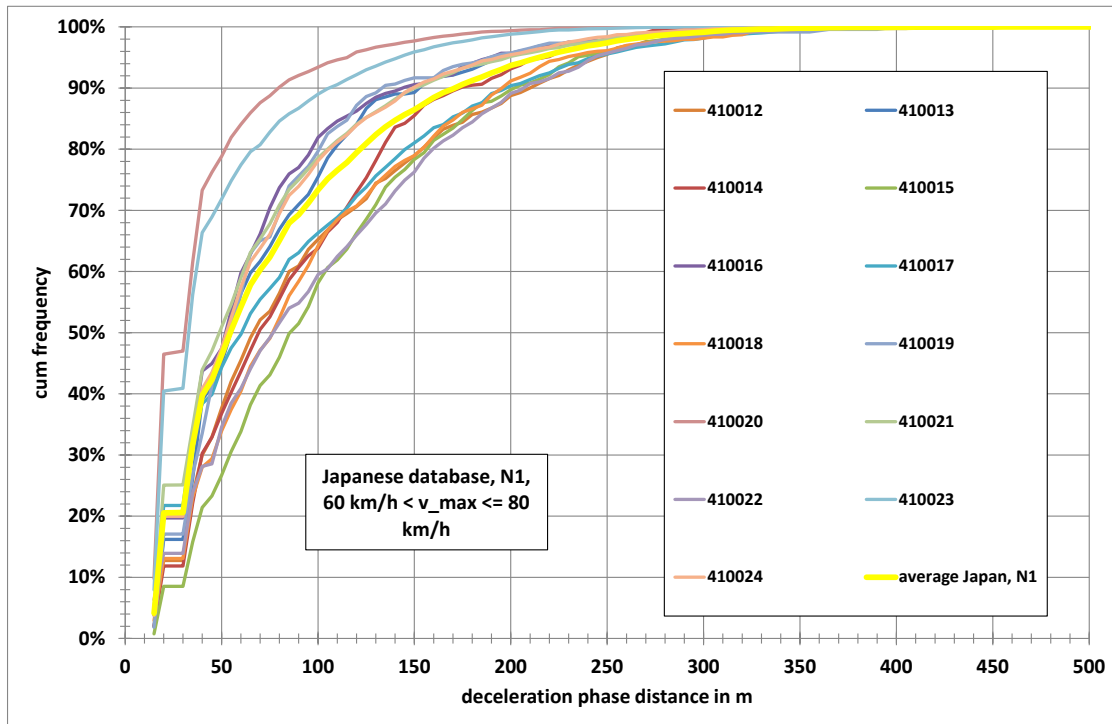


Figure 124: Deceleration phase distance distributions of N1 vehicles in Japan ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

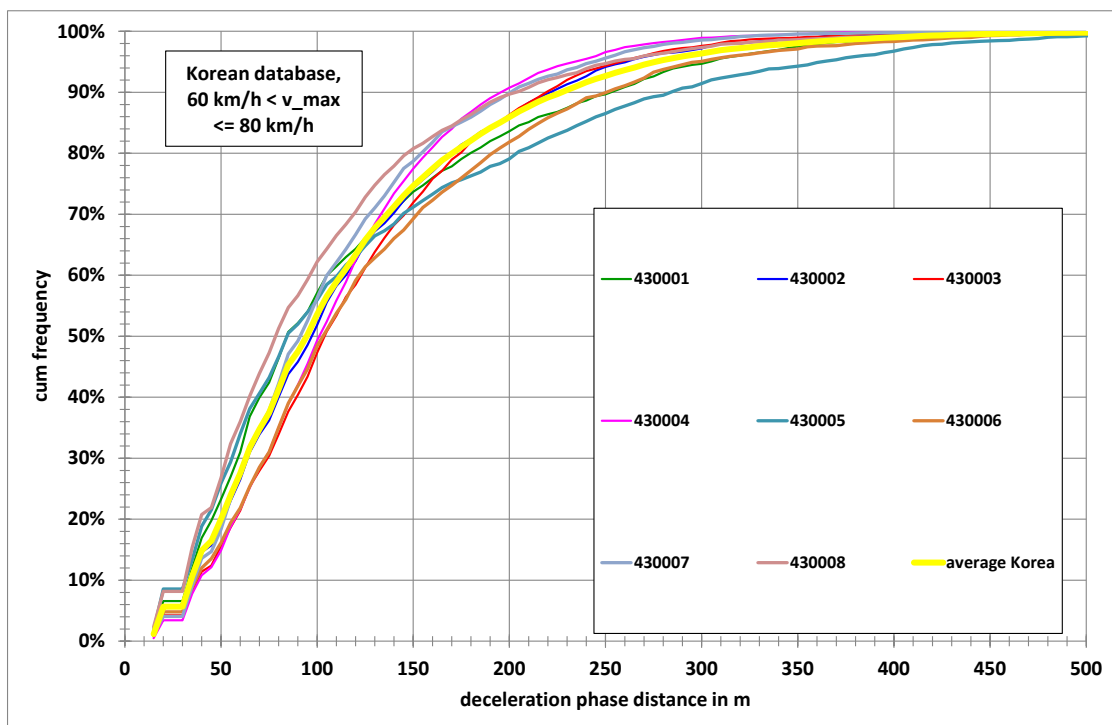


Figure 125: Deceleration phase distance distributions of the vehicles in Korea ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

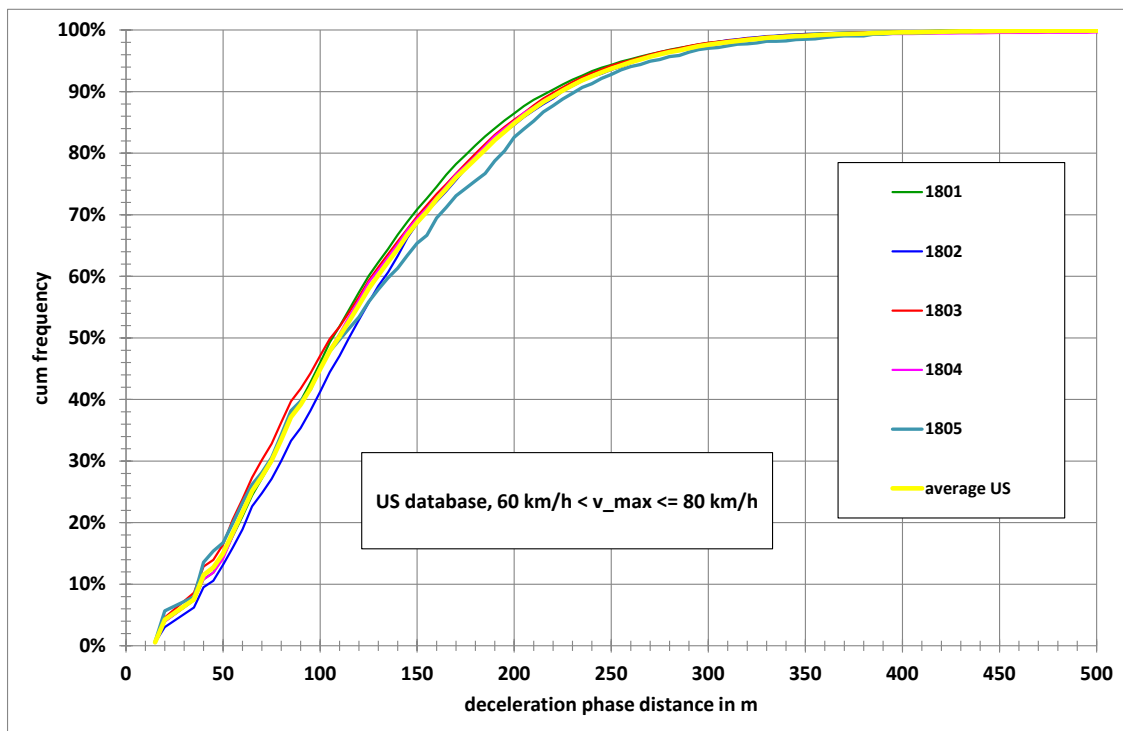


Figure 126: Deceleration phase distance distributions of the vehicles in USA ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

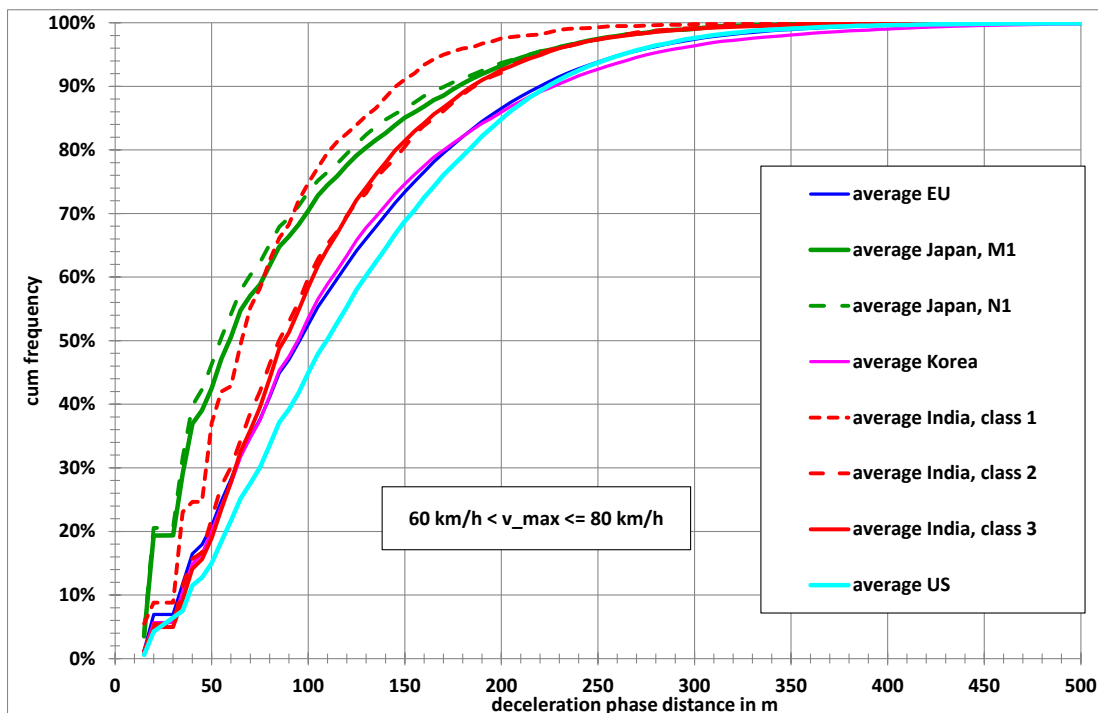


Figure 127: Deceleration phase distance distributions for the different regions ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

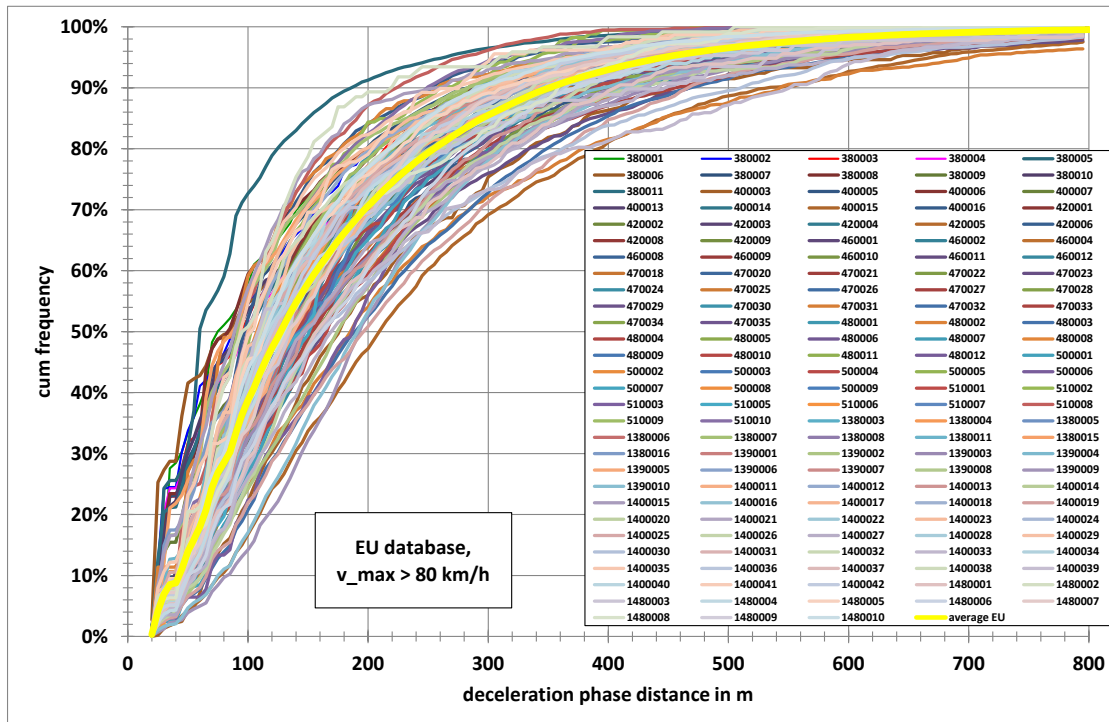


Figure 128: Deceleration phase distance distributions of the vehicles in Europe ($v_{max} > 80$ km/h)

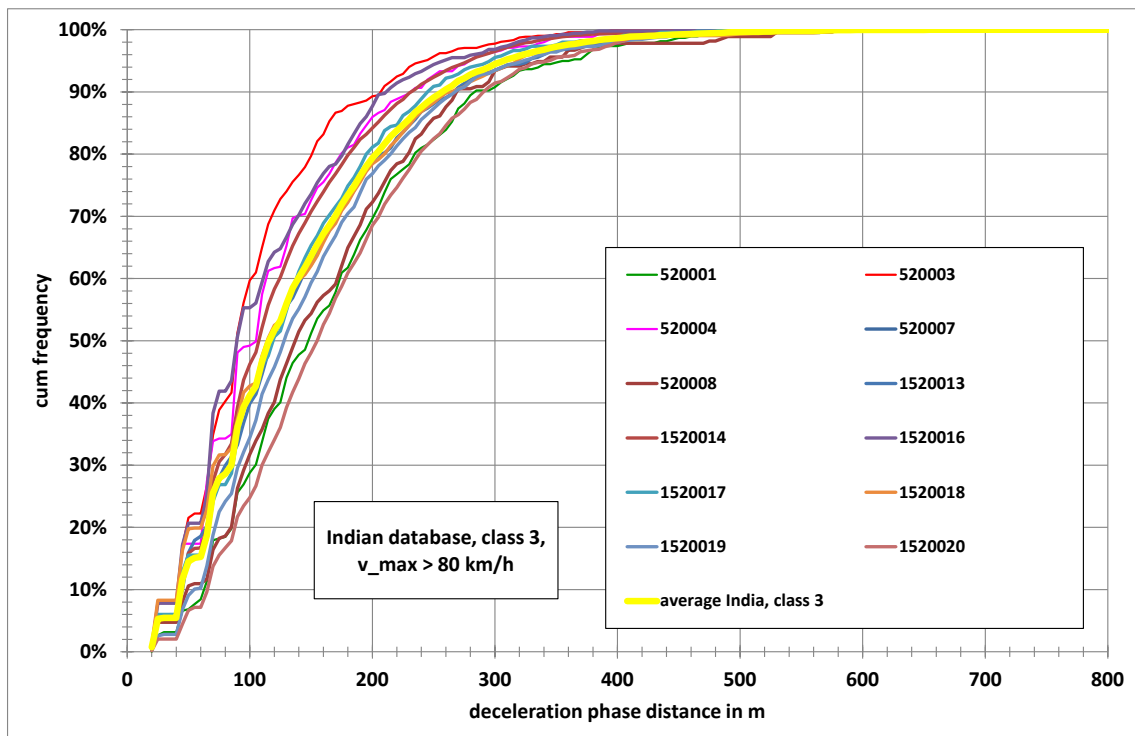


Figure 129: Deceleration phase distance distributions of class 3 vehicles in India ($v_{max} > 80$ km/h)

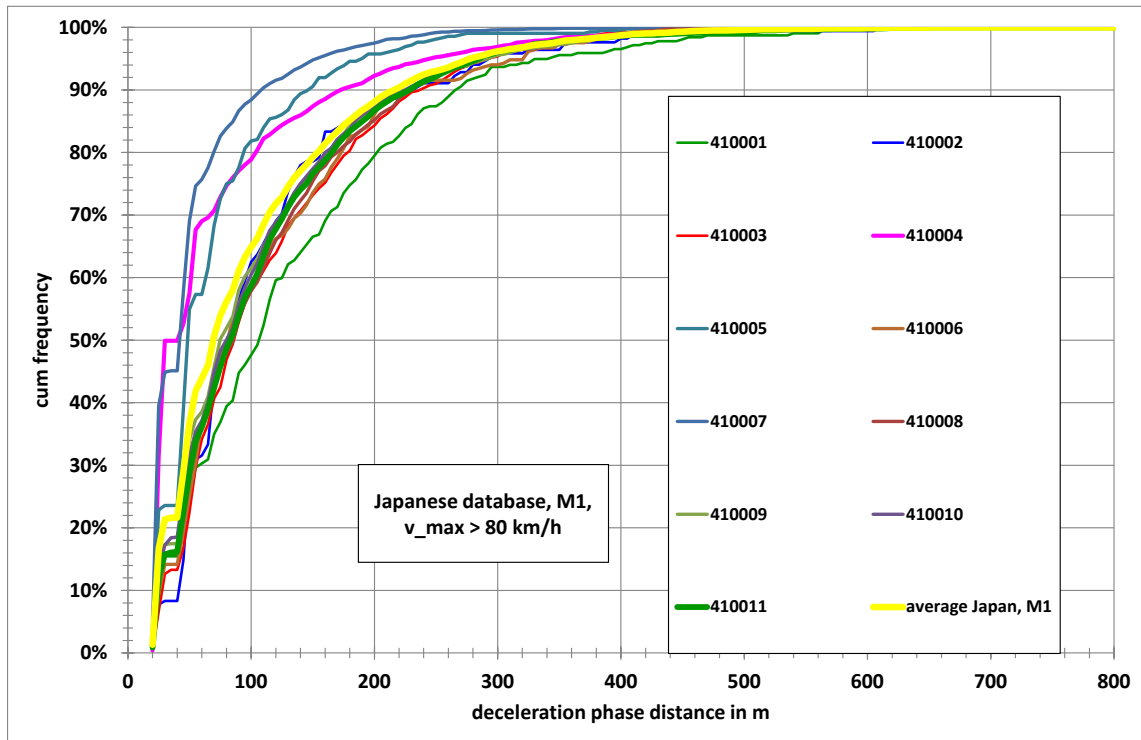


Figure 130: Deceleration phase distance distributions of M1 vehicles in Japan ($v_{max} > 80$ km/h)

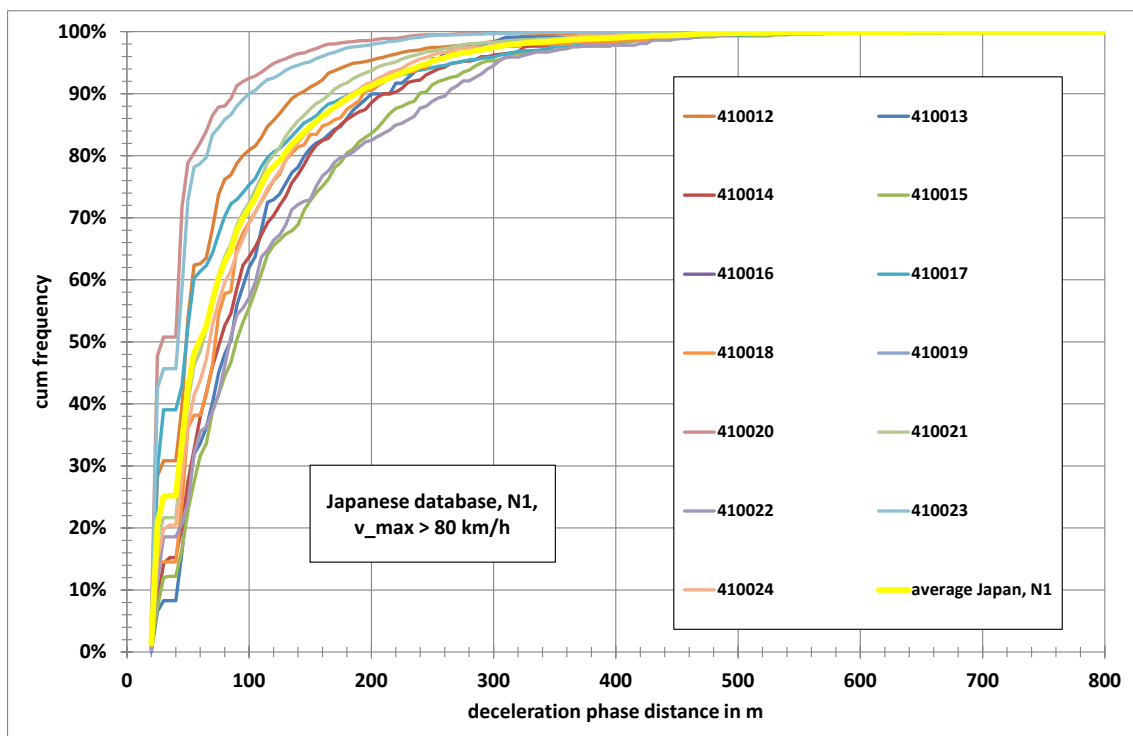


Figure 131: Deceleration phase distance distributions of N1 vehicles in Japan ($v_{max} > 80$ km/h)

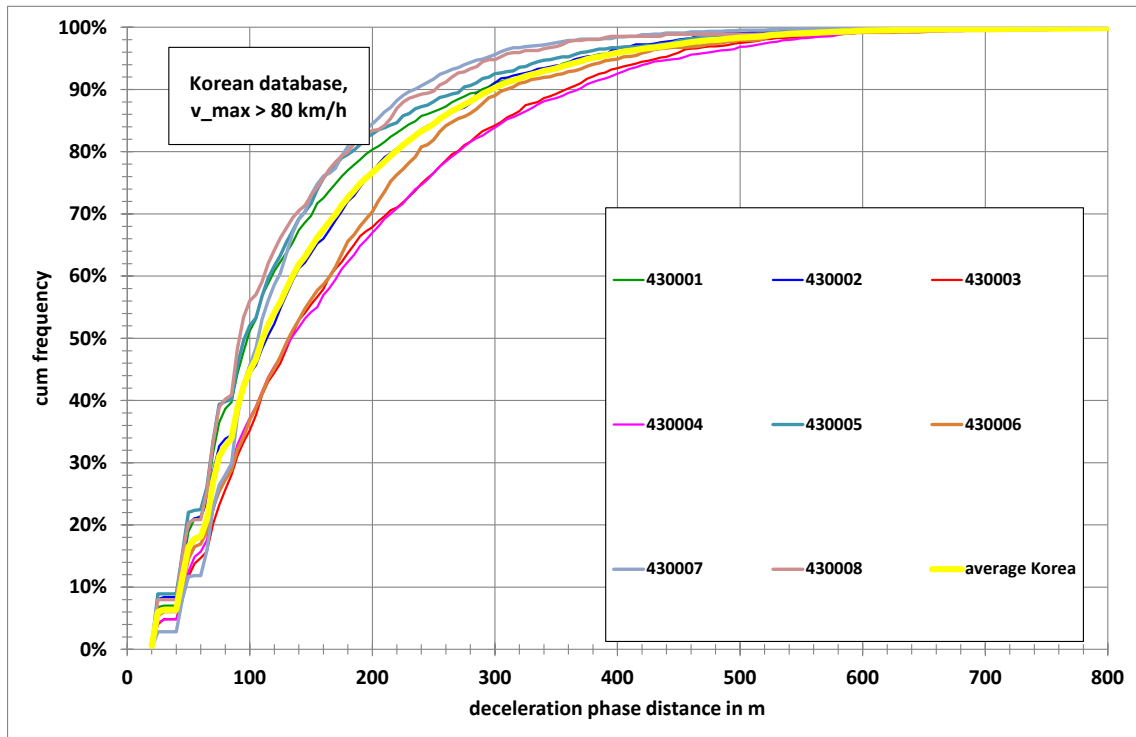


Figure 132: Deceleration phase distance distributions of the vehicles in Korea ($v_{max} > 80$ km/h)

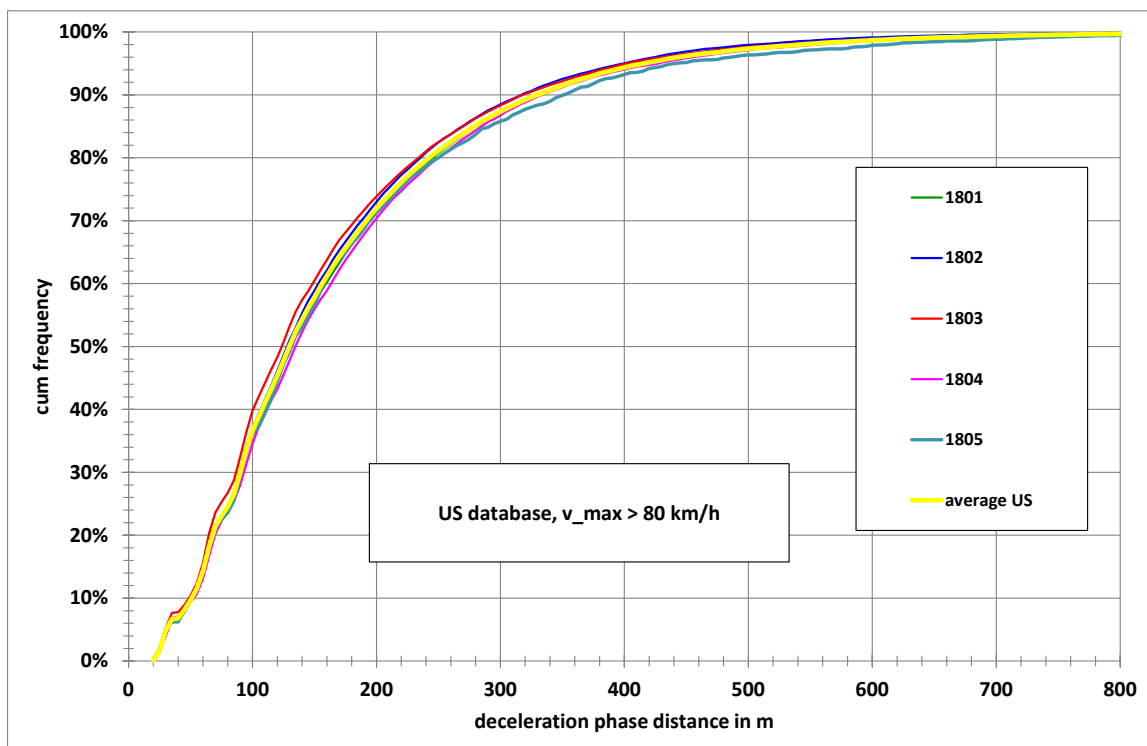




Figure 133: Deceleration phase distance distributions of the vehicles in USA ($v_{max} > 80$ km/h)

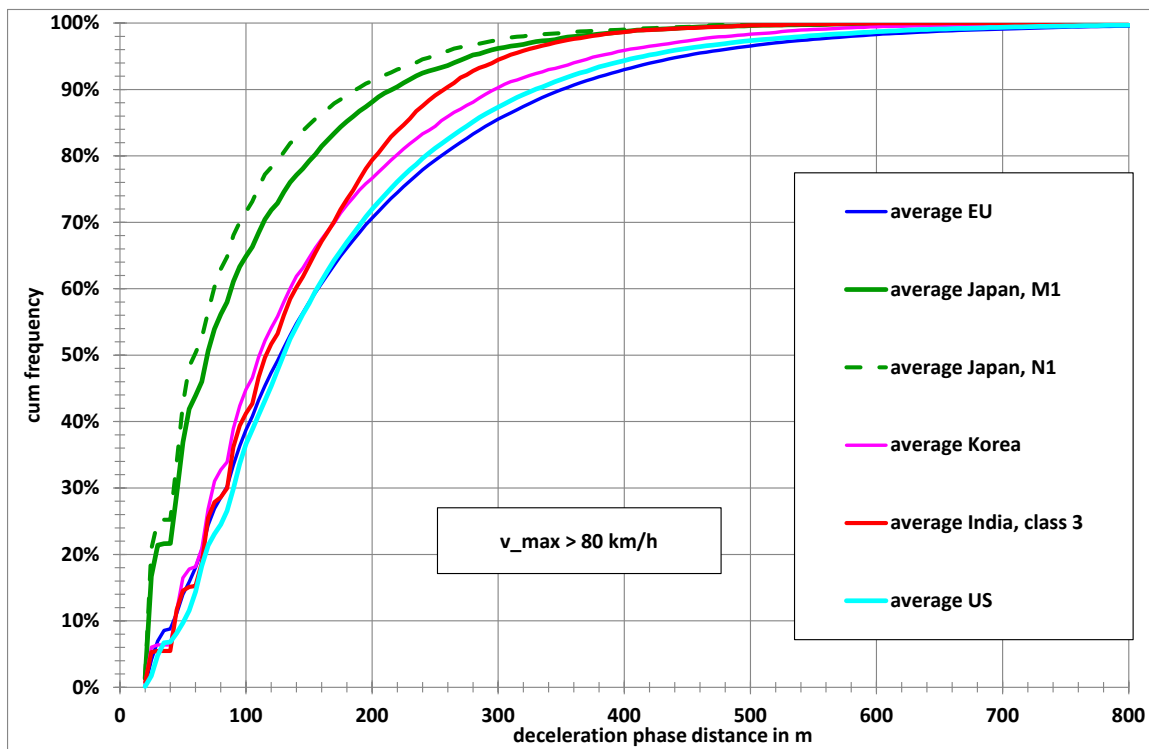


Figure 134: Deceleration phase distance distributions for the different regions ($v_{max} > 80$ km/h)

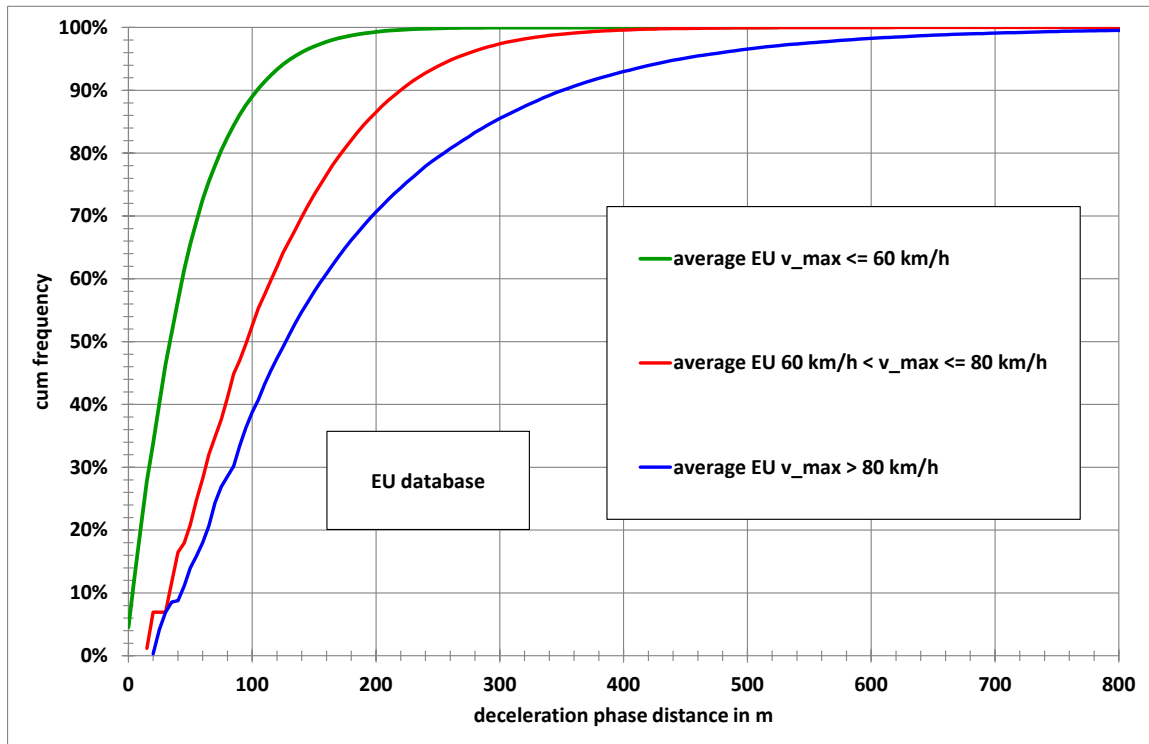


Figure 135: Deceleration phase distance distributions for short trips with different v_{max}



11 Phases with brake engaged

11.1 Determination of a speed dependent deceleration threshold curve

Another task within this analysis was the determination of brake use duration and distance distributions. The brake use during deceleration phases should be determined by expert guess thresholds for the deceleration or for $v \cdot a$ respectively.

Fortunately, an alternative method could be used, because the author could analyse in-use driving behaviour data from a former research project of the German Environment Agency, dedicated to the improvement of the type approval noise measurement method for light duty vehicles (“Investigations on Improving the Method of Noise Measurement for Powered Vehicles”, July 1997). Within this project in-use driving behaviour measurements were performed with 11 cars in Aachen and the surroundings, where vehicle speed, engine speed and drive axle torque, but also clutch and brake engagement was measured.

The technical data of these vehicles (see Table 66) show, that a broad variety of power to mass ratio is covered. The data from vehicles 1 to 10 could be used for the determination of a threshold curve for brake use.

veh. no.	category	Cap cm ³	Pn kW	s min ⁻¹	Mmax Nm	n_Mmax min ⁻¹	n-idle min ⁻¹	engine	gearbox	number of gears	m0 kg	payload kg	m_max kg	Pn/m0 kW/t	Pn/m_max kW/t
1	car	1999	110	6000	196	4600	950	4R	manual	5	1100	450	1550	100.0	71.0
2	car	1799	90	5500	170	4200	800	4R	manual	5	1280	550	1830	70.3	49.2
3	car	3600	200	6100	330	5000	750	6B	manual	6	1420	340	1760	140.8	113.6
4	car	1900	66	4000	202	1900	900	4R	manual	5	1145	565	1710	57.6	38.6
5	car	1900	66	4000	202	1900	900	4R	automatic	4	1225	485	1710	53.9	38.6
6	car	4000	210	5800	400	4500	700	V8	automatic	5	1725	550	2275	121.7	92.3
7	car	4000	210	5800	400	4500	650	V8	manual	6	1680	595	2275	125.0	92.3
8	van	2900	90	3800	280	2000	650	6RL	manual	5	1870	930	2800	48.1	32.1
9	car	1239	40	5300	90	2800	750	4R	manual	5	840	350	1190	47.6	33.6
10	car	1242	44	5500	98	3000	850	4R	automatic	2	927	473	1400	47.5	31.4
11	off road	2826	84.5	4400	235	2400	800	6R	manual	5	1885	815	2700	44.8	31.3

Table 71: Technical data of the vehicles tested in the noise project from 1997

Several threshold curves were tested and the resulting brake use duration and distance distributions were compared with the measured ones. The best fit was achieved for the following vehicle speed dependent deceleration threshold curve:

$$a_threshold = -0.098468 \cdot \ln(v) - 0.30439$$

This results in the following polynomial function for a corresponding $v \cdot a$ threshold curve:

$$v \cdot a_threshold = 7.83392E-07 \cdot v^3 - 4.10447E-04 \cdot v^2 - 1.80147E-01 \cdot v + 3.35105E-01$$



Both curves are shown in Figure 136. The comparisons of duration distributions based on calculated and measured brake engagement phases are shown in Figure 137 to Figure 146. Figure 145 to Figure 154 show corresponding results for distance distributions. When vehicles with automatic transmissions are disregarded, the calculated distributions are in sufficiently good agreement with the measured distributions.

Due to a copy and paste error the reference year in some figures is 1998 instead of 1997.

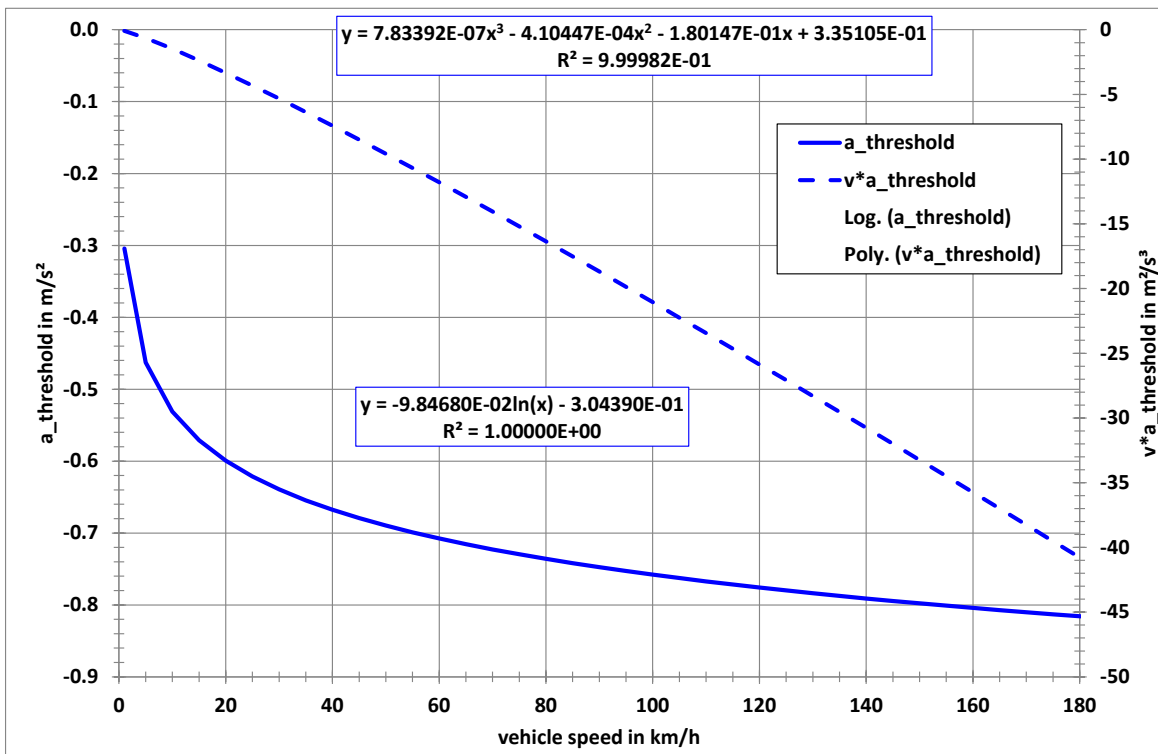


Figure 136: Threshold curves for the determination of brake engagement phases

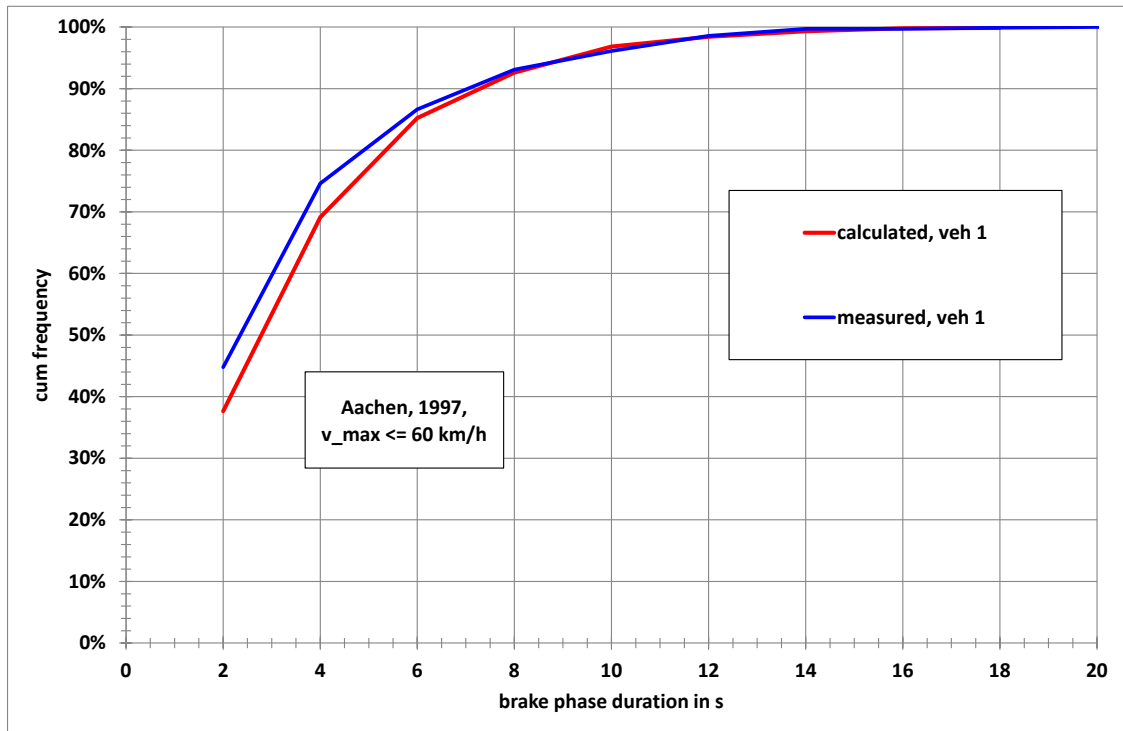


Figure 137: Comparison of brake phase duration distribution curves (calculated and measured) for vehicle 1 from Table 66

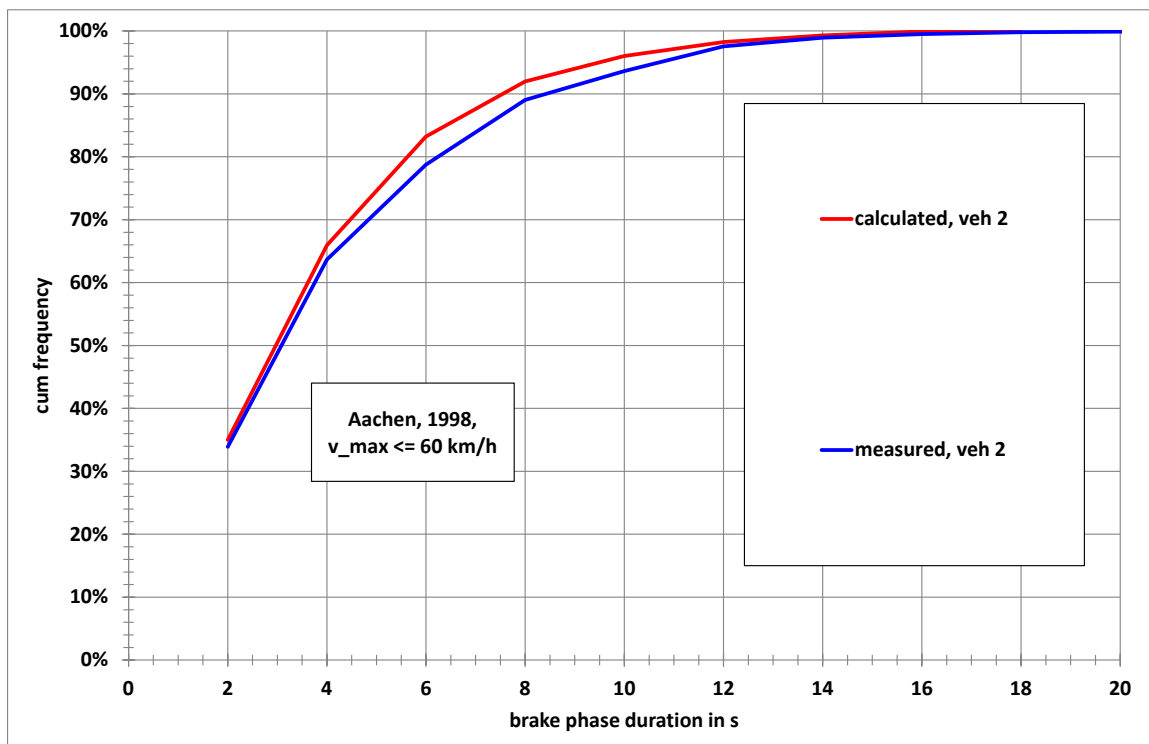


Figure 138: Comparison of brake phase duration distribution curves (calculated and measured) for vehicle 2 from Table 66

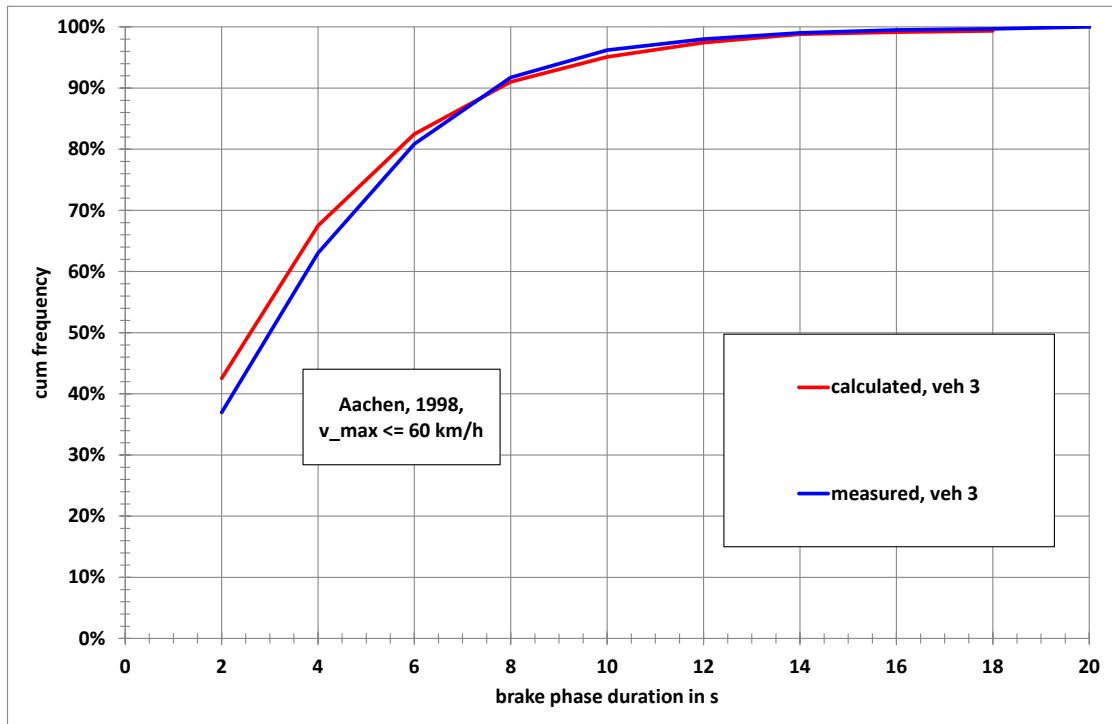


Figure 139: Comparison of brake phase duration distribution curves (calculated and measured) for vehicle 3 from Table 66

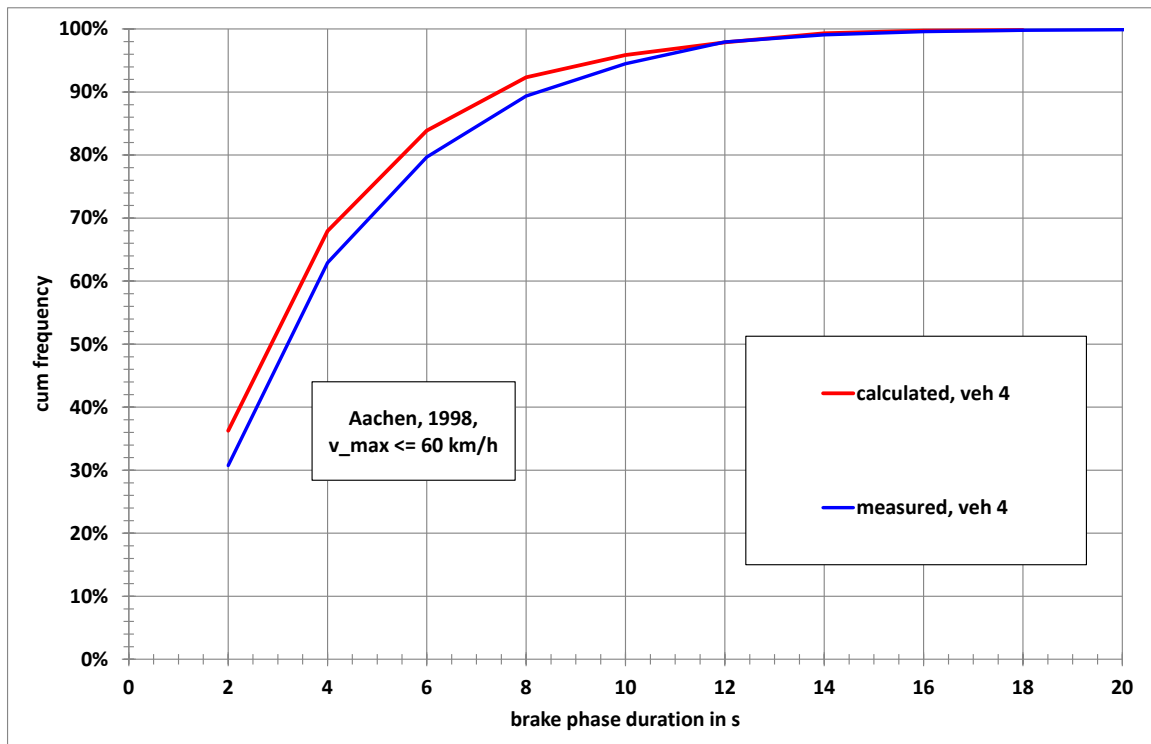


Figure 140: Comparison of brake phase duration distribution curves (calculated and measured) for vehicle 4 from Table 66

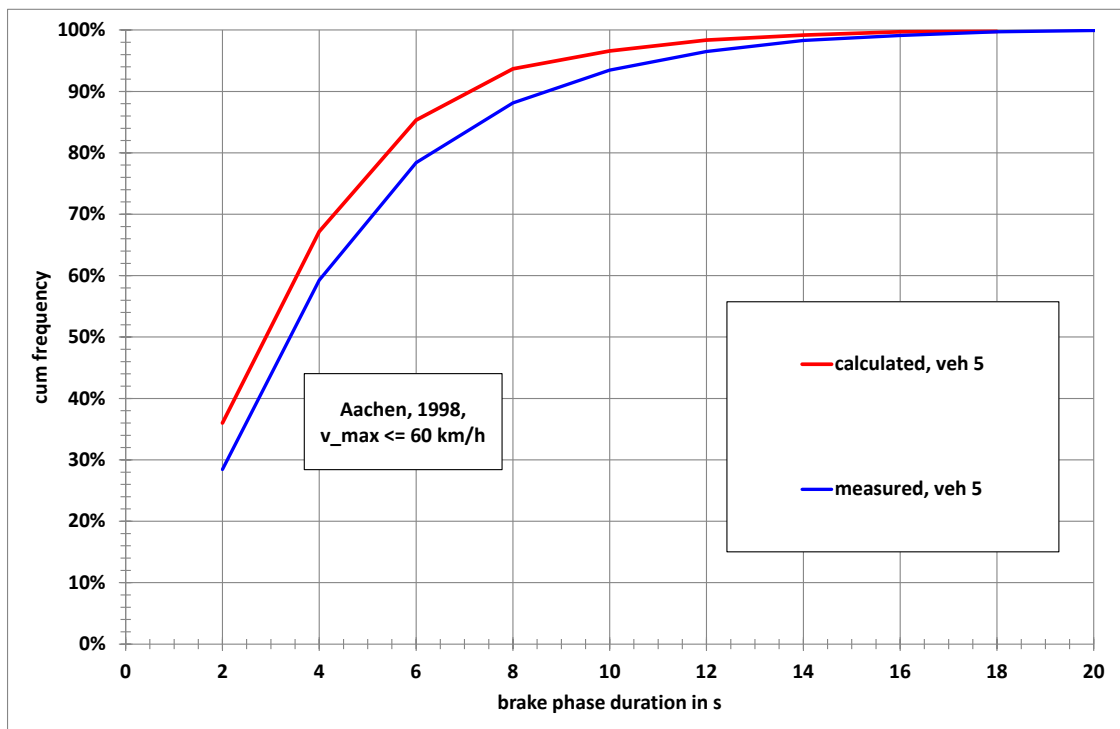


Figure 141: Comparison of brake phase duration distribution curves (calculated and measured) for vehicle 5 from Table 66

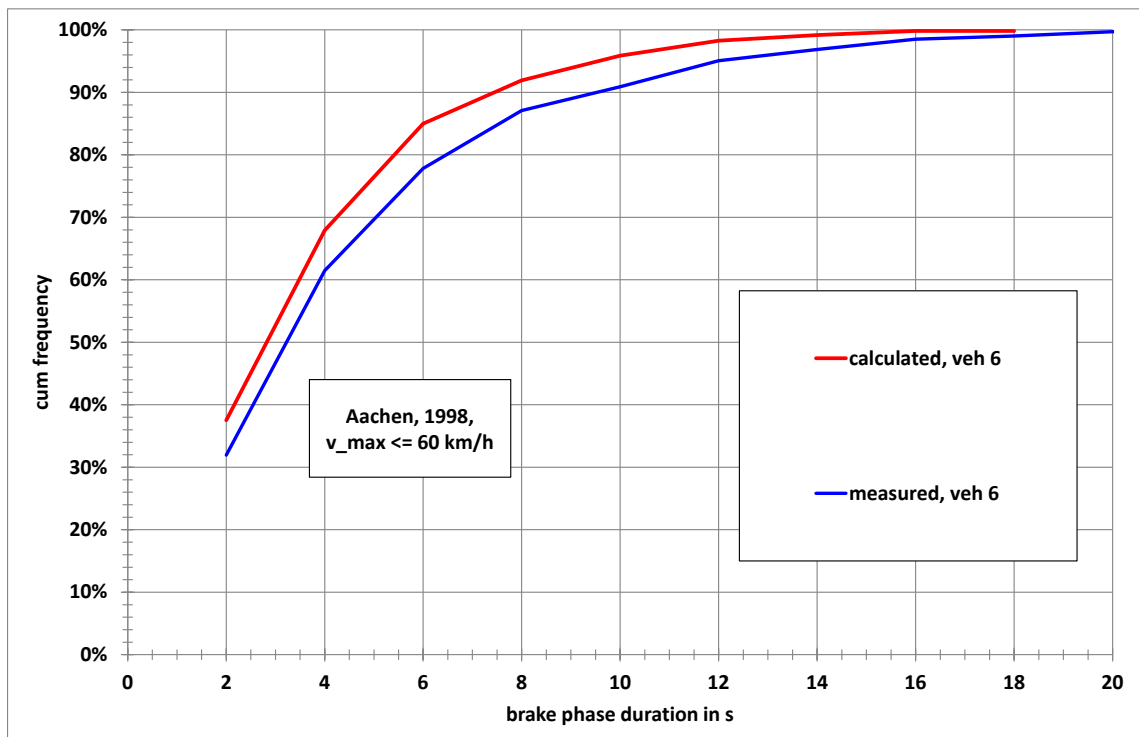


Figure 142: Comparison of brake phase duration distribution curves (calculated and measured) for vehicle 6 from Table 66

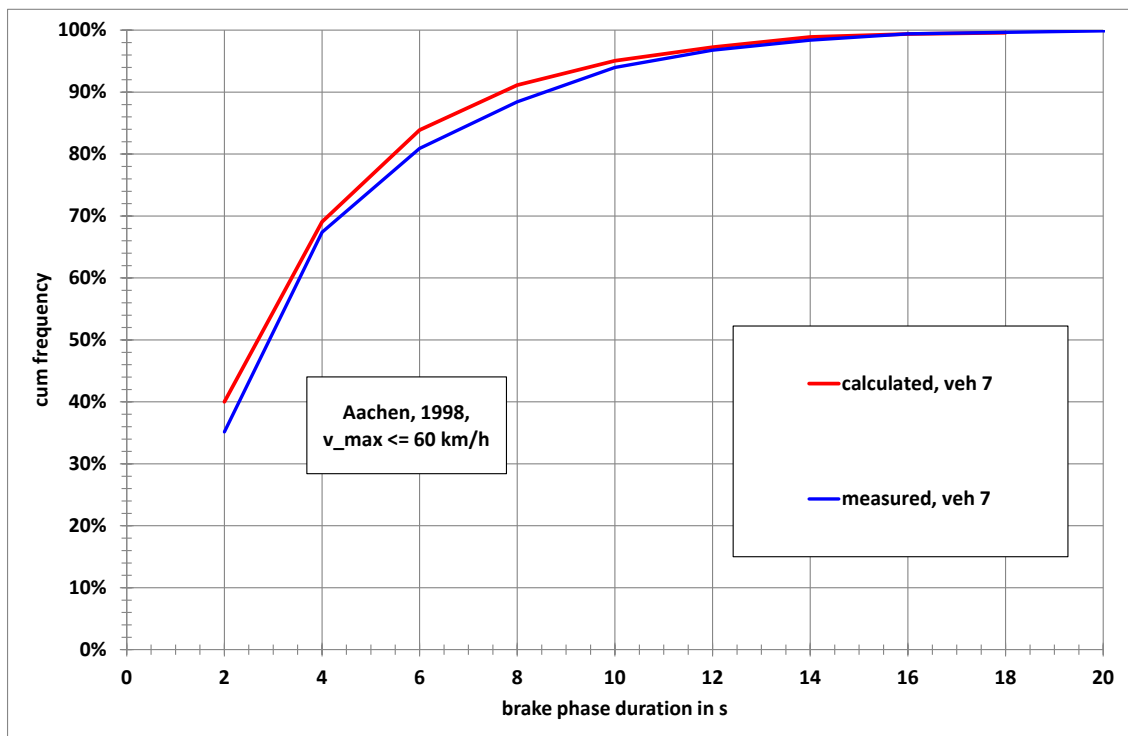


Figure 143: Comparison of brake phase duration distribution curves (calculated and measured) for vehicle 7 from Table 66

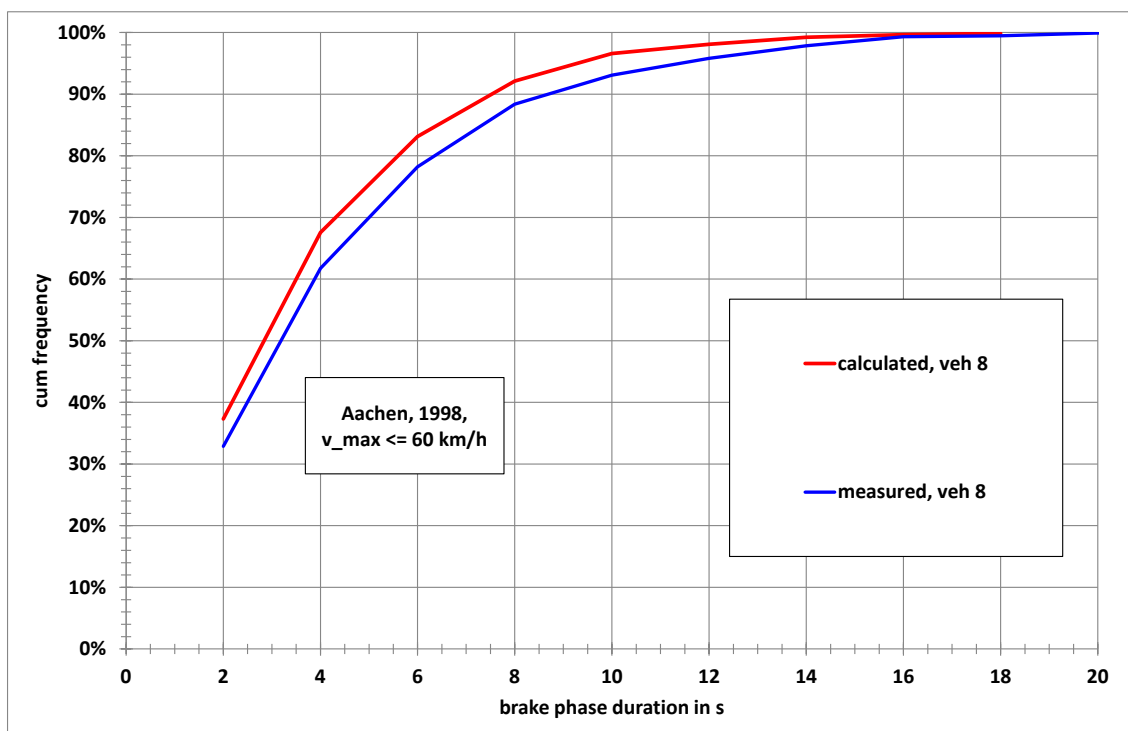


Figure 144: Comparison of brake phase duration distribution curves (calculated and measured) for vehicle 8 from Table 66

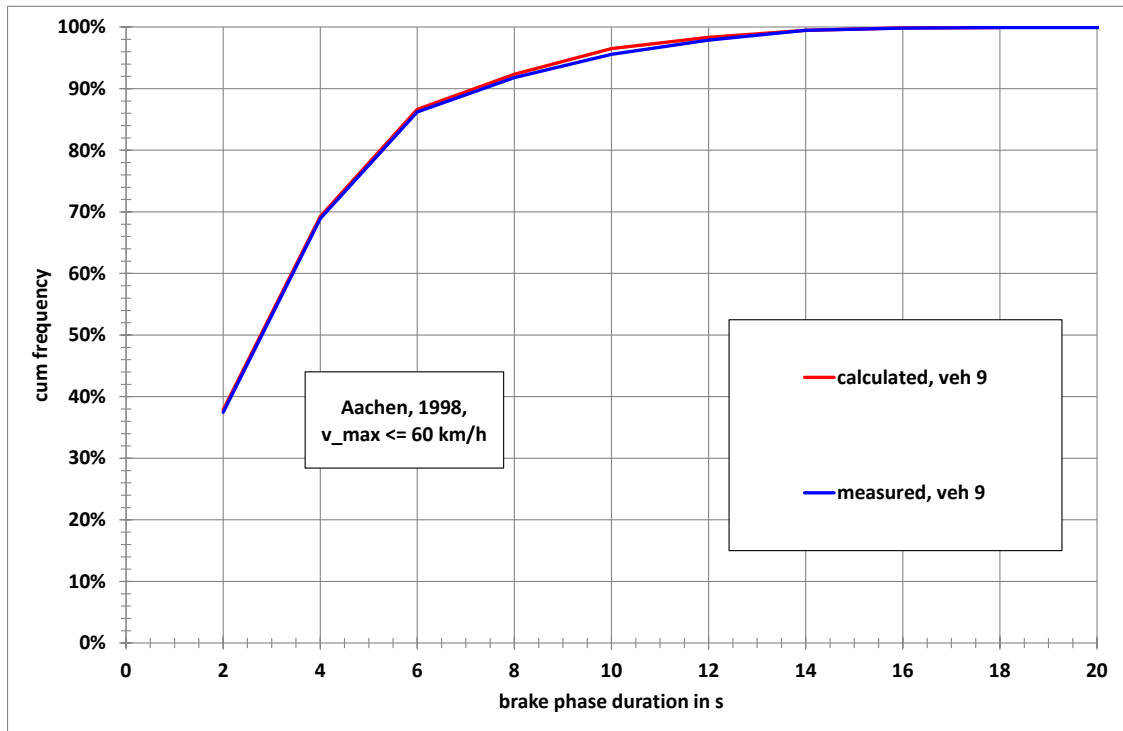


Figure 145: Comparison of brake phase duration distribution curves (calculated and measured) for vehicle 9 from Table 66

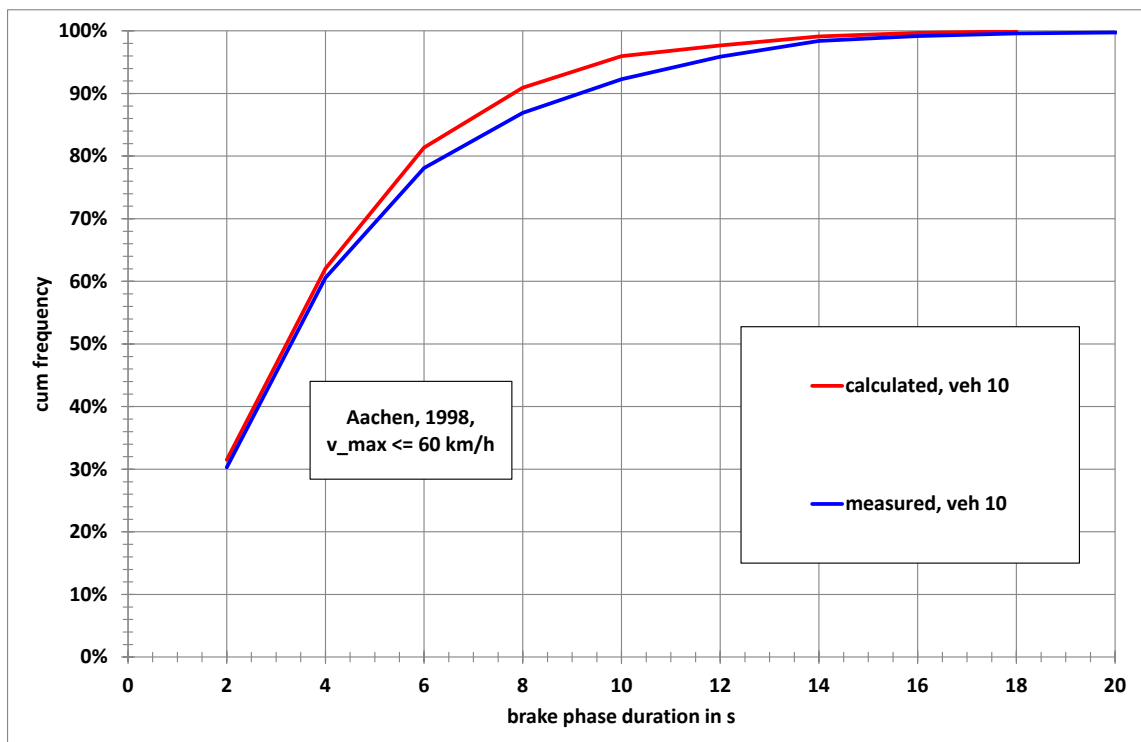


Figure 146: Comparison of brake phase duration distribution curves (calculated and measured) for vehicle 10 from Table 66

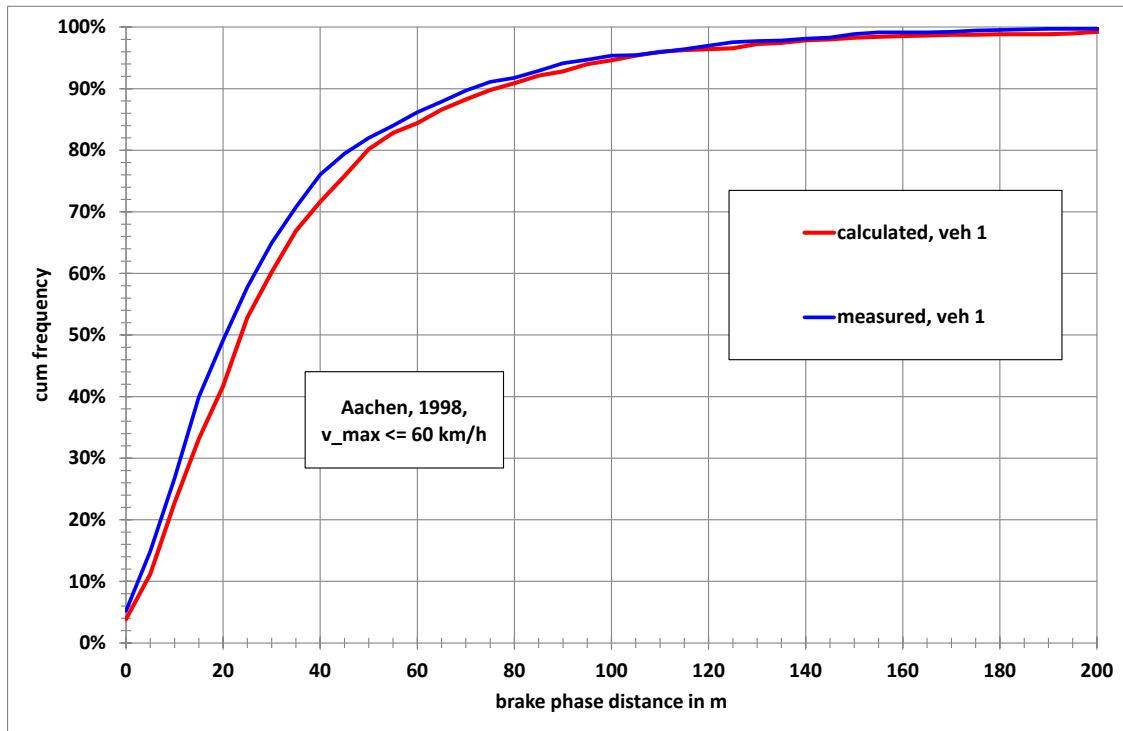


Figure 147: Comparison of brake phase distance distribution curves (calculated and measured) for vehicle 2 from Table 66

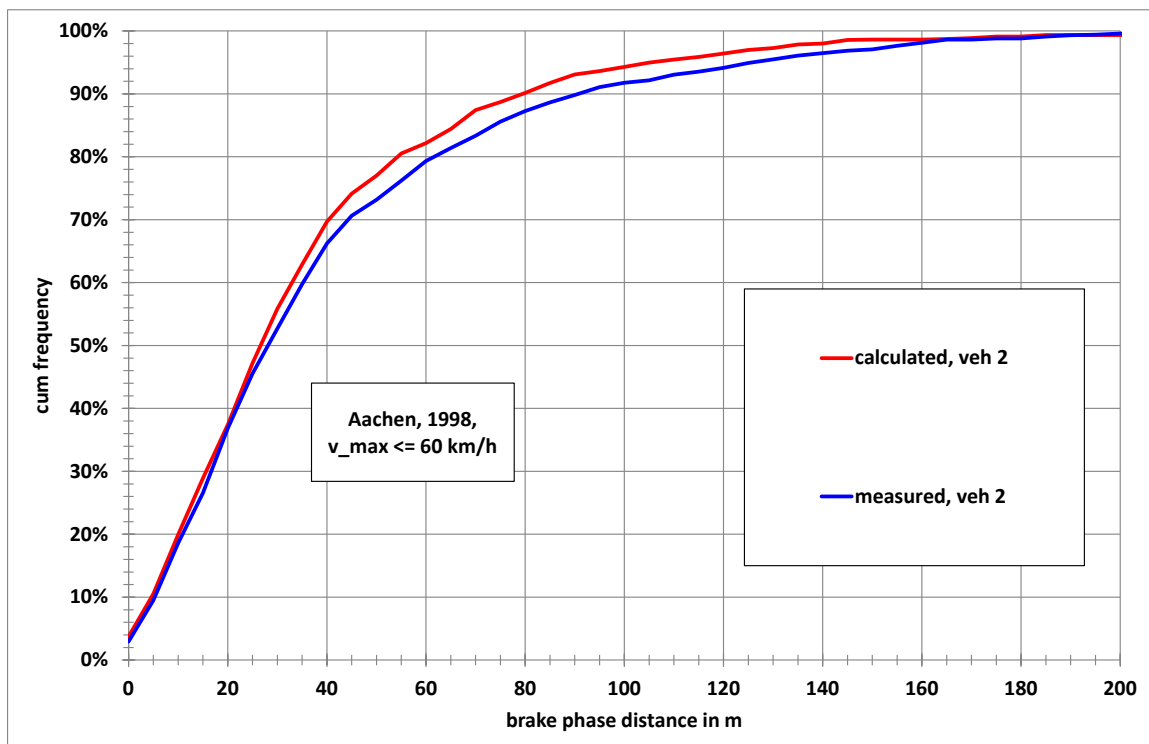


Figure 148: Comparison of brake phase distance distribution curves (calculated and measured) for vehicle 3 from Table 66

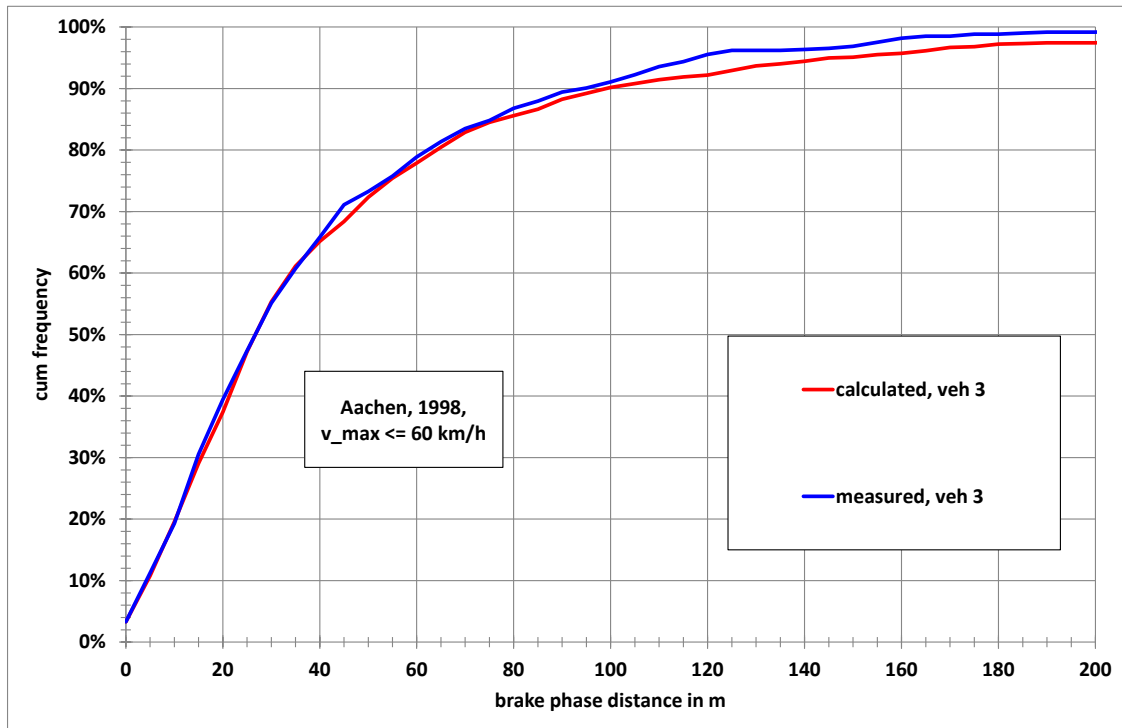


Figure 149: Comparison of brake phase distance distribution curves (calculated and measured) for vehicle 1 from Table 66

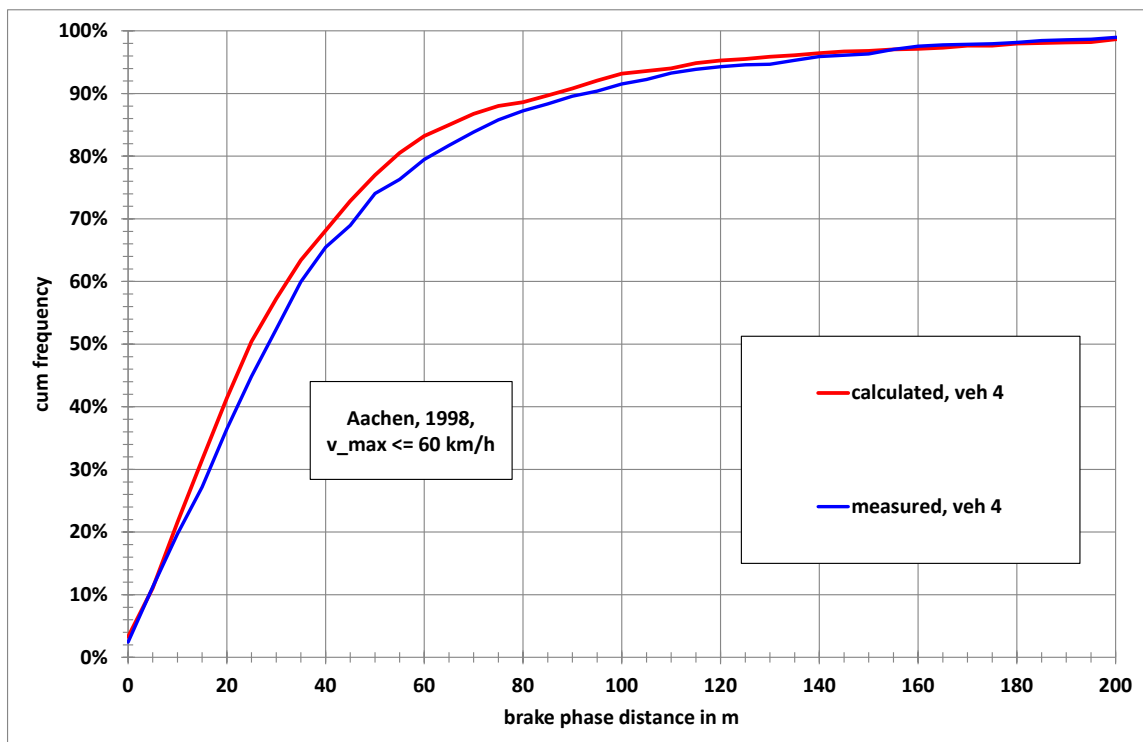


Figure 150: Comparison of brake phase distance distribution curves (calculated and measured) for vehicle 4 from Table 66

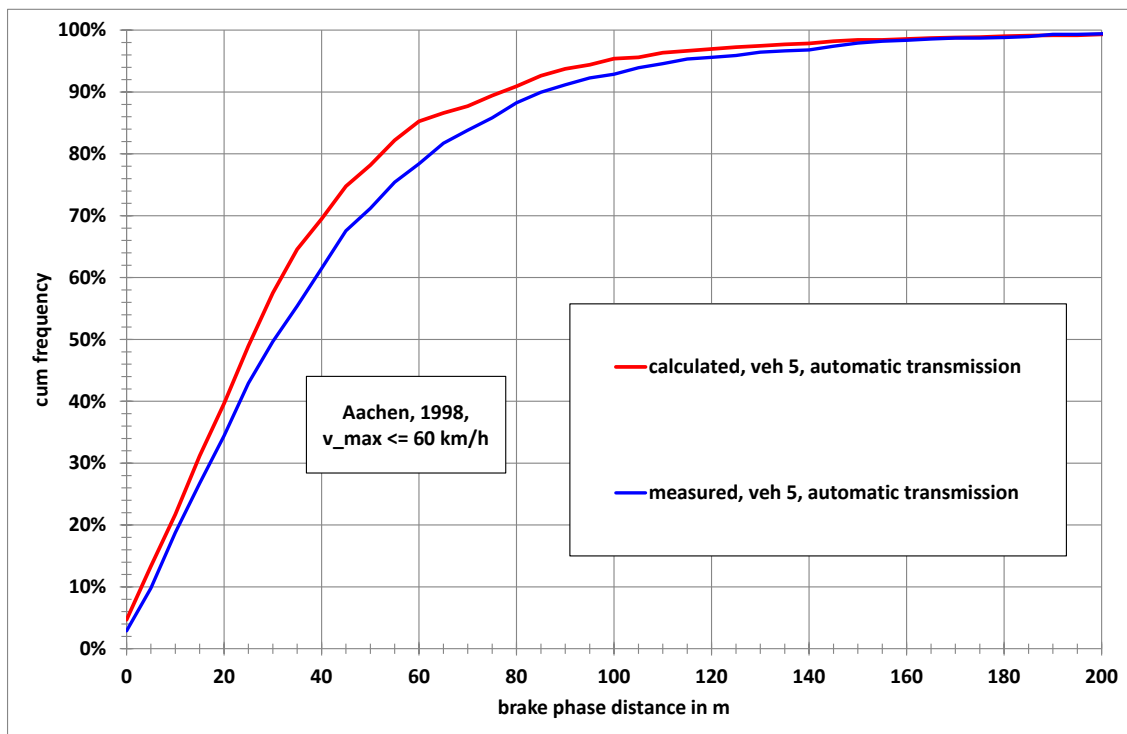


Figure 151: Comparison of brake phase distance distribution curves (calculated and measured) for vehicle 5 from Table 66

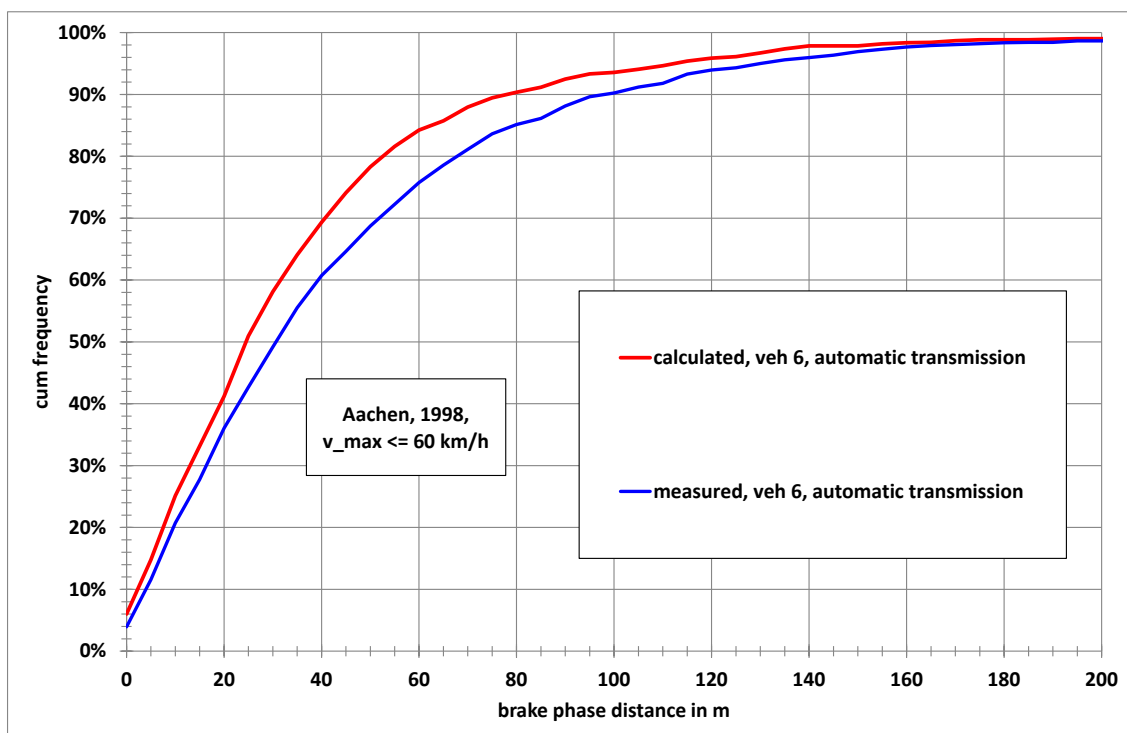


Figure 152: Comparison of brake phase distance distribution curves (calculated and measured) for vehicle 6 from Table 66

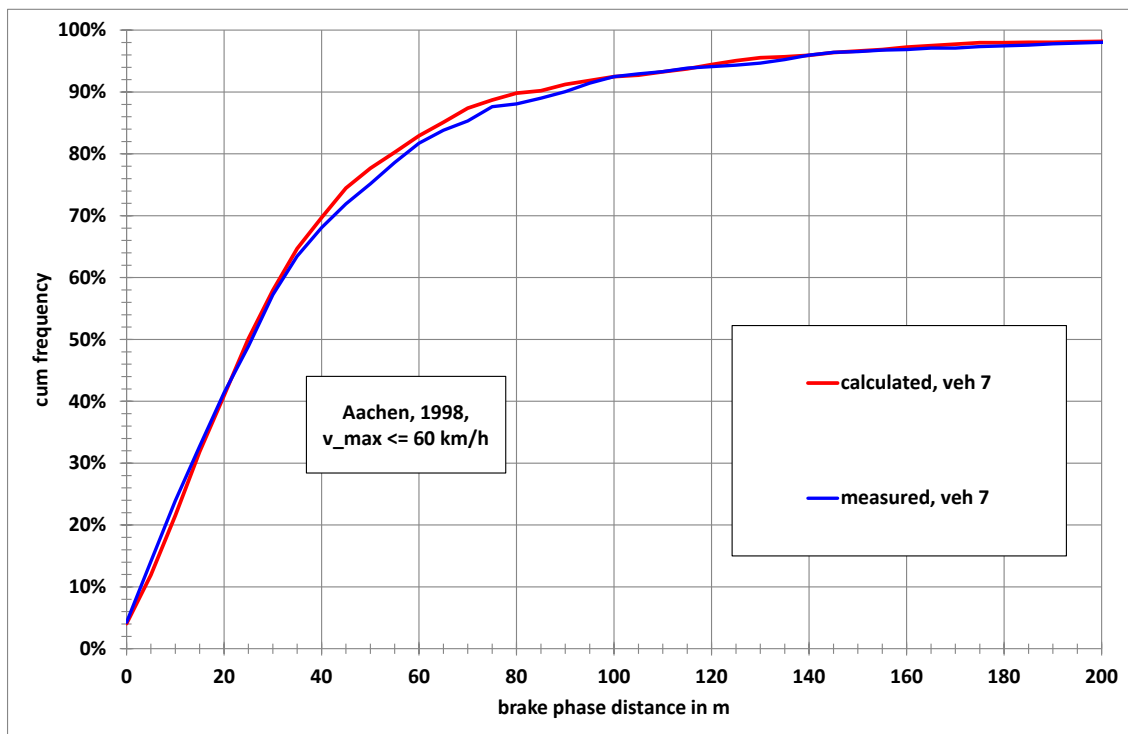


Figure 153: Comparison of brake phase distance distribution curves (calculated and measured) for vehicle 7 from Table 66

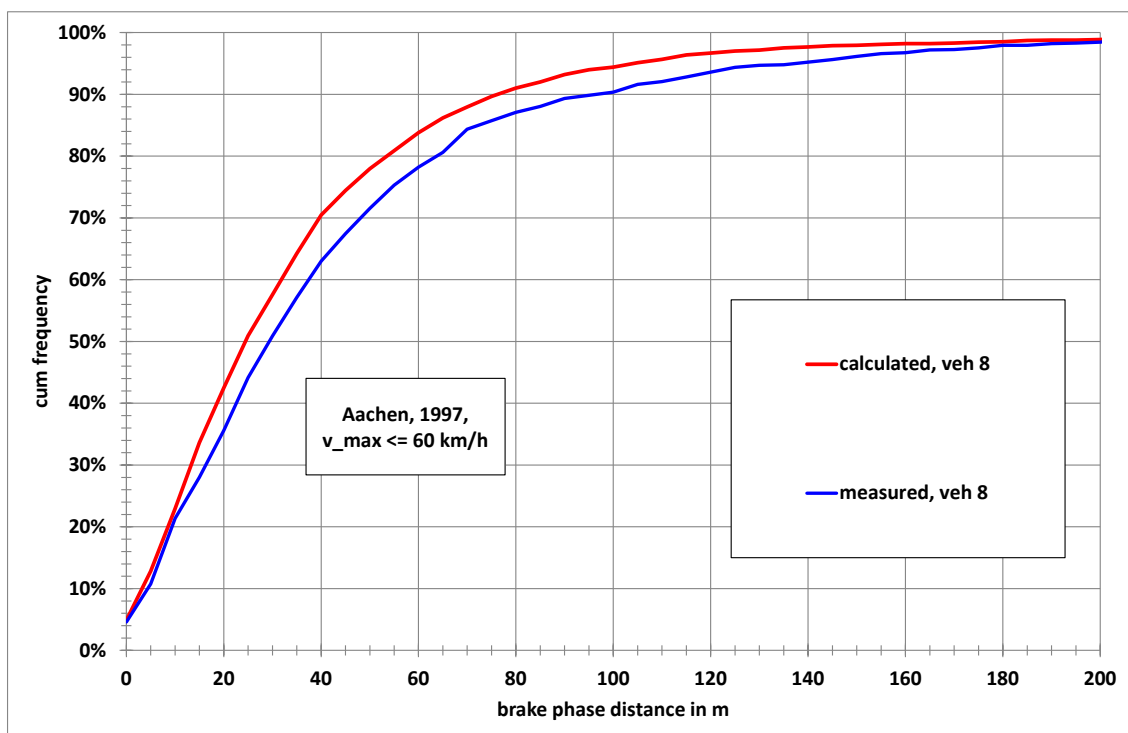


Figure 154: Comparison of brake phase distance distribution curves (calculated and measured) for vehicle 8 from Table 66

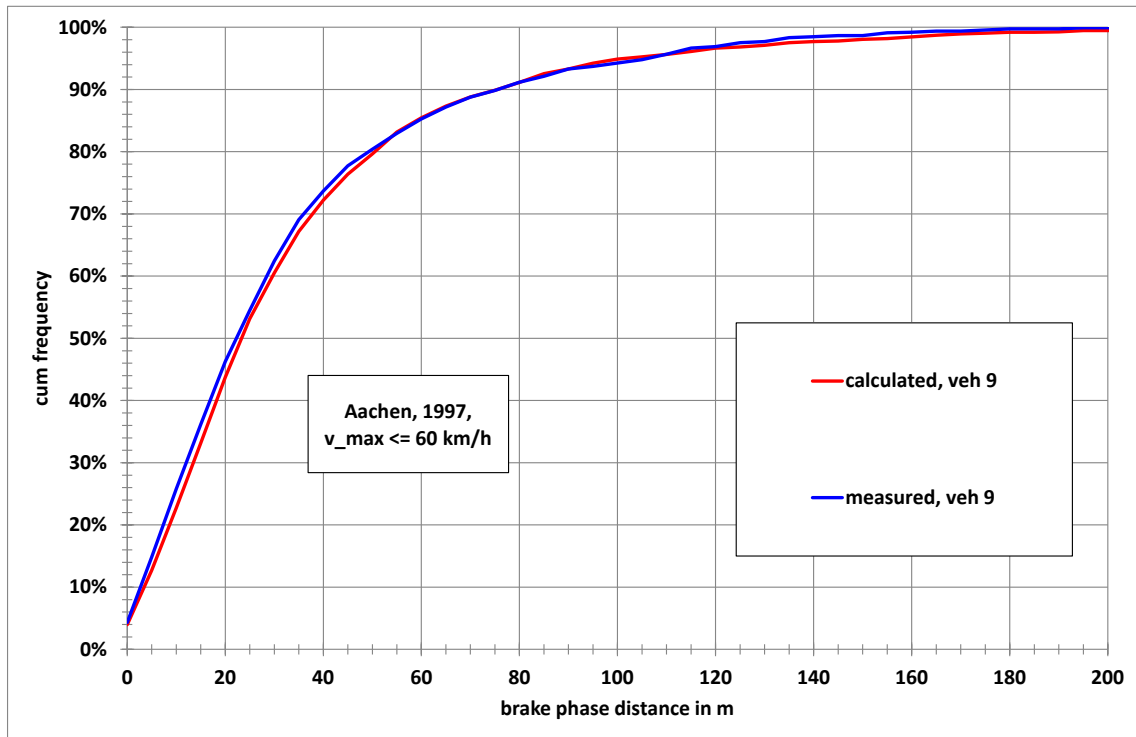


Figure 155: Comparison of brake phase distance distribution curves (calculated and measured) for vehicle 9 from Table 66

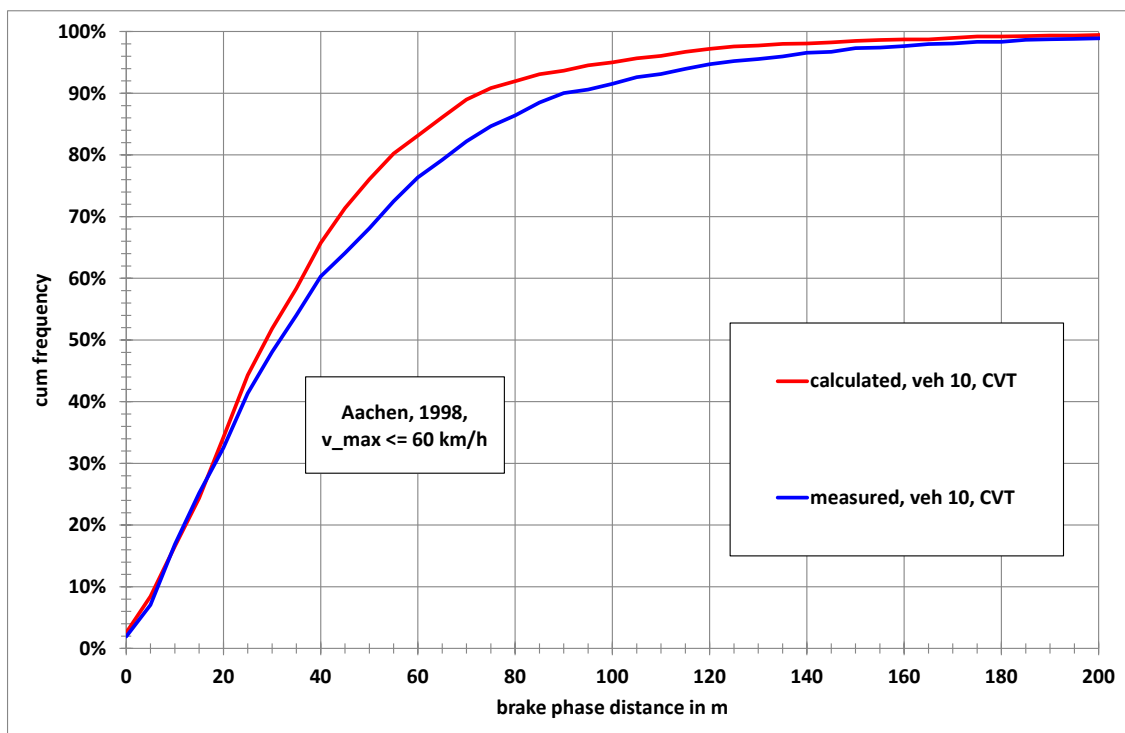


Figure 156: Comparison of brake phase distance distribution curves (calculated and measured) for vehicle 10 from Table 66



11.2 Results for the WLTP database

11.2.1 Brake phase duration distributions

Vehicle specific duration distributions for the different regions and for deceleration phases with $v_{max} \leq 60$ km/h are shown in Figure 155 to Figure 163.

Figure 164 to Figure 171 show the corresponding distributions for deceleration phases with v_{max} between 60 and 80 km/h and Figure 172 to Figure 132 shown the distributions for deceleration phases with v_{max} above 80 km/h.

Figure 179 shows a comparison of the average curves for Europe with the different v_{max} ranges.

The numbers in the legends are vehicle indicators according to Table 60 to Table 65.

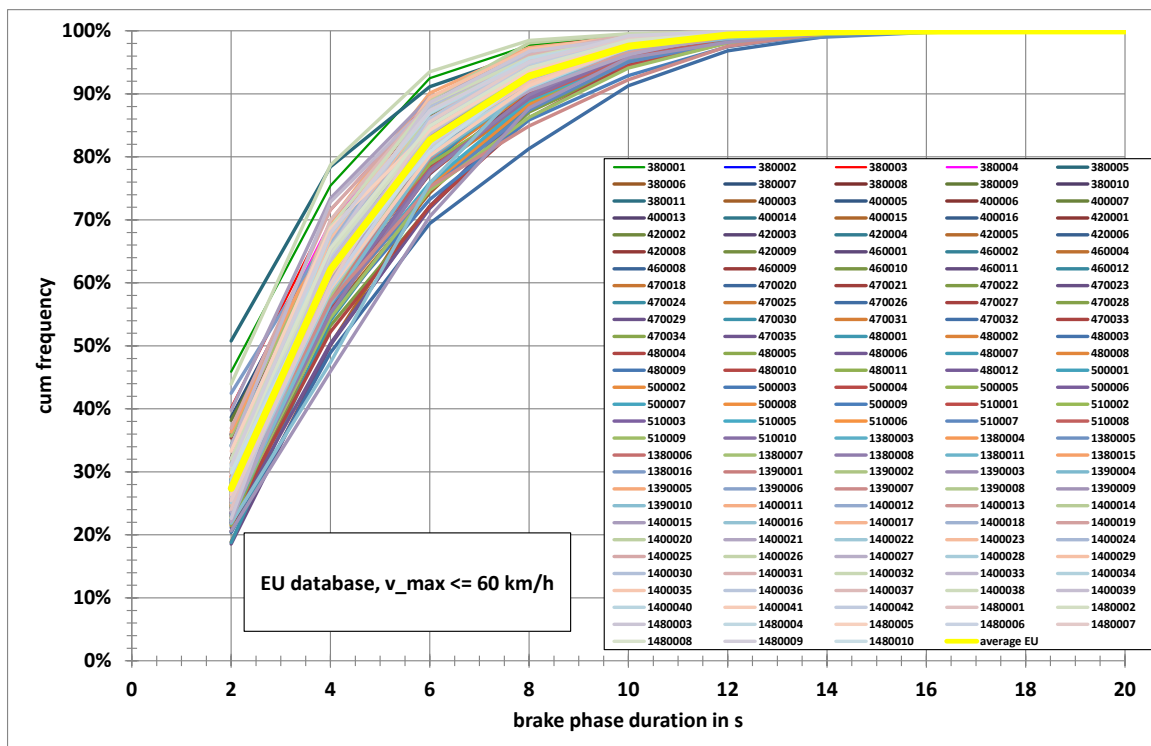


Figure 157: Brake phase duration distributions for the vehicles in the EU ($v_{max} \leq 60$ km/h)

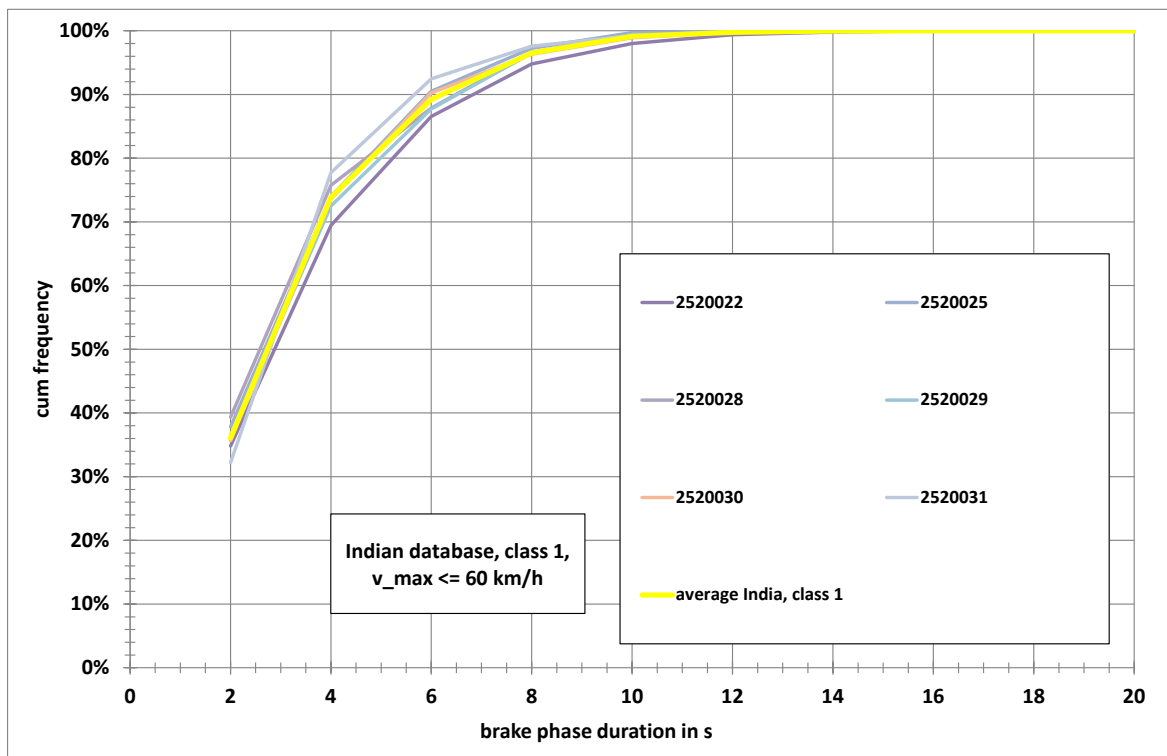


Figure 158: Brake phase duration distributions for class 1 vehicles in India ($v_{max} \leq 60$ km/h)

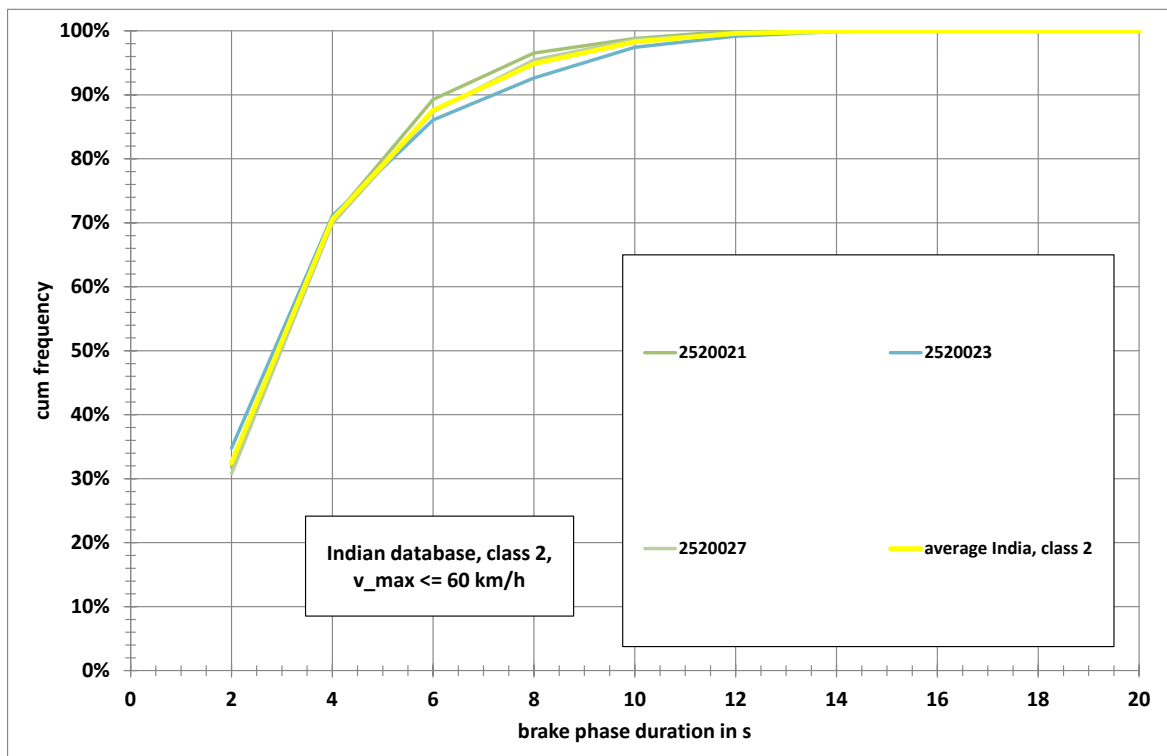


Figure 159: Brake phase duration distributions for class 2 vehicles in India ($v_{max} \leq 60$ km/h)

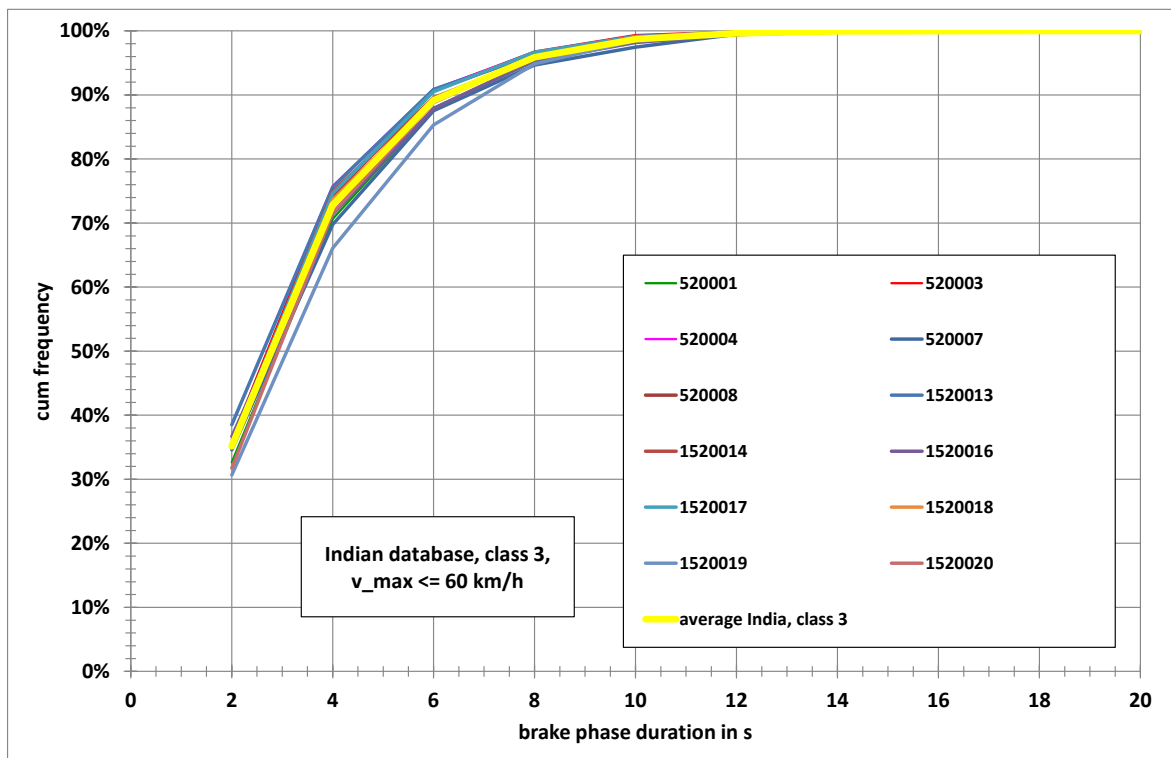


Figure 160: Brake phase duration distributions for class 3 vehicles in India ($v_{max} \leq 60$ km/h)

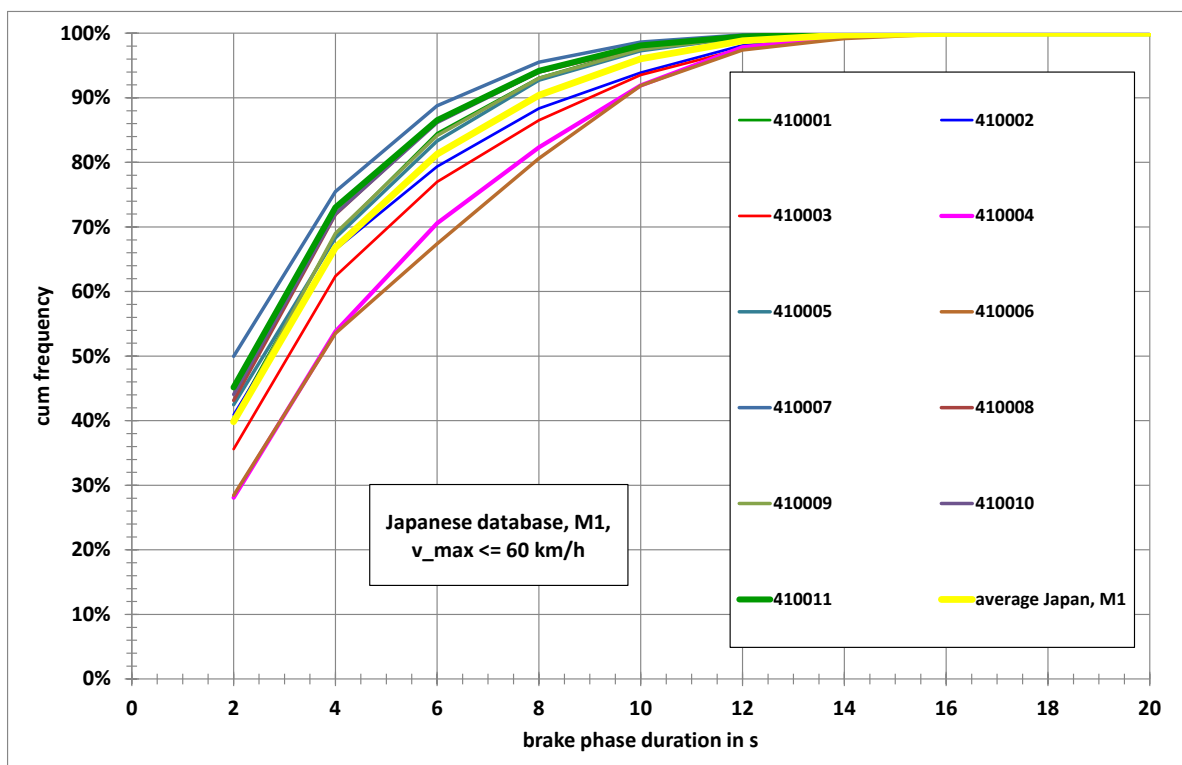


Figure 161: Brake phase duration distributions for M1 vehicles in Japan ($v_{max} \leq 60$ km/h)

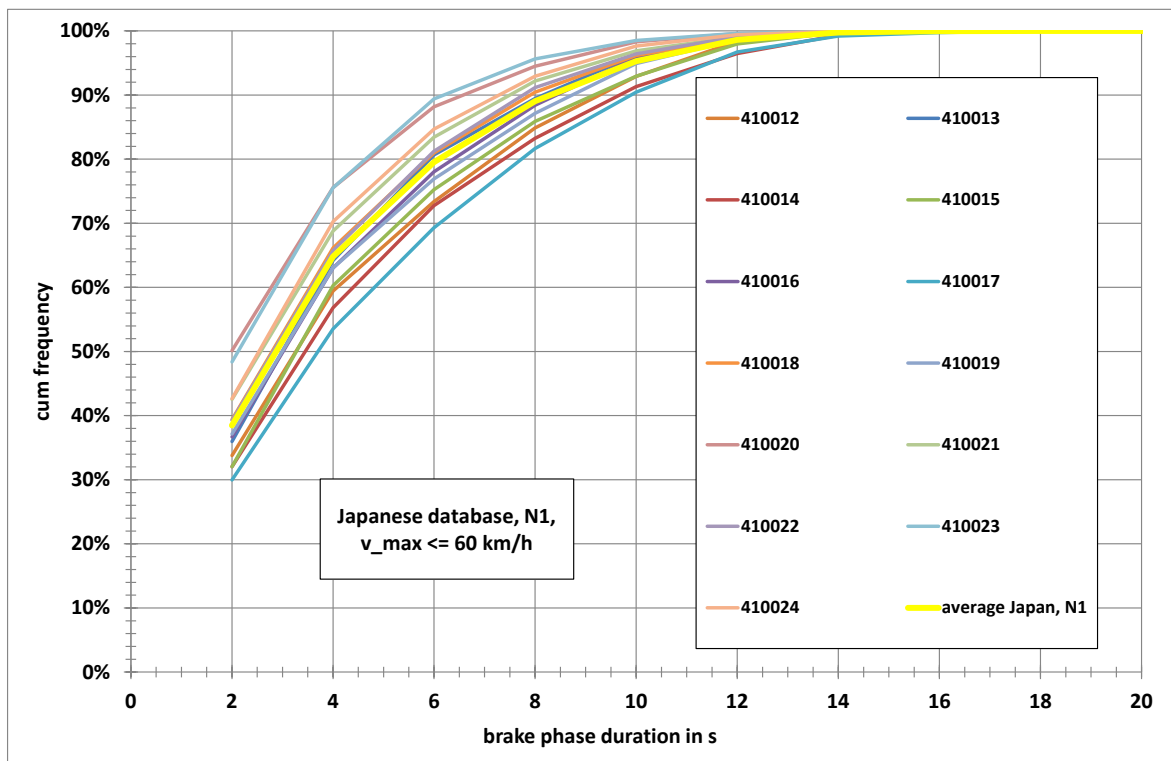


Figure 162: Brake phase duration distributions for N1 vehicles in Japan ($v_{max} \leq 60$ km/h)

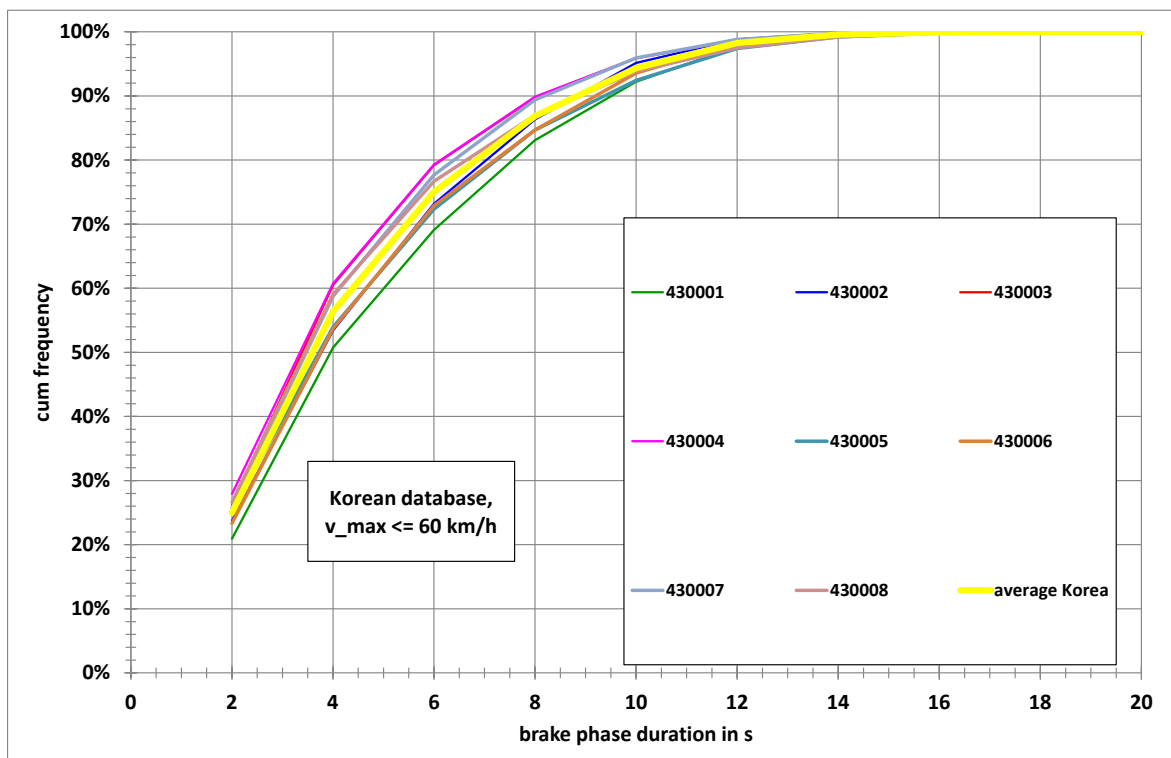


Figure 163: Brake phase duration distributions for the vehicles in Korea ($v_{max} \leq 60$ km/h)

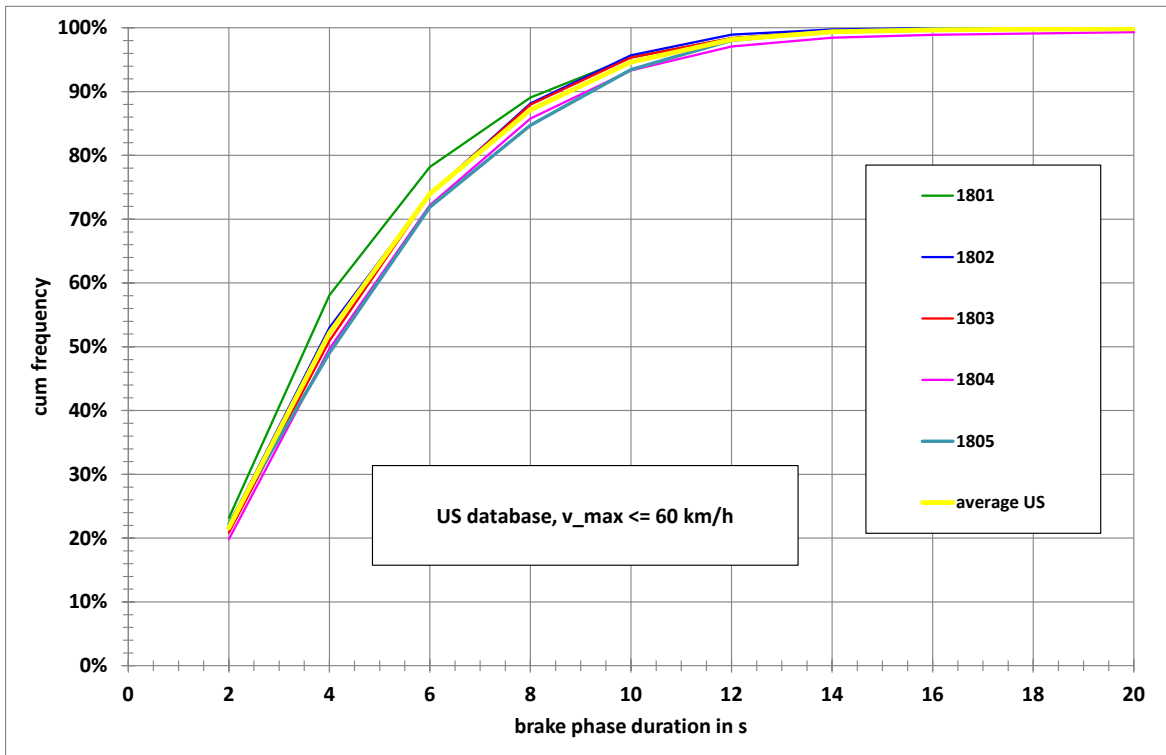


Figure 164: Brake phase duration distributions for the vehicles in the US ($v_{max} \leq 60$ km/h)

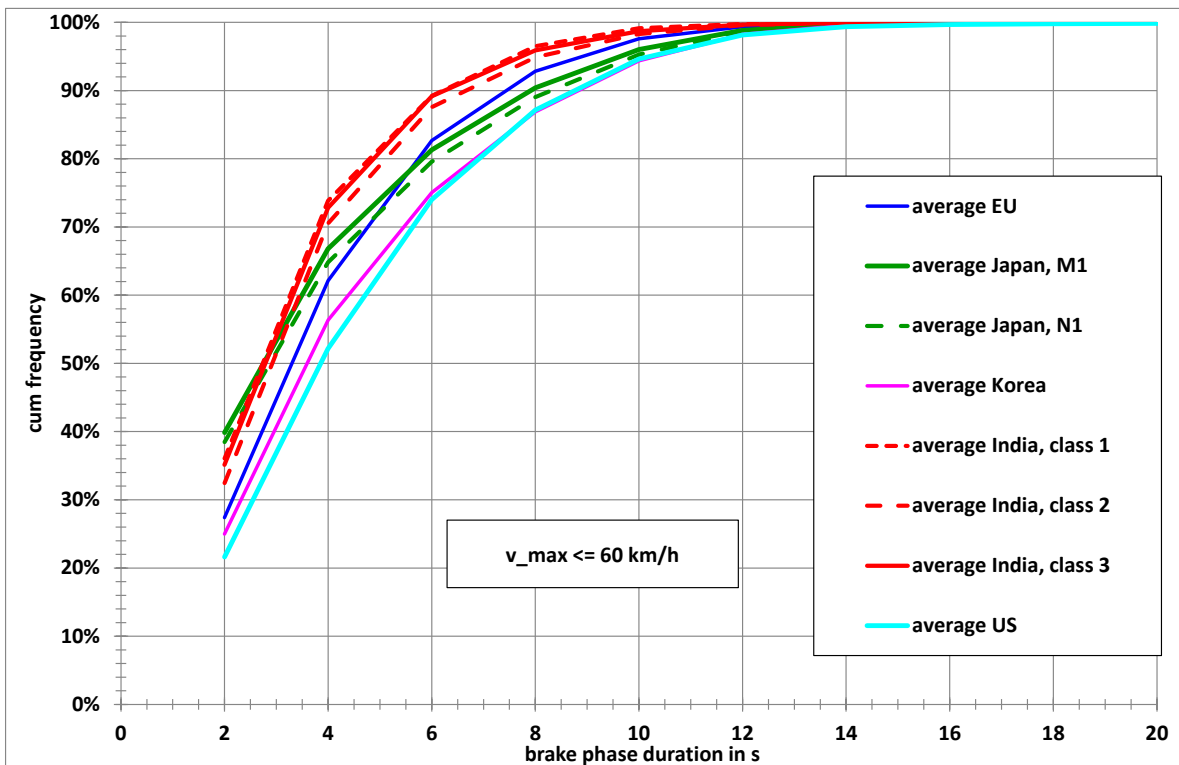


Figure 165: Brake phase duration distributions for the different regions ($v_{max} \leq 60$ km/h)

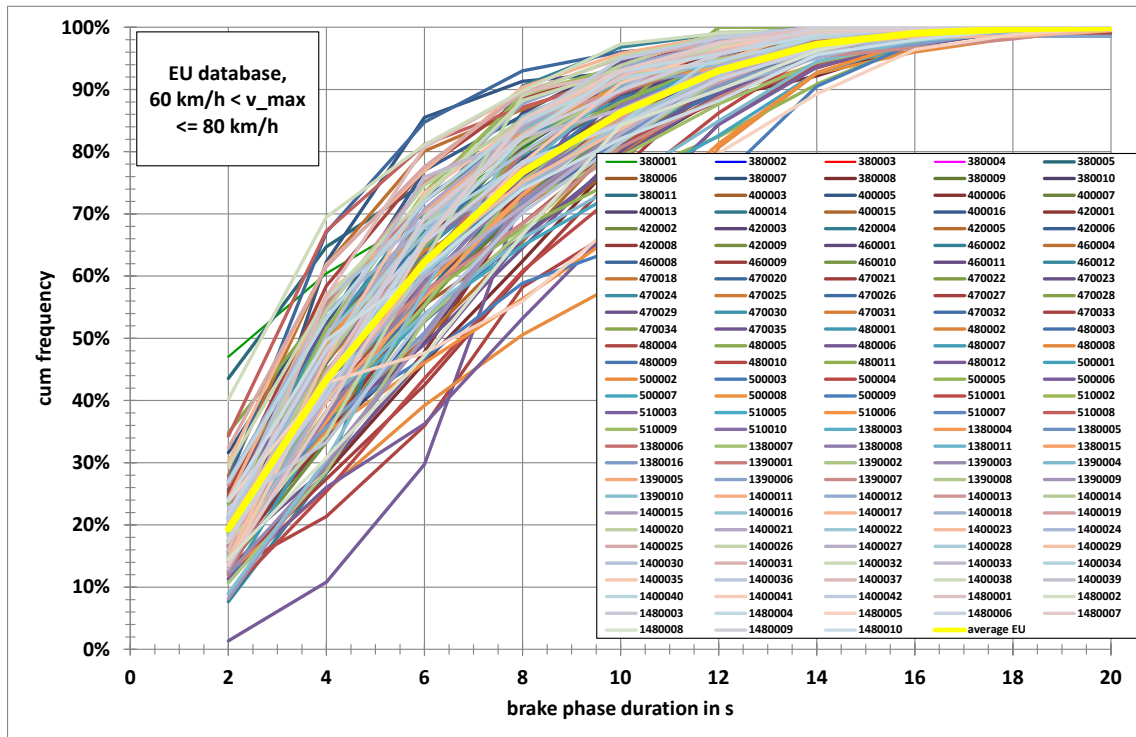


Figure 166: Brake phase duration distributions for the vehicles in the EU ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

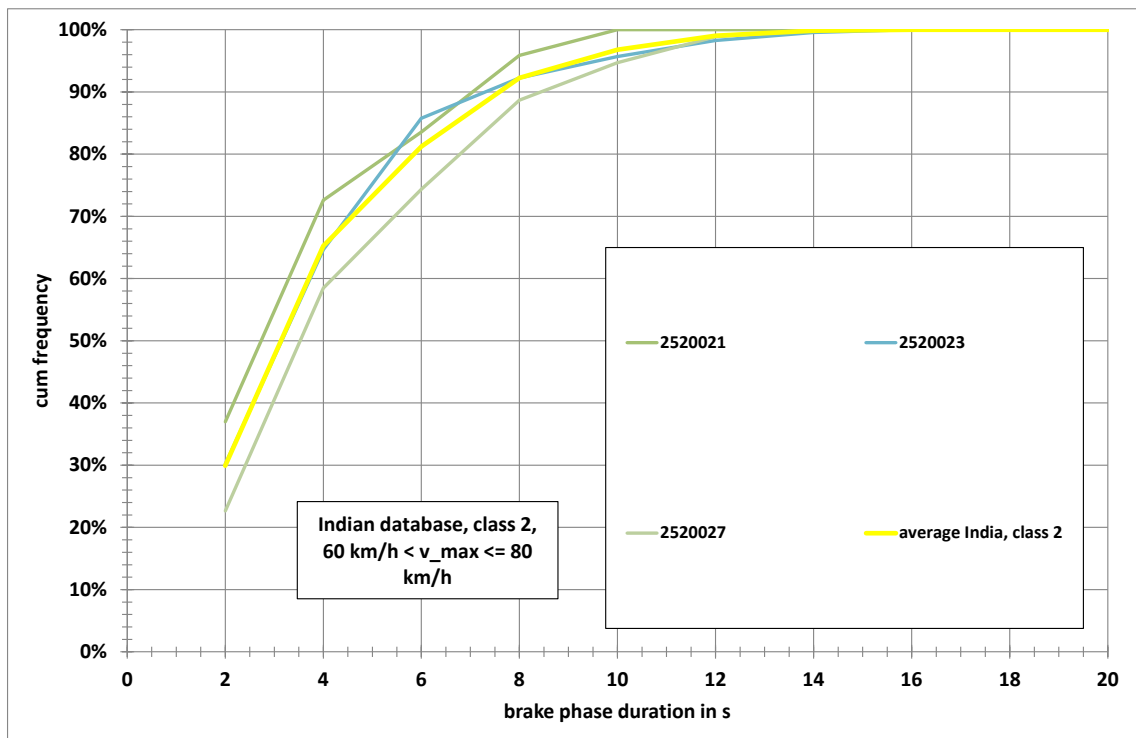


Figure 167: Brake phase duration distributions for class 2 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

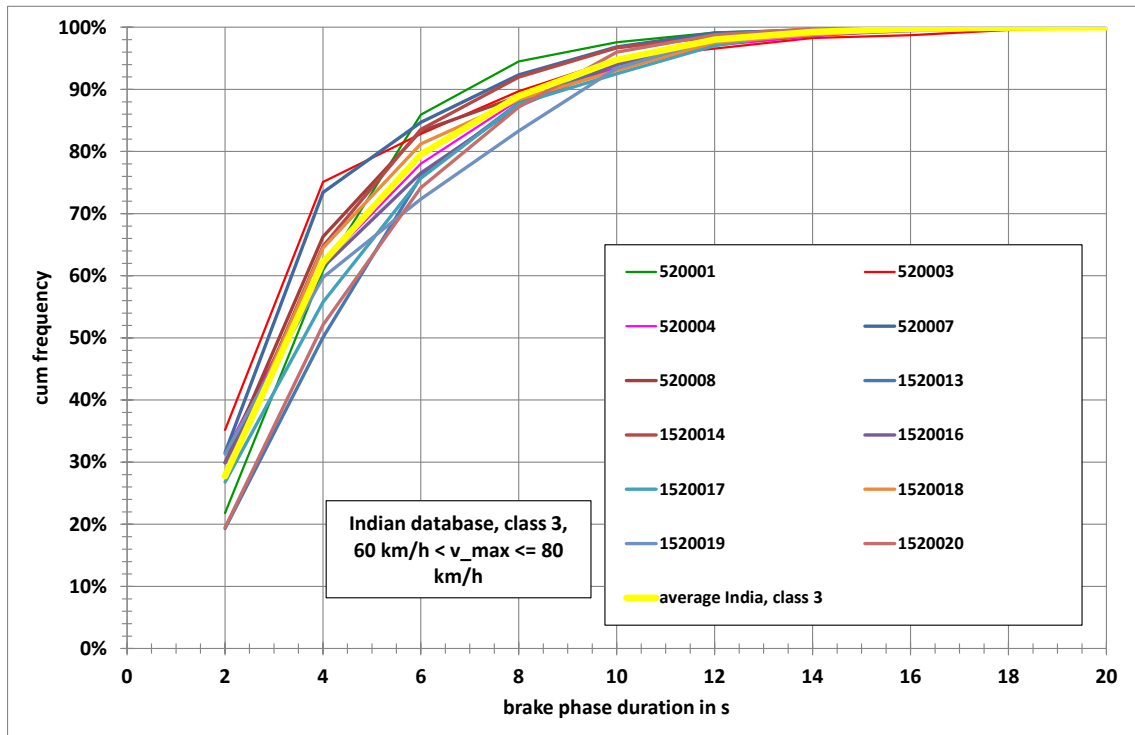


Figure 168: Brake phase duration distributions for class 3 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

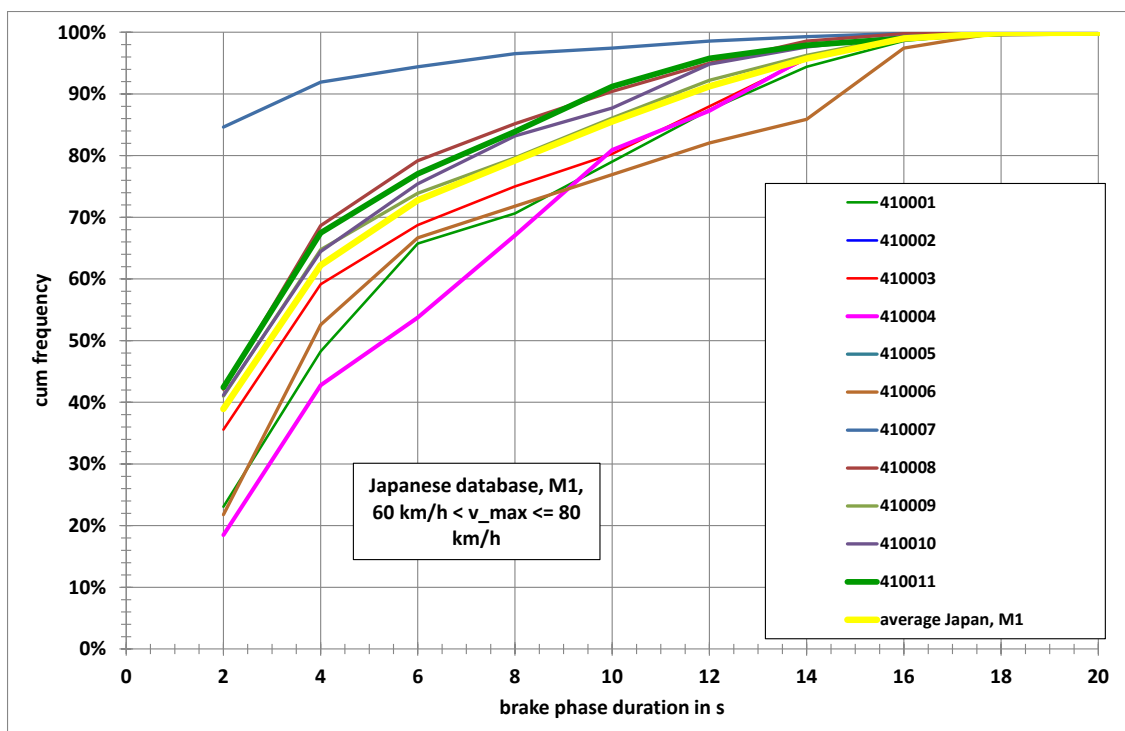


Figure 169: Brake phase duration distributions for M1 vehicles in Japan ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

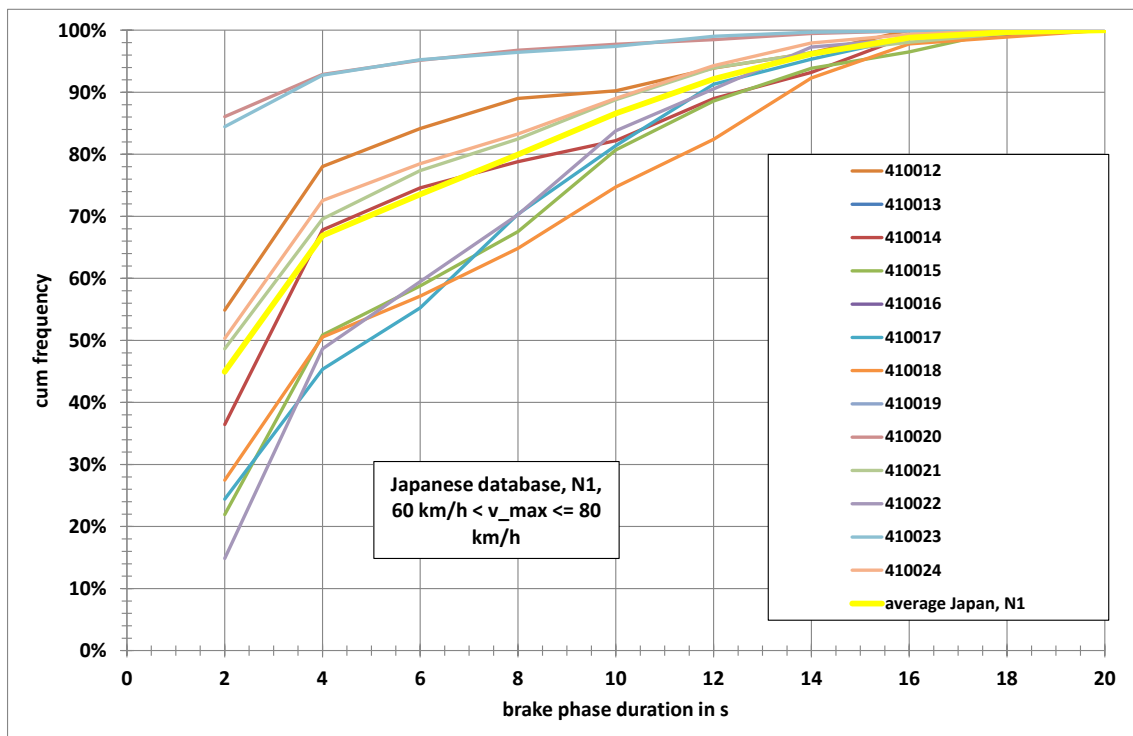


Figure 170: Brake phase duration distributions for N1 vehicles in Japan ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

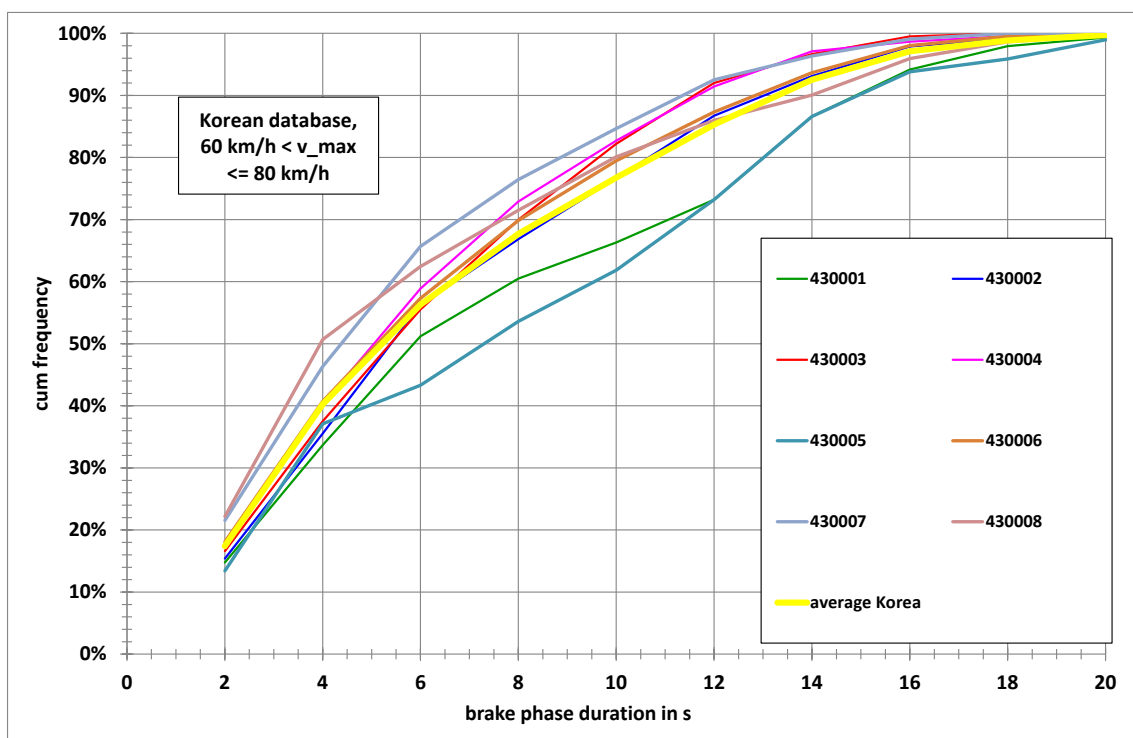


Figure 171: Brake phase duration distributions for the vehicles in Korea ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

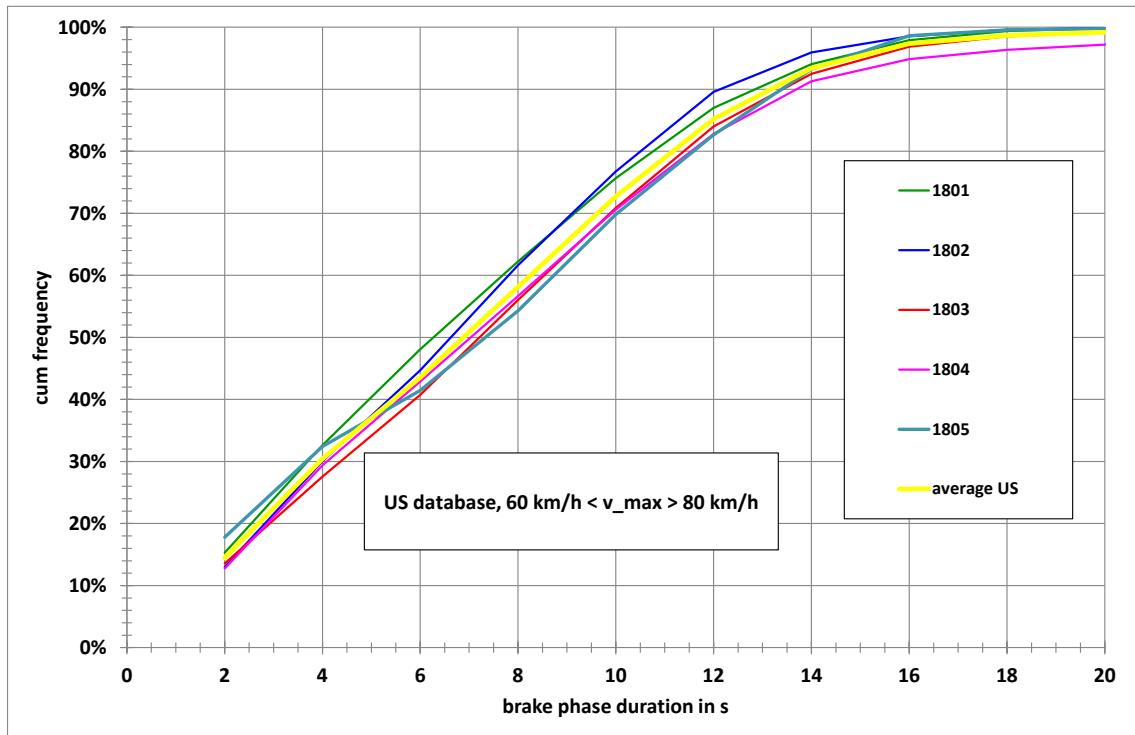


Figure 172: Brake phase duration distributions for the vehicles in the US (60 km/h < v_max <= 80 km/h)

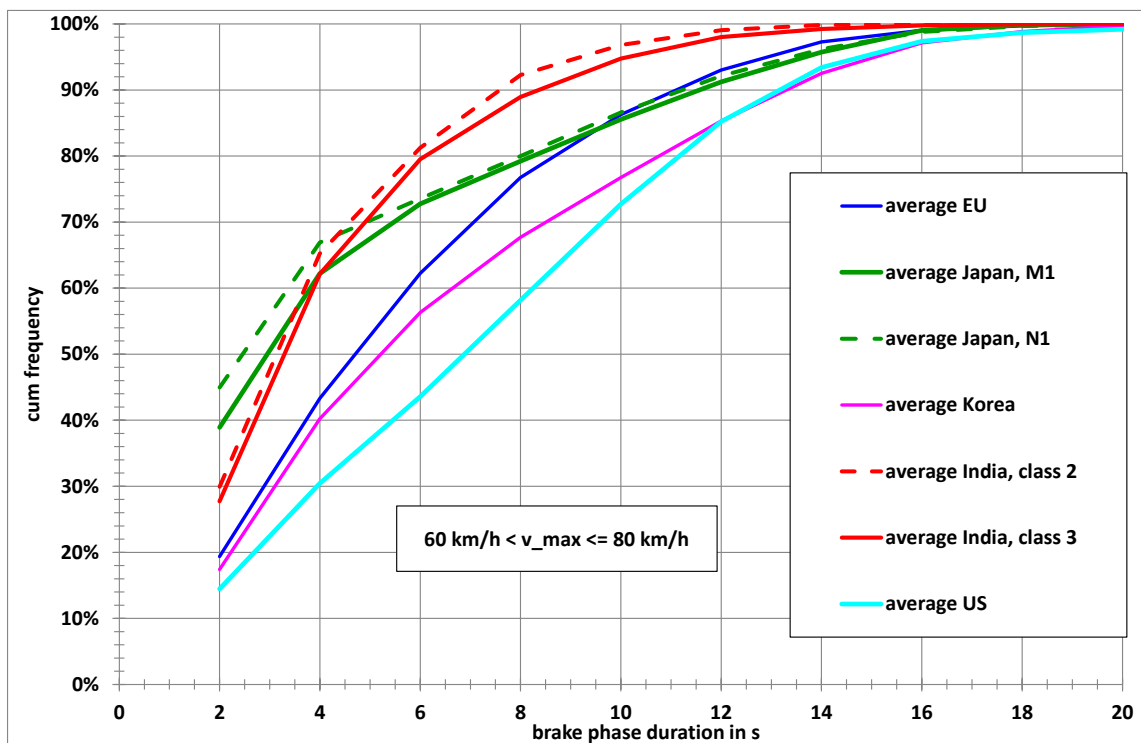


Figure 173: Brake phase duration distributions for the different regions (60 km/h < v_max <= 80 km/h)

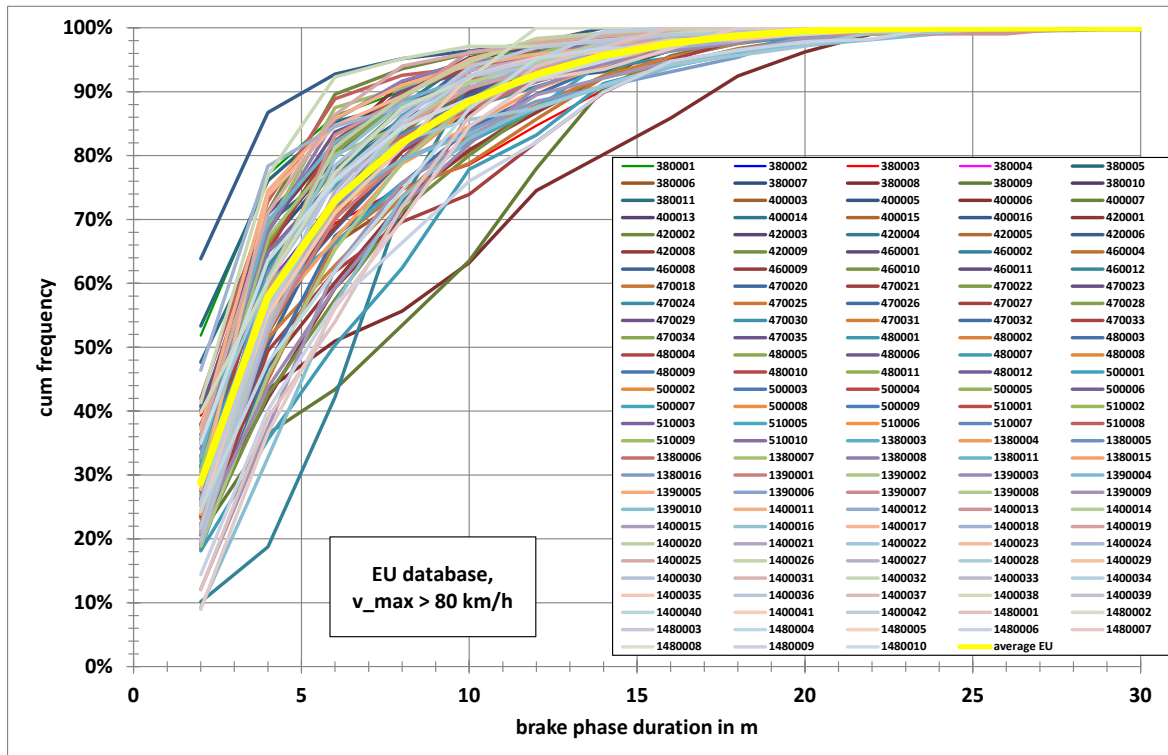


Figure 174: Brake phase duration distributions for the vehicles in the EU ($v_{max} > 80$ km/h)

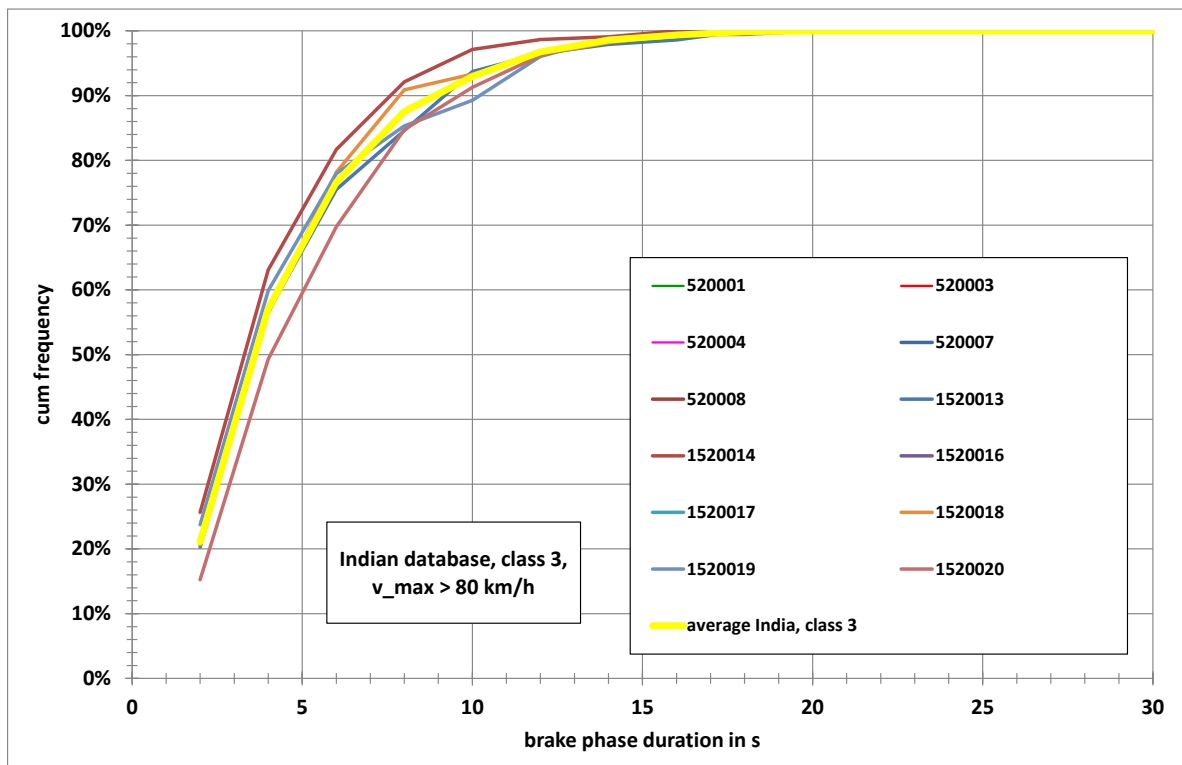


Figure 175: Brake phase duration distributions for class 3 vehicles in India ($v_{max} > 80$ km/h)

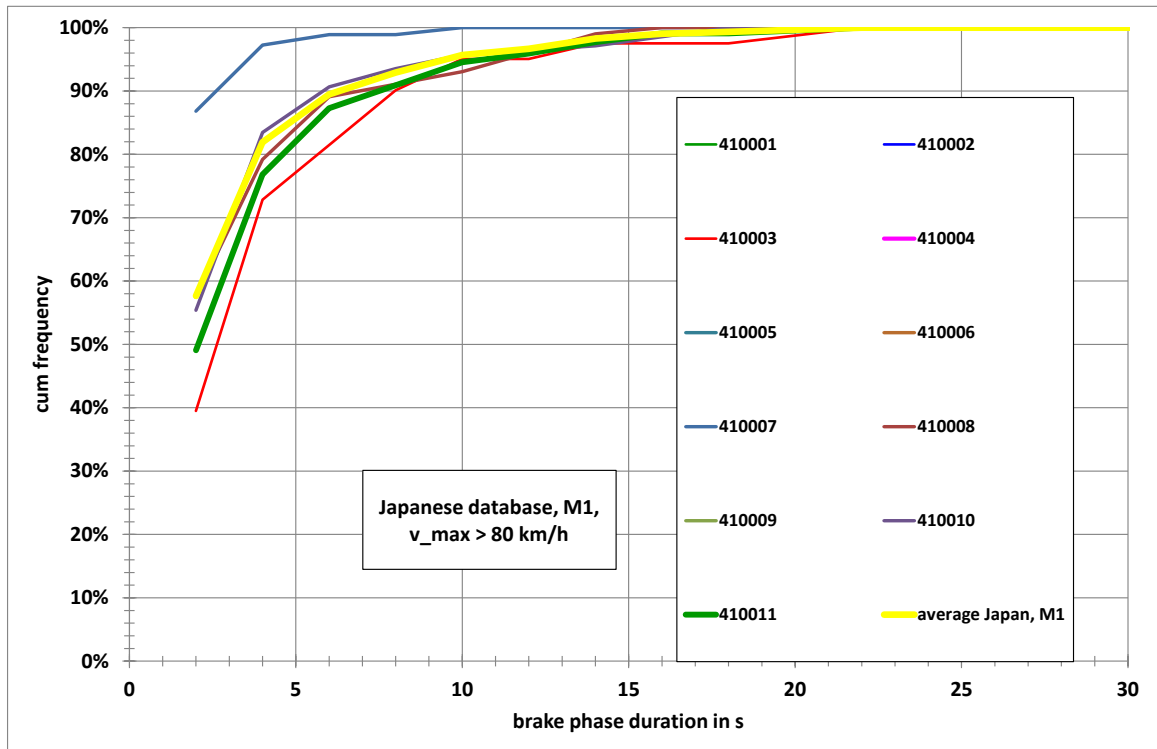


Figure 176: Brake phase duration distributions for M1 vehicles in Japan ($v_{max} > 80$ km/h)

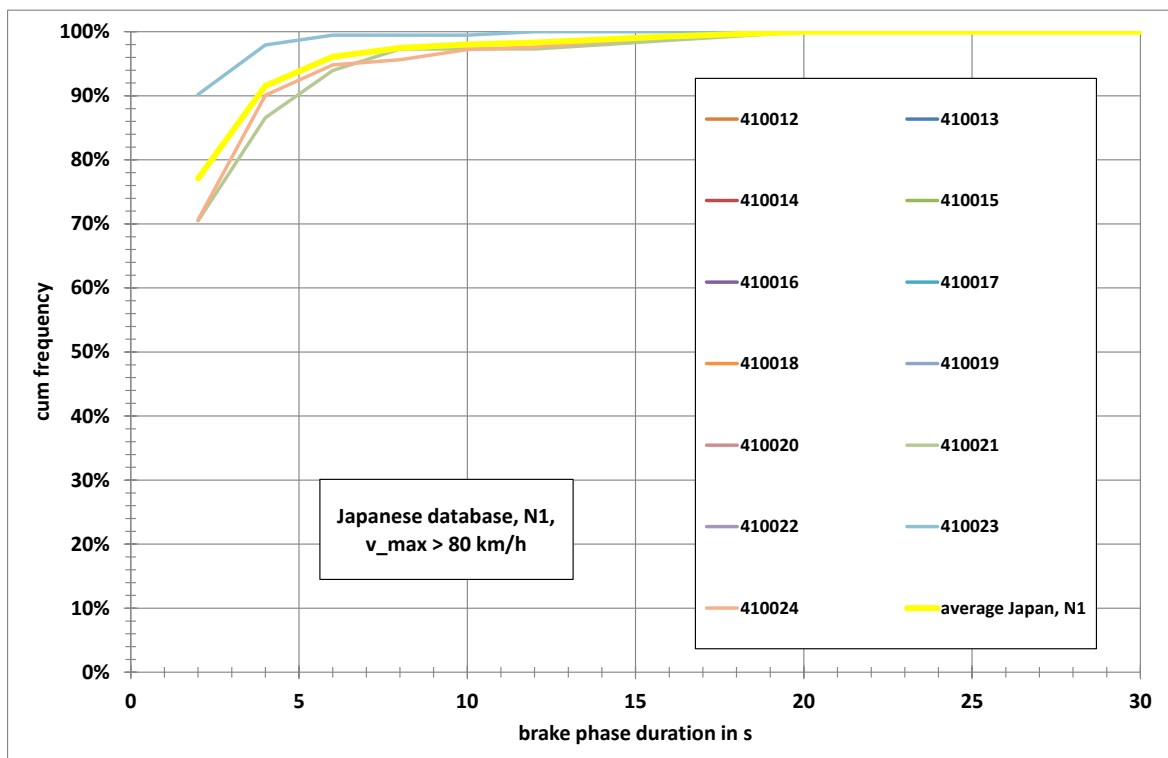


Figure 177: Brake phase duration distributions for N1 vehicles in Japan ($v_{max} > 80$ km/h)

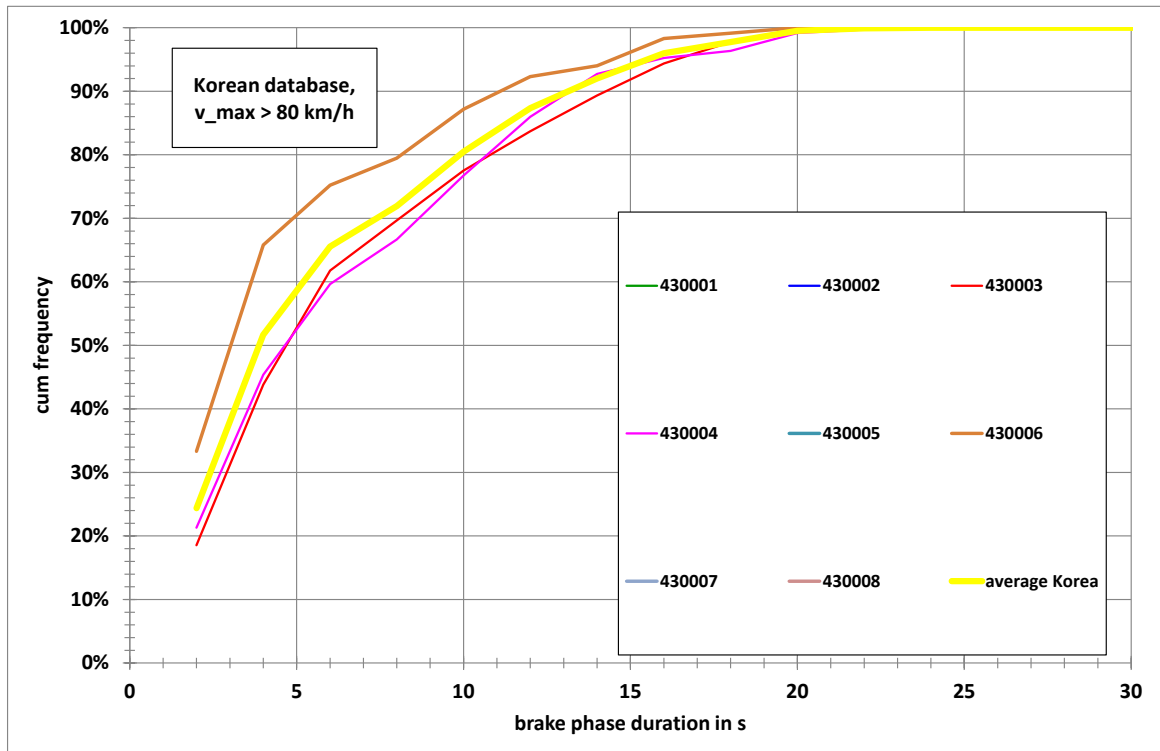


Figure 178: Brake phase duration distributions for the vehicles in Korea ($v_{max} > 80$ km/h)

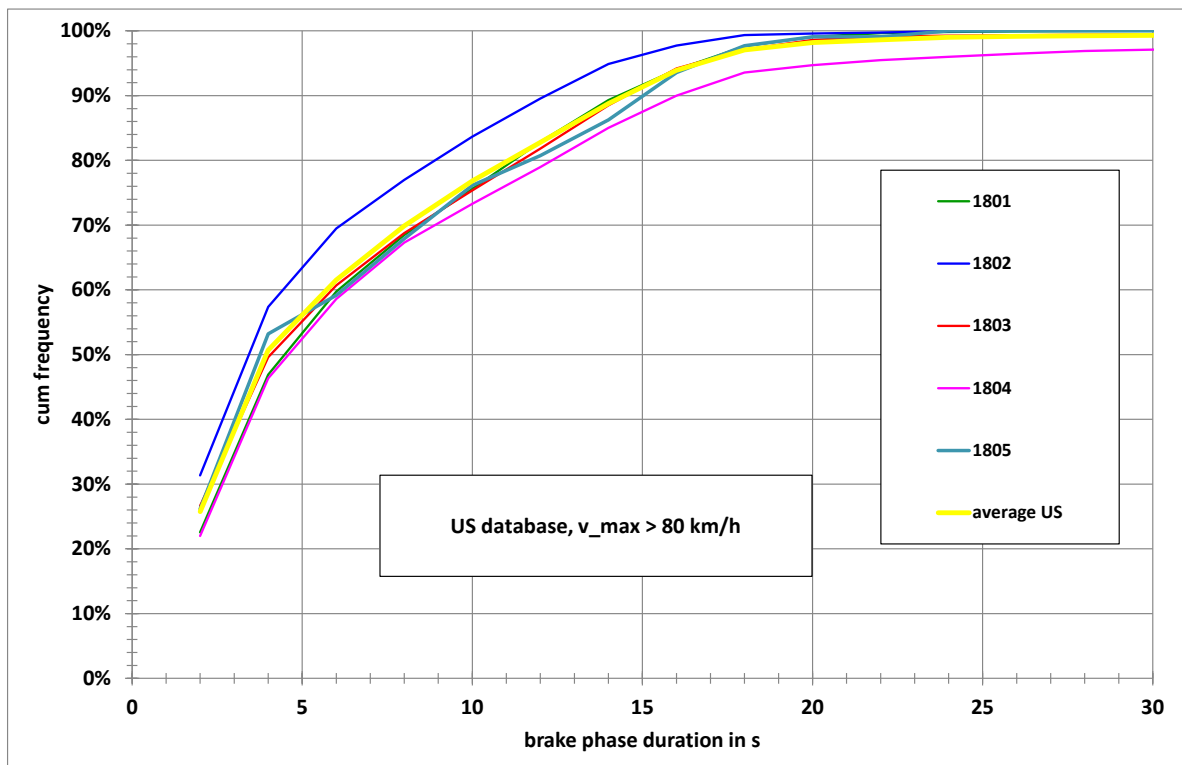


Figure 179: Brake phase duration distributions for the vehicles in the US ($v_{max} > 80$ km/h)

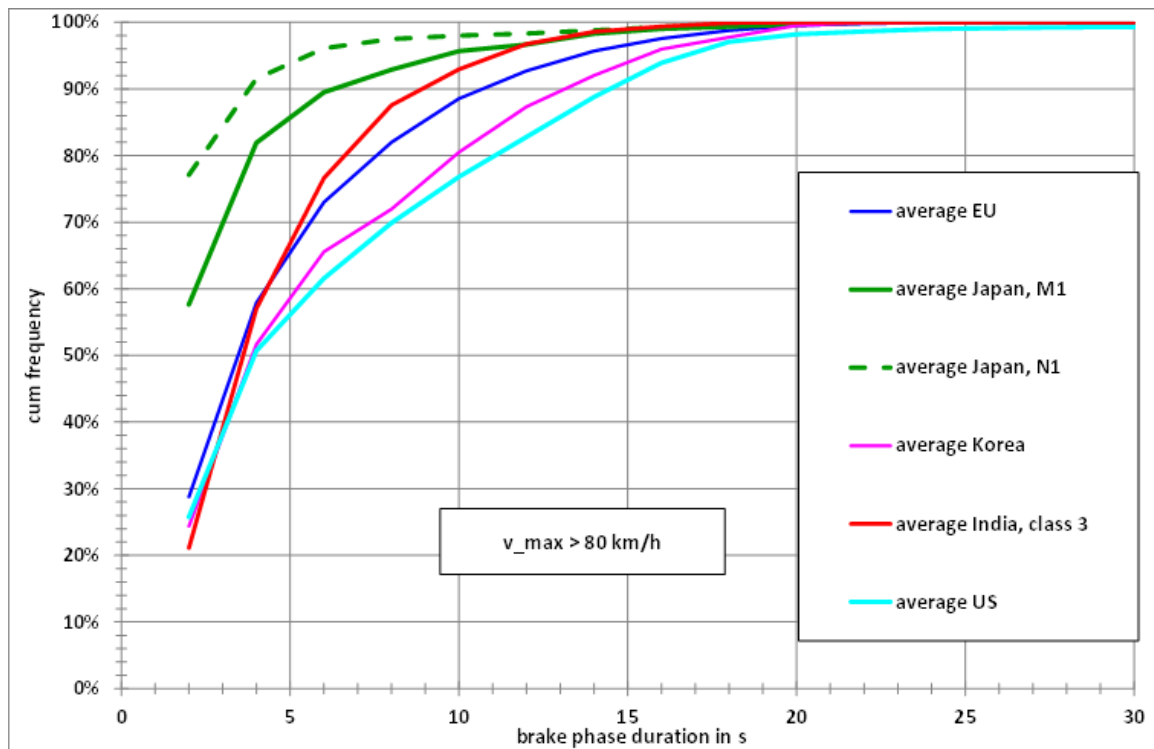


Figure 180: Brake phase duration distributions for the different regions ($v_{max} > 80$ km/h)

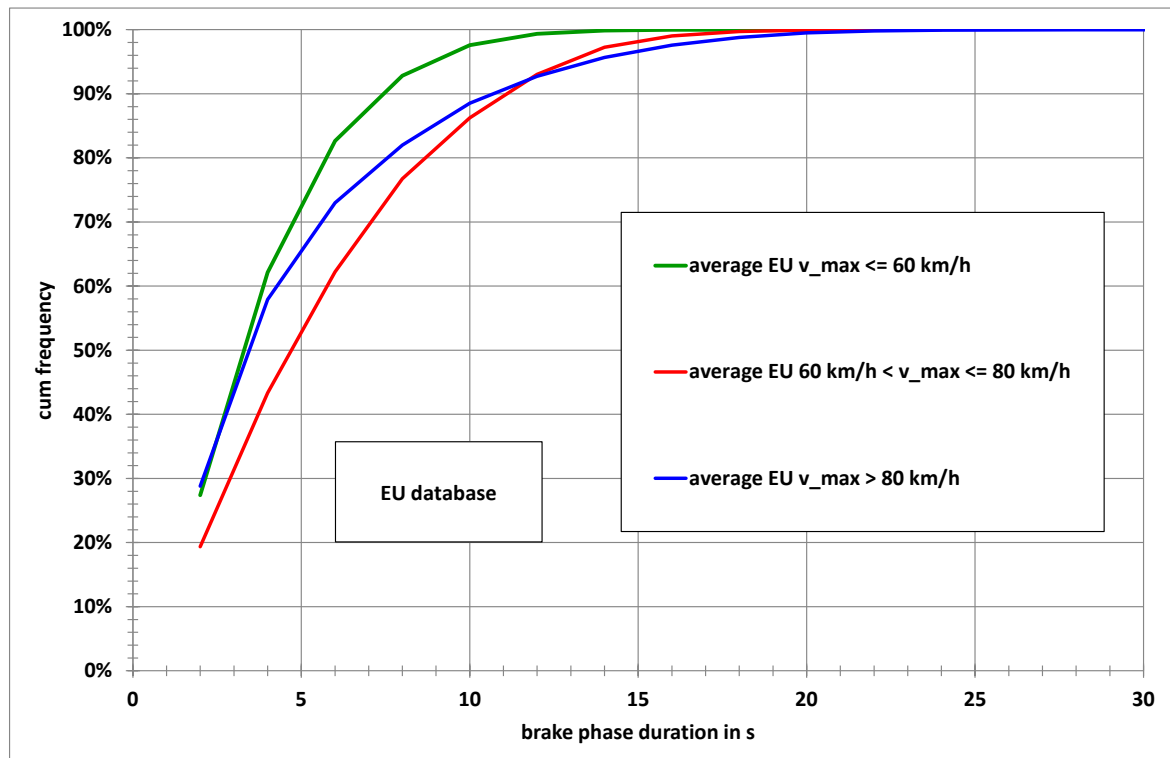


Figure 181: Brake phase duration distributions for short trips with different v_{max}



11.2.2 Brake phase distance distributions

Vehicle specific distance distributions for the different regions and for deceleration phases with $v_{max} \leq 60$ km/h are shown in Figure 180 to Figure 188.

Figure 189 to Figure 196 show the corresponding distributions for deceleration phases with v_{max} between 60 and 80 km/h and Figure 197 to Figure 203 shown the distributions for deceleration phases with v_{max} above 80 km/h.

Figure 204 shows a comparison of the average curves for Europe with the different v_{max} ranges.

The numbers in the legends are vehicle indicators according to Table 60 to Table 65.

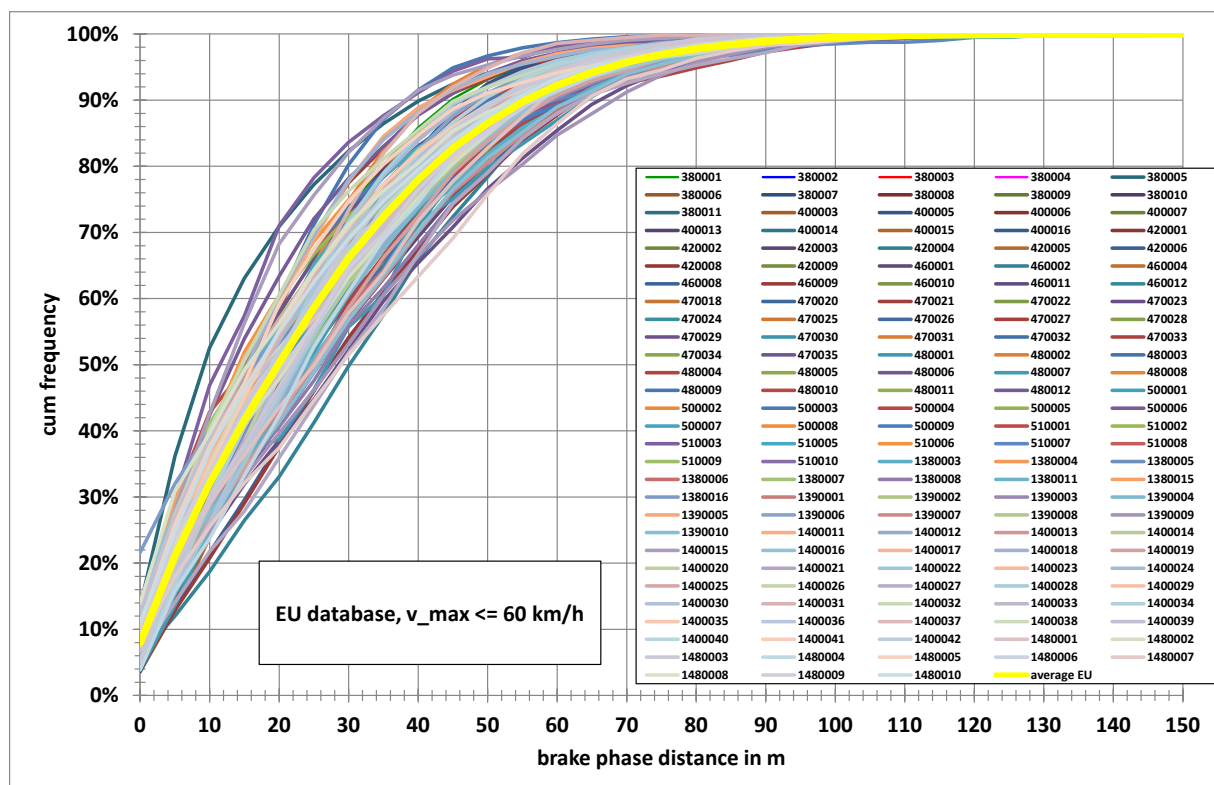


Figure 182: Brake phase distance distributions for the vehicles in the EU ($v_{max} \leq 60$ km/h)

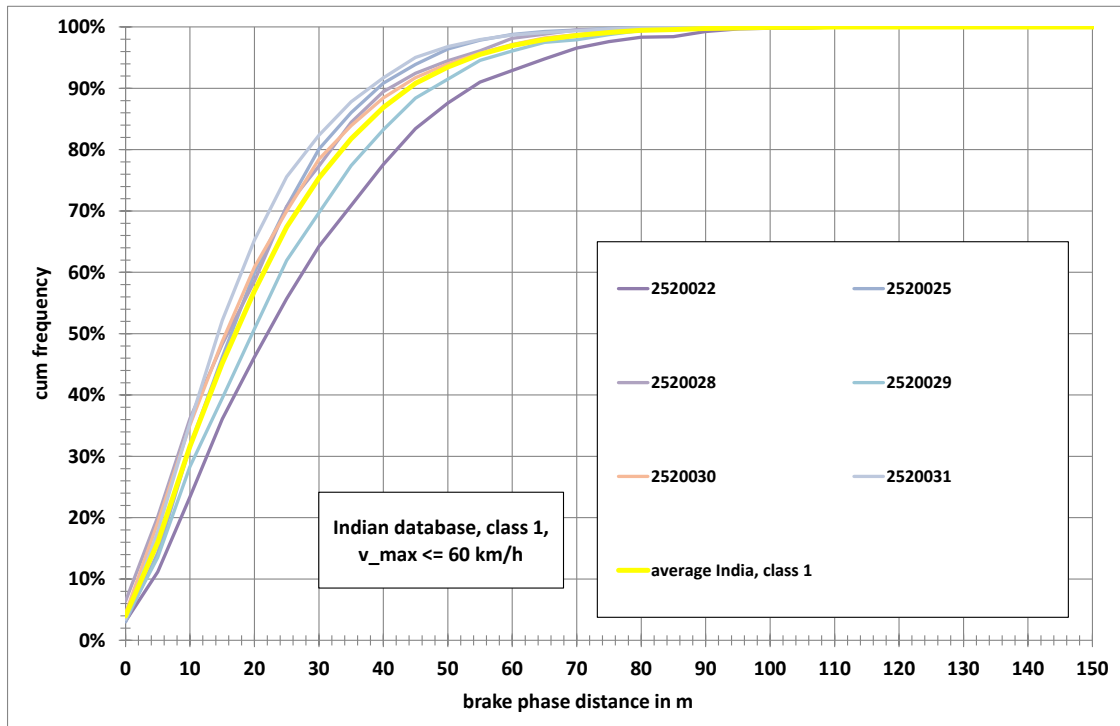


Figure 183: Brake phase distance distributions for class 1 vehicles in India ($v_{max} \leq 60$ km/h)

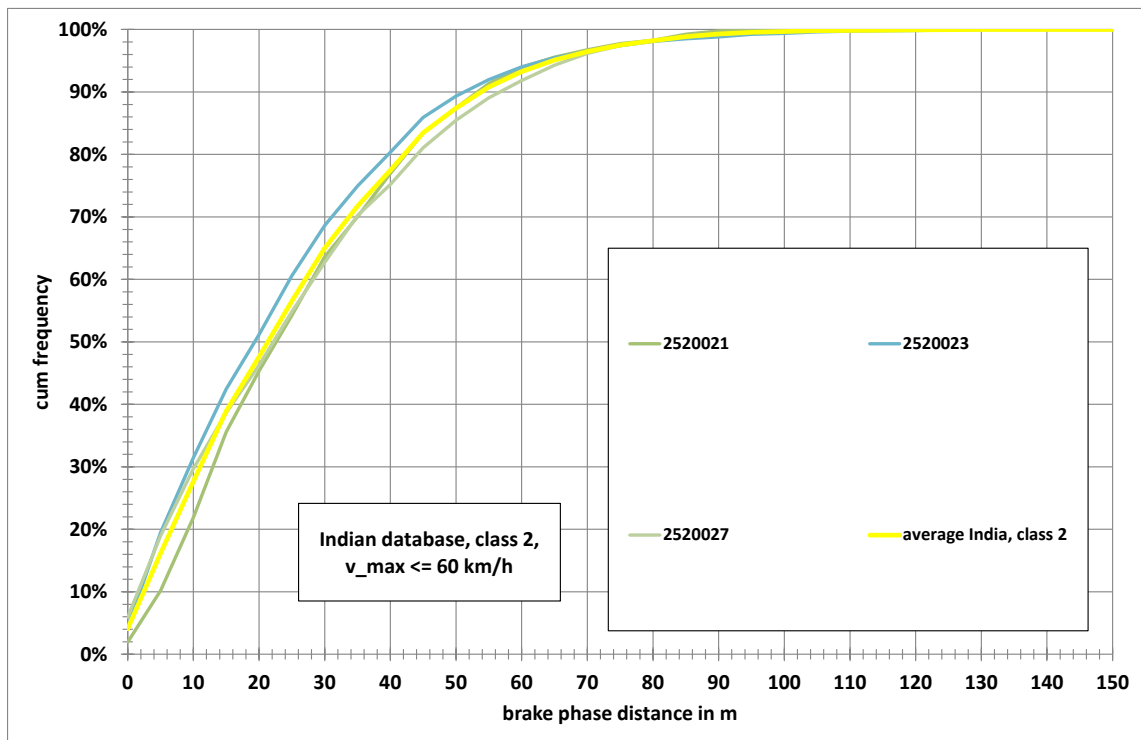


Figure 184: Brake phase distance distributions for class 2 vehicles in India ($v_{max} \leq 60$ km/h)

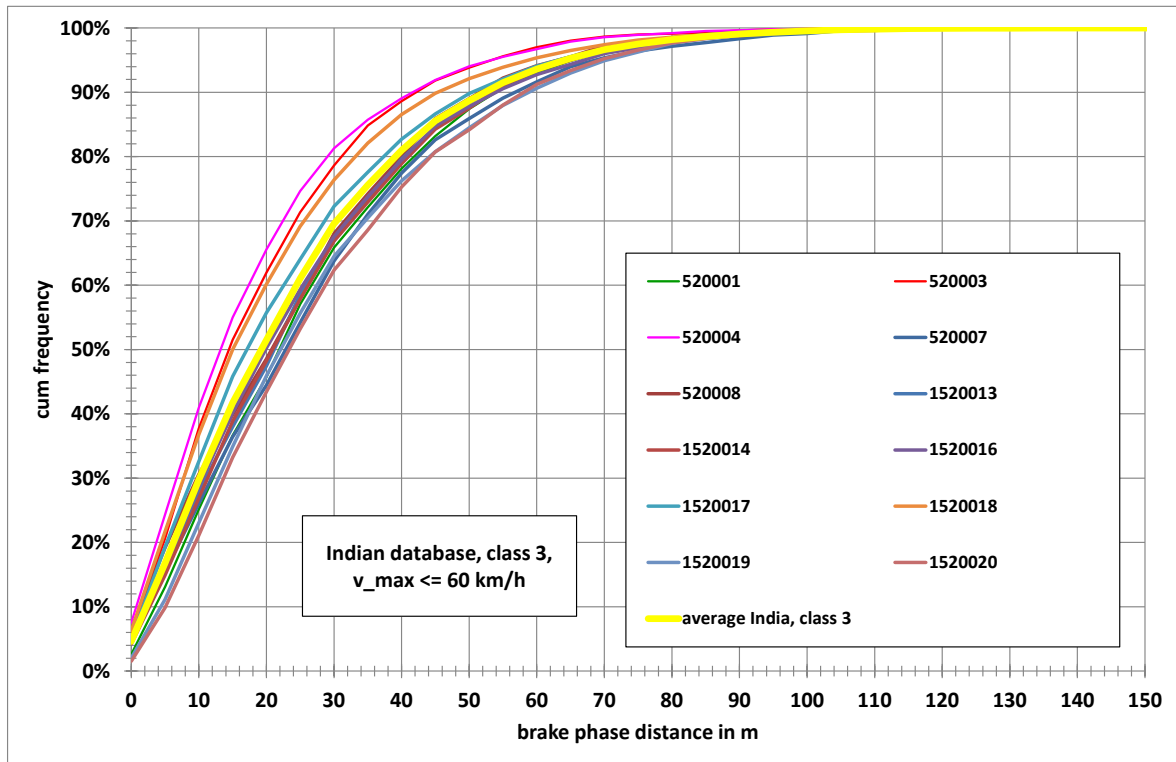


Figure 185: Brake phase distance distributions for class 3 vehicles in India ($v_{max} \leq 60$ km/h)

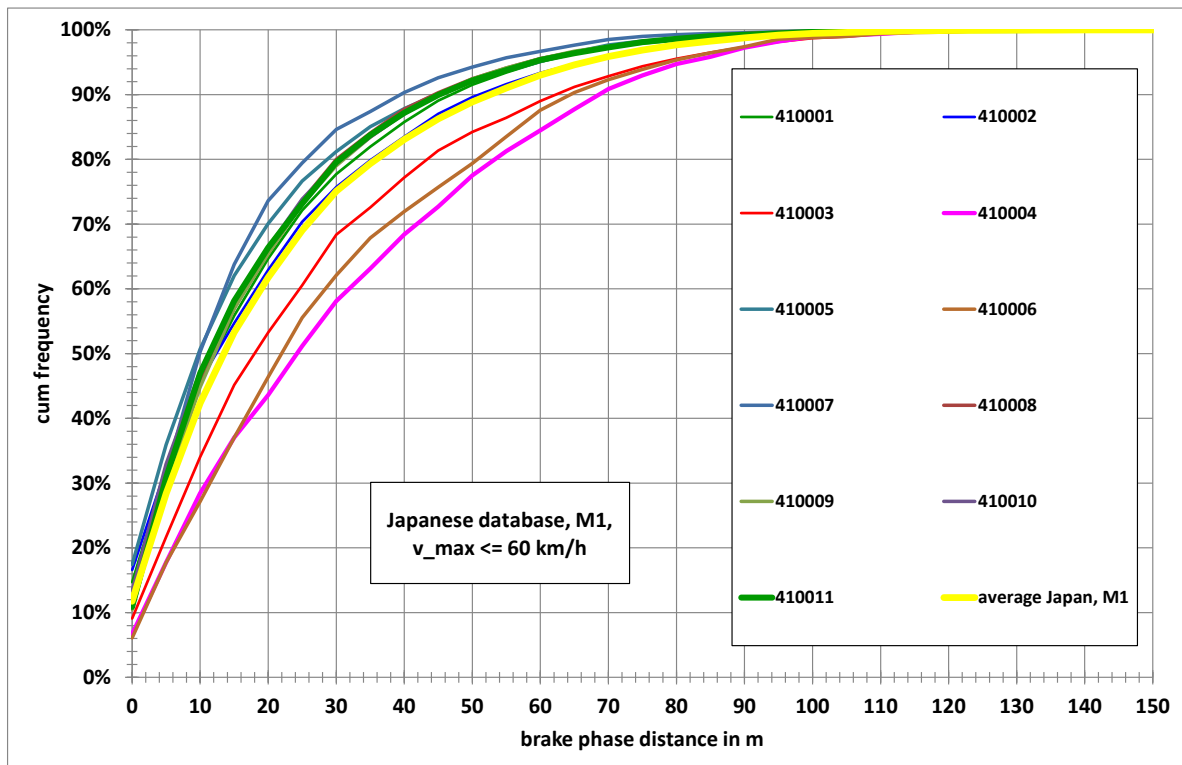


Figure 186: Brake phase distance distributions for M1 vehicles in Japan ($v_{max} \leq 60$ km/h)

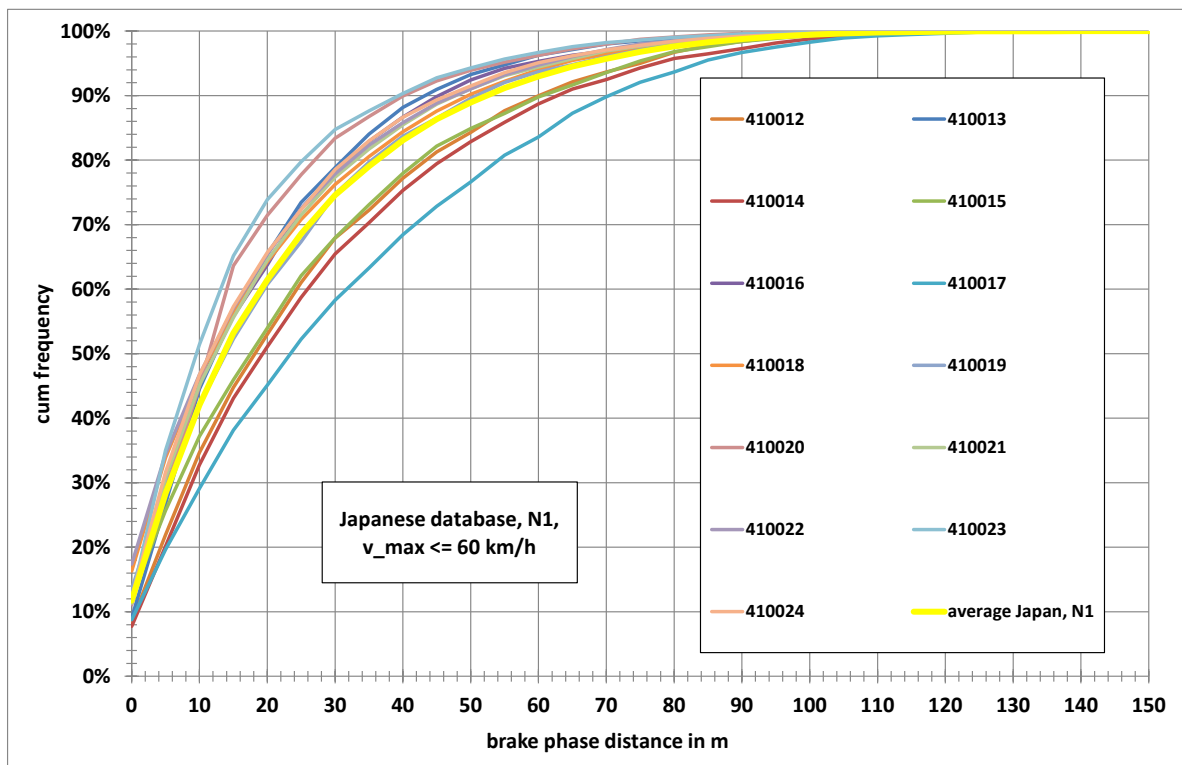


Figure 187: Brake phase distance distributions for N1 vehicles in Japan ($v_{max} \leq 60$ km/h)

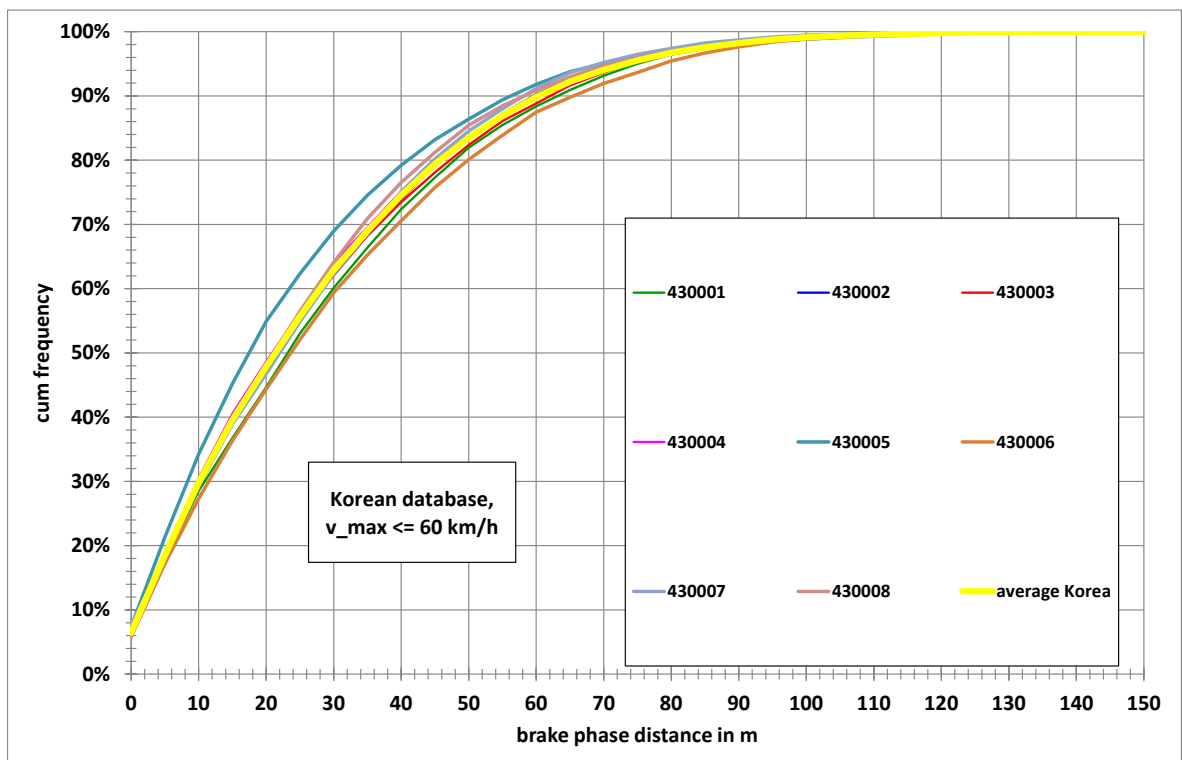


Figure 188: Brake phase distance distributions for the vehicles in Korea ($v_{max} \leq 60$ km/h)

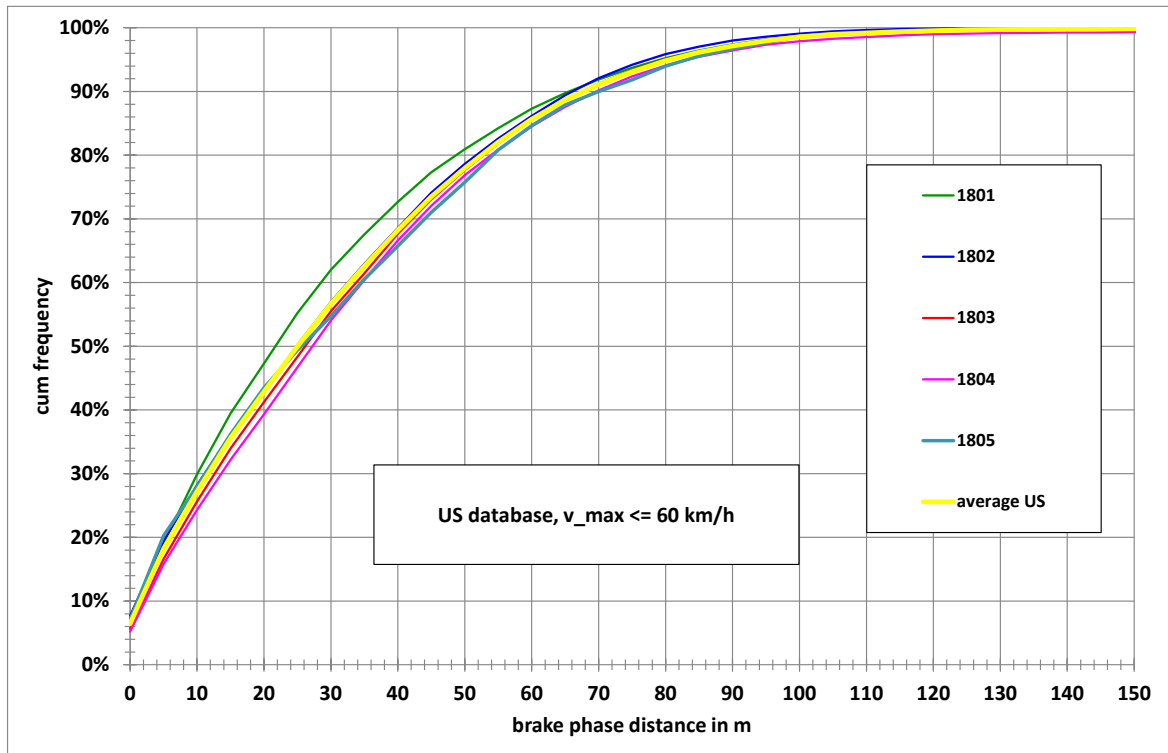


Figure 189: Brake phase distance distributions for the vehicles in the US ($v_{max} \leq 60$ km/h)

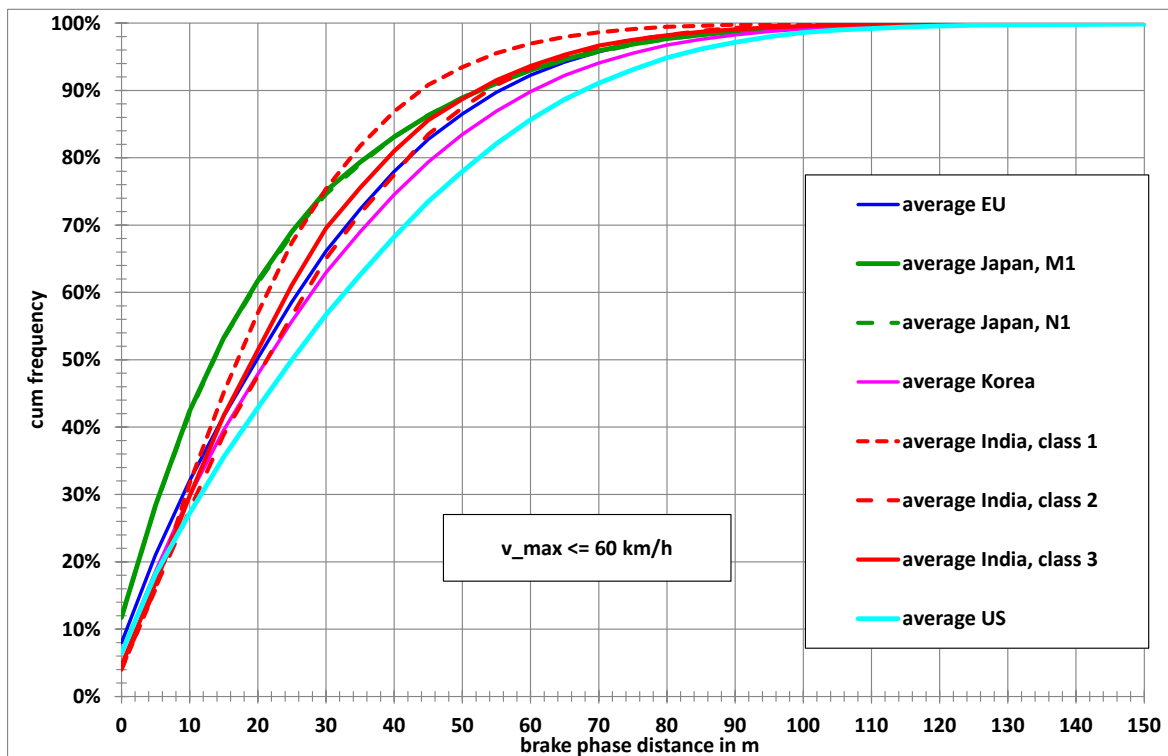


Figure 190: Brake phase distance distributions for the different regions ($v_{max} \leq 60$ km/h)

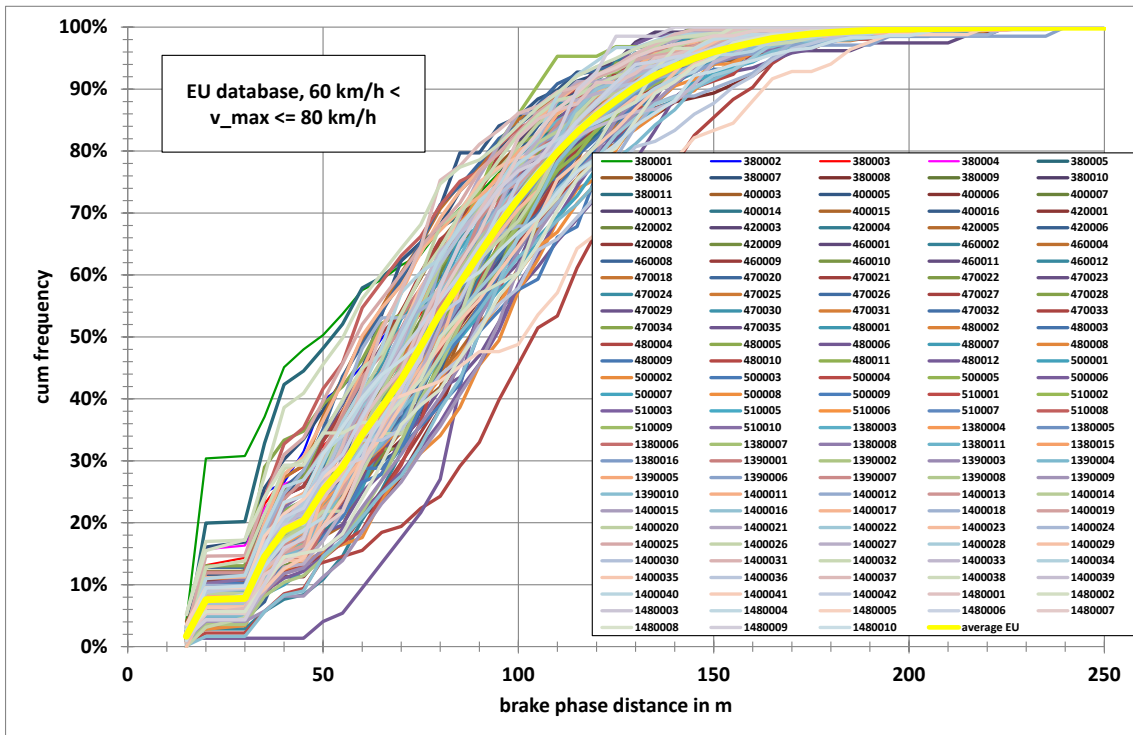


Figure 191: Brake phase distance distributions for the vehicles in the EU ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

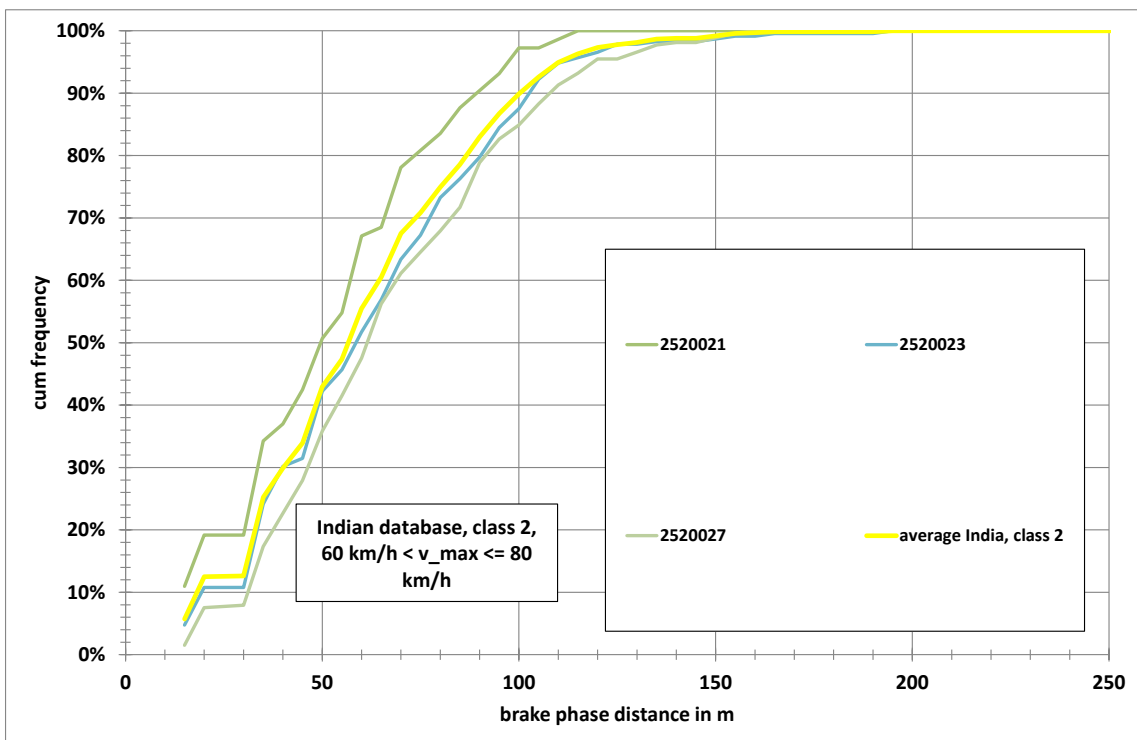


Figure 192: Brake phase distance distributions for class 2 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

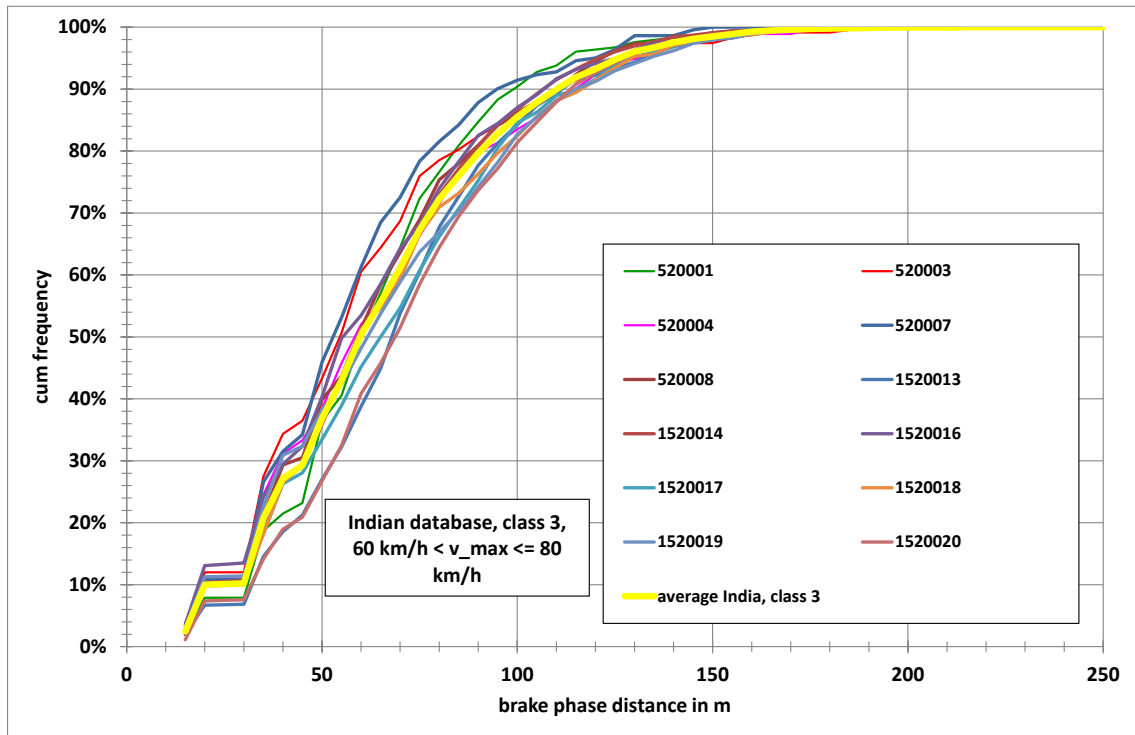


Figure 193: Brake phase distance distributions for class 3 vehicles in India ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

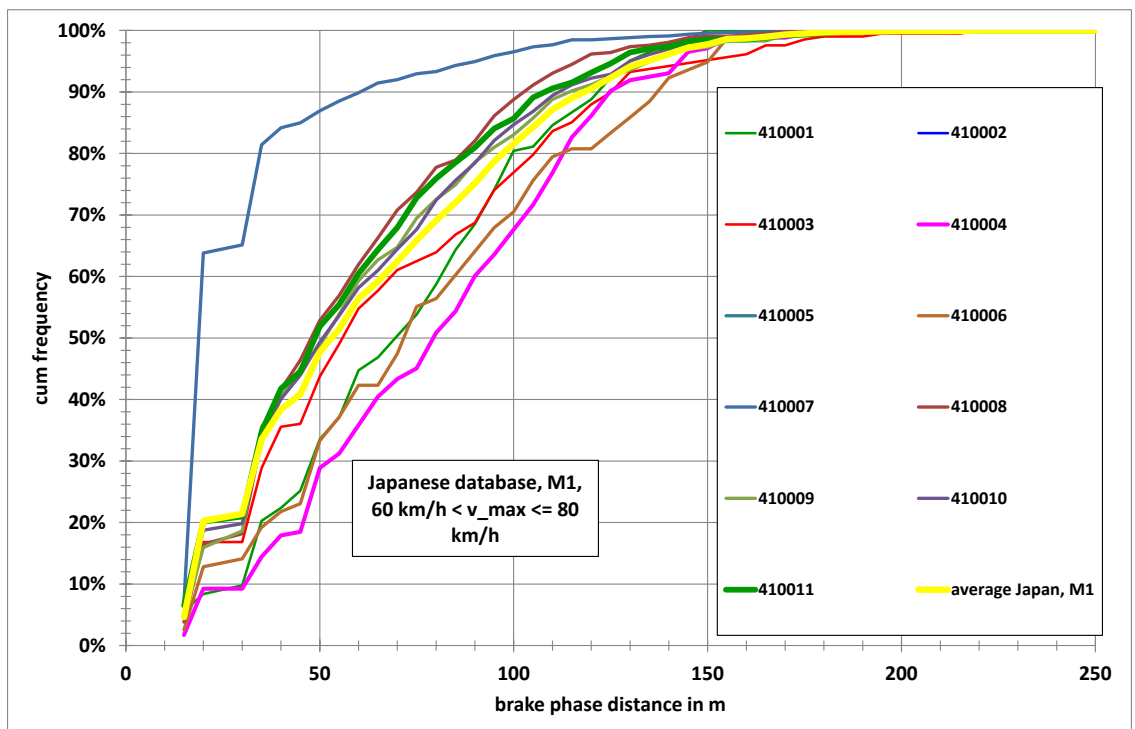


Figure 194: Brake phase distance distributions for M1 vehicles in Japan ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

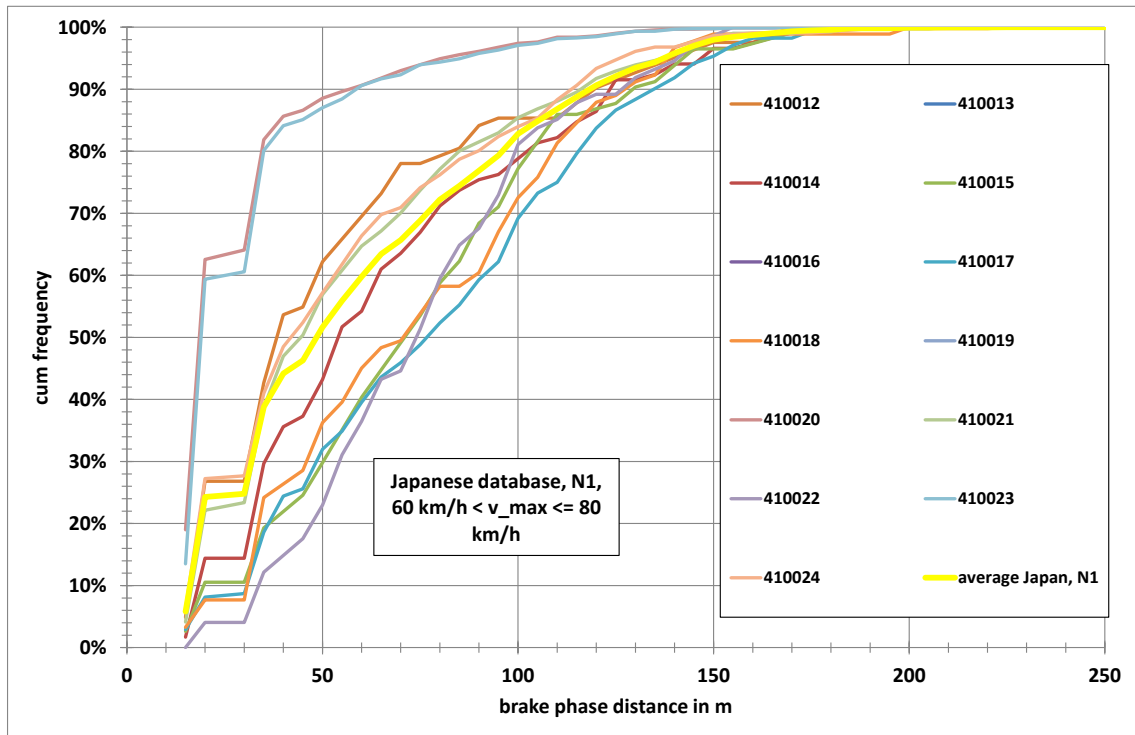


Figure 195: Brake phase distance distributions for N1 vehicles in Japan ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

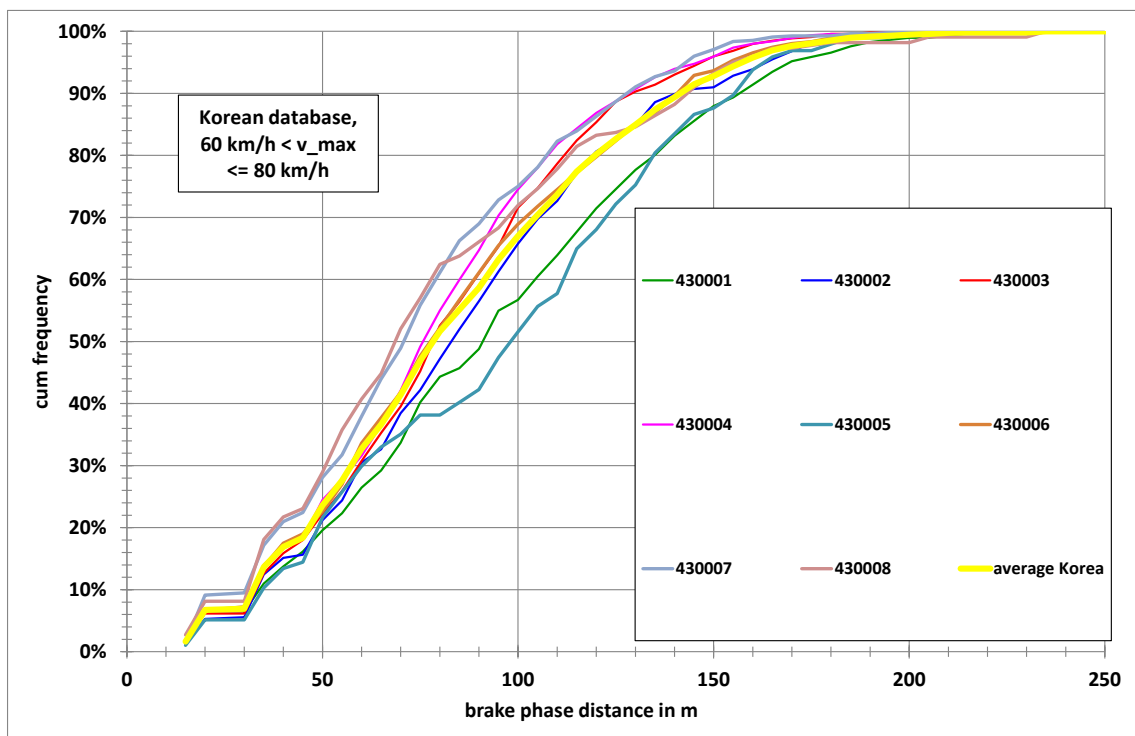


Figure 196: Brake phase distance distributions for the vehicles in Korea ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

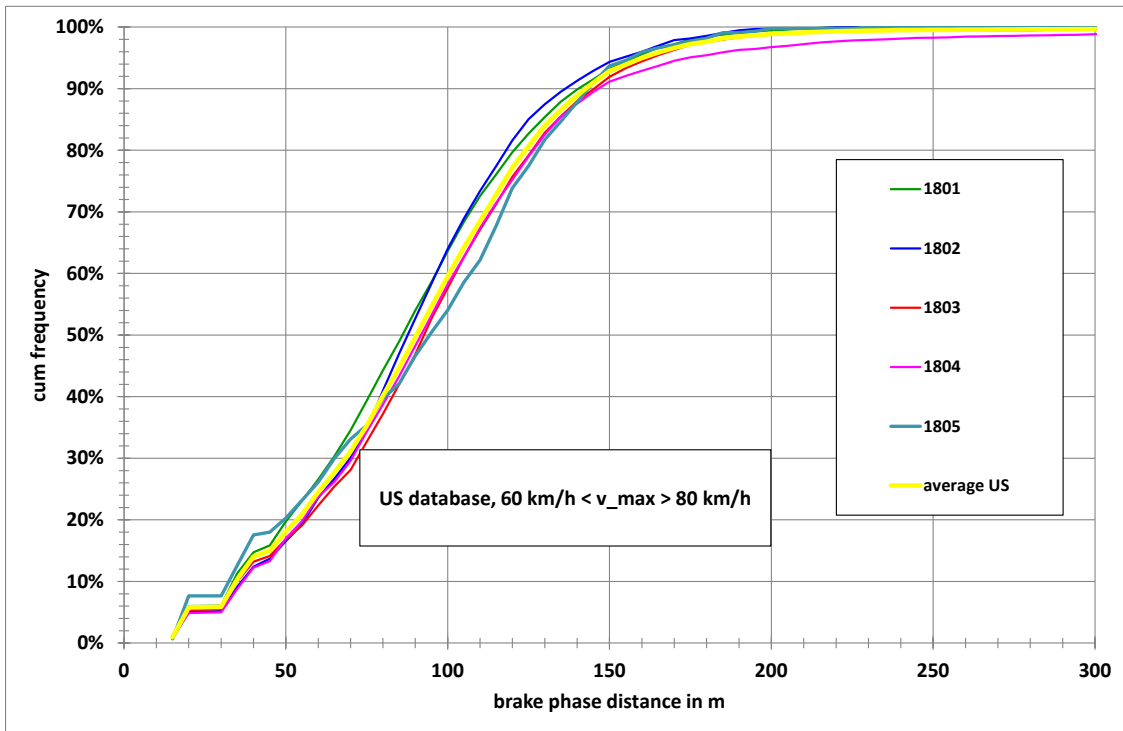


Figure 197: Brake phase distance distributions for the vehicles in the US ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

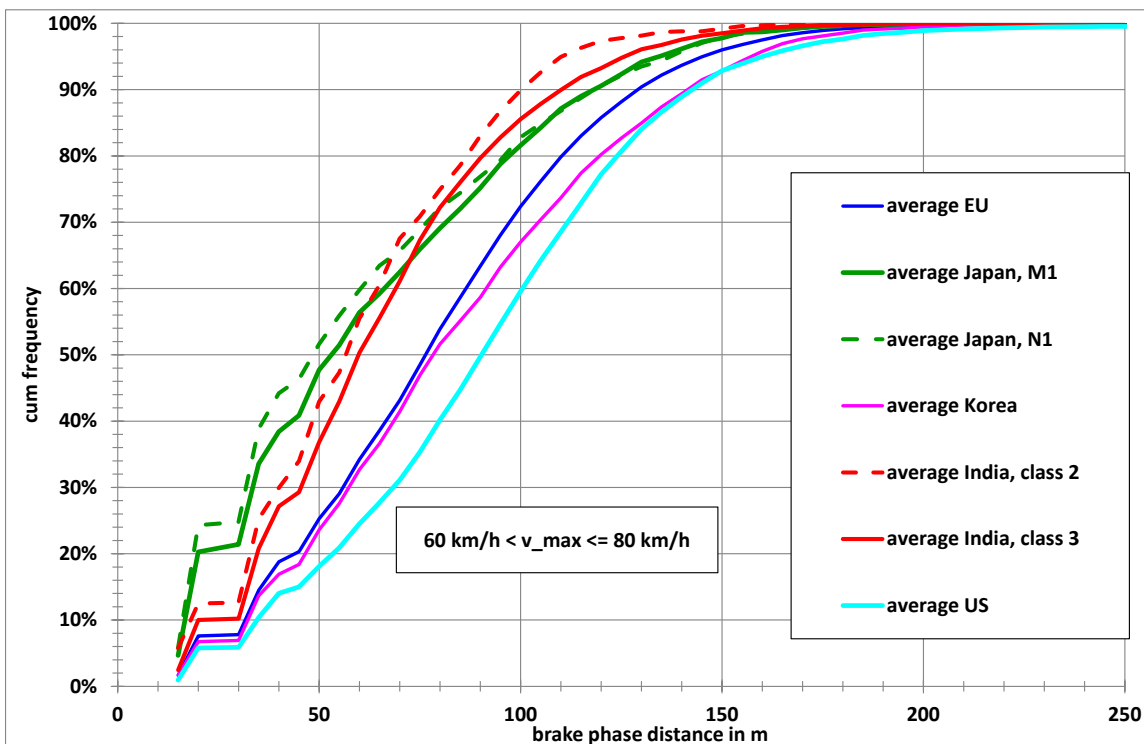


Figure 198: Brake phase distance distributions for the different regions ($60 \text{ km/h} < v_{\text{max}} \leq 80 \text{ km/h}$)

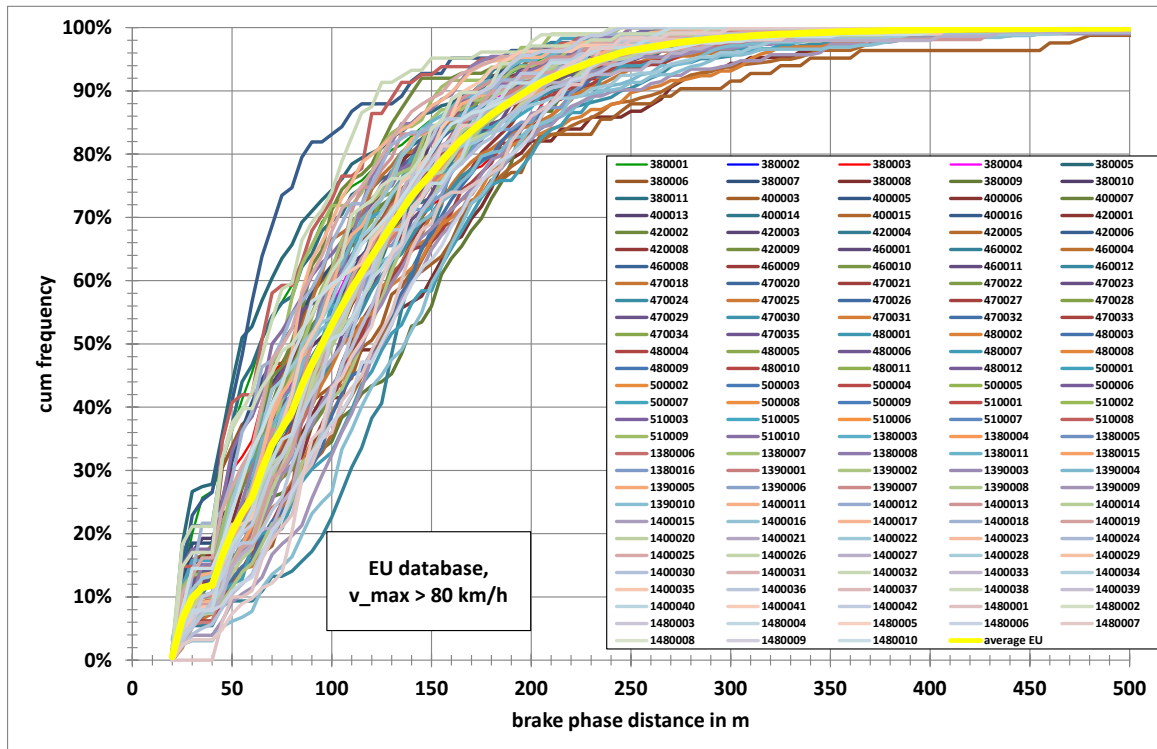


Figure 199: Brake phase distance distributions for the vehicles in the EU ($v_{max} > 80$ km/h)

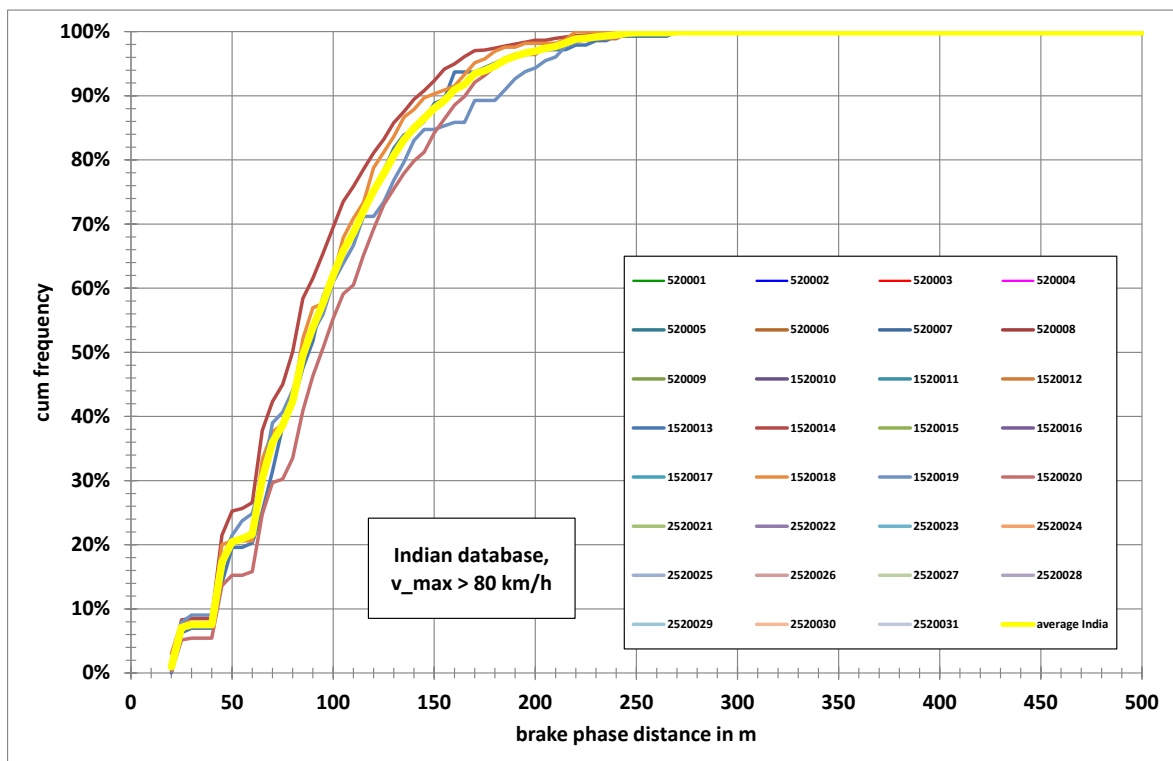


Figure 200: Brake phase distance distributions for the class 3 vehicles in India ($v_{max} > 80$ km/h)

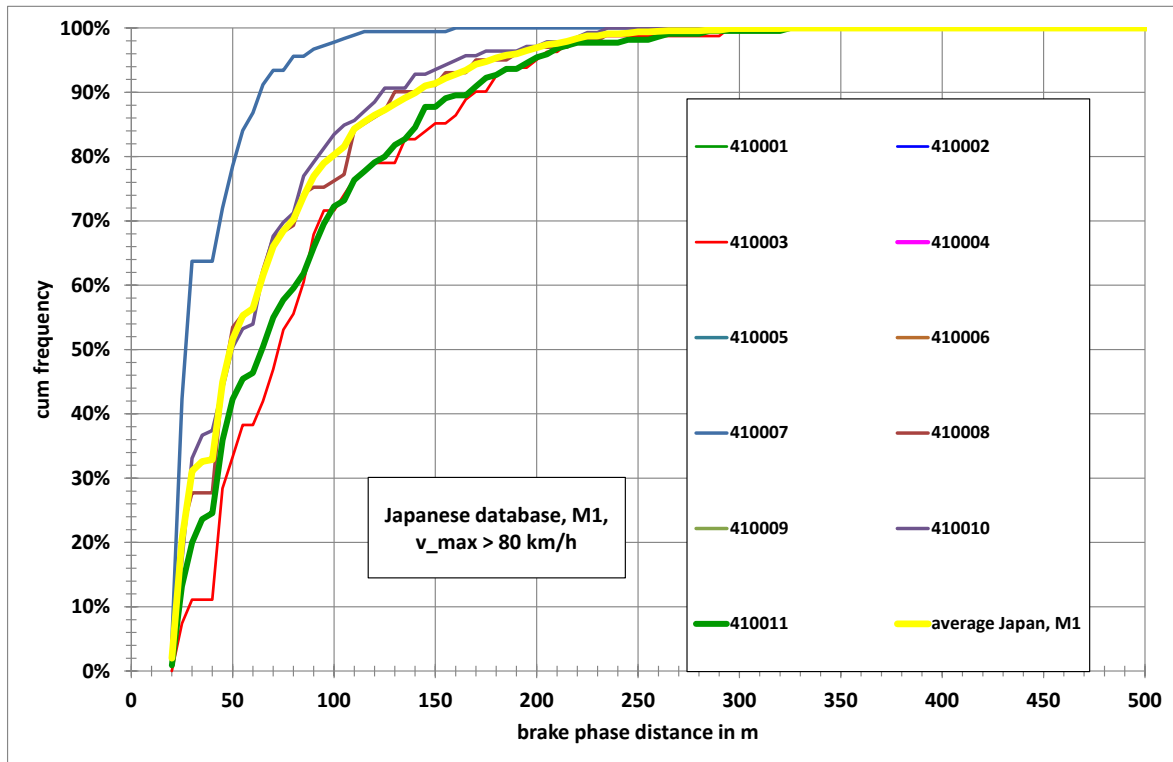


Figure 201: Brake phase distance distributions for M1 vehicles in Japan ($v_{max} > 80$ km/h)

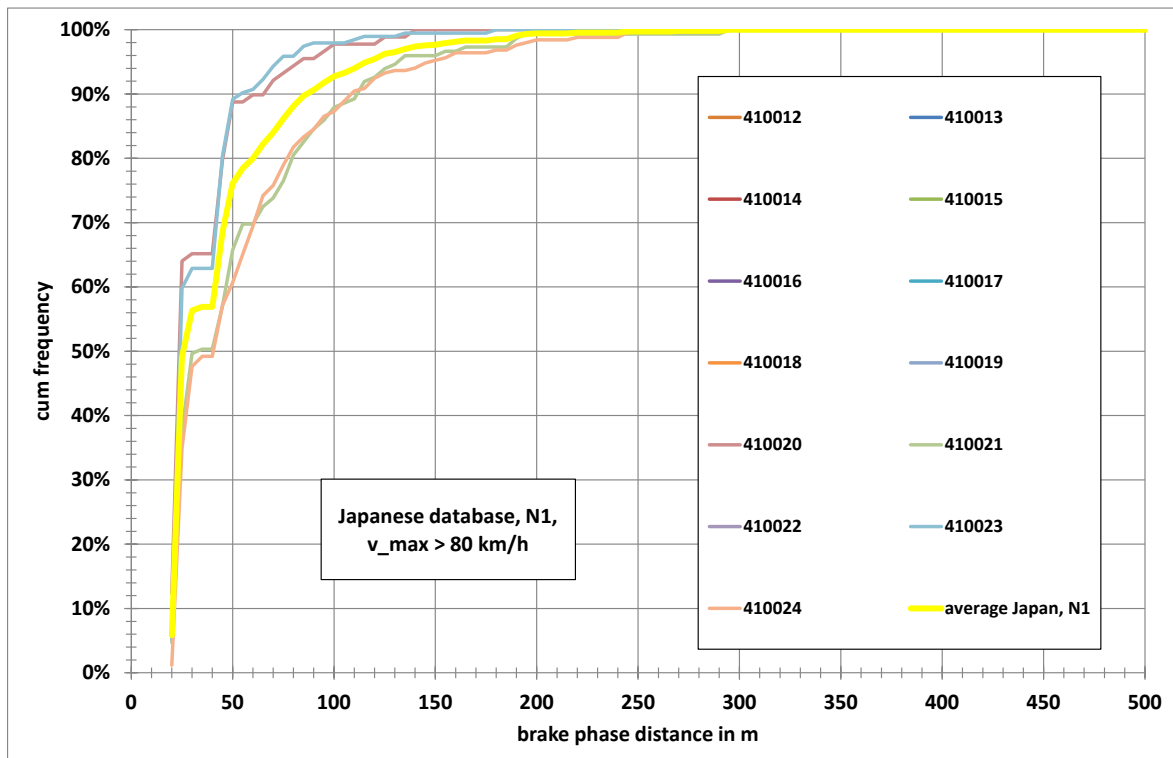


Figure 202: Brake phase distance distributions for N1 vehicles in Japan ($v_{max} > 80$ km/h)

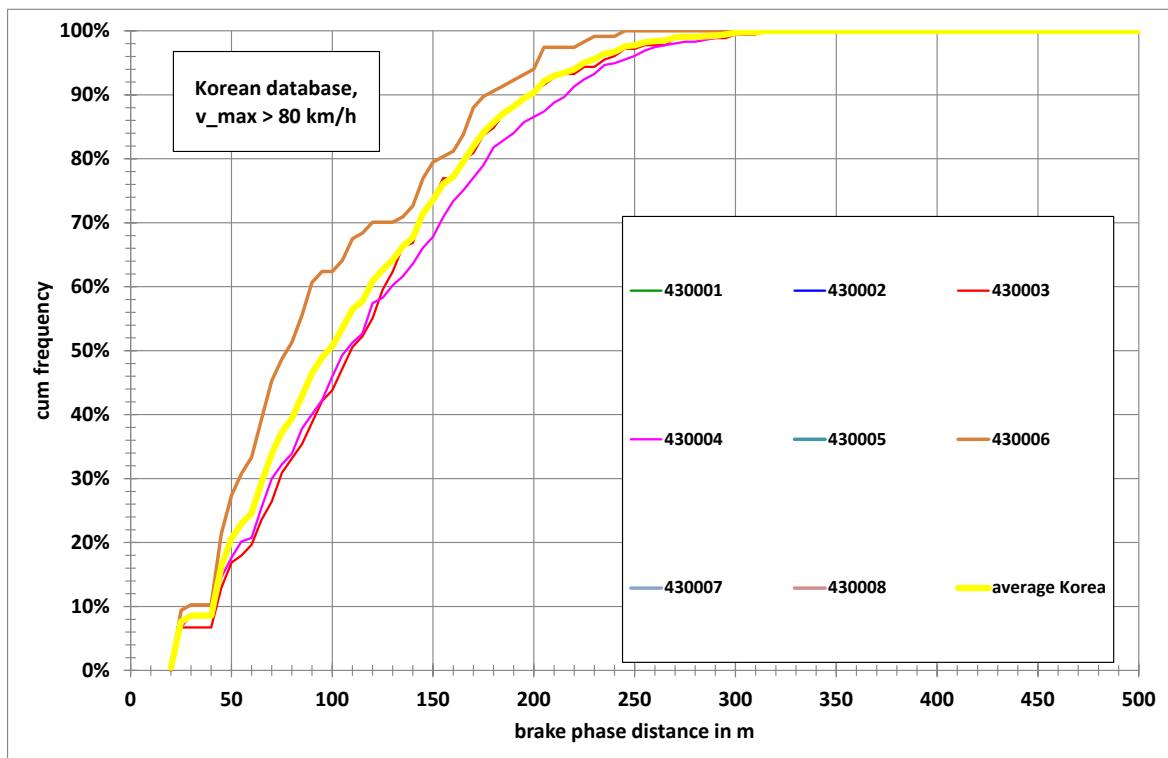


Figure 203: Brake phase distance distributions for the vehicles in Korea ($v_{max} > 80$ km/h)

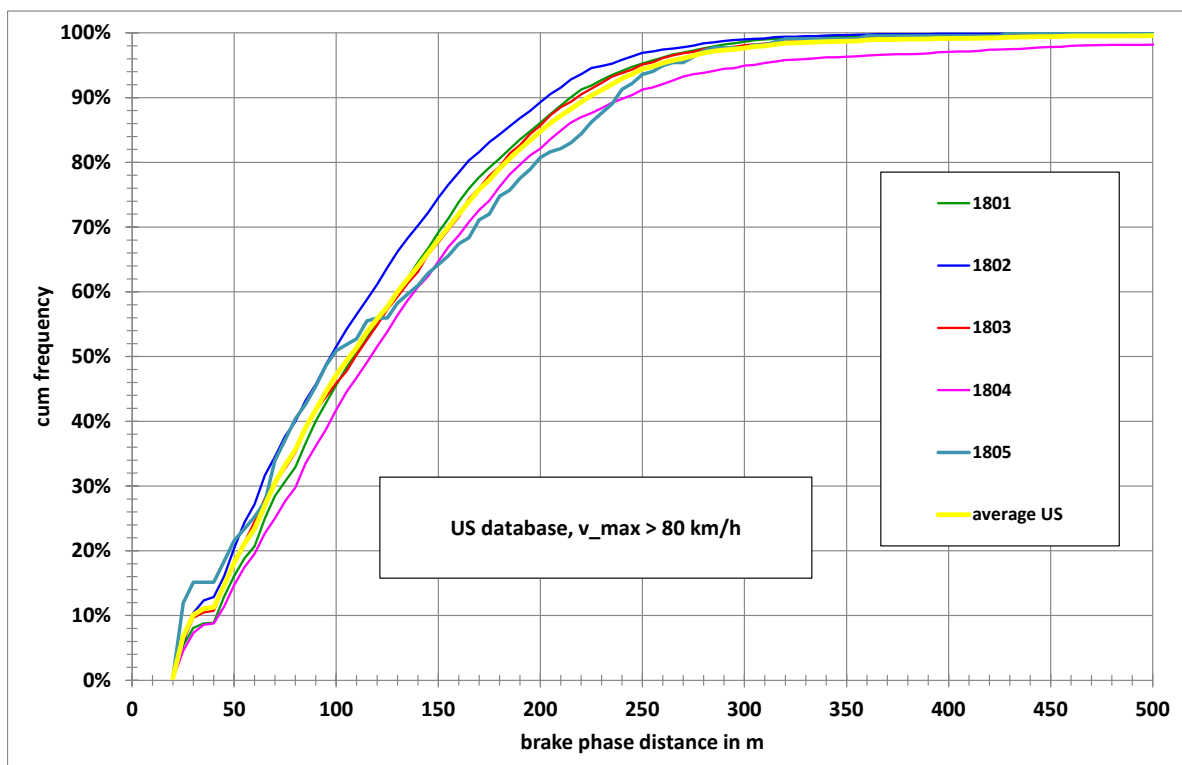


Figure 204: Brake phase distance distributions for the vehicles in the US ($v_{max} > 80$ km/h)

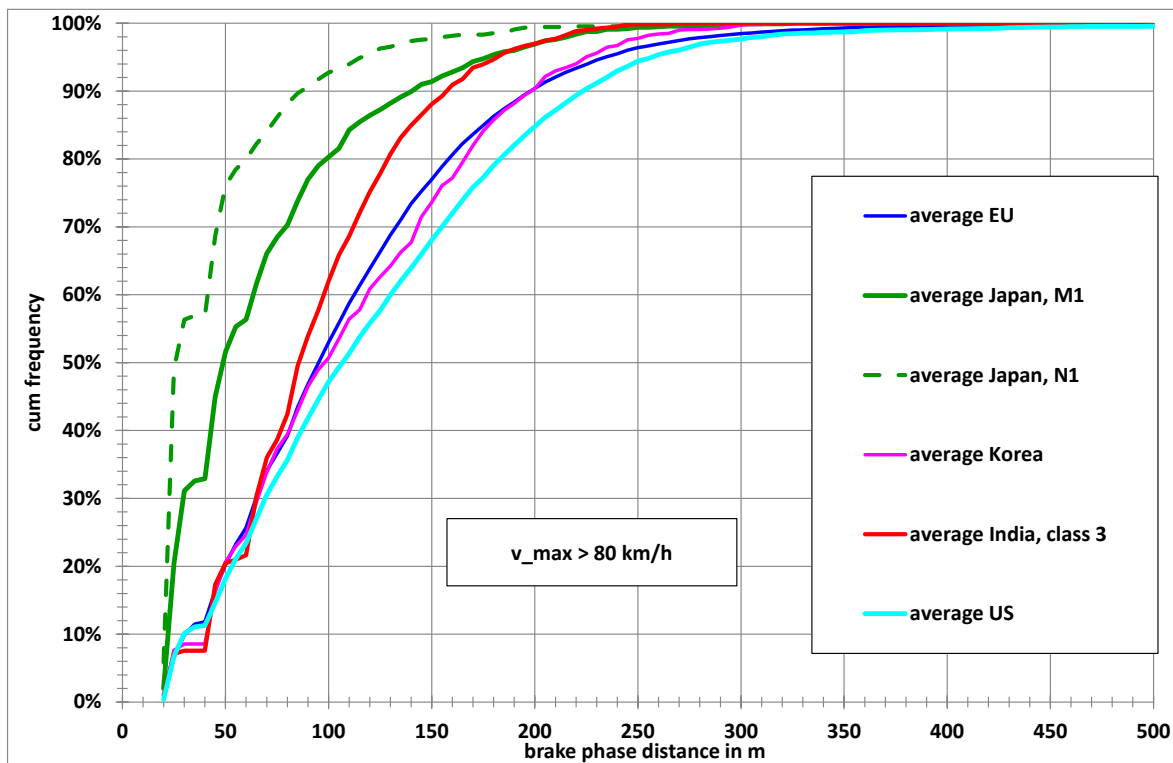


Figure 205: Brake phase distance distributions for the different regions ($v_{max} > 80$ km/h)

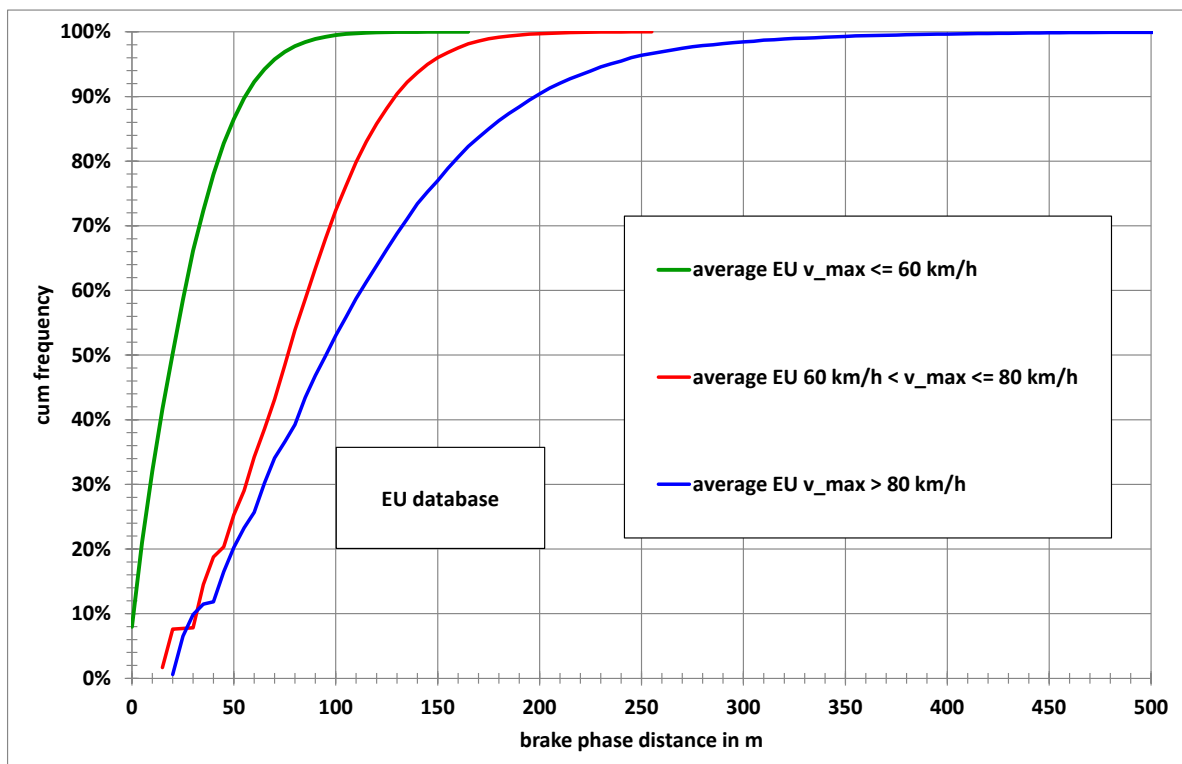


Figure 206: Brake phase distance distributions for short trips with different v_{max}



11.2.3 Number of brake phases per km

The following tables show the number of brake phases per km distance driven for different regions, road categories and vehicles.

Table 70 shows the percentage of brake phases down to a stop phase with respect to the total number of brake phases for different road categories

region	# of brake phases per km				
	average	Short trips with v_max			
		<= 60 km/h	60 km/h < and <= 80 km/h	80 km/h < and <= 110 km/h	> 110 km/h
Europe	1.56	5.3	2.1	1.0	0.4
India, class 1	1.36	1.7	0.5		
India, class 2	1.55	3.7	1.3	0.8	
India, class 3	1.84	4.4	1.9	1.1	1.1
Japan	3.00	6.1	2.1	0.7	0.4
Korea	2.01	4.3	1.5	0.8	0.7
USA	1.37	6.4	2.4	1.3	0.3

Table 72: Number of brake phases per Kilometer distance for different regions

region	# of brake phases per km		
	urban	rural	motorway
Europe	3.8	1.0	0.2
India, class 1	3.2	1.6	
India, class 2	2.3	1.5	0.8
India, class 3	2.8	2.1	1.0
Japan	4.5	1.3	1.2
Korea	3.6	1.4	0.7

Table 73: Number of brake phases per Kilometer distance for different regions per road category

	EU	Japan	Korea	India
urban	31.8%	34.5%	42.4%	10.5%
rural	15.7%	38.6%	19.5%	5.1%
motorway	13.5%	22.7%	15.9%	6.1%

Table 74: Percentage of brake phases down to a stop phase with respect to the total number of brake phases for different road categories



country	ID_vehicle	number of brake phases per km		
		urban	rural	motorway
France	1390001	3.7	1.3	
	1390002	4.8	1.1	0.2
	1390003	3.6	1.1	
	1390004	3.9	1.0	
	1390005	5.4	0.8	
	1390006	4.6	0.8	
	1390007	4.2	0.8	0.1
	1390008	3.9	0.9	0.1
	1390009	3.0	0.8	0.2
	1390010	3.0	0.7	0.1
	1400011	5.7	1.0	
	1400012	4.1	1.0	
	1400013	3.9	0.6	
	1400014	3.5	0.8	0.1
	1400015	5.7	0.6	
	1400016	3.8	0.9	
	1400017	3.4	0.8	
	1400018	4.9	0.3	
	1400019	3.9	0.9	
	1400020	5.1	1.3	
	1400021	3.5	0.9	
	1400022	3.9	1.1	0.1
	1400023	4.3	1.0	
	1400024	5.8		
	1400025	3.5	0.8	0.1
	1400026	4.1	0.5	
	1400027	4.4	0.7	
	1400028	6.8	1.4	
	1400029	3.9	0.9	
	1400030	4.4	1.4	
	1400031	6.8		
	1400032	5.5	1.3	
	1400033	3.3	1.0	
	1400034	5.0	0.9	
	1400035	4.3	0.6	
	1400036	4.1	1.4	0.6
	1400037	3.6	1.1	
	1400038	4.8	0.9	
	1400039	2.9	1.1	
	1400040	5.7	0.4	
	1400041	6.3	0.7	
	1400042	5.0	0.8	0.3

Table 75: Number of brake phases per Kilometer distance for France per vehicle and road category



country	ID_vehicle	number of brake phases per km		
		urban	rural	motorway
Germany	400003	3.8	0.6	0.4
	400005	3.7	1.1	
	400006	3.8	0.4	0.2
	400007	3.5	0.5	0.2
	400013	2.5	0.5	0.1
	400014	4.0	0.6	0.3
	400015	3.6	0.7	0.4
	400016	3.2	0.5	0.1
Italy	460001	4.3	1.1	0.2
	460002	2.5	1.1	0.1
	460004	3.3	0.7	0.2
	460008	4.4	1.0	0.1
	460009	4.2	1.1	0.2
	460010	3.4	0.7	0.2
	460011	3.7	0.9	0.1
	460012	4.1	1.0	0.4
Slovenia	470018	3.4	0.7	0.2
	470020	2.6	0.4	0.1
	470021	3.8	0.9	
	470022	3.5	0.6	0.4
	470023	3.0	0.7	0.2
	470024	4.1	0.8	0.3
	470025	3.4	0.6	0.2
	470026	4.0	0.9	
	470027	3.6	0.6	0.2
	470028	3.9	0.9	0.2
	470029	3.9	0.9	0.4
	470030	3.3	0.6	0.2
	470031	4.3	0.6	0.3
	470032	3.9	0.7	0.2
	470033	2.6	0.6	0.3
	470034	2.9	0.6	0.1
	470035	3.0	0.4	0.1

Table 76: Number of brake phases per Kilometer distance for Germany, Italy and Slovenia per vehicle and road category



country	ID_vehicle	number of brake phases per km		
		urban	rural	motorway
UK, M1	1480001	3.1	1.3	
	1480002	1.7	0.5	
	1480003	3.2	0.7	0.4
	1480004	1.9	0.8	0.1
	1480005	2.1	0.6	0.2
	1480006	3.1	0.9	0.4
	1480007	1.4	0.7	
	1480008	3.1	0.7	0.2
	1480009	2.9	1.4	
	1480010	3.8	0.3	0.3
Poland	500001	3.8	0.9	
	500002	4.2	1.4	
	500003	3.2	0.4	
	500004	3.9	1.1	
	500005	2.8	0.7	
	500006	4.4	1.8	
	500007	4.0	0.9	0.2
	500008	3.7	0.8	0.1
	500009	3.5	1.0	0.1
Spain	510001	3.5	0.3	0.3
	510002	4.4	1.1	
	510003	7.7	1.7	
	510005	4.1	0.6	
	510006	4.7	0.7	0.1
	510007	5.4	0.7	
	510008	4.6	0.8	
	510009	5.7	0.7	0.1
	510010	5.6	0.6	
	Belgium	380001	5.1	2.3
380002		4.3	2.3	1.2
380003		5.4	2.6	0.5
380004		4.9	2.2	0.3
380005		11.1	4.4	0.7
380006		6.6	1.2	0.6
380007		3.2	1.6	0.3
380008		5.1	2.4	0.4
380009		4.5	1.7	1.2
380010		4.4	3.3	1.3
380011		4.3	1.2	0.5

Table 77: Number of brake phases per Kilometer distance for UK (M1), Poland, Spain and Belgium per vehicle and road category



12 Joint vehicle speed acceleration distributions

12.1 Time weighted

See annex 2.

12.2 Distance weighted

See annex 3

13 Acceleration distributions, acceleration > 0.15 m/s²

13.1 Time weighted

The figures in the legends indicate vehicle speed classes. 0 stands for speeds up to 2,5 km/h which means starting from standstill.

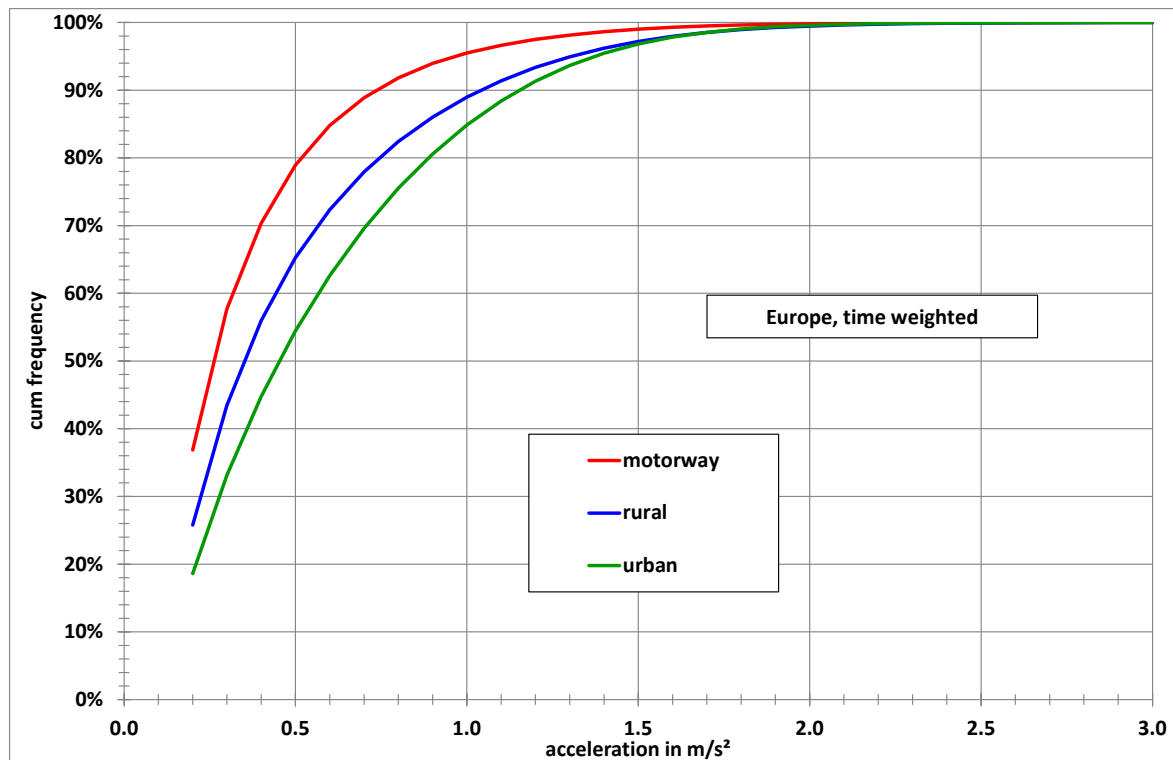


Figure 207: Acceleration distributions for road categories, time weighted, Europe

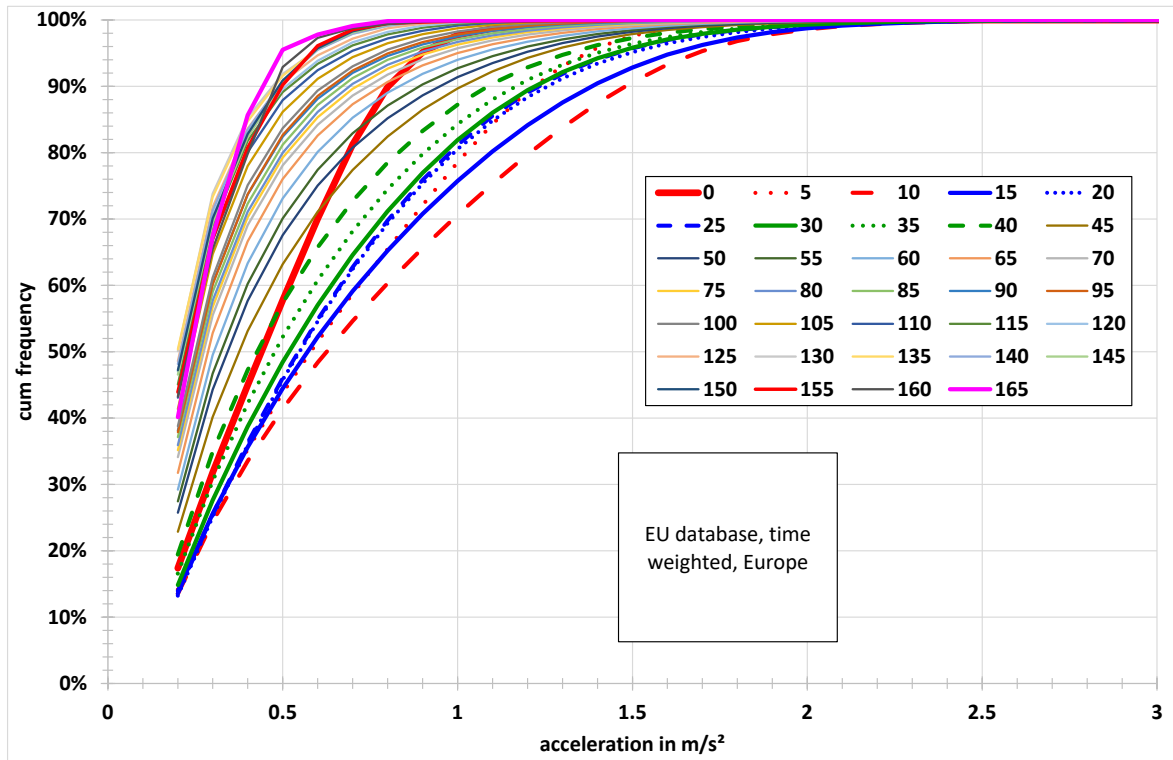


Figure 208: Acceleration distributions for vehicle speed classes, time weighted, Europe

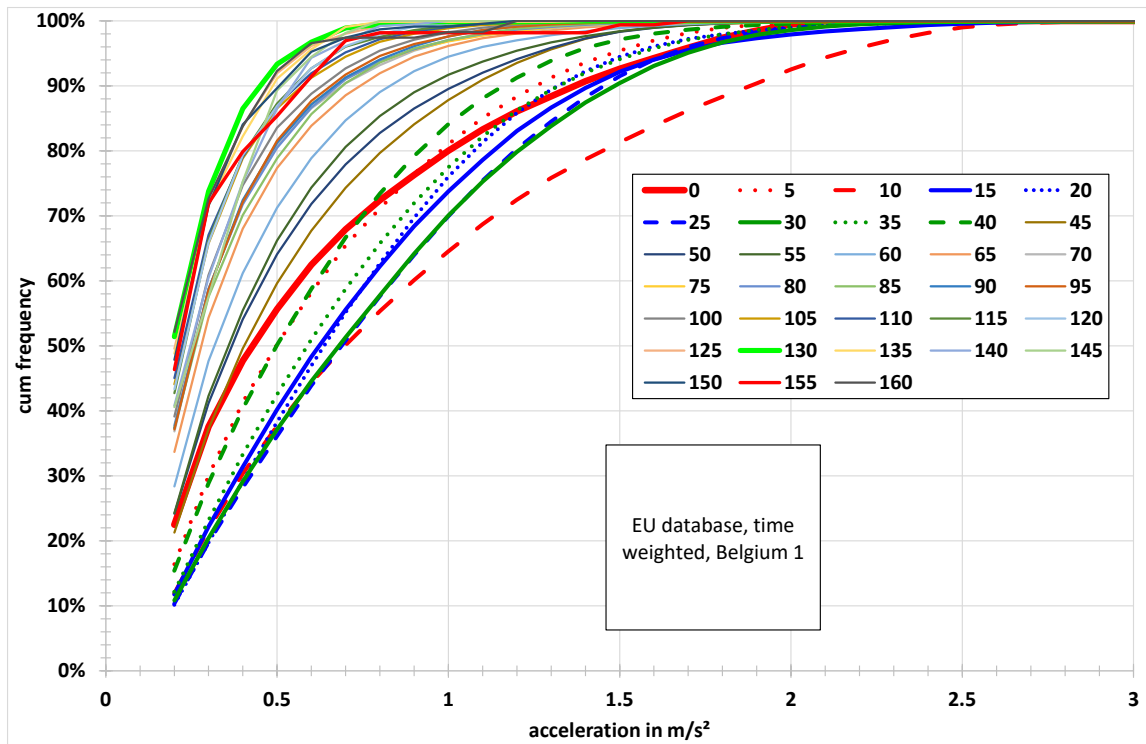


Figure 209: Acceleration distributions for vehicle speed classes, time weighted, Belgium 1

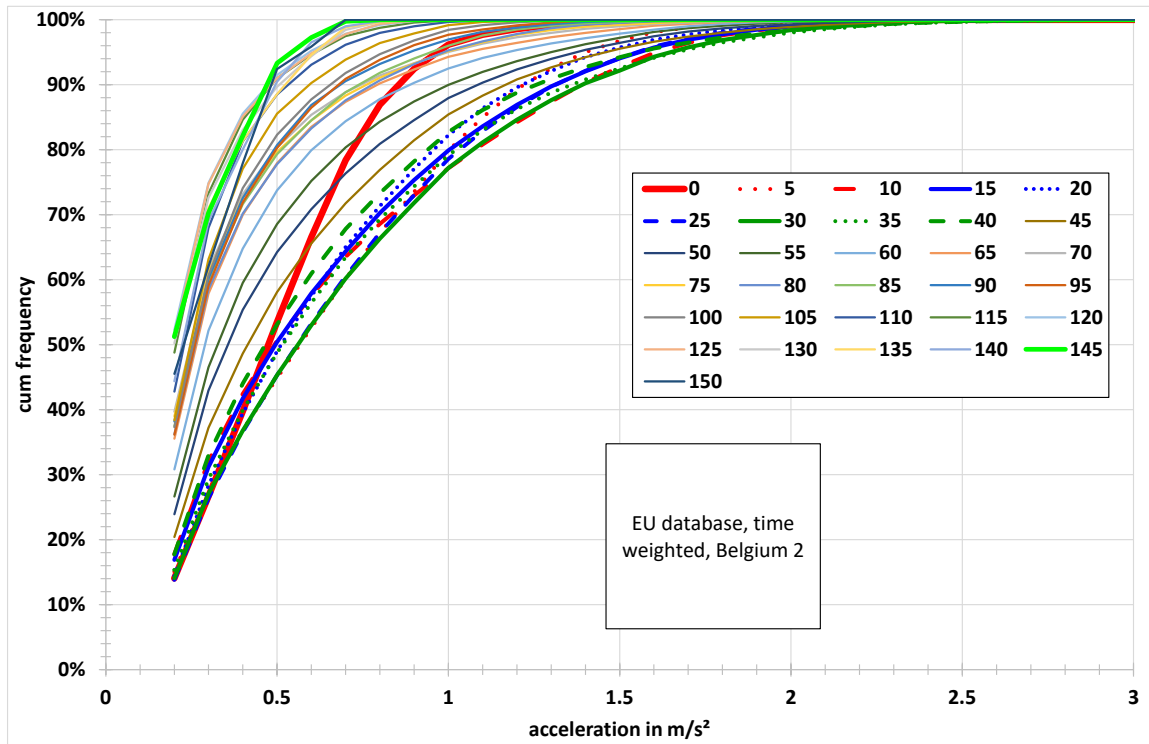


Figure 210: Acceleration distributions for vehicle speed classes, time weighted, Belgium 2

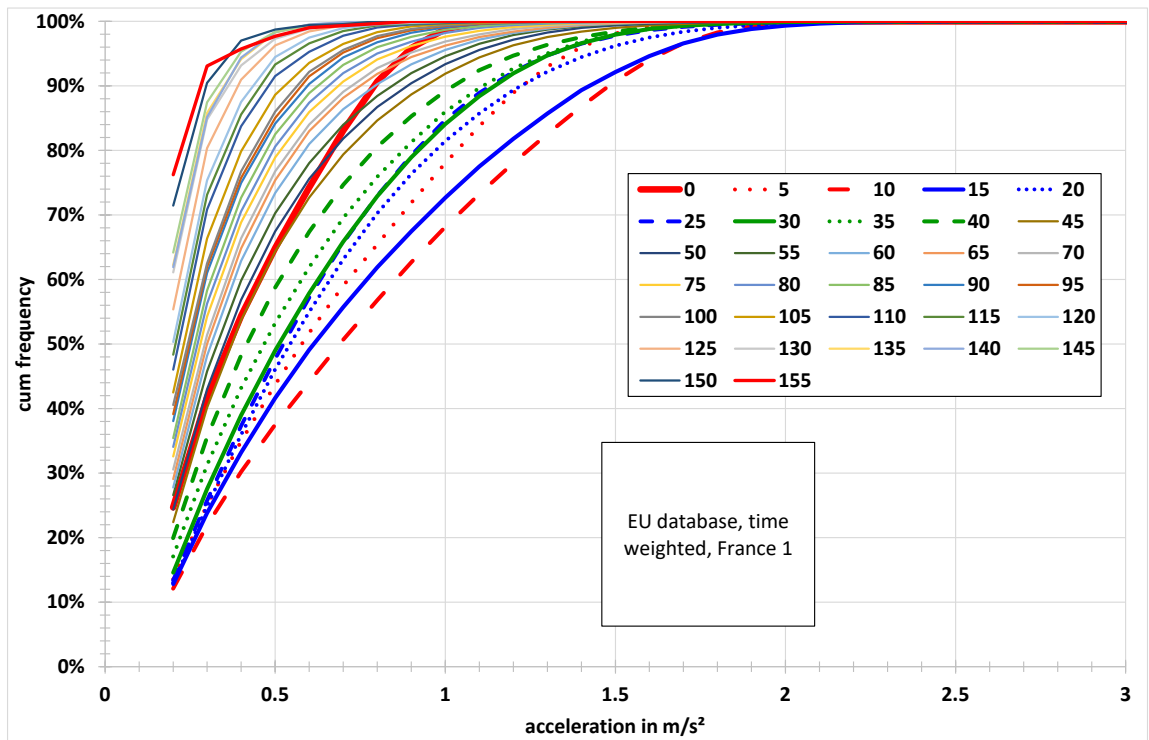


Figure 211: Acceleration distributions for vehicle speed classes, time weighted, France 1

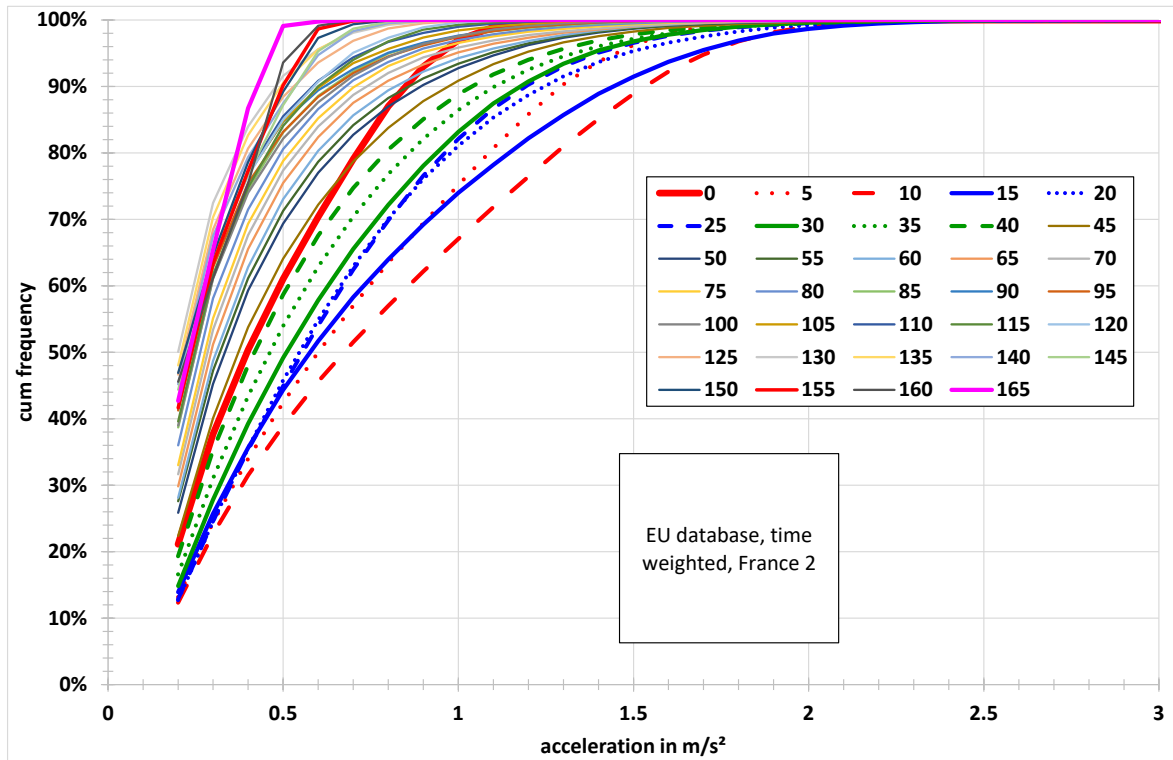


Figure 212: Acceleration distributions for vehicle speed classes, time weighted, France 2

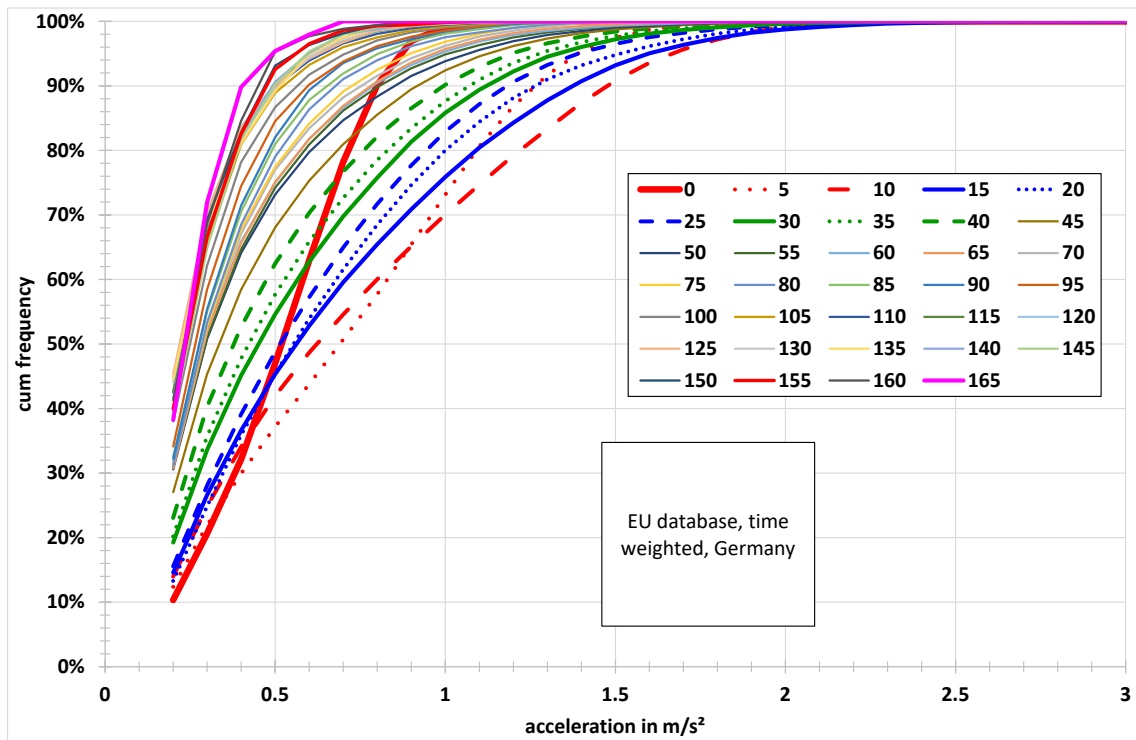


Figure 213: Acceleration distributions for vehicle speed classes, time weighted, Germany

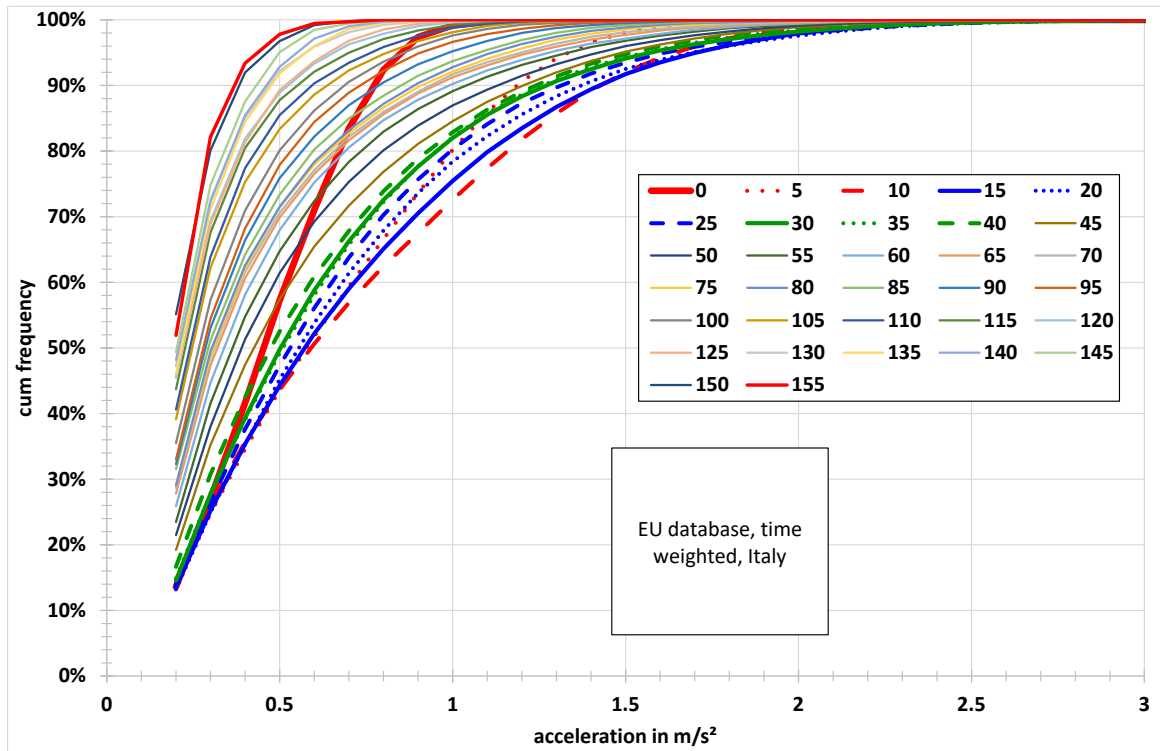


Figure 214: Acceleration distributions for vehicle speed classes, time weighted, Italy

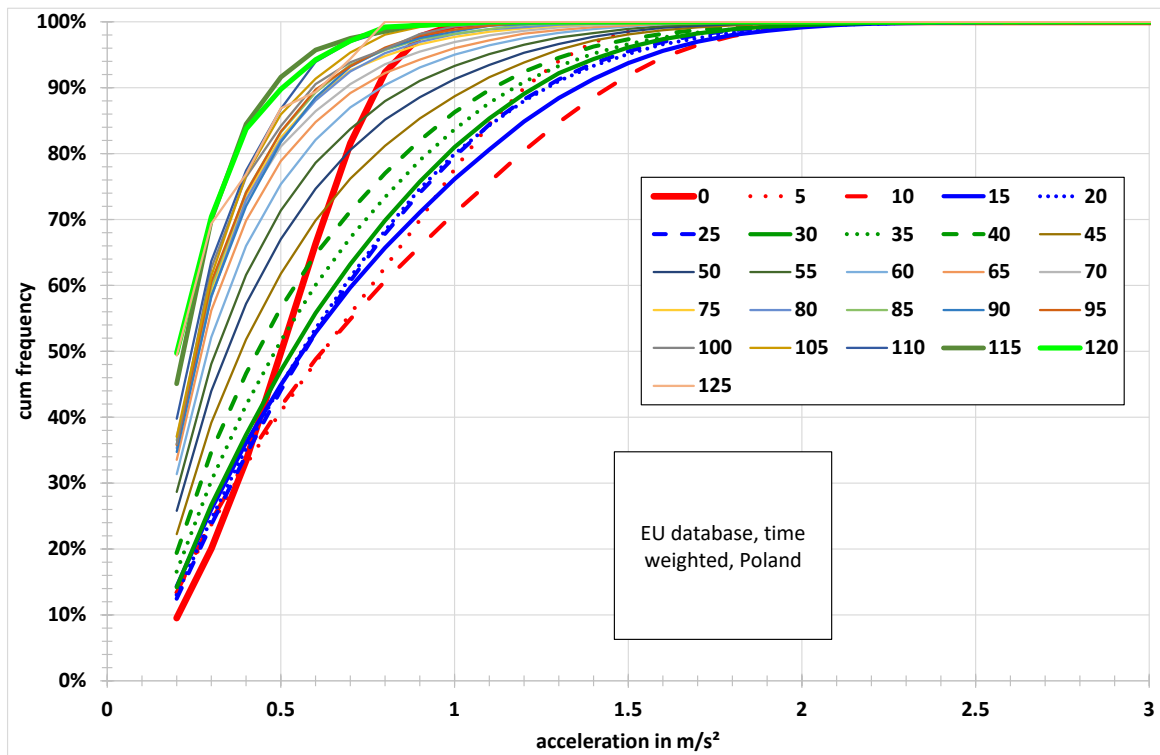


Figure 215: Acceleration distributions for vehicle speed classes, time weighted, Poland

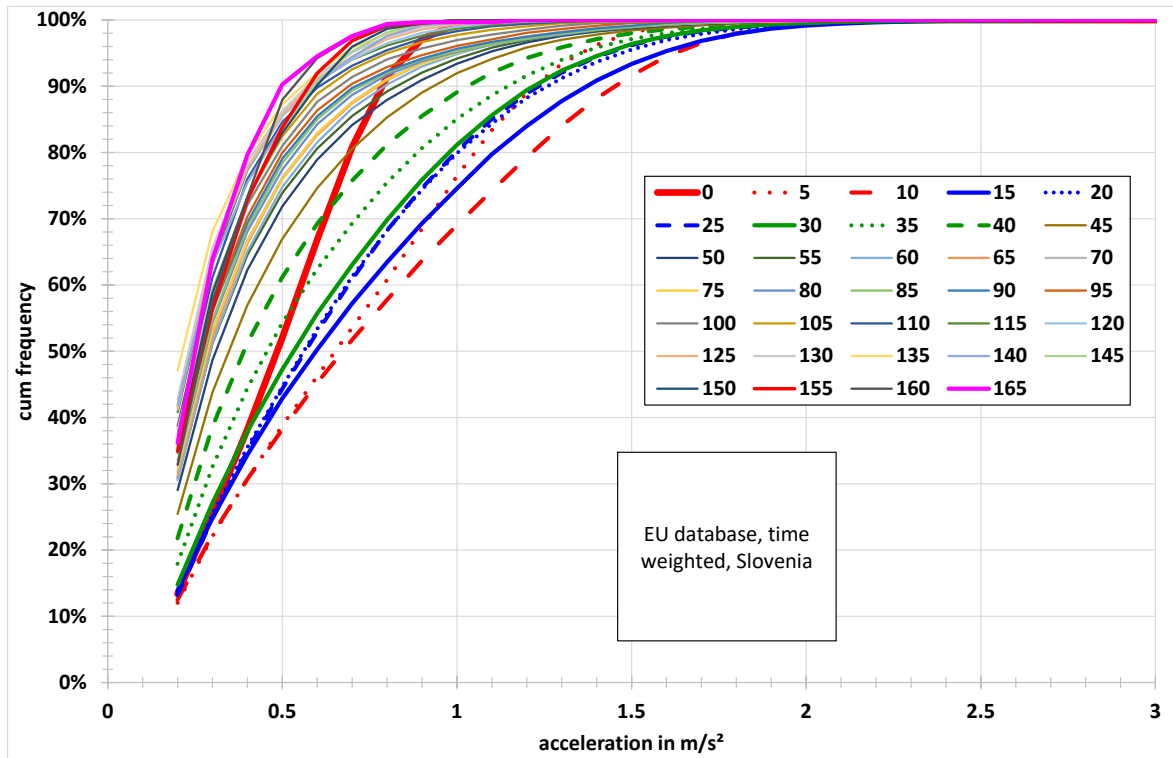


Figure 216: Acceleration distributions for vehicle speed classes, time weighted, Slovenia

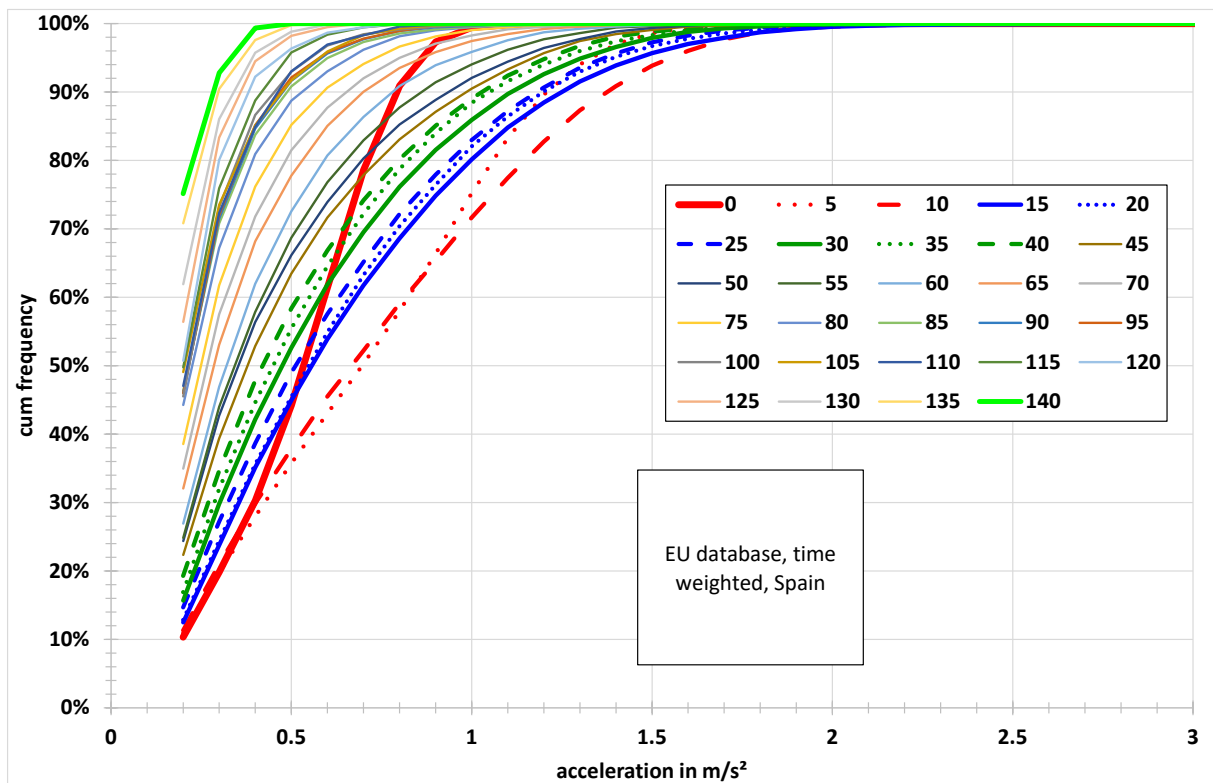


Figure 217: Acceleration distributions for vehicle speed classes, time weighted, Spain

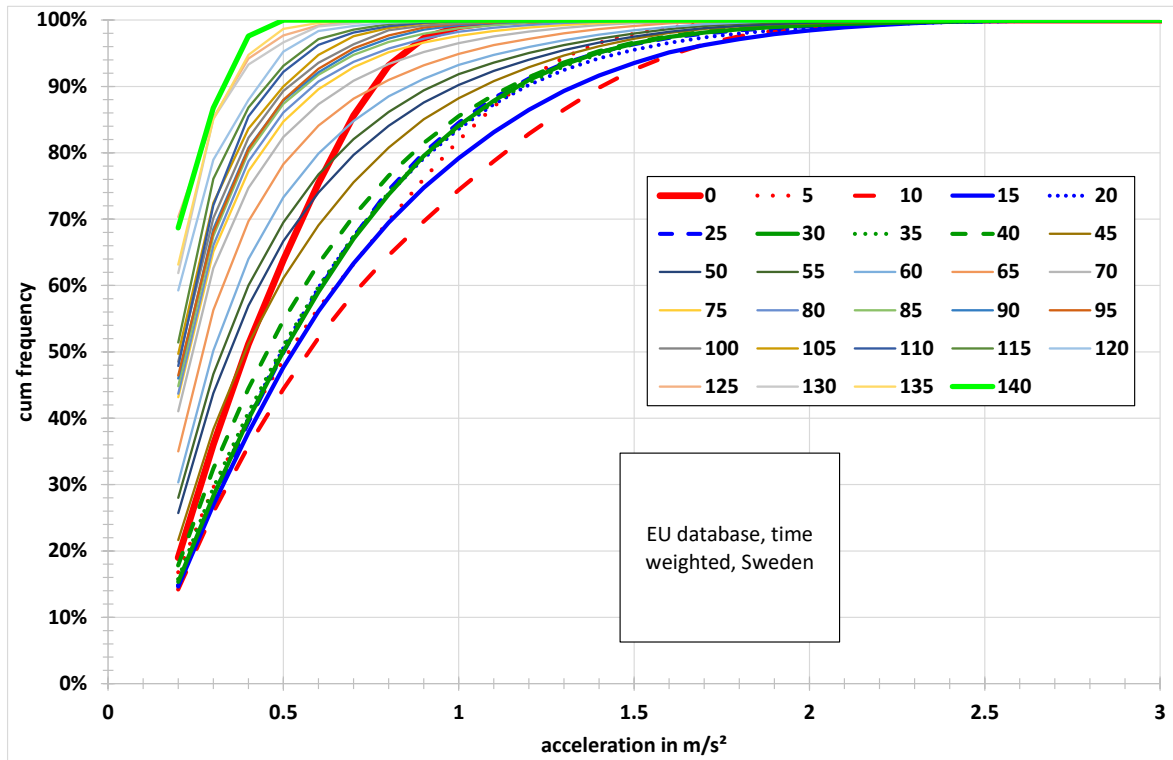


Figure 218: Acceleration distributions for vehicle speed classes, time weighted, Sweden

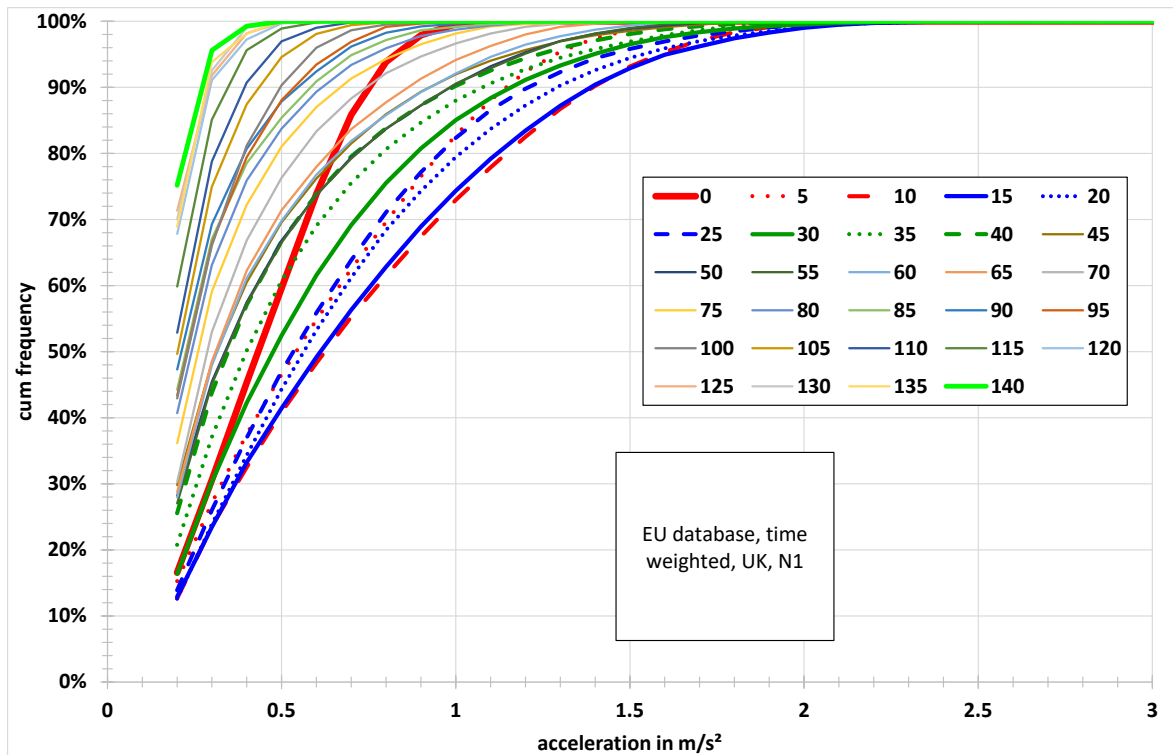


Figure 219: Acceleration distributions for vehicle speed classes, time weighted, UK, N1

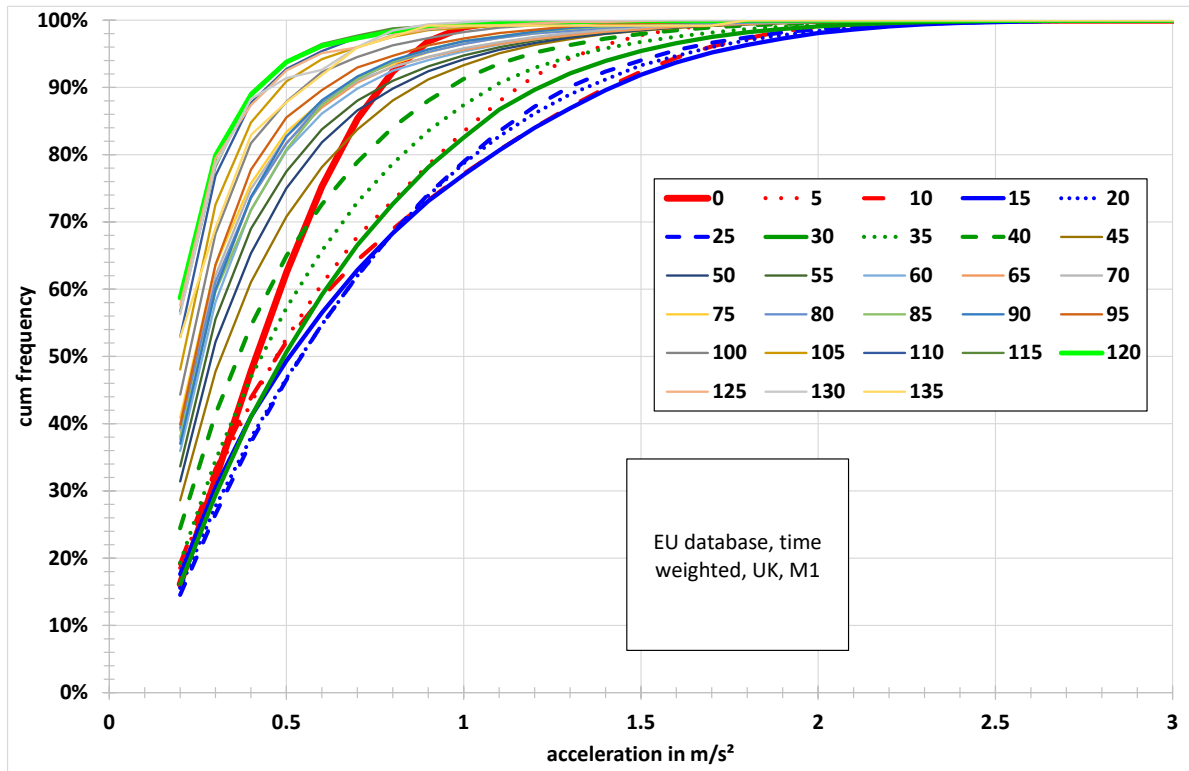


Figure 220: Acceleration distributions for vehicle speed classes, time weighted, UK, M1

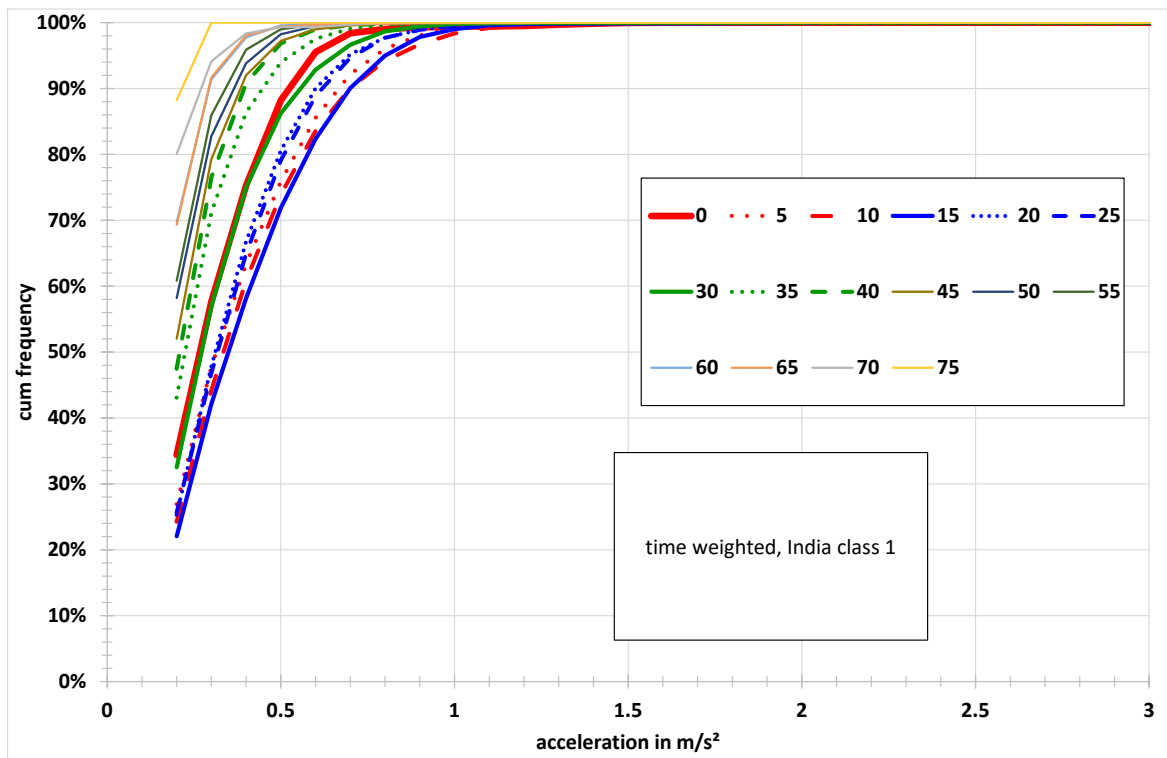


Figure 221: Acceleration distributions for vehicle speed classes, time weighted, India class 1

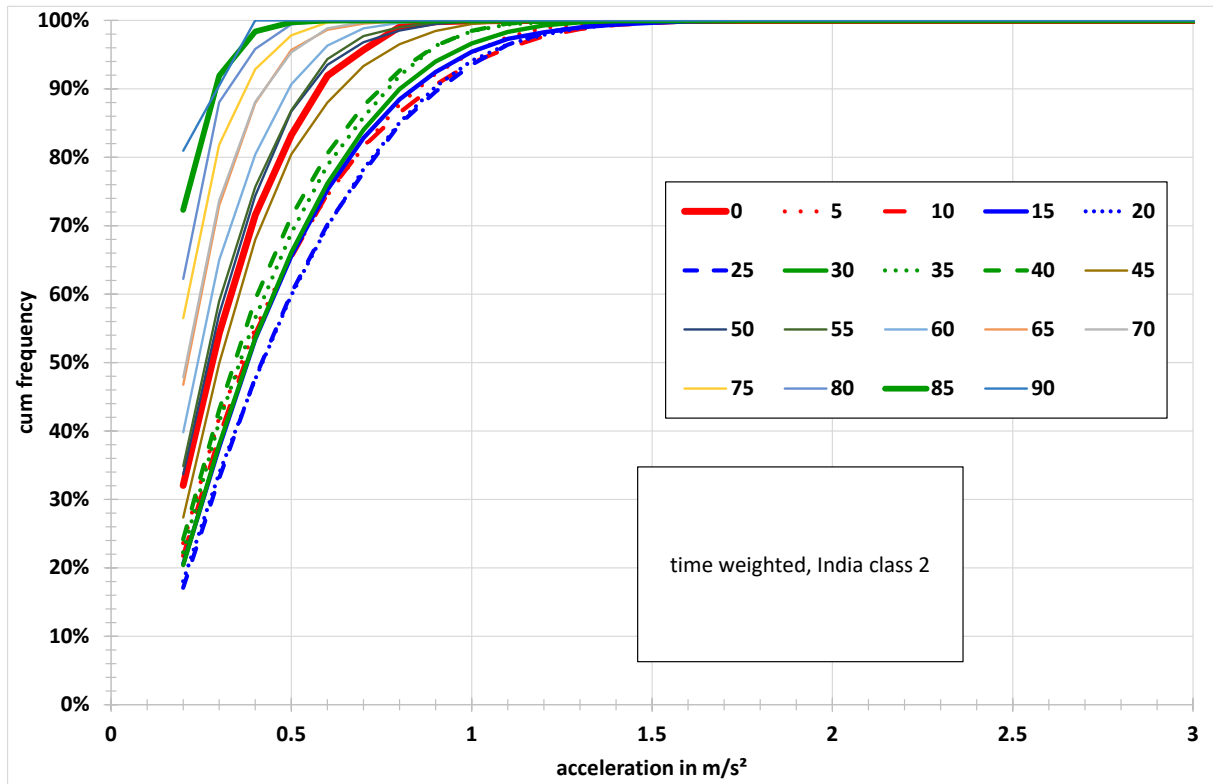


Figure 222: Acceleration distributions for vehicle speed classes, time weighted, India class 2

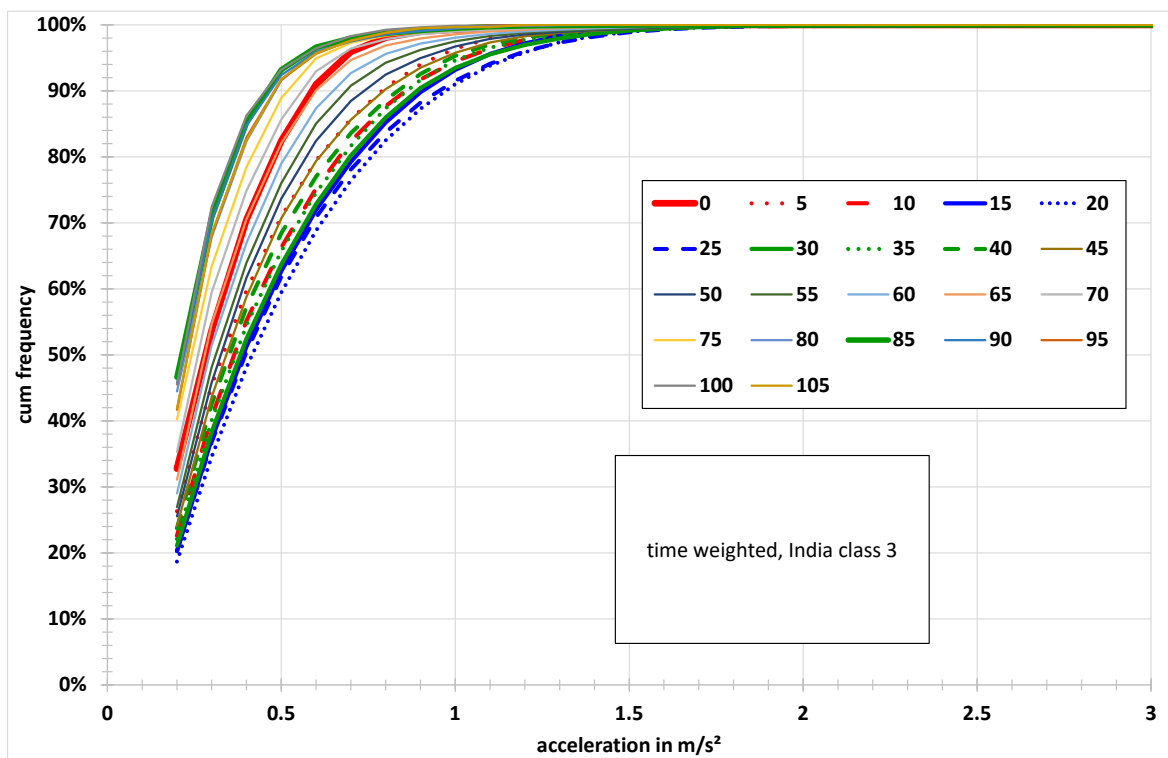


Figure 223: Acceleration distributions for vehicle speed classes, time weighted, India class 3

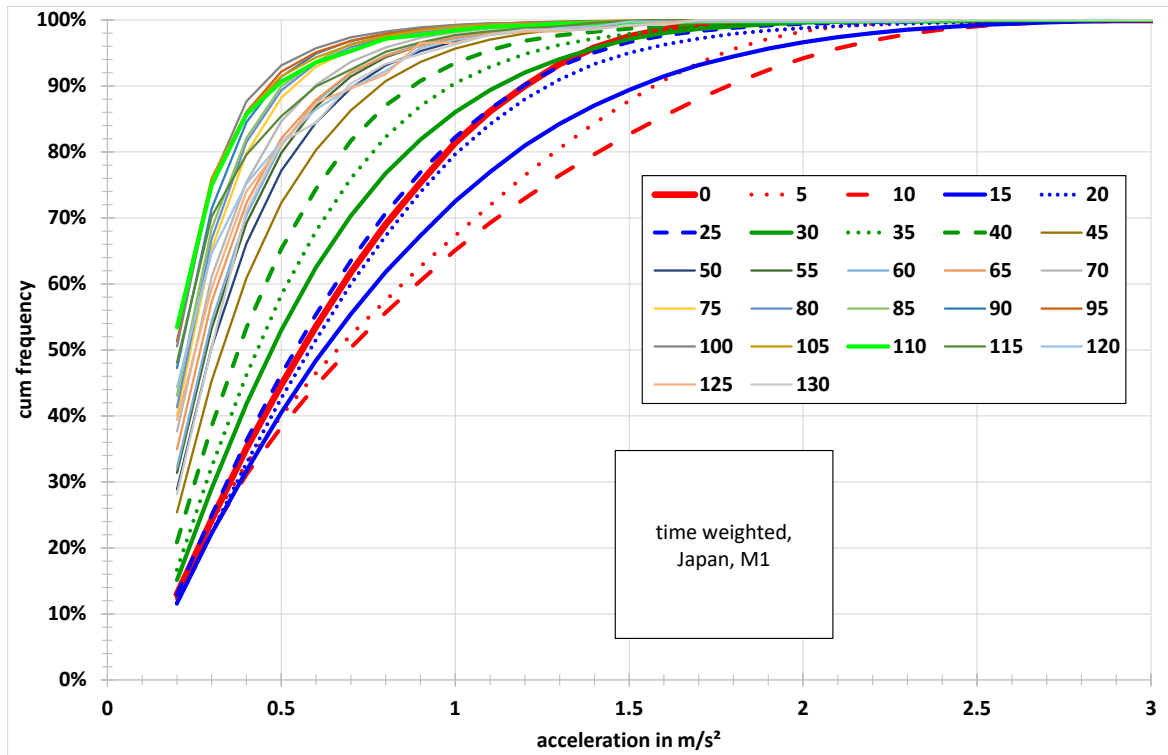


Figure 224: Acceleration distributions for vehicle speed classes, time weighted, Japan M1

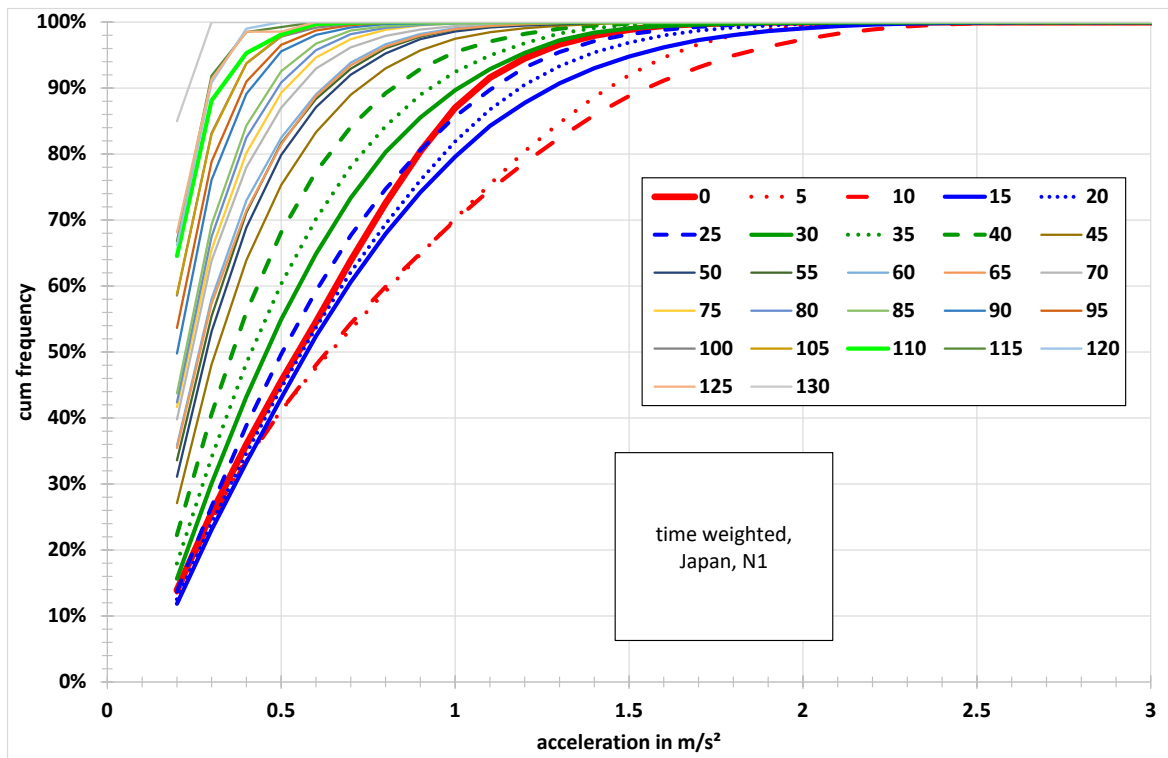


Figure 225: Acceleration distributions for vehicle speed classes, time weighted, Japan N1

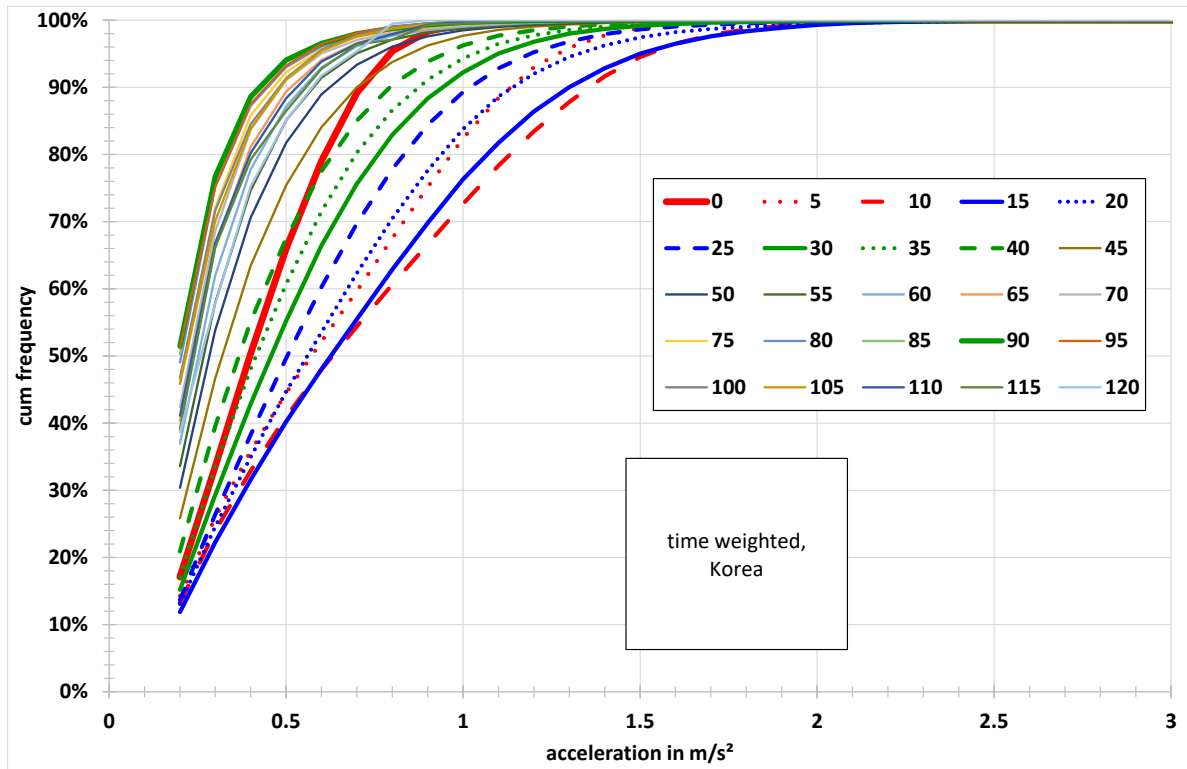


Figure 226: Acceleration distributions for vehicle speed classes, time weighted, Korea

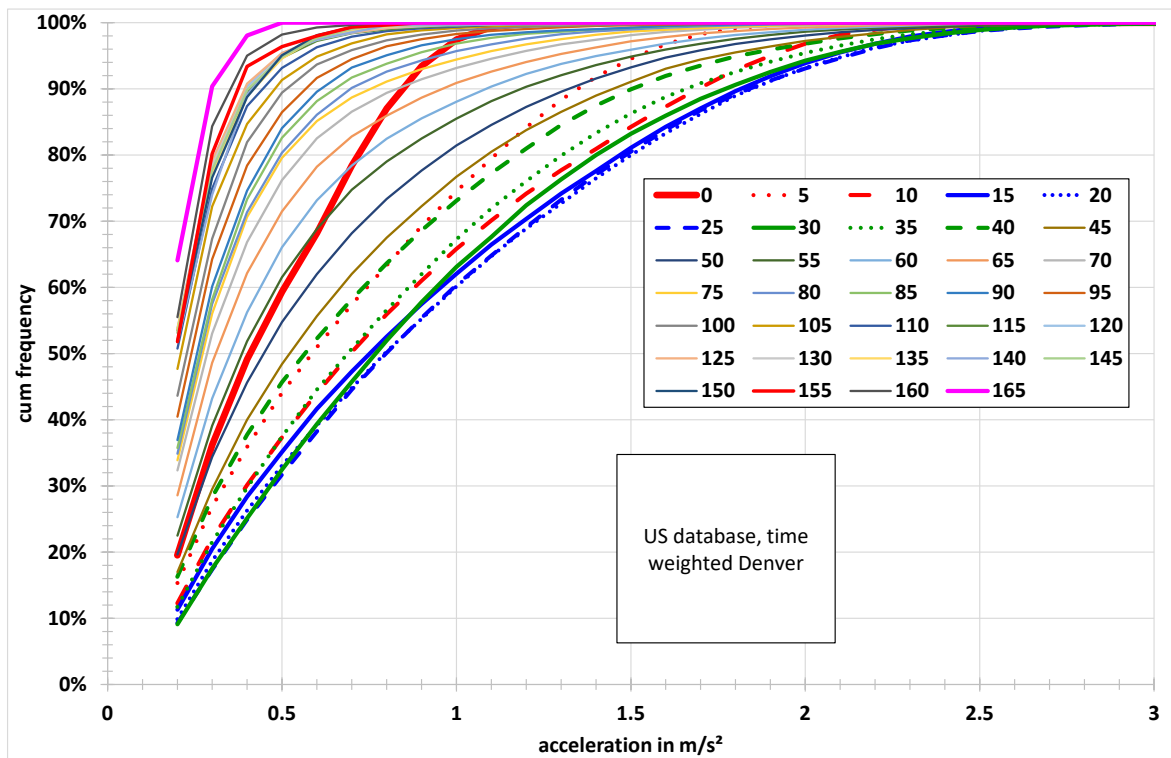


Figure 227: Acceleration distributions for vehicle speed classes, time weighted, USA, Denver

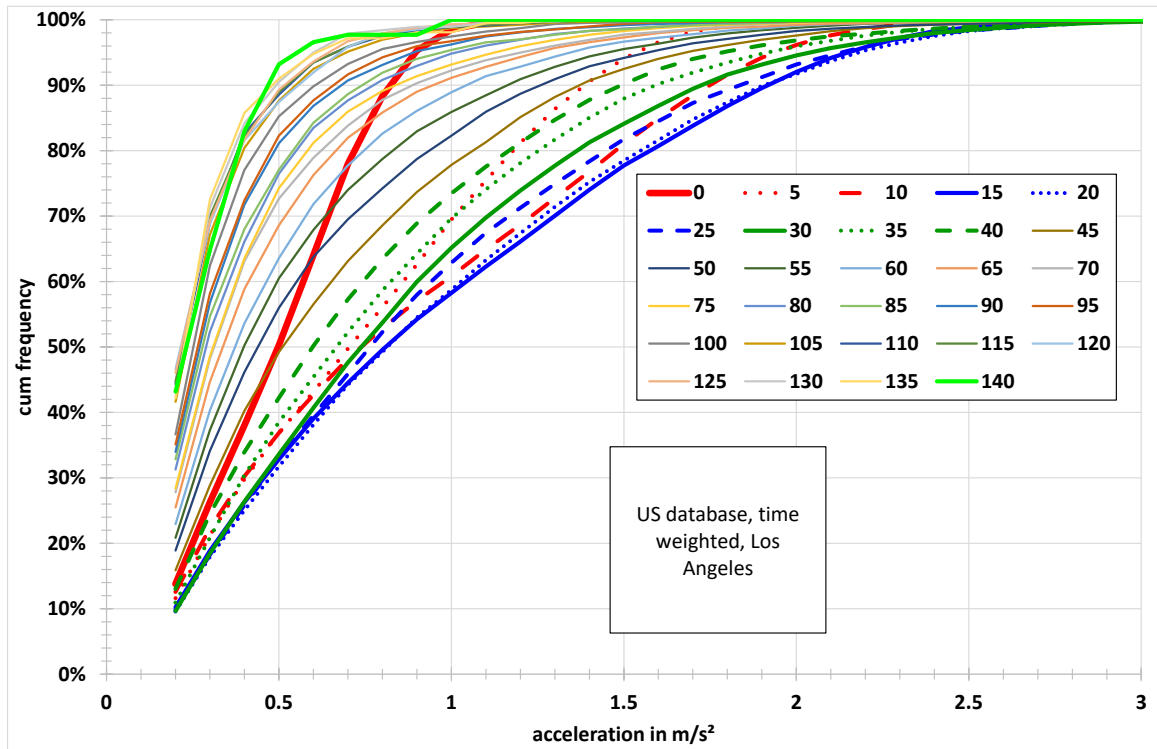


Figure 228: Acceleration distributions for vehicle speed classes, time weighted, USA, Los Angeles

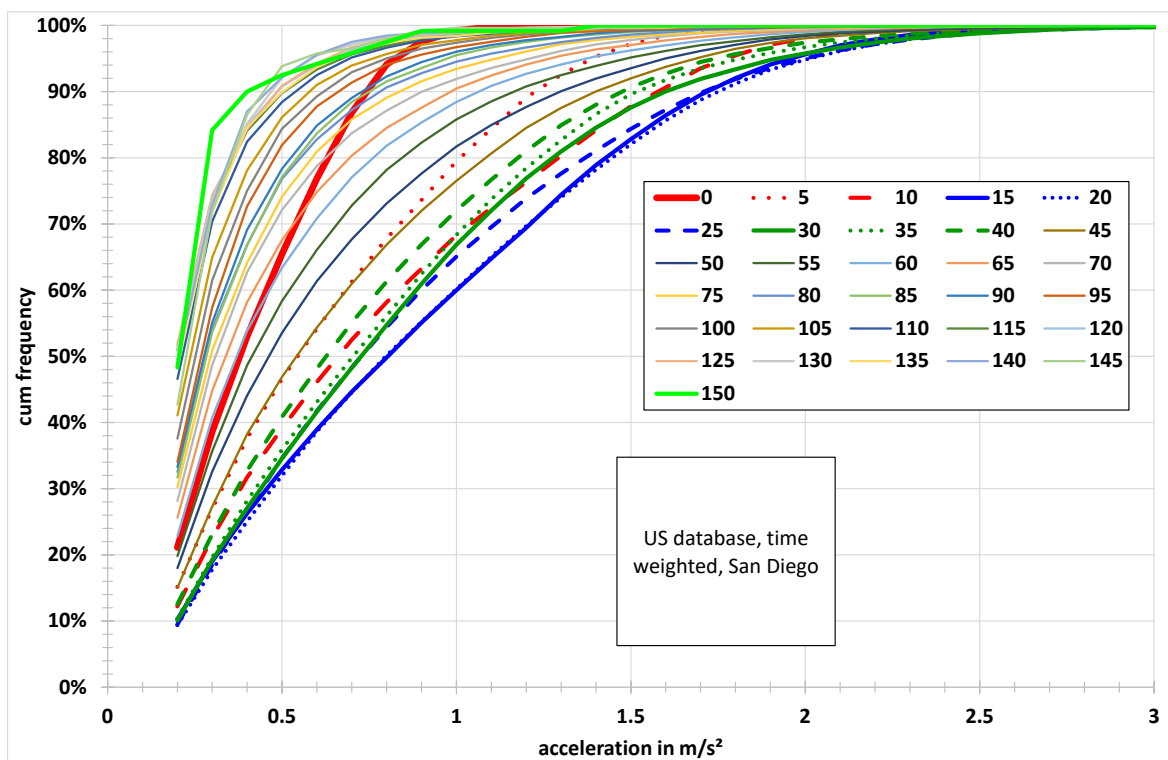




Figure 229: Acceleration distributions for vehicle speed classes, time weighted, USA, San Diego

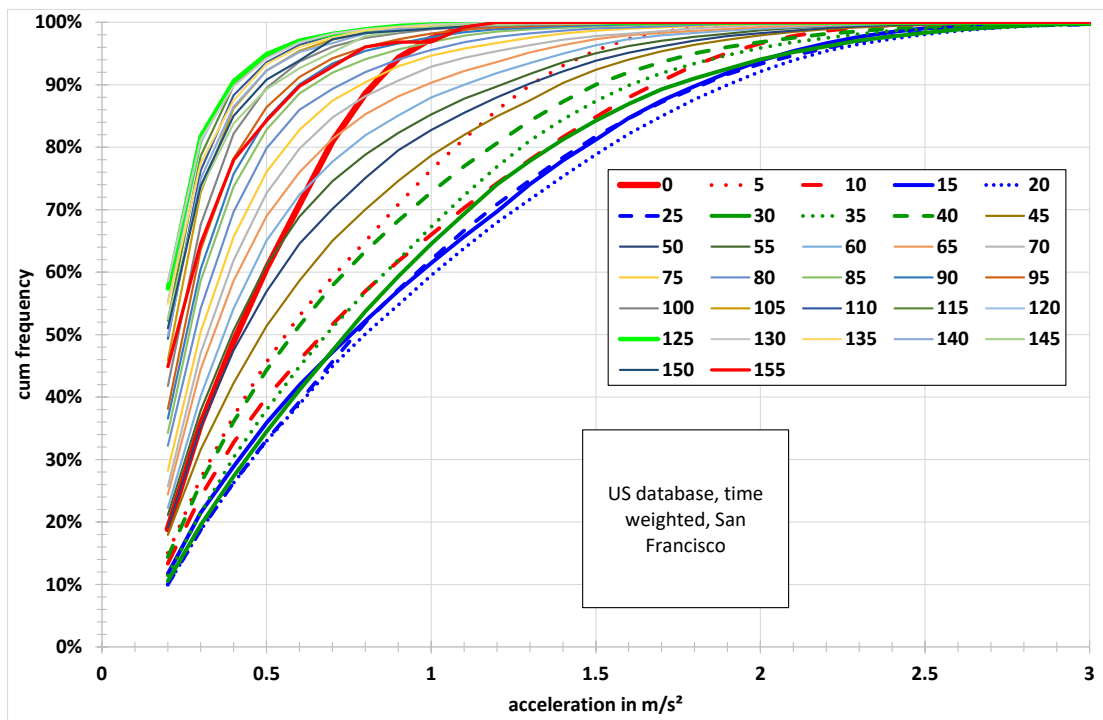


Figure 230: Acceleration distributions for vehicle speed classes, time weighted, USA, San Francisco



13.2 Distance weighted

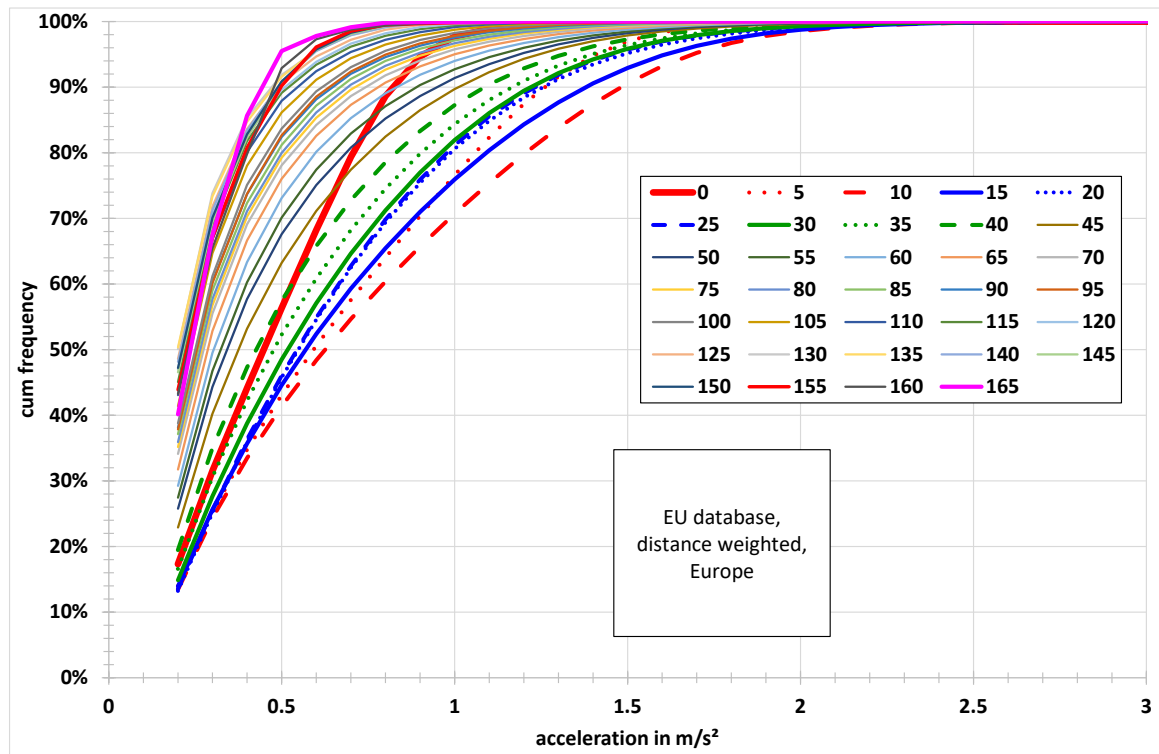


Figure 231: Acceleration distributions for vehicle speed classes, distance weighted, Europe

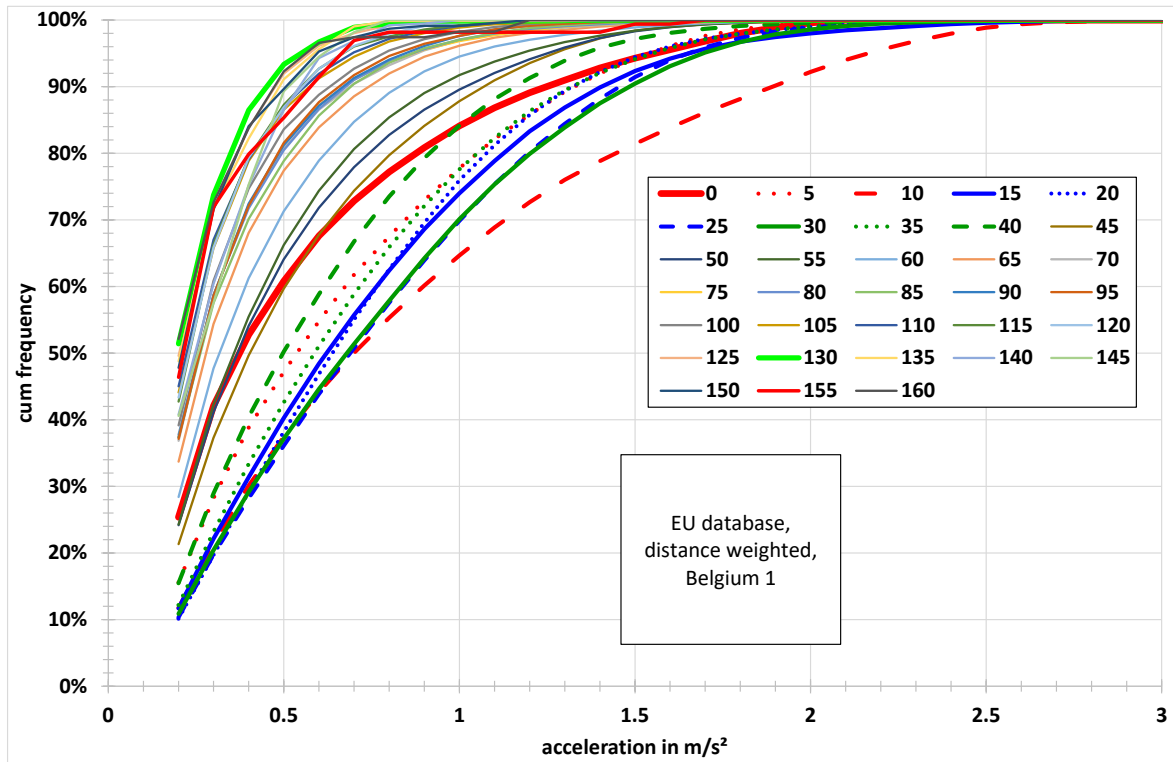


Figure 232: Acceleration distributions for vehicle speed classes, distance weighted, Belgium 1

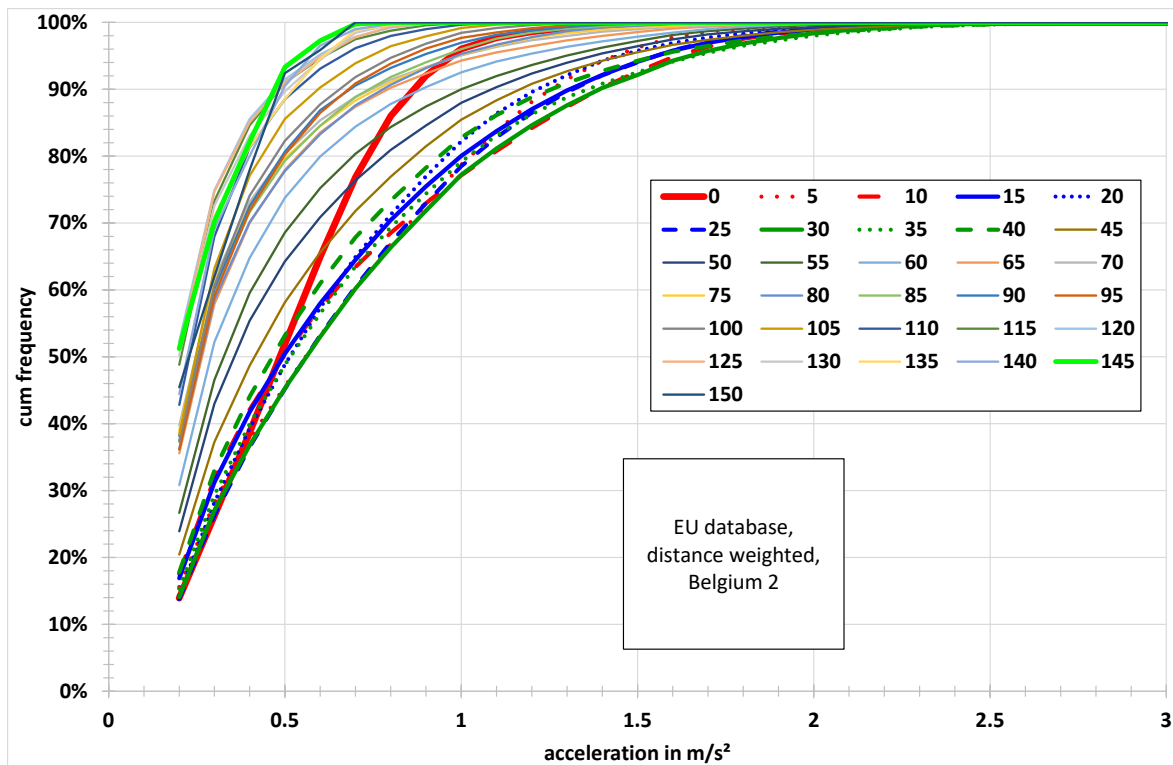


Figure 233: Acceleration distributions for vehicle speed classes, distance weighted, Belgium 2

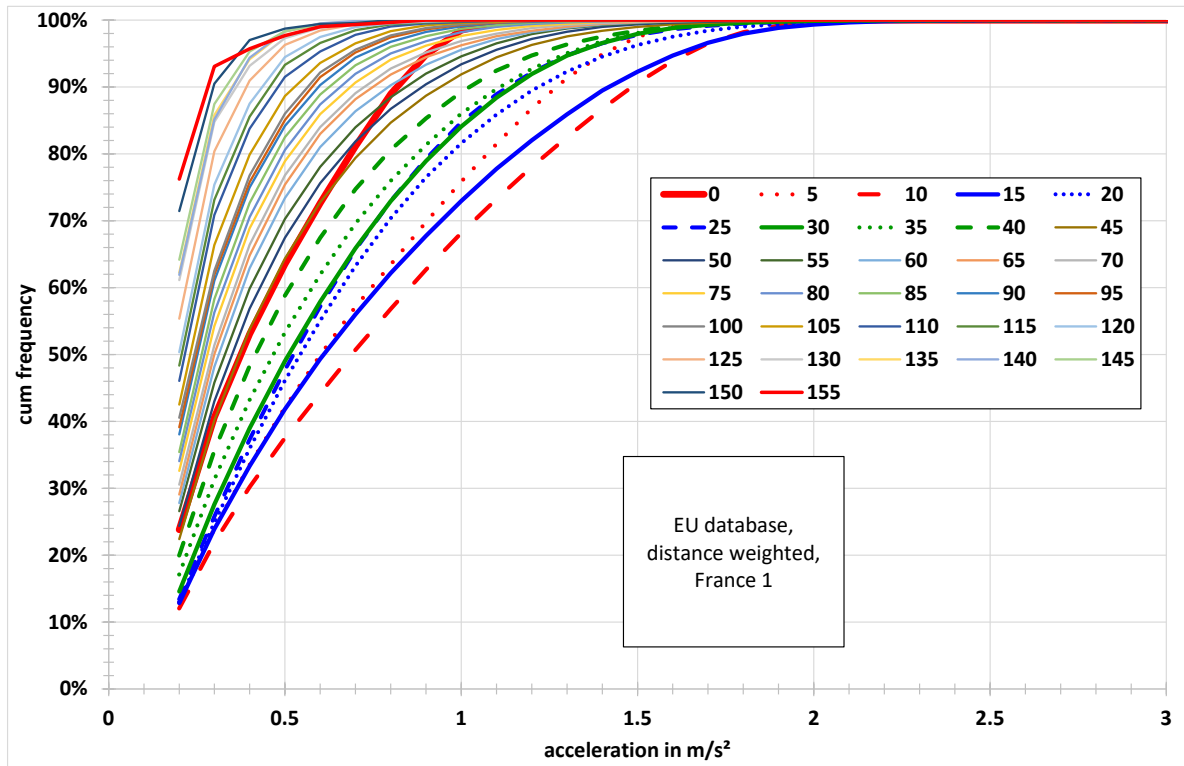


Figure 234: Acceleration distributions for vehicle speed classes, distance weighted, France 1

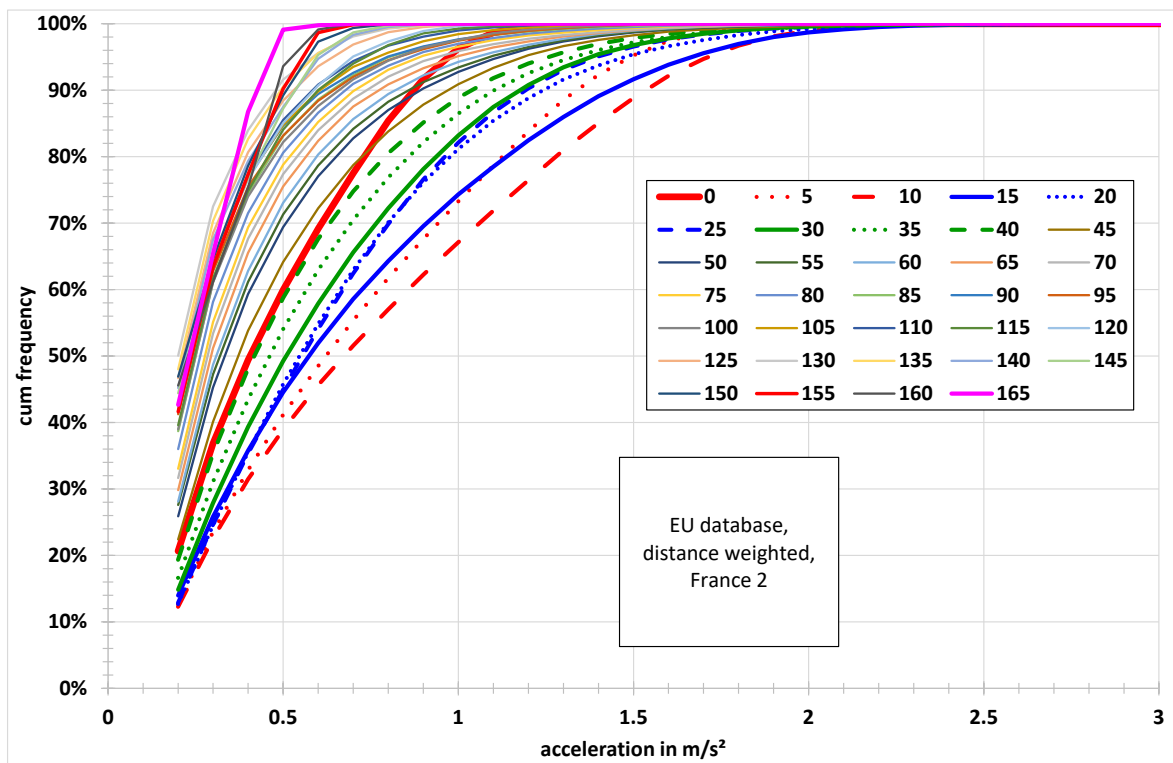


Figure 235: Acceleration distributions for vehicle speed classes, distance weighted, France 2

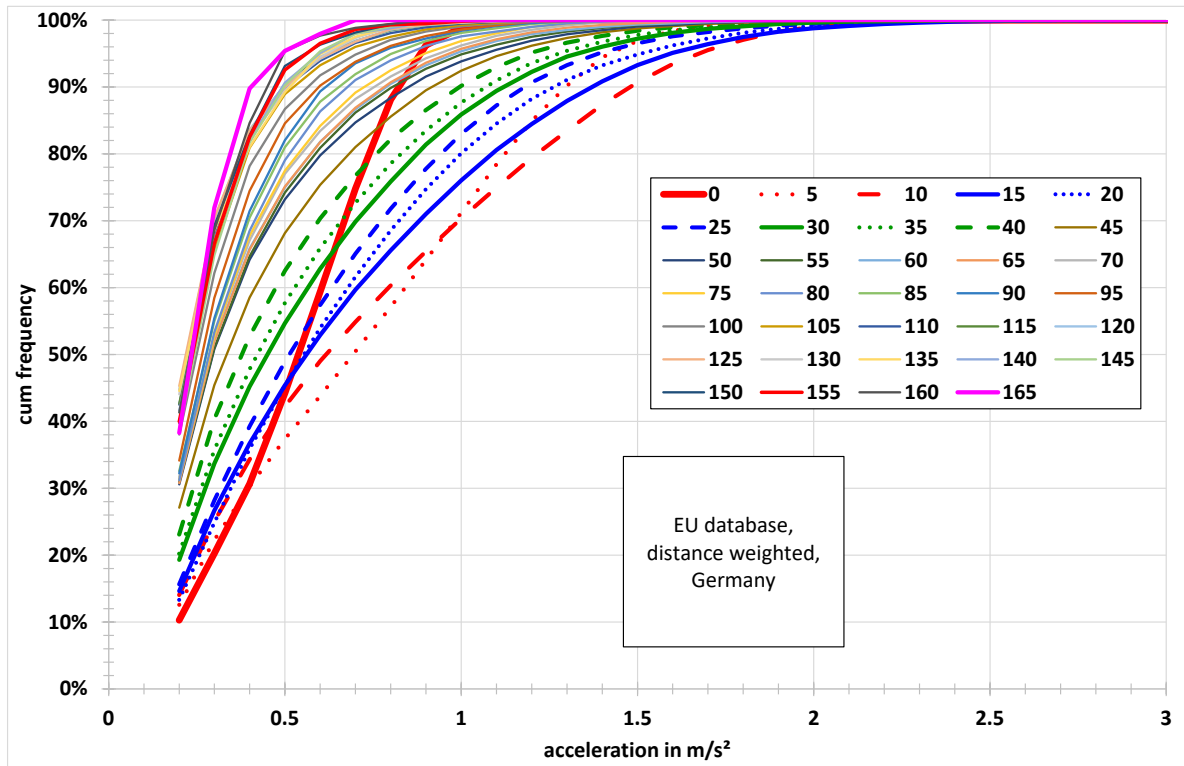


Figure 236: Acceleration distributions for vehicle speed classes, distance weighted, Germany

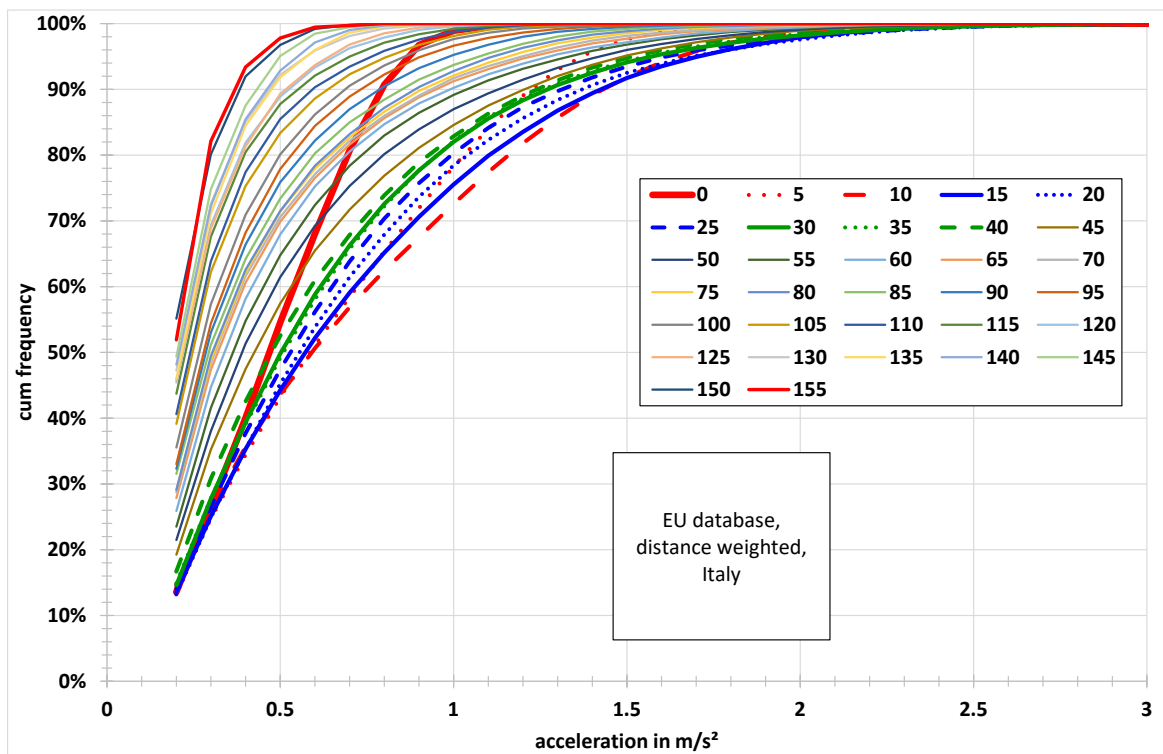


Figure 237: Acceleration distributions for vehicle speed classes, distance weighted, Italy

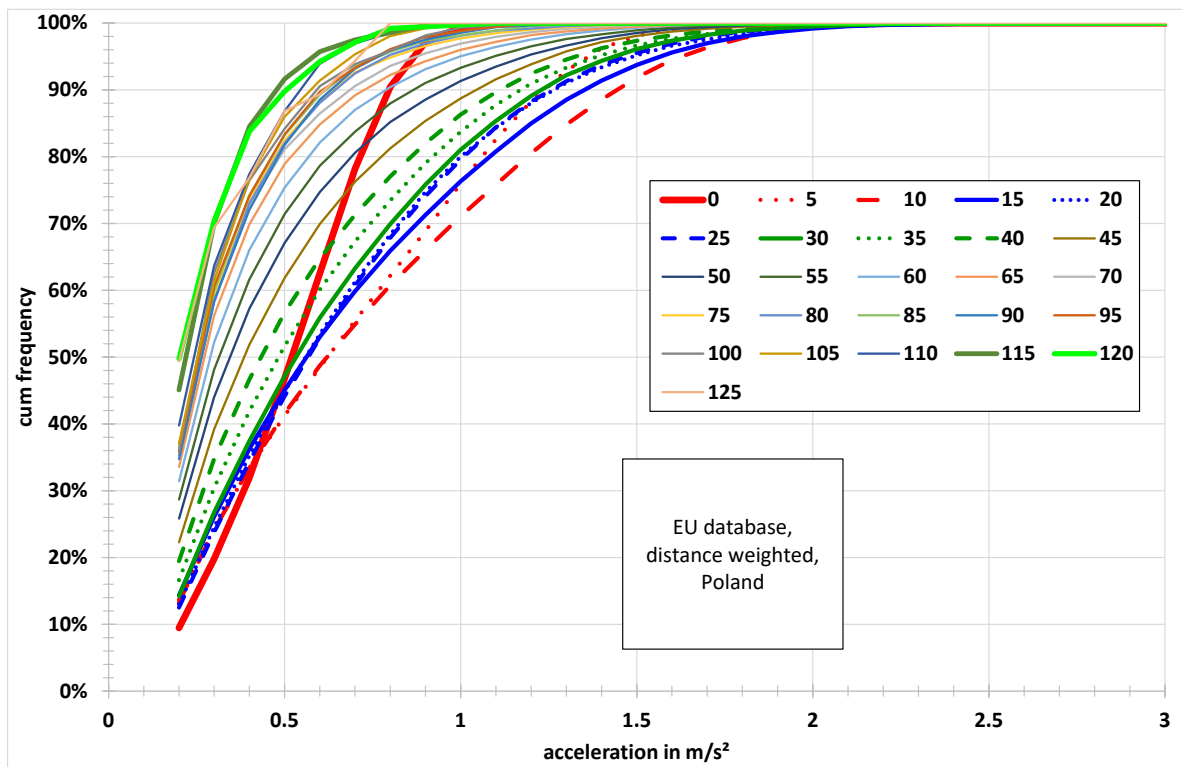


Figure 238: Acceleration distributions for vehicle speed classes, distance weighted, Poland

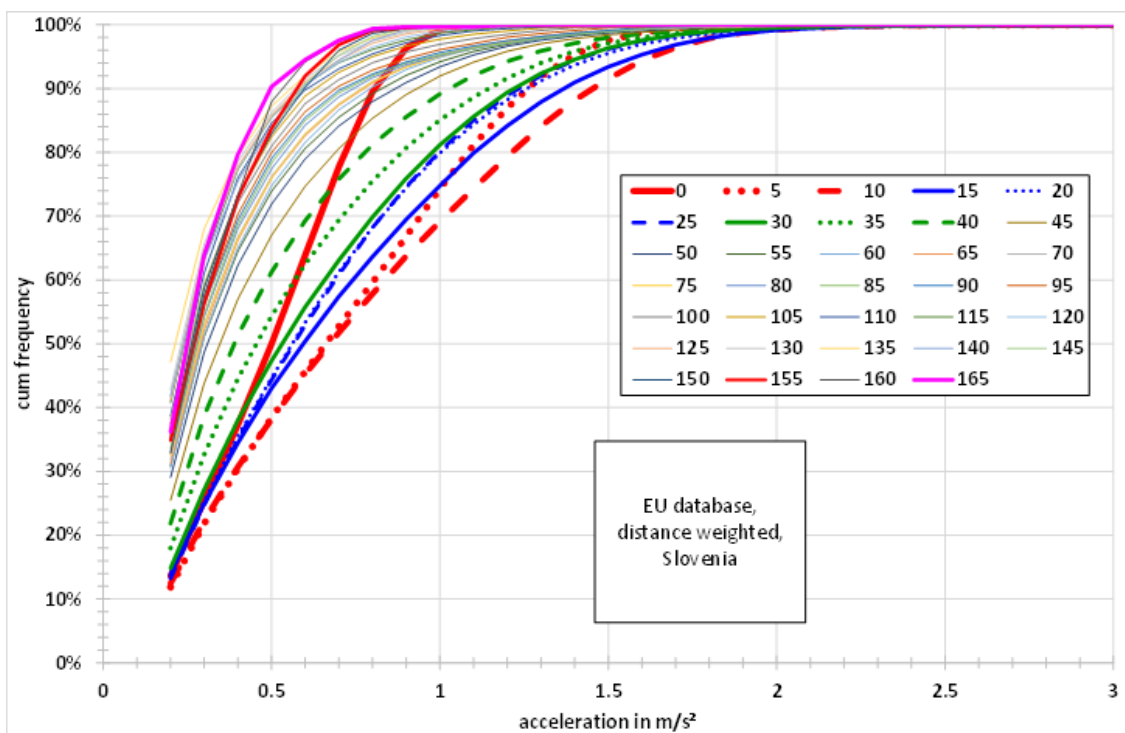


Figure 239: Acceleration distributions for vehicle speed classes, distance weighted, Slovenia

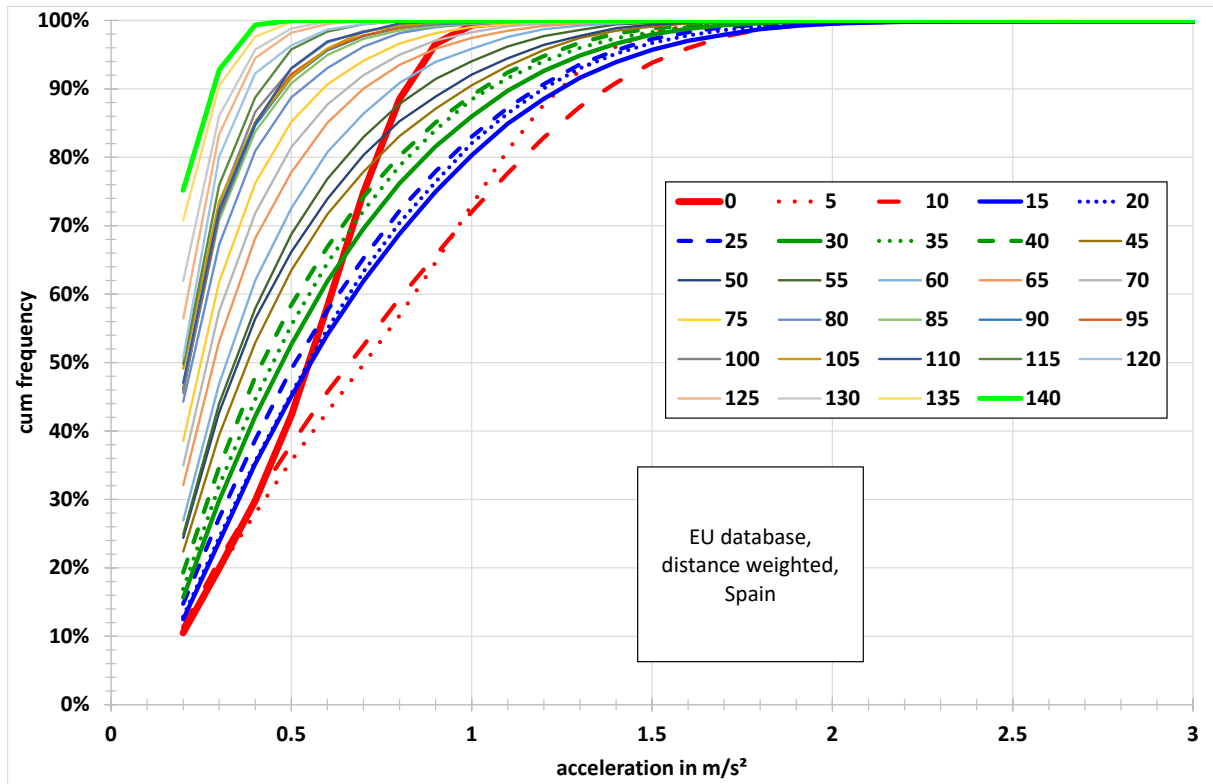


Figure 240: Acceleration distributions for vehicle speed classes, distance weighted, Spain

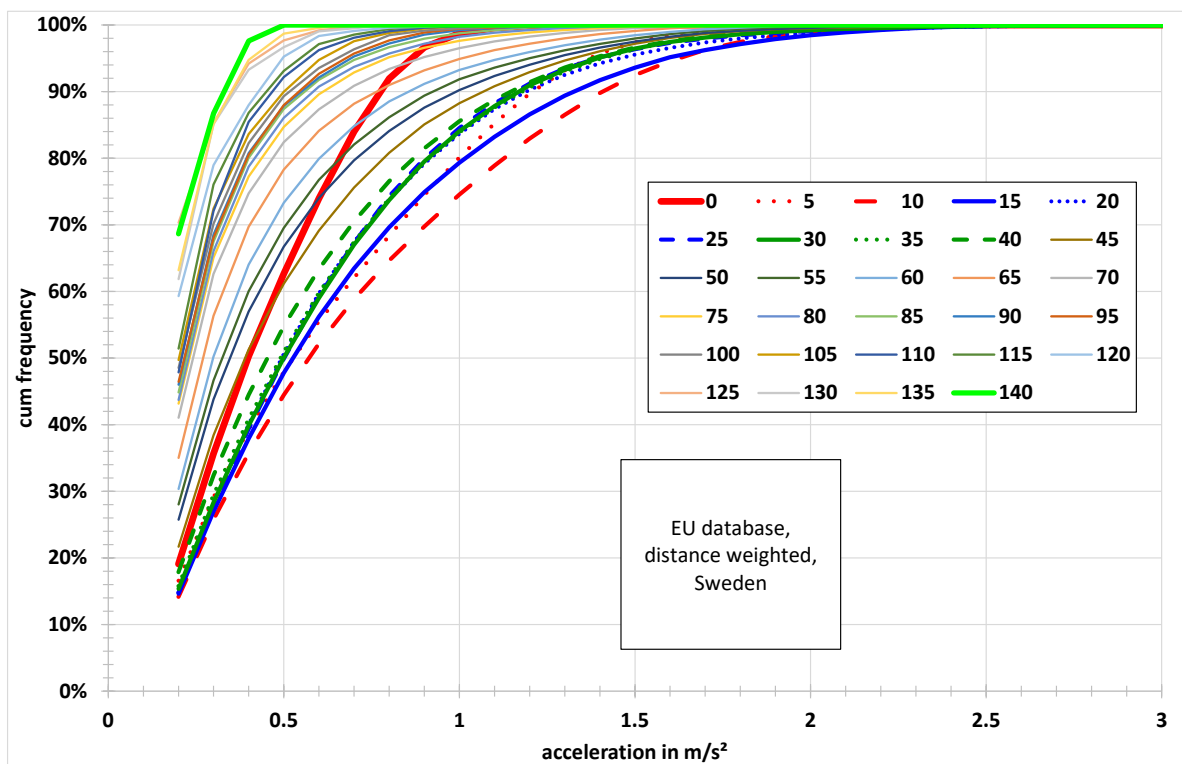




Figure 241: Acceleration distributions for vehicle speed classes, distance weighted, Sweden

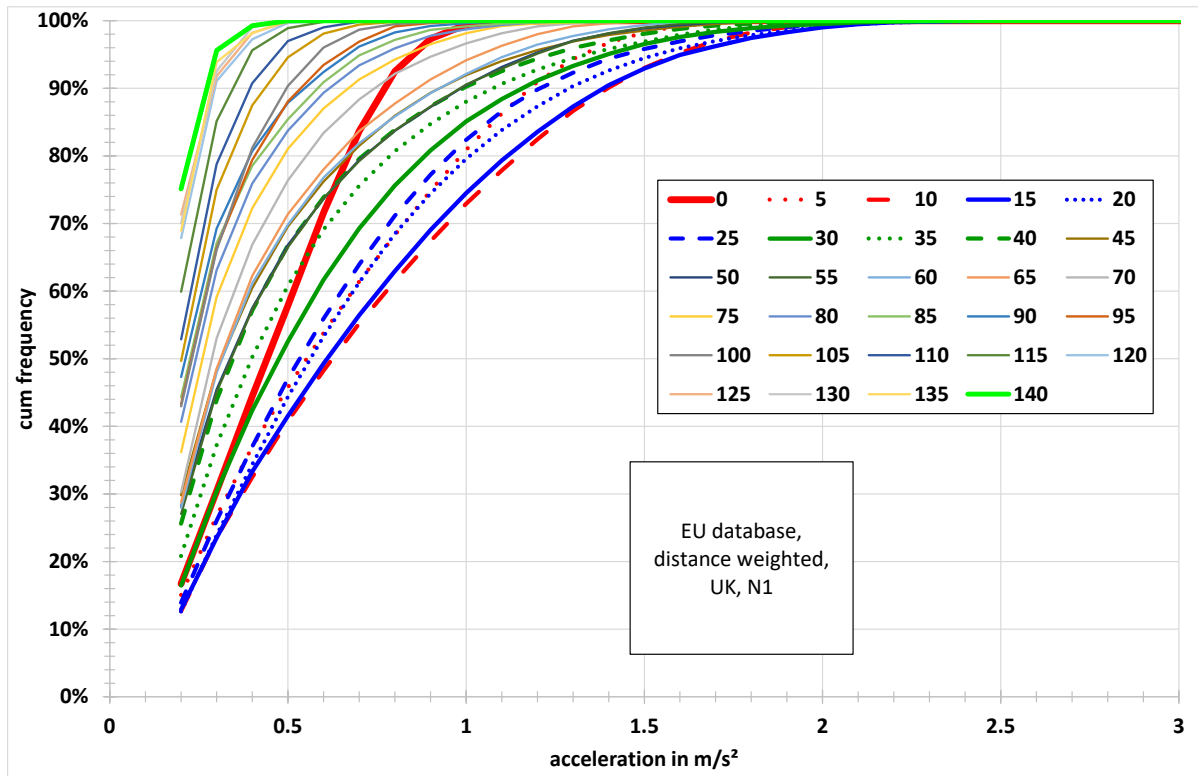


Figure 242: Acceleration distributions for vehicle speed classes, distance weighted, UK, N1

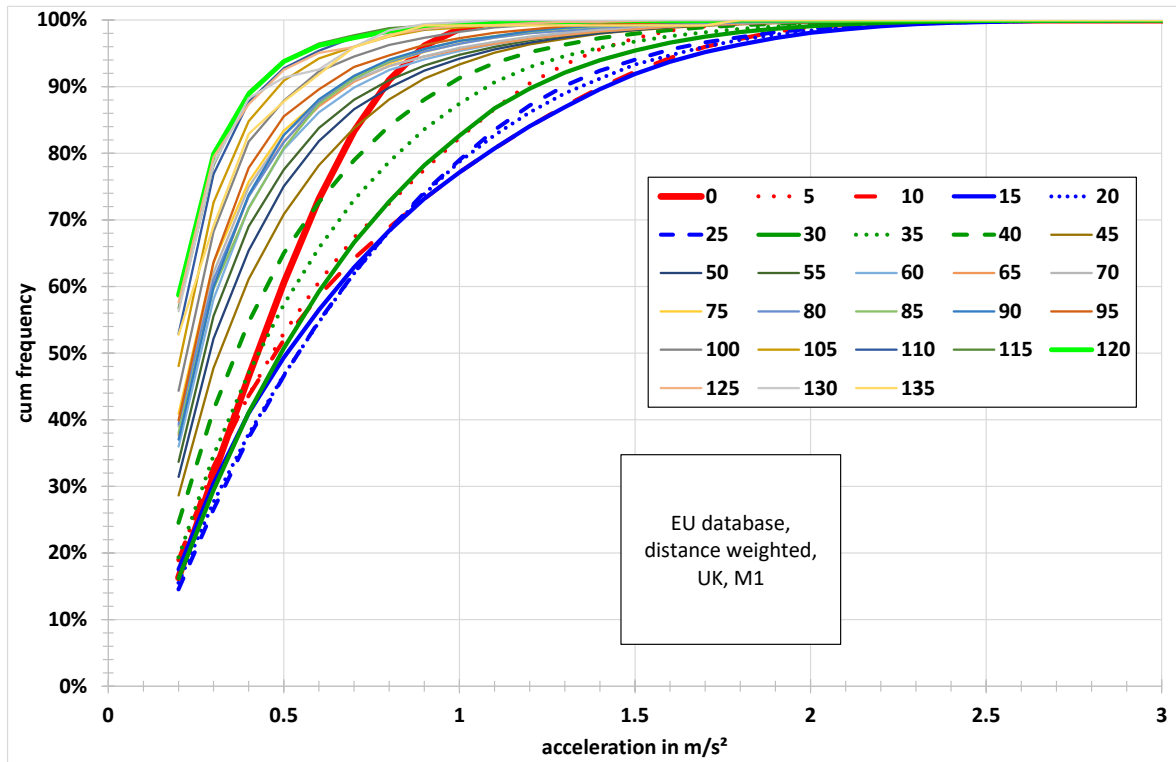


Figure 243: Acceleration distributions for vehicle speed classes, distance weighted, UK, M1

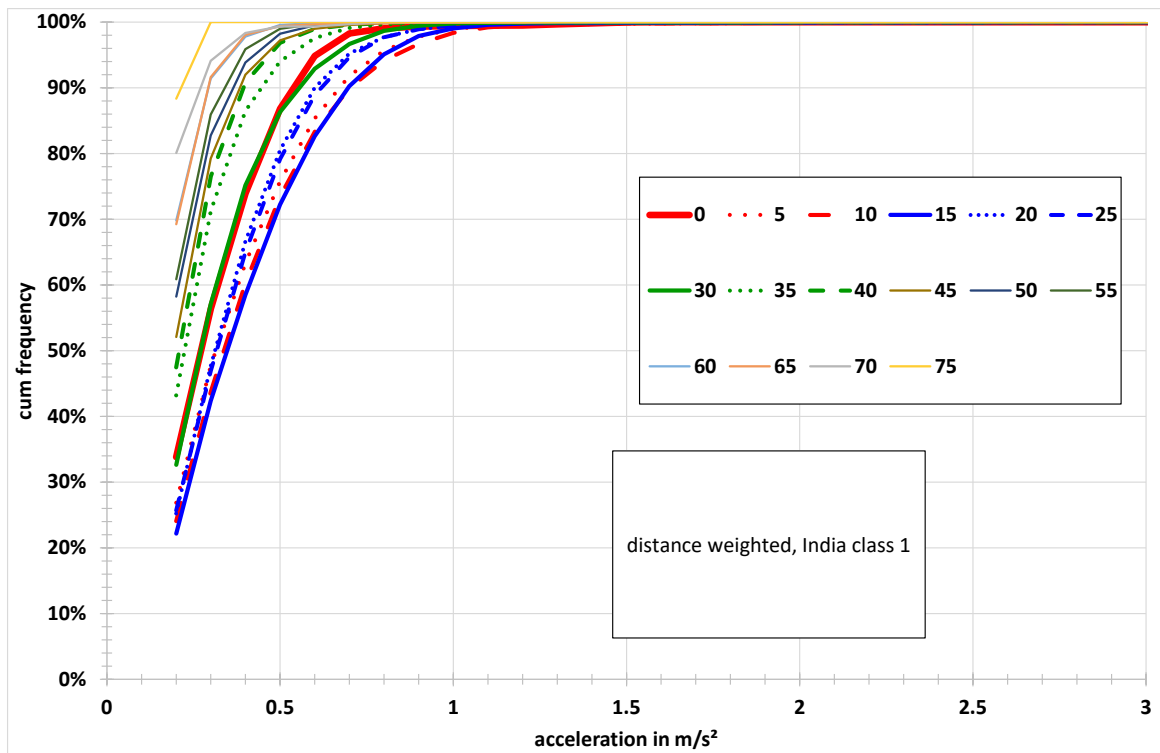


Figure 244: Acceleration distributions for vehicle speed classes, dist. weighted, India class 1

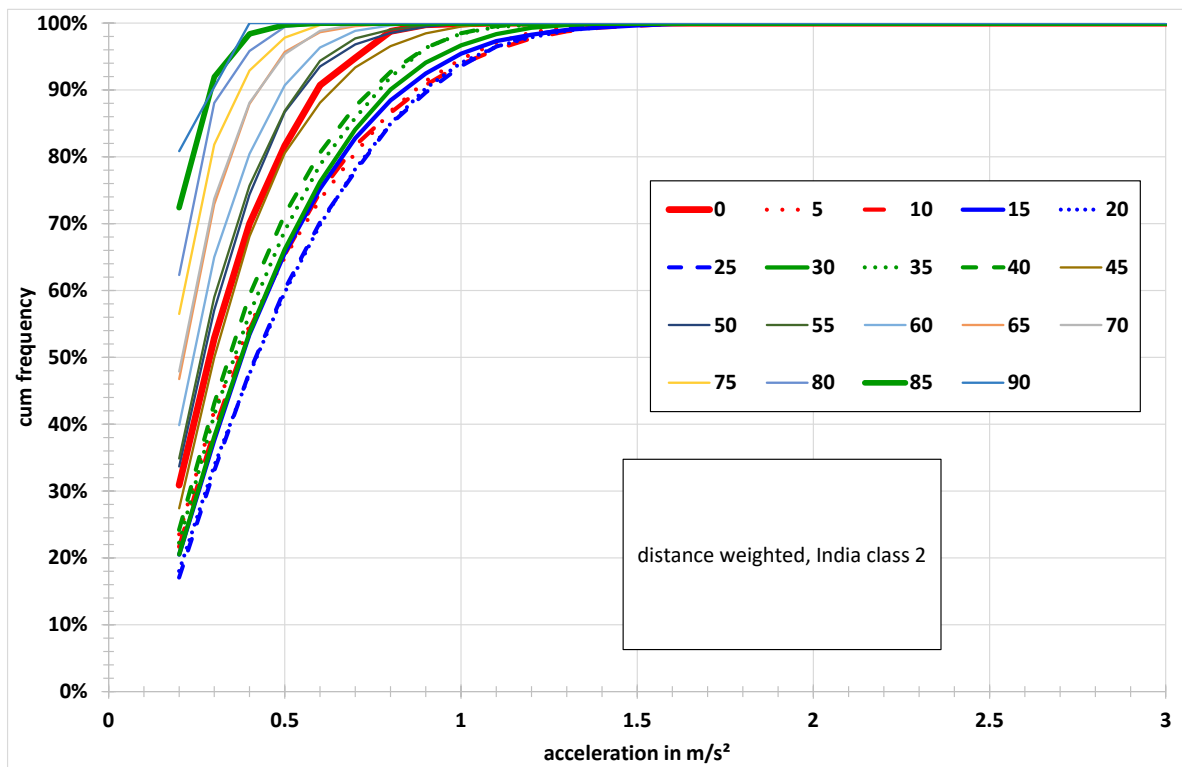


Figure 245: Acceleration distributions for vehicle speed classes, dist. weighted, India class 2

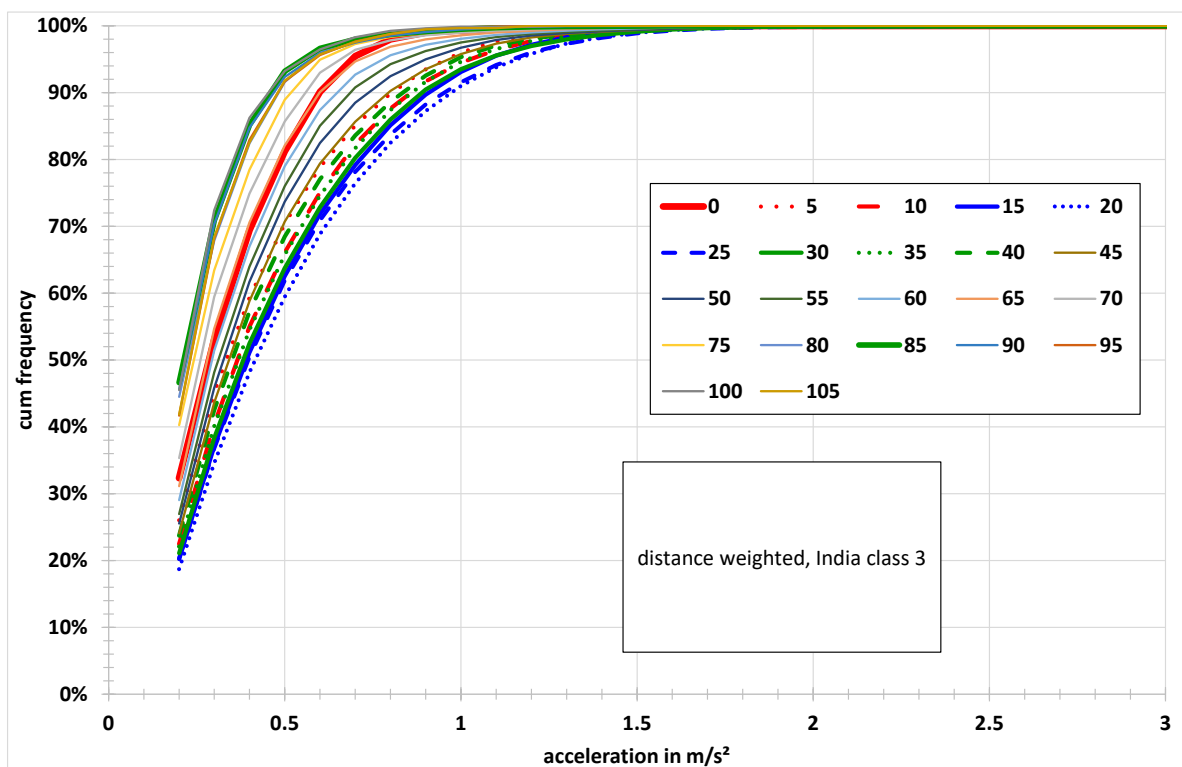


Figure 246: Acceleration distributions for vehicle speed classes, dist. weighted, India class 3

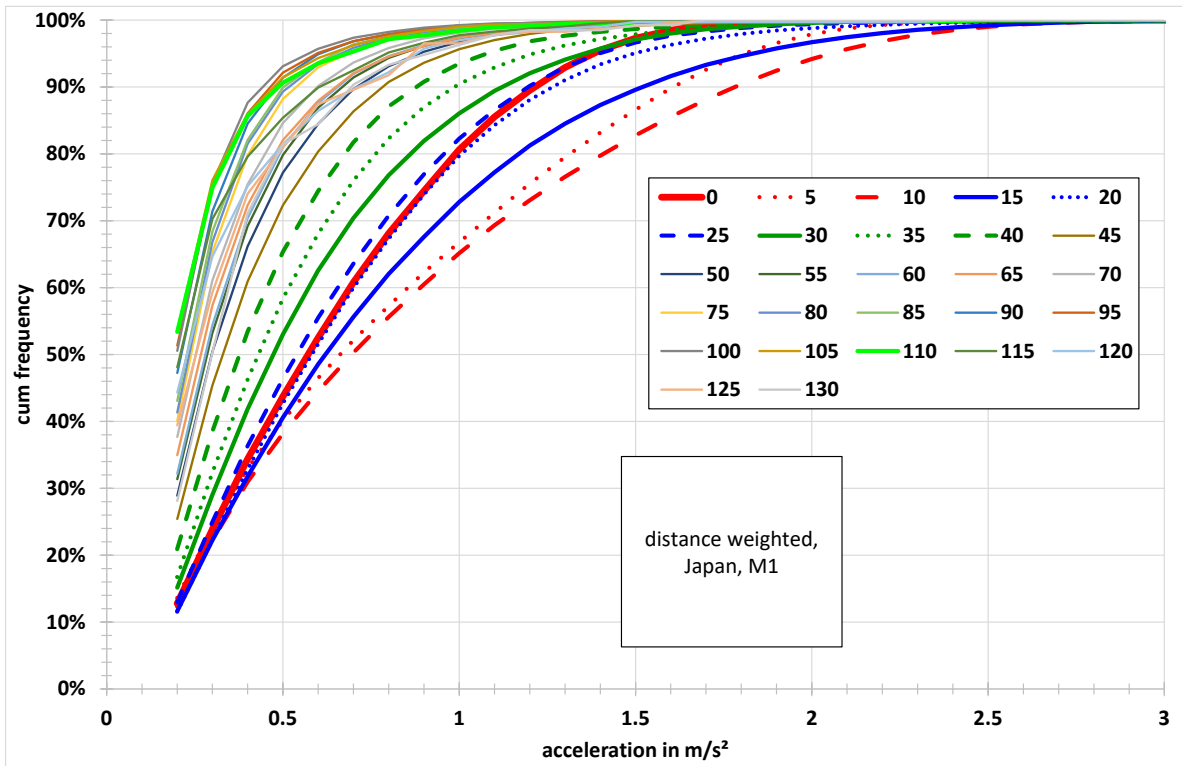


Figure 247: Acceleration distributions for vehicle speed classes, distance weighted, Japan M1

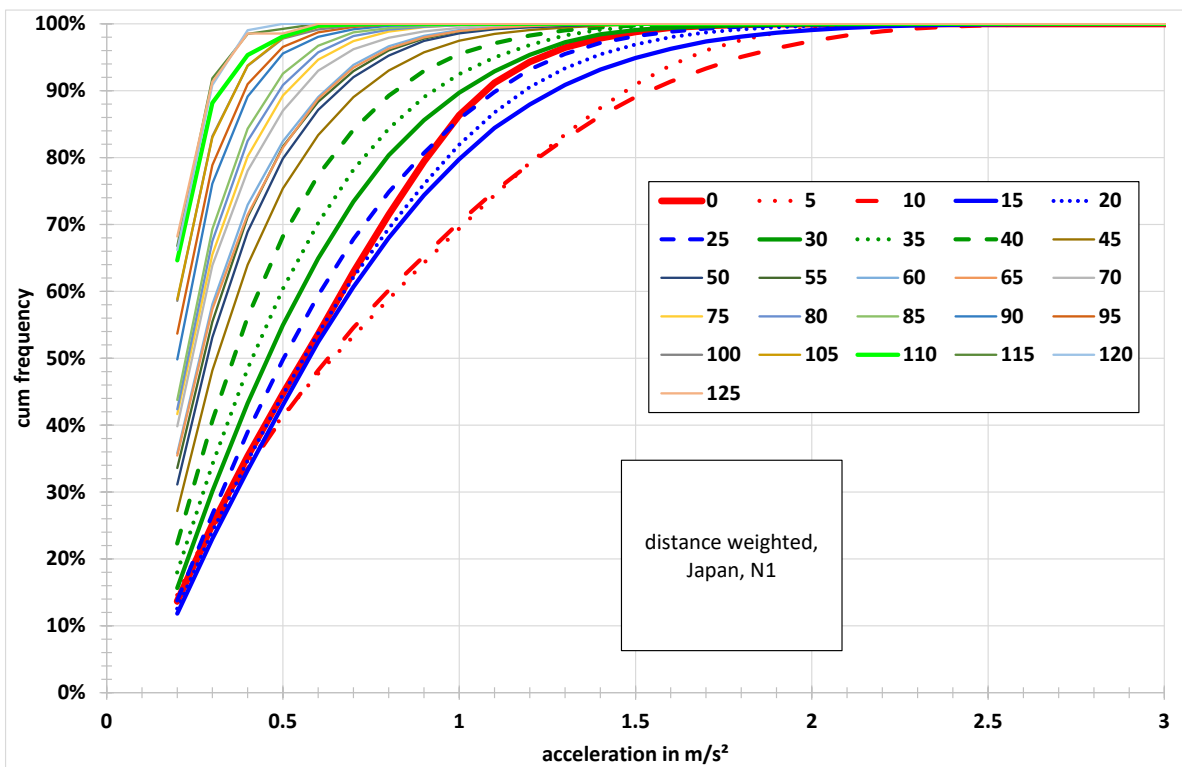


Figure 248: Acceleration distributions for vehicle speed classes, distance weighted, Japan N1

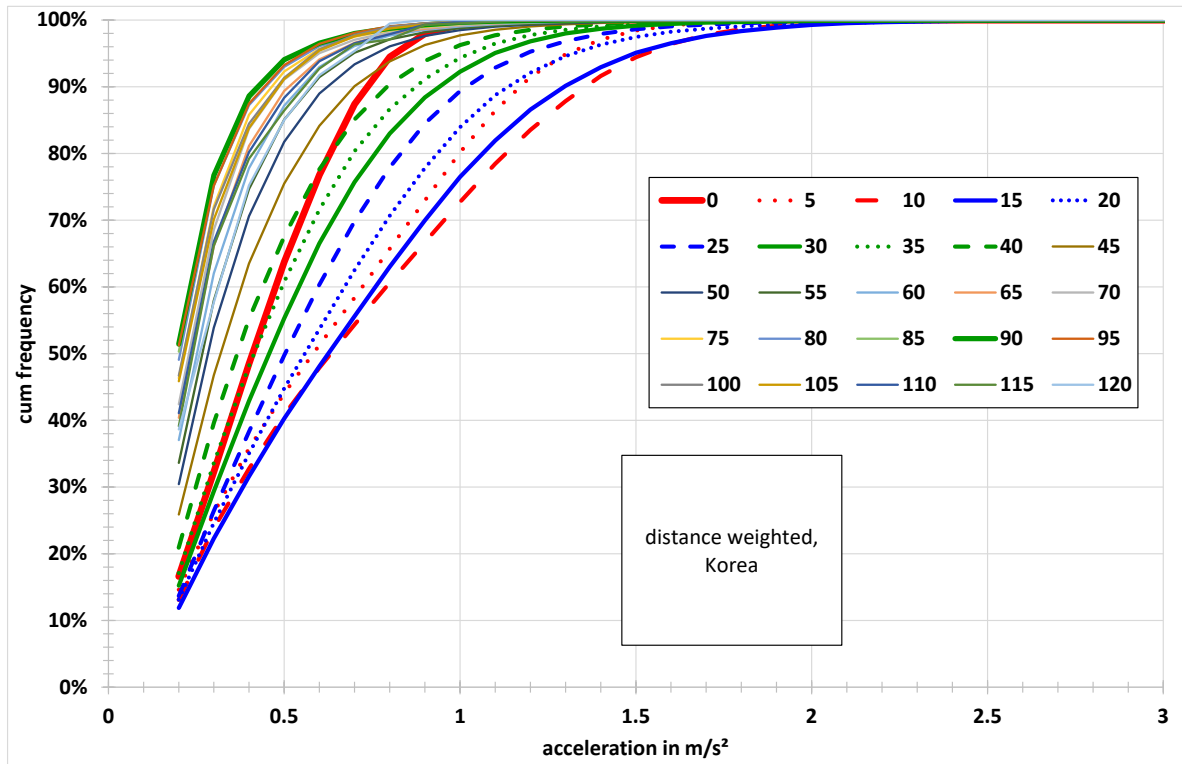


Figure 249: Acceleration distributions for vehicle speed classes, distance weighted, Korea

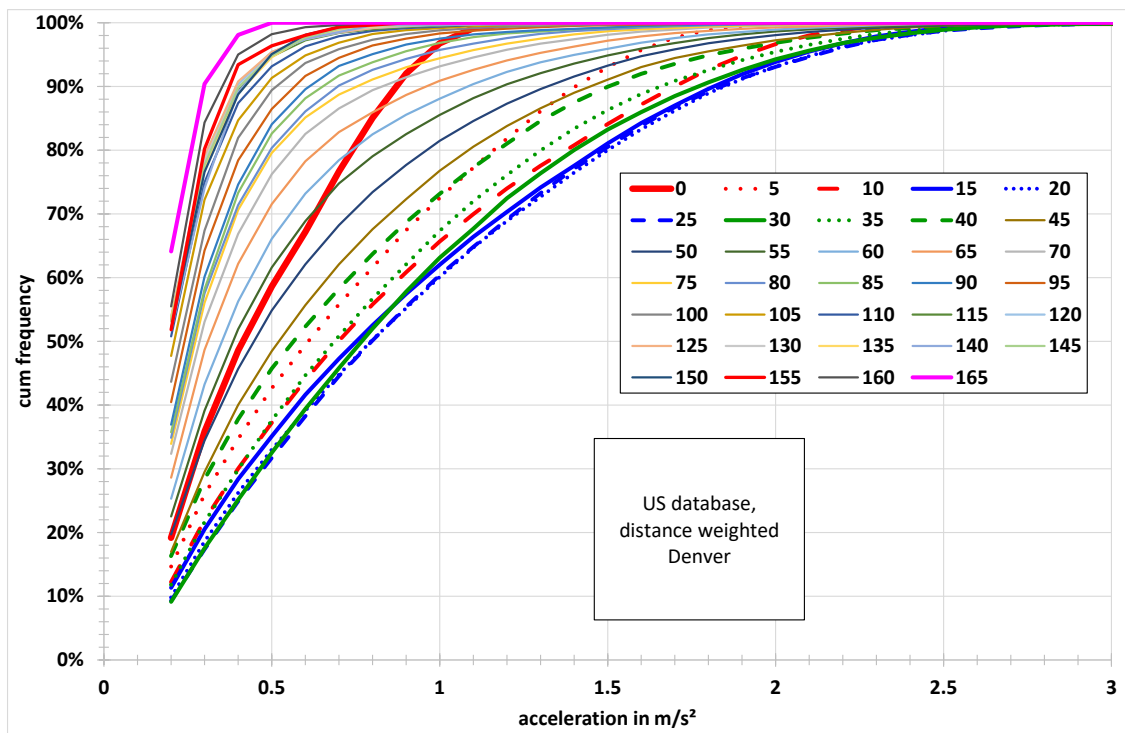


Figure 250: Acceleration distributions for vehicle speed classes, distance weighted, USA, Denver

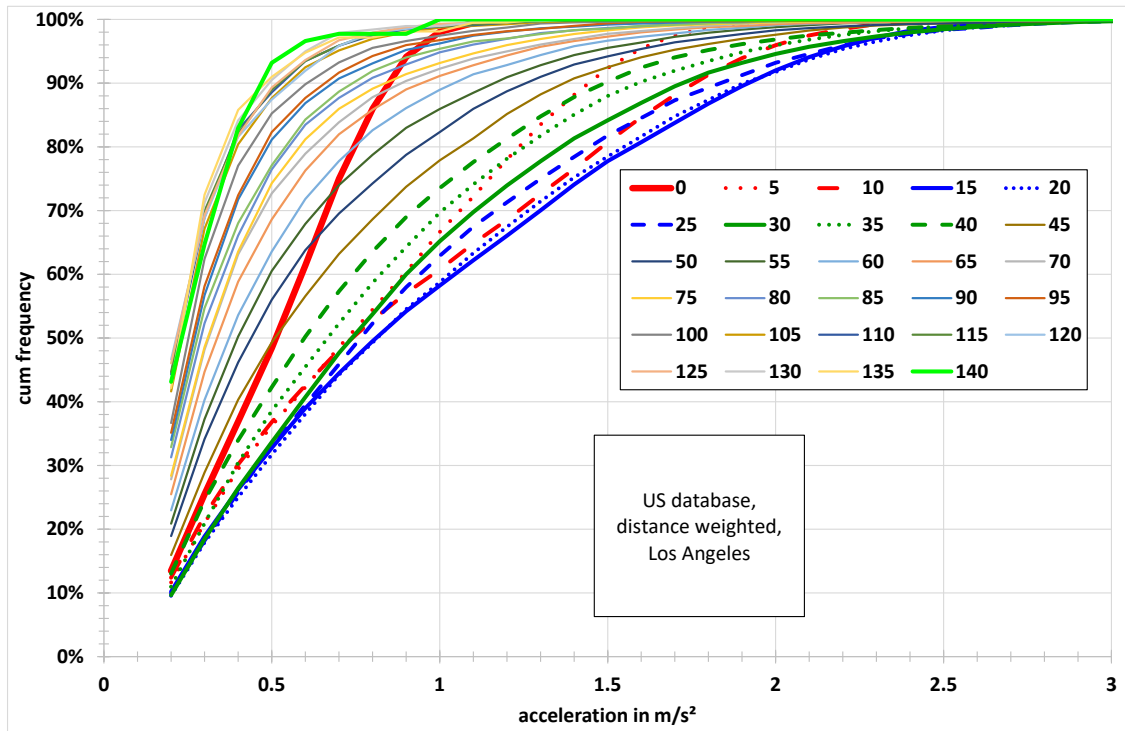


Figure 251: Acceleration distributions for vehicle speed classes, distance weighted, USA, Los Angeles

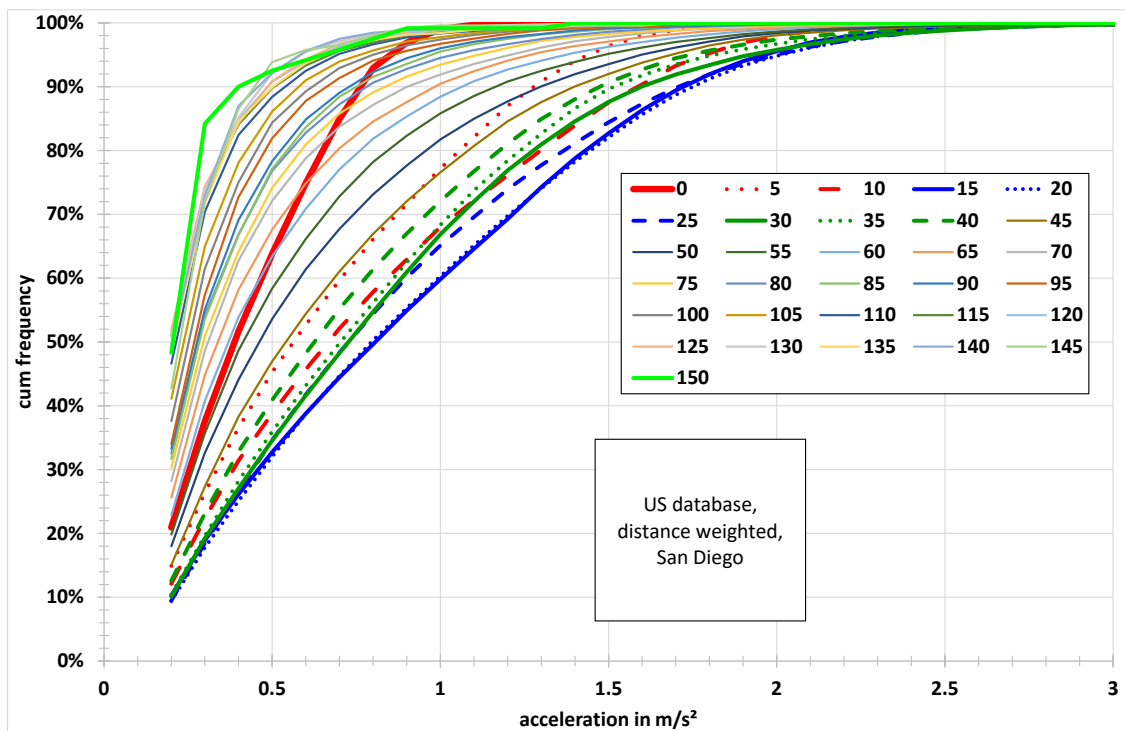


Figure 252: Acceleration distributions for vehicle speed classes, distance weighted, USA, San Diego

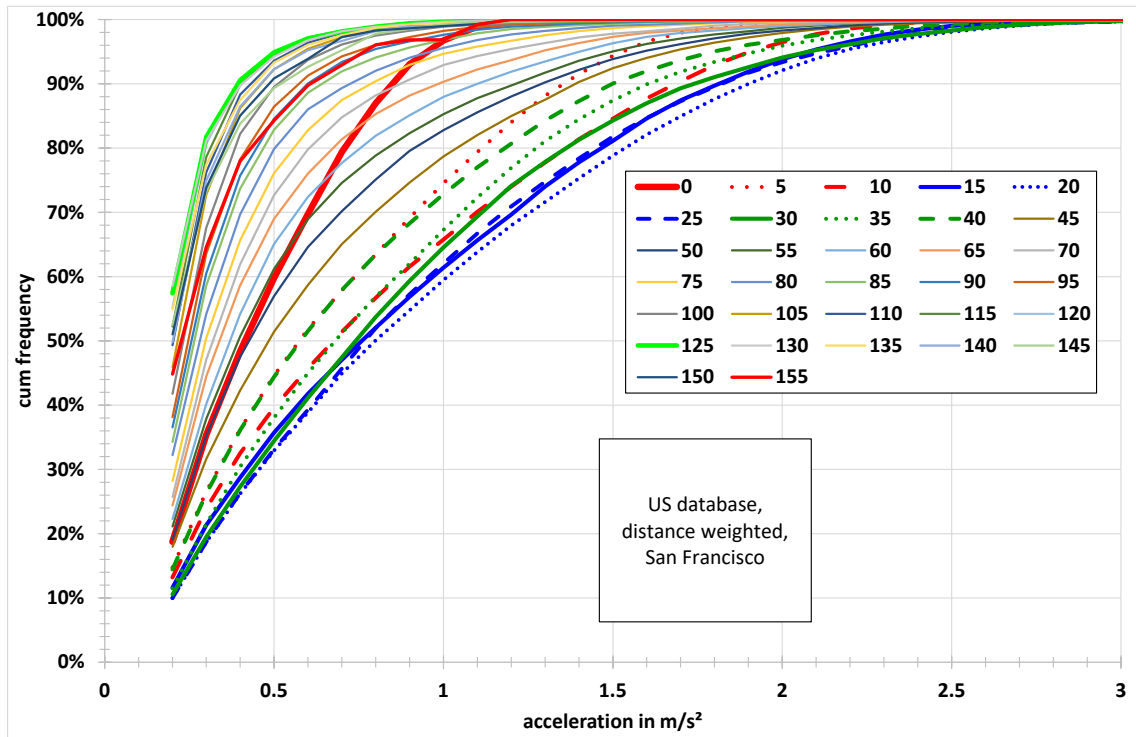


Figure 253: Acceleration distributions for vehicle speed classes, distance weighted, USA, San Francisco



14 Deceleration distributions, deceleration <math>< -0.15 \text{ m/s}^2</math>

14.1 Time weighted

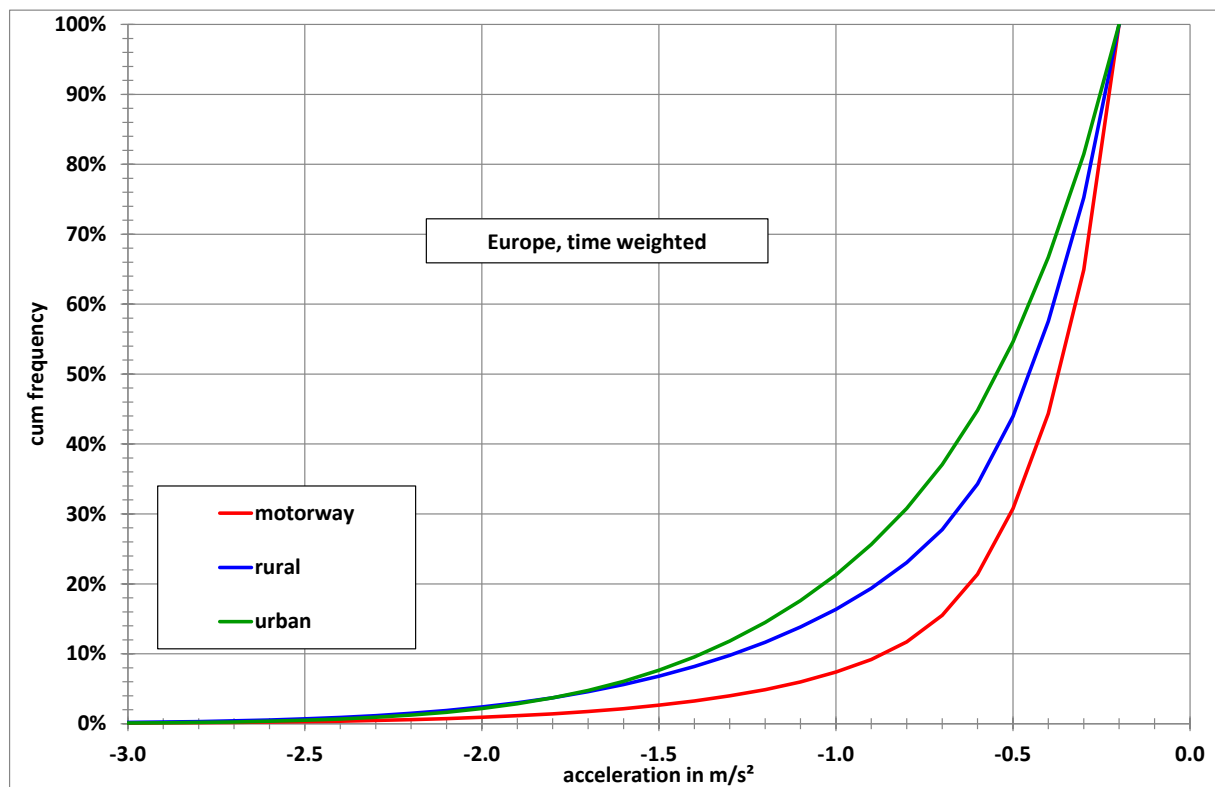


Figure 254: Deceleration distributions for road categories, time weighted, Europe

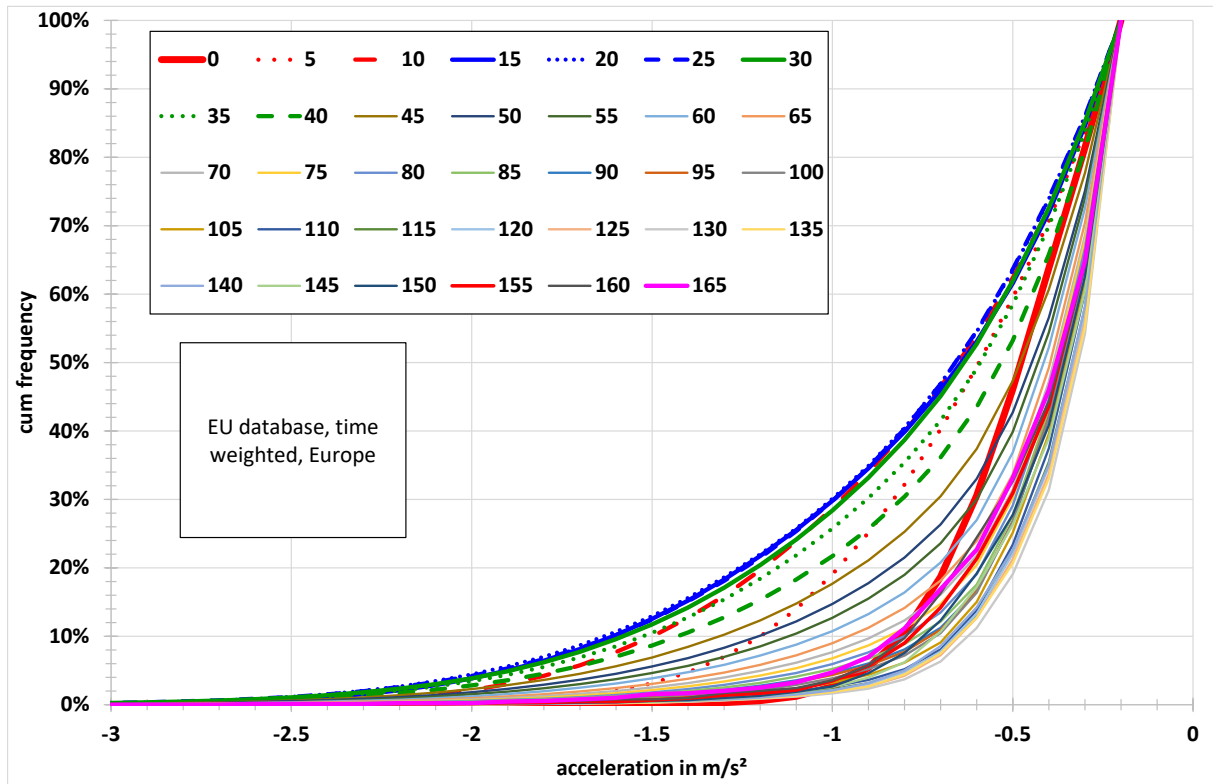


Figure 255: Deceleration distributions for vehicle speed classes, time weighted, Europe

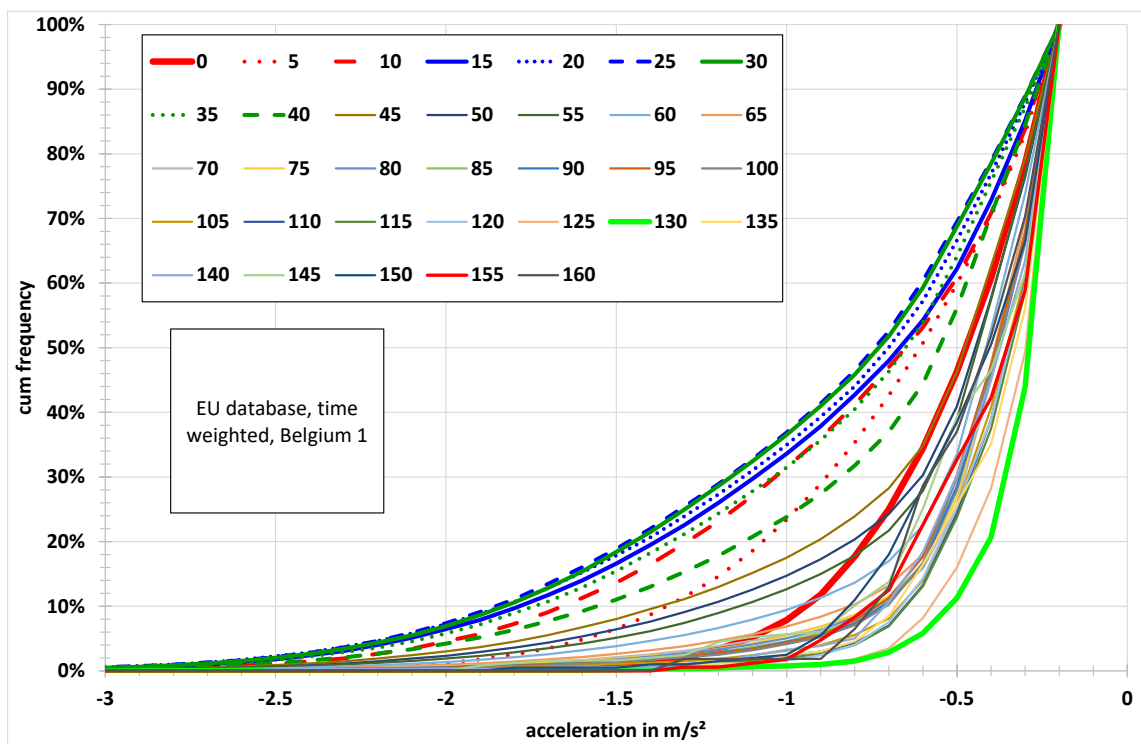


Figure 256: Deceleration distributions for vehicle speed classes, time weighted, Belgium 1

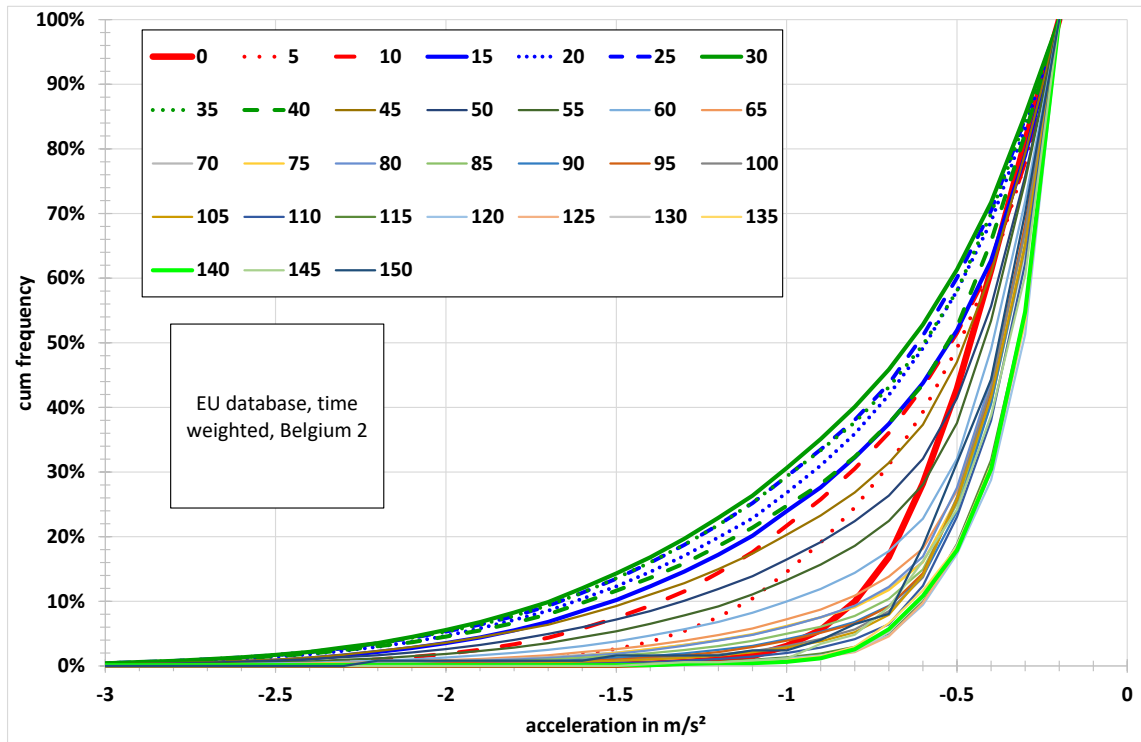


Figure 257: Deceleration distributions for vehicle speed classes, time weighted, Belgium 2

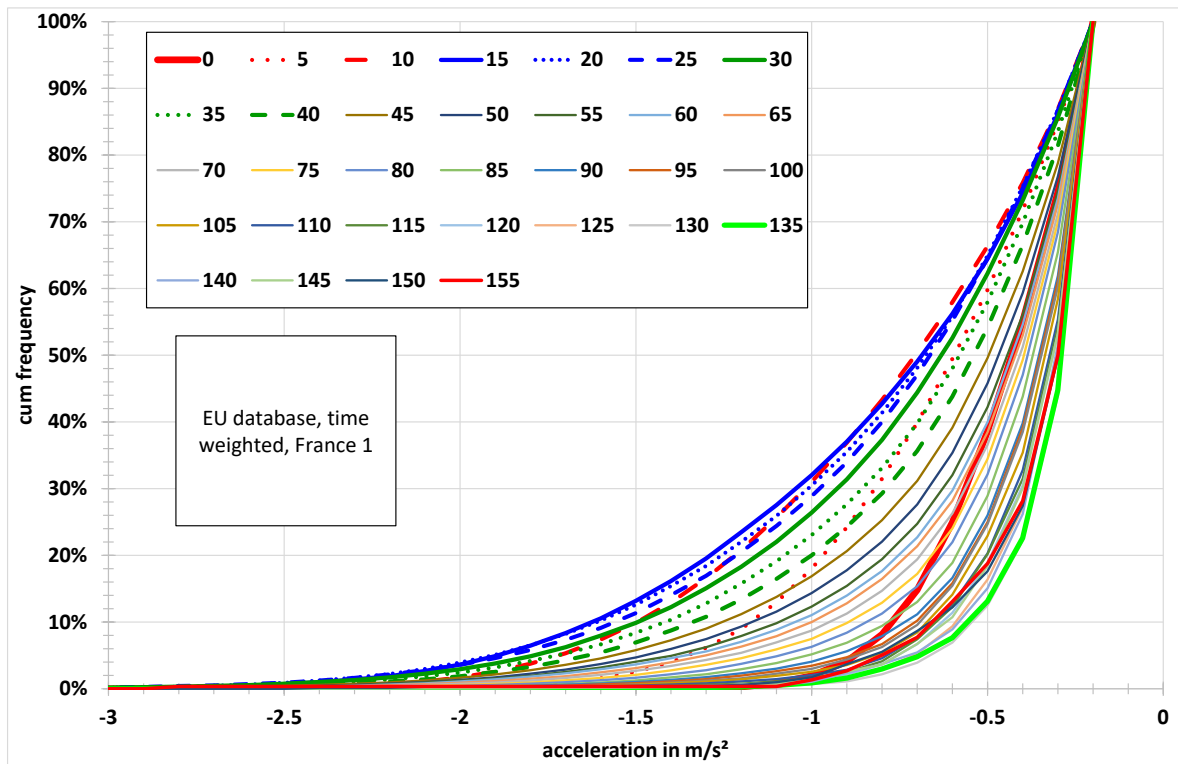


Figure 258: Deceleration distributions for vehicle speed classes, time weighted, France 1

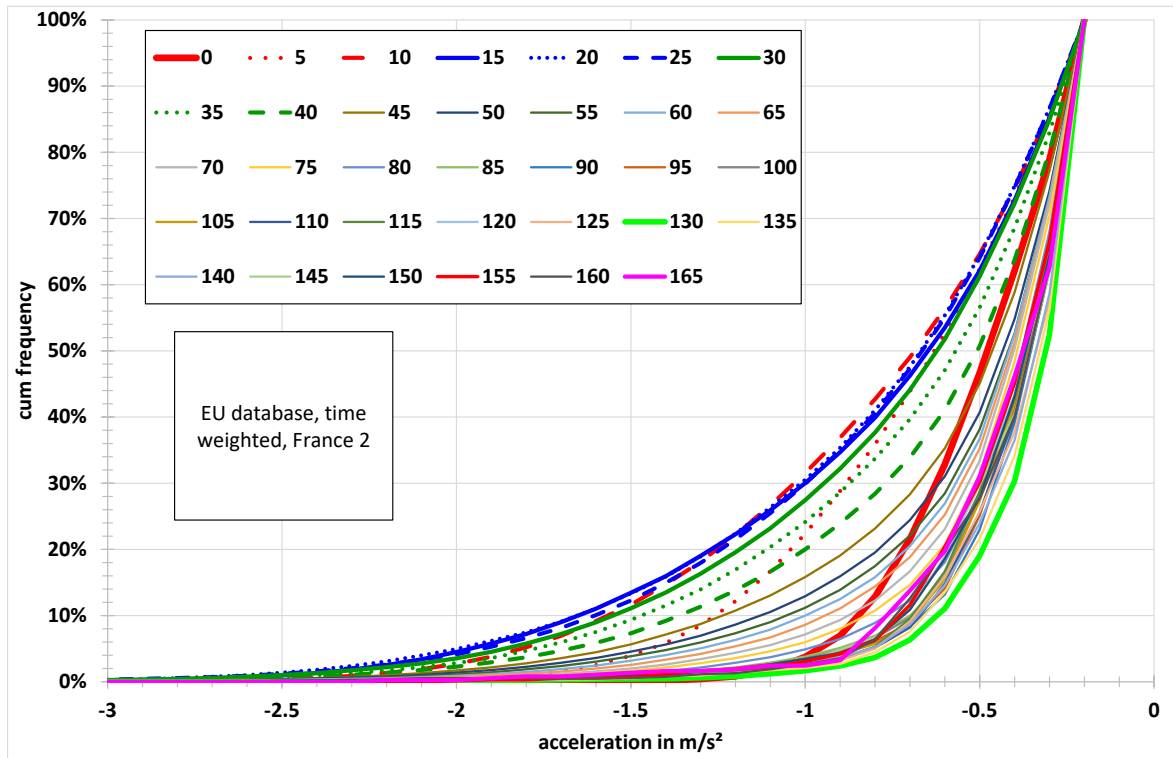


Figure 259: Deceleration distributions for vehicle speed classes, time weighted, France 2

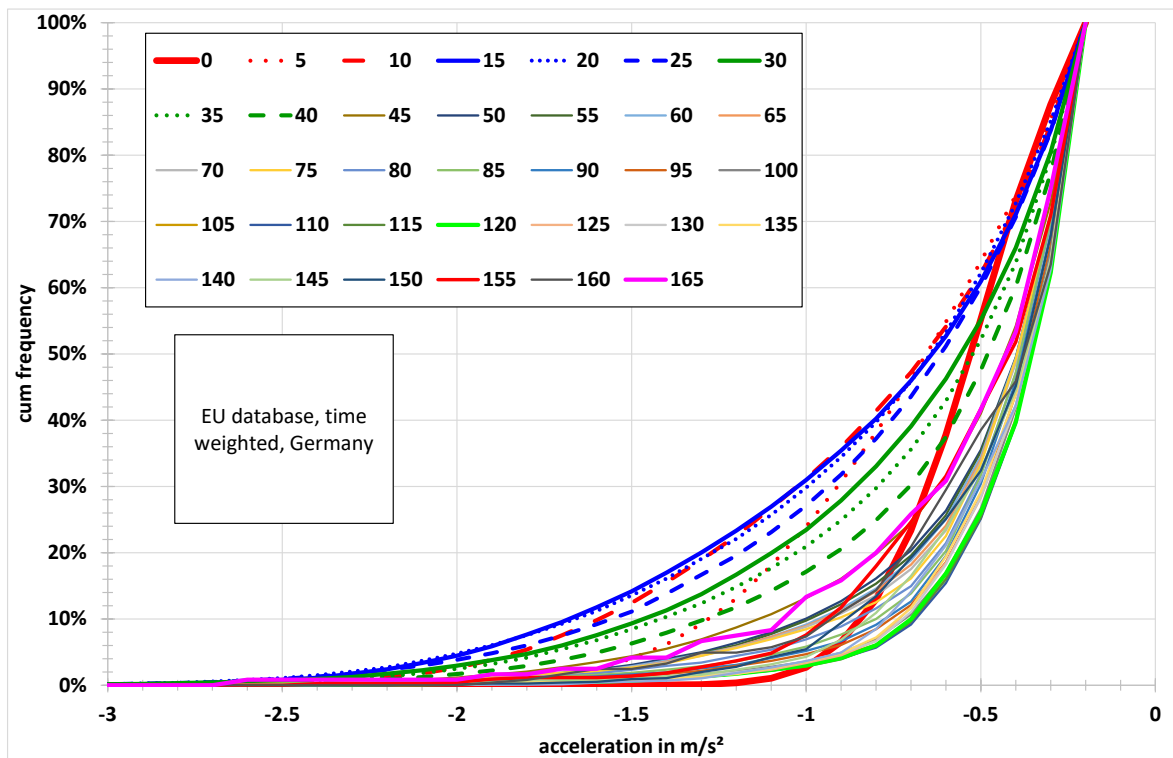


Figure 260: Deceleration distributions for vehicle speed classes, time weighted, Germany

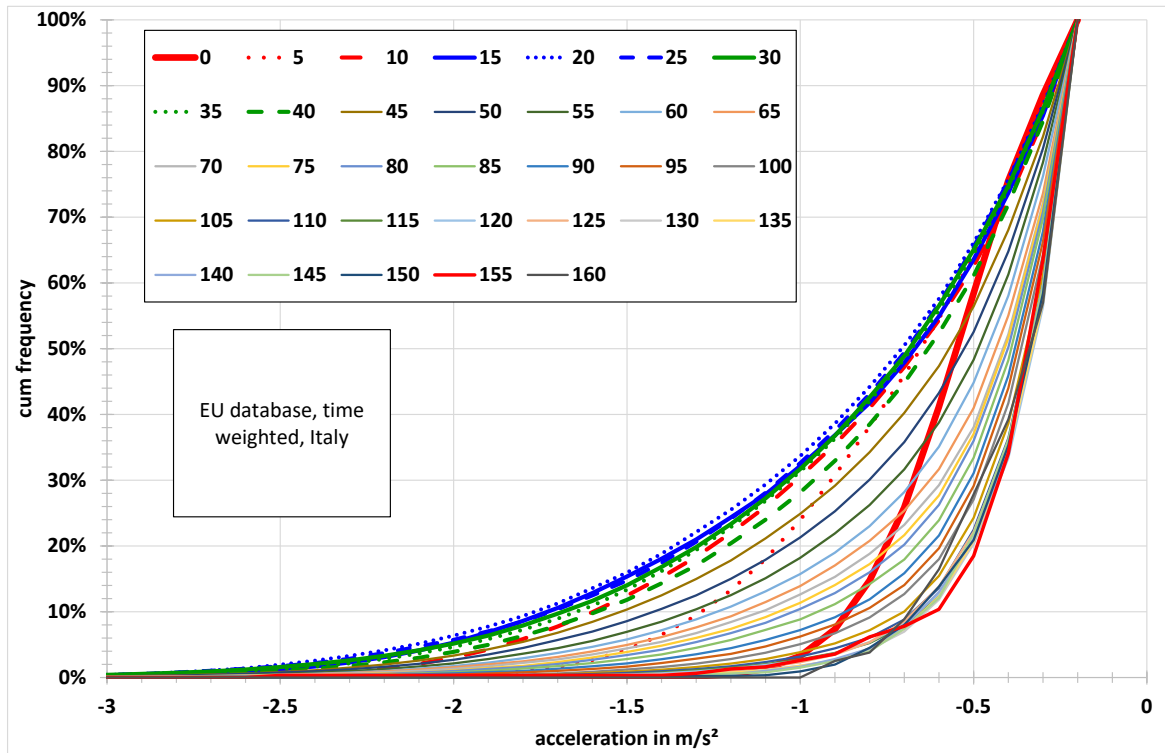


Figure 261: Deceleration distributions for vehicle speed classes, time weighted, Italy

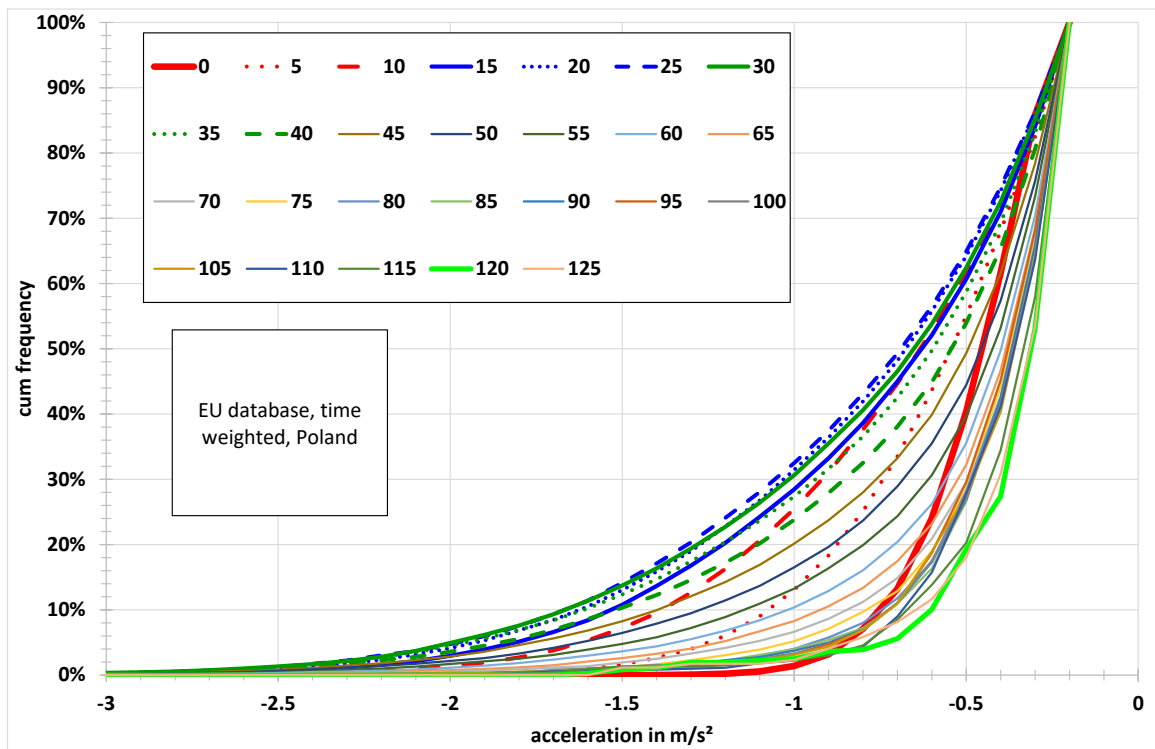


Figure 262: Deceleration distributions for vehicle speed classes, time weighted, Poland

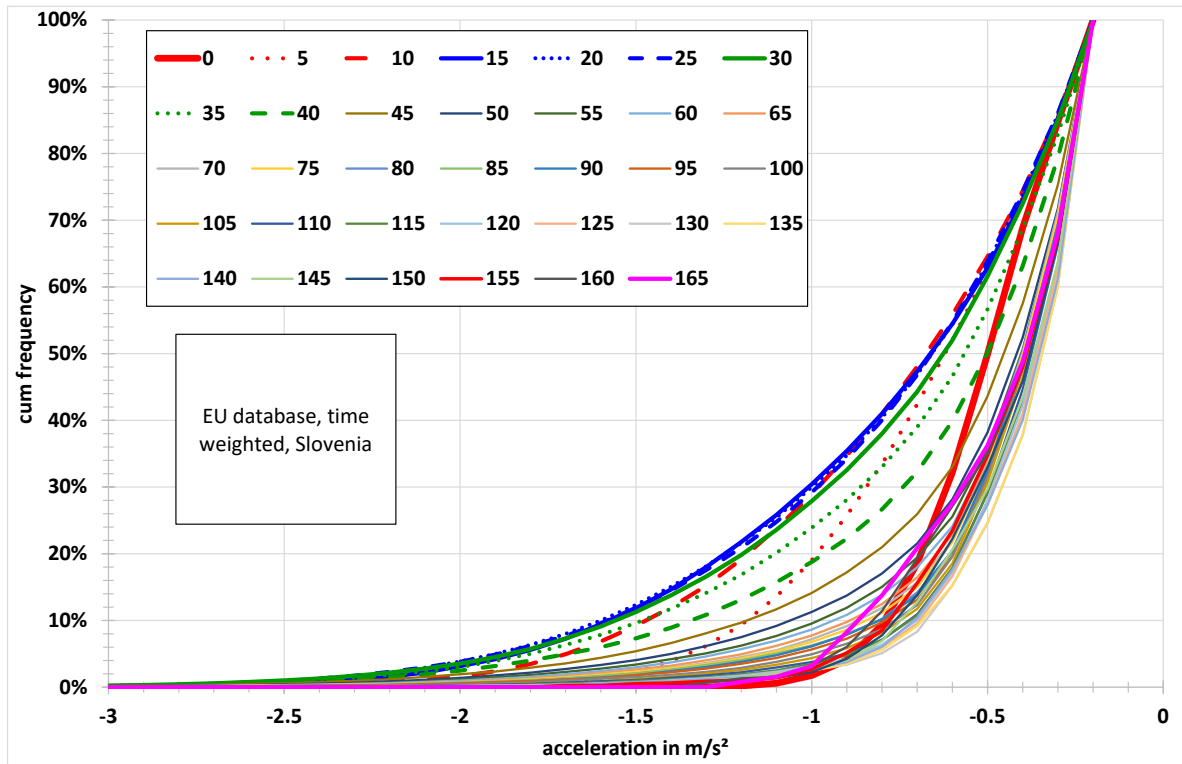


Figure 263: Deceleration distributions for vehicle speed classes, time weighted, Slovenia

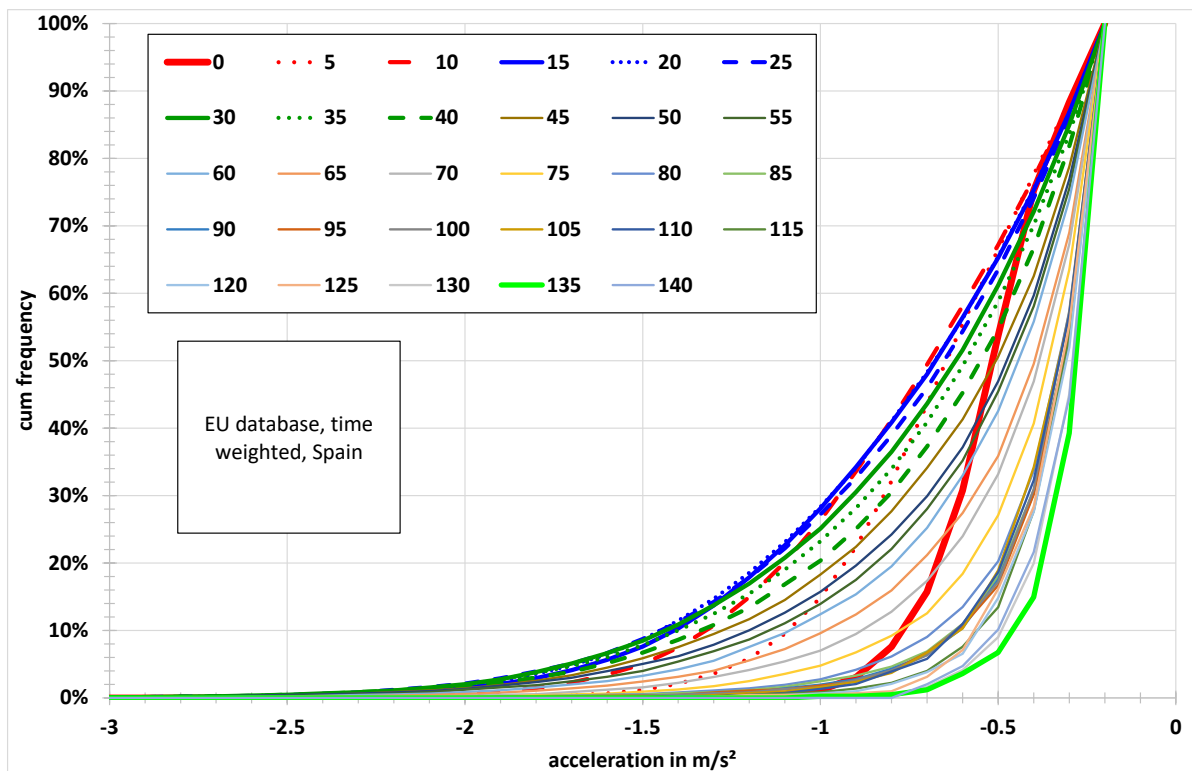


Figure 264: Deceleration distributions for vehicle speed classes, time weighted, Spain

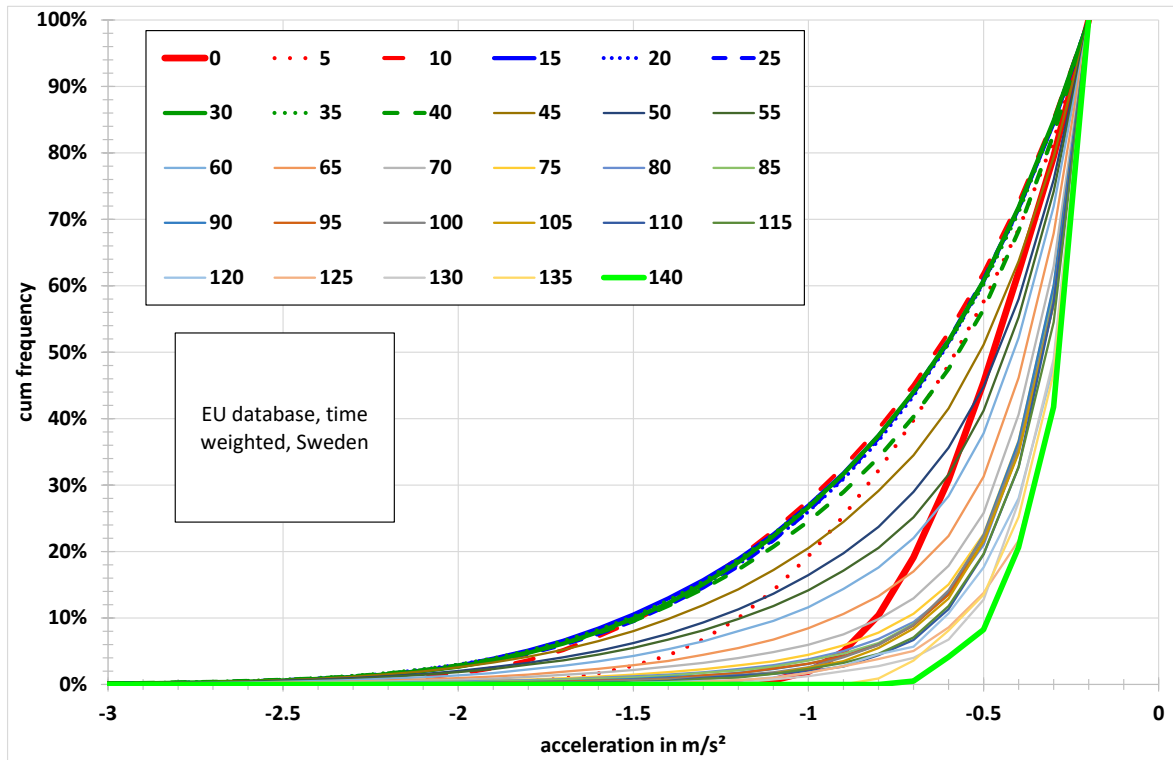


Figure 265: Deceleration distributions for vehicle speed classes, time weighted, Sweden

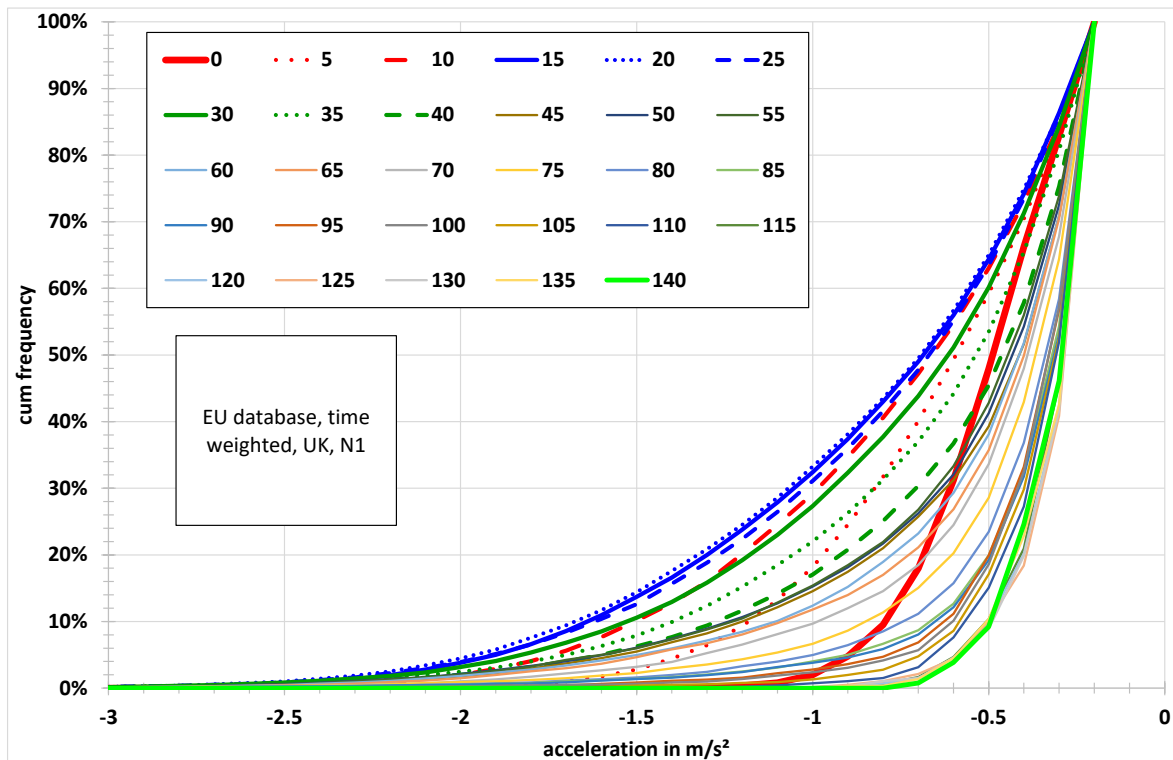


Figure 266: Deceleration distributions for vehicle speed classes, time weighted, UK, N1

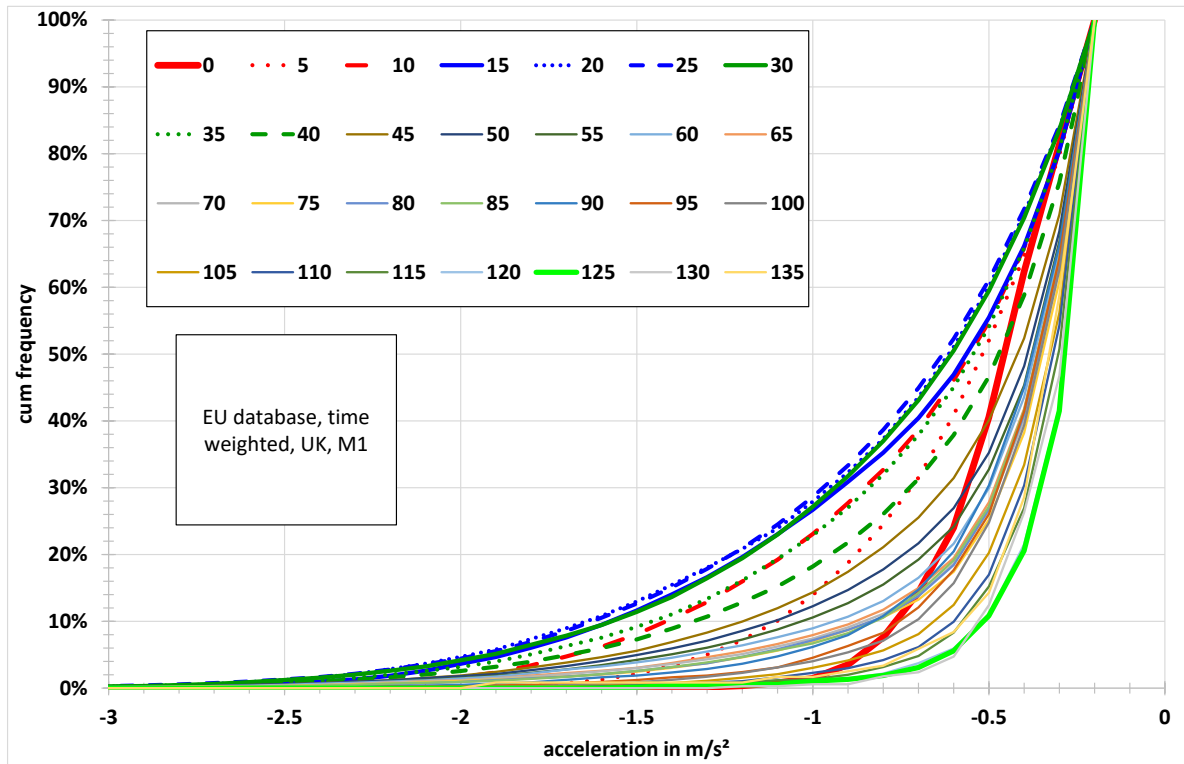


Figure 267: Deceleration distributions for vehicle speed classes, time weighted, UK, M1

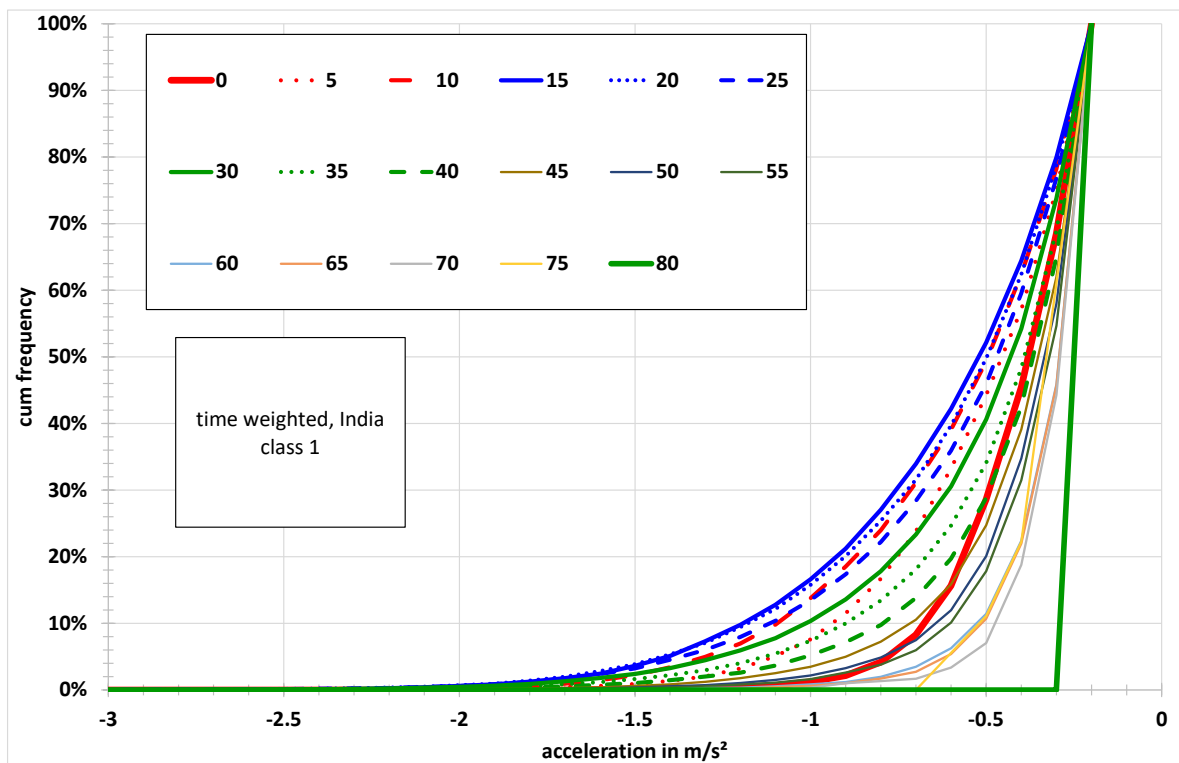


Figure 268: Deceleration distributions for vehicle speed classes, time weighted, India class 1

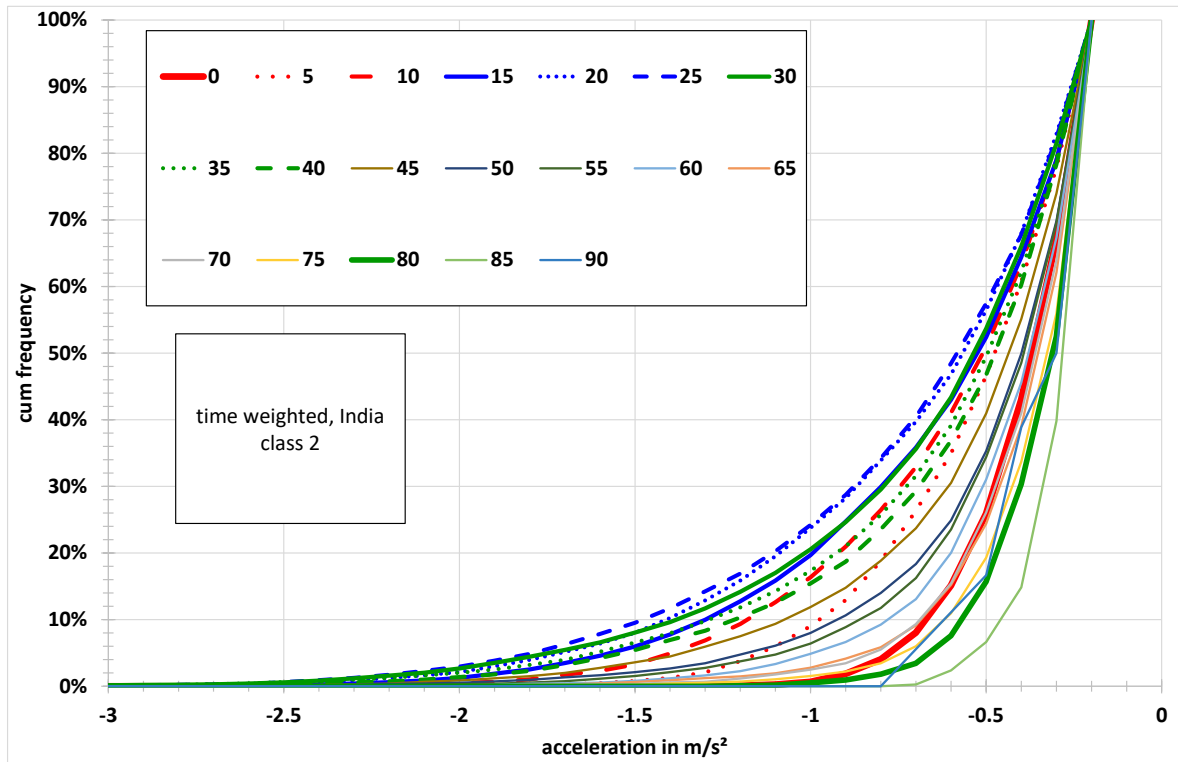


Figure 269: Deceleration distributions for vehicle speed classes, time weighted, India class 2

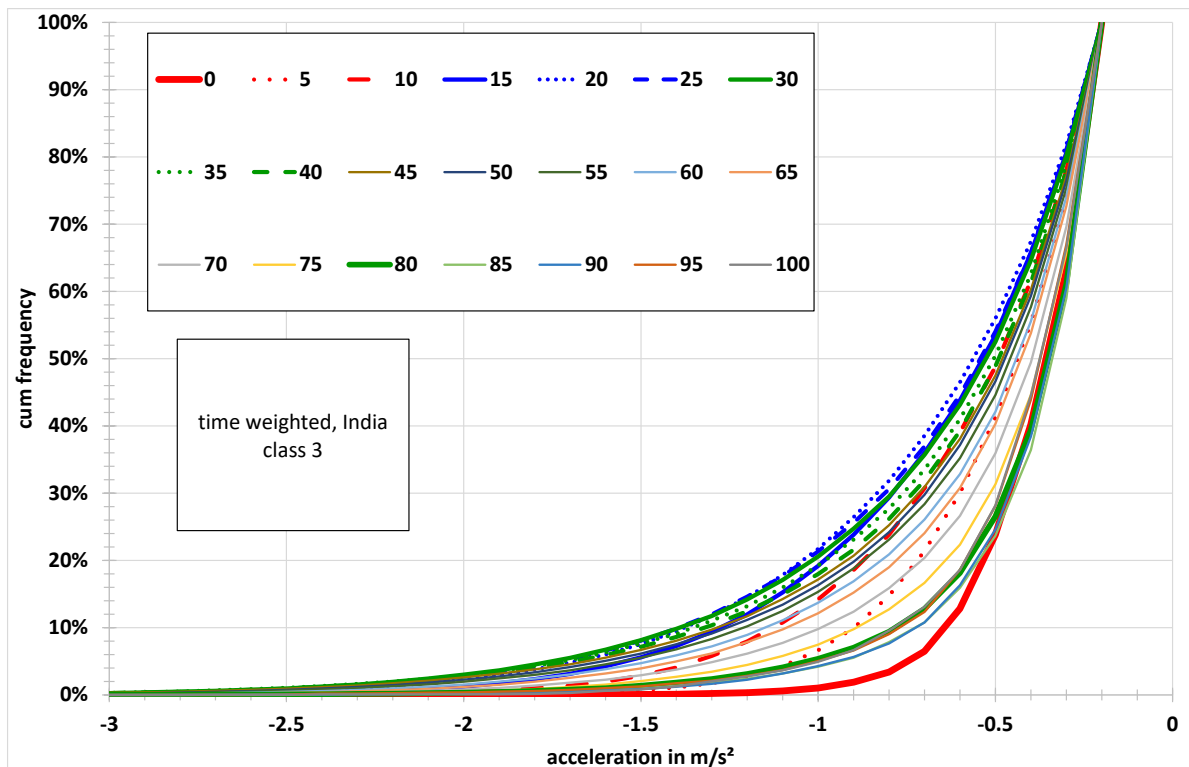


Figure 270: Deceleration distributions for vehicle speed classes, time weighted, India class 3

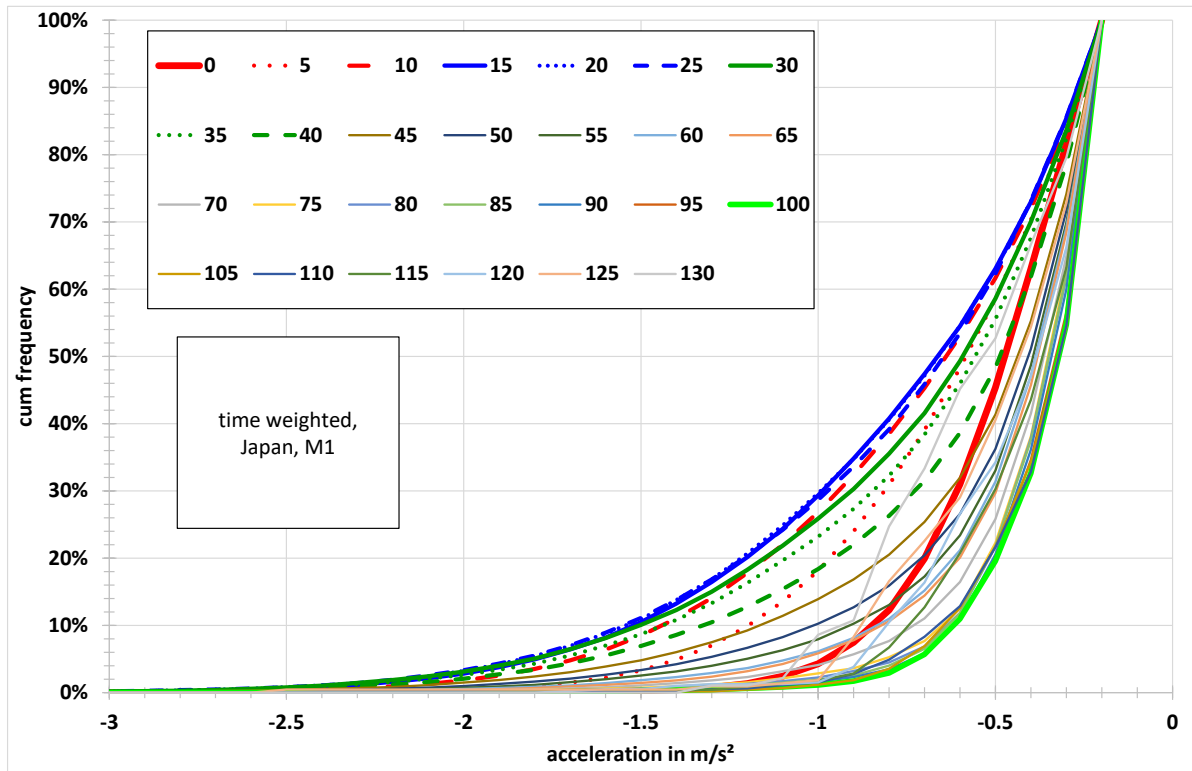


Figure 271: Deceleration distributions for vehicle speed classes, time weighted, Japan M1

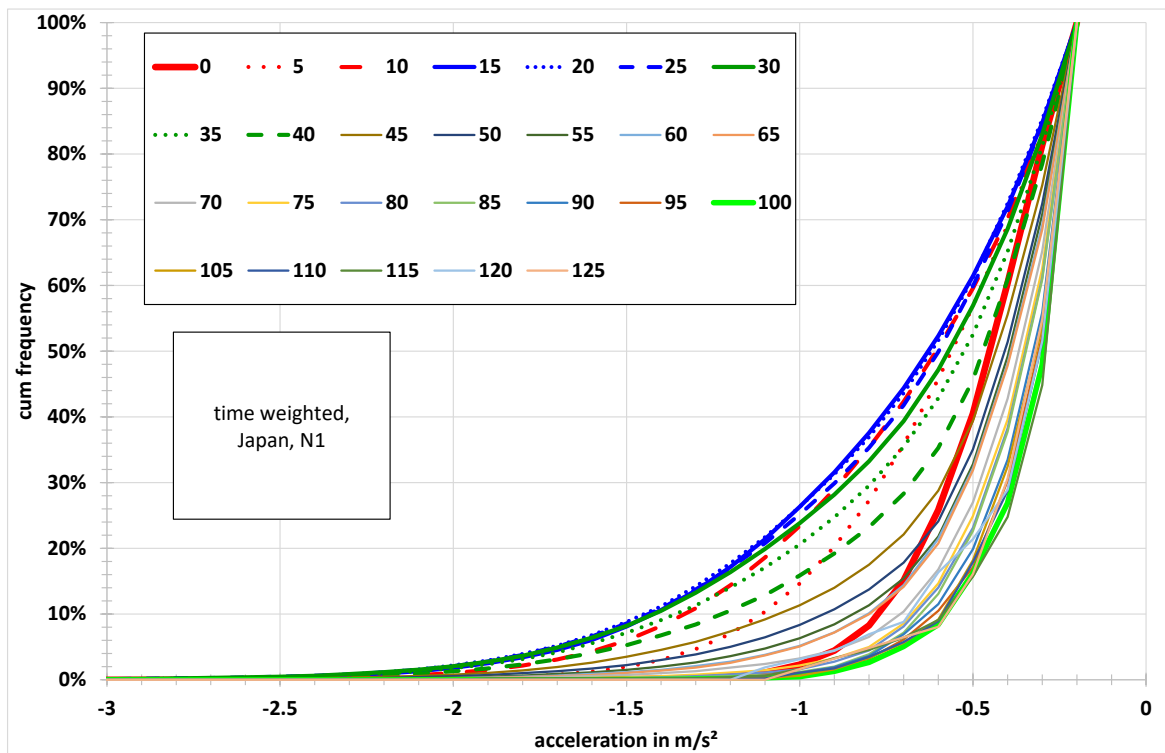


Figure 272: Deceleration distributions for vehicle speed classes, time weighted, Japan N1

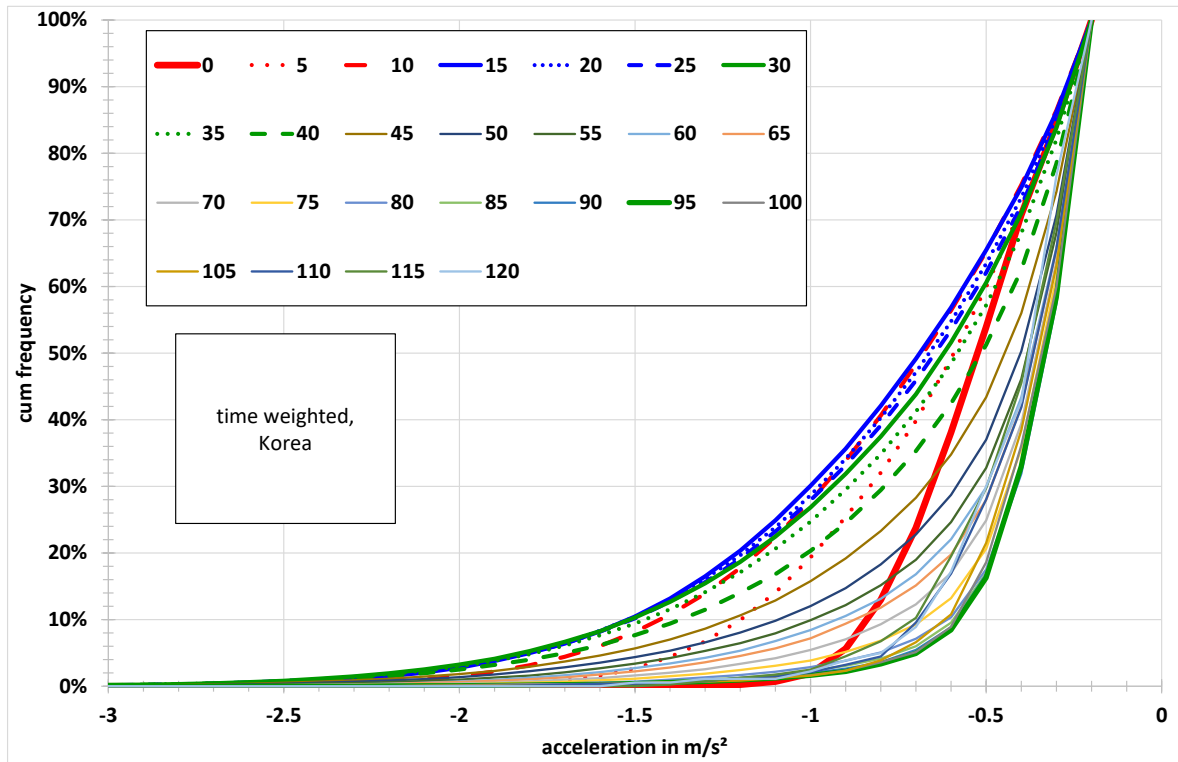


Figure 273: Deceleration distributions for vehicle speed classes, time weighted, Korea

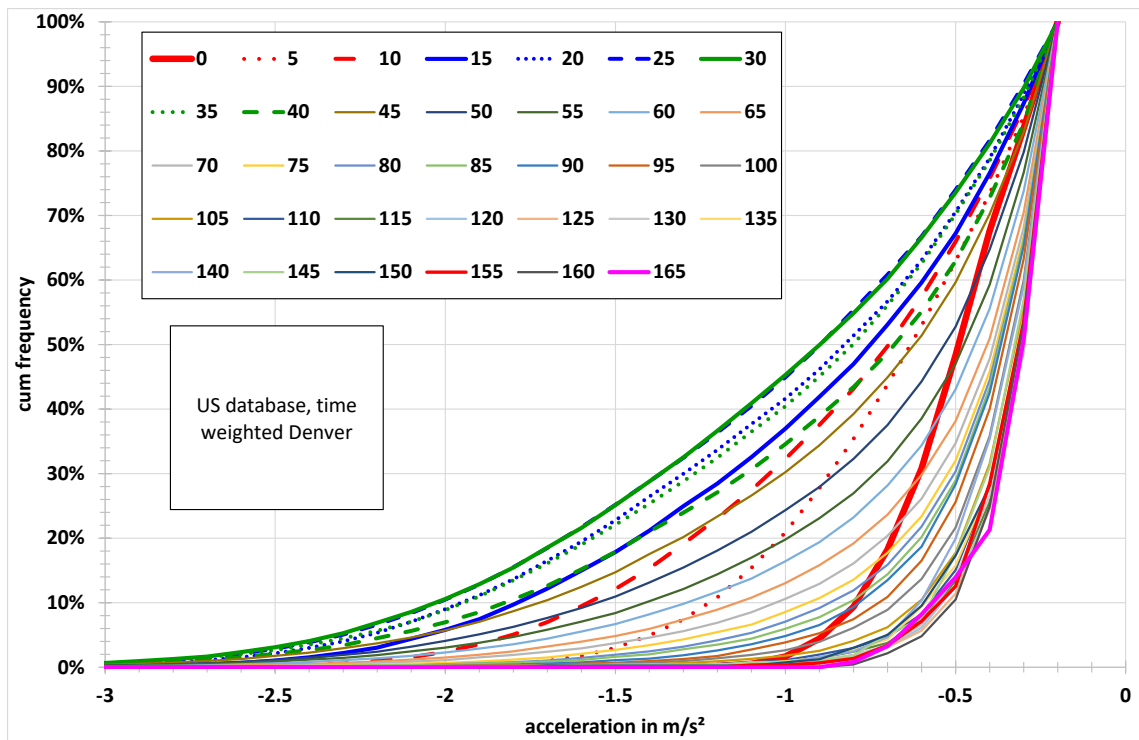


Figure 274: Deceleration distributions for vehicle speed classes, time weighted, USA, Denver

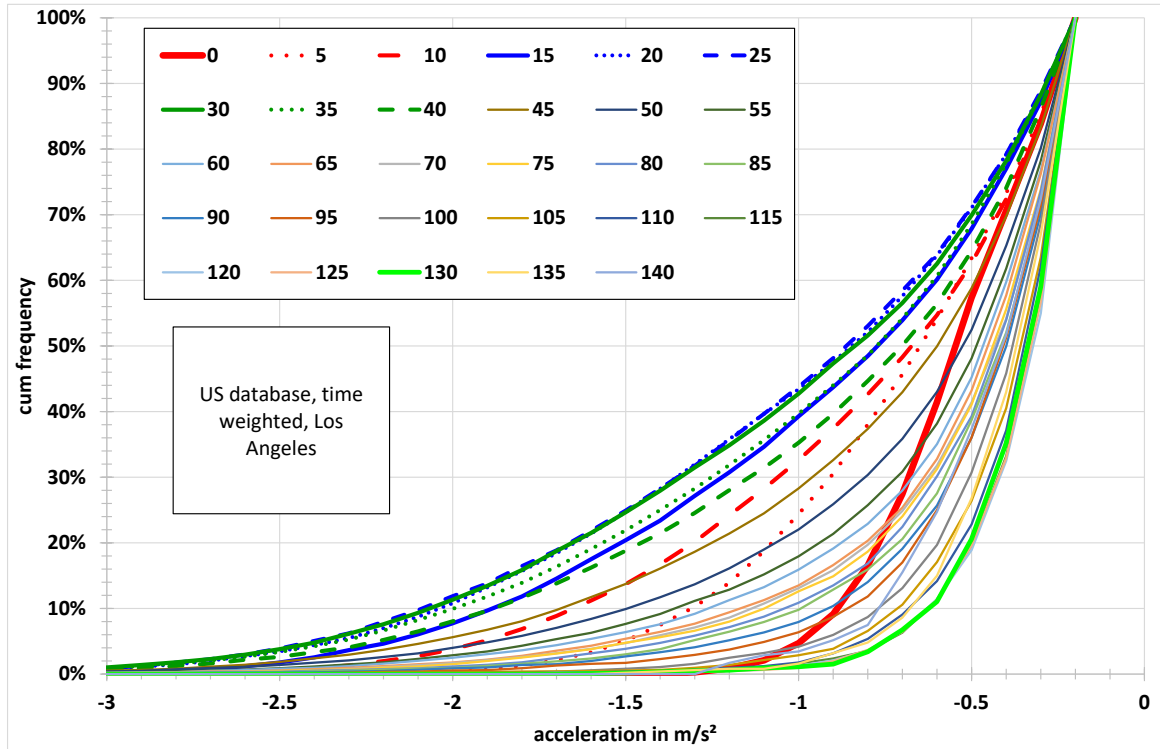


Figure 275: Deceleration distributions for vehicle speed classes, time weighted, USA, Los Angeles

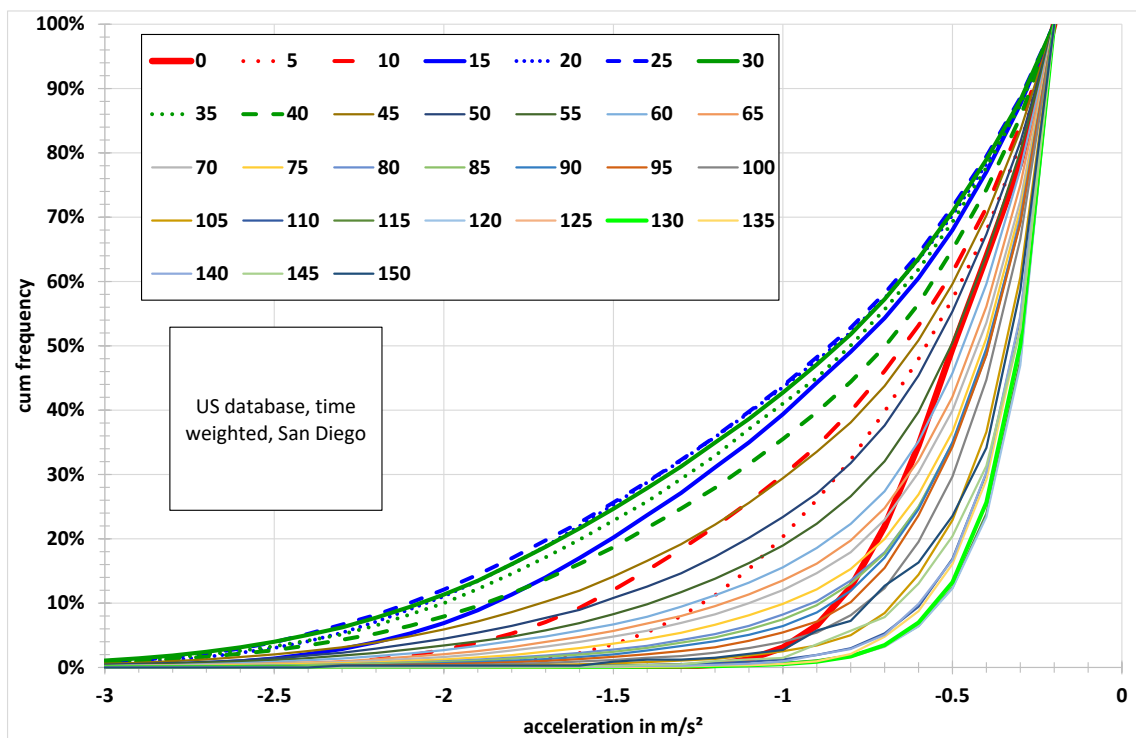




Figure 276: Deceleration distributions for vehicle speed classes, time weighted, USA, San Diego

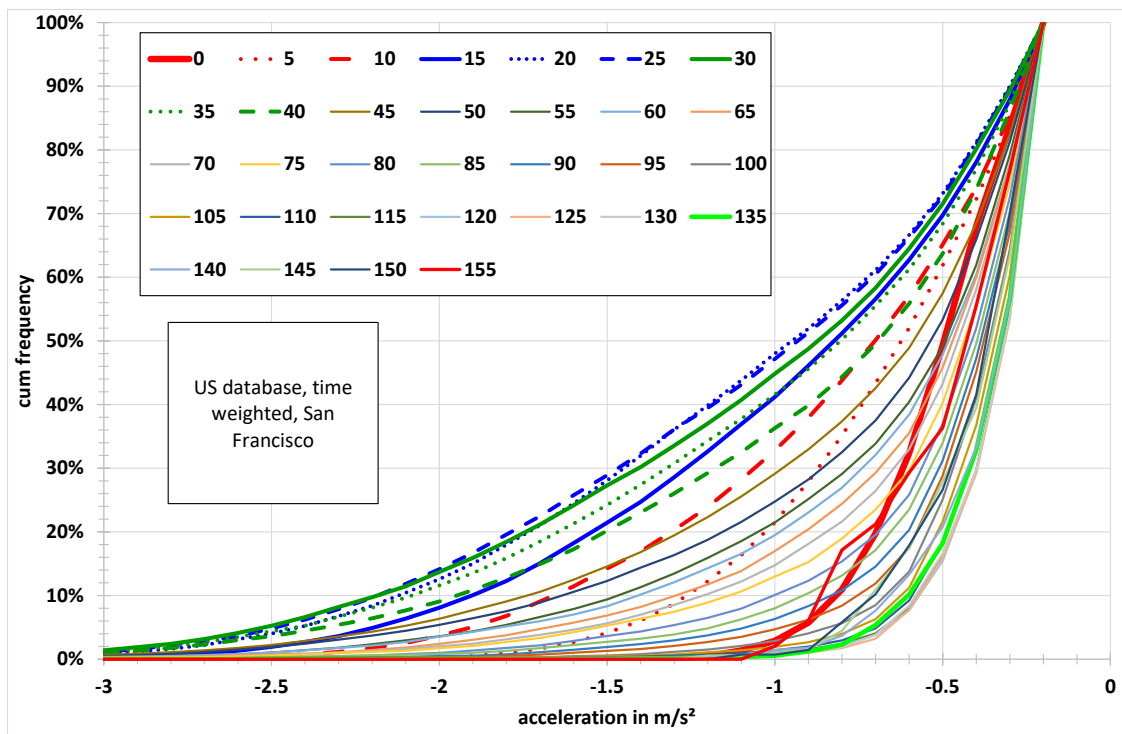


Figure 277: Deceleration distributions for vehicle speed classes, time weighted, USA, San Francisco



14.2 Distance weighted

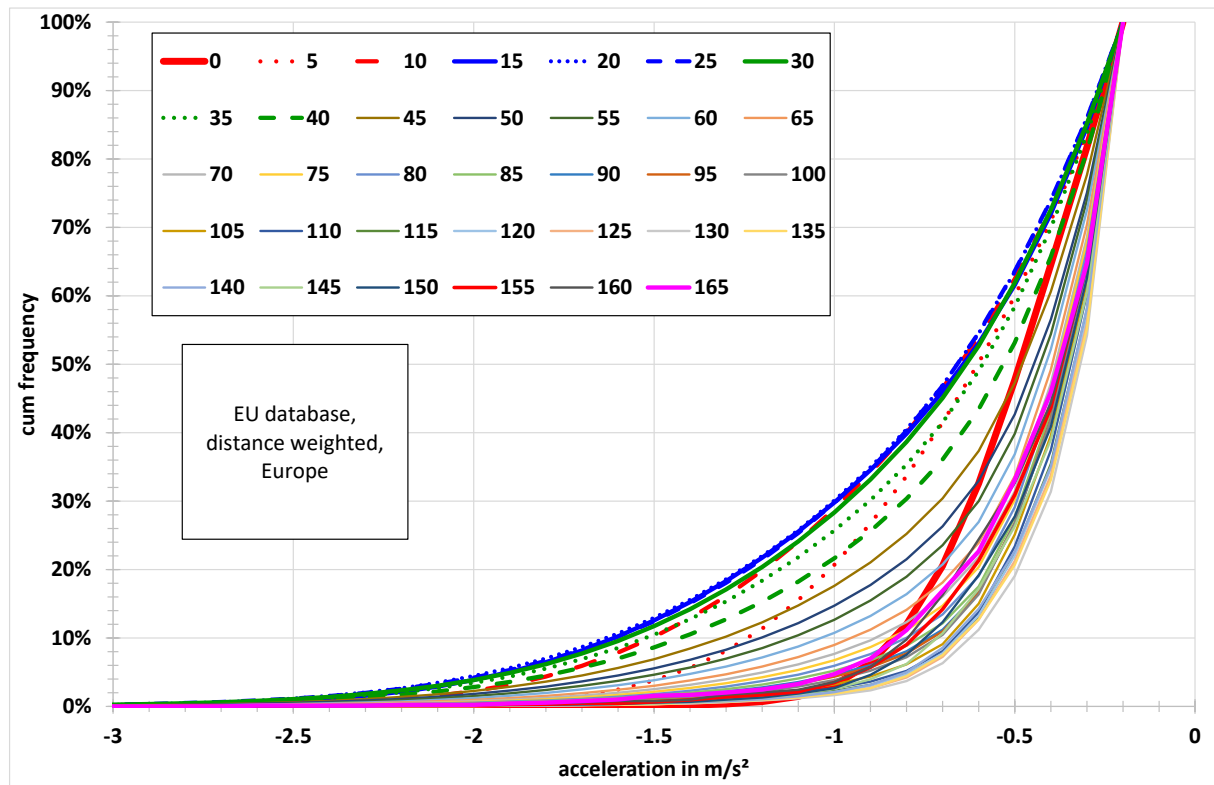


Figure 278: Deceleration distributions for vehicle speed classes, distance weighted, Europe

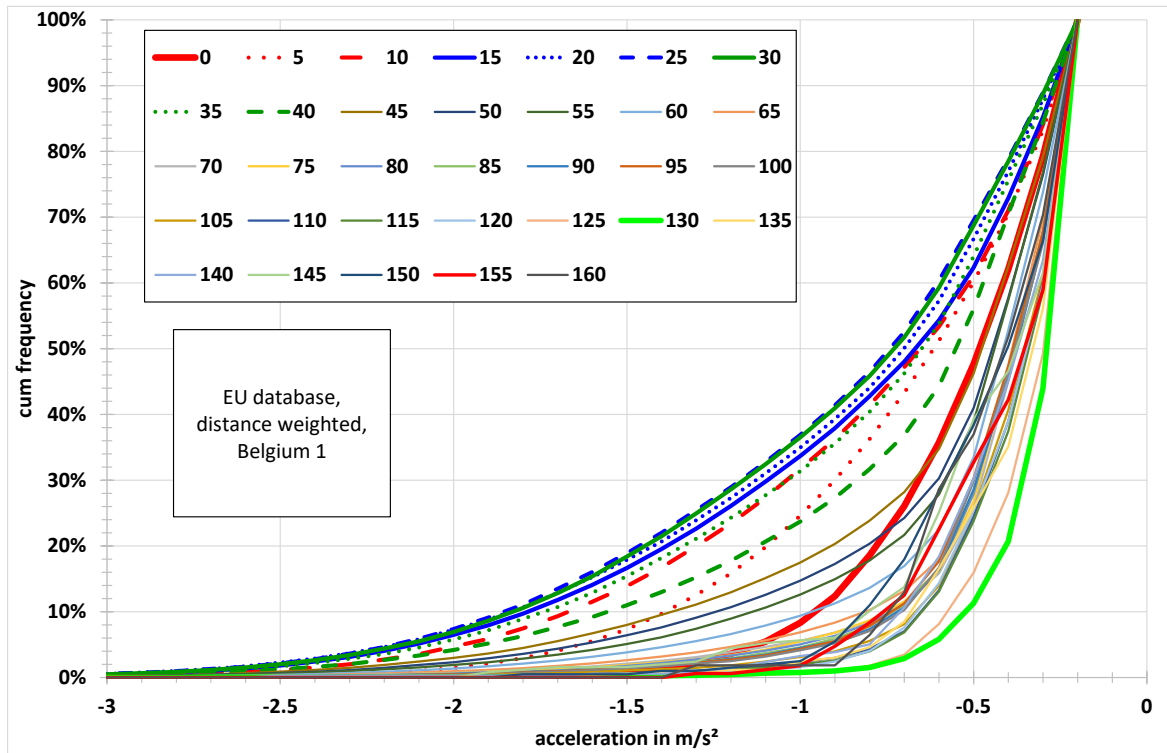


Figure 279: Deceleration distributions for vehicle speed classes, distance weighted, BE 1

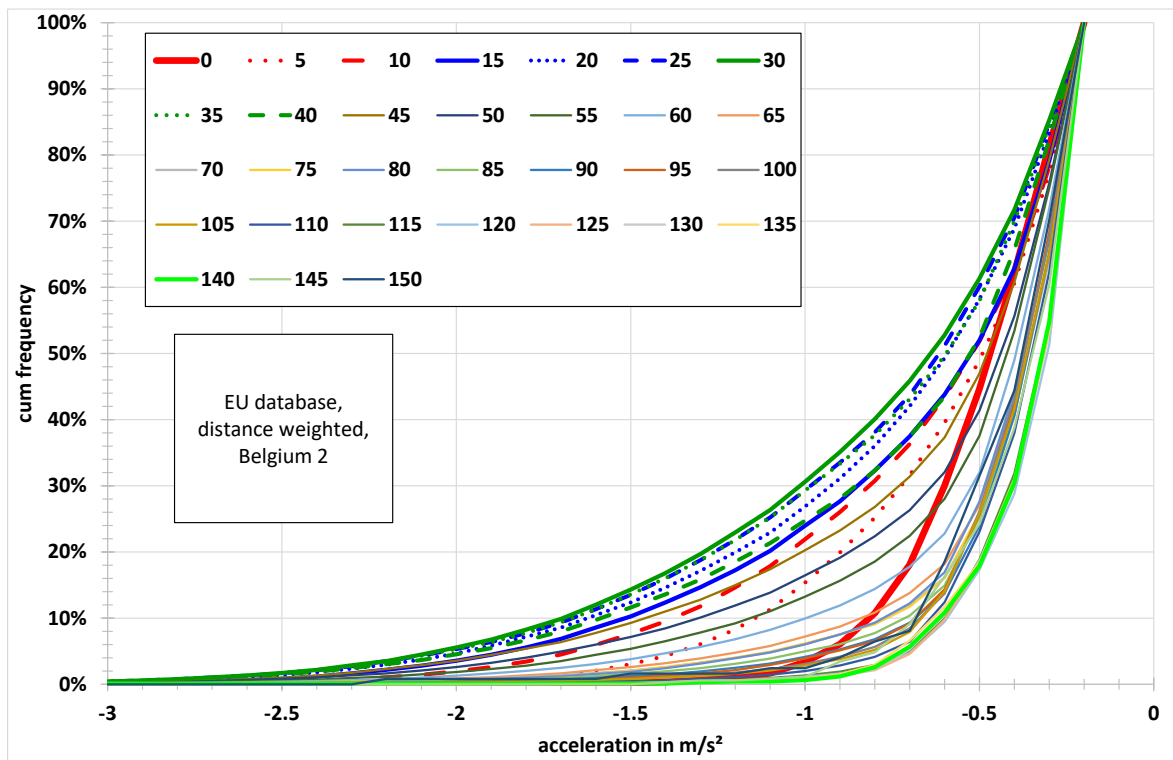


Figure 280: Deceleration distributions for vehicle speed classes, distance weighted, BE 2

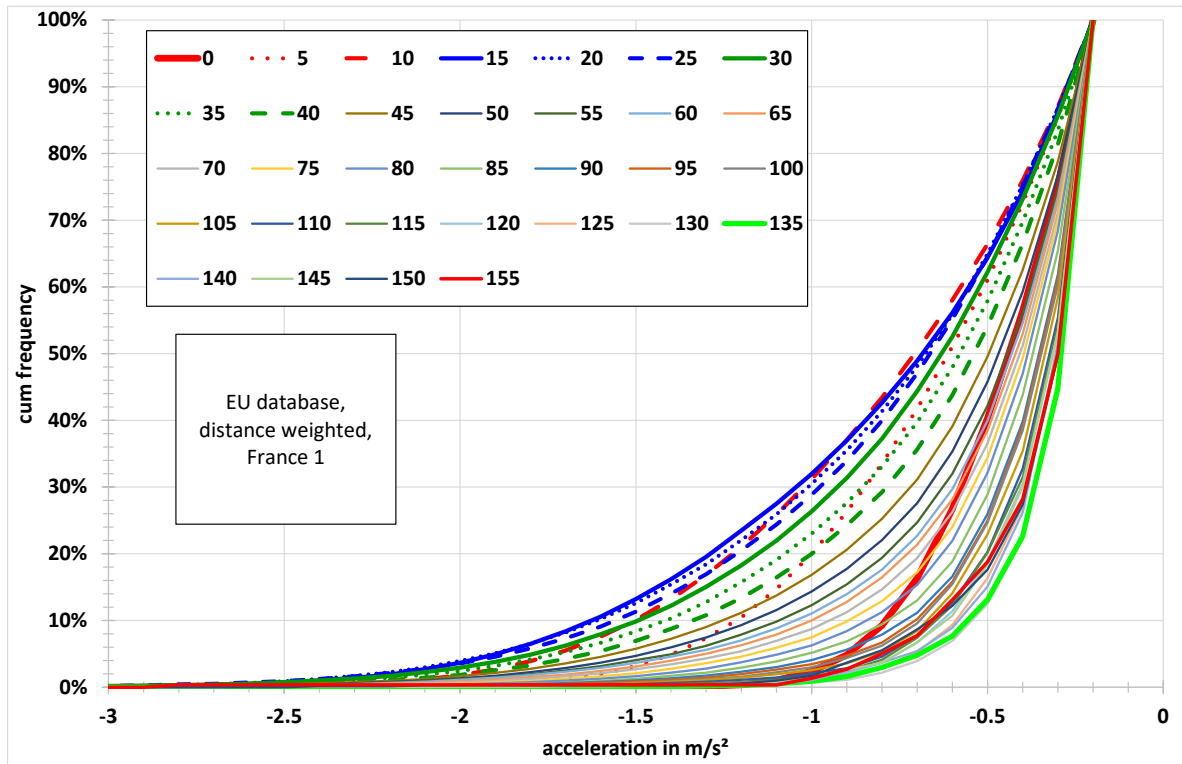


Figure 281: Deceleration distributions for vehicle speed classes, distance weighted, France 1

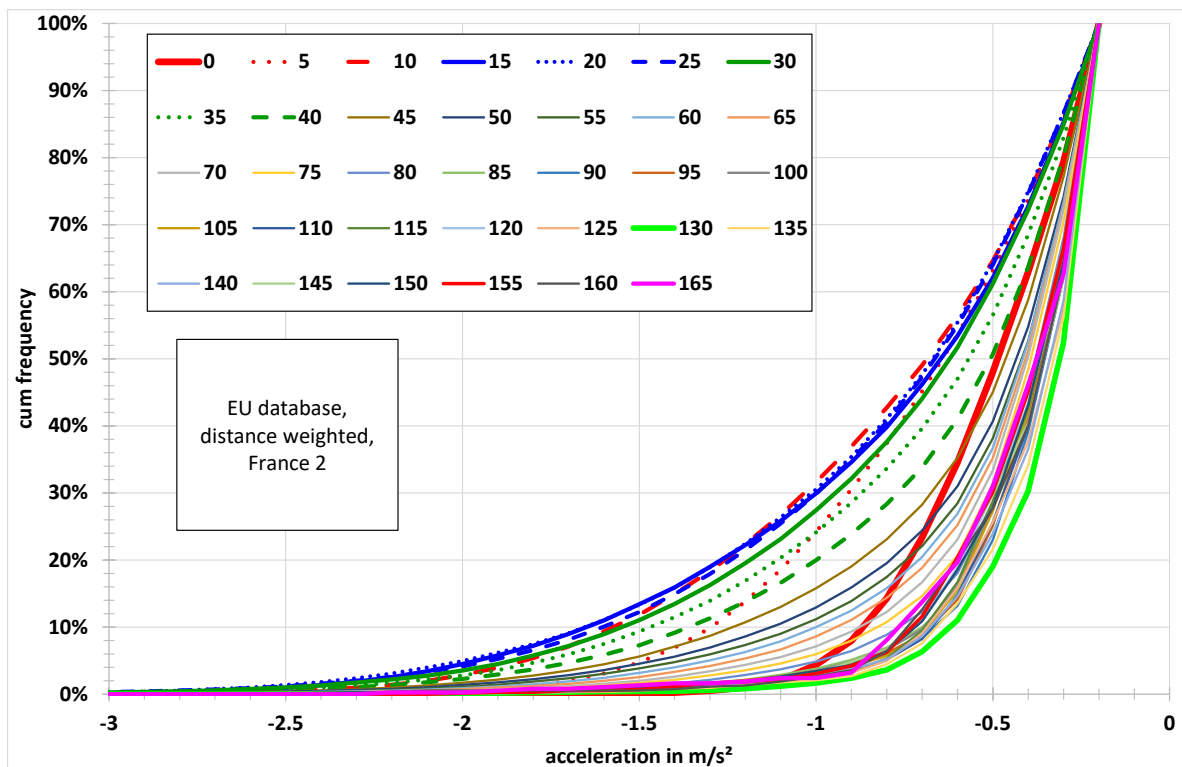


Figure 282: Deceleration distributions for vehicle speed classes, distance weighted, France 2

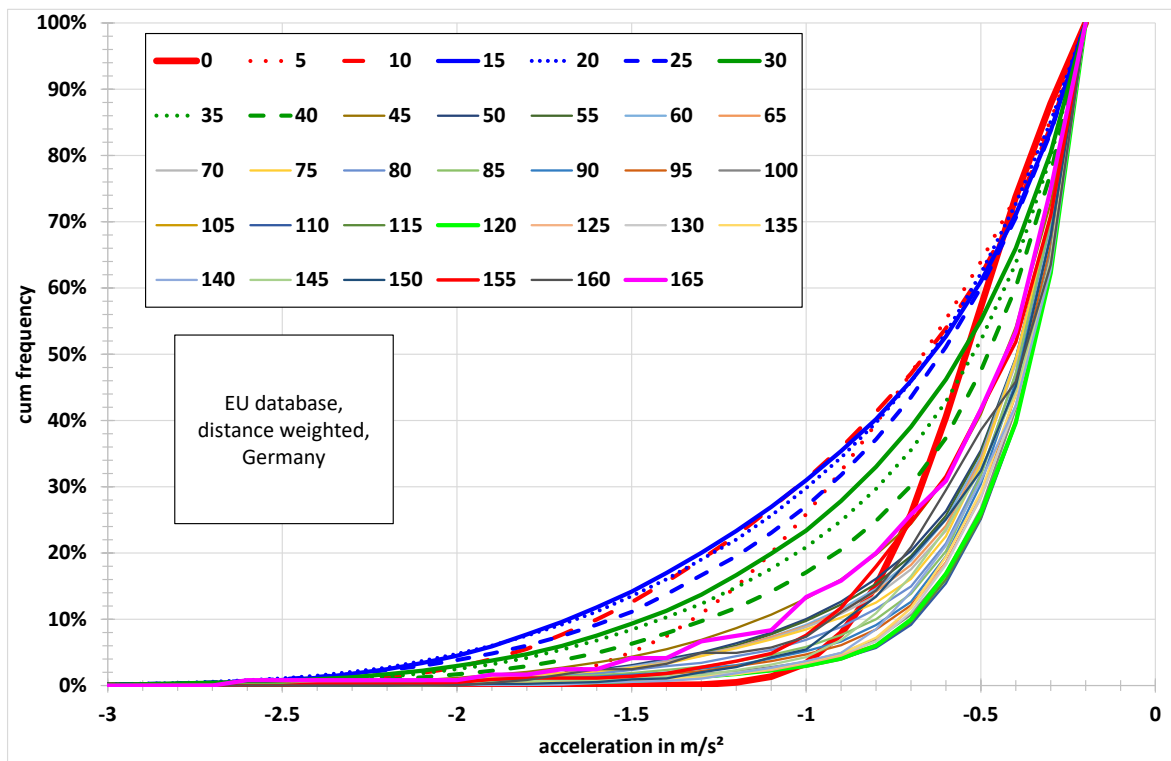


Figure 283: Deceleration distributions for vehicle speed classes, distance weighted, Germany

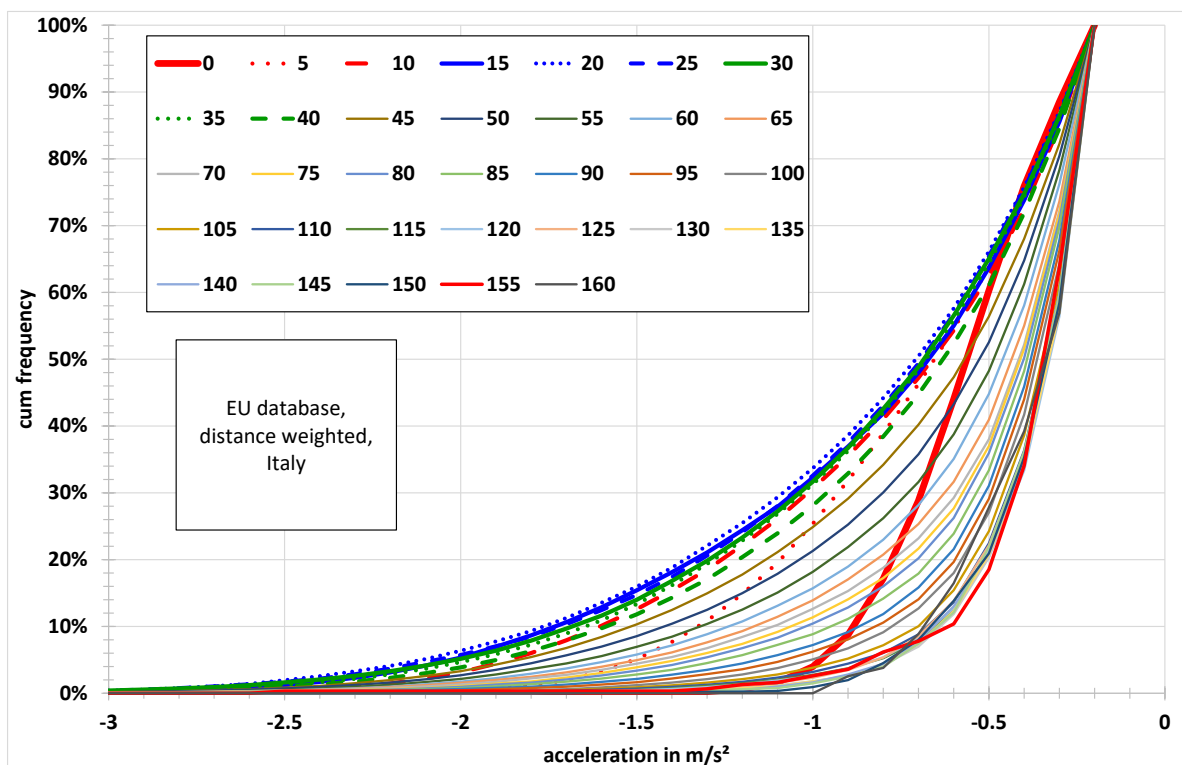


Figure 284: Deceleration distributions for vehicle speed classes, distance weighted, Italy

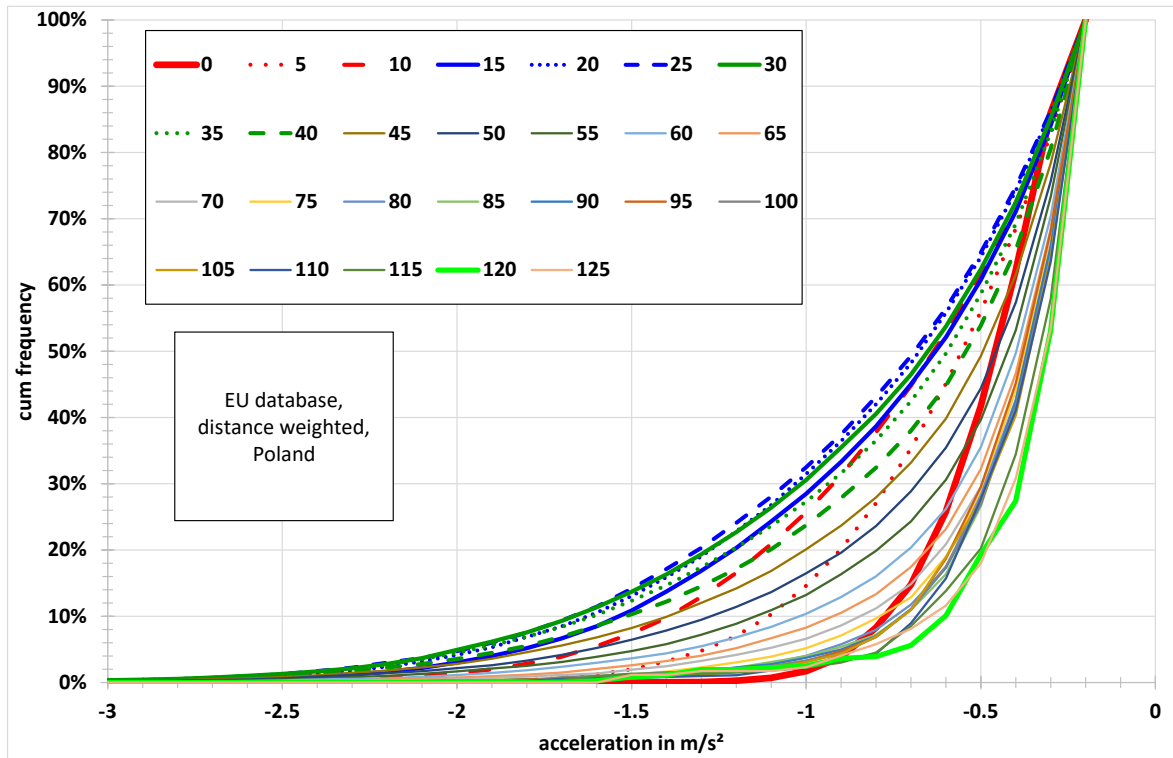


Figure 285: Deceleration distributions for vehicle speed classes, distance weighted, Poland

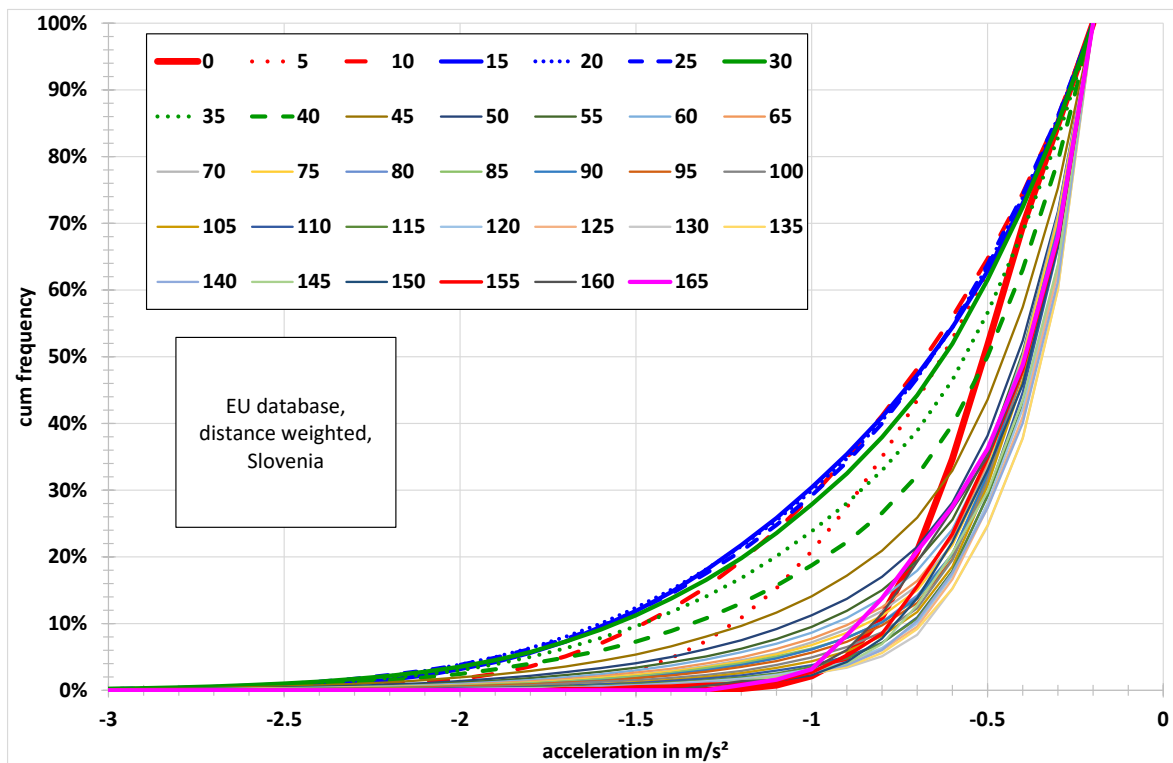


Figure 286: Deceleration distributions for vehicle speed classes, distance weighted, Slovenia

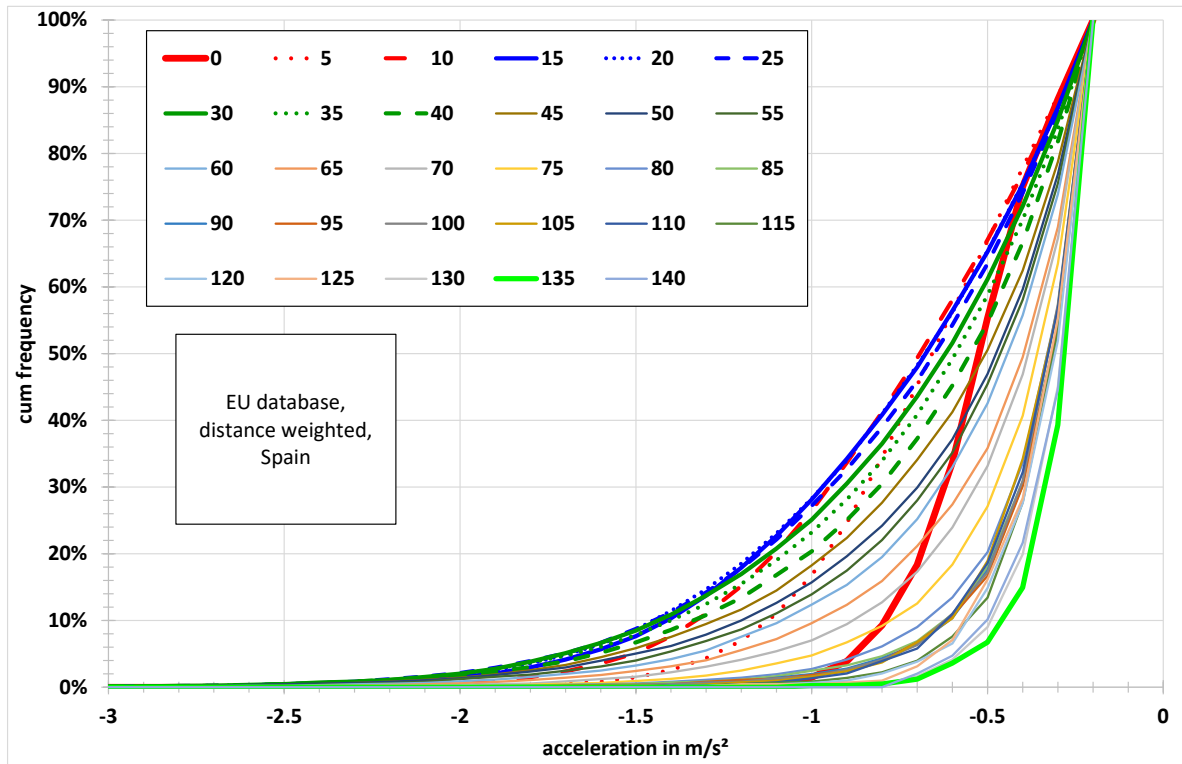


Figure 287: Deceleration distributions for vehicle speed classes, distance weighted, Spain

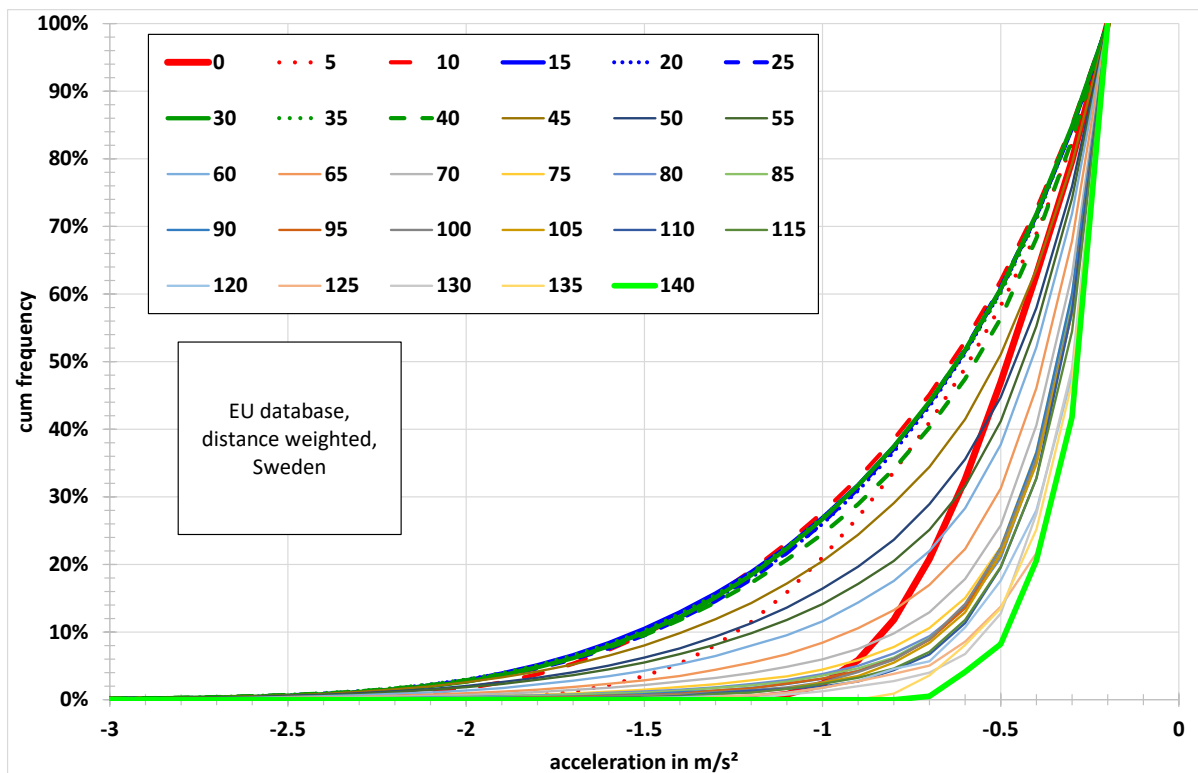


Figure 288: Deceleration distributions for vehicle speed classes, distance weighted, Sweden

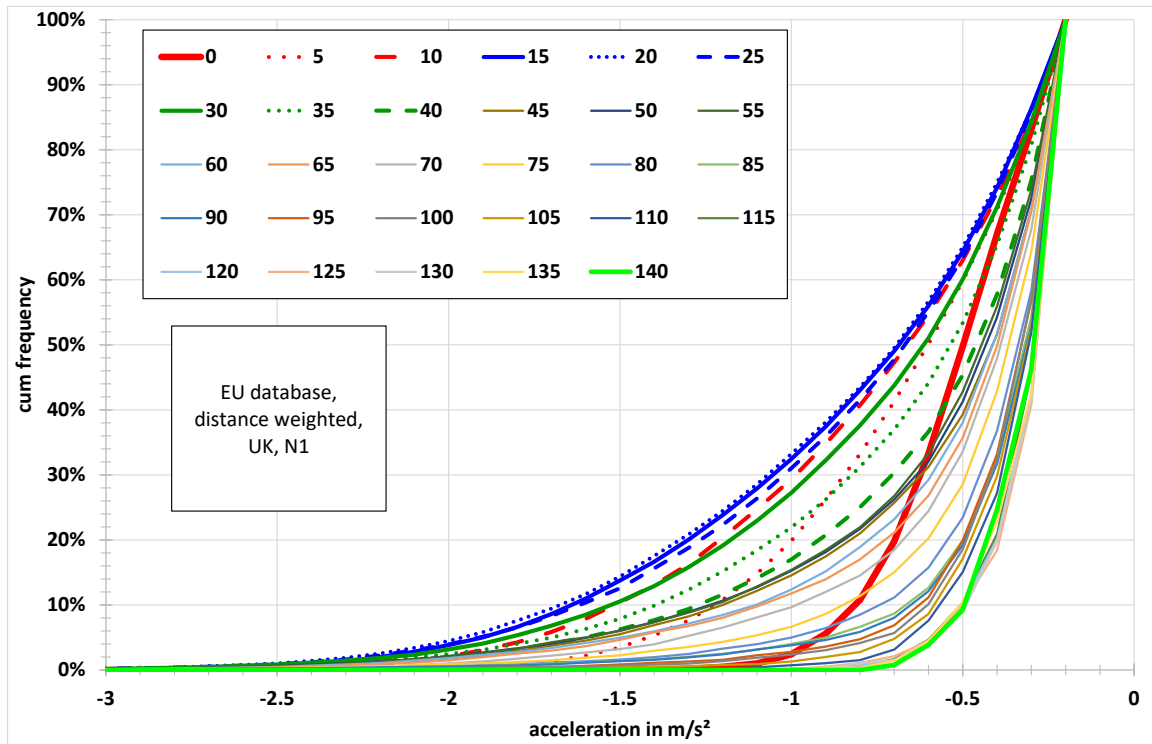


Figure 289: Deceleration distributions for vehicle speed classes, distance weighted, UK, N1

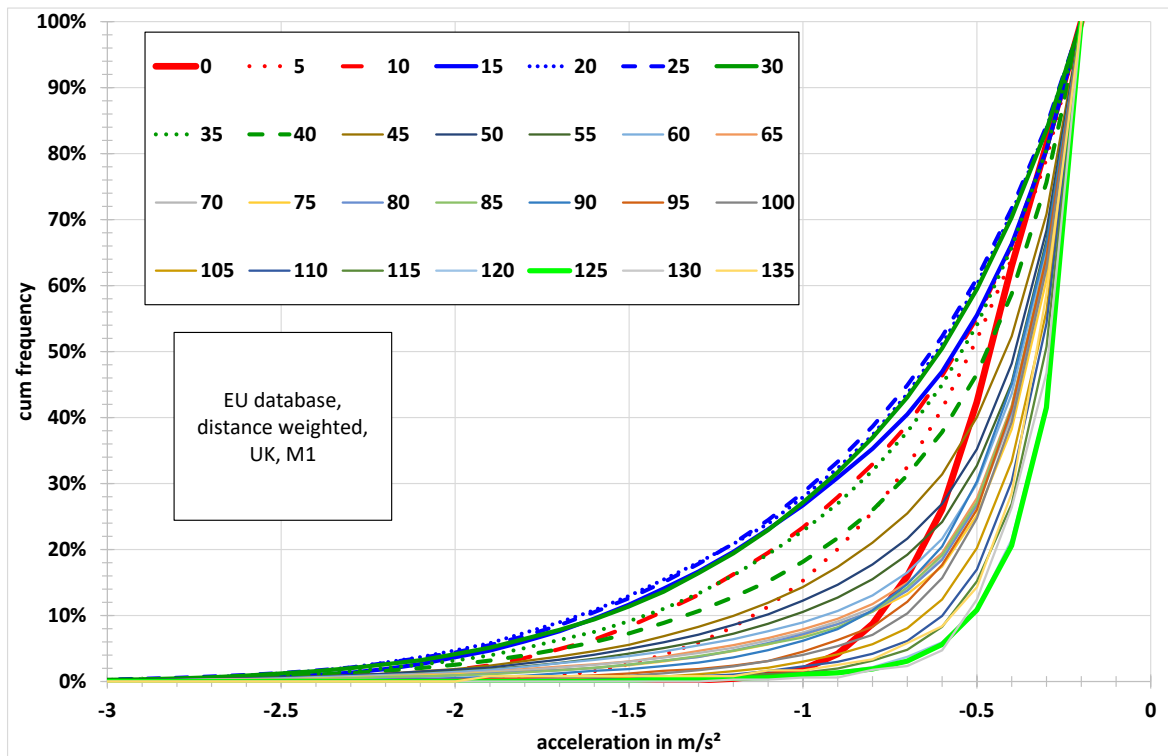


Figure 290: Deceleration distributions for vehicle speed classes, distance weighted, UK, M1

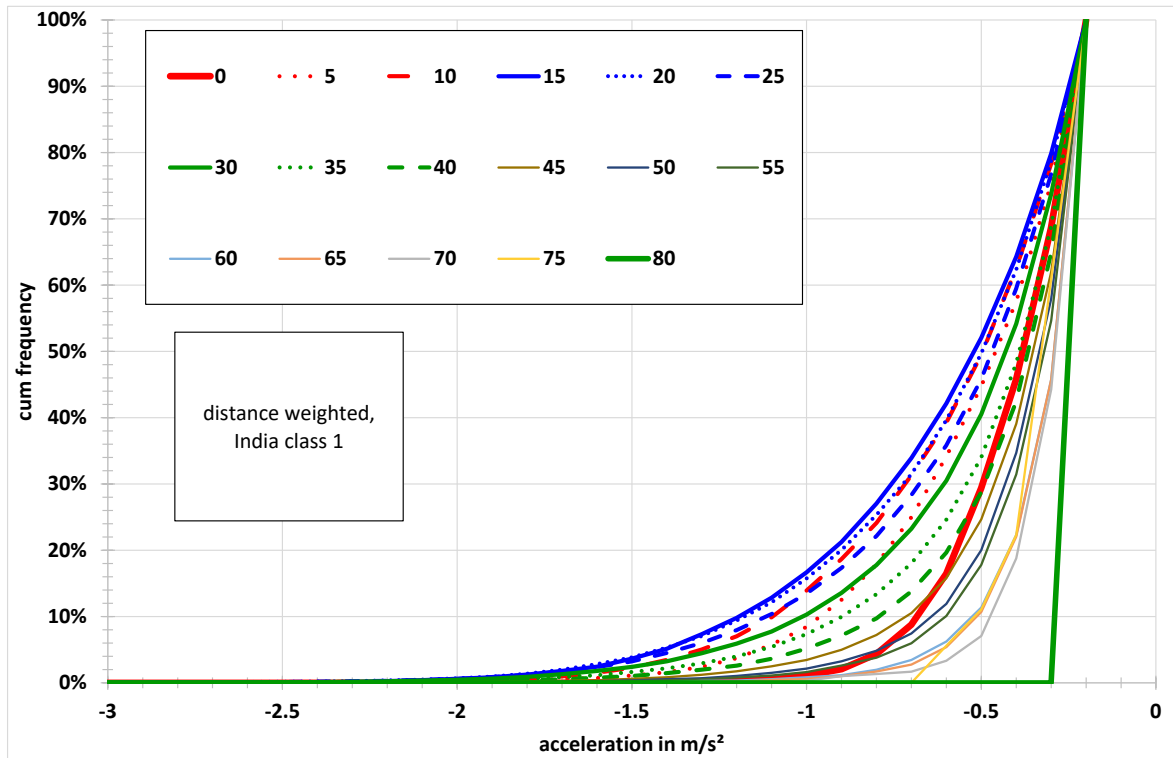


Figure 291: Deceleration distributions for vehicle speed classes, dist. weighted, India class 1

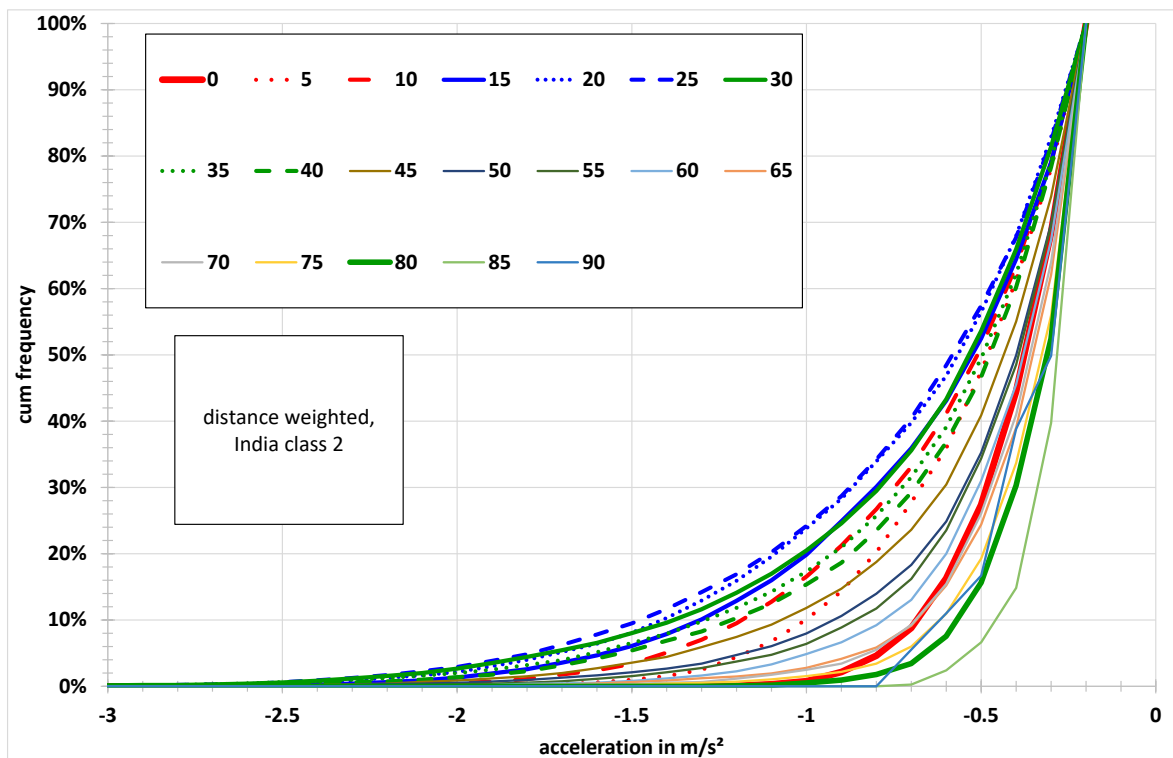


Figure 292: Deceleration distributions for vehicle speed classes, dist. weighted, India class 2

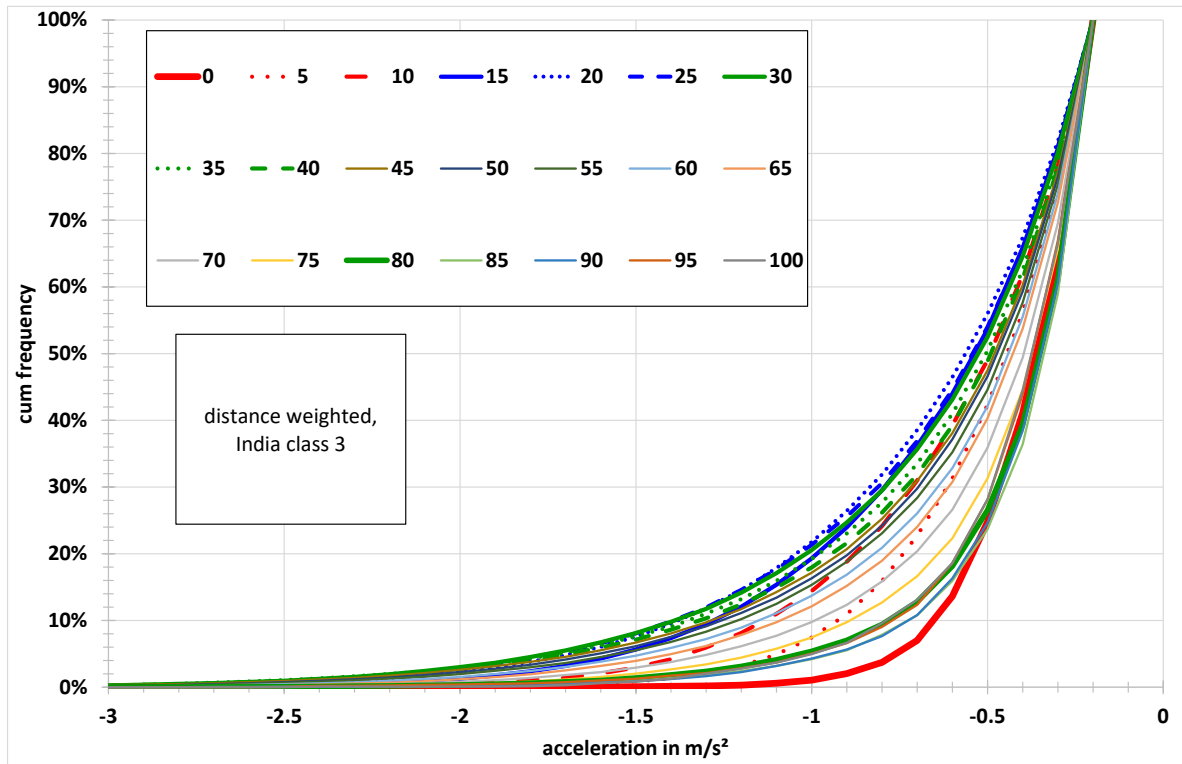


Figure 293: Deceleration distributions for vehicle speed classes, dist. weighted, India class 3

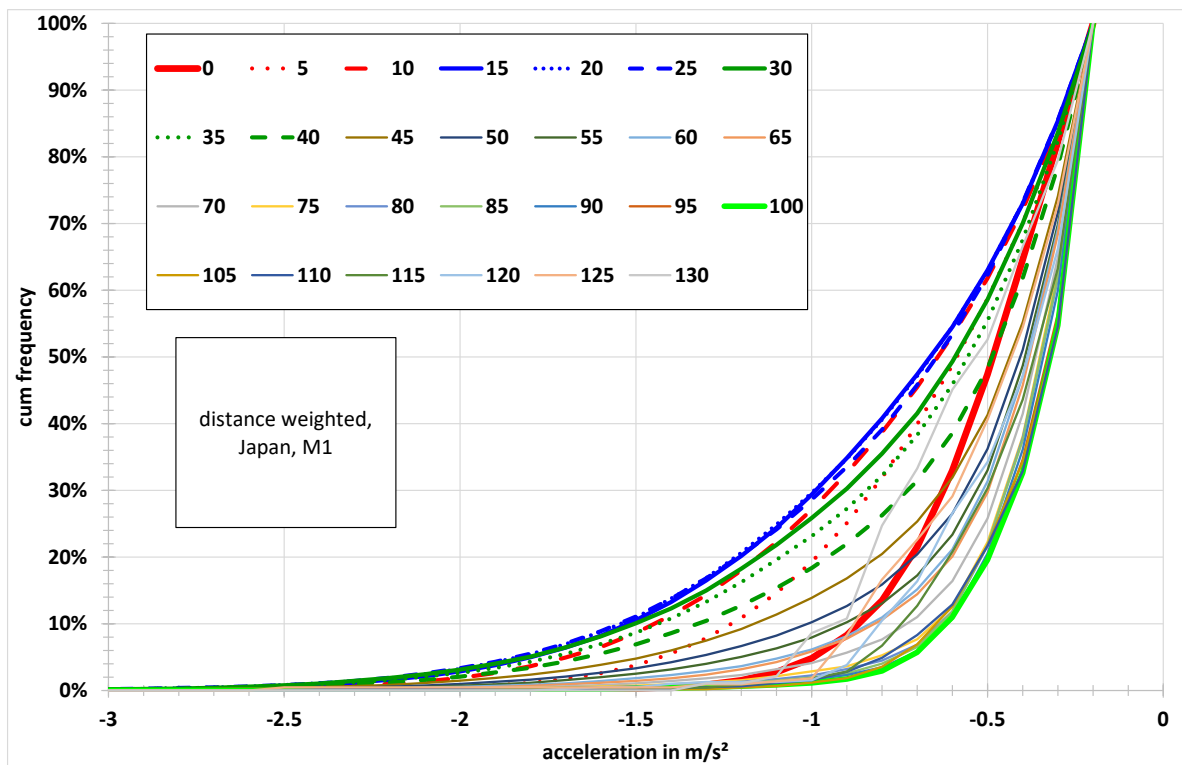


Figure 294: Deceleration distributions for vehicle speed classes, distance weighted, Japan M1

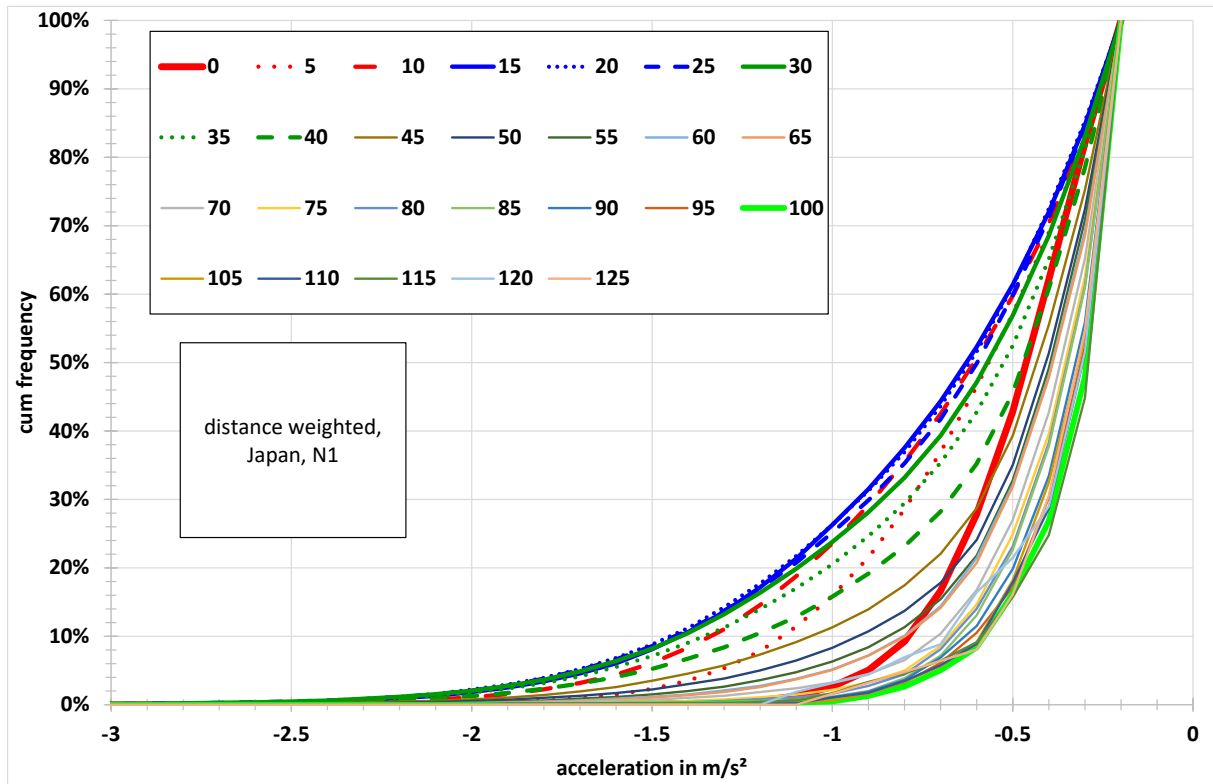


Figure 295: Deceleration distributions for vehicle speed classes, distance weighted, Japan N1

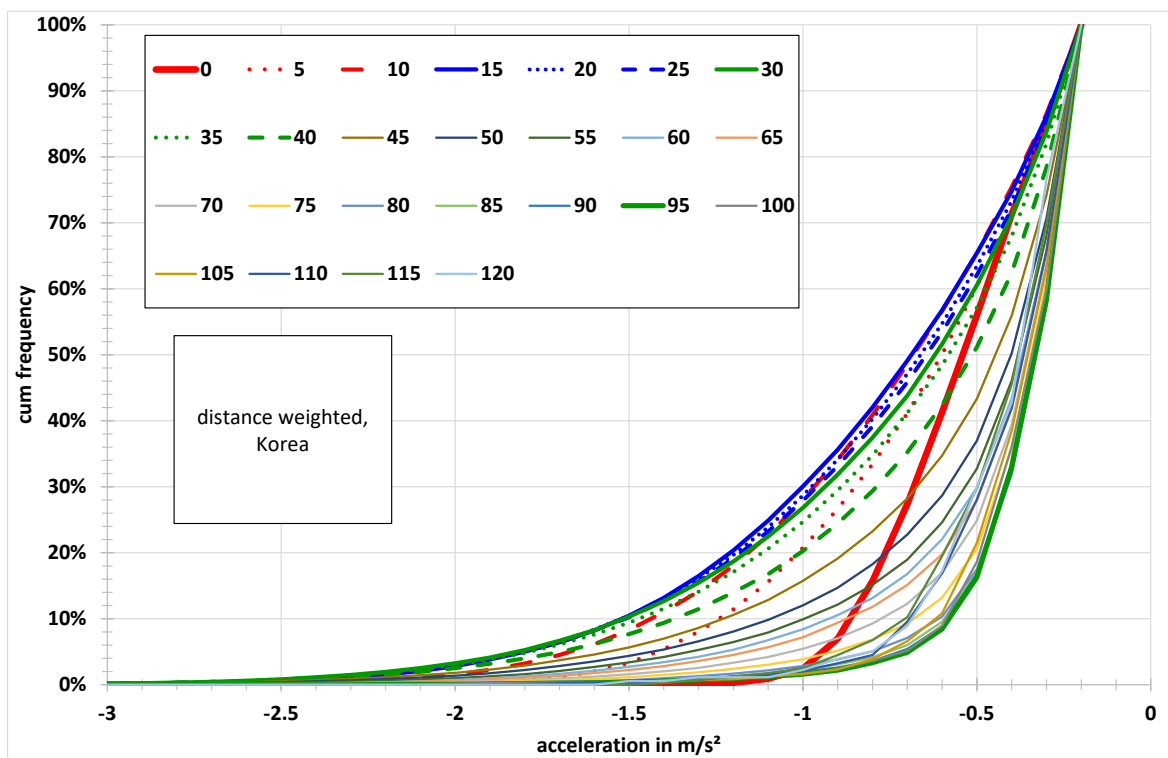


Figure 296: Deceleration distributions for vehicle speed classes, distance weighted, Korea

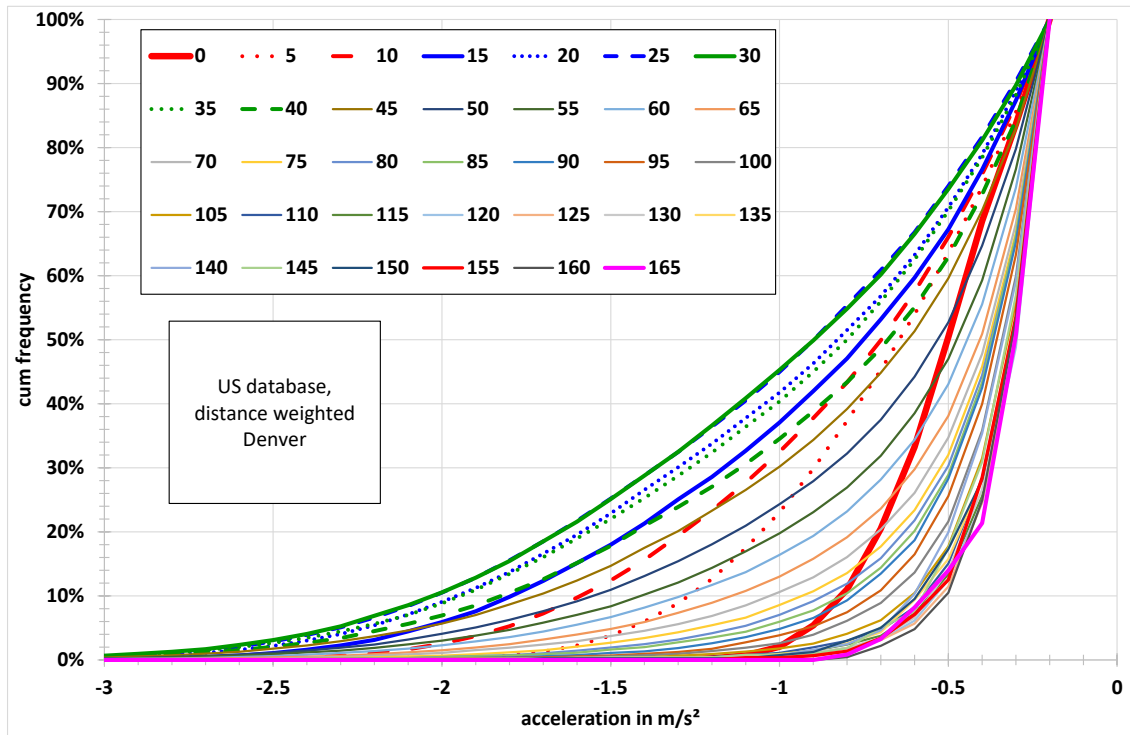


Figure 297: Deceleration distributions for vehicle speed classes, distance weighted, USA, Denver

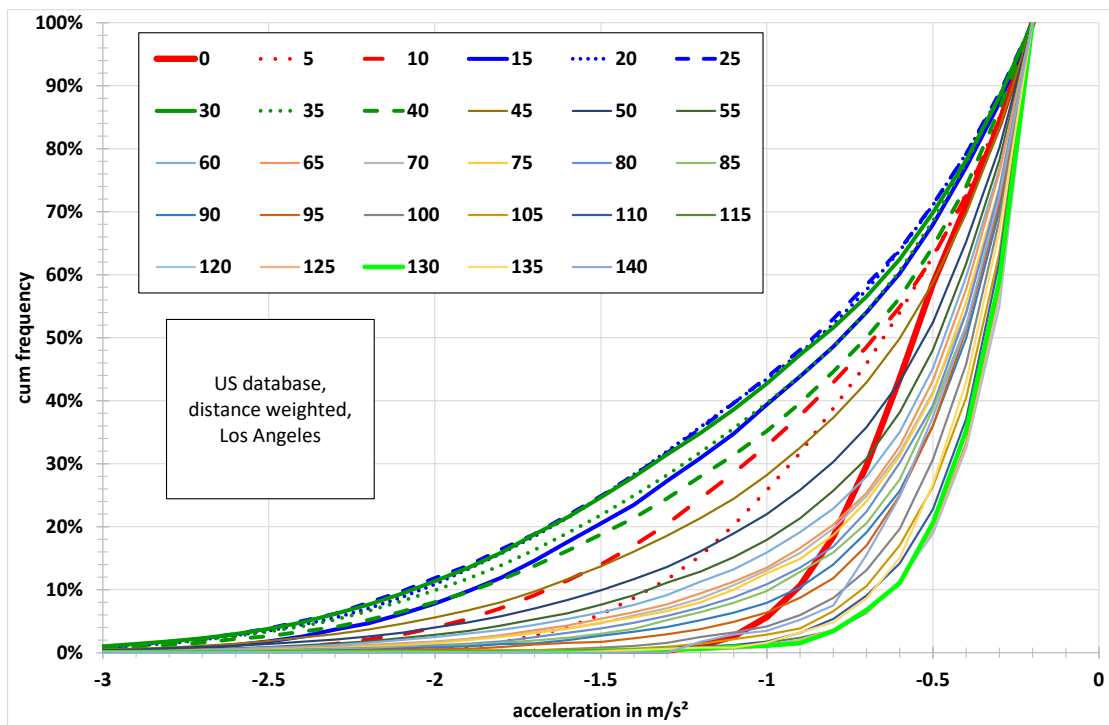


Figure 298: Deceleration distributions for vehicle speed classes, distance weighted, USA, Los Angeles

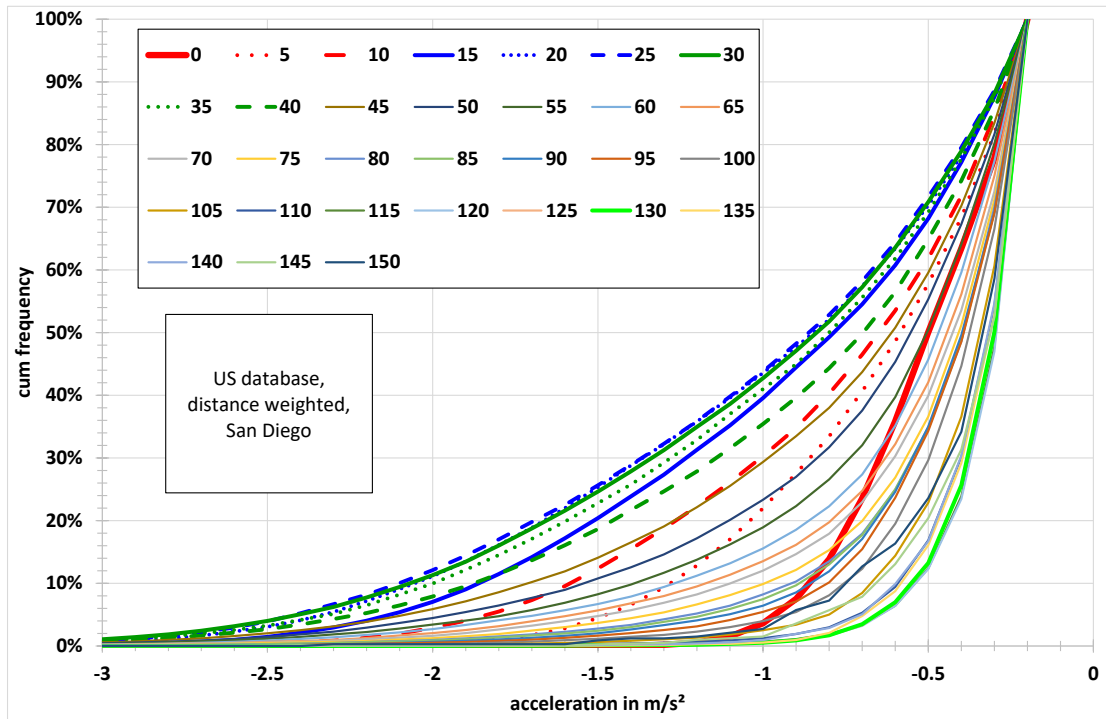


Figure 299: Deceleration distributions for vehicle speed classes, distance weighted, USA, San Diego

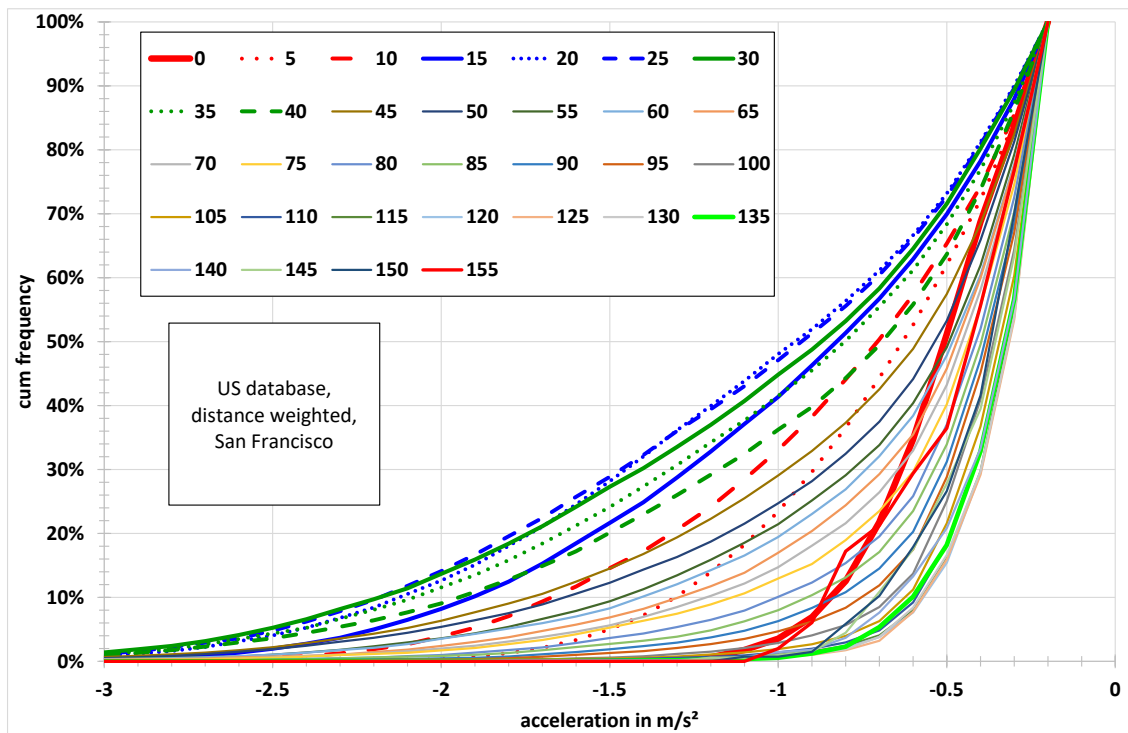


Figure 300: Deceleration distributions for vehicle speed classes, distance weighted, USA, San Francisco



15 Vehicle specific acceleration distributions, EU database

15.1 Time weighted

The numbers in the legends are vehicle indicators according to Table 61 to Table 66.

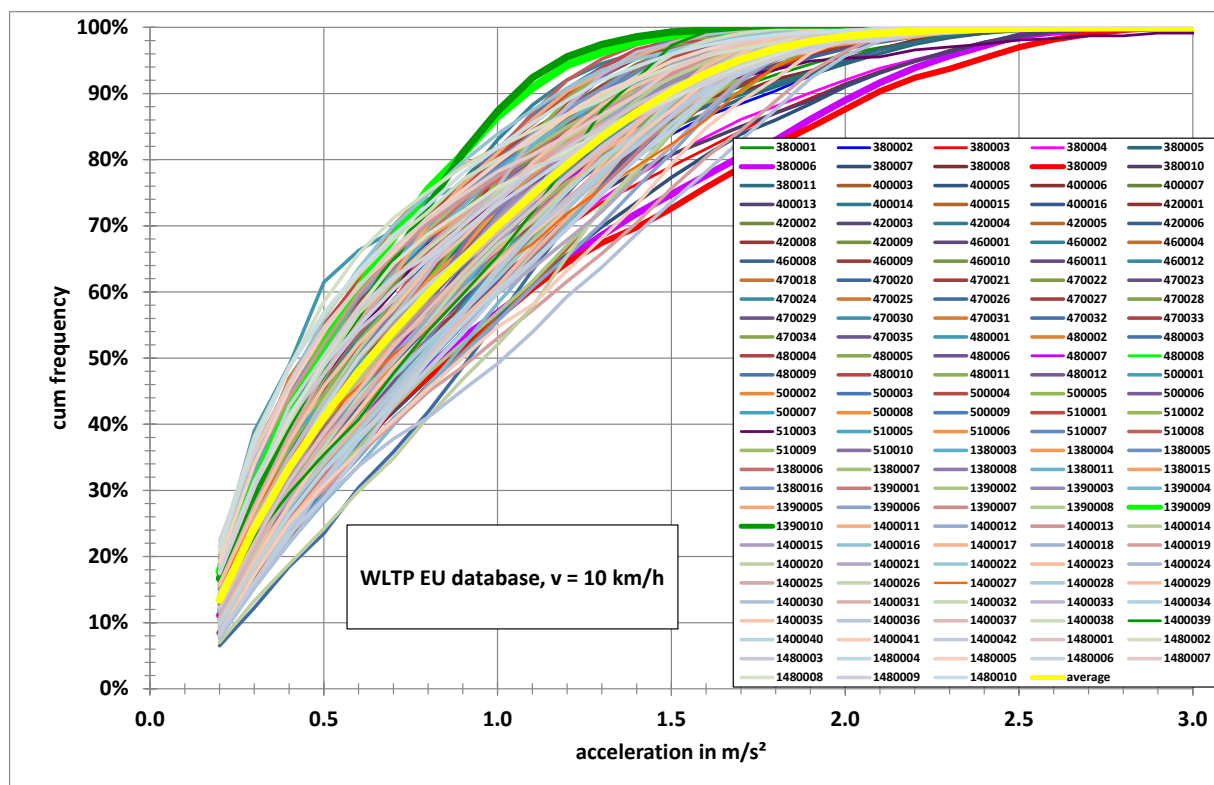


Figure 301: Acceleration distribution, vehicle speeds between 7.5 km/h and 12.5 km/h

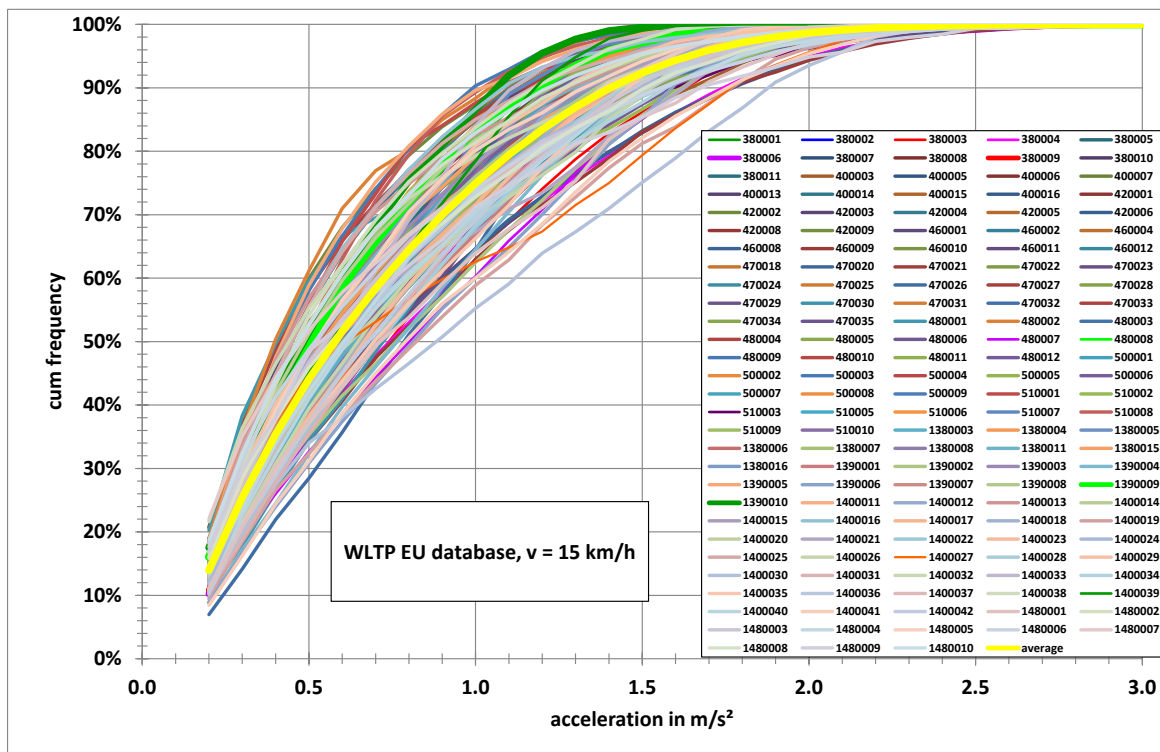


Figure 302: Acceleration distribution, vehicle speeds between 12.5 km/h and 17.5 km/h

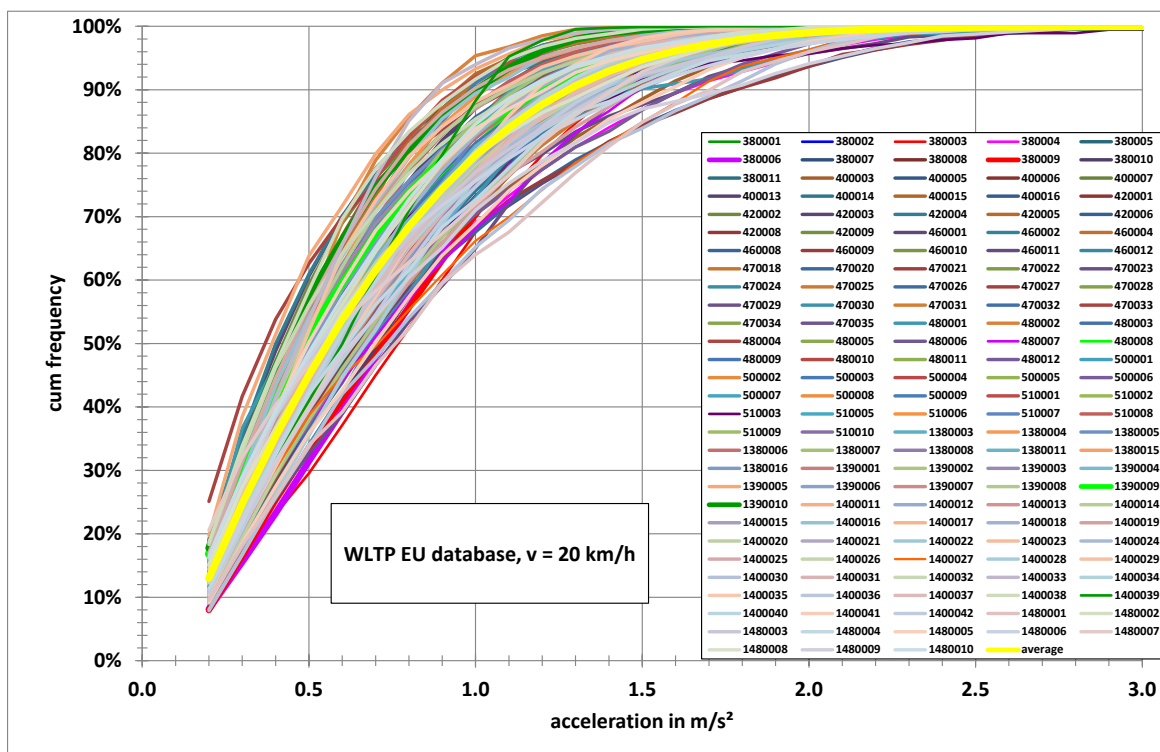


Figure 303: Acceleration distribution, vehicle speeds between 17.5 km/h and 22.5 km/h

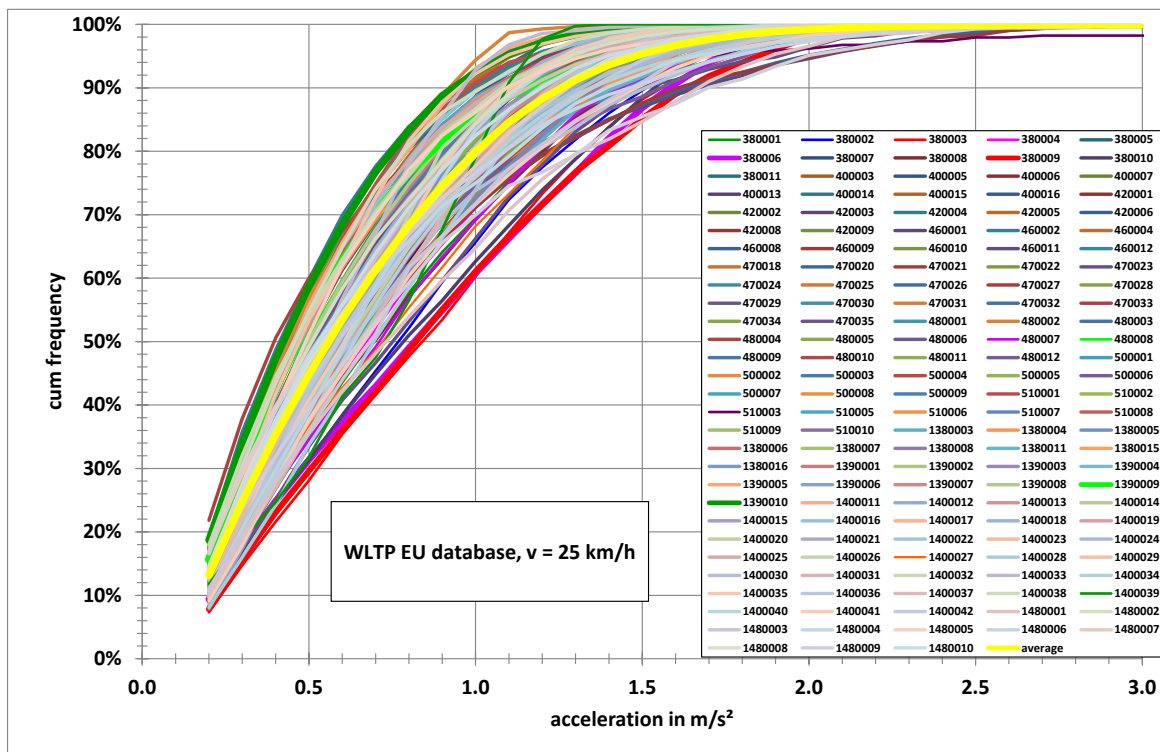


Figure 304: Acceleration distribution, vehicle speeds between 22.5 km/h and 27.5 km/h

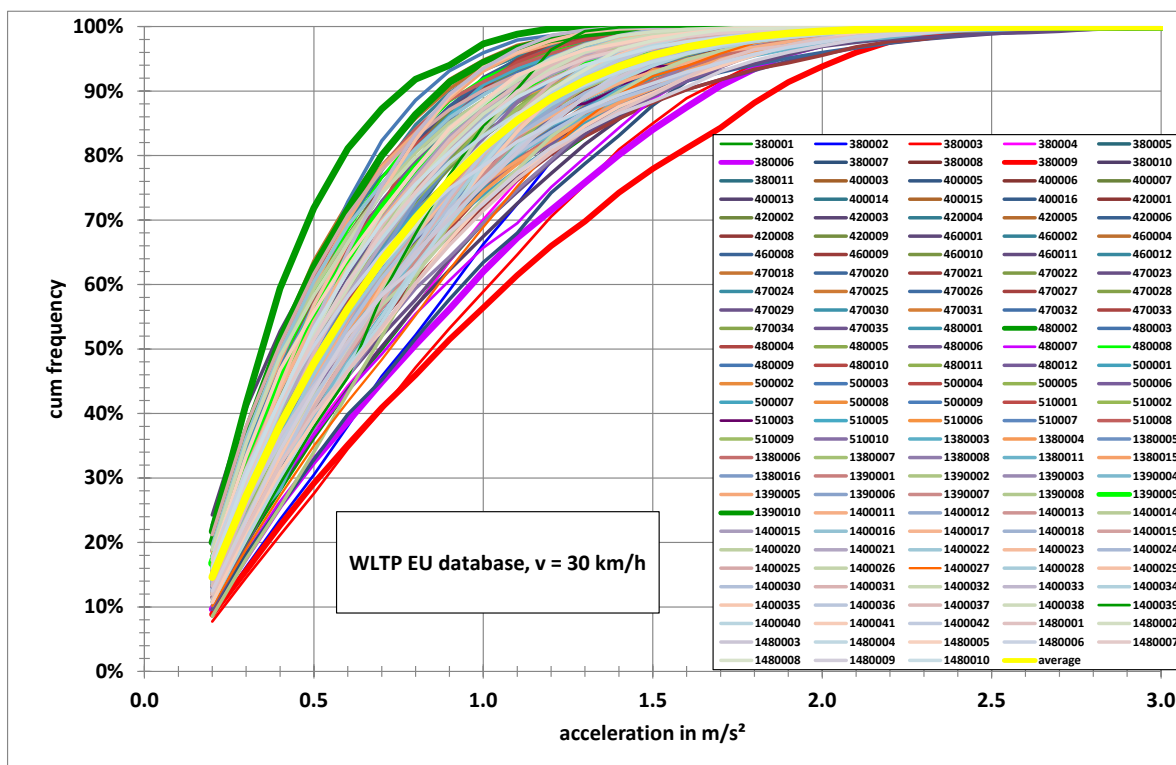


Figure 305: Acceleration distribution, vehicle speeds between 27.5 km/h and 32.5 km/h

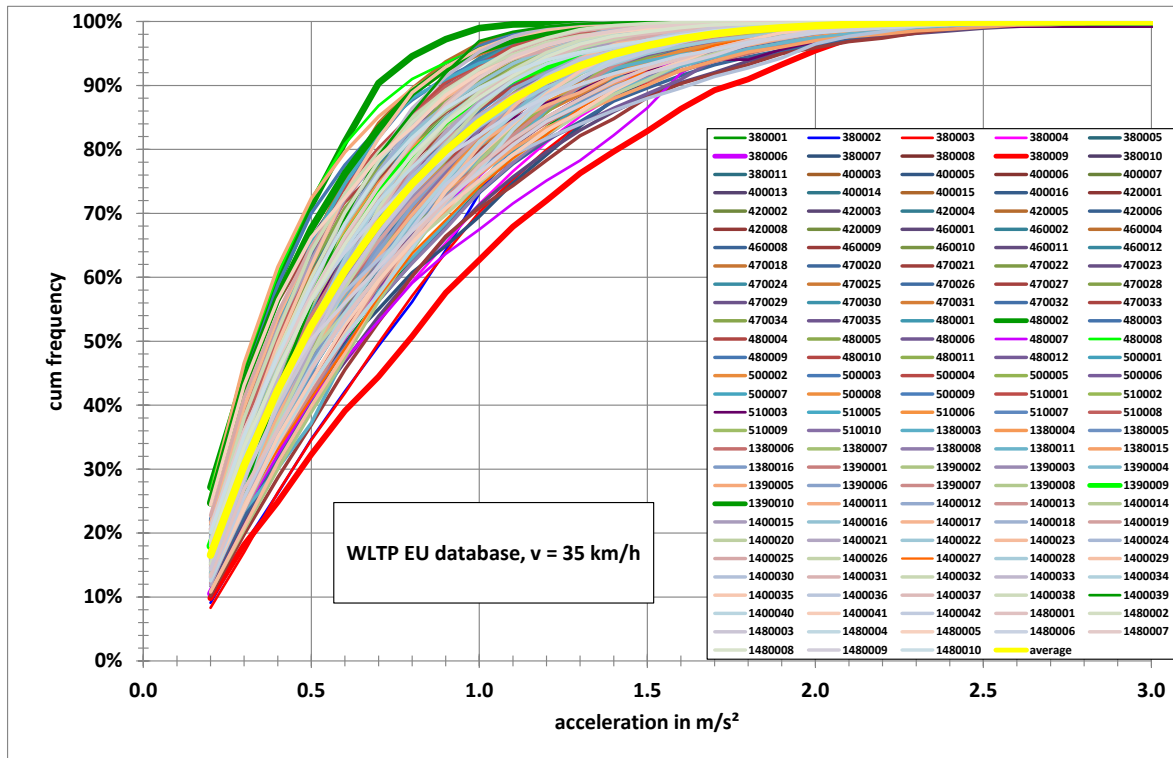


Figure 306: Acceleration distribution, vehicle speeds between 32.5 km/h and 37.5 km/h

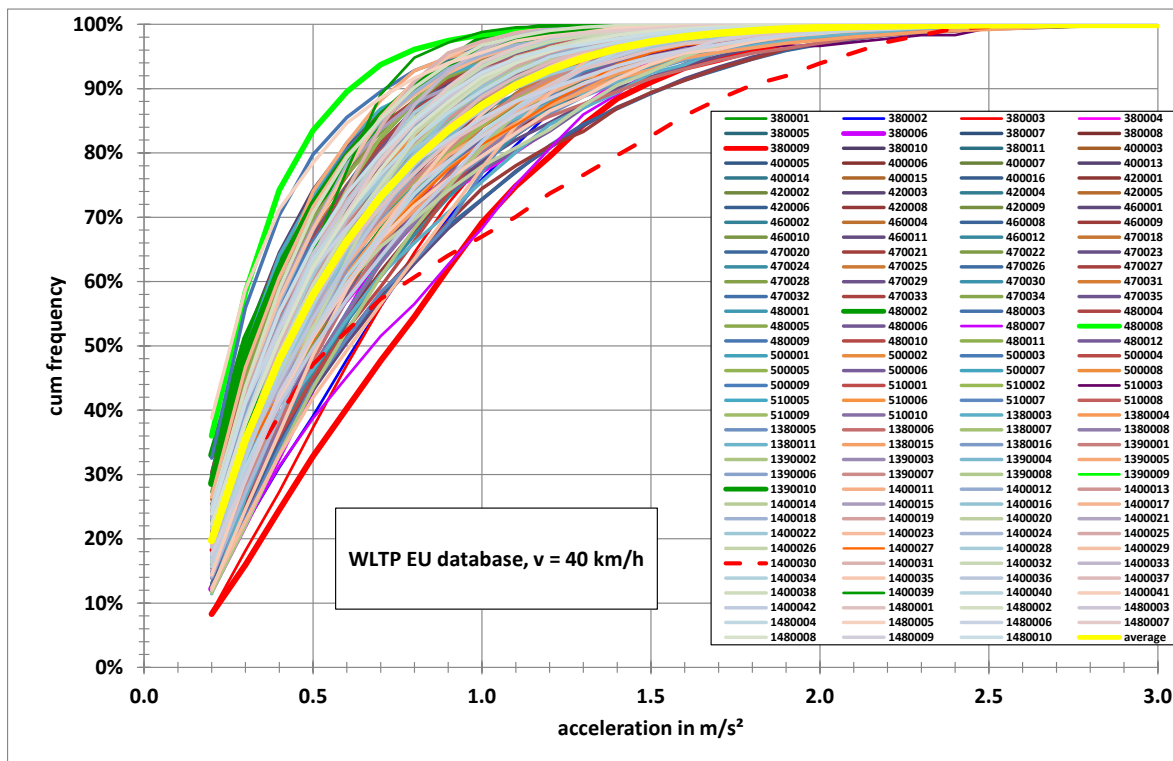


Figure 307: Acceleration distribution, vehicle speeds between 37.5 km/h and 42.5 km/h

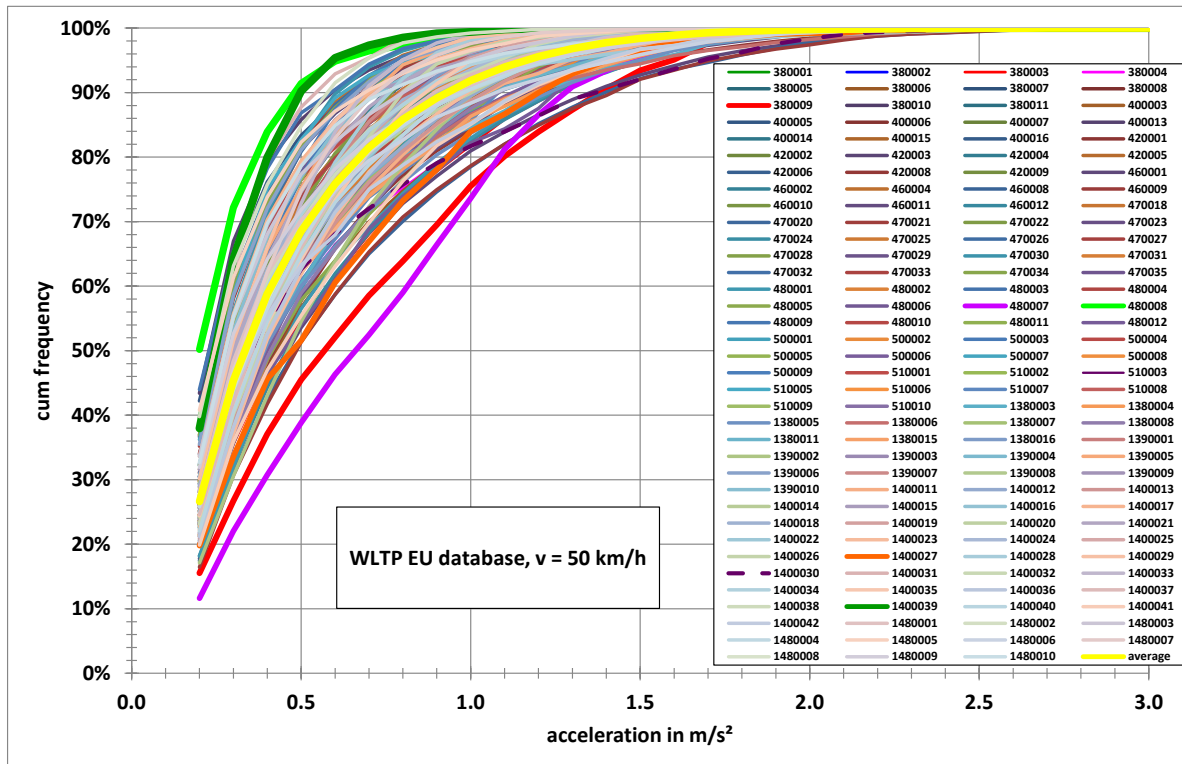


Figure 308: Acceleration distribution, vehicle speeds between 47.5 km/h and 52.5 km/h

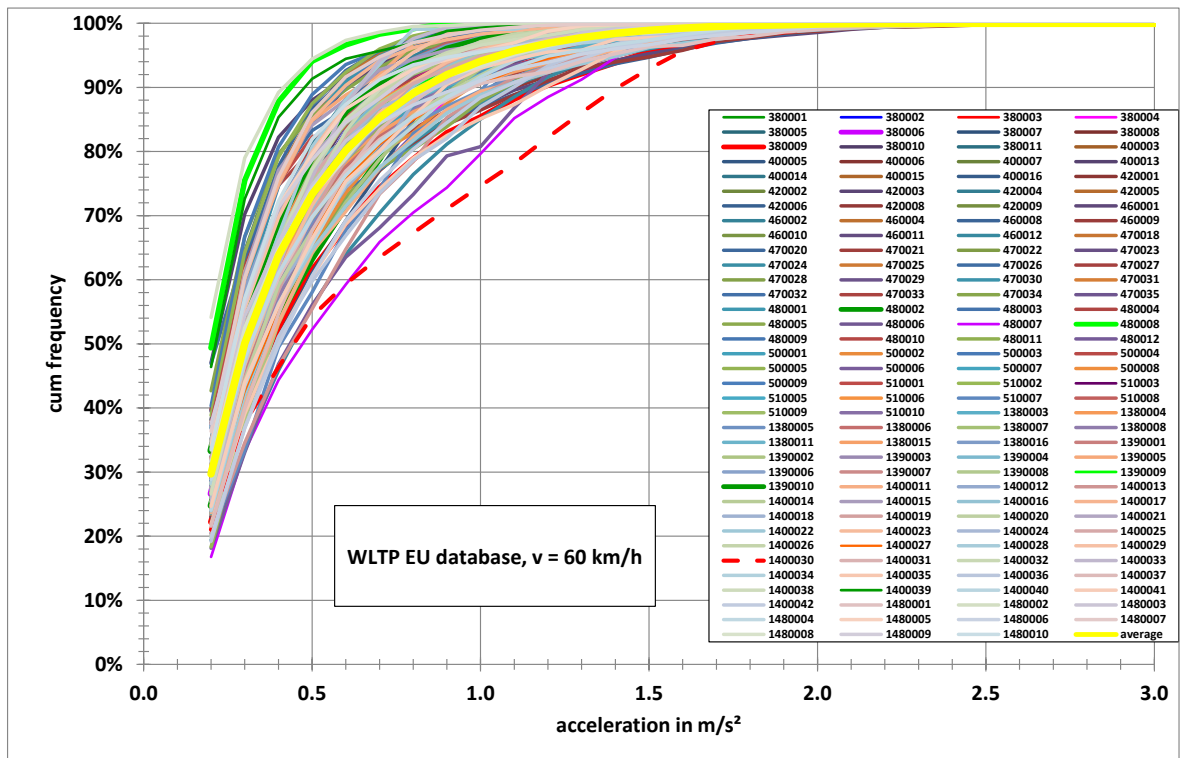


Figure 309: Acceleration distribution, vehicle speeds between 57.5 km/h and 62.5 km/h

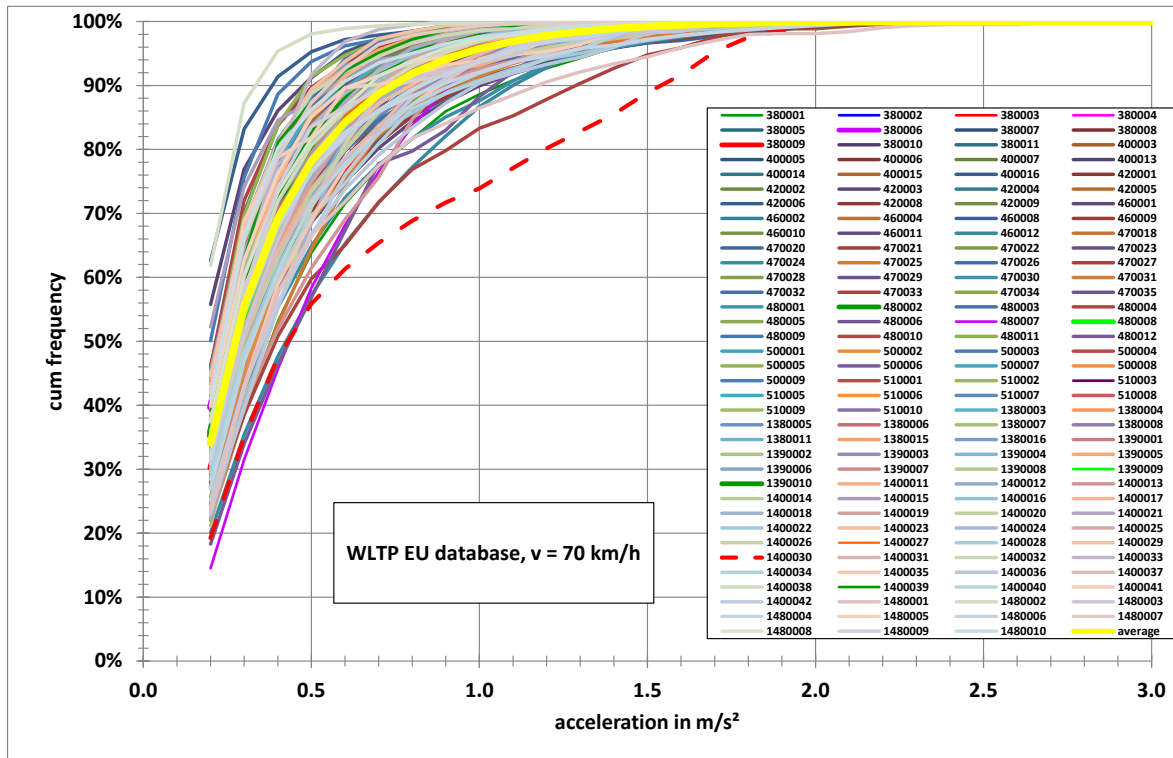


Figure 310: Acceleration distribution, vehicle speeds between 67.5 km/h and 72.5 km/h

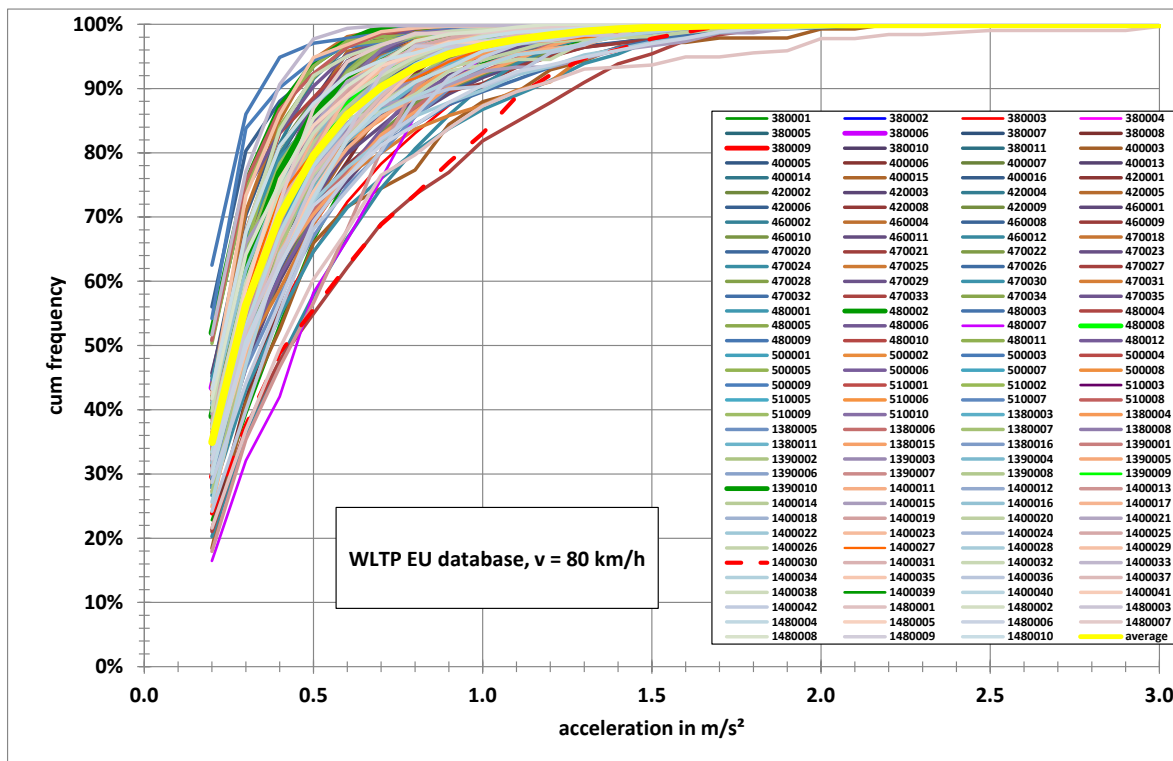


Figure 311: Acceleration distribution, vehicle speeds between 77.5 km/h and 82.5 km/h

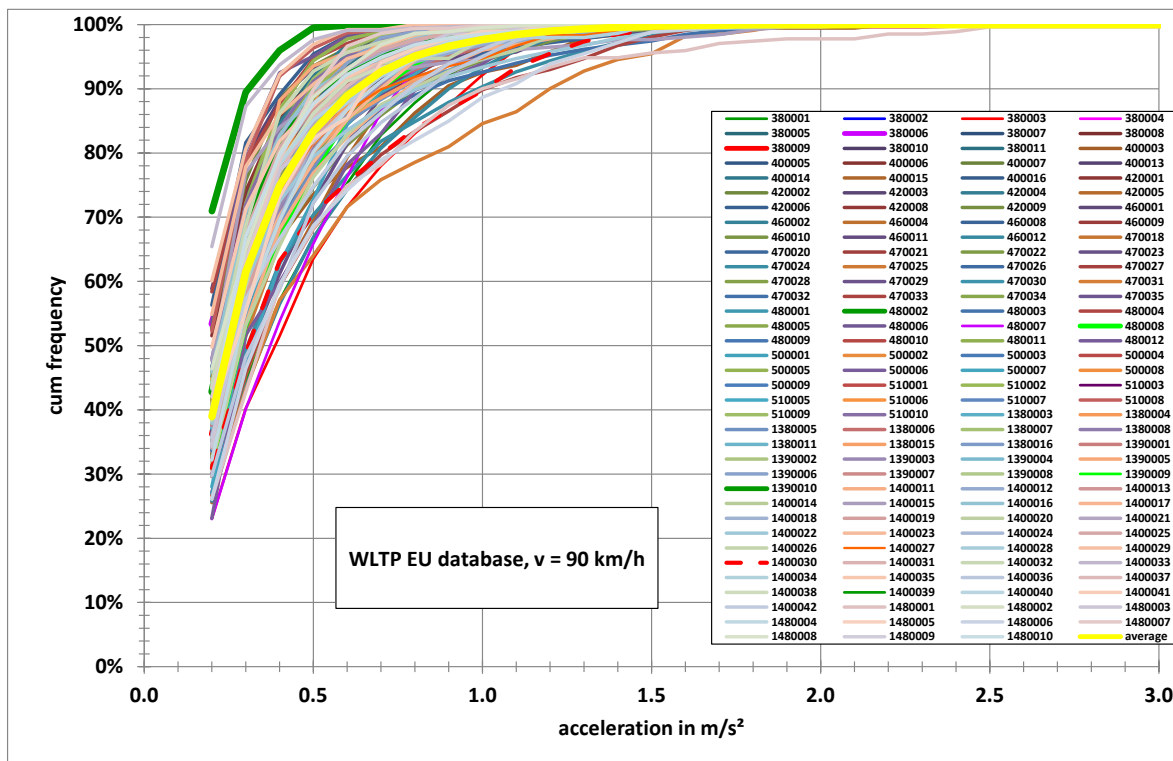


Figure 312: Acceleration distribution, vehicle speeds between 87.5 km/h and 92.5 km/h

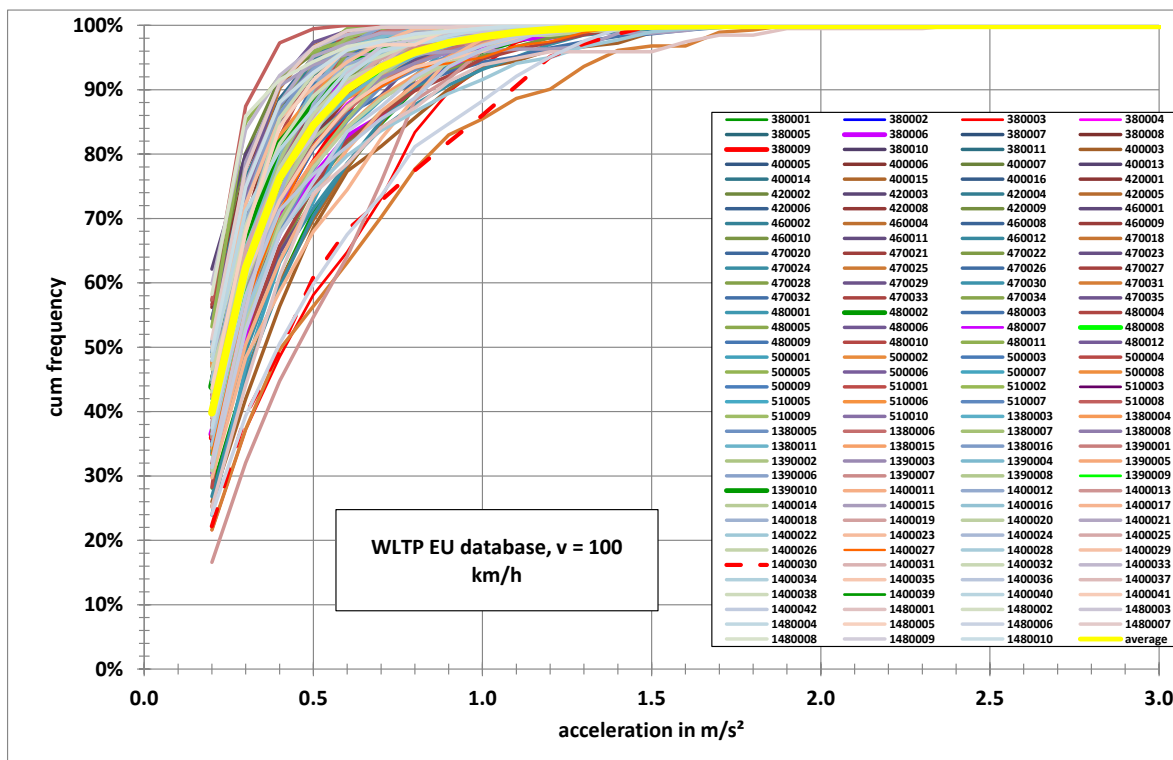


Figure 313: Acceleration distribution, vehicle speeds between 97.5 km/h and 102.5 km/h

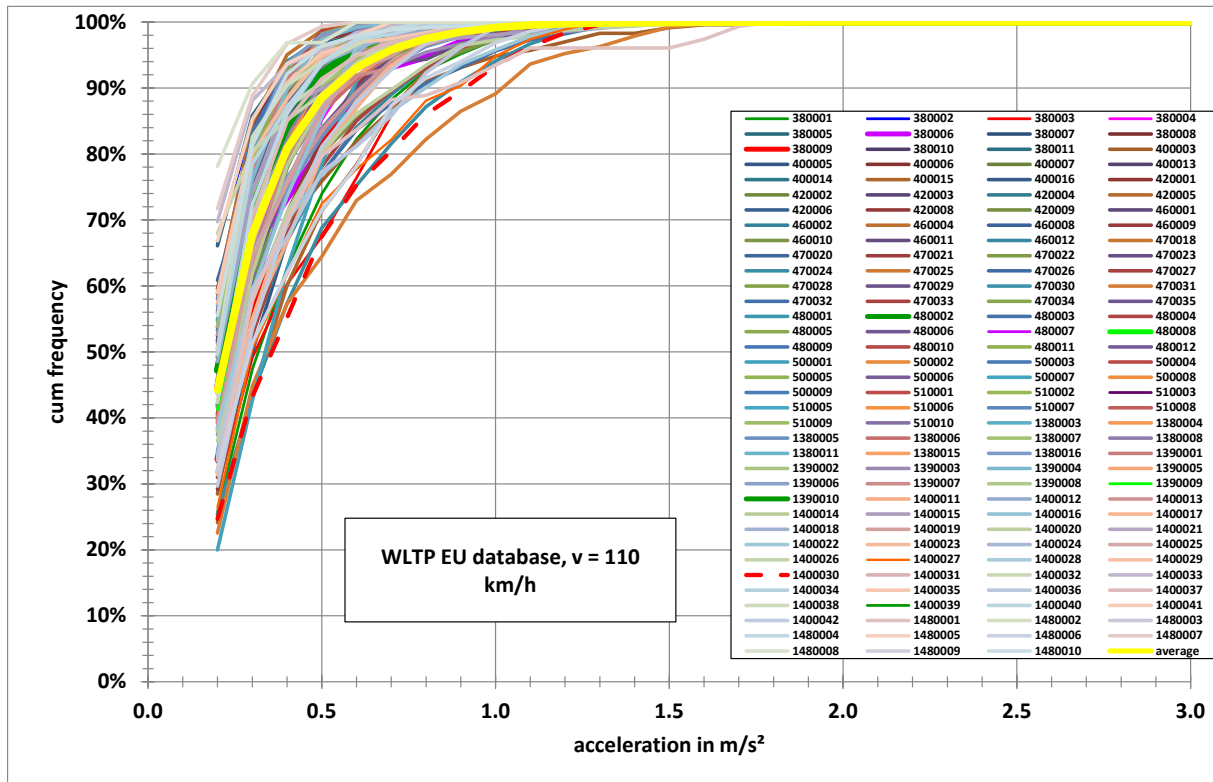


Figure 314: Acceleration distribution, vehicle speeds between 107.5 km/h and 112.5 km/h



15.2 Distance weighted

The numbers in the legends are vehicle indicators according to Table 61 to Table 66.

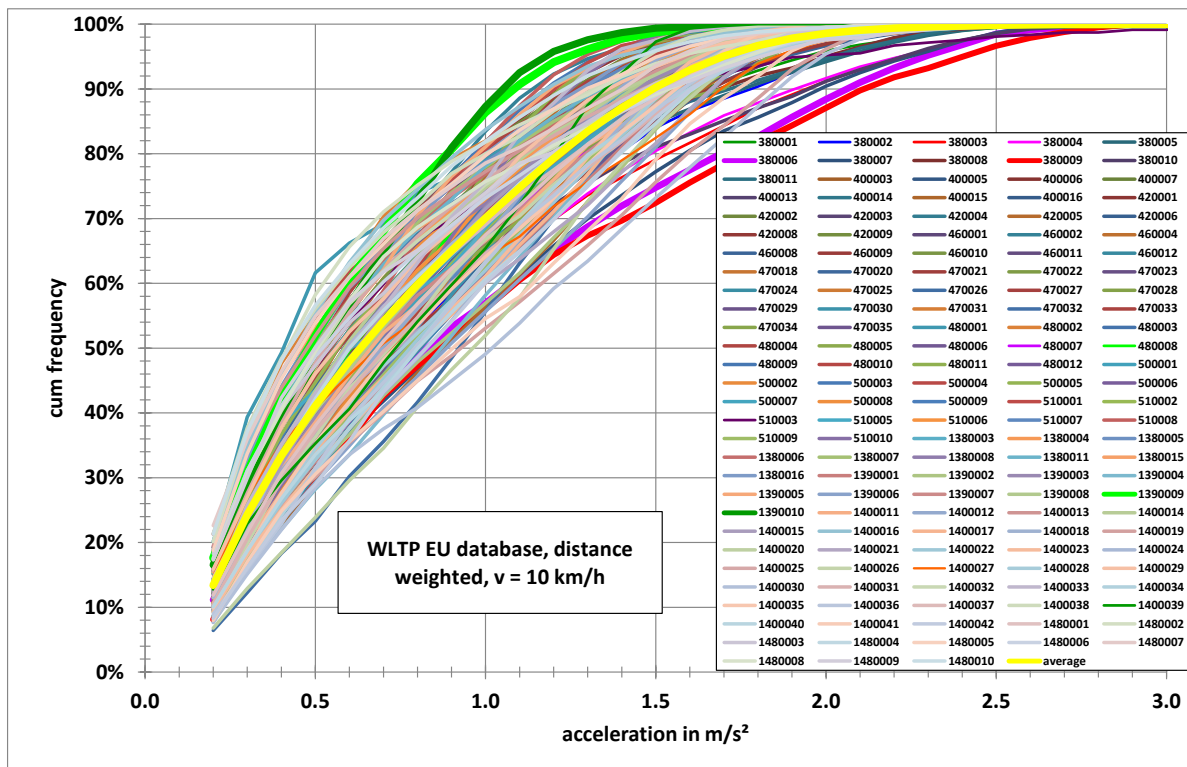


Figure 315: Acceleration distribution, vehicle speeds between 7.5 km/h and 12.5 km/h

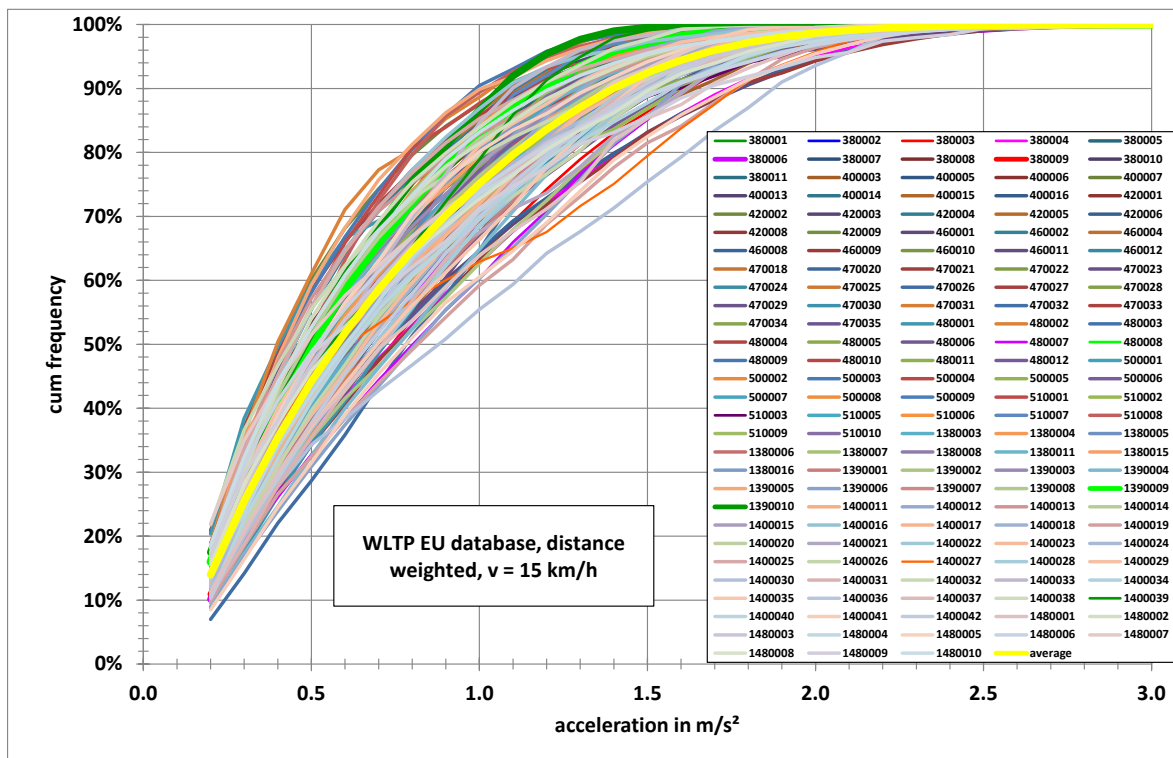


Figure 316: Acceleration distribution, vehicle speeds between 12.5 km/h and 17.5 km/h

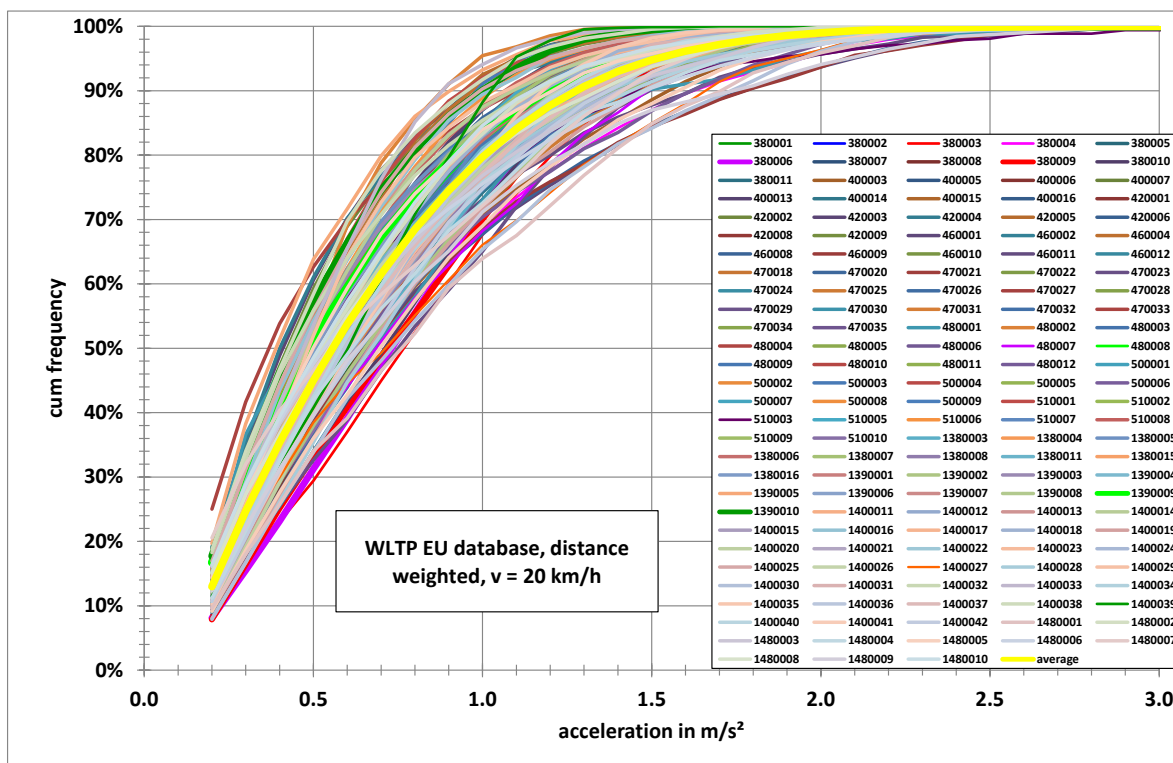


Figure 317: Acceleration distribution, vehicle speeds between 17.5 km/h and 22.5 km/h

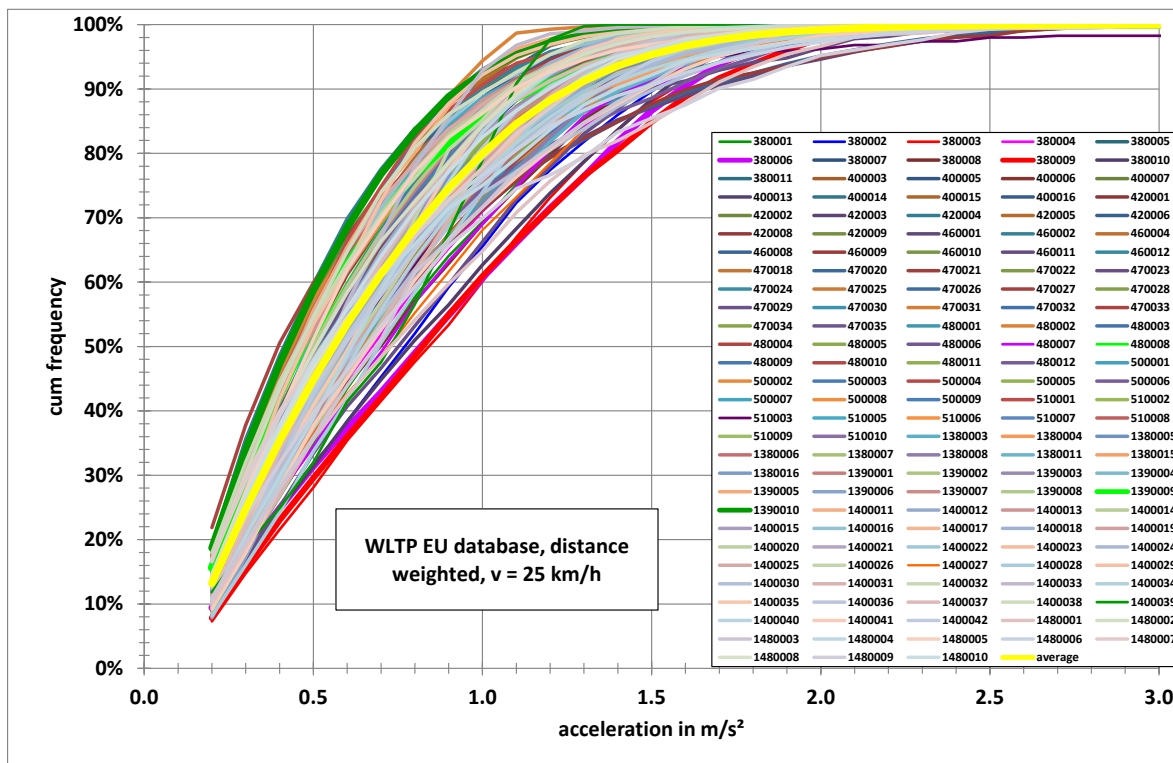


Figure 318: Acceleration distribution, vehicle speeds between 22.5 km/h and 27.5 km/h

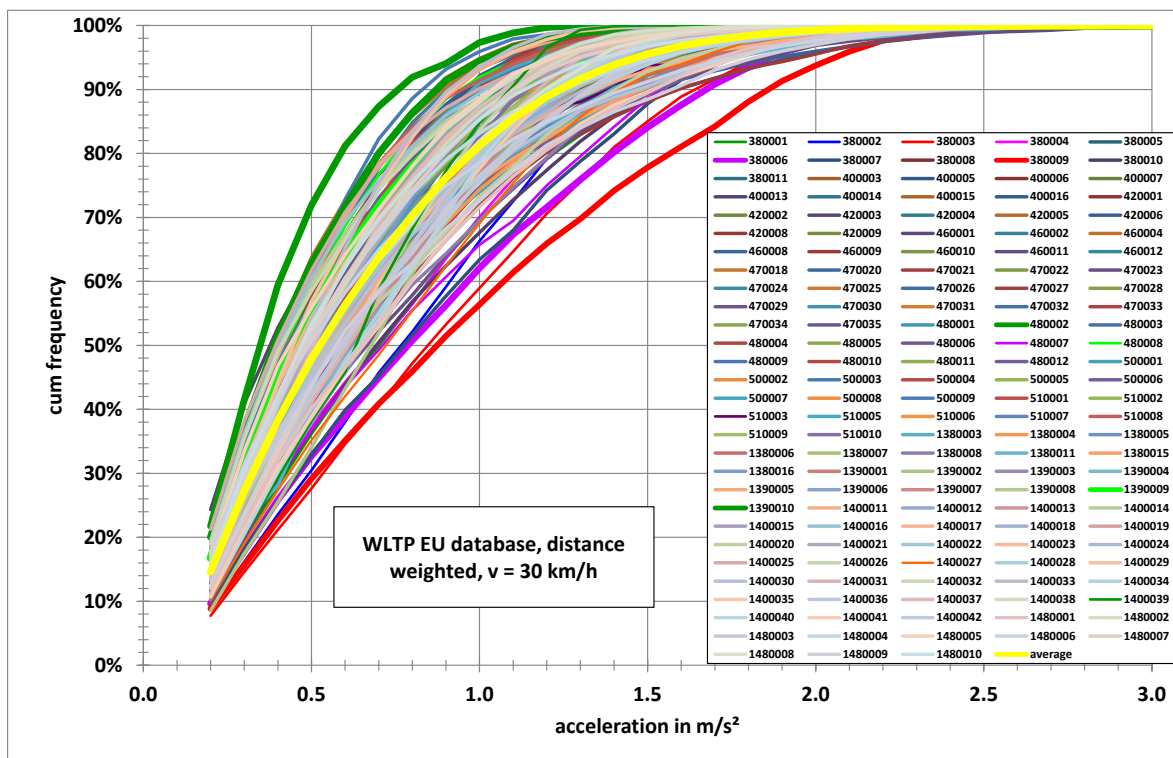


Figure 319: Acceleration distribution, vehicle speeds between 27.5 km/h and 32.5 km/h

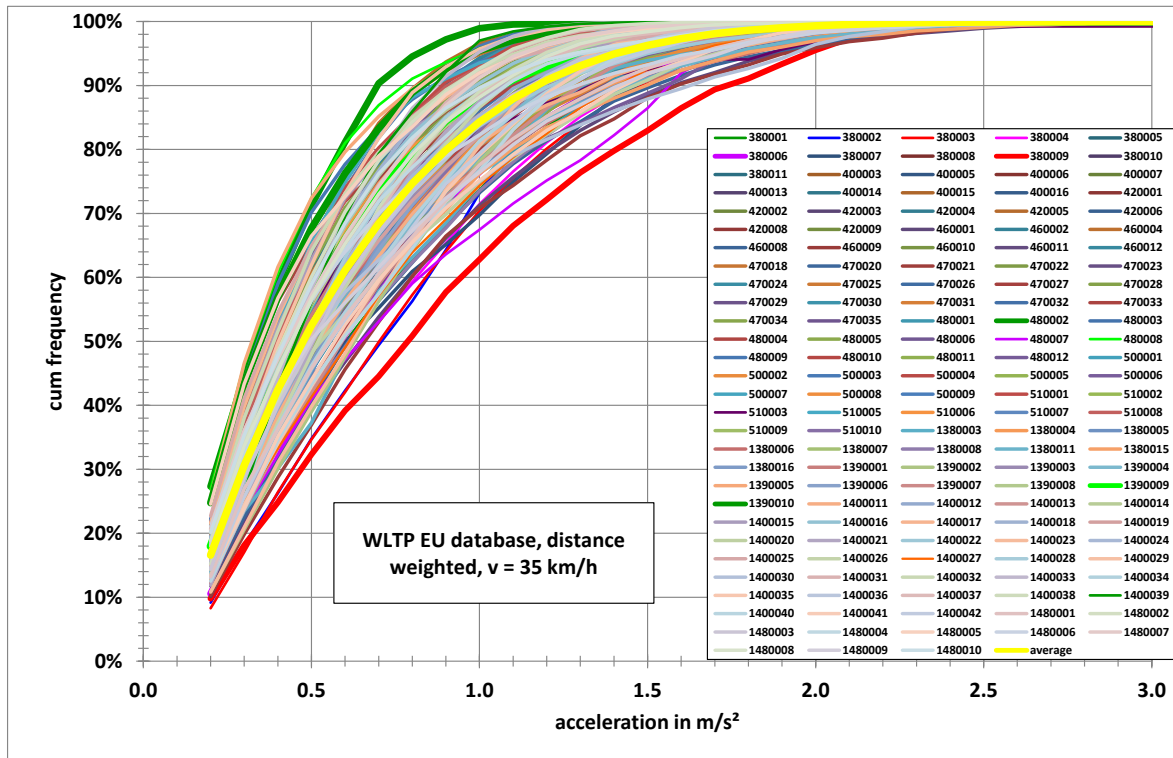


Figure 320: Acceleration distribution, vehicle speeds between 32.5 km/h and 37.5 km/h

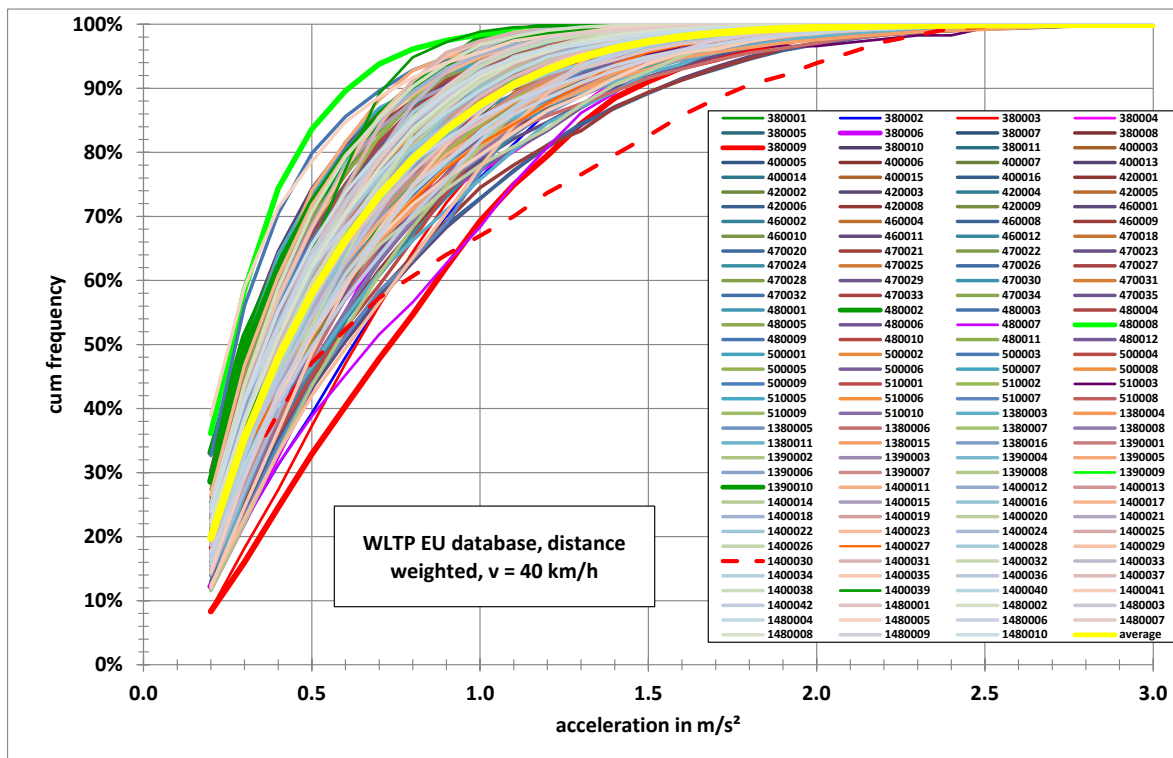


Figure 321: Acceleration distribution, vehicle speeds between 37.5 km/h and 42.5 km/h

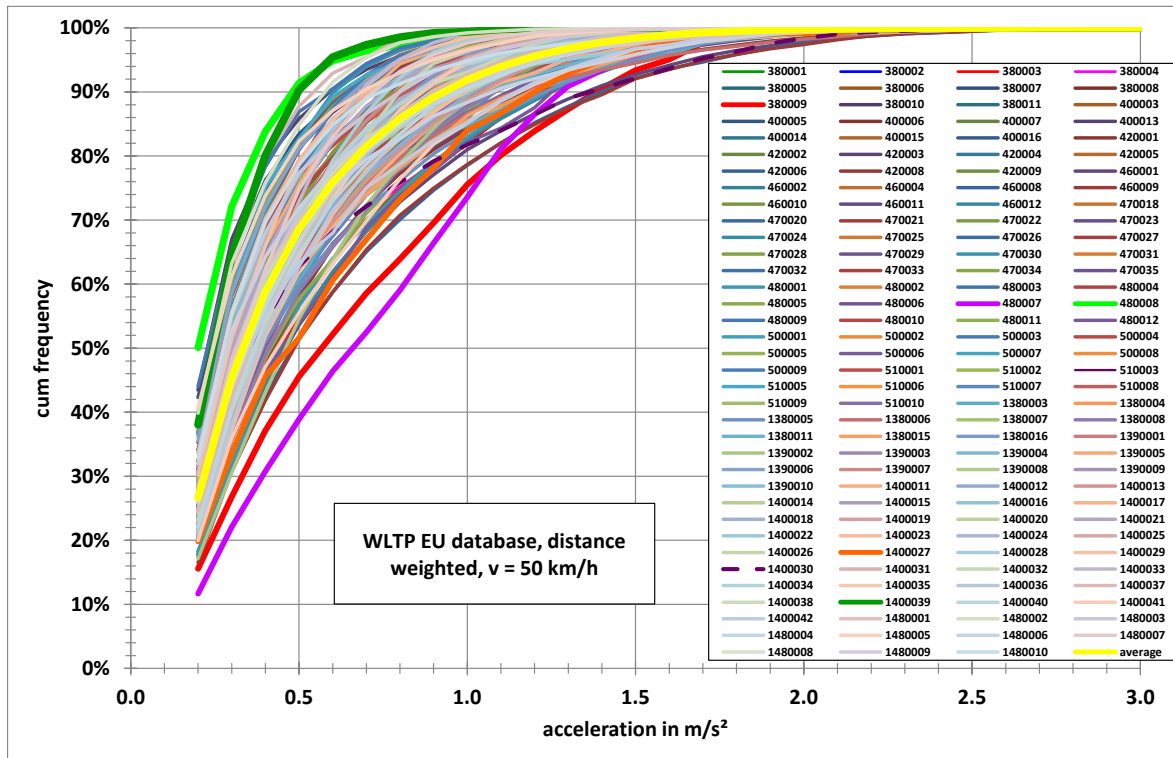


Figure 322: Acceleration distribution, vehicle speeds between 47.5 km/h and 52.5 km/h

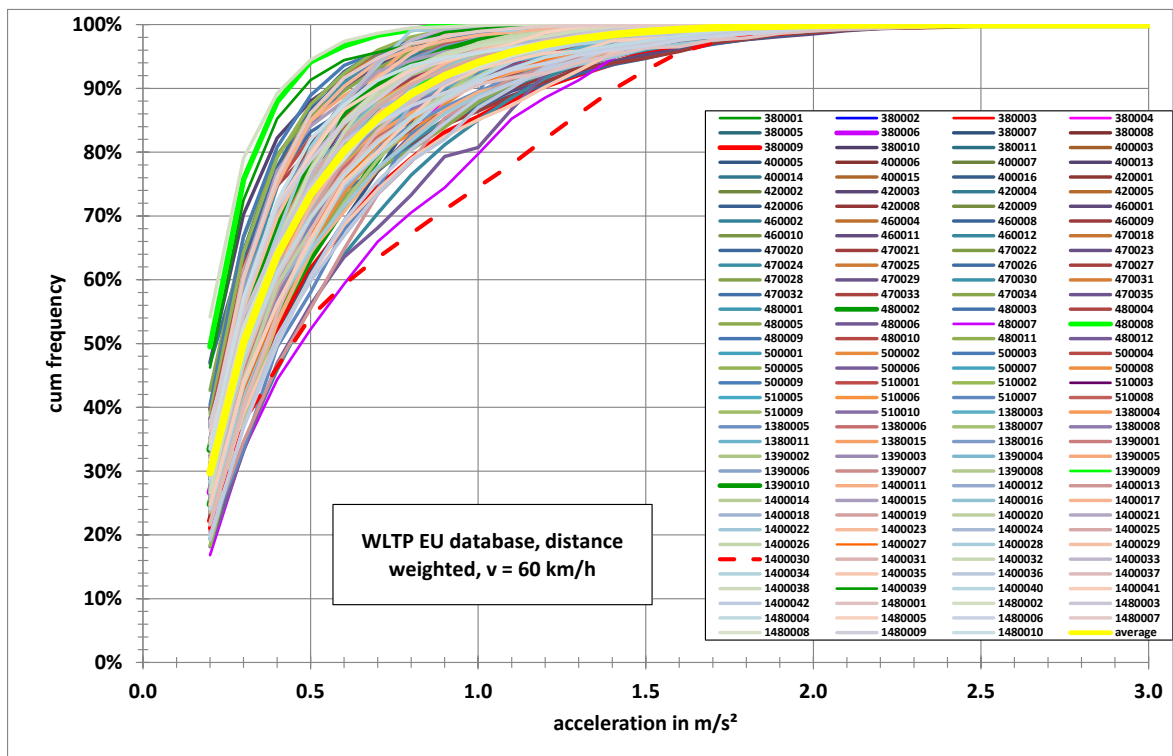


Figure 323: Acceleration distribution, vehicle speeds between 57.5 km/h and 62.5 km/h

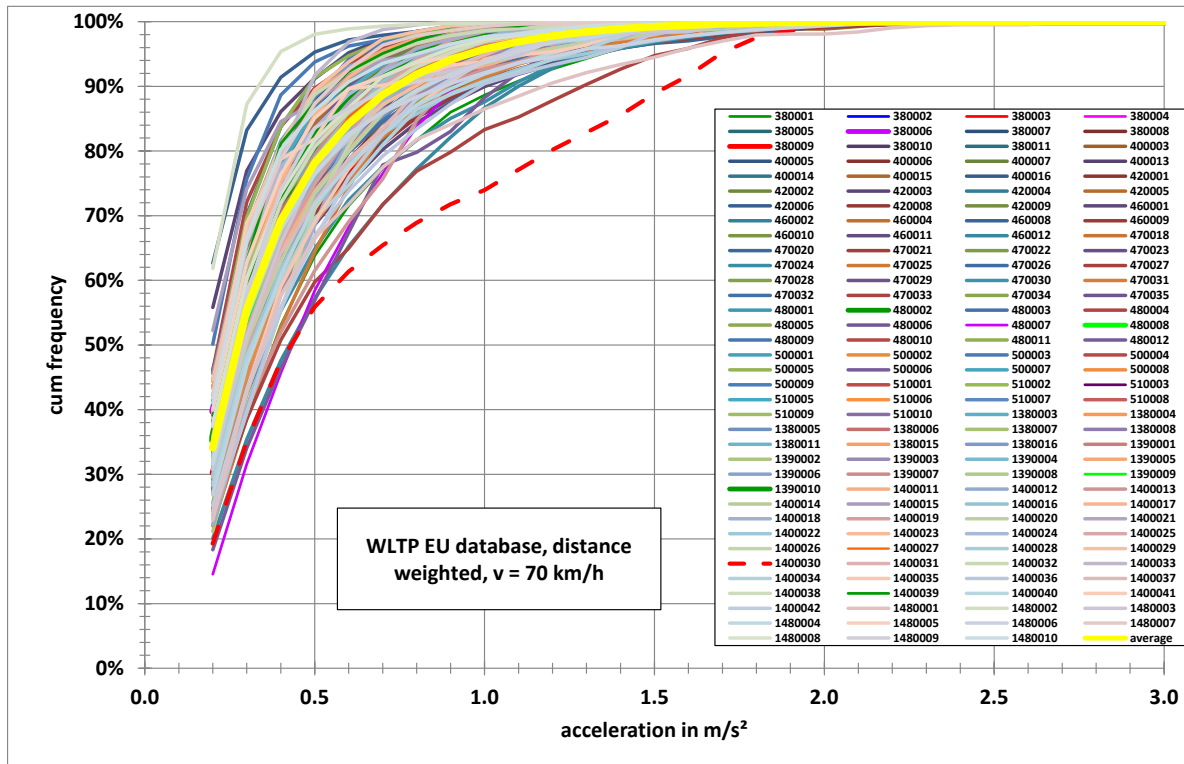


Figure 324: Acceleration distribution, vehicle speeds between 67.5 km/h and 72.5 km/h

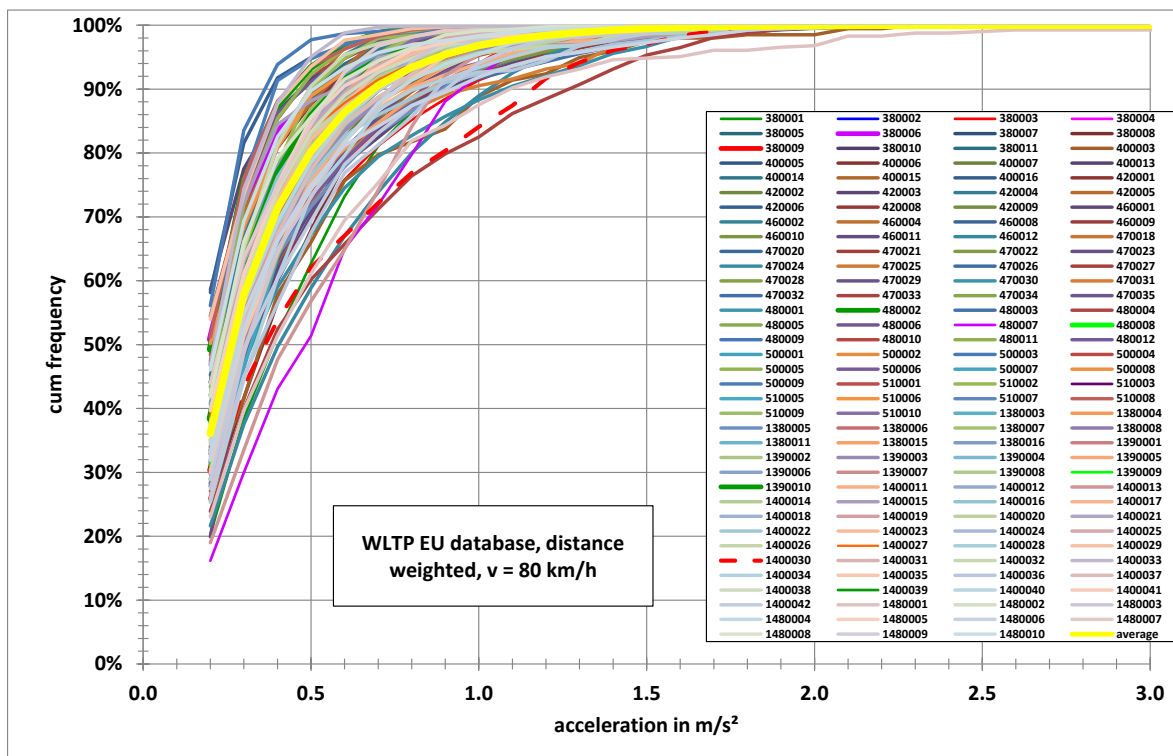


Figure 325: Acceleration distribution, vehicle speeds between 77.5 km/h and 82.5 km/h

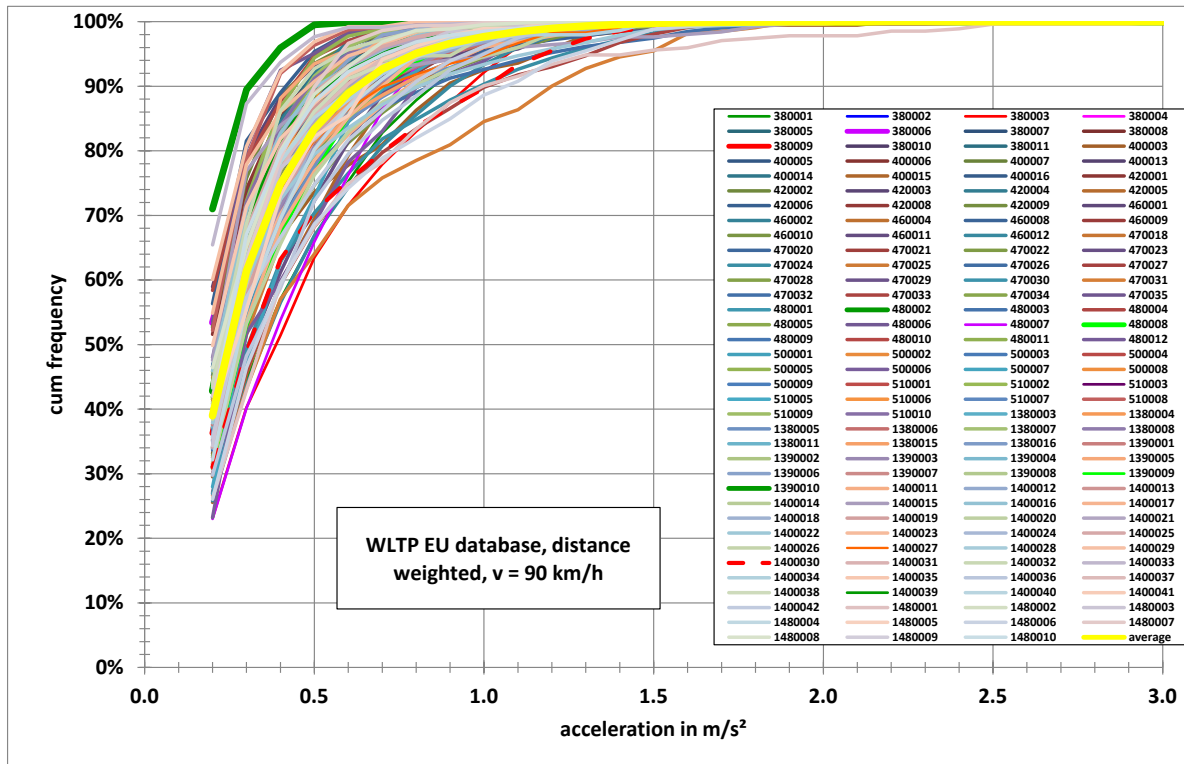


Figure 326: Acceleration distribution, vehicle speeds between 87.5 km/h and 92.5 km/h

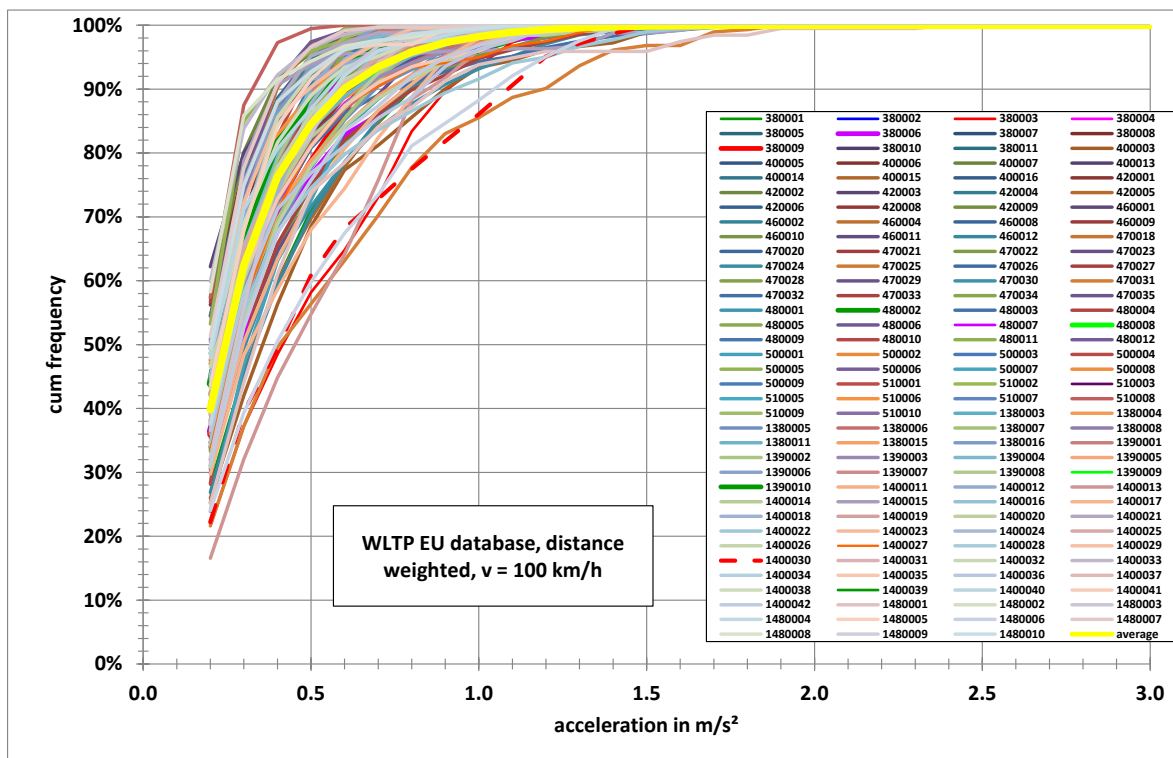


Figure 327: Acceleration distribution, vehicle speeds between 97.5 km/h and 102.5 km/h

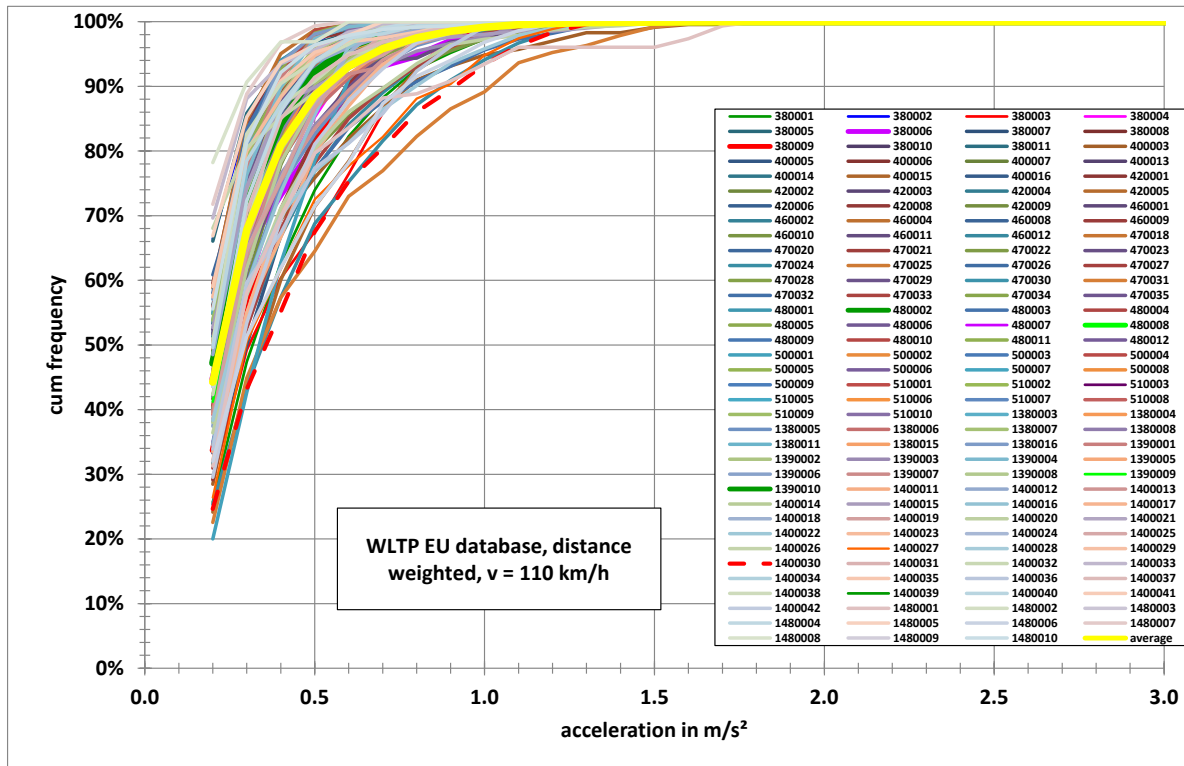


Figure 328: Acceleration distribution, vehicle speeds between 107.5 km/h and 112.5 km/h



16 Vehicle specific deceleration distributions, EU database

The numbers in the legends are vehicle indicators according to Table 61 to Table 66.

16.1 Time weighted

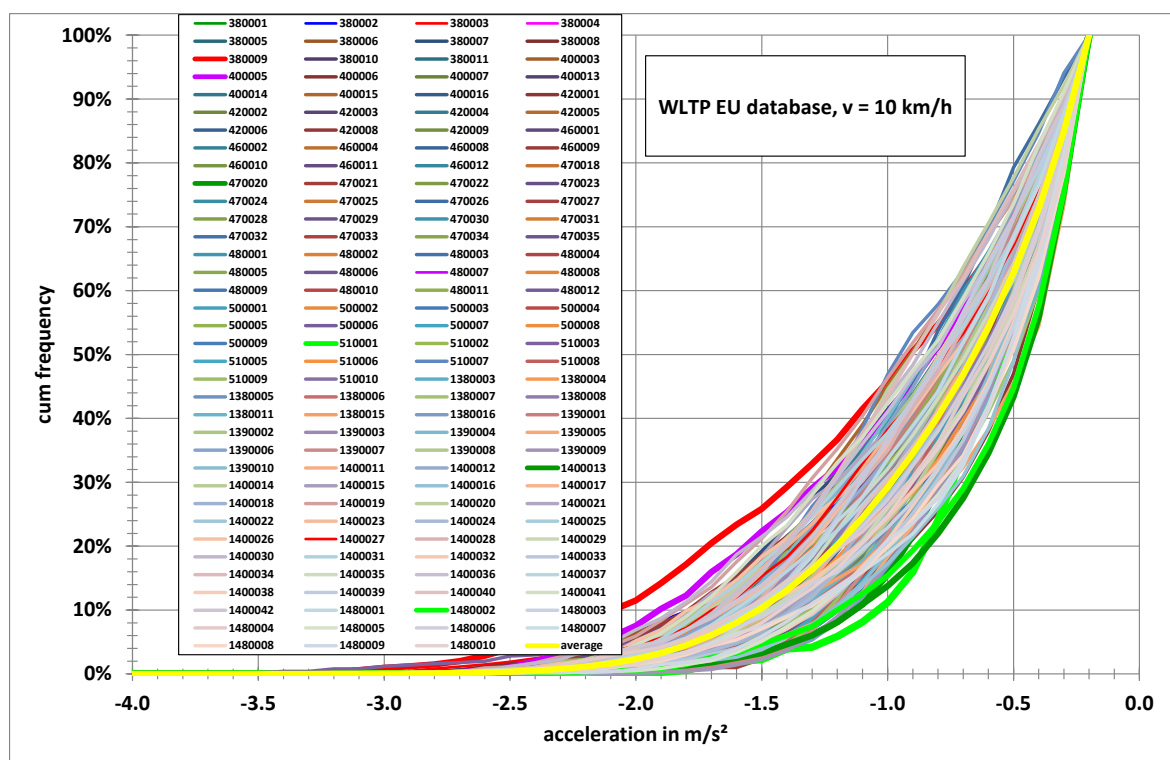


Figure 329: Deceleration distribution, vehicle speeds between 7.5 km/h and 12.5 km/h

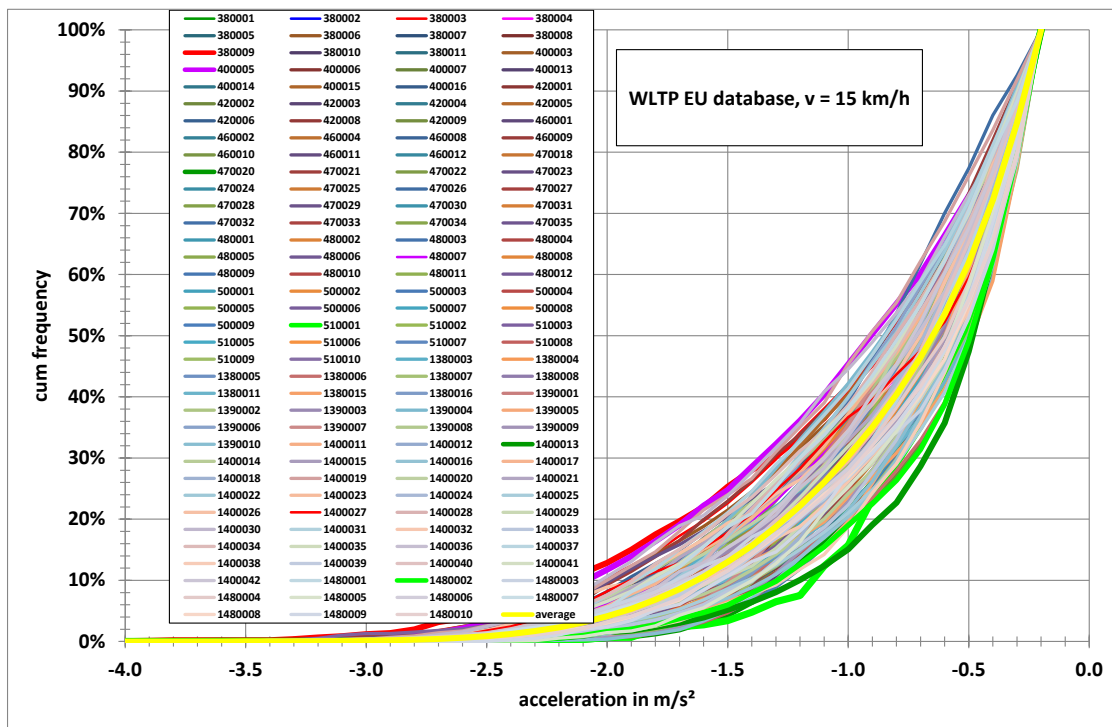


Figure 330: Deceleration distribution, vehicle speeds between 12.5 km/h and 17.5 km/h

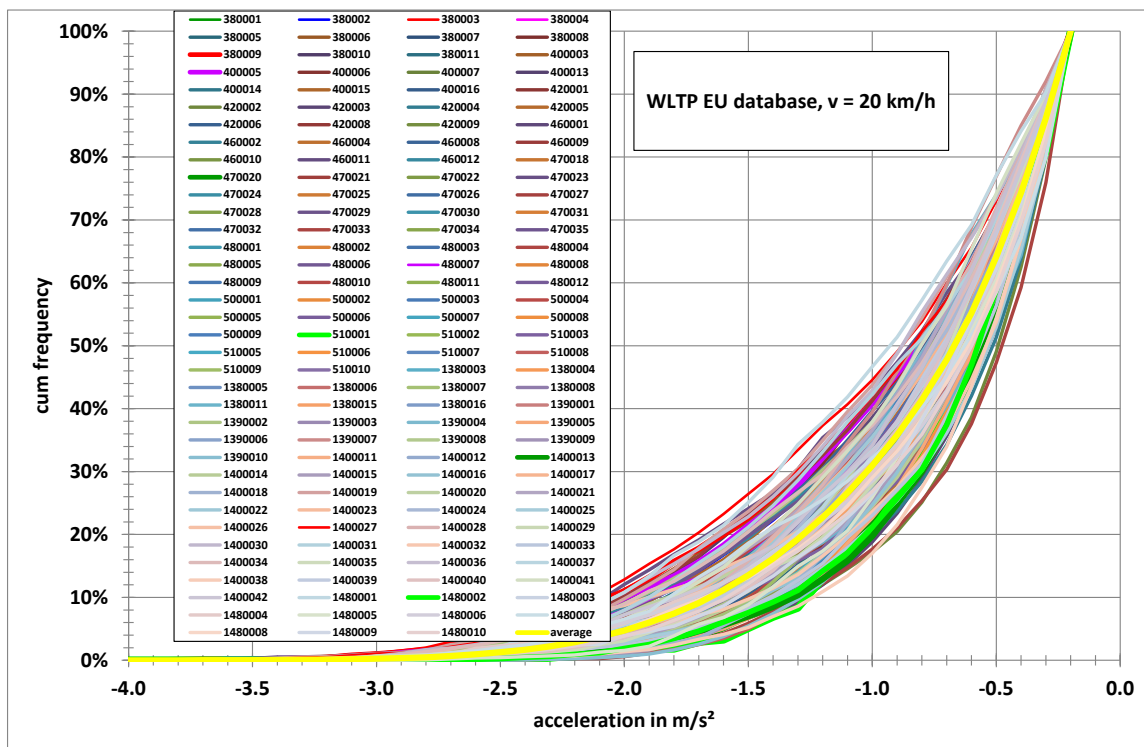


Figure 331: Deceleration distribution, vehicle speeds between 17.5 km/h and 22.5 km/h

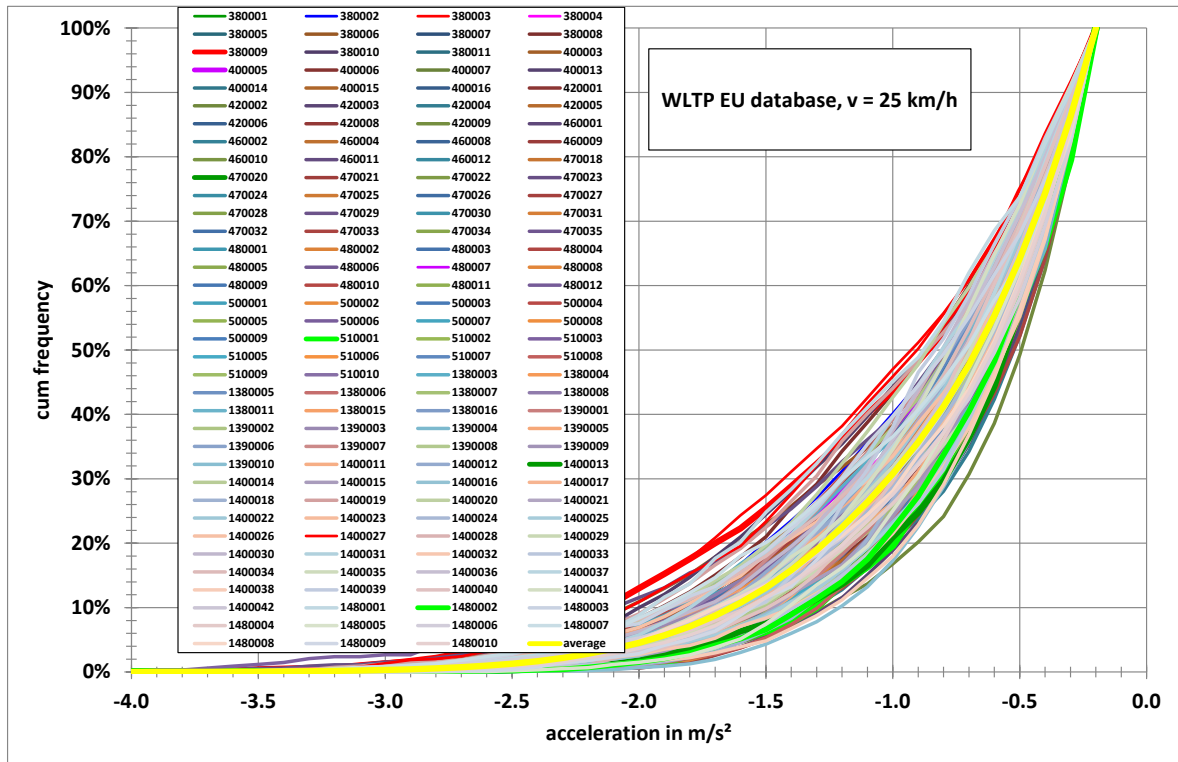


Figure 332: Deceleration distribution, vehicle speeds between 22.5 km/h and 27.5 km/h

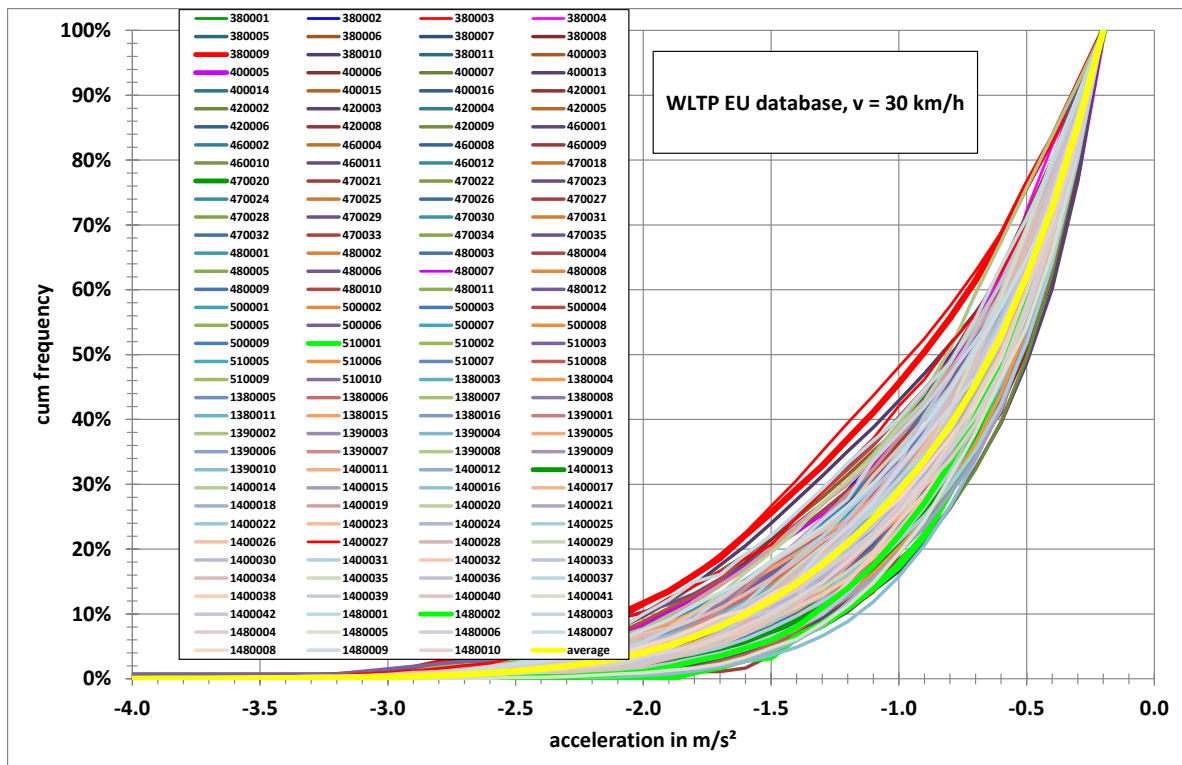


Figure 333: Deceleration distribution, vehicle speeds between 27.5 km/h and 32.5 km/h

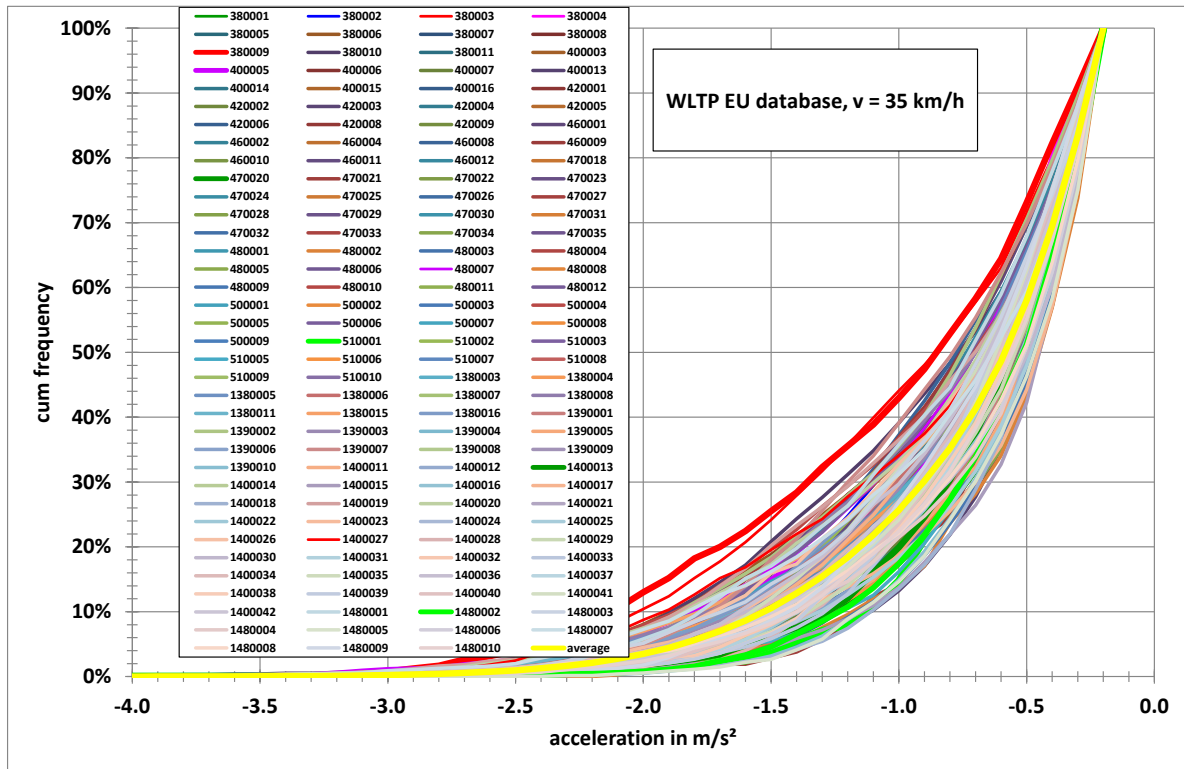


Figure 334: Deceleration distribution, vehicle speeds between 32.5 km/h and 37.5 km/h

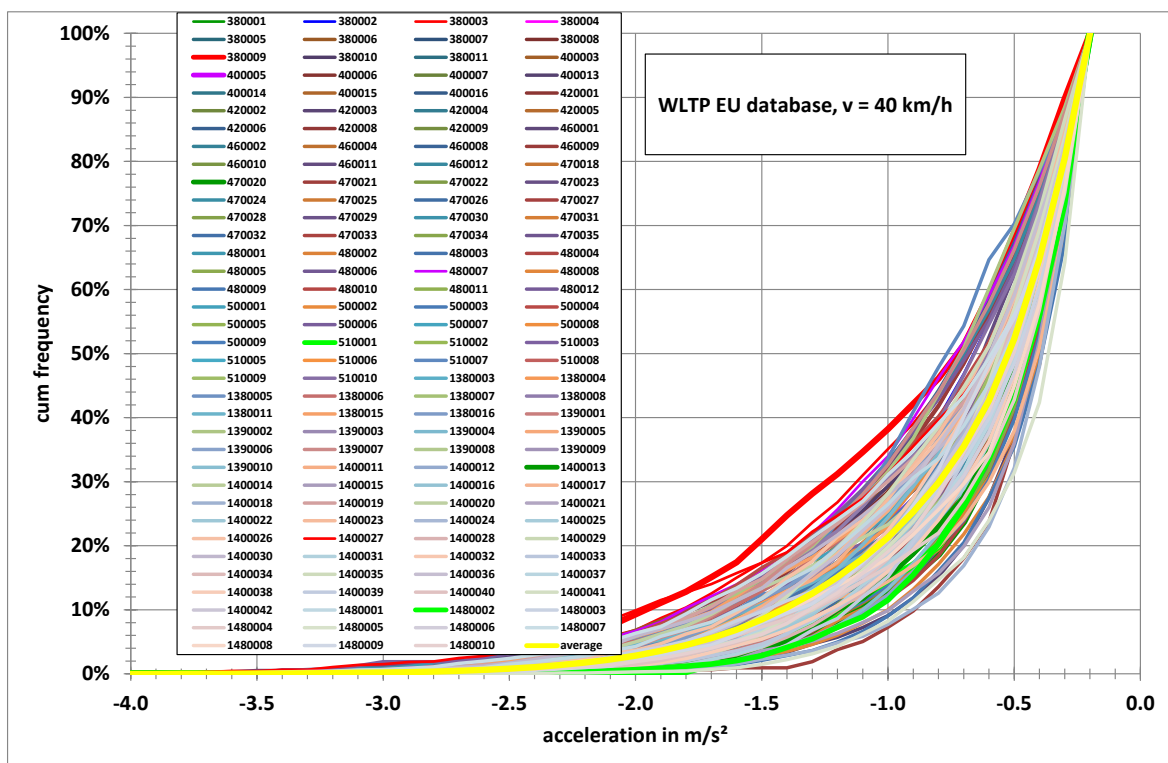


Figure 335: Deceleration distribution, vehicle speeds between 37.5 km/h and 42.5 km/h

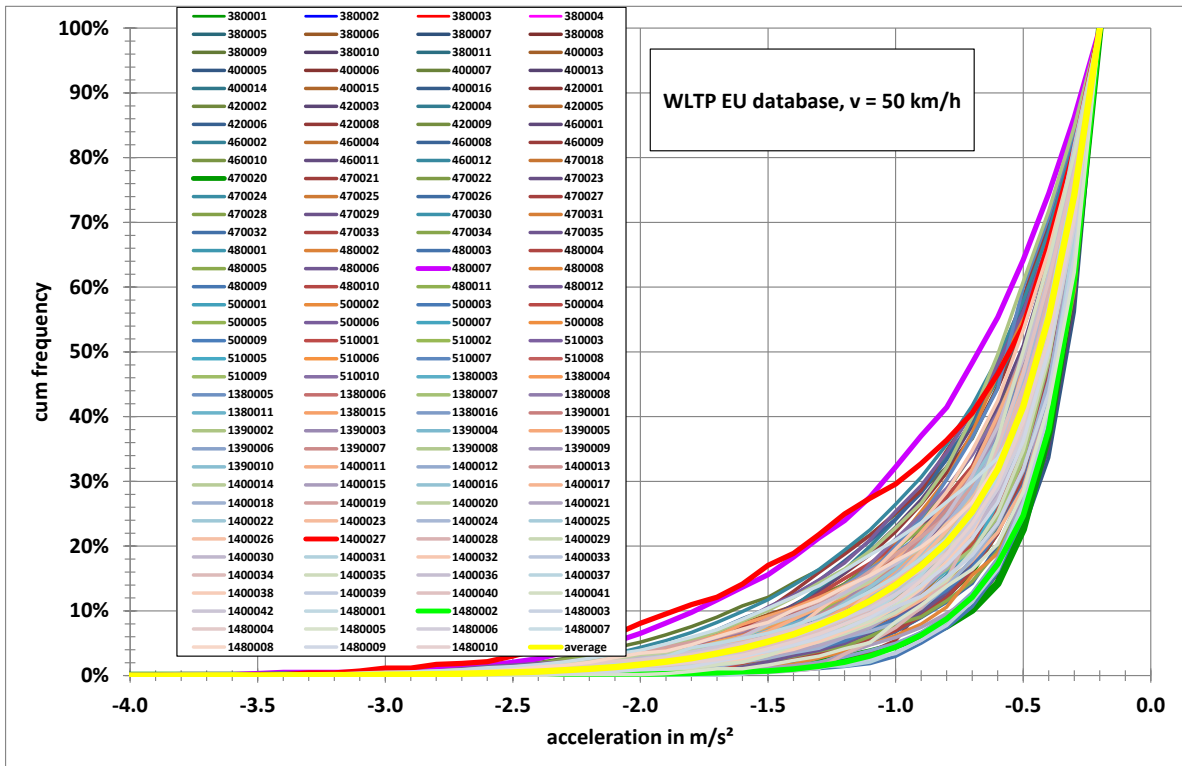


Figure 336: Deceleration distribution, vehicle speeds between 47.5 km/h and 52.5 km/h

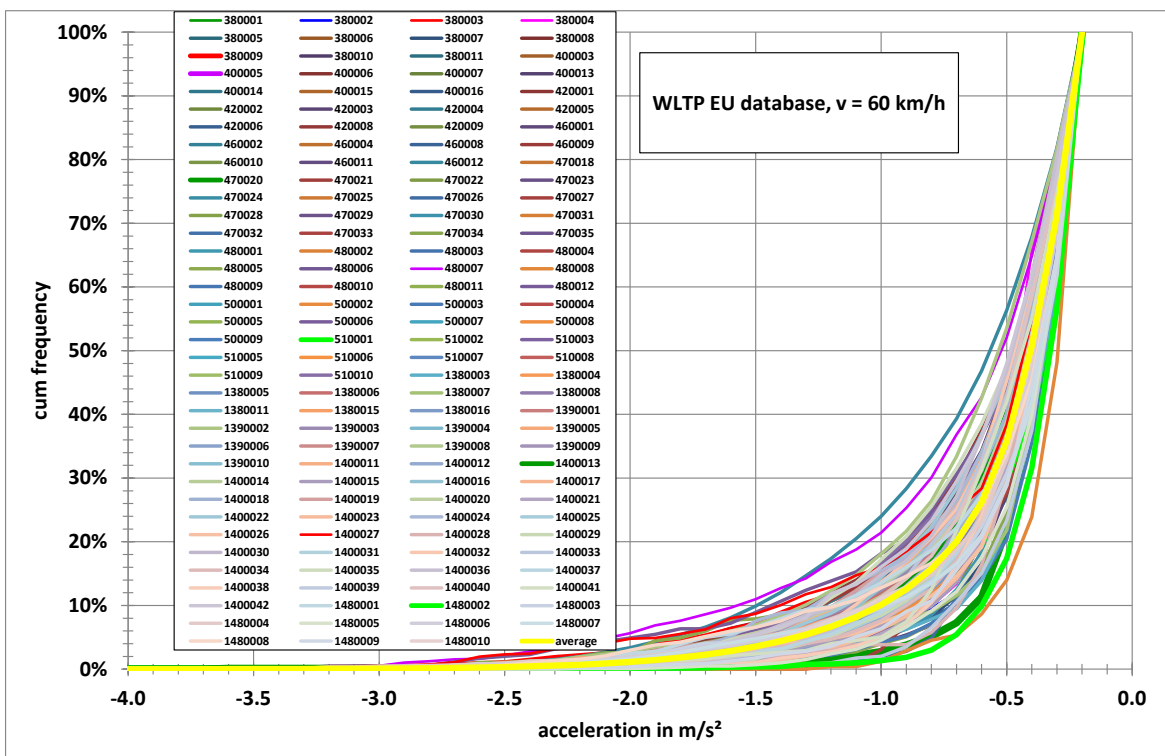


Figure 337: Deceleration distribution, vehicle speeds between 57.5 km/h and 62.5 km/h

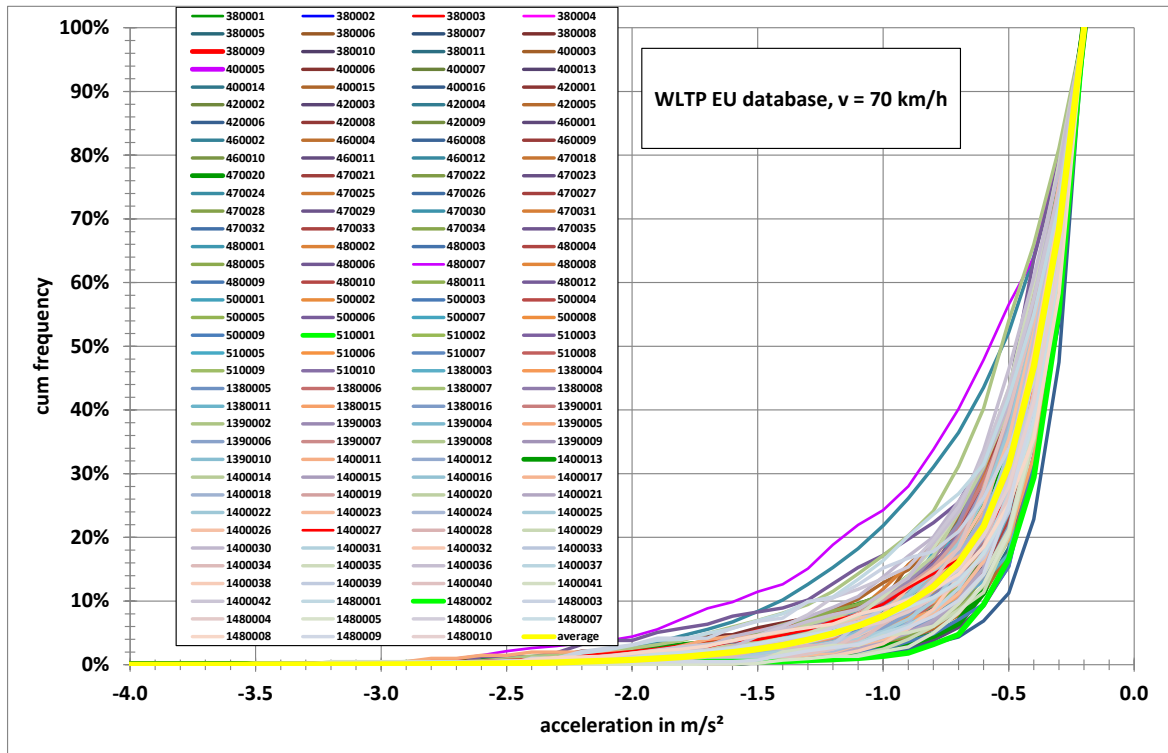


Figure 338: Deceleration distribution, vehicle speeds between 67.5 km/h and 72.5 km/h

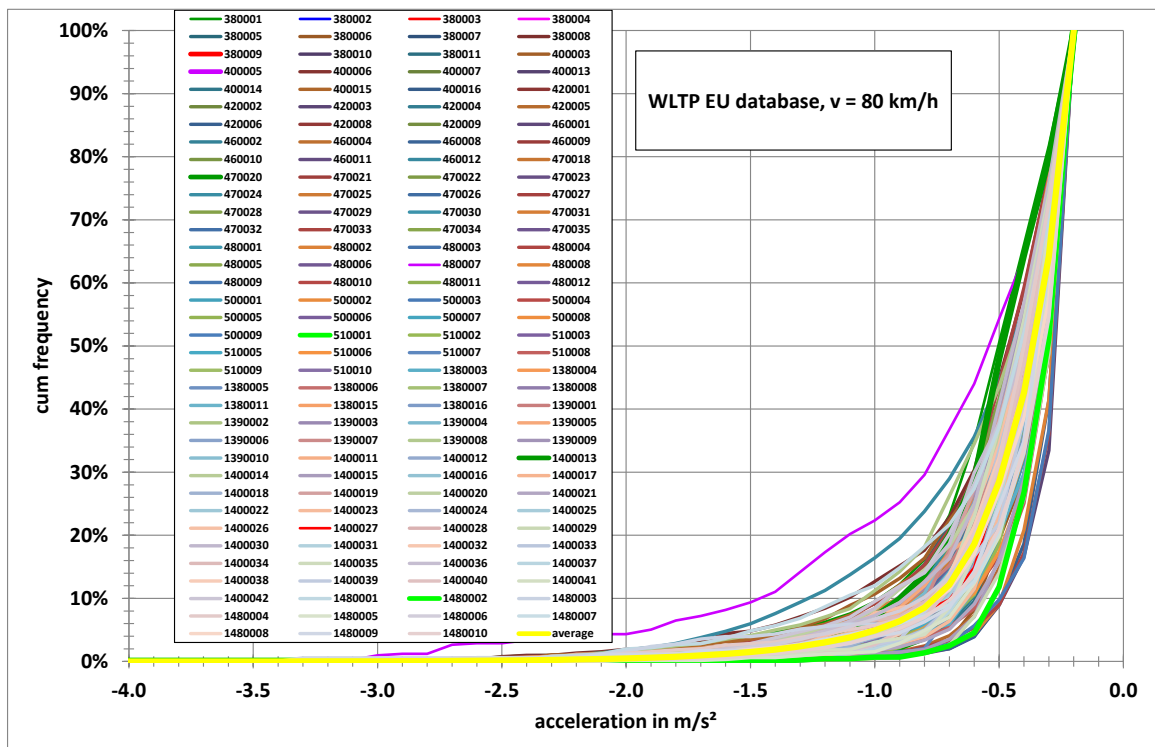


Figure 339: Deceleration distribution, vehicle speeds between 77.5 km/h and 82.5 km/h

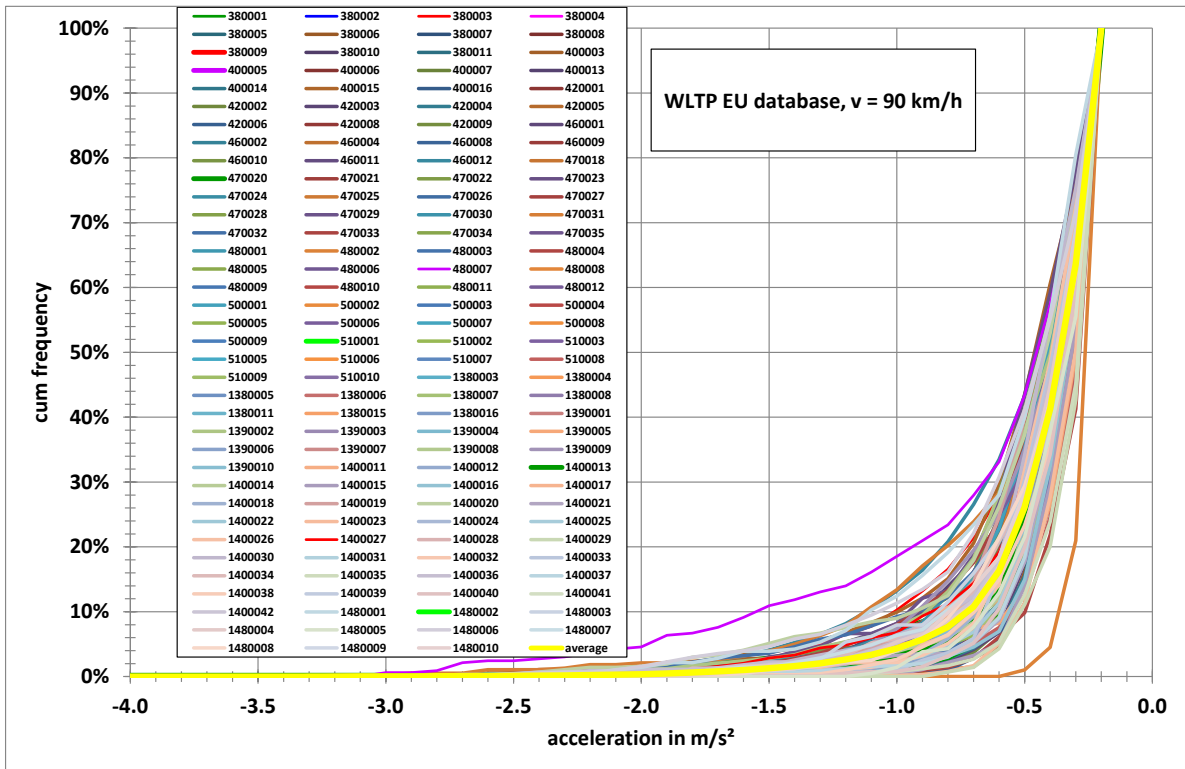


Figure 340: Deceleration distribution, vehicle speeds between 87.5 km/h and 92.5 km/h

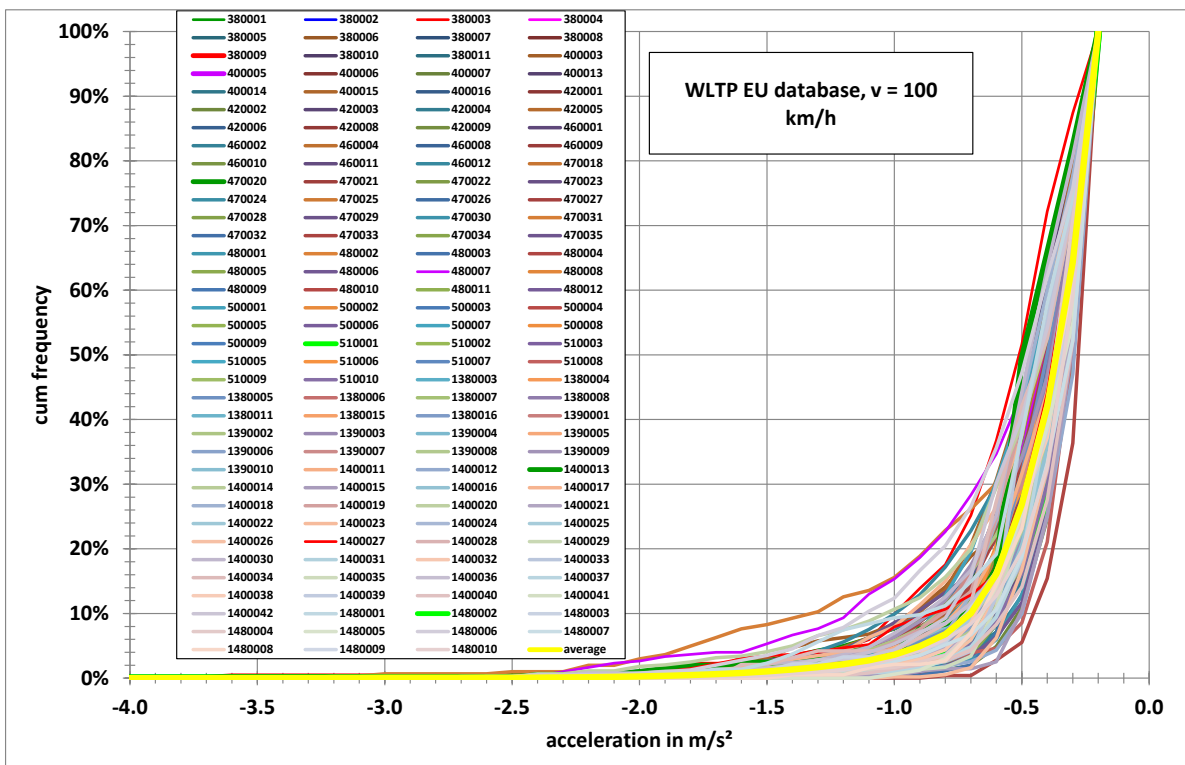
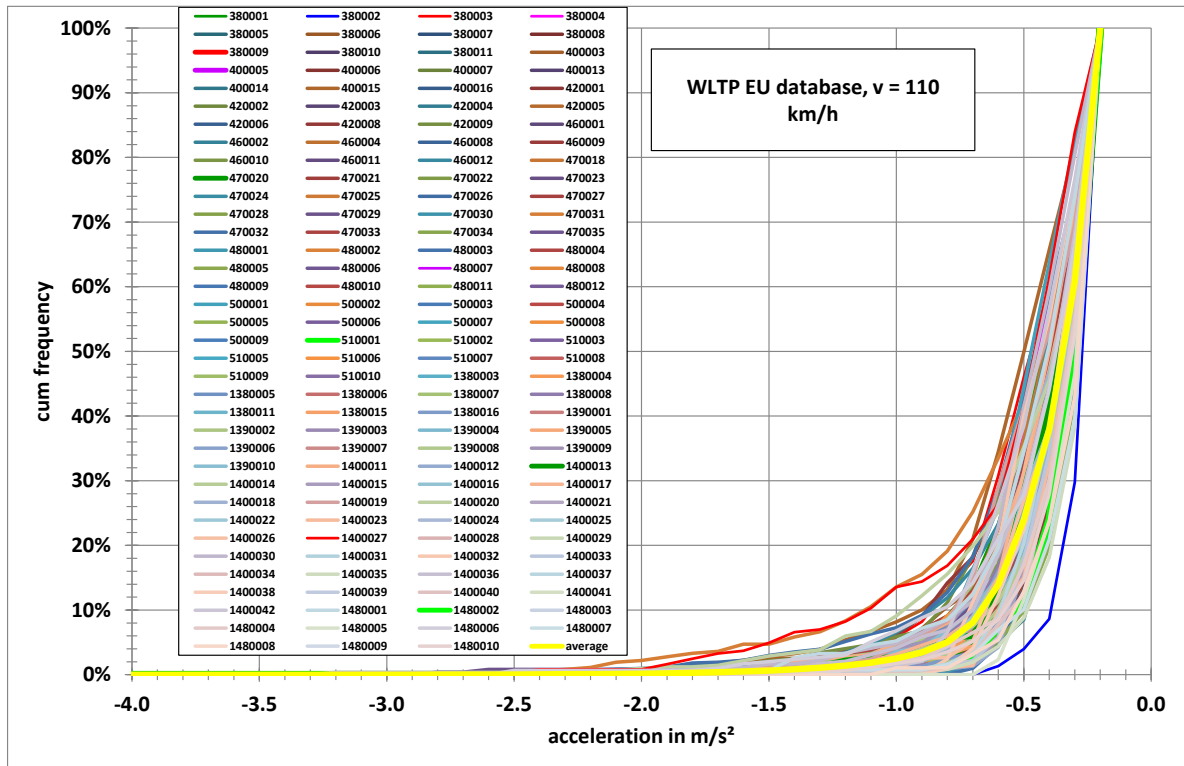


Figure 341: Deceleration distribution, vehicle speeds between 97.5 km/h and 102.5 km/h





16.2 Distance weighted

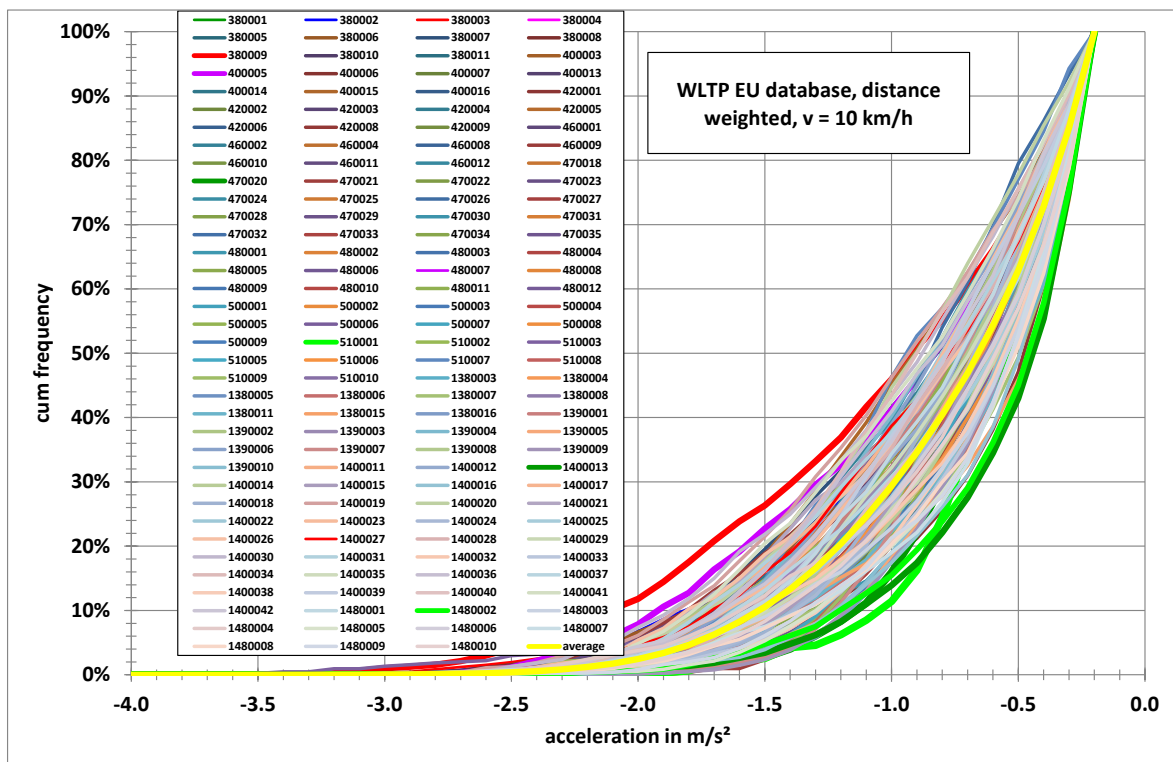


Figure 343: Deceleration distribution, vehicle speeds between 7.5 km/h and 12.5 km/h

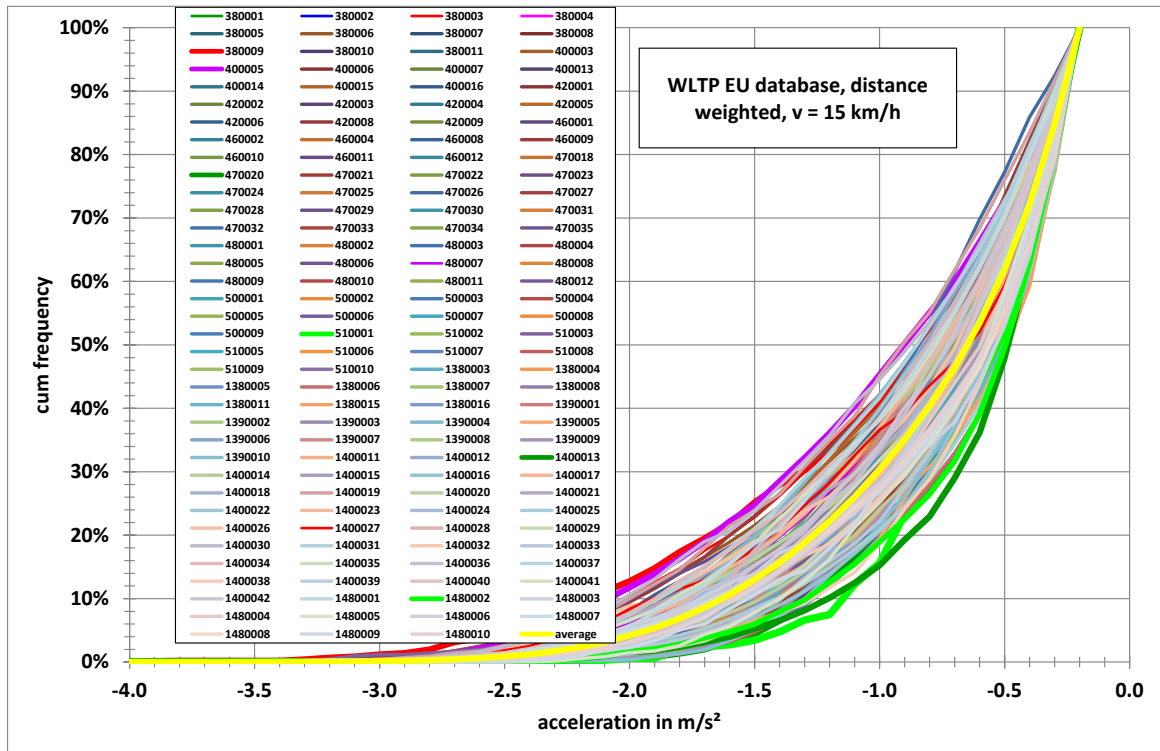


Figure 344: Deceleration distribution, vehicle speeds between 12.5 km/h and 17.5 km/h

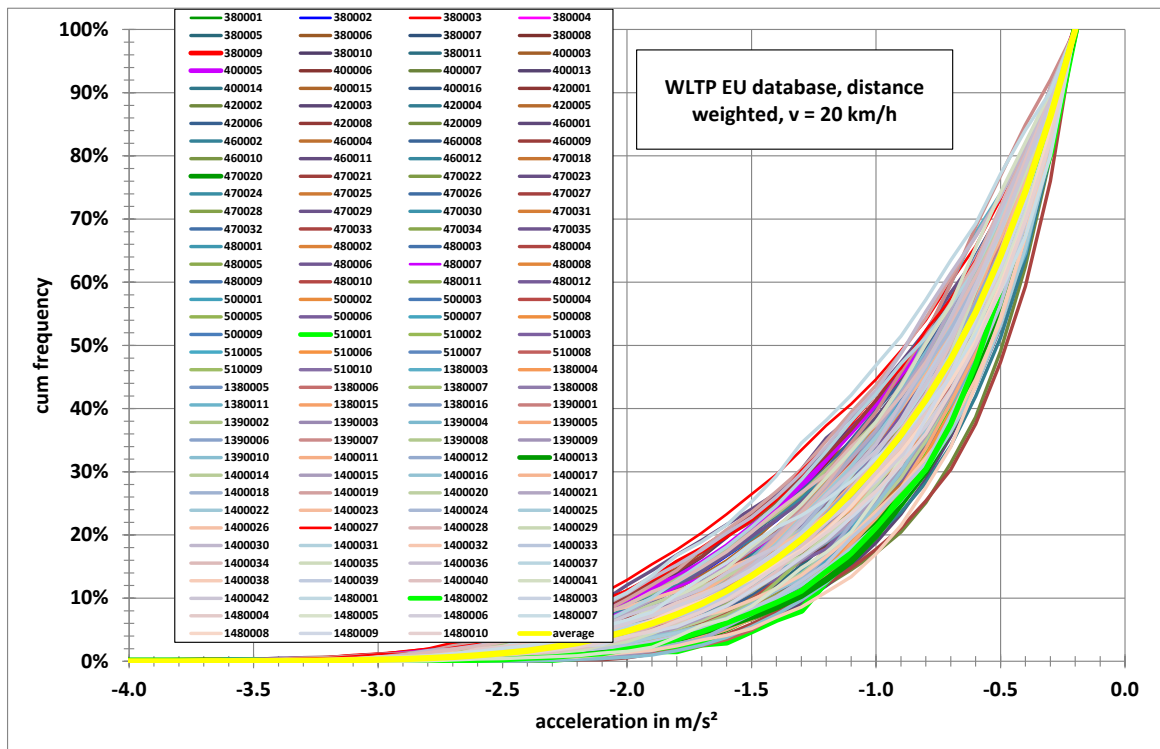


Figure 345: Deceleration distribution, vehicle speeds between 17.5 km/h and 22.5 km/h

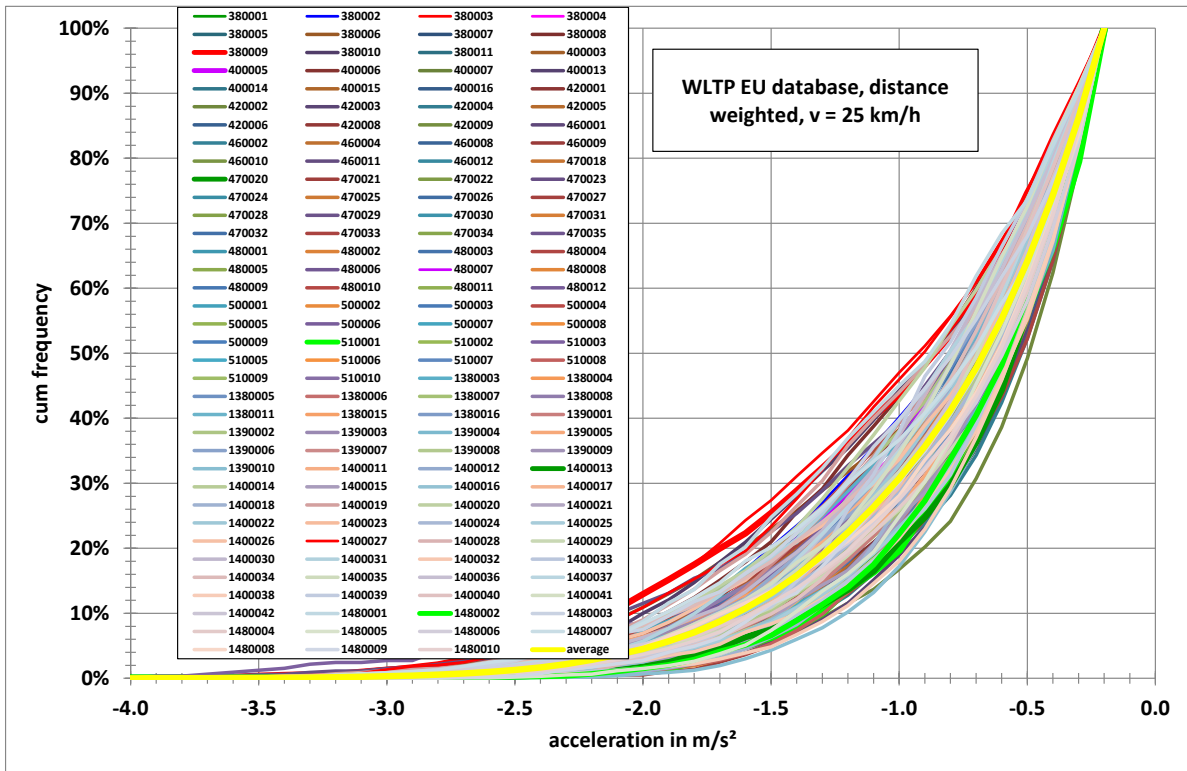


Figure 346: Deceleration distribution, vehicle speeds between 22.5 km/h and 27.5 km/h

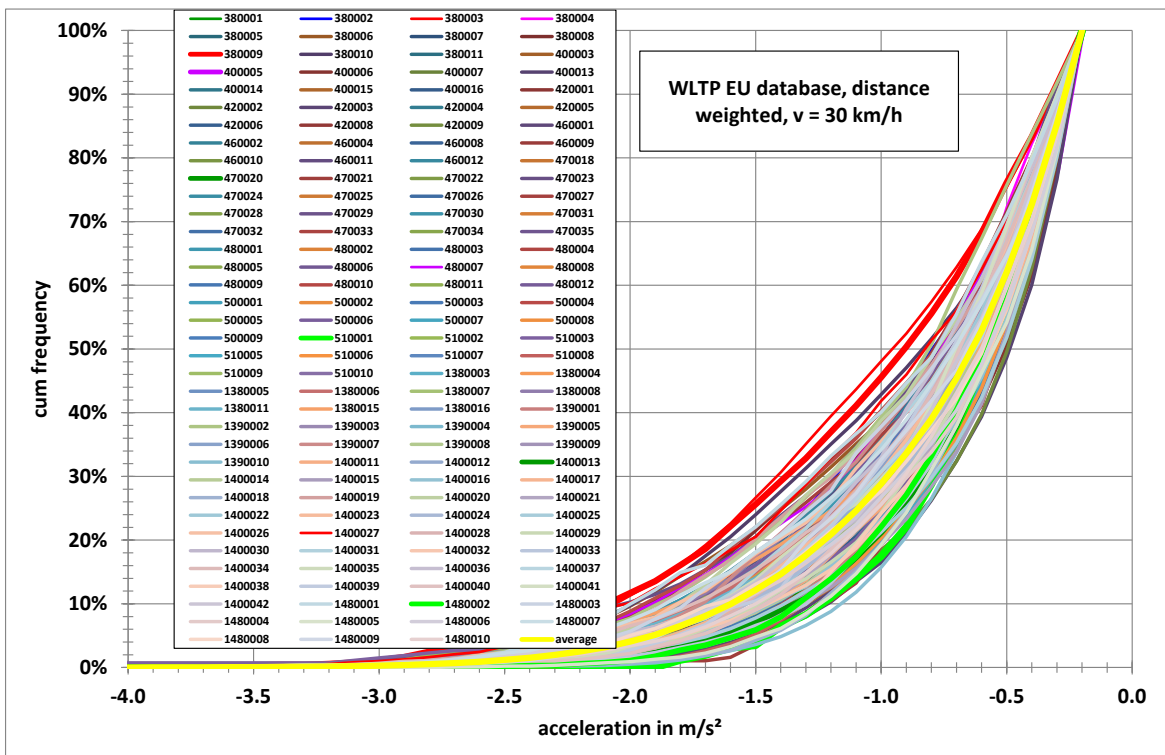


Figure 347: Deceleration distribution, vehicle speeds between 27.5 km/h and 32.5 km/h

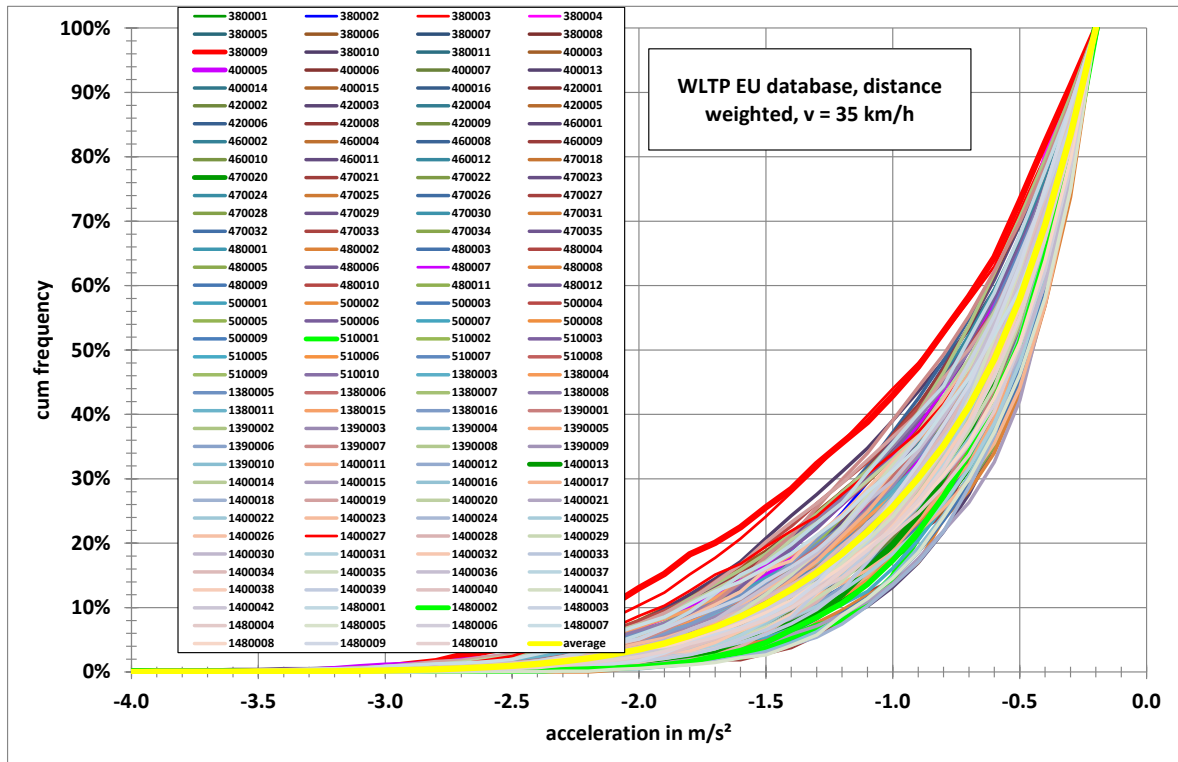


Figure 348: Deceleration distribution, vehicle speeds between 32.5 km/h and 37.5 km/h

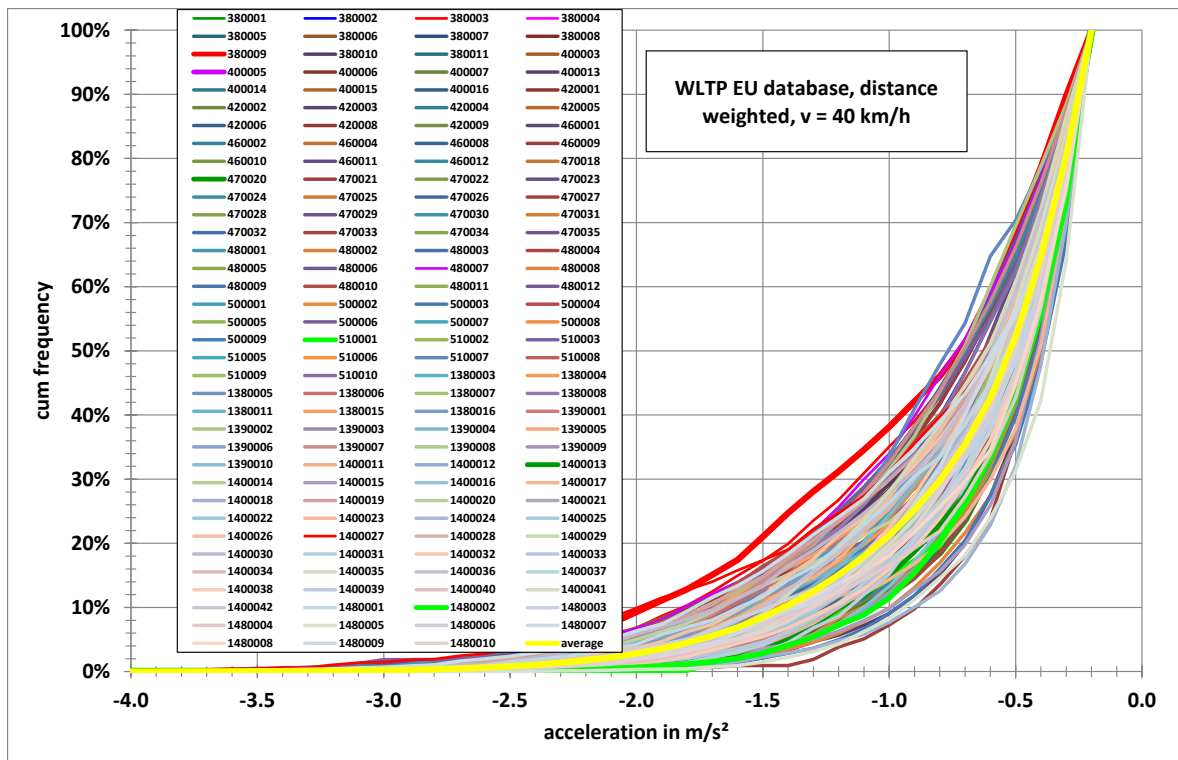


Figure 349: Deceleration distribution, vehicle speeds between 37.5 km/h and 42.5 km/h

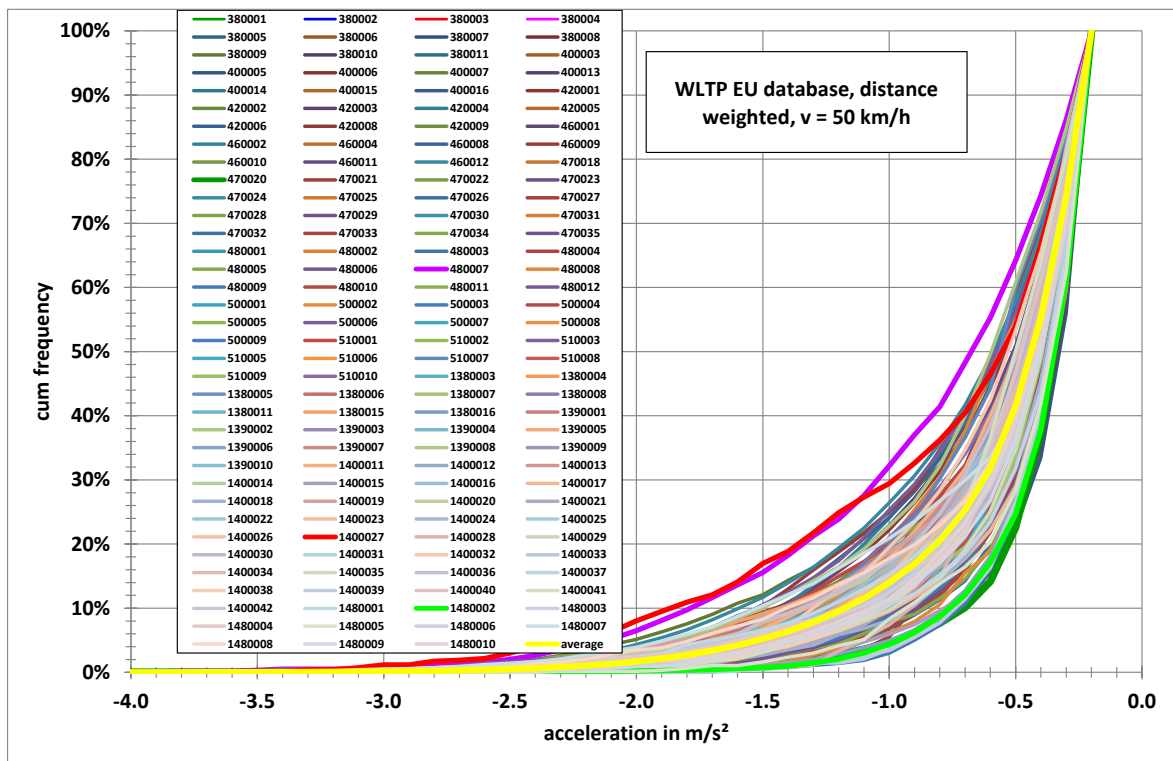


Figure 350: Deceleration distribution, vehicle speeds between 47.5 km/h and 52.5 km/h

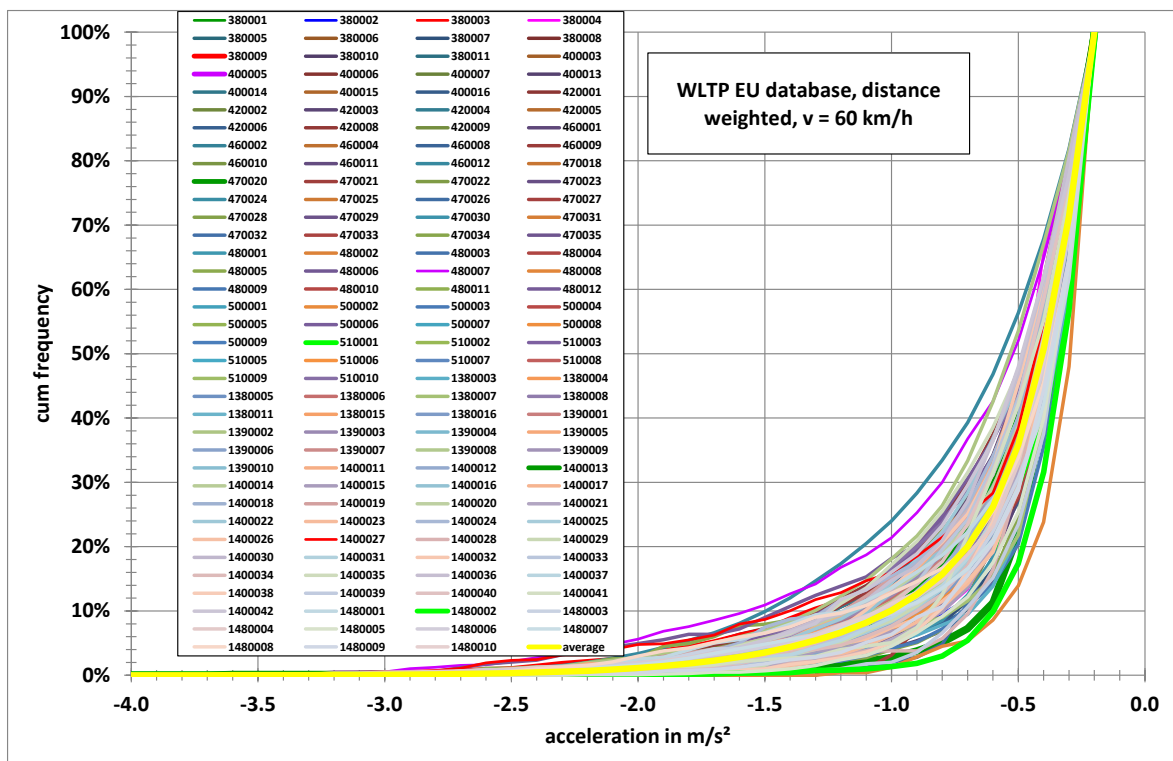


Figure 351: Deceleration distribution, vehicle speeds between 57.5 km/h and 62.5 km/h

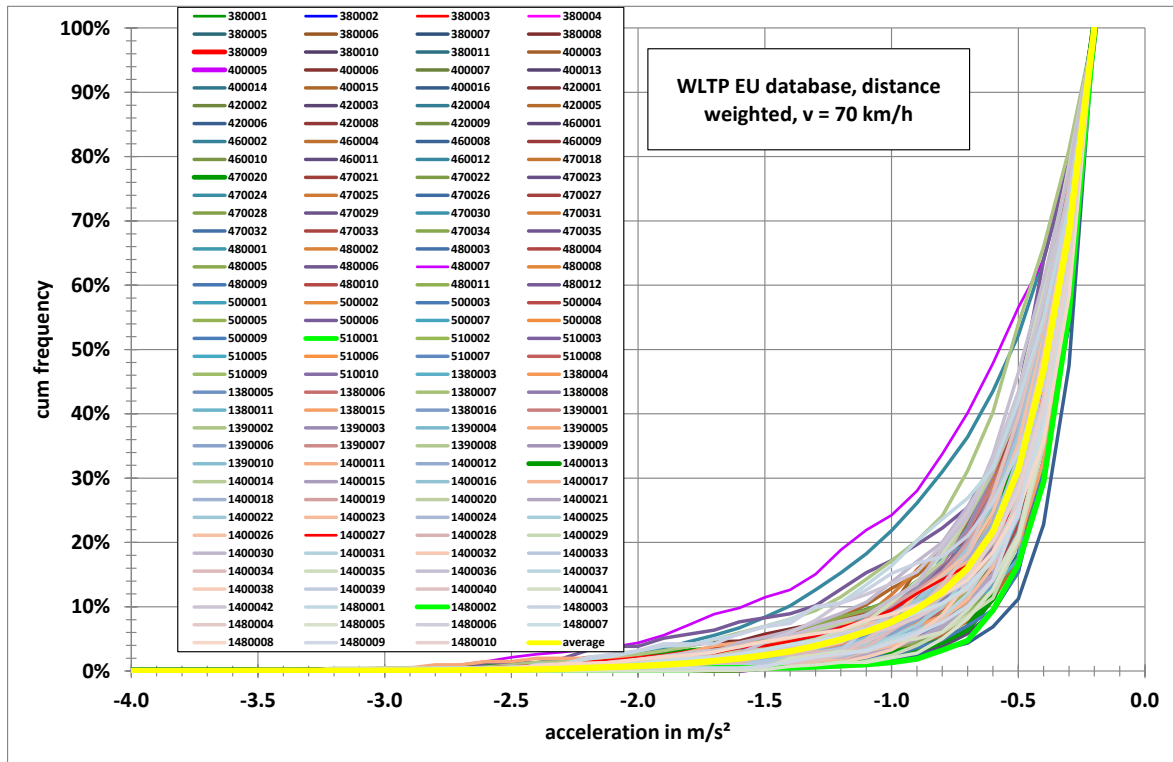


Figure 352: Deceleration distribution, vehicle speeds between 67.5 km/h and 72.5 km/h

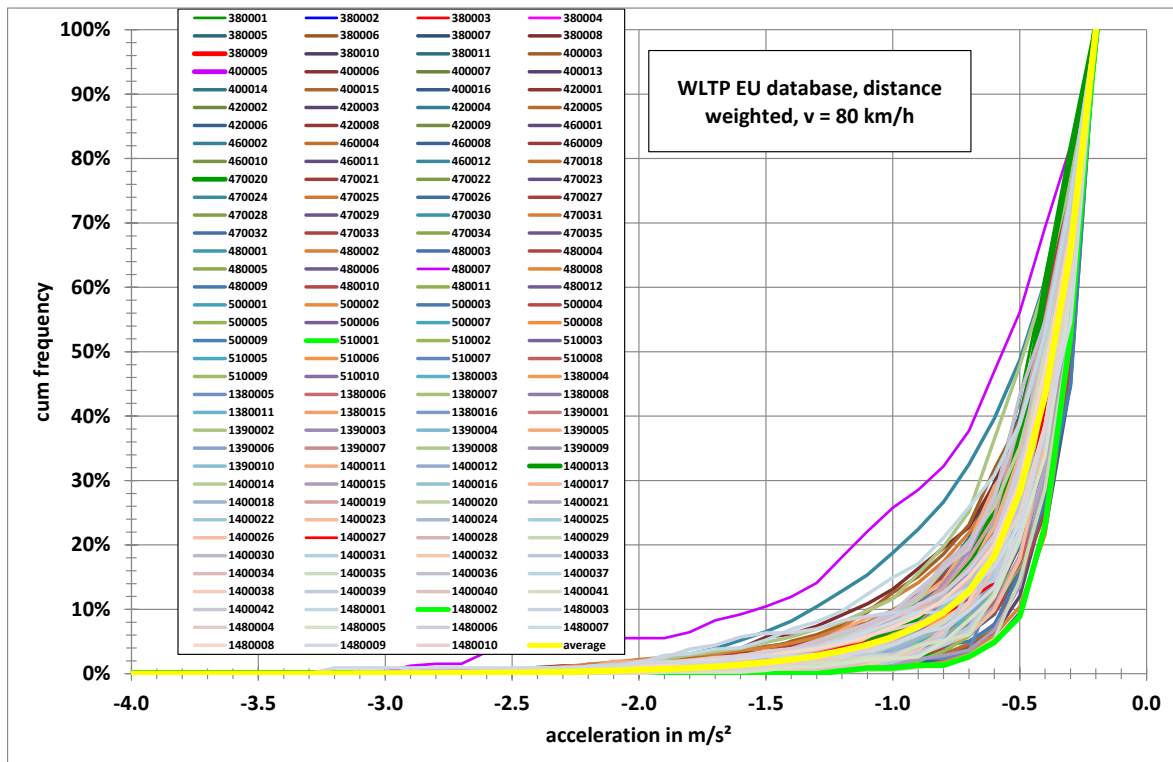


Figure 353: Deceleration distribution, vehicle speeds between 77.5 km/h and 82.5 km/h

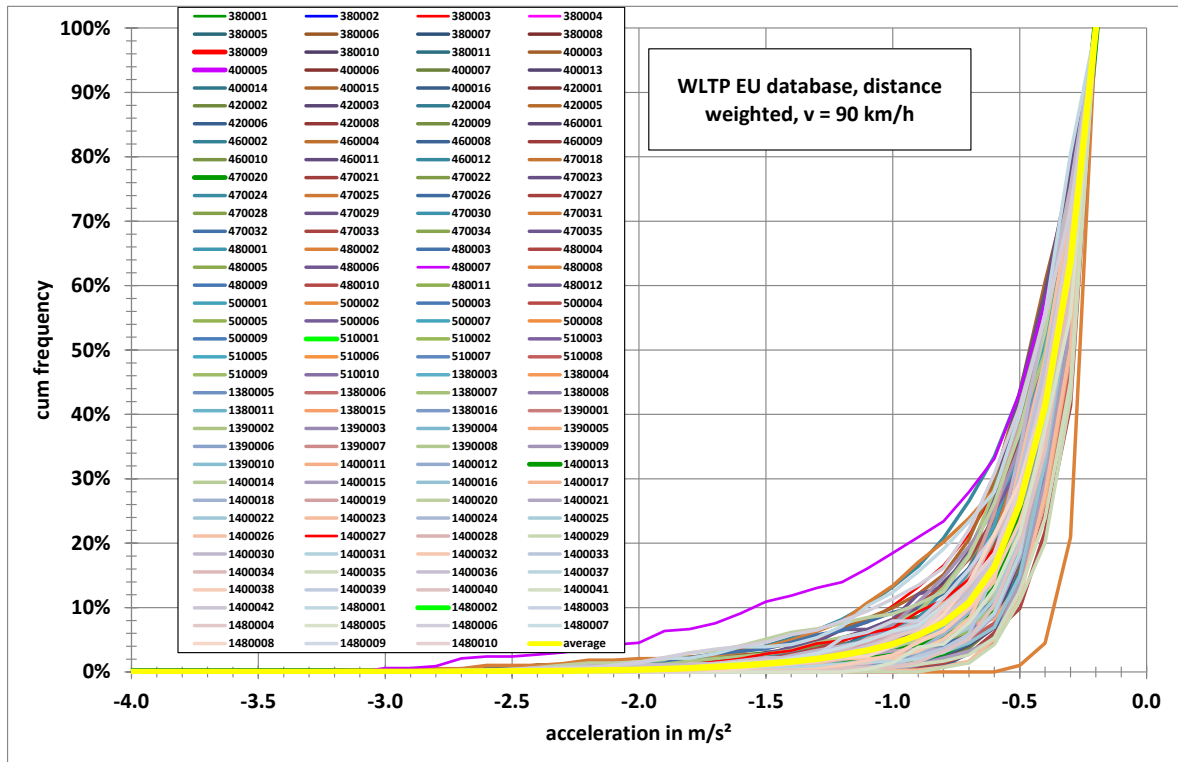


Figure 354: Deceleration distribution, vehicle speeds between 87.5 km/h and 92.5 km/h

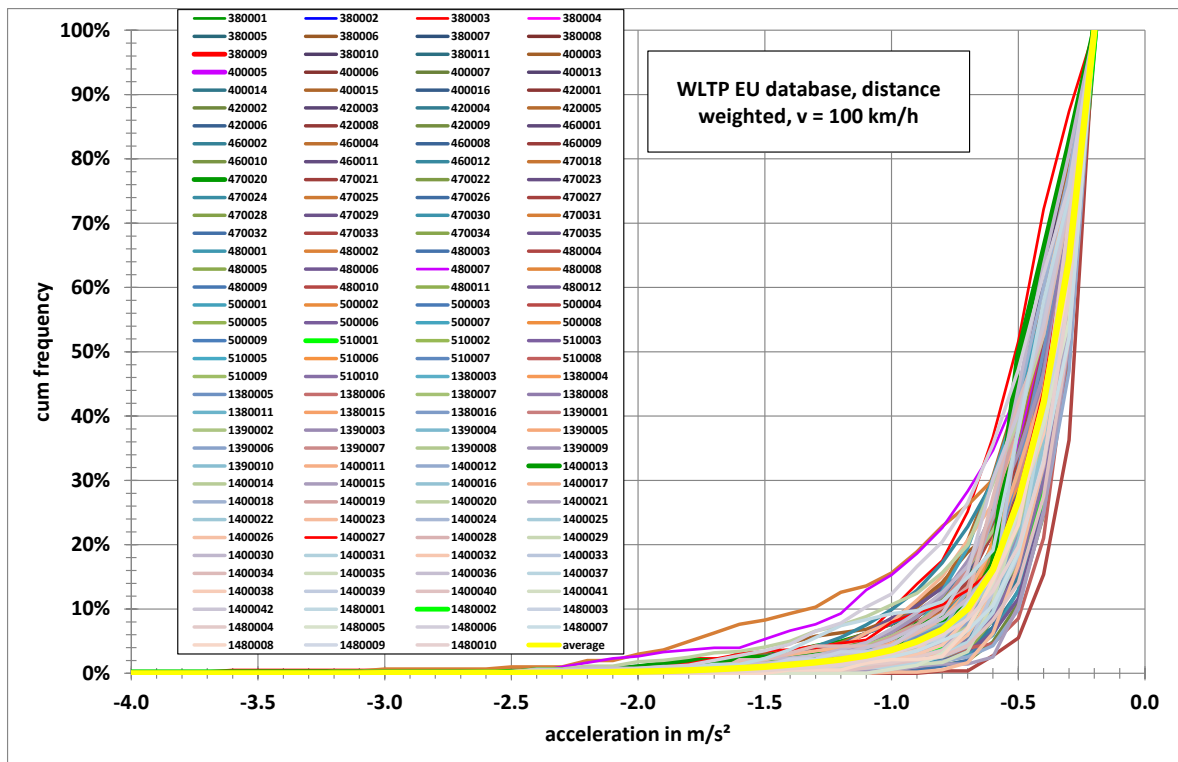
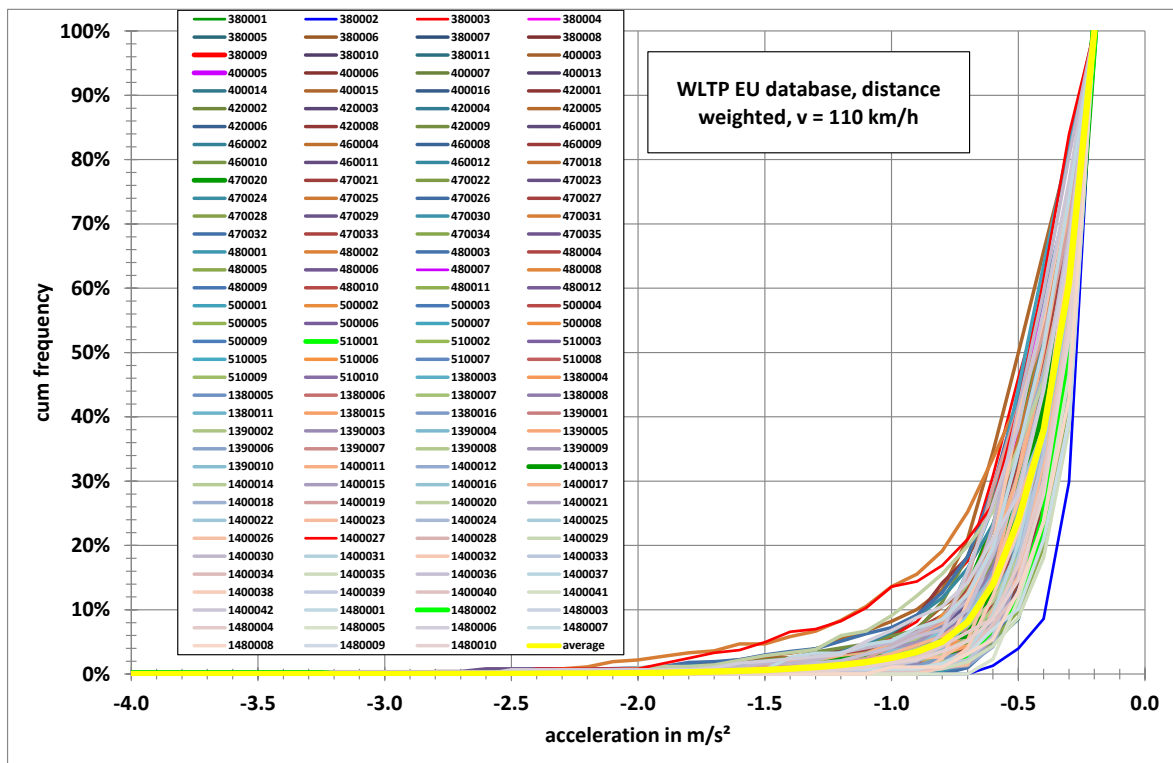


Figure 355: Deceleration distribution, vehicle speeds between 97.5 km/h and 102.5 km/h





17 v*a_negative distributions, v*a < -1 m²/s³

17.1 Time weighted

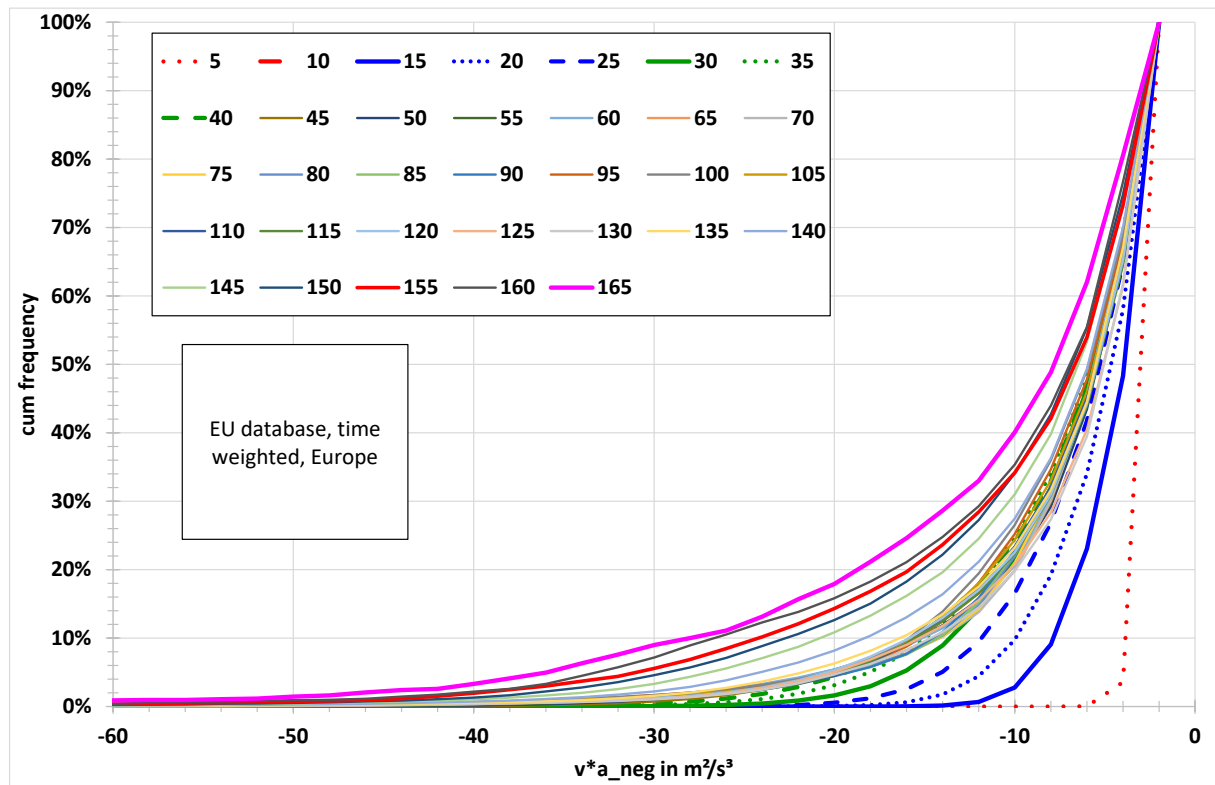


Figure 357: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, Europe

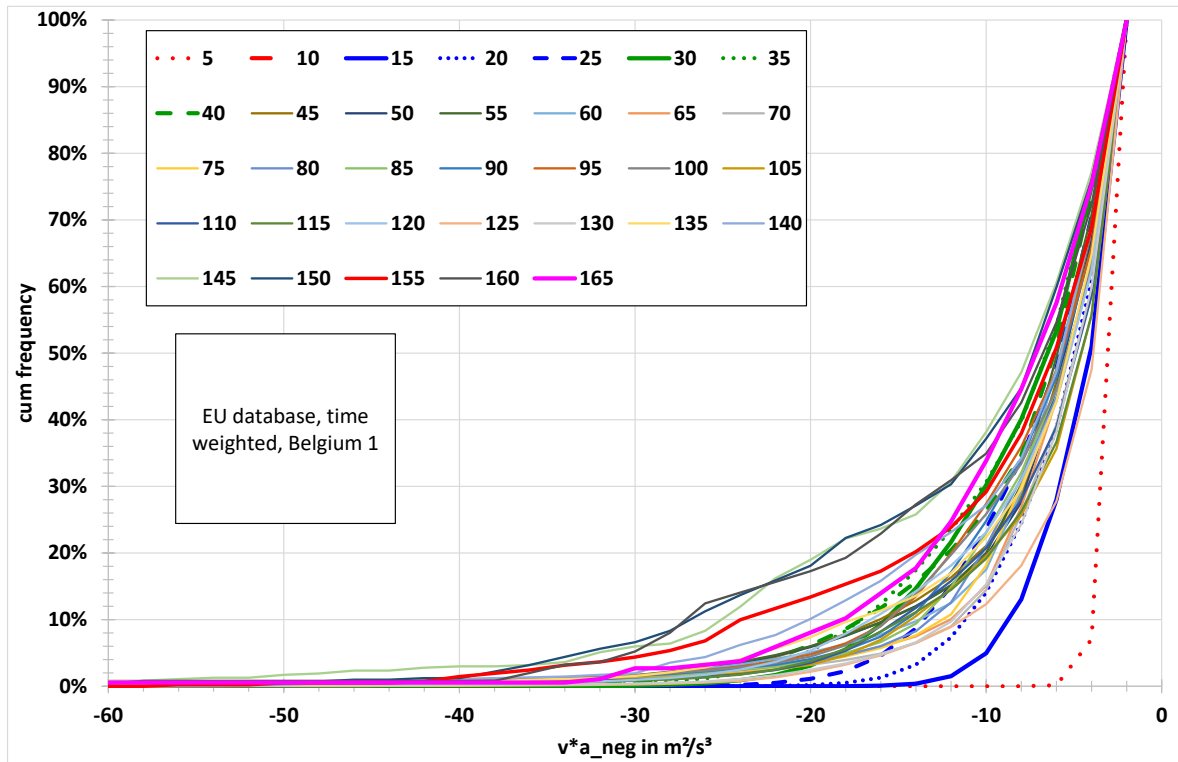


Figure 358: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, Belgium 1

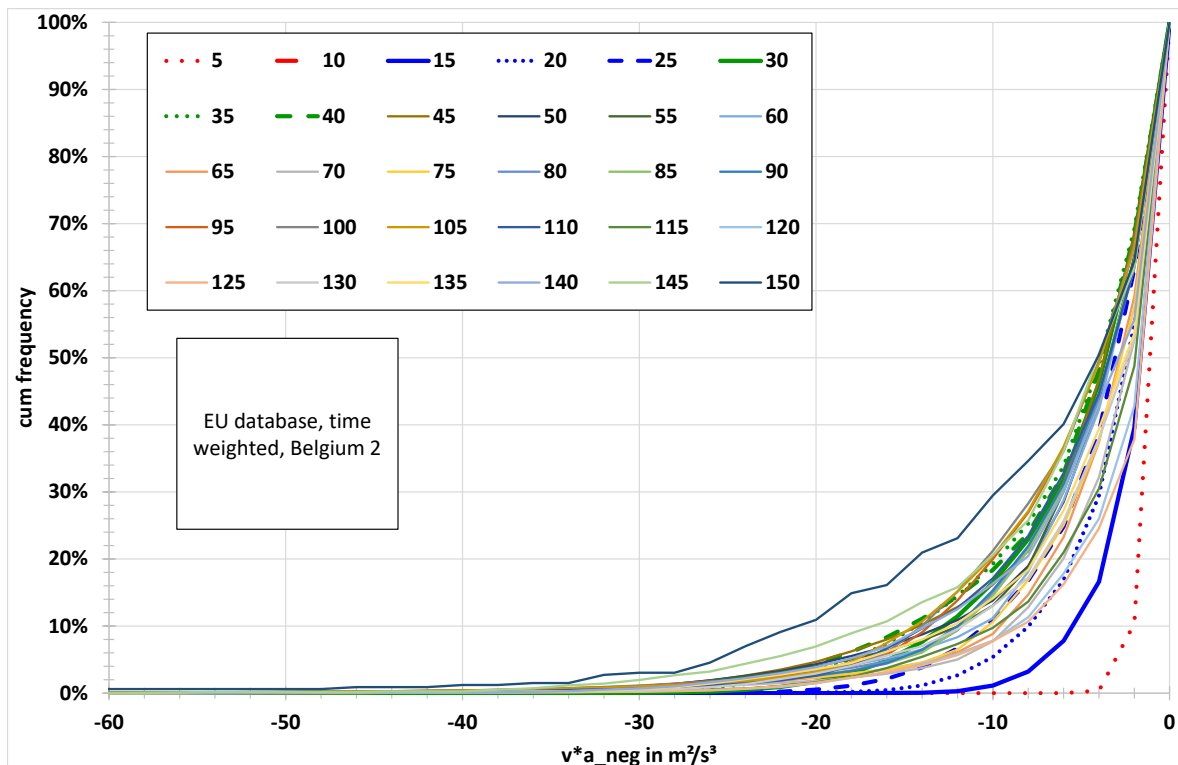


Figure 359: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, Belgium 2

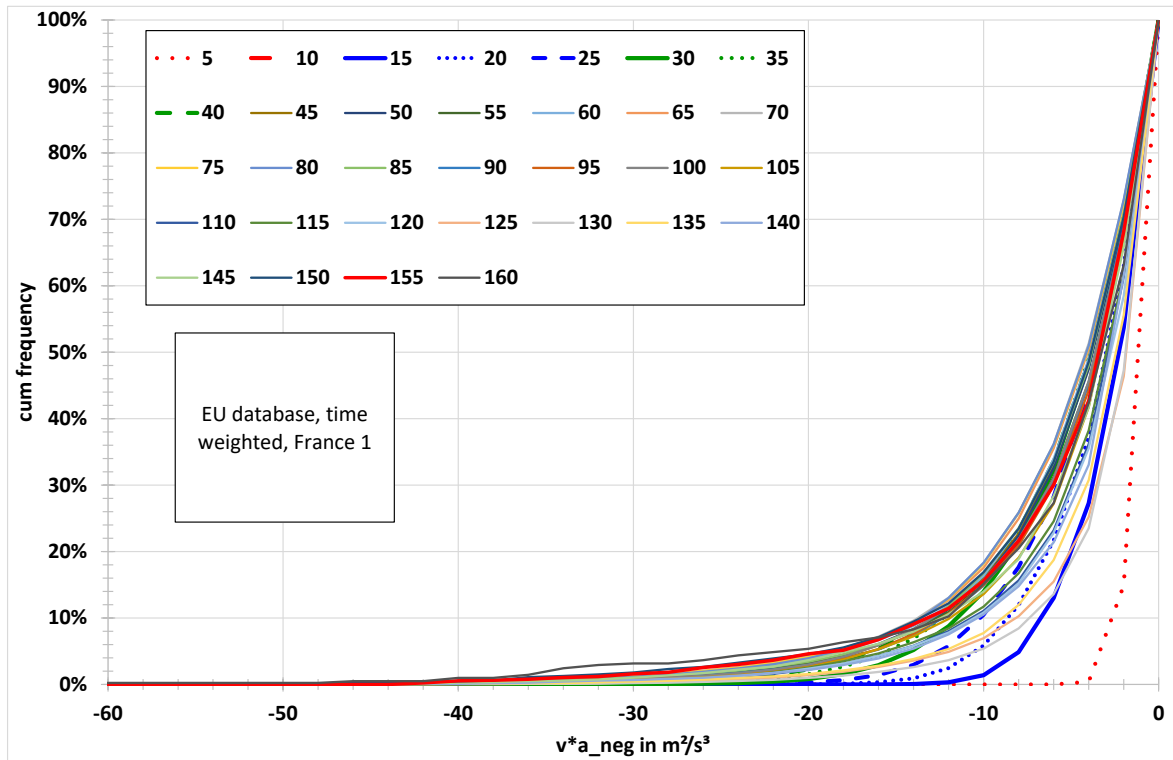


Figure 360: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, France 1

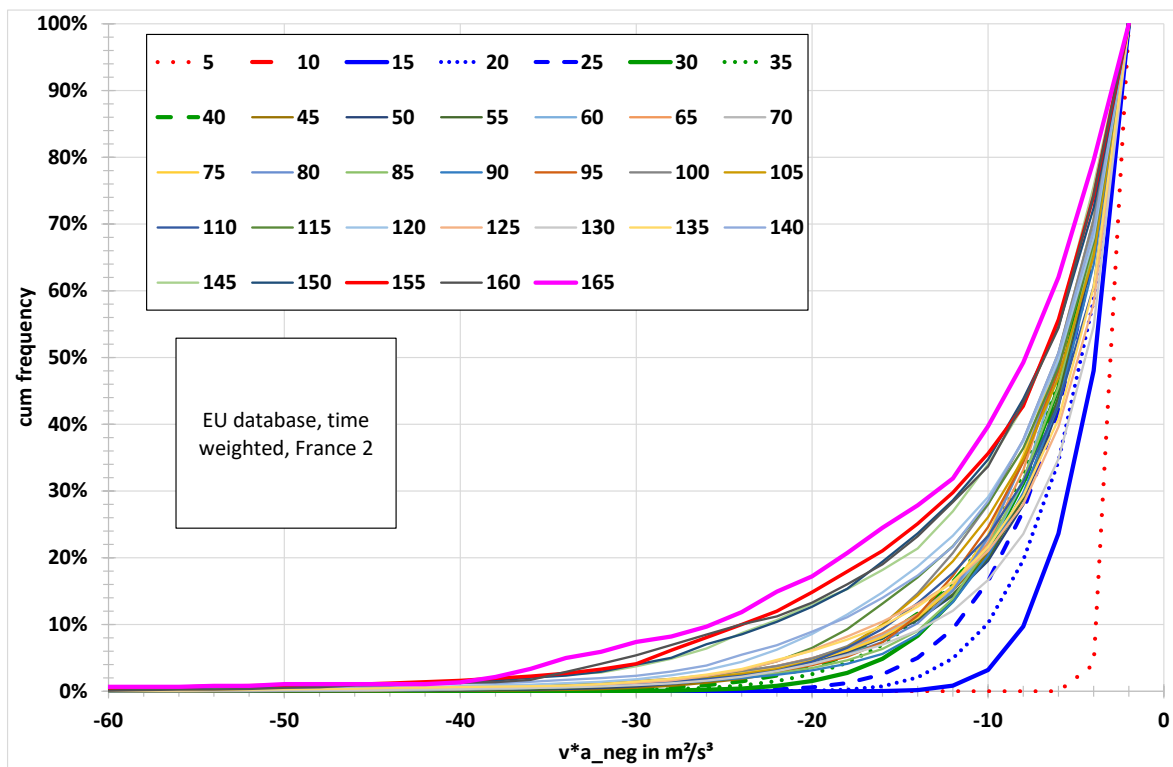


Figure 361: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, France 2

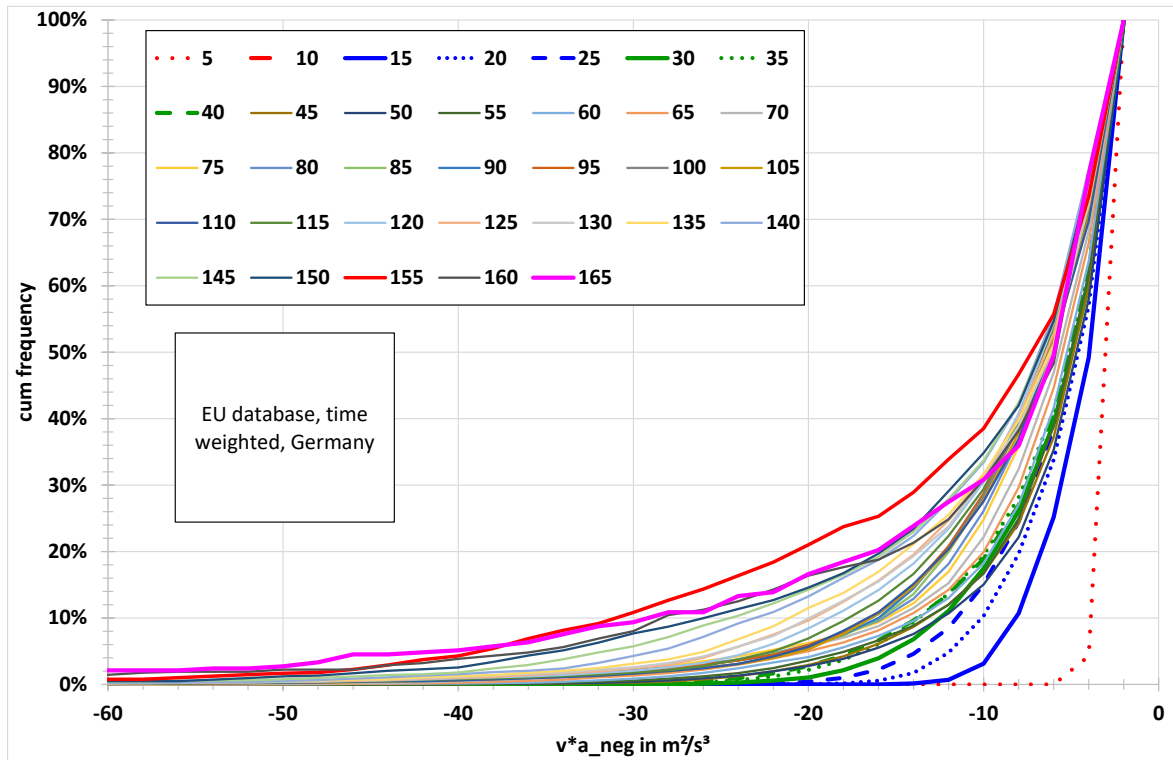


Figure 362: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, Germany

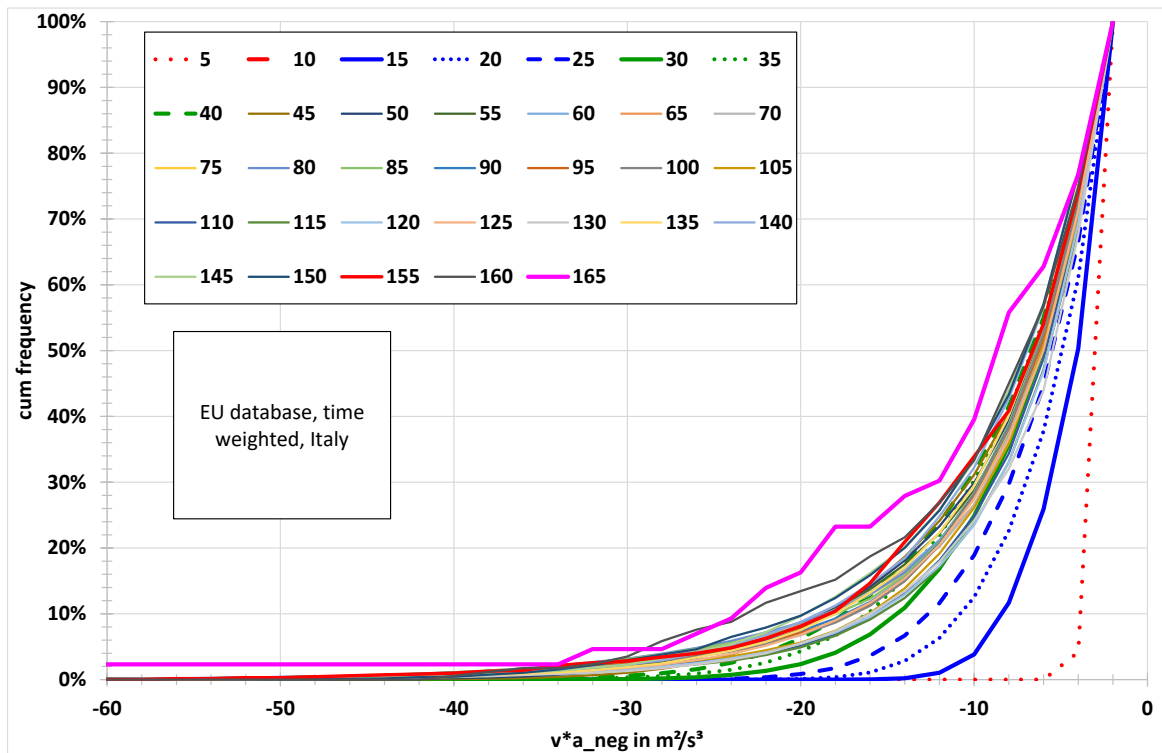


Figure 363: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, Italy

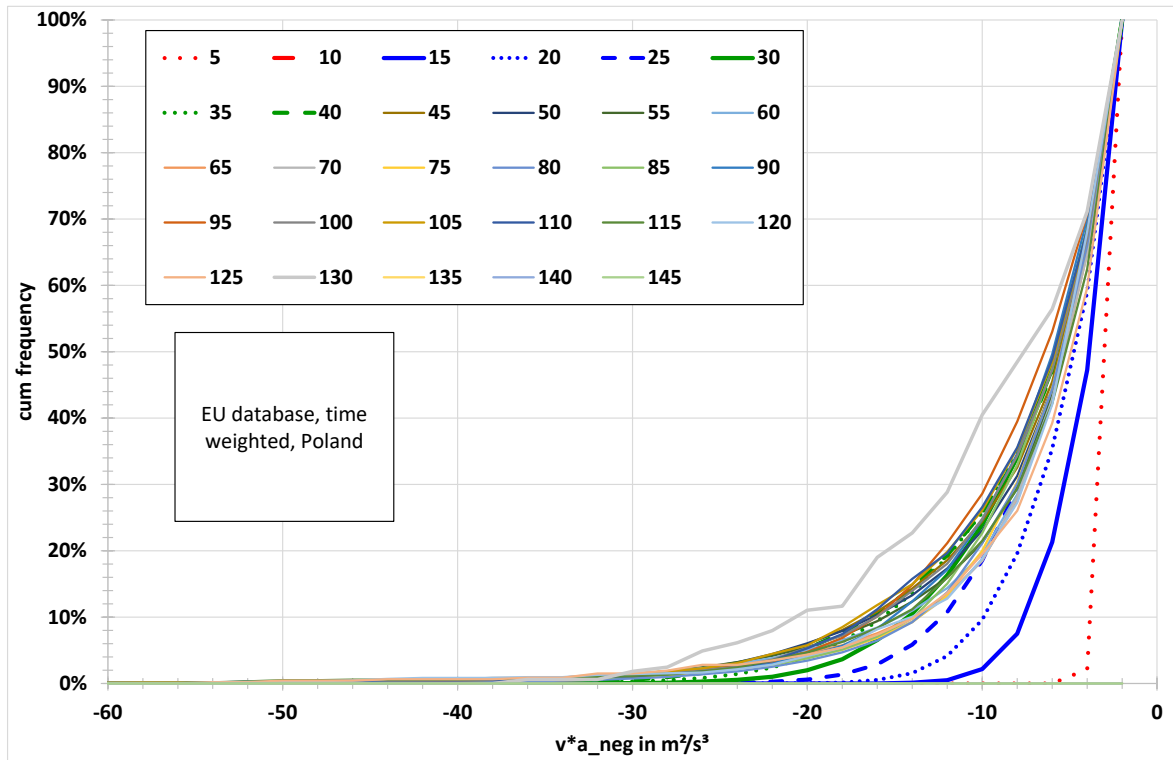


Figure 364: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, Poland

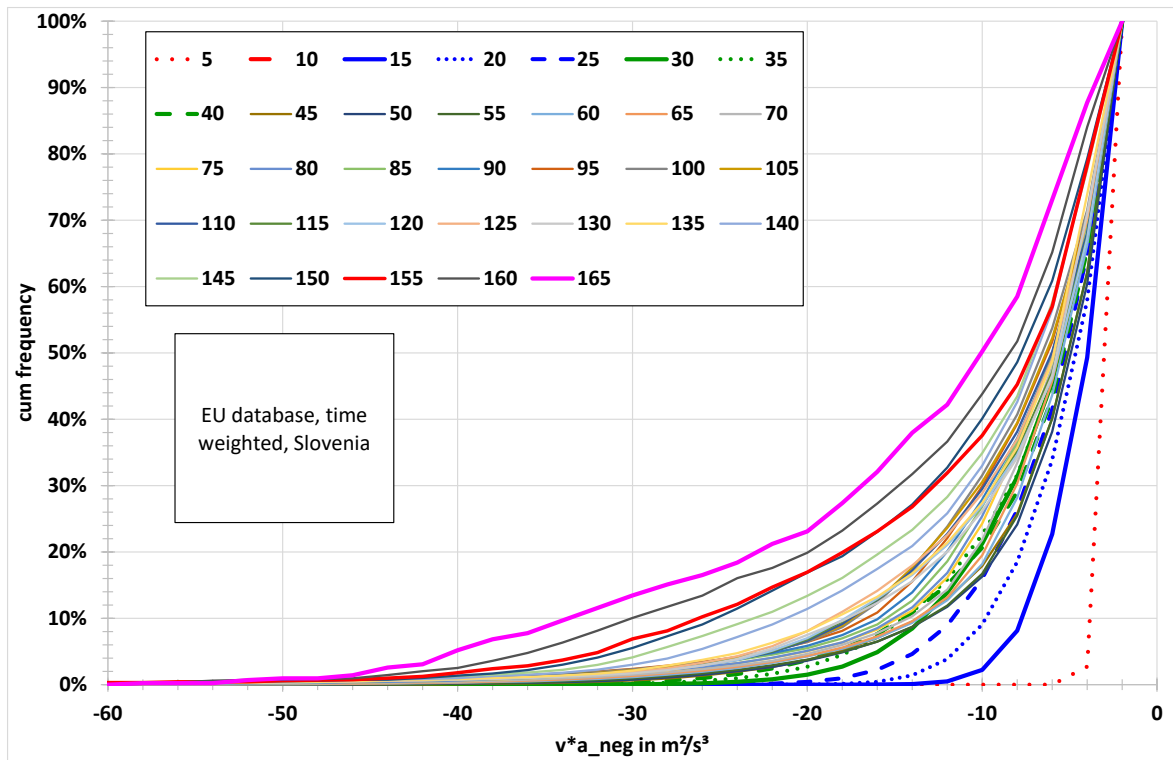


Figure 365: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, Slovenia

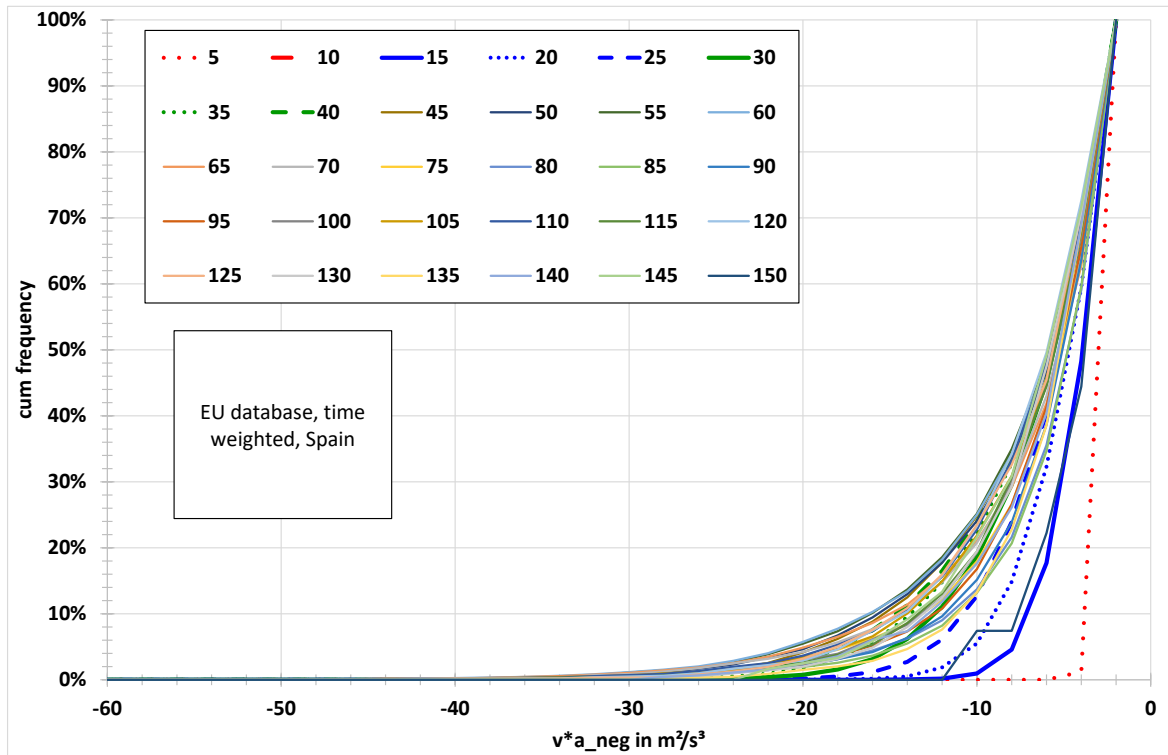


Figure 366: v^*a_{neg} distributions for vehicle speed classes, time weighted, Spain

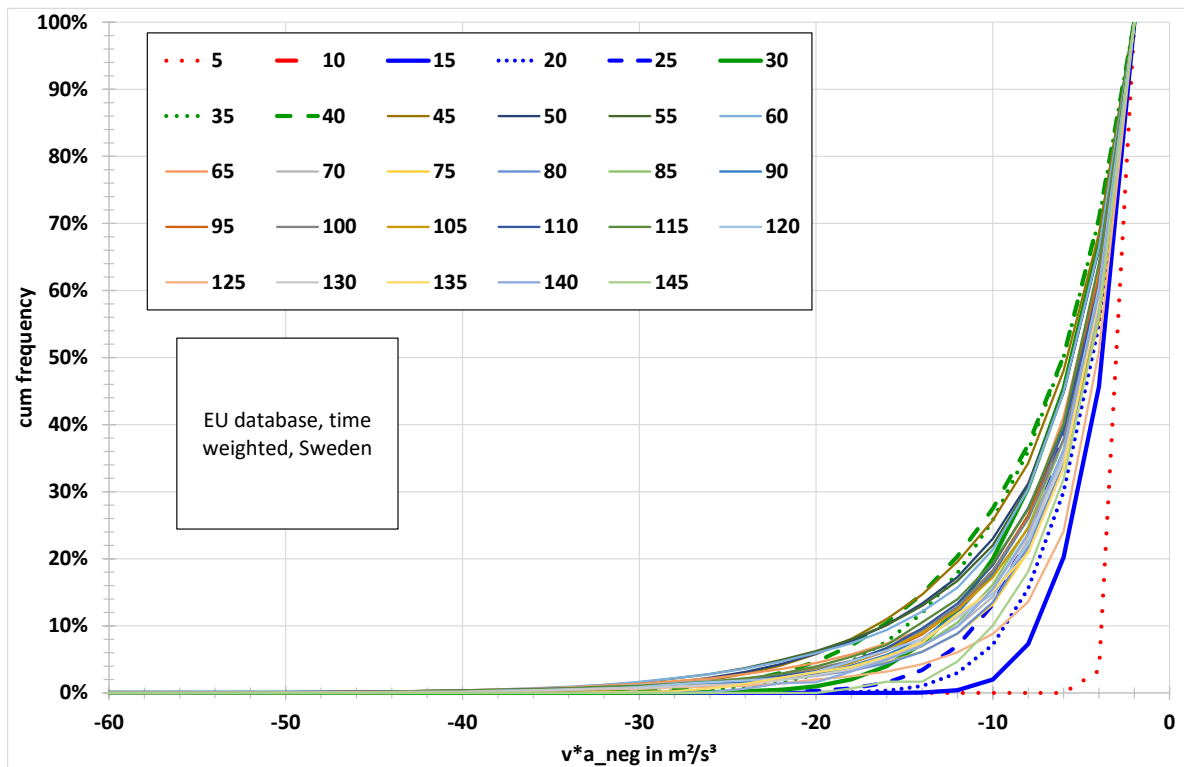


Figure 367: v^*a_{neg} distributions for vehicle speed classes, time weighted, Sweden

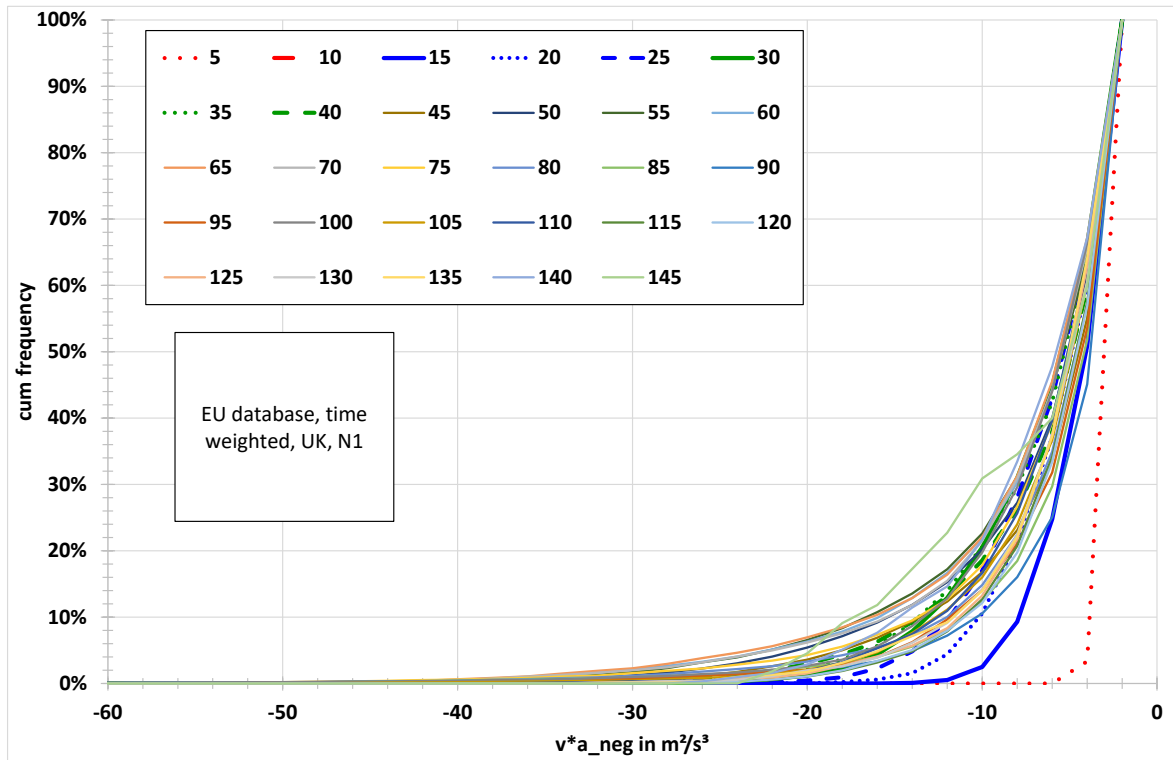


Figure 368: $v*a_{neg}$ distributions for vehicle speed classes, time weighted, UK, N1

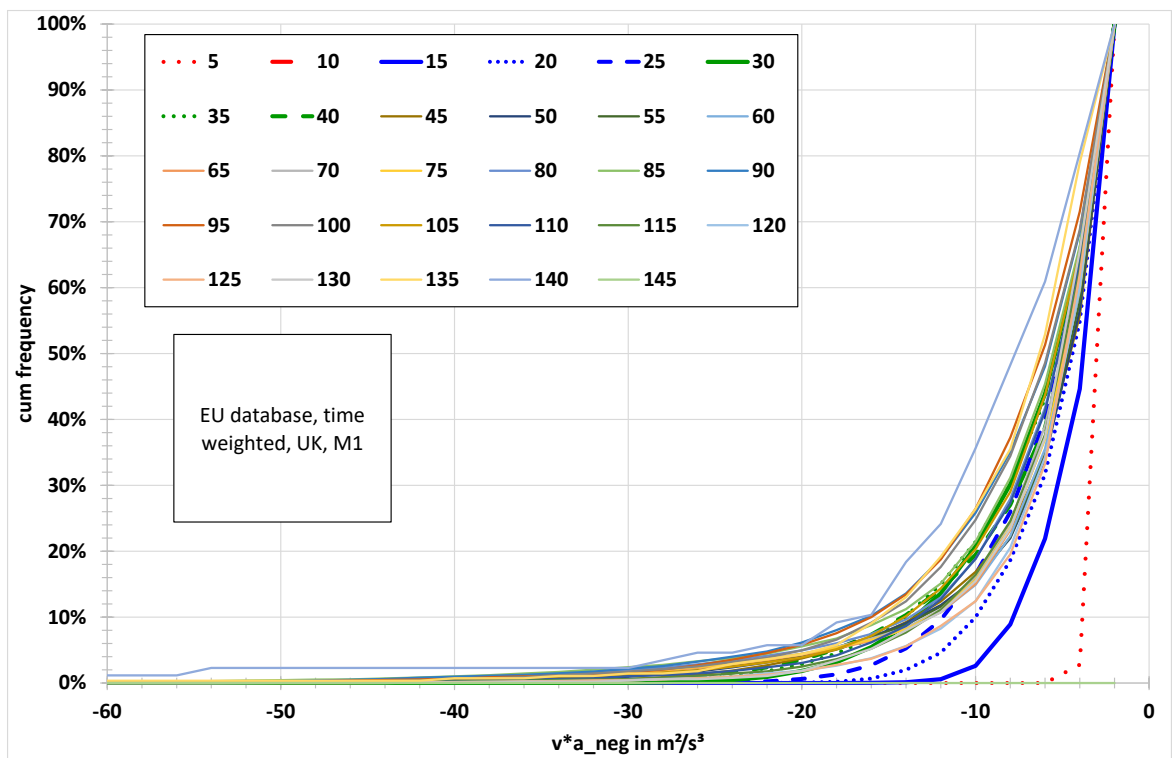


Figure 369: $v*a_{neg}$ distributions for vehicle speed classes, time weighted, UK, M1

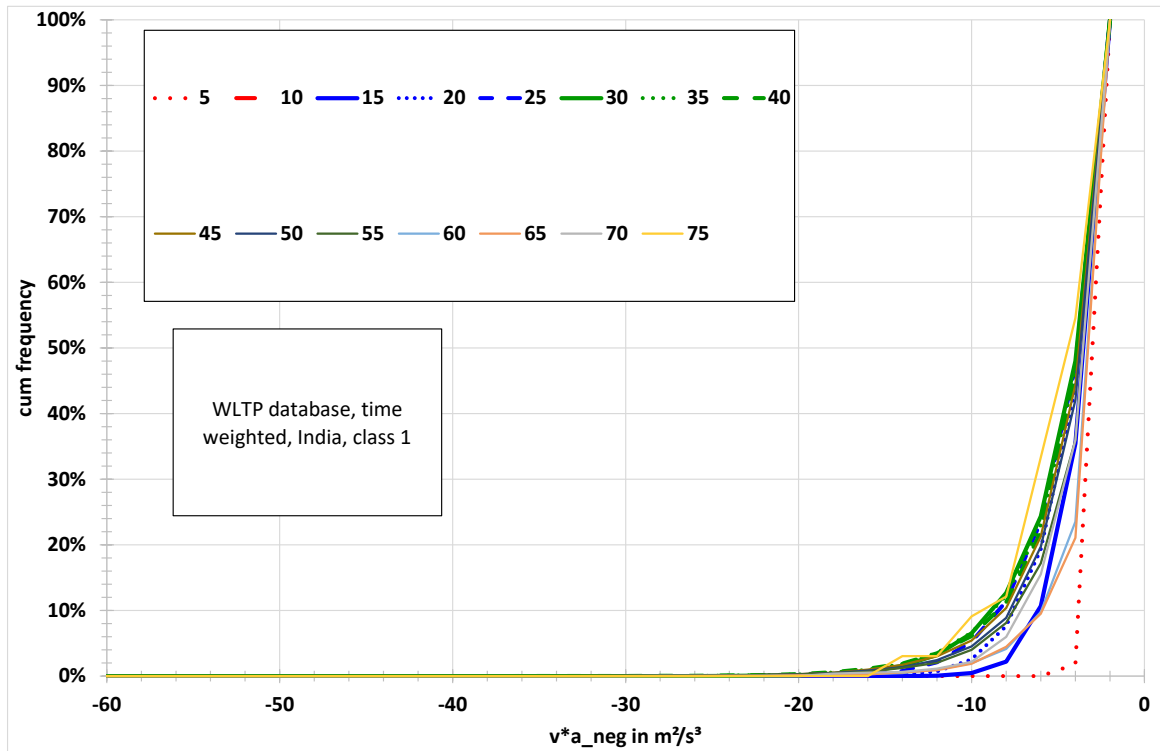


Figure 370: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, India class 1

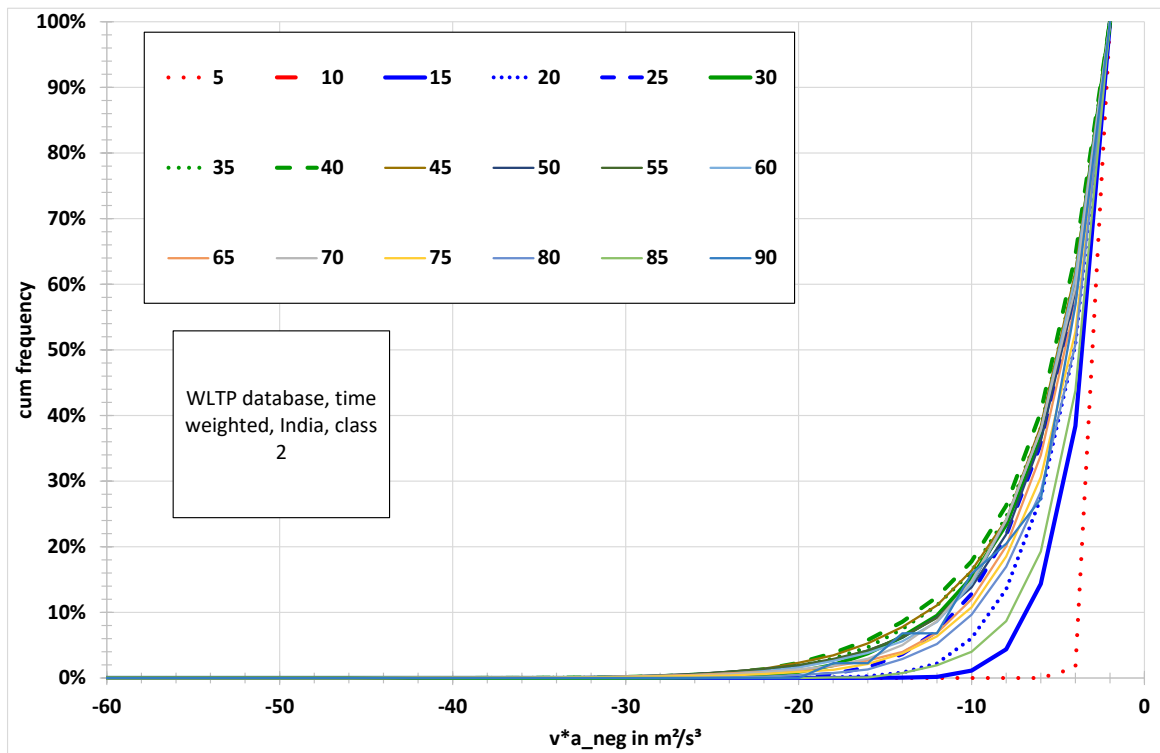


Figure 371: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, India class 2

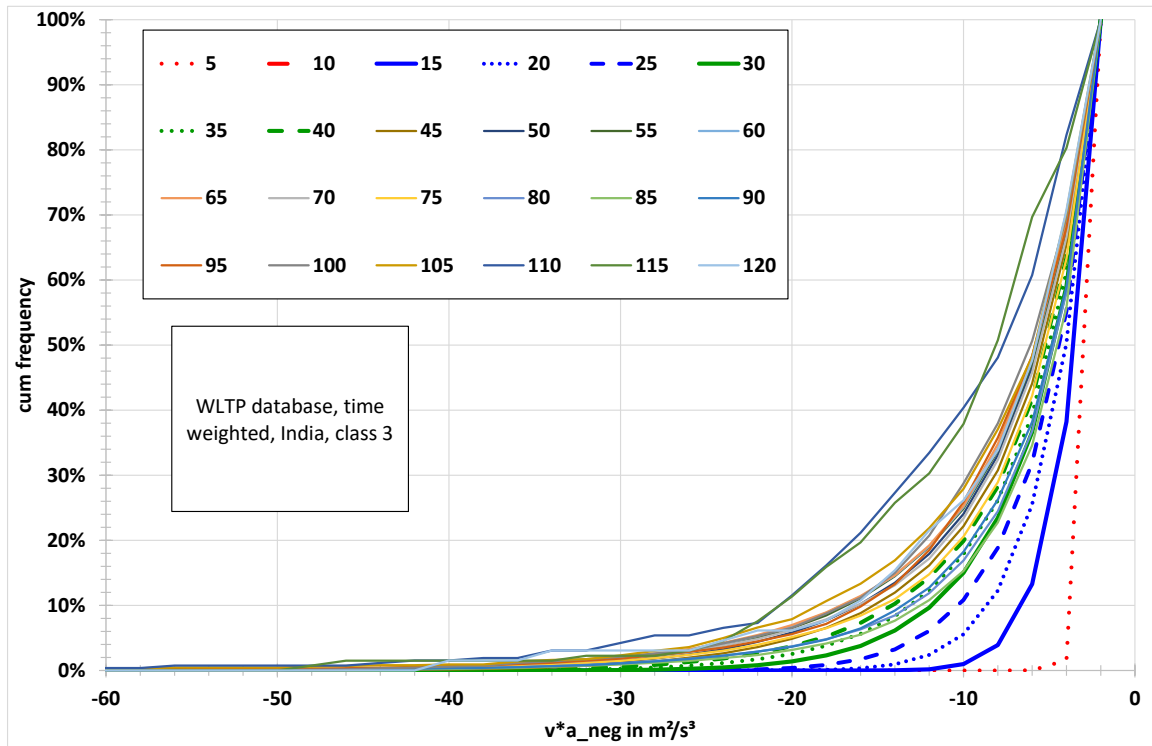


Figure 372: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, India class 3

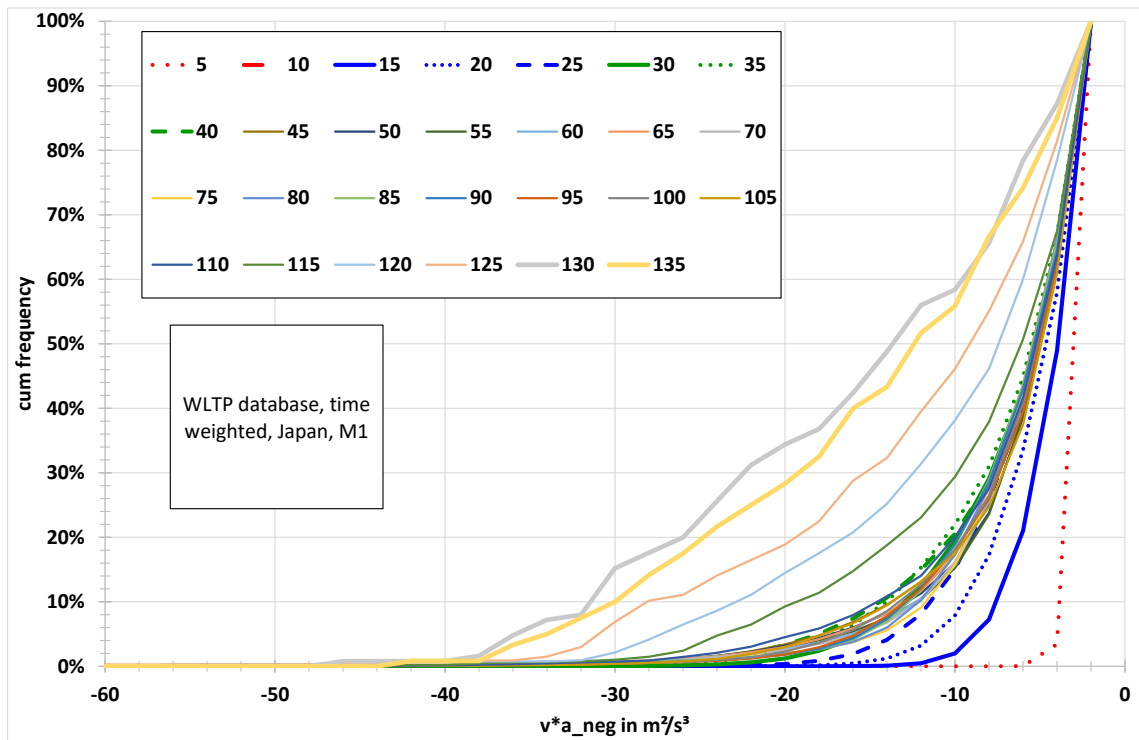


Figure 373: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, Japan M1

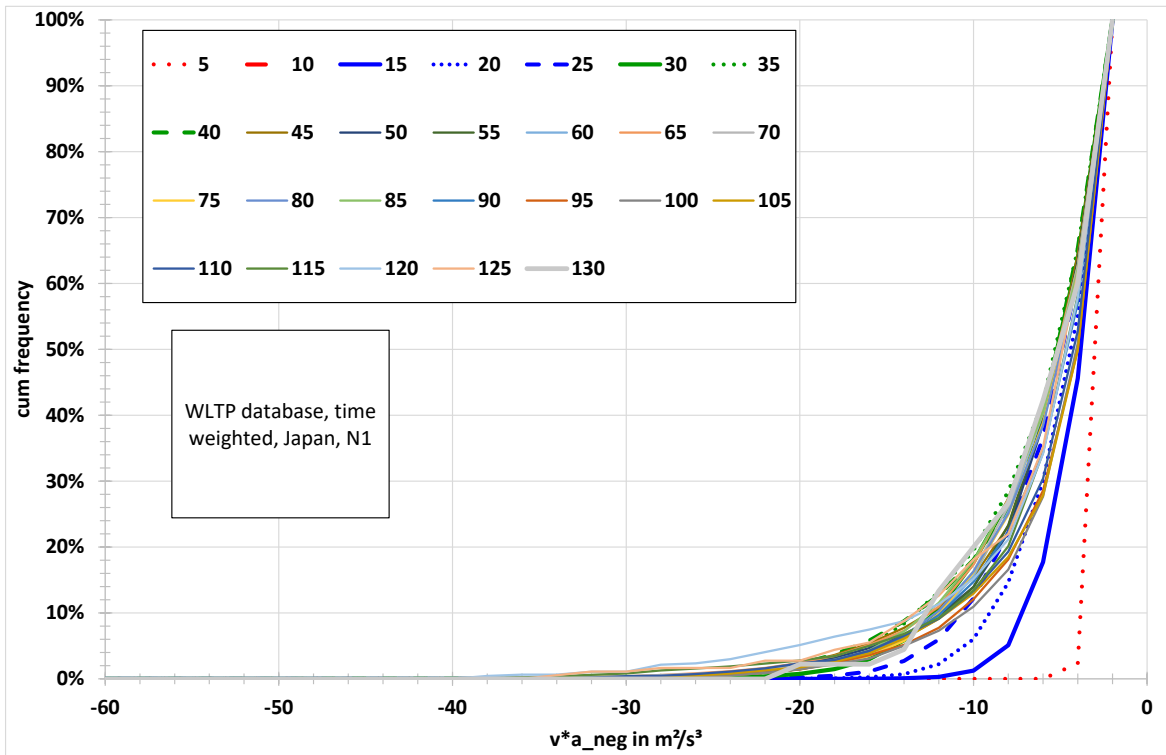


Figure 374: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, Japan N1

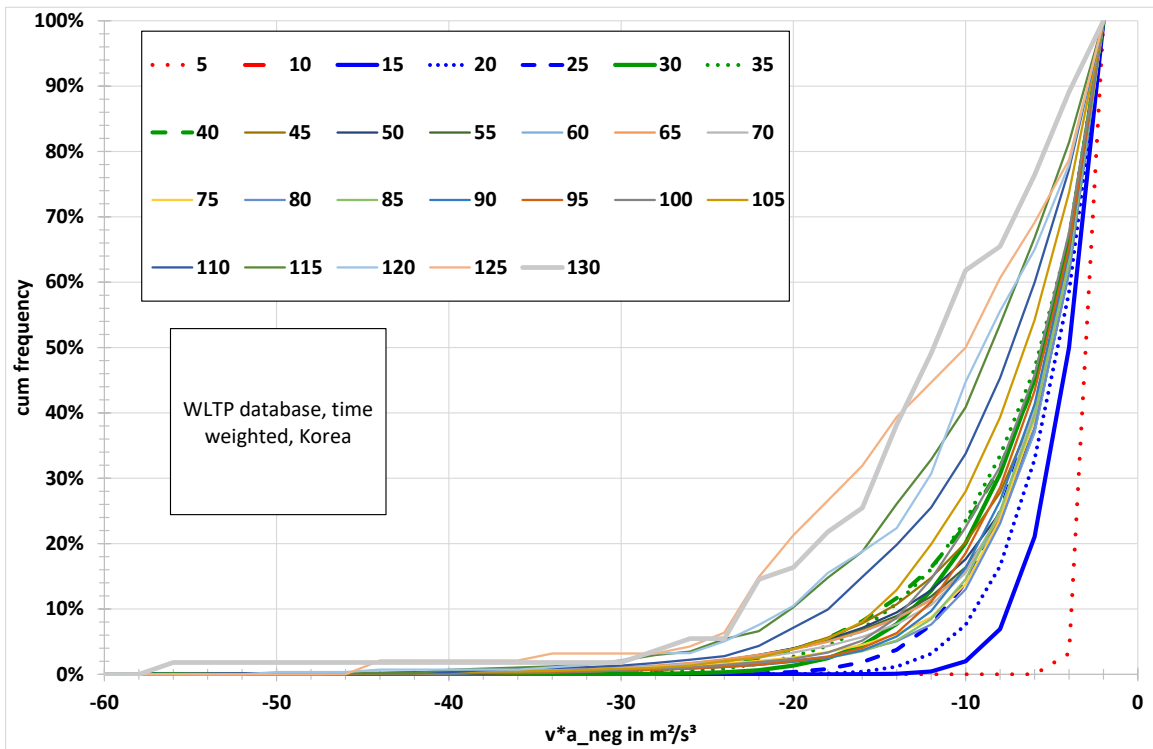


Figure 375: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, Korea

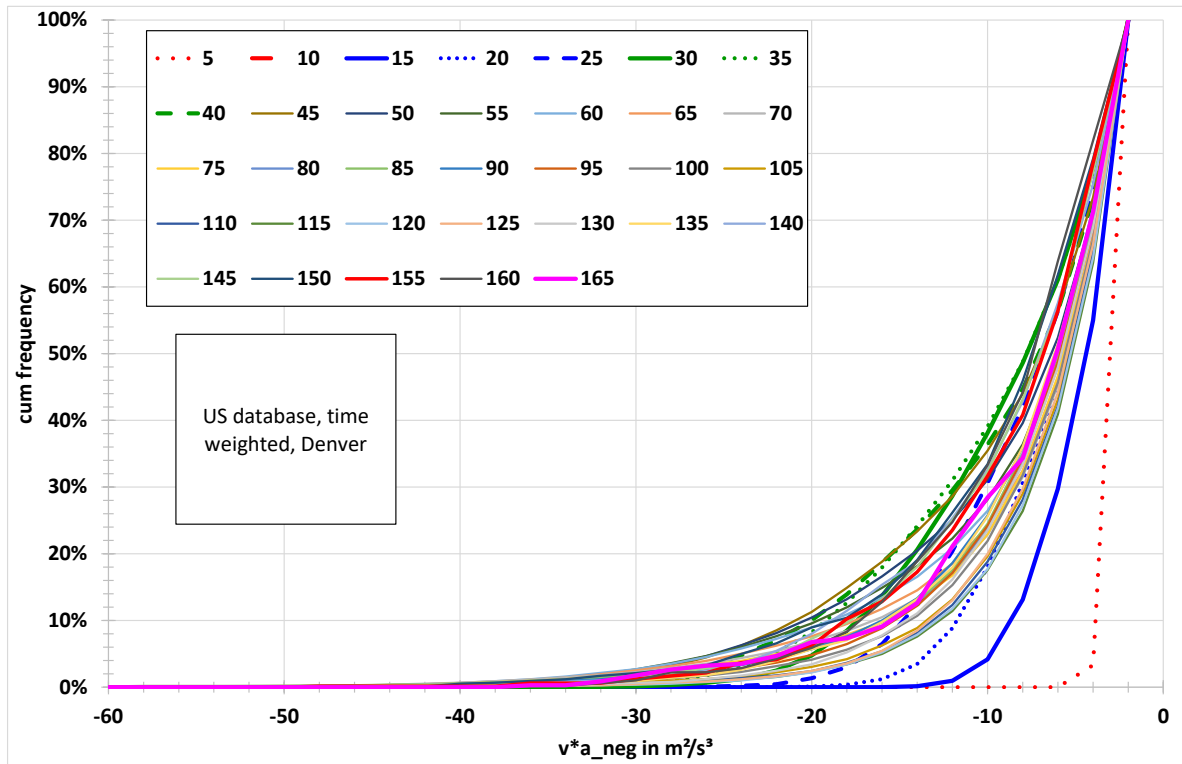


Figure 376: $v*a_{neg}$ distributions for vehicle speed classes, time weighted, USA, Denver

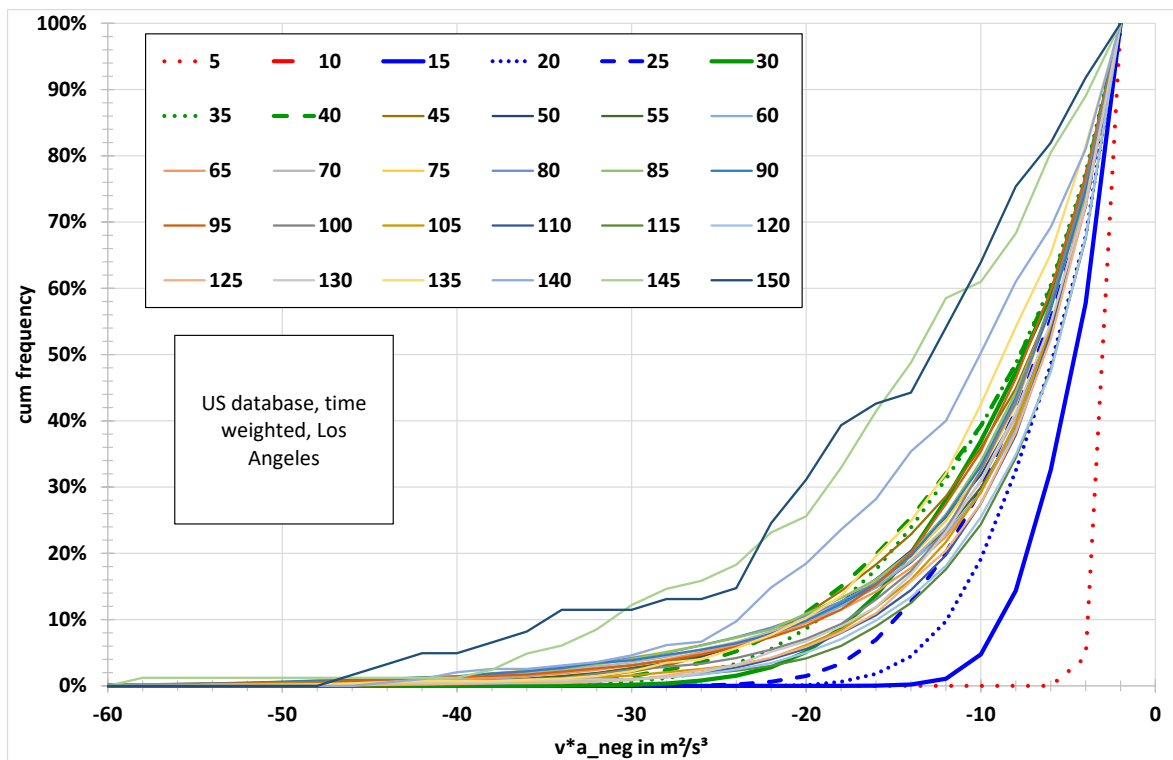


Figure 377: $v*a_{neg}$ distributions for vehicle speed classes, time weighted, USA, Los Angeles

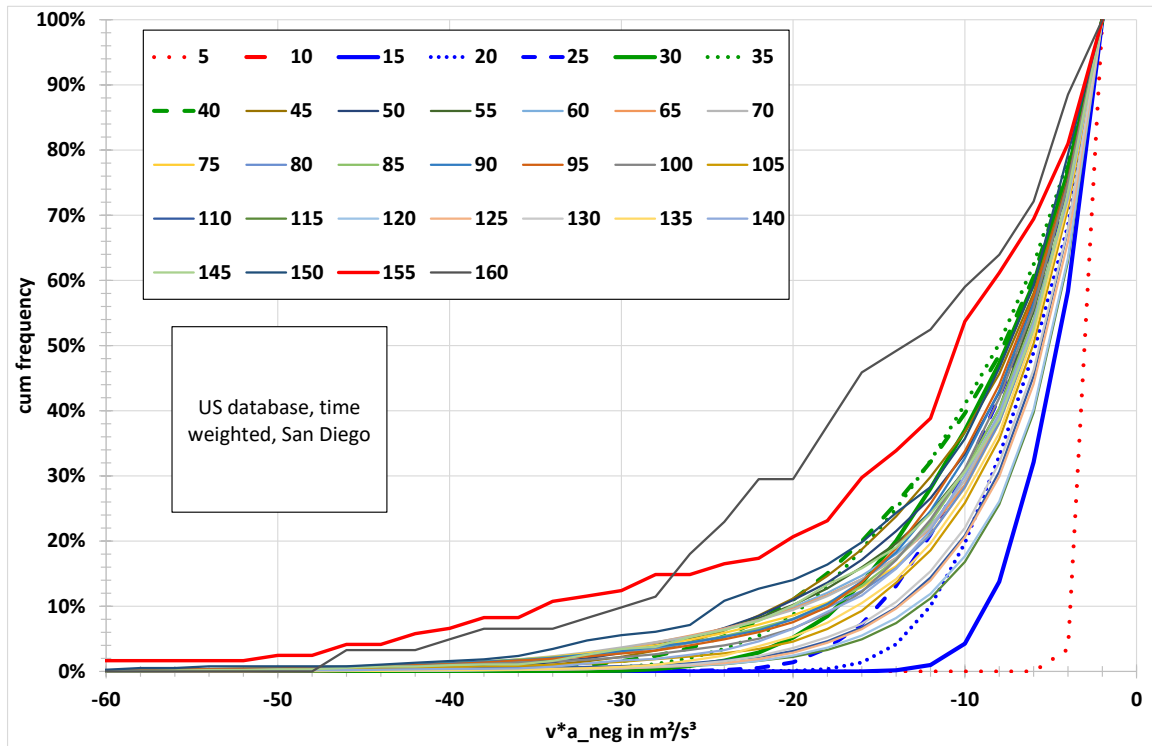


Figure 378: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, USA, San Diego

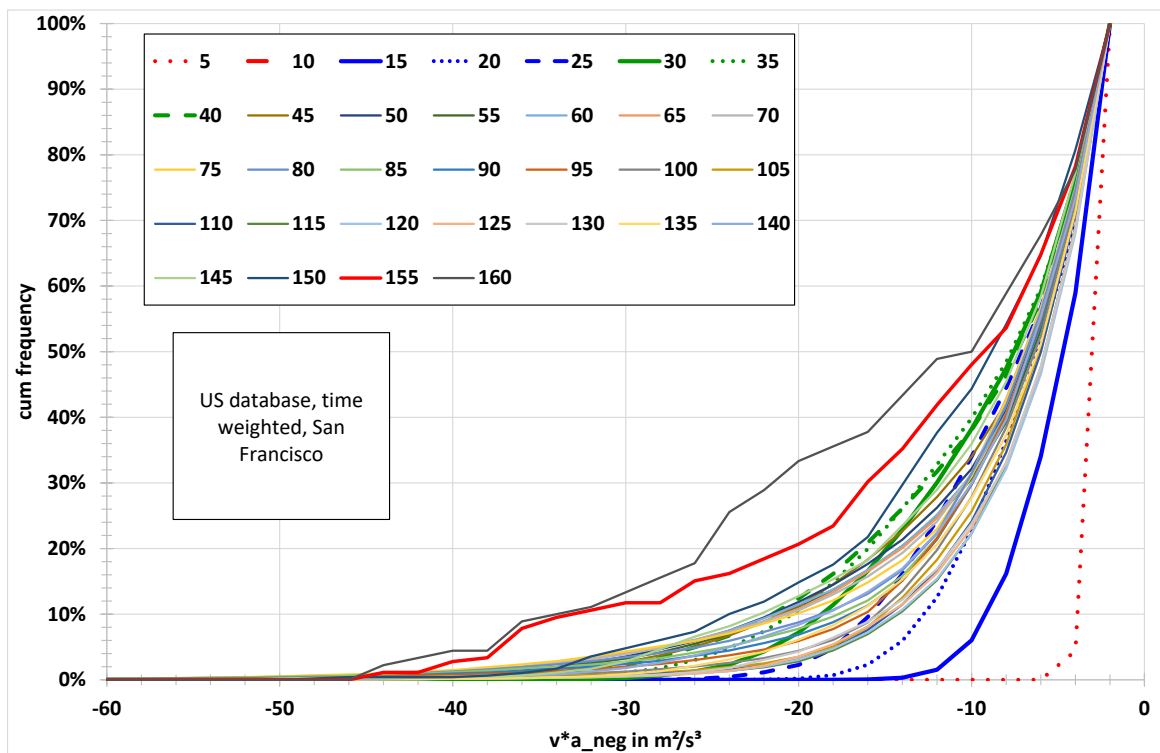


Figure 379: $v \cdot a_{neg}$ distributions for vehicle speed classes, time weighted, USA, San Francisco



17.2 Distance weighted

The figures in the legends indicate the vehicle speed class

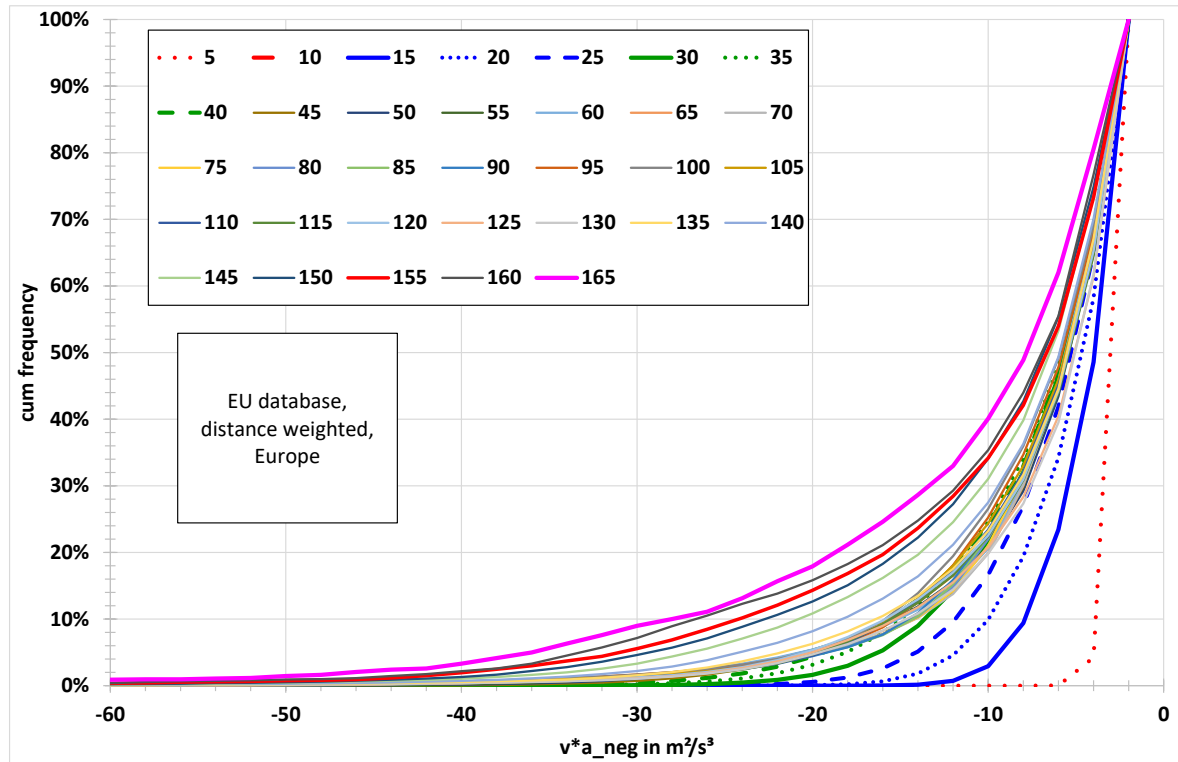


Figure 380: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, Europe

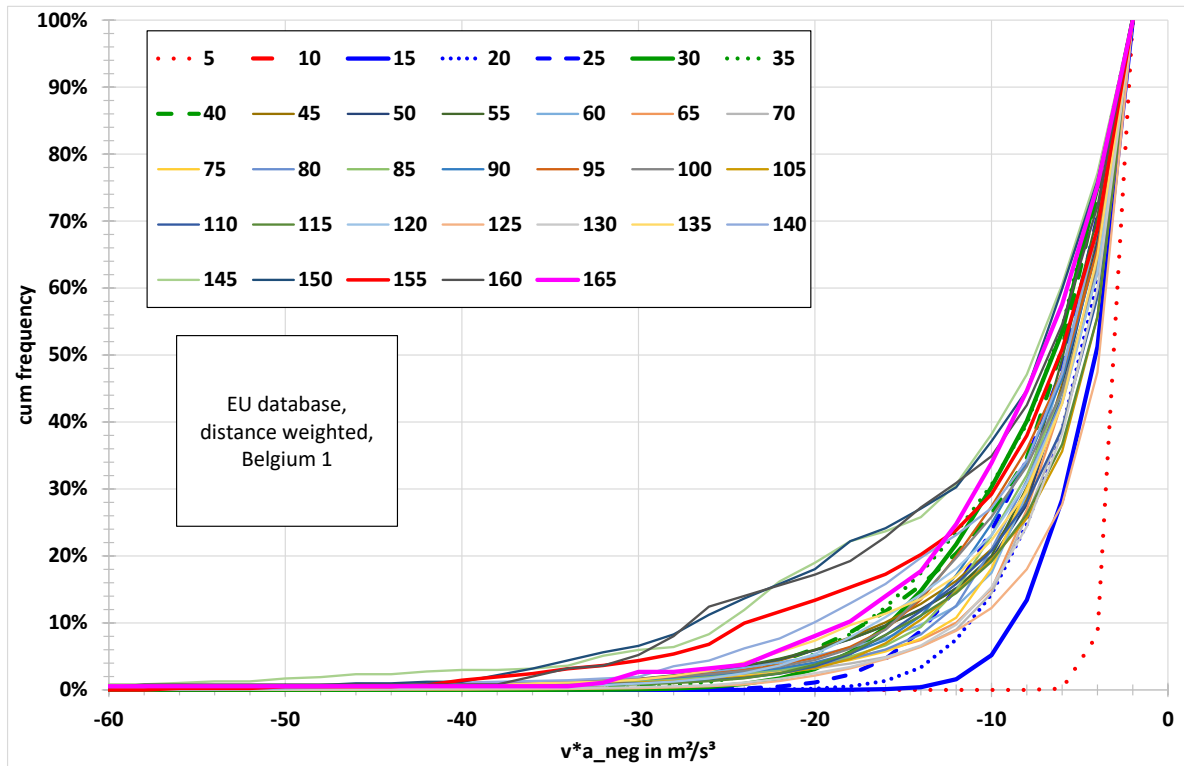


Figure 381: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, BE 1

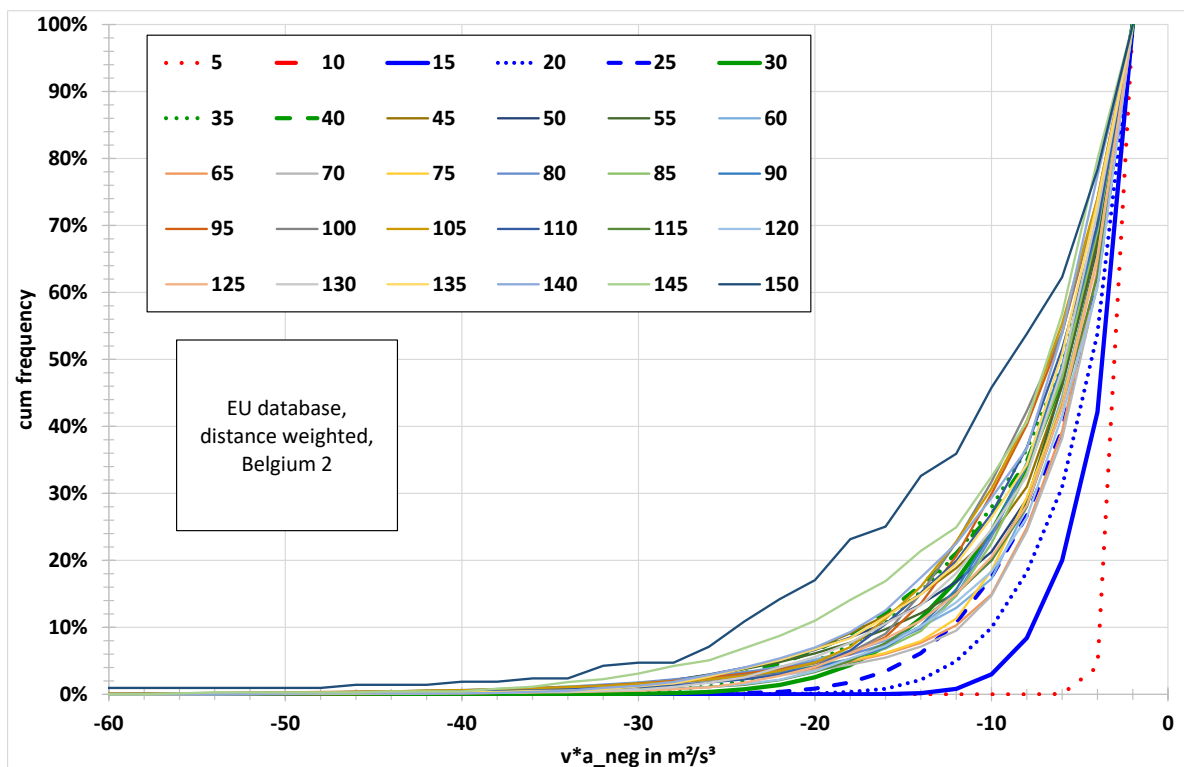


Figure 382: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, BE 2

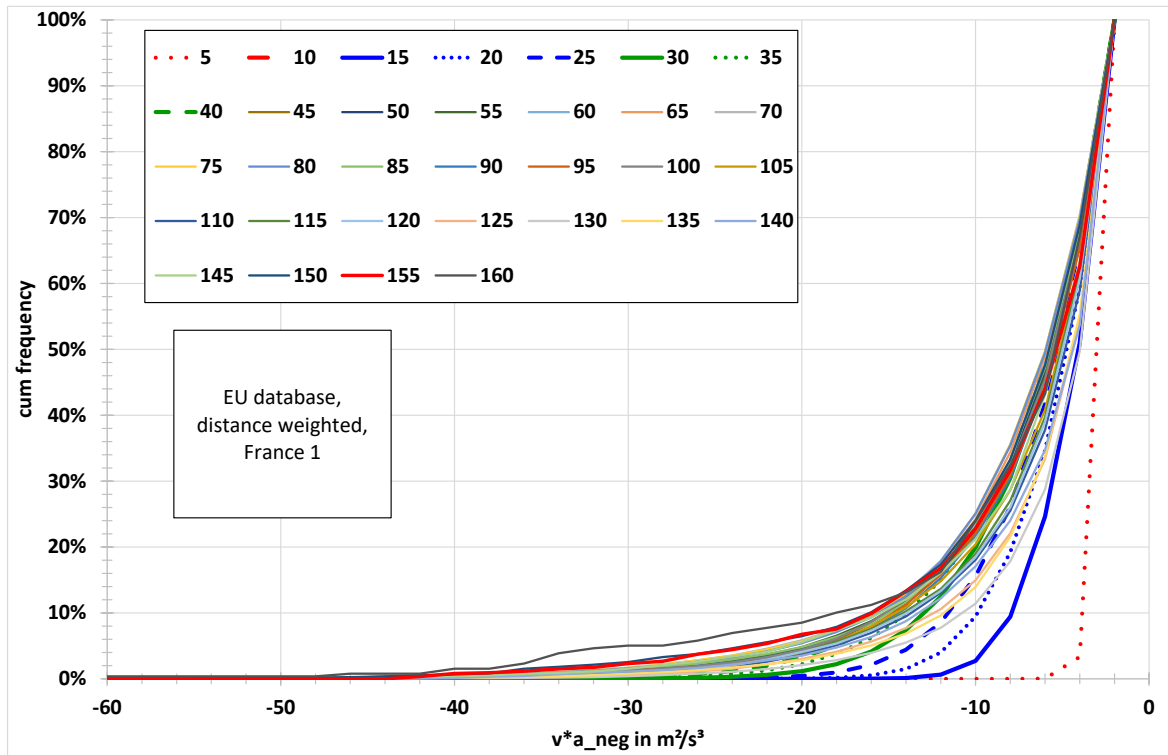


Figure 383: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, France 1

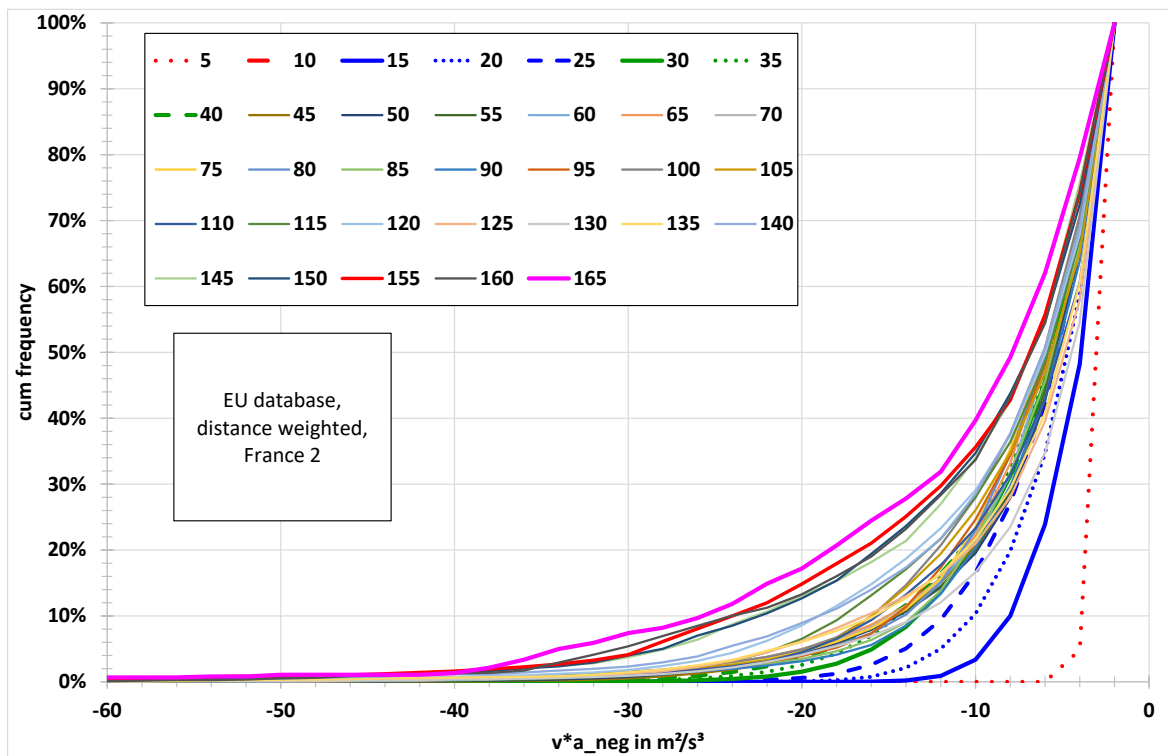


Figure 384: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, France 2

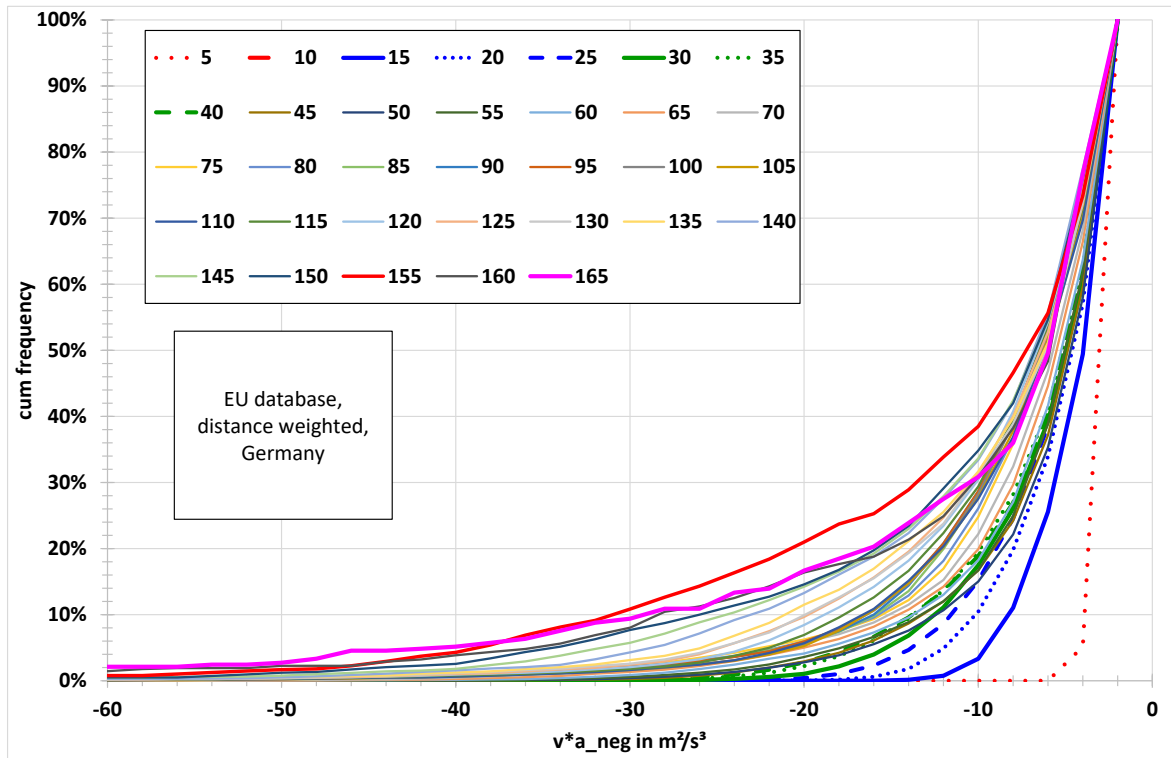


Figure 385: $v*a_{neg}$ distributions for vehicle speed classes, distance weighted, Germany

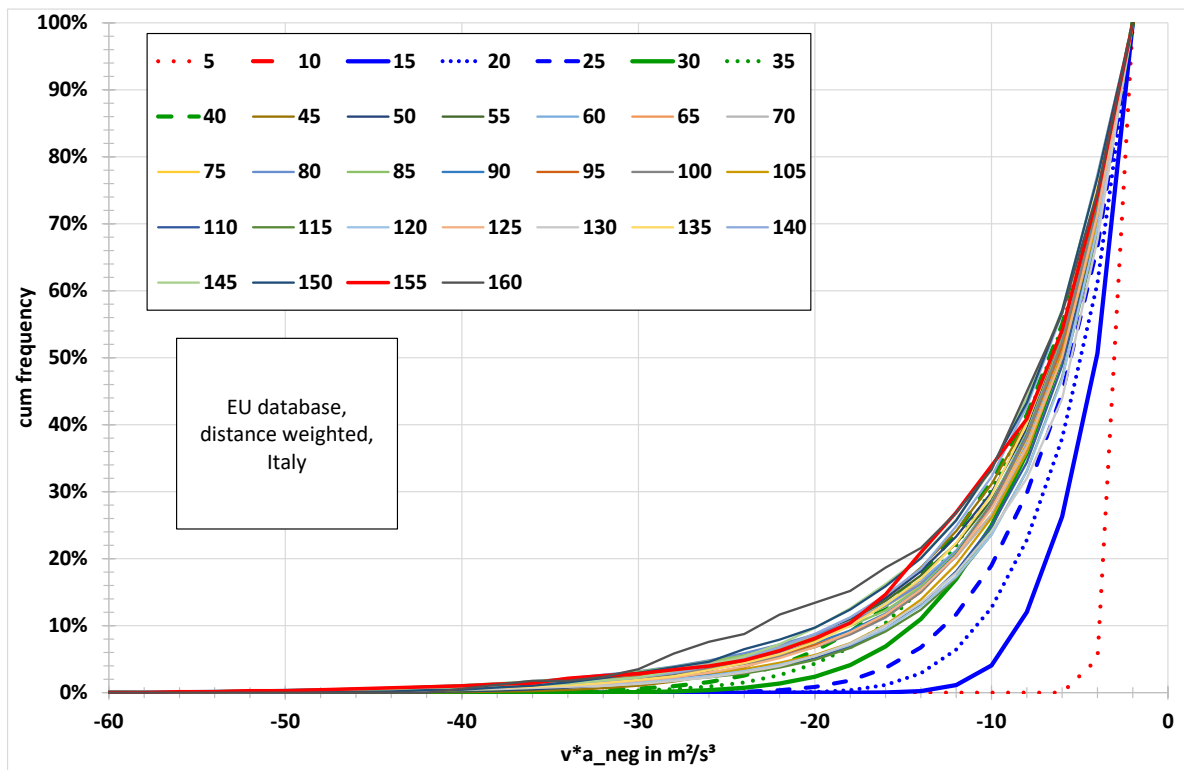


Figure 386: $v*a_{neg}$ distributions for vehicle speed classes, distance weighted, Italy

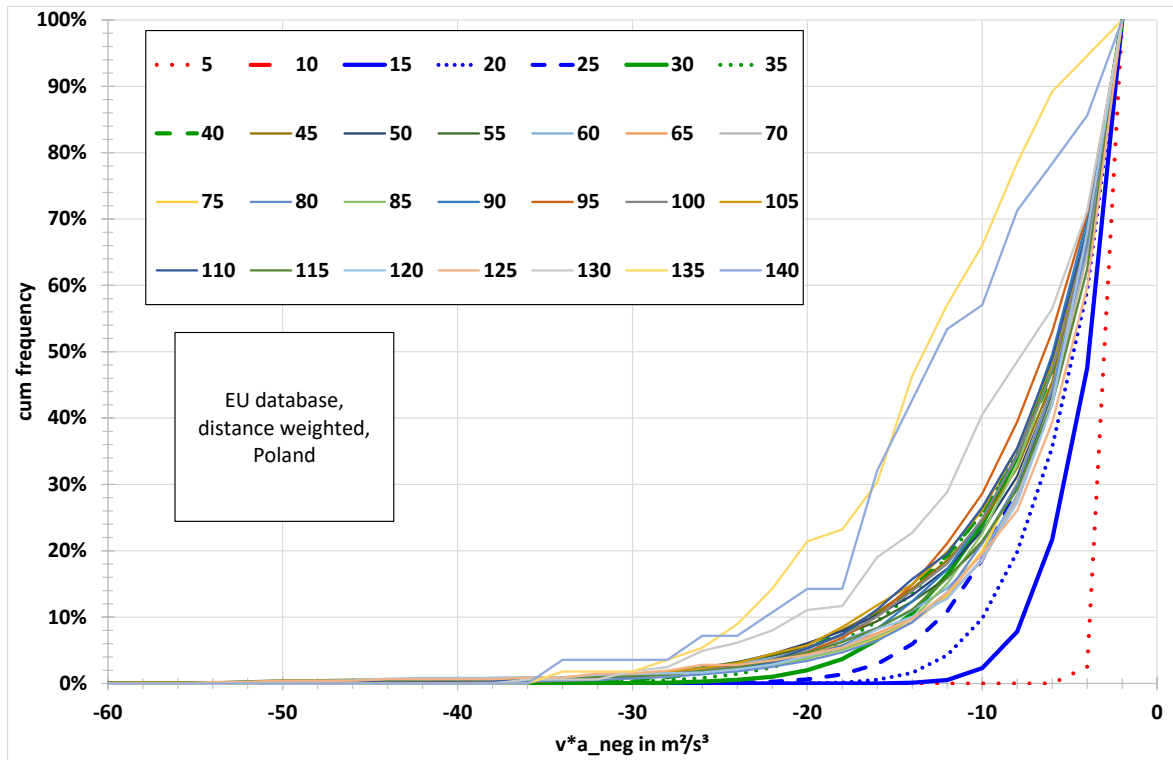


Figure 387: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, Poland

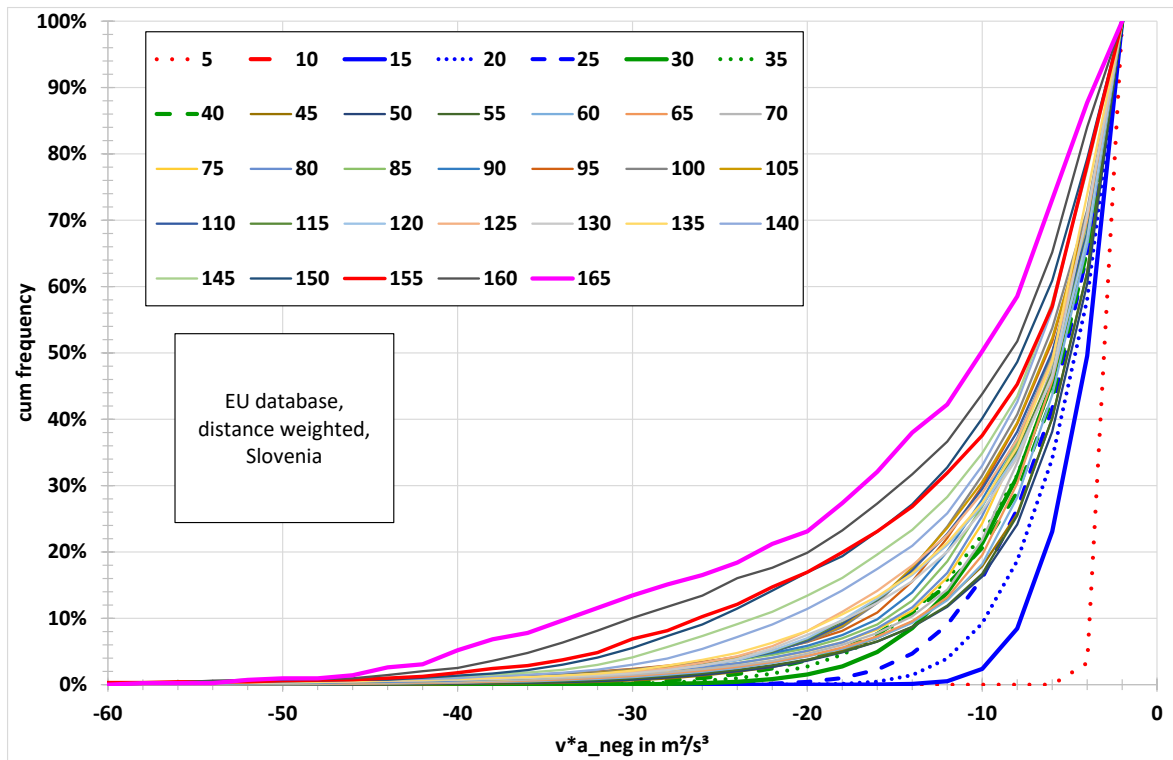


Figure 388: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, Slovenia

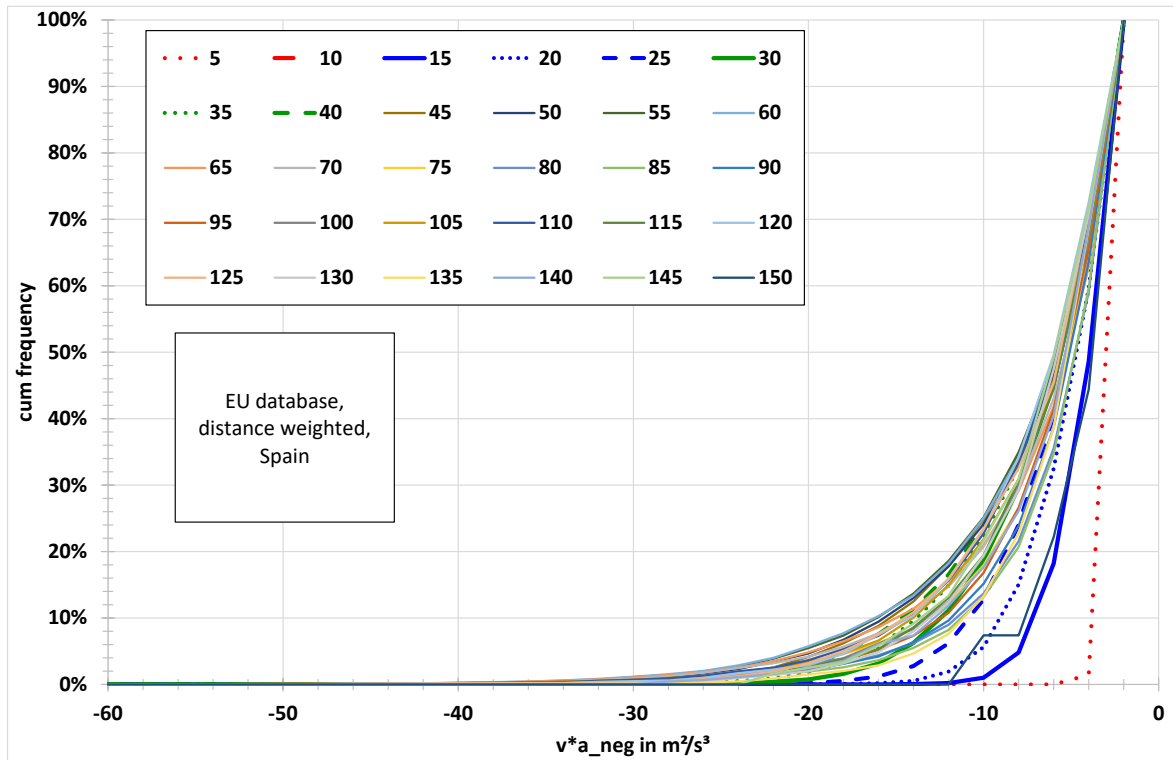


Figure 389: $v*a_{neg}$ distributions for vehicle speed classes, distance weighted, Spain

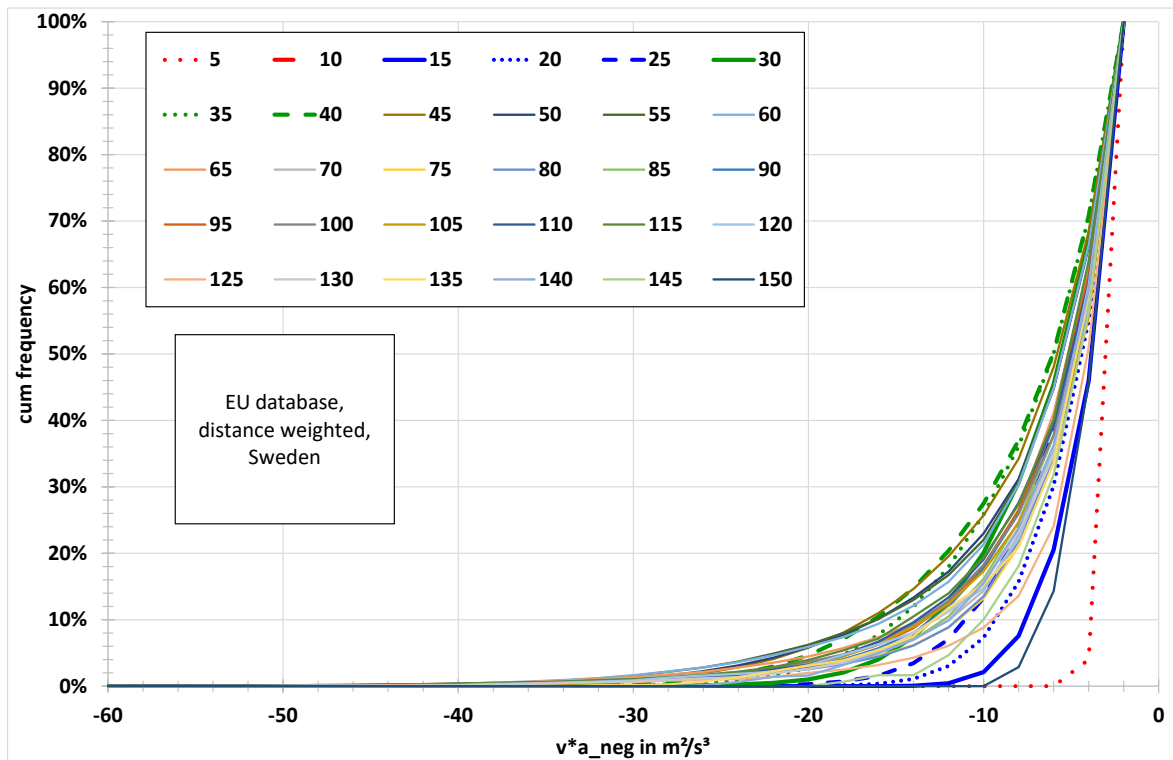


Figure 390: $v*a_{neg}$ distributions for vehicle speed classes, distance weighted, Sweden

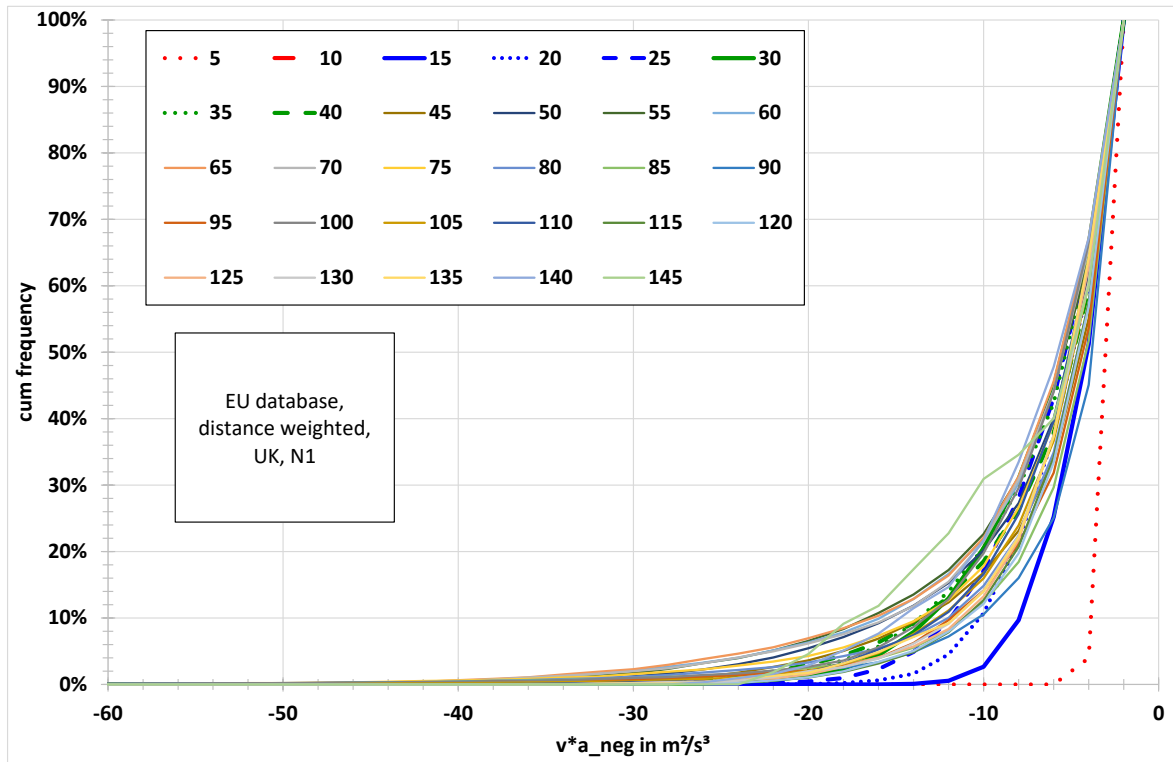


Figure 391: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, UK, N1

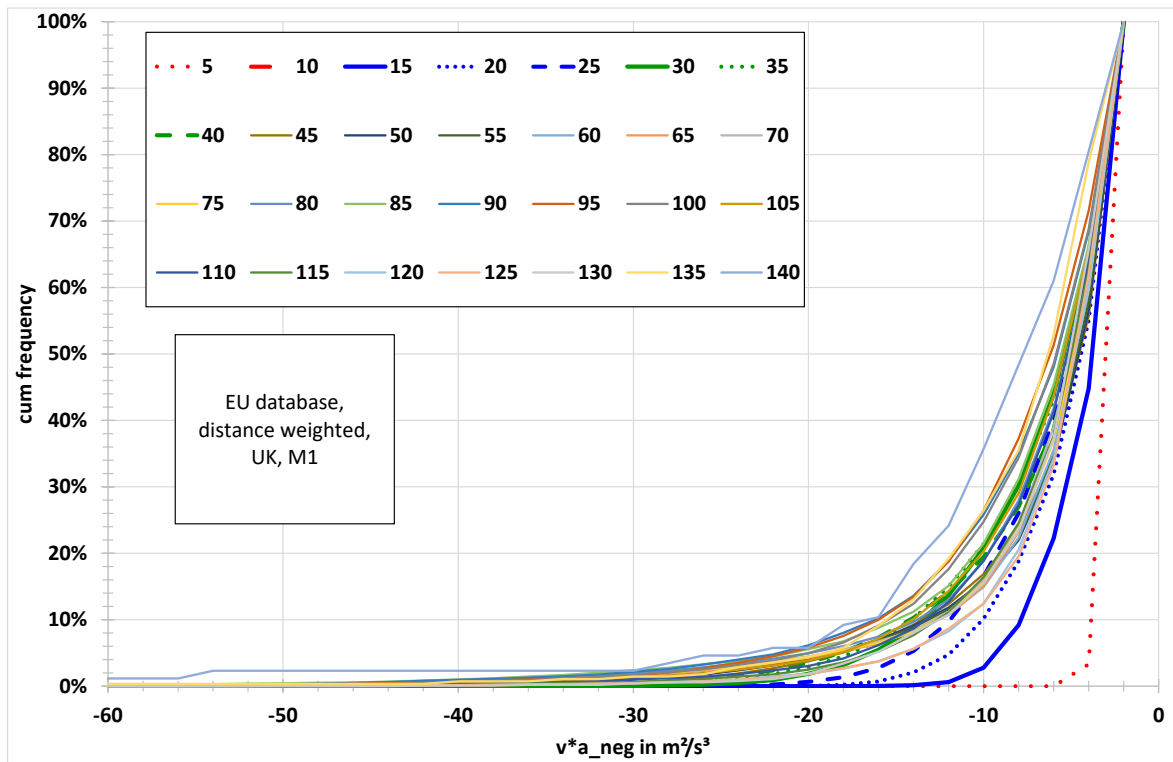


Figure 392: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, UK, M1

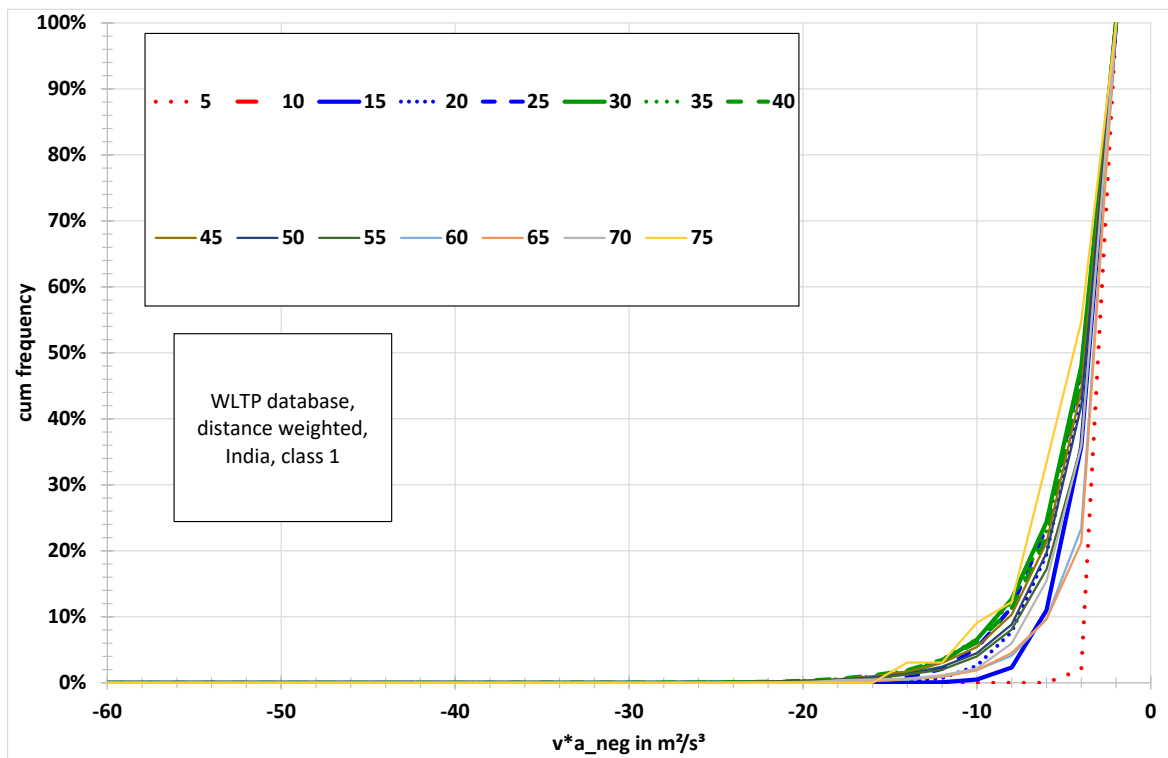


Figure 393: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, India class 1

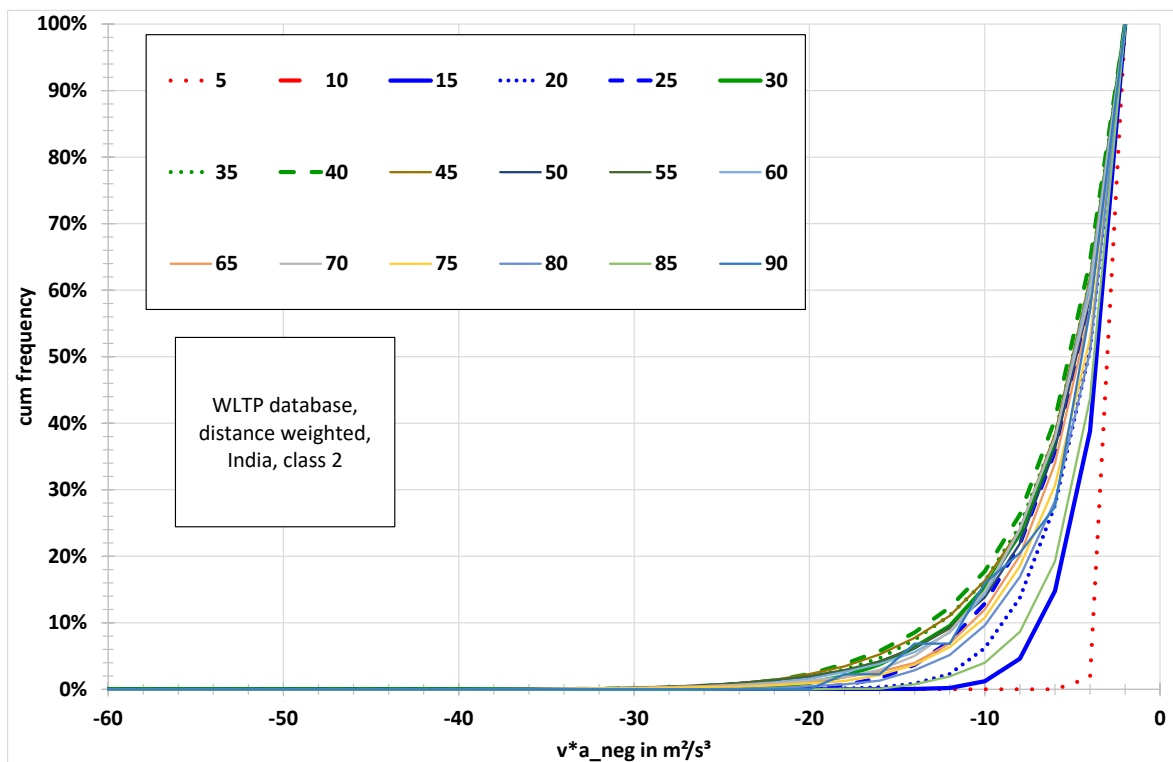


Figure 394: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, India class 2

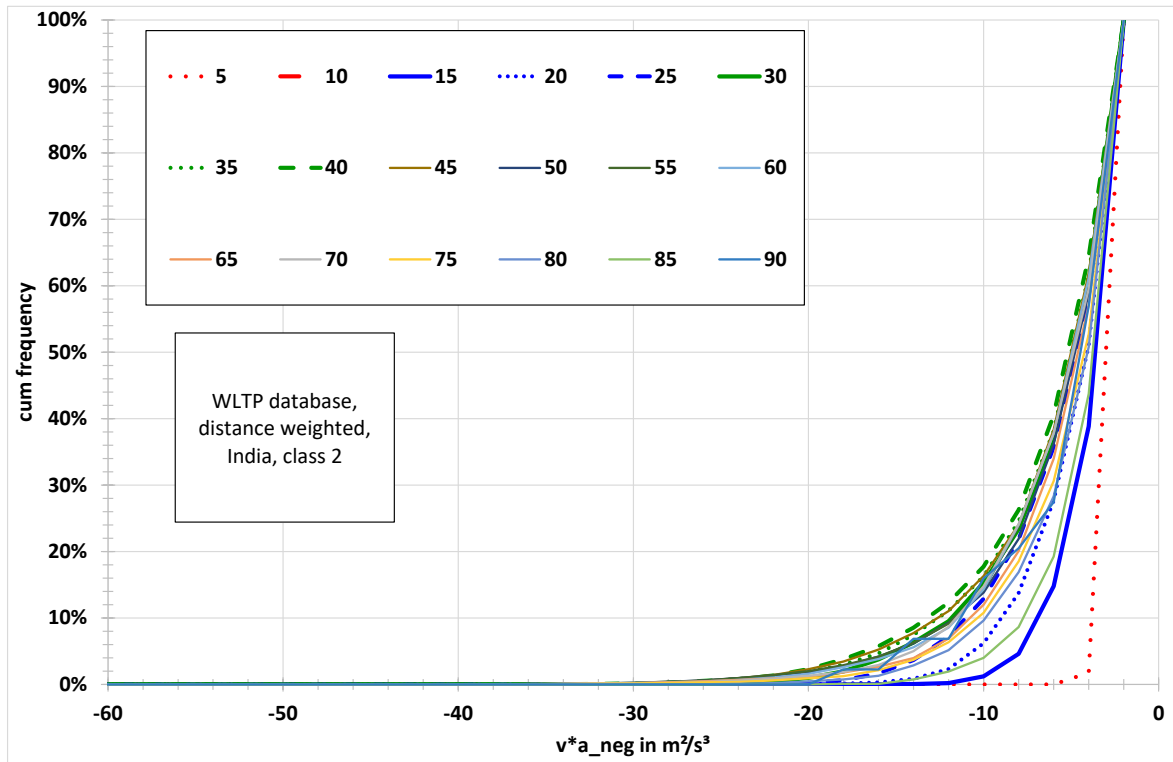


Figure 395: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, India class 3

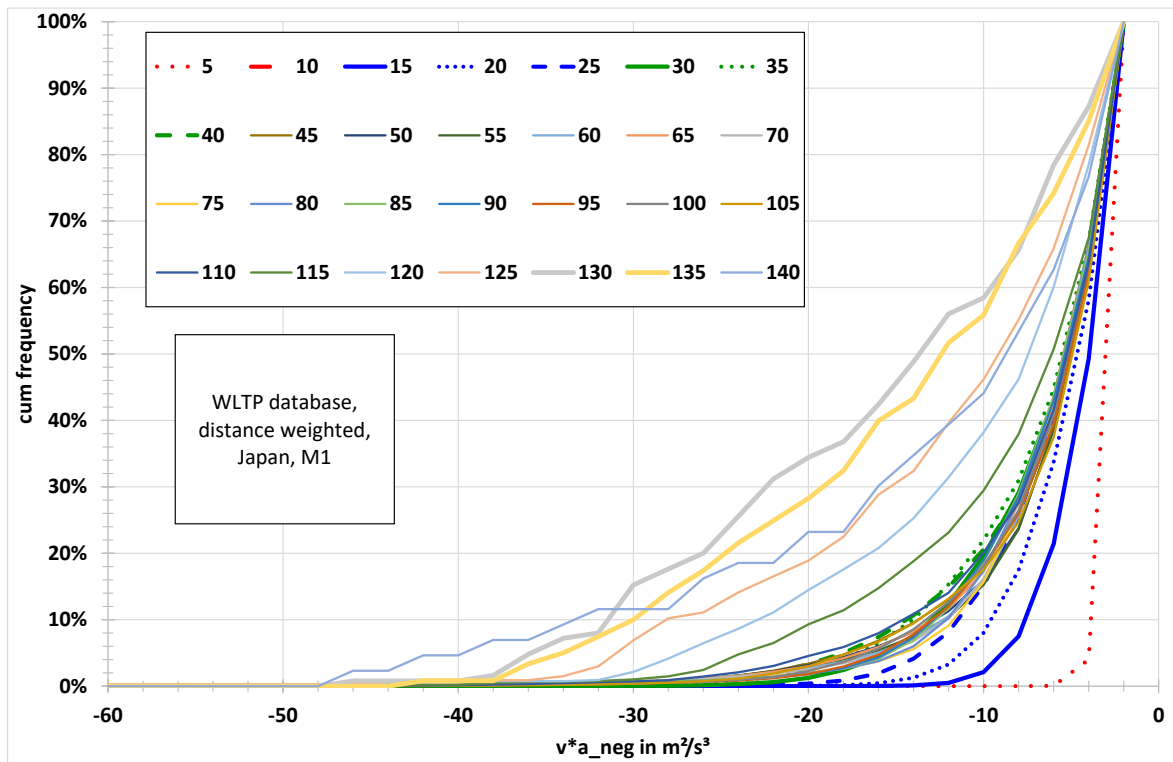


Figure 396: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, Japan M1

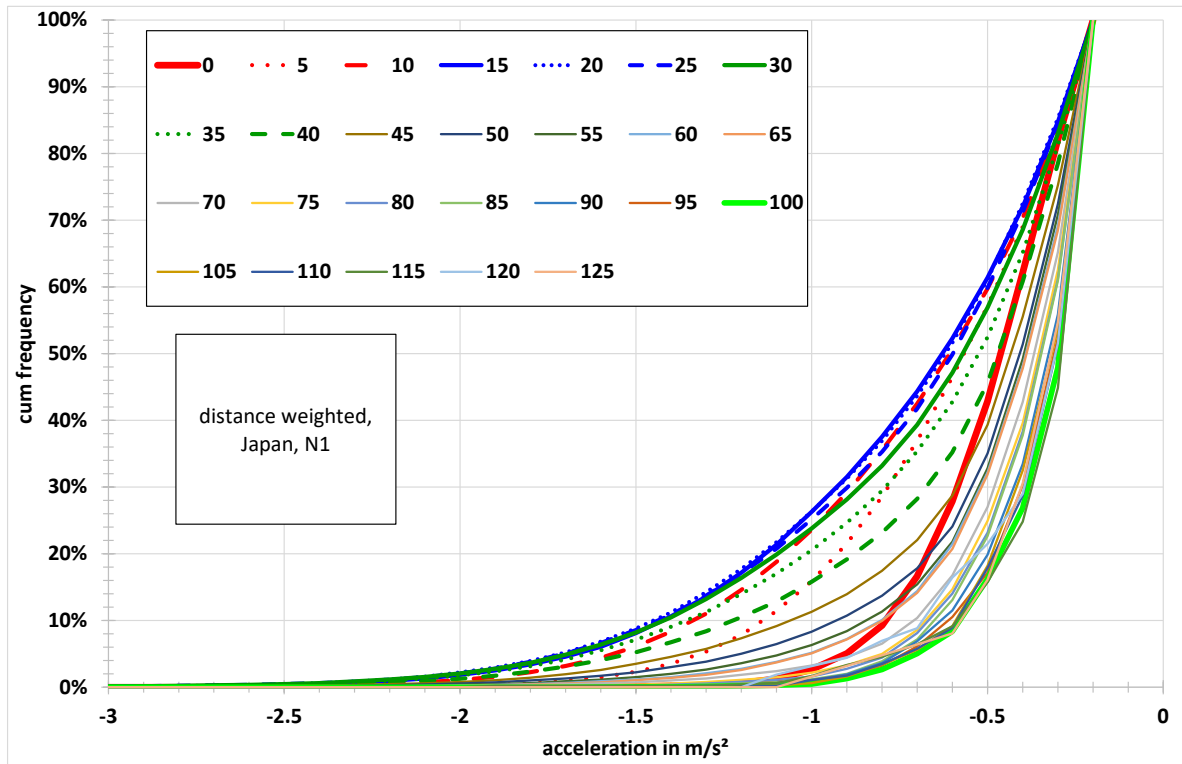


Figure 397: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, Japan N1

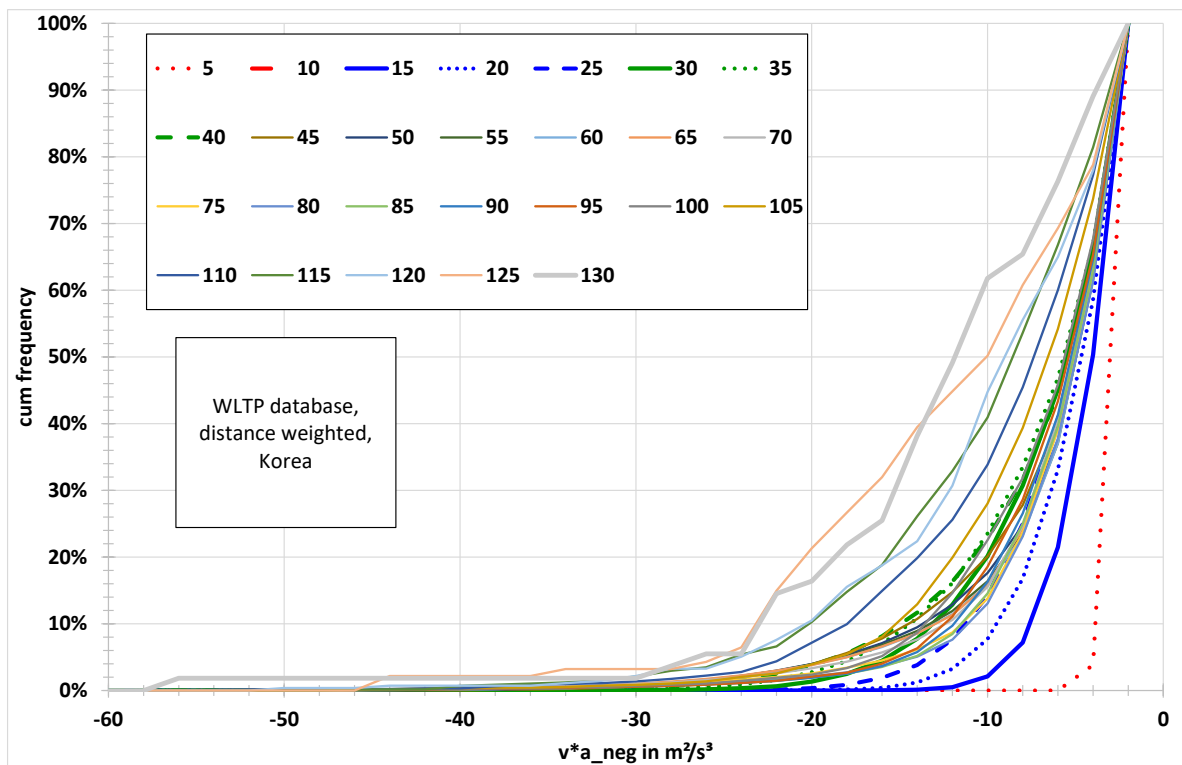


Figure 398: $v \cdot a_{neg}$ distributions for vehicle speed classes, distance weighted, Korea

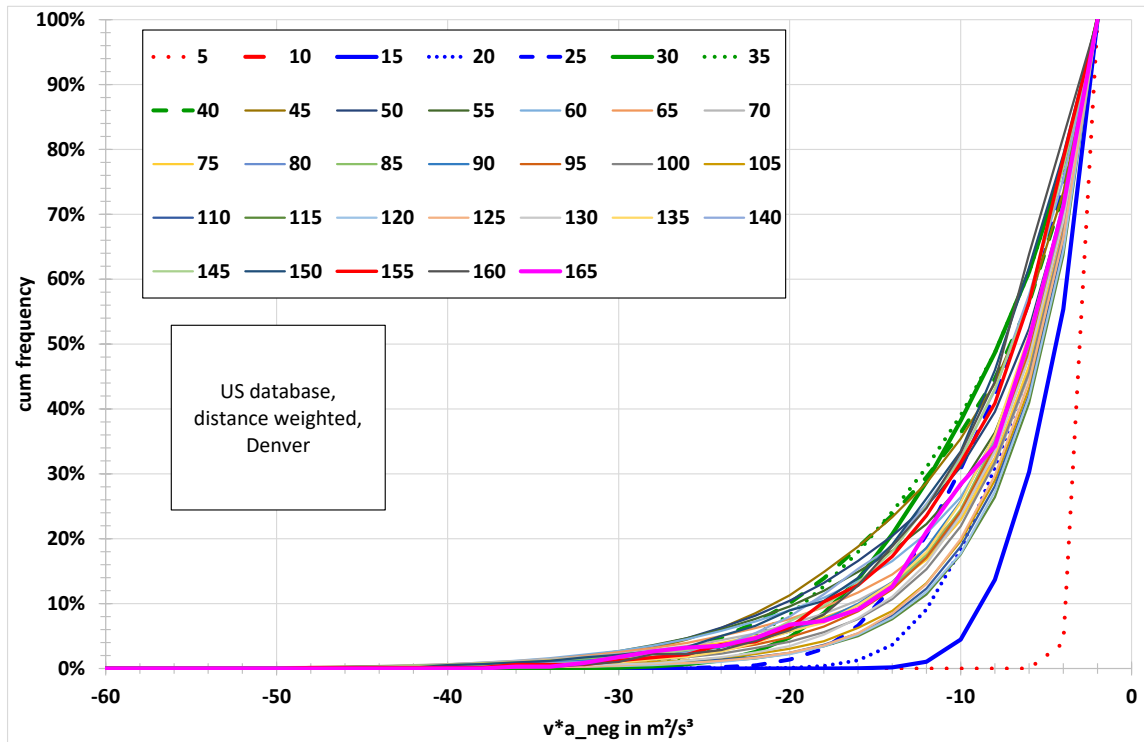


Figure 399: $v*a_{neg}$ distributions for vehicle speed classes, distance weighted, USA, Denver

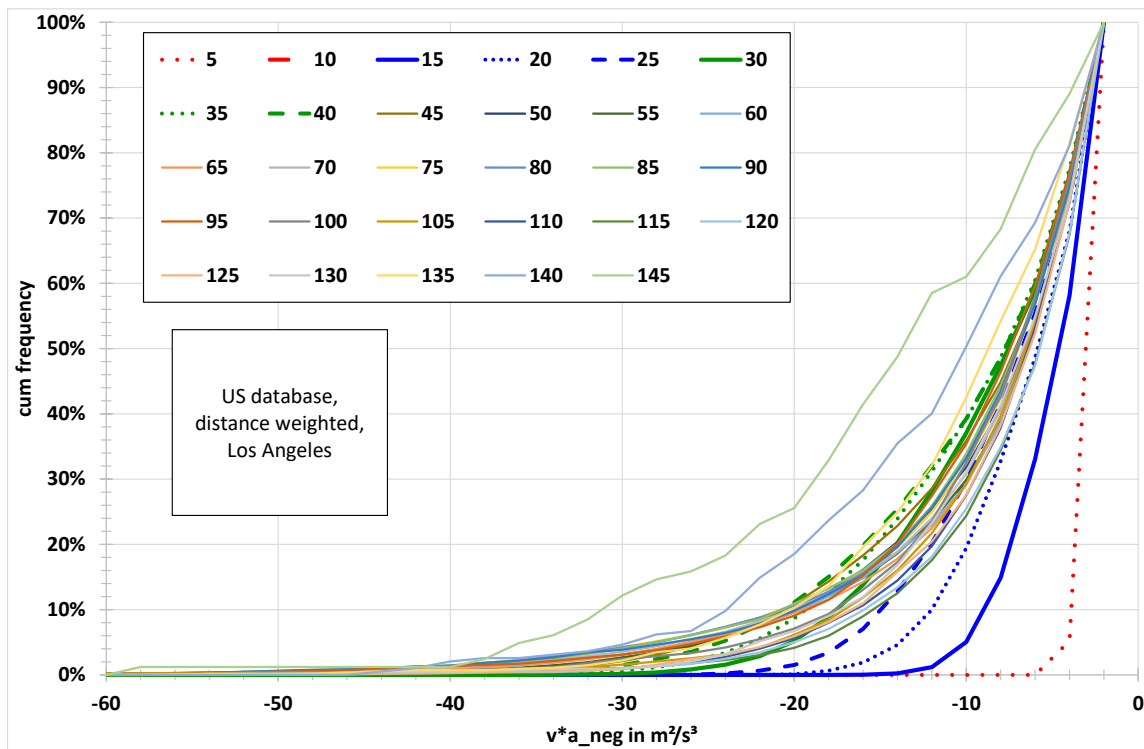


Figure 400: $v*a_{neg}$ distributions for vehicle speed classes, distance weighted, USA, Los Angeles

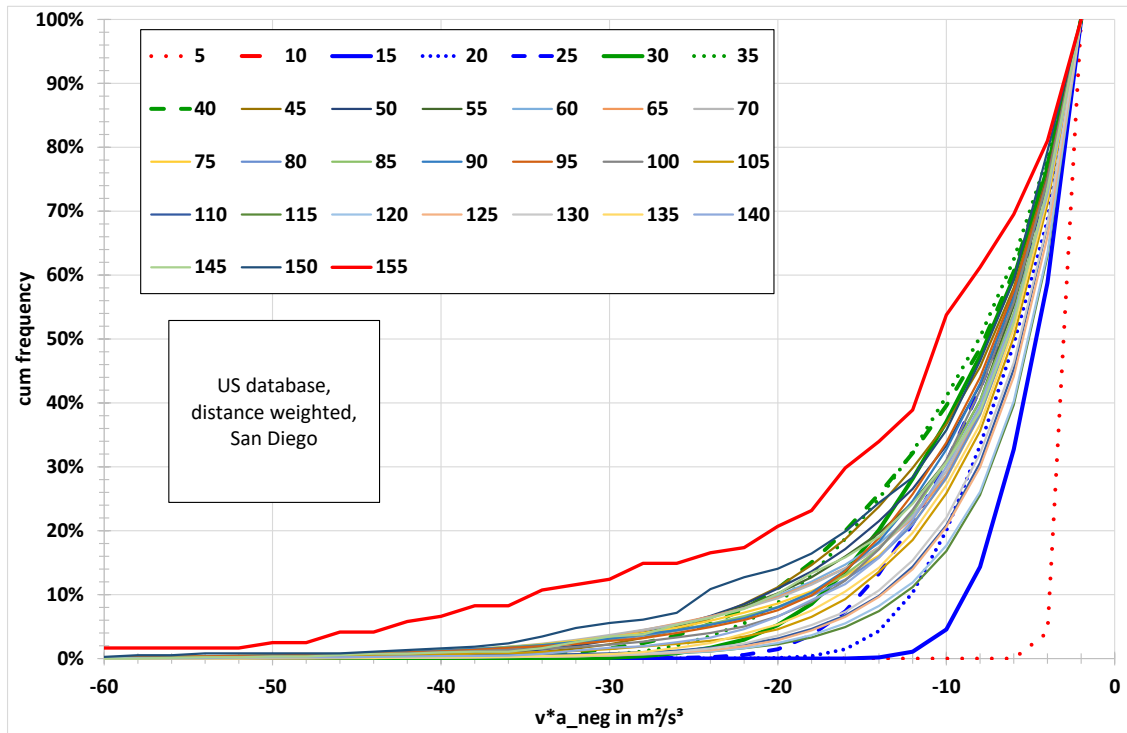


Figure 401: v^*a_{neg} distributions for vehicle speed classes, distance weighted, USA, San Diego

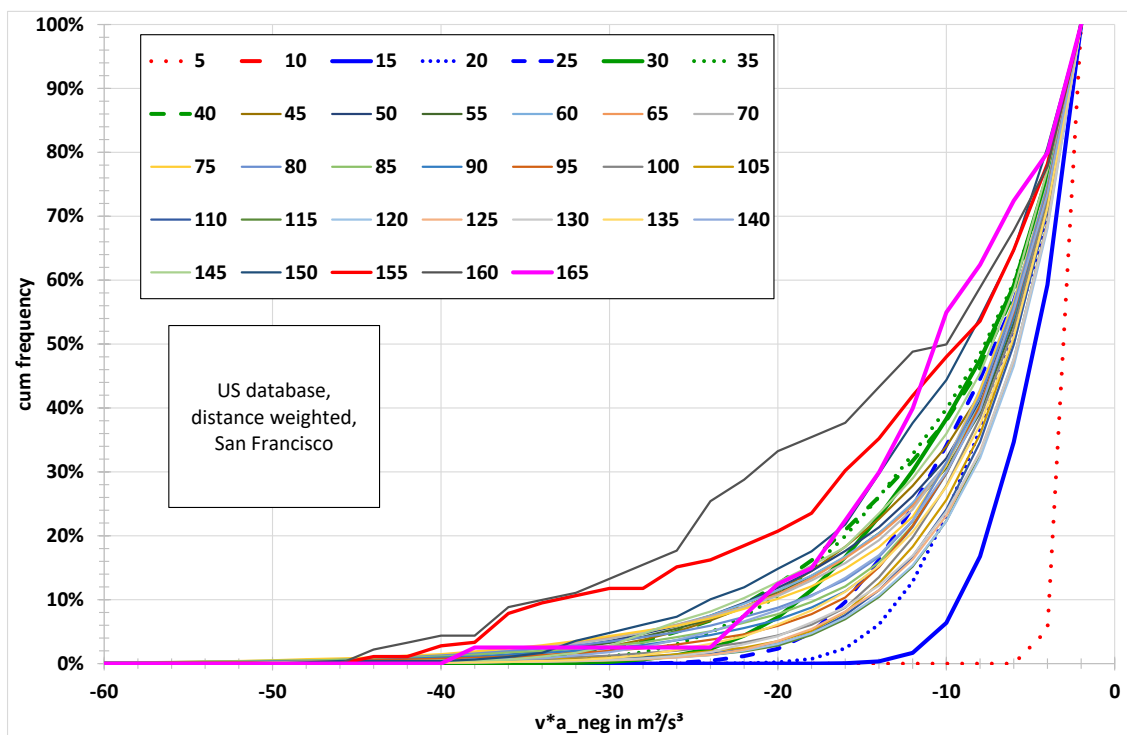


Figure 402: v^*a_{neg} distributions for vehicle speed classes, distance weighted, USA, San Francisco