ATTACHMENT III

Memorandum

Date: February 28, 2006
April 28, 2006 (Revised)

To: File

From: Michael Freeman

Subject: Evaluation of 2005 Vehicle Registration Data for Northern Virginia Jurisdictions of the Washington Area

Background

The Mobile 6.2 model that is used to develop emissions rates for mobile source emissions inventory for the State Implementation Plan (SIP) and transportation conformity analysis requires a number of vehicle-specific inputs. In the Washington non-attainment region emissions rates are developed for each jurisdiction in the non-attainment area. Two of the inputs are: vehicle registration data used to develop age distribution by vehicle type, and the percentage of diesel vehicles for each vehicle type. As part of the interagency consultation procedures in place, the transportation department and the environmental department have agreed to update these data sets once every three years. The region has been using 2002 registration data sets for all emissions analysis and we are in the process of using the 2005 raw registration data information to develop 2005 input files to the Mobile 6.2 model.

Vehicle registration data have been used to develop the two input files used in the Mobile 6.2 model; namely "xxx.rdt" (age distribution by vehicle type) and "xxx.dsf" (percentage of diesel vehicles for each vehicle type and for each model year). VDOT staff has transmitted to TPB staff 2005 raw registration data files as well as "xxx.rdt" and "xxx.dsf" files

developed using their own methodology from the 2005 raw registration data. TPB staff has used these raw data to produce a second set of "xxx.rdt" and "xxx.dsf" files using a method that includes vehicle identification number (VIN) decoding software. This memo will document TPB staff's findings and make recommendations for developing rdt and dsf files for future air quality planning studies.

Methodology

COG used the following outline to develop rdt and dsf files (depicted graphically in Attachment 1).:

1) Extract all unique VIN (deleting duplicates and purging expired registrations) by jurisdiction from the 2005 vehicle registration database (July 2005 snapshot) and decode with VINPOWER decoding software. The decoding software provided model year, Mobile 6.2 vehicle type, and other vehicle attributes. Attachment 2 summarizes the VIN control totals and decoded results. A summary of the number of decoded VIN by vehicle type and jurisdiction is provided in Attachment 5.
2) Convert the decode results:
    a. Vehicle age distribution: This is the first of the two input files needed.
        i. *Vehicle type*: The VIN decoder software breaks down the registration data in to the Mobile 6.2 28 vehicle categories. However, the current version of Mobile 6.2 16 can only handle registration (xxx.rdt) files in 16 vehicle types and it uses the "xxx.dsf" files internally to break it into 28 categoires. Therefore, the decoded data are converted from the 28 (Mobile 6.2) types to 16 vehicle types by combining the diesel and gasoline vehicle types. While aggregating the data and developing the diesel vehicle percentages, a percentage of the heavy duty gas bus (HDGB) had to be assigned to heavy duty school bus, and heavy duty transit bus. Since Mobile 6.2 guidance did not provide specific guidance as to how to split the heavy duty gas bus

between school and transit bus staff assigned 50% of the heavy duty gas bus to transit bus (HDBT) and 50% to school bus (HDBS). A similar assumption had to be made with light duty diesel trucks as well due to lack of guidance. Light duty diesel trucks 12 (LDDT 12) were assigned 50% percent to light duty truck 1 (LDT1) and 50% to light duty truck 2 (LDT2), and light duty diesel truck 34 (LDDT34) were assigned 50% to light duty truck 3 (LDT3) and 50% to light duty truck 4 (LDT4). After discussion with air and transportation agency representatives the method was modified. Since all heavy duty transit buses are diesel, and since a majority of the heavy duty gas buses were smaller shuttle buses it was decided that heavy duty gas bus (HDGB) were to be distributed among the different heavy duty vehicle types (HDV2B, HDV3, and HDV6) using the gross vehicle weight of the bus as determined by the VIN decoder. Similarly light duty diesel truck 1,2 and light duty diesel truck 3,4 were also distributed among light duty trucks 1,2,3 and 4 based on the gross vehicle weight as determined by the VIN decoder. Attachment 3 shows the factors used for converting the 28 types to 16 types.

ii. *Model Years*: Since the raw registration file reflects July 1, 2005 conditions, it includes model year 2005 and 2006 as the first year vehicles. The Mobile 6.2 guidance recommends combining the two model years into model year 'one'. In addition, Vinpower does not decode VINs for vehicles that were manufactured prior to 1980 since the VINs did not meet International Standards Organization (ISO) standards prior to 1980. In order to solve this problem, we used the decoded results to directly assign vehicles to model years one through twenty-four, and used the year 24 profile to develop year 25 and older model years. The vehicle registration records were used to determine control totals by jurisdiction for: (A) Mobile 6 vehicle type years < than 25; (B) Mobile 6 vehicle types year = 25 or older. For Mobile 6

vehicle type year = 25, apply regional distribution for mobile year = 24 and normalize to match control total % from step (B). For Mobile years 1 through 24, use vin decode results to develop distributions by vehicle type and year. Then normalize years 1 through 24 of each row so that years 1 through 25 = 100%. Develop 16 (vehicle type) by 25 (Mobile 6 year) matrices by jurisdiction. This is the rdt file for input into Mobile 6. After discussion, this method was modified by distributing model year 25+ vehicles among the 16 vehicle types using the vehicle type distribution for years 20 through 24 obtained through the VIN decoder. This calculation is depicted in Attachment 6.

b. *Diesel percentages by vehicle type*: This is the second input file needed in Mobile 6.2 model. For percentage of diesel vehicles by vehicle type and by year (xxx.dsf) file development, use the vehicle equivalency table and the VIN decode to calculate the number of diesel and gasoline vehicles for each of the 14 vehicle types. The ratio of diesel vehicles to the total number of vehicles is the dsf for each category. Since the VIN decoder will not decode for year 25, use the dsf calculated for year 24 for year 25, also.

Comparison with VDOT Data

The next step in the processes was to compare the data developed using the methodology described above with data developed by VDOT staff. The attached comparison charts were used to summarize the findings.

1) Vehicle Age Distribution

a. For LDV and LDT1, LDT2, LDT3, LDT4 (less so than the others) vehicle types, the estimates from VDOT and the VIN Decodes are very close for each jurisdiction.

b. Generally “Heavy Duty” vehicle categories do not track as well as “Light Duty” vehicle categories among all jurisdictions.

c. For the motorcycle category, the VDOT method seems to put all vehicles older than 12 years into the 12th year category and no values are provided for years 13 through 25.

2) *Percentage of Diesel Vehicles*: For this comparison we aggregated all the northern Virginia data into one instead of breaking down by jurisdiction and compared them against Mobile 6 defaults. The reason behind this action was due to the fact that diesel vehicles by vehicle types were low in a number of jurisdictions and by aggregating we were able to increase the total number of vehicles for each vehicle type.

a *LDV: Both the vin decodes and VDOT/VDEQ 2005 data have dsf values near zero for* years 1 to 20. For years 20 to 25, the mobile defaults increase to about 0.08, but the dsf values based on VIN decodes increase to about 0.25 for the same years.

b *LDT1/LDT2:* The DSF values generated by the VIN decode method are near zero for a number of years as compared to the *VDOT/VDEQ 2005 data*.

c *LDT3/LDT4:* The VIN decoder identifies diesel vehicles in most of the years for these categories. For LDT3 both VIN decode and *VDOT/VDEQ 2005 data* have low values, typically less than 0.02. For LDT4, the *VDOT/VDEQ 2005 data* is also low, but the VIN decode values rise from about 0.1 in year 19 to above 0.5 in year 23.

d. *HDV2B:* VIN decoder and Mobile defaults are fairly close with VIN decodes slightly higher in years 1 through 10 and mobile defaults slightly higher in years 11 through 24.

e. *HDV3/HDV4:* VIN decodes are lower than Mobile defaults for these categories, particularly in later years.

f. *HDV5/HDV6/HDV7:* VIN decodes are higher than Mobile defaults for these categories.

g. *HDV8A/HDV8B:* Both VIN decodes and Mobile defaults have dsf values at or near 1.0.

Recommendations

1) Age Distributions

- Use distributions developed by COG based on VIN decode results for each jurisdiction and 16 vehicle types. It was decided to use the VIN decoded transit

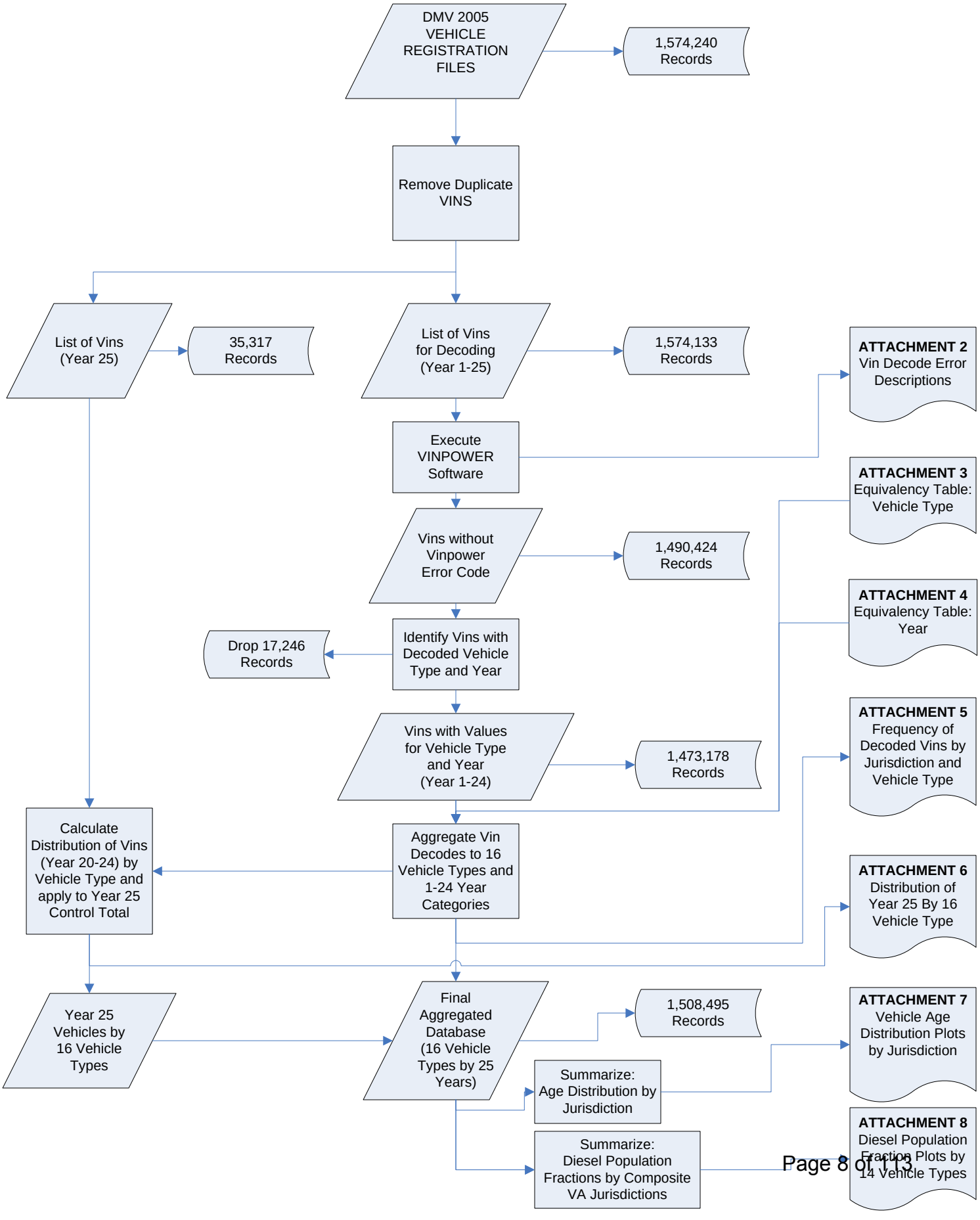
and school bus registration data instead of the Mobile 6.2 defaults as was done previously, despite the ‘peaks’ occasioned by the periodic purchase of vehicles.

2) Diesel Fractions

- It is clear we need to use NOVA level aggregation for vehicle type diesel percentages. It is recommended we use VIN decode results for each of the 14 vehicle types.

LIST OF ATTACHMENTS

ATTACHMENT 1
Vin Decode Process Flowchart
Virginia Jurisdictions



ATTACHMENT 2

2005 Vehicle Registration Data
VinPower Decode Results

State	VINS
VA	1,574,133

Error Code	Error Code Description	VA
	No Error - Decoded Sucessfully	94.7%
1	VIN Number contains illegal characters	0.2%
2	VIN too short to decode (i,e.: < 10 chars)	1.2%
3	VIN Exceeds 17 characters	0.0%
4	Check Digit is bad	0.8%
5	This vehicle is unavailable in the database	1.4%
6	The model year for this vehicle is unavailable	1.1%
7	VIN Decode Error	0.0%
	Error w/o Error Code	0.6%
	TOTAL	**100.0%**

ATTACHMENT 3
EQUIVALENCY TABLE - VEHICLE TYPE

Mobile 6 Vehicle Type		COG Vehicle Type																TOTAL
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
		LDV	LDT1	LDT2	LDT3	LDT4	HDV2B	HDV3	HDV4	HDV5	HDV6	HDV7	HDV8A	HDV8B	HDBS	HDBT	MC	
1	LDGV	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
2	LDGT1	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
3	LDGT2	-	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
4	LDGT3	-	-	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	1.00
5	LDGT4	-	-	-	-	1.00	-	-	-	-	-	-	-	-	-	-	-	1.00
6	HDGV2B	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	-	-	1.00
7	HDGV3	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	-	1.00
8	HDGV4	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	1.00
9	HDGV5	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	1.00
10	HDGV6	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	1.00
11	HDGV7	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	1.00
12	HDGV8A	-	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	1.00
13	HDGV8B	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	1.00
14	LDDV	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
15	LDDT12	-	0.11	0.89	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
16	HDDV2B	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	-	-	1.00
17	HDDV3	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	-	1.00
18	HDDV4	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	1.00
19	HDDV5	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	1.00
20	HDDV6	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	1.00
21	HDDV7	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	1.00
22	HDDV8A	-	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	1.00
23	HDDV8B	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	1.00
24	MC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	1.00
25	HDGB	-	-	-	-	-	0.75	0.21	-	0.00	0.03	0.00	-	-	-	-	-	1.00
26	HDDBT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	1.00
27	HDDBS	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	-	1.00
28	LDDT34	-	-	-	0.59	0.41	-	-	-	-	-	-	-	-	-	-	-	1.00

ATTACHMENT 4
EQUIVALENCY TABLE - YEAR

Vehicle Model Year	Mobile 6 Year
2006, 2005	1
2004	2
2003	3
2002	4
2001	5
2000	6
1999	7
1998	8
1997	9
1996	10
1995	11
1994	12
1993	13
1992	14
1991	15
1990	16
1989	17
1988	18
1987	19
1986	20
1985	21
1984	22
1983	23
1982	24
<= 1981	25

ATTACHMENT 5
FREQUENCY OF DECODED VINS BY JURISDICTION AND VEHICLE TYPE

Sum of Count	Jurisdiction					
Vehicle Type	ALX	ARL	FFX	LDN	PW	Grand Total
LDV	84,759	83,001	437,485	92,847	145,737	843,829
LDT1	1,032	1,142	6,224	1,429	2,587	12,414
LDT2	29,450	28,581	201,269	56,439	85,170	400,909
LDT3	6,123	5,001	45,544	15,717	25,426	97,811
LDT4	1,494	1,210	13,188	4,965	7,369	28,226
HDV2B	1,568	1,376	14,527	6,195	9,562	33,228
HDV3	274	264	2,928	1,404	2,447	7,317
HDV4	345	280	2,466	876	1,489	5,456
HDV5	84	55	744	362	541	1,786
HDV6	301	95	1,680	798	1,211	4,085
HDV7	145	70	963	448	669	2,295
HDV8A	193	156	1,696	946	1,322	4,313
HDV8B	26	17	334	252	330	959
HDBS	238	139	1,767	447	512	3,103
HDBt	281	182	1,287	539	1,413	3,702
MC	1,281	1,447	10,275	3,775	6,967	23,745
Grand Total	127,594	123,016	742,377	187,439	292,752	1,473,178

Sum of Count (%	Jurisdiction					
Vehicle Type	ALX	ARL	FFX	LDN	PW	Grand Total
LDV	66.43%	67.47%	58.93%	49.53%	49.78%	57.28%
LDT1	0.81%	0.93%	0.84%	0.76%	0.88%	0.84%
LDT2	23.08%	23.23%	27.11%	30.11%	29.09%	27.21%
LDT3	4.80%	4.07%	6.13%	8.39%	8.69%	6.64%
LDT4	1.17%	0.98%	1.78%	2.65%	2.52%	1.92%
HDV2B	1.23%	1.12%	1.96%	3.31%	3.27%	2.26%
HDV3	0.21%	0.21%	0.39%	0.75%	0.84%	0.50%
HDV4	0.27%	0.23%	0.33%	0.47%	0.51%	0.37%
HDV5	0.07%	0.04%	0.10%	0.19%	0.18%	0.12%
HDV6	0.24%	0.08%	0.23%	0.43%	0.41%	0.28%
HDV7	0.11%	0.06%	0.13%	0.24%	0.23%	0.16%
HDV8A	0.15%	0.13%	0.23%	0.50%	0.45%	0.29%
HDV8B	0.02%	0.01%	0.04%	0.13%	0.11%	0.07%
HDBS	0.19%	0.11%	0.24%	0.24%	0.17%	0.21%
HDBt	0.22%	0.15%	0.17%	0.29%	0.48%	0.25%
MC	1.00%	1.18%	1.38%	2.01%	2.38%	1.61%
Grand Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

ATTACHMENT 6

Estimation of 25th Year Age Fraction

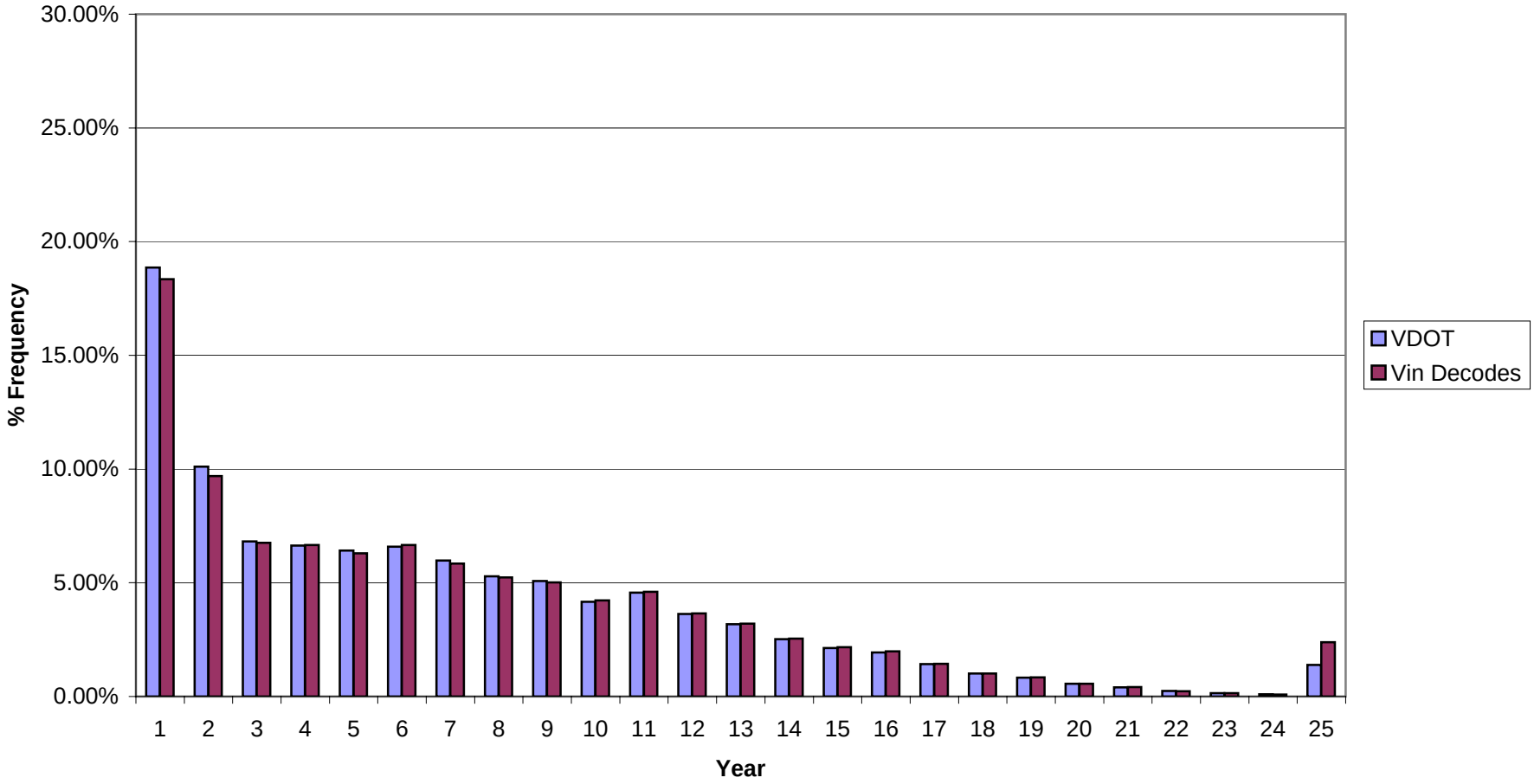
Based Upon DMV Vehicle Registration Records and Vin Decode Results

2005 Virginia Vehicle Registration Data		
	Freq	%
Years 1 - 24	1,538,816	97.76%
Year 25	35,317	2.24%
TOTAL	1,574,133	100.00%

A	B	C	D	E	F	G
Vehicle Type	Yrs 20 - 24		Est 25th YR Veh	Vin Decodes	Est Control Total	25th Yr RDT
	Freq	%	C*35317	Yrs 1 - 24	D+E	D/F
LDV	14,388	58.42%	20,632	843,829	864,461	2.39%
LDT1	430	1.75%	617	12,380	12,997	4.74%
LDT2	4,551	18.48%	6,526	400,943	407,469	1.60%
LDT3	1,725	7.00%	2,474	97,686	100,160	2.47%
LDT4	184	0.75%	264	28,351	28,615	0.92%
HDV2B	1,406	5.71%	2,016	35,418	37,434	5.39%
HDV3	293	1.19%	420	7,819	8,239	5.10%
HDV4	108	0.44%	155	5,456	5,611	2.76%
HDV5	16	0.06%	23	1,786	1,809	1.27%
HDV6	178	0.72%	255	4,220	4,475	5.70%
HDV7	211	0.86%	303	2,295	2,598	11.65%
HDV8A	184	0.75%	264	4,313	4,577	5.76%
HDV8B	18	0.07%	26	959	985	2.62%
HDBS	46	0.19%	66	1,710	1,776	3.71%
HDBT	40	0.16%	57	2,268	2,325	2.47%
MC	851	3.46%	1,220	23,745	24,965	4.89%
TOTAL	**24,629**	**100.00%**	**35,317**	**1,473,178**	**1,508,495**	**2.34%**

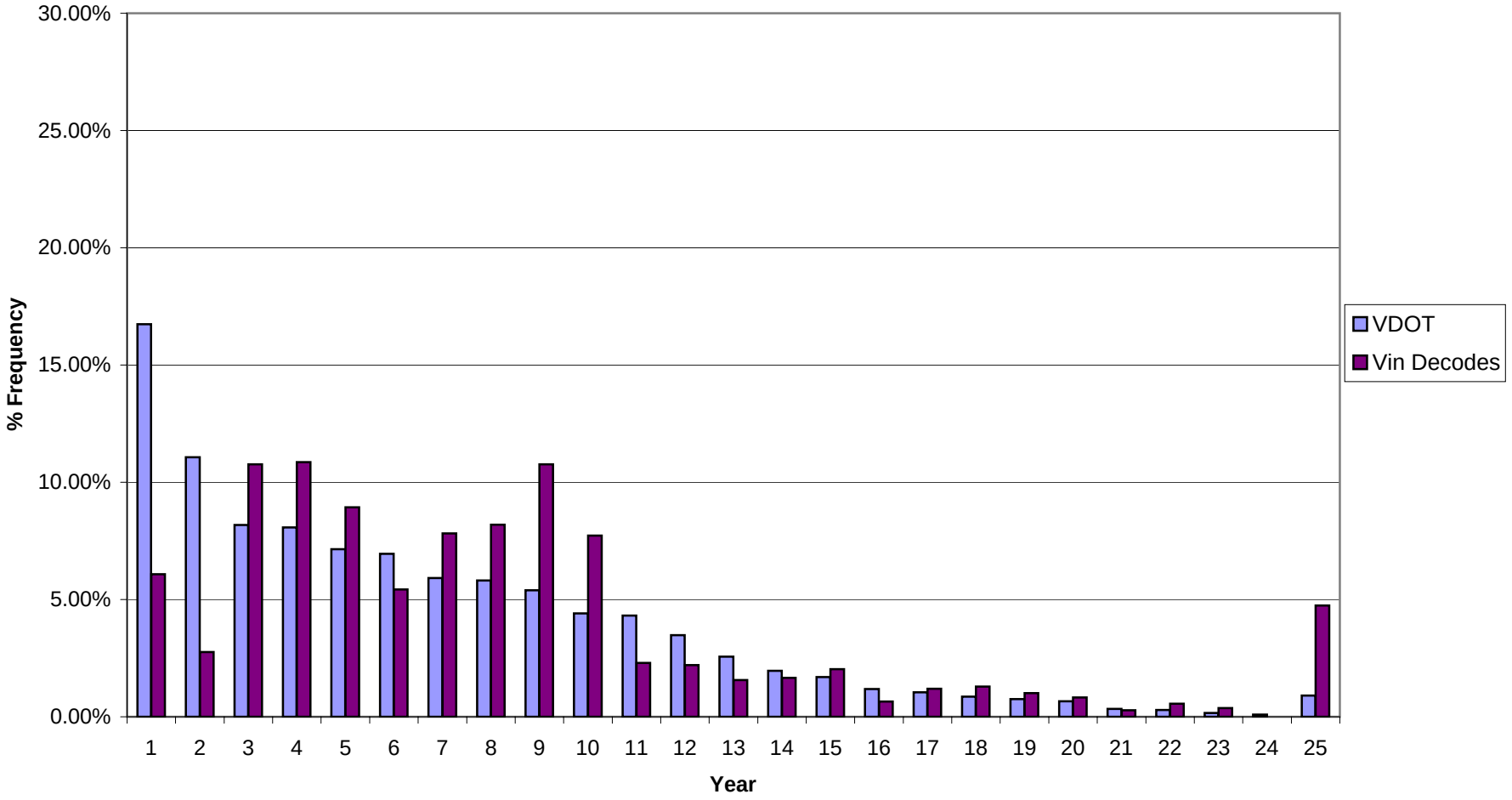
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = LDV
Number of Decoded Vins = 84,759



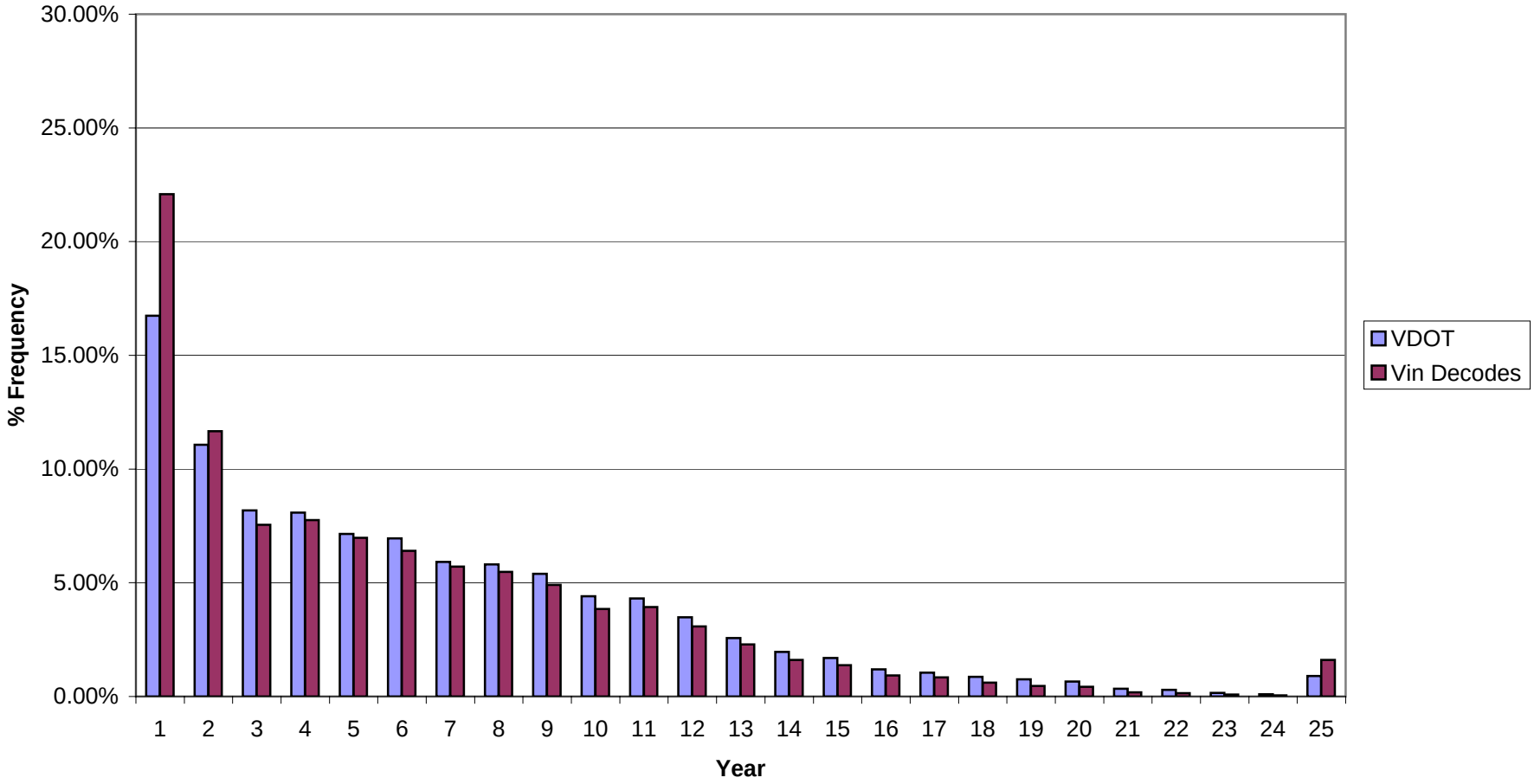
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = LDT1
Number of Decoded Vins = 1,032



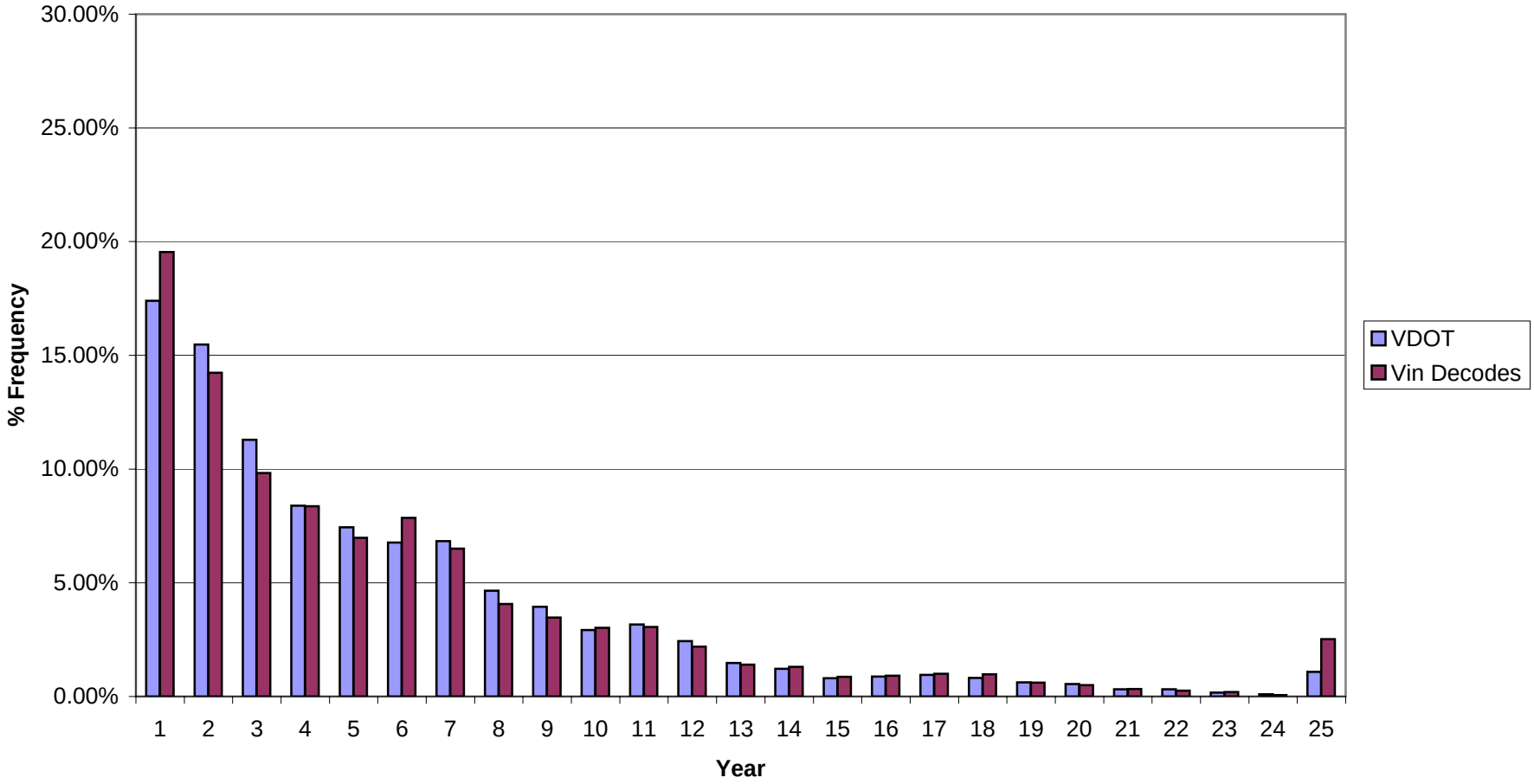
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = LDT2
Number of Decoded Vins = 29,450



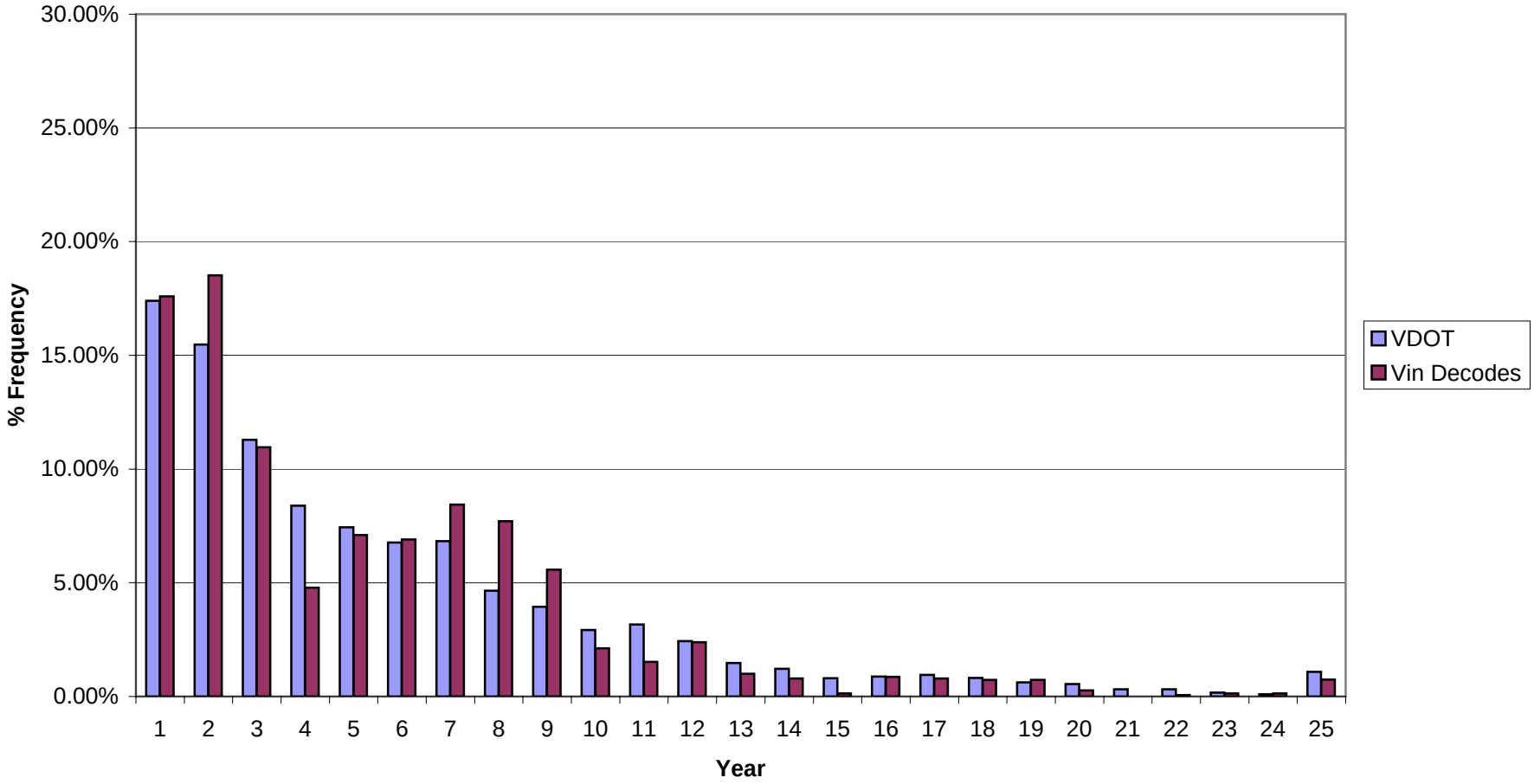
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = LDT3
Number of Decoded Vins = 6,123



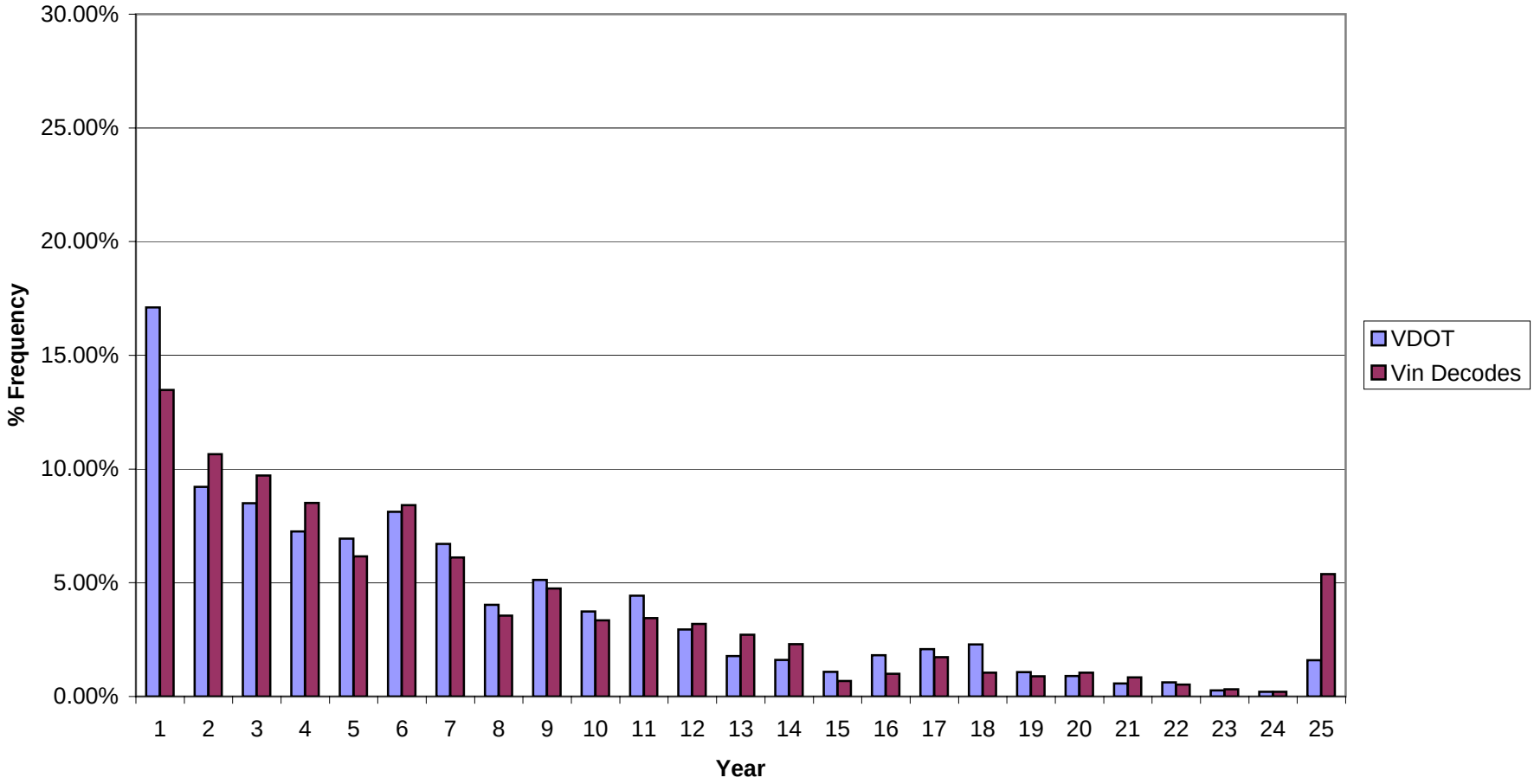
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = LDT4
Number of Decoded Vins = 1,494



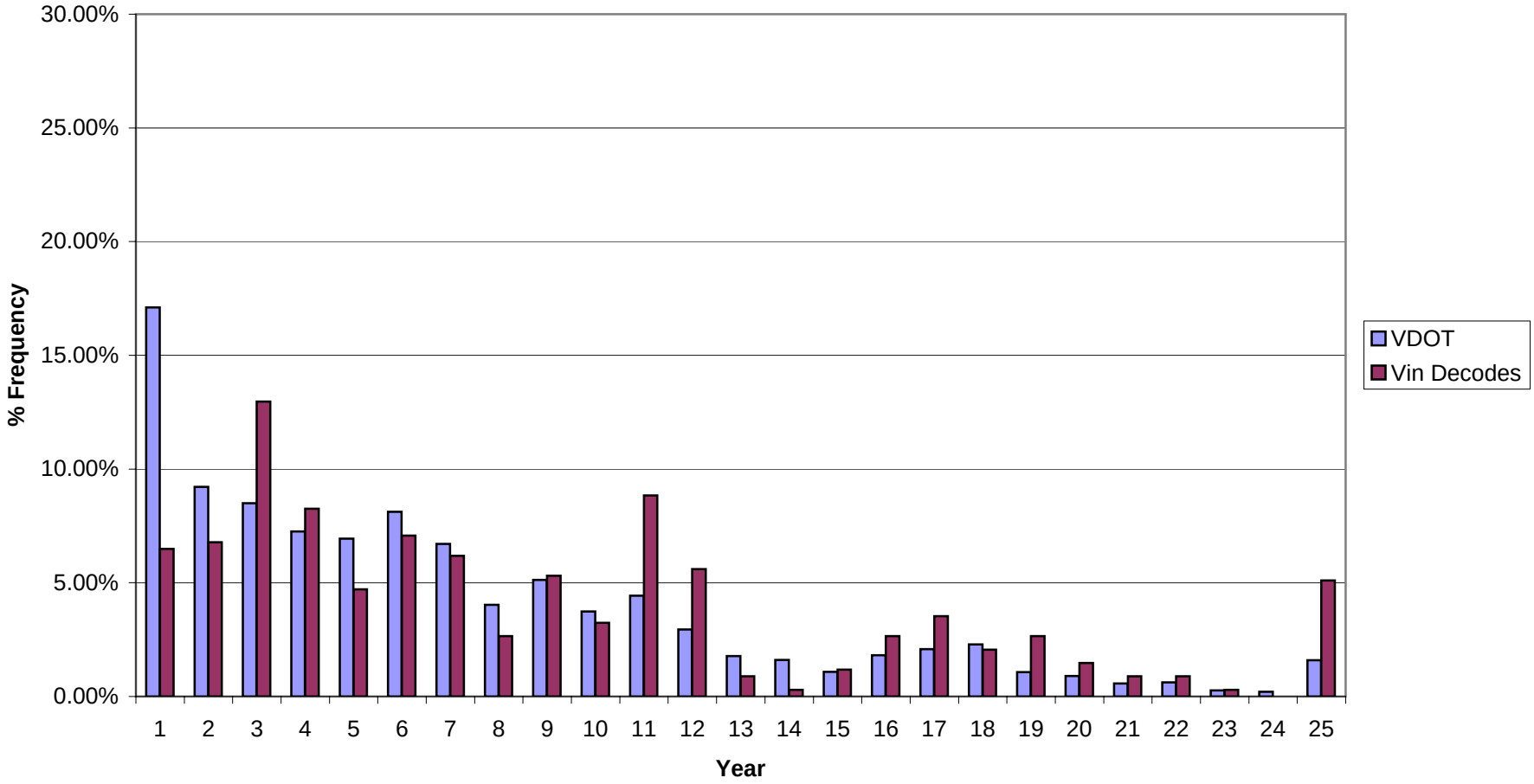
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = HDV2B
Number of Decoded Vins = 1,568



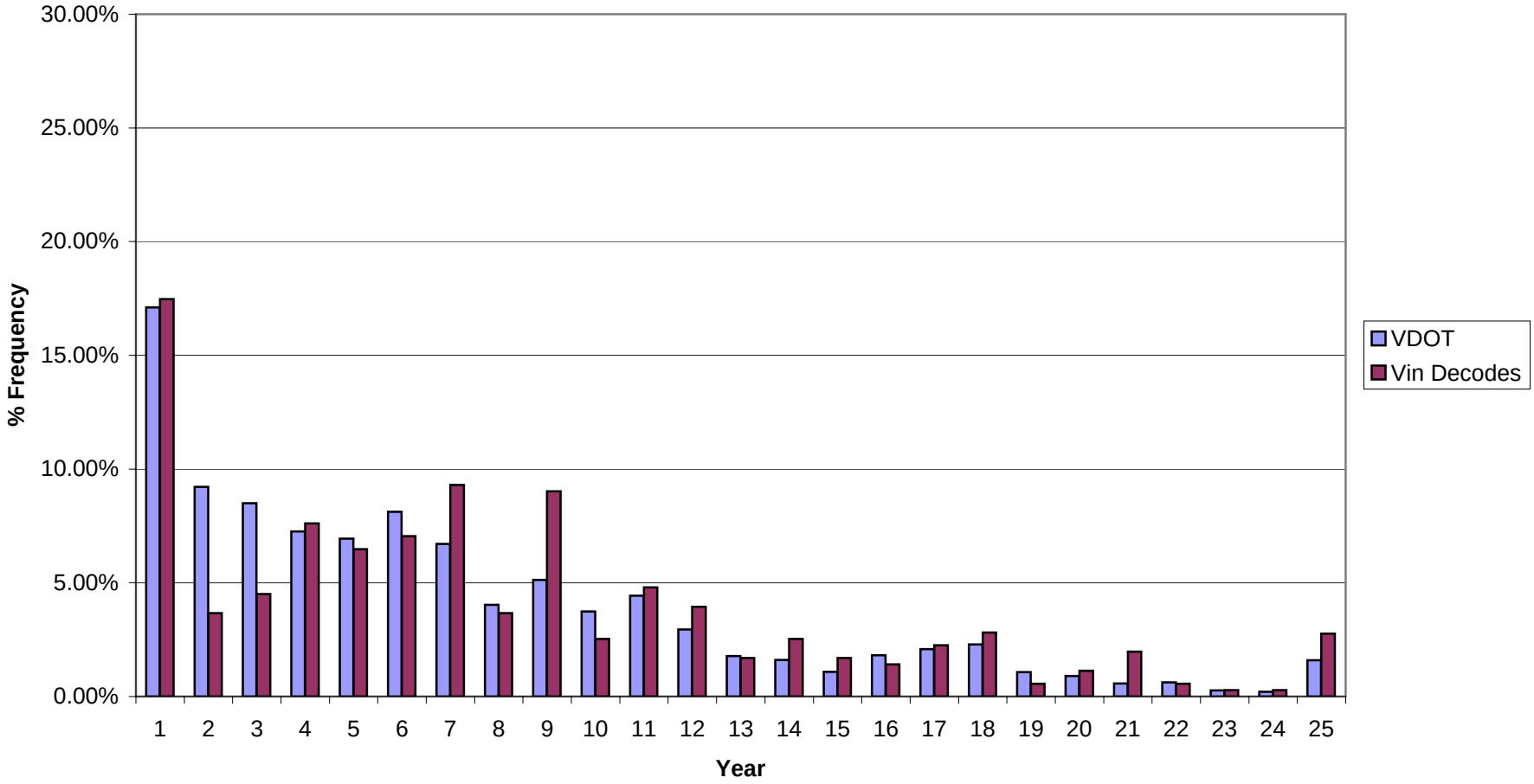
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = HDV3
Number of Decoded Vins = 274



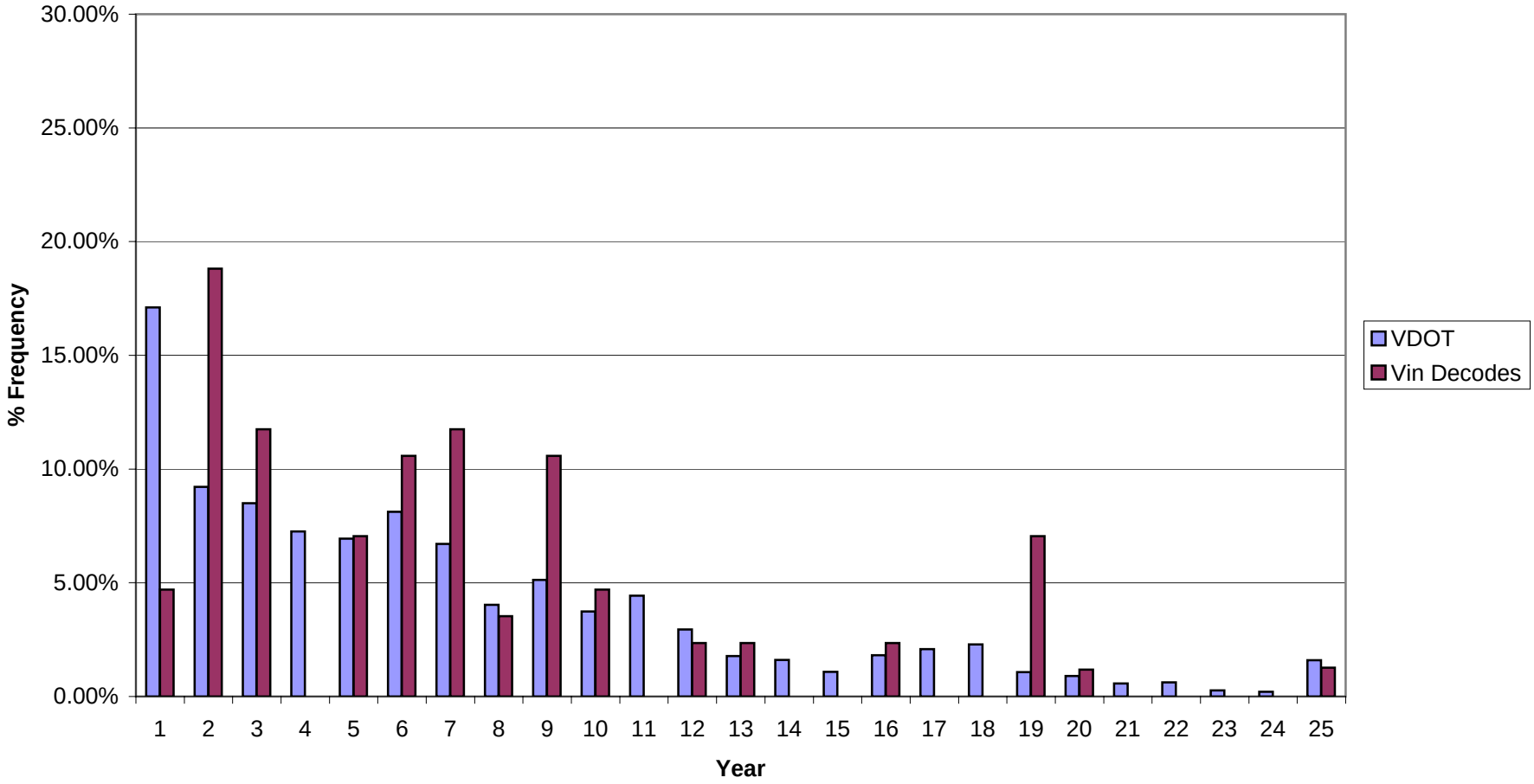
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = HDV4
Number of Decoded Vins = 345



ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = HDV5
Number of Decoded Vins = 84



ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
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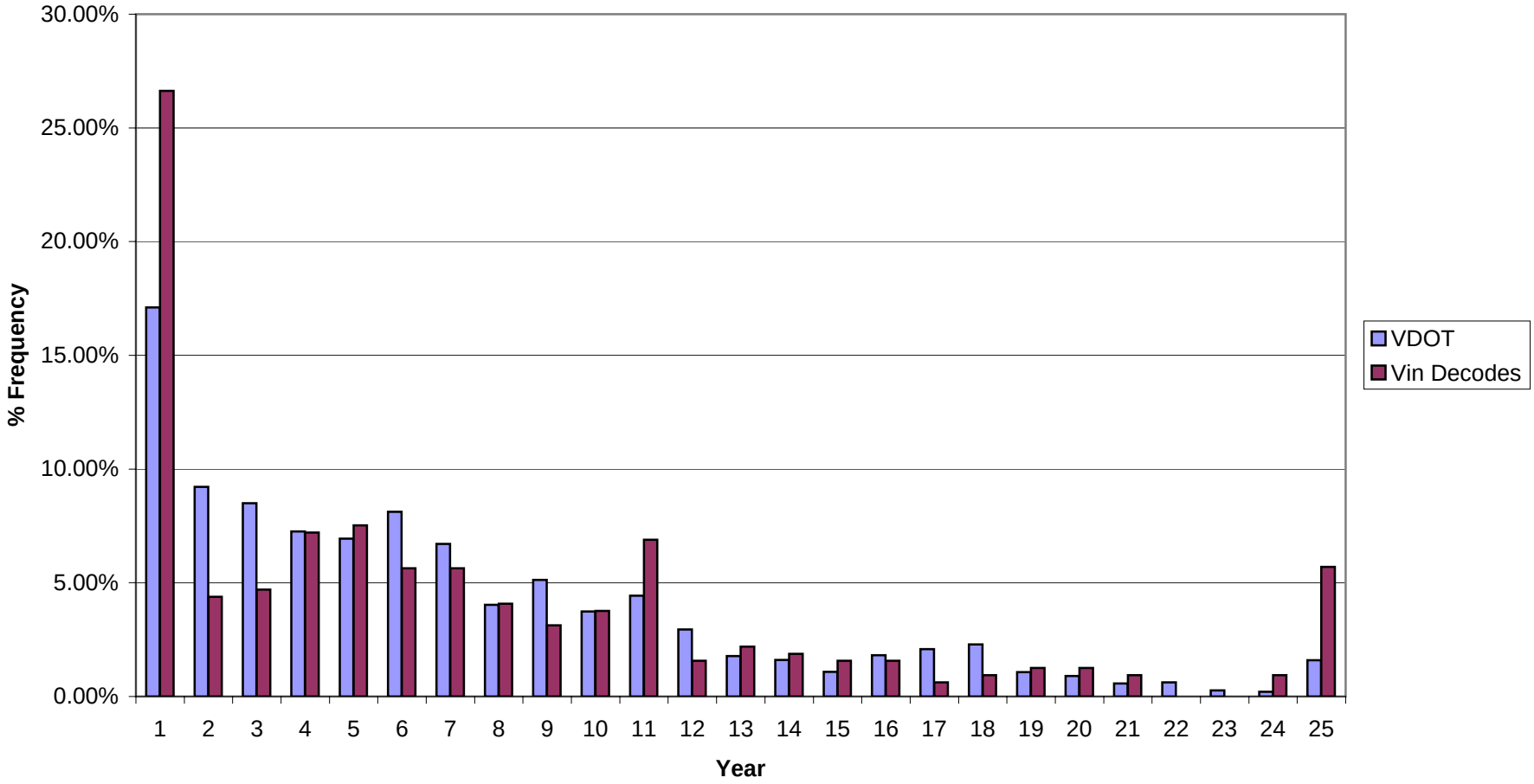
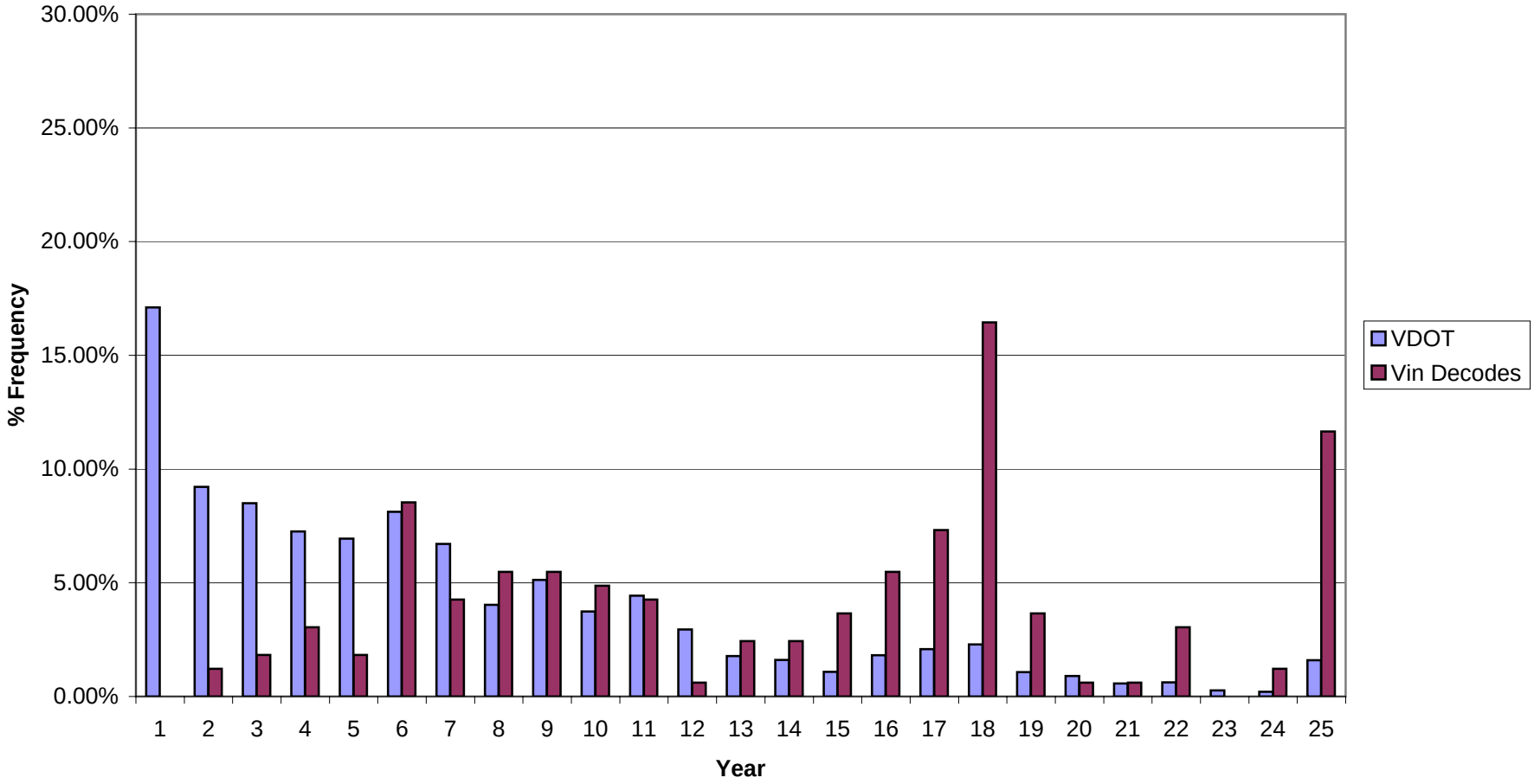
Vehicle Type = HDV6
Number of Decoded Vins = 301



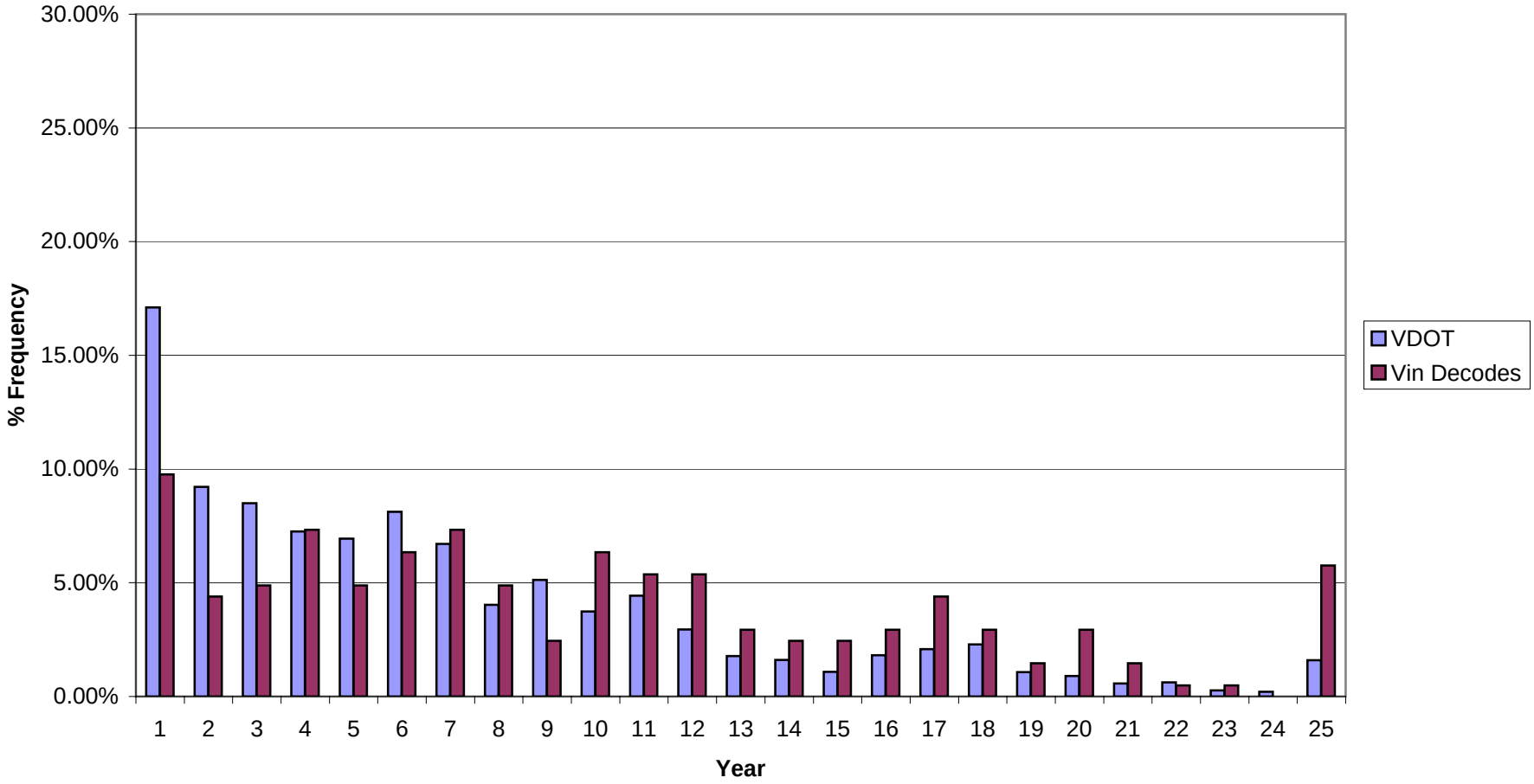
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = HDV7
Number of Decoded Vins = 145



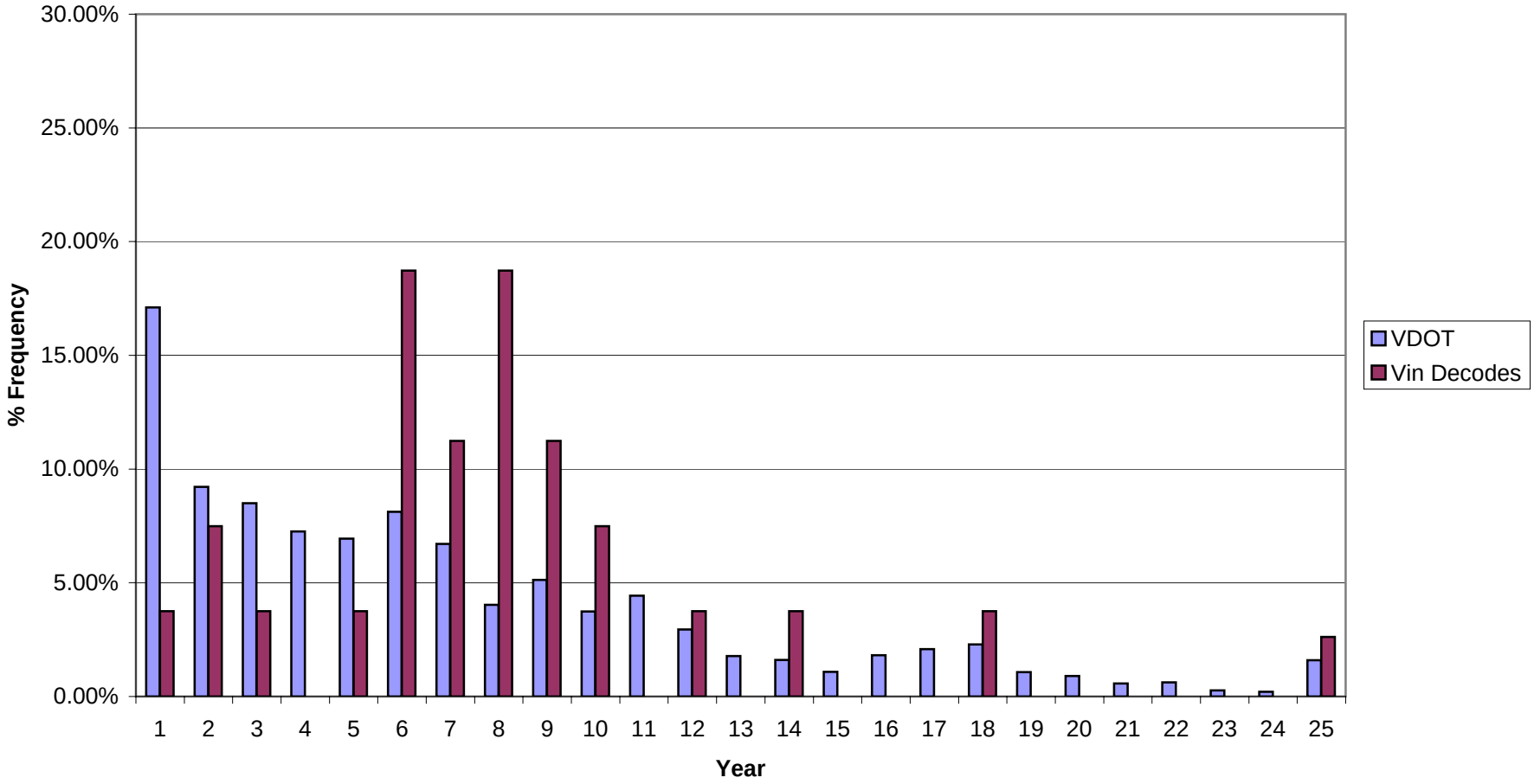
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = HDV8A
Number of Decoded Vins = 193



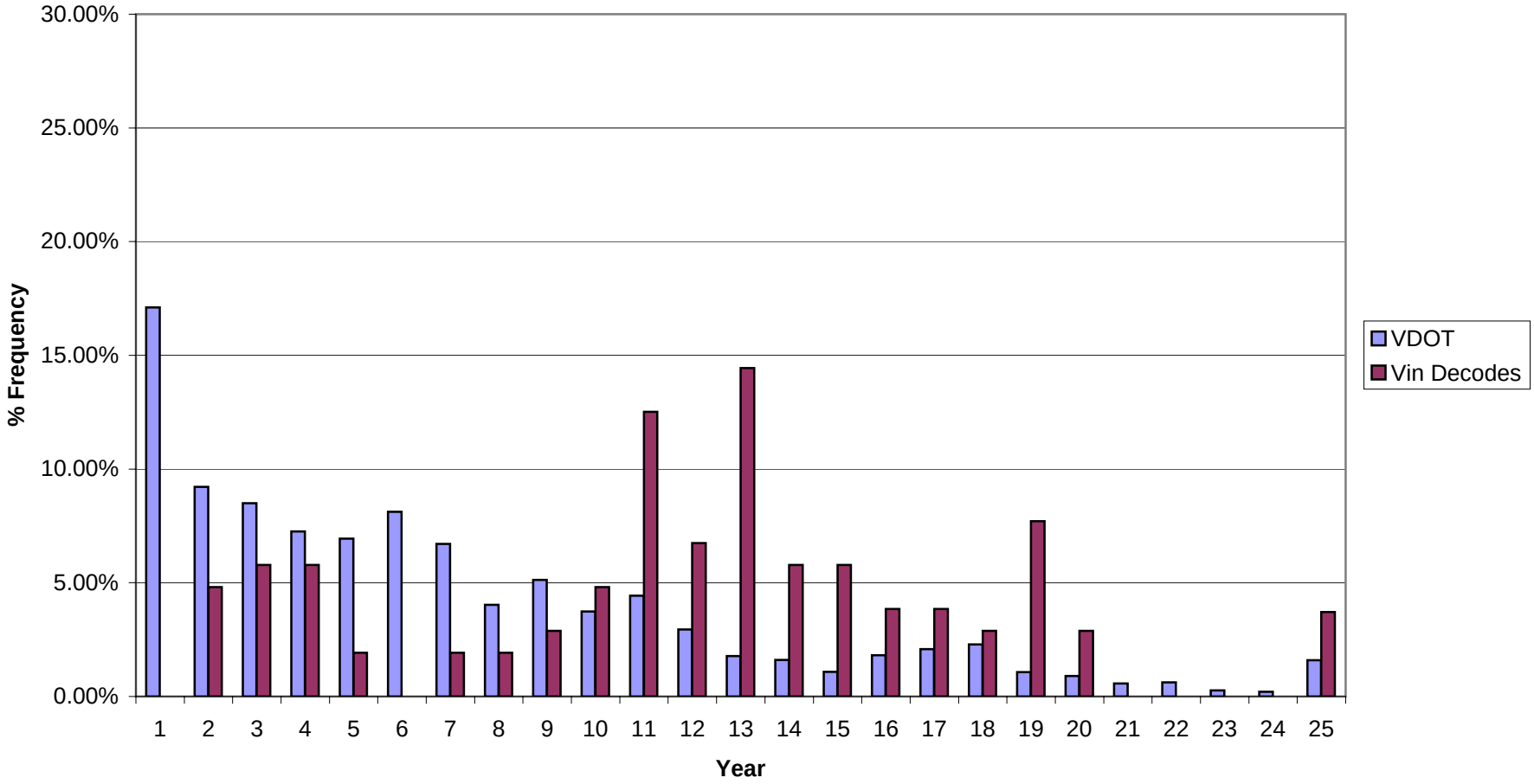
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = HDV8B
Number of Decoded Vins = 26



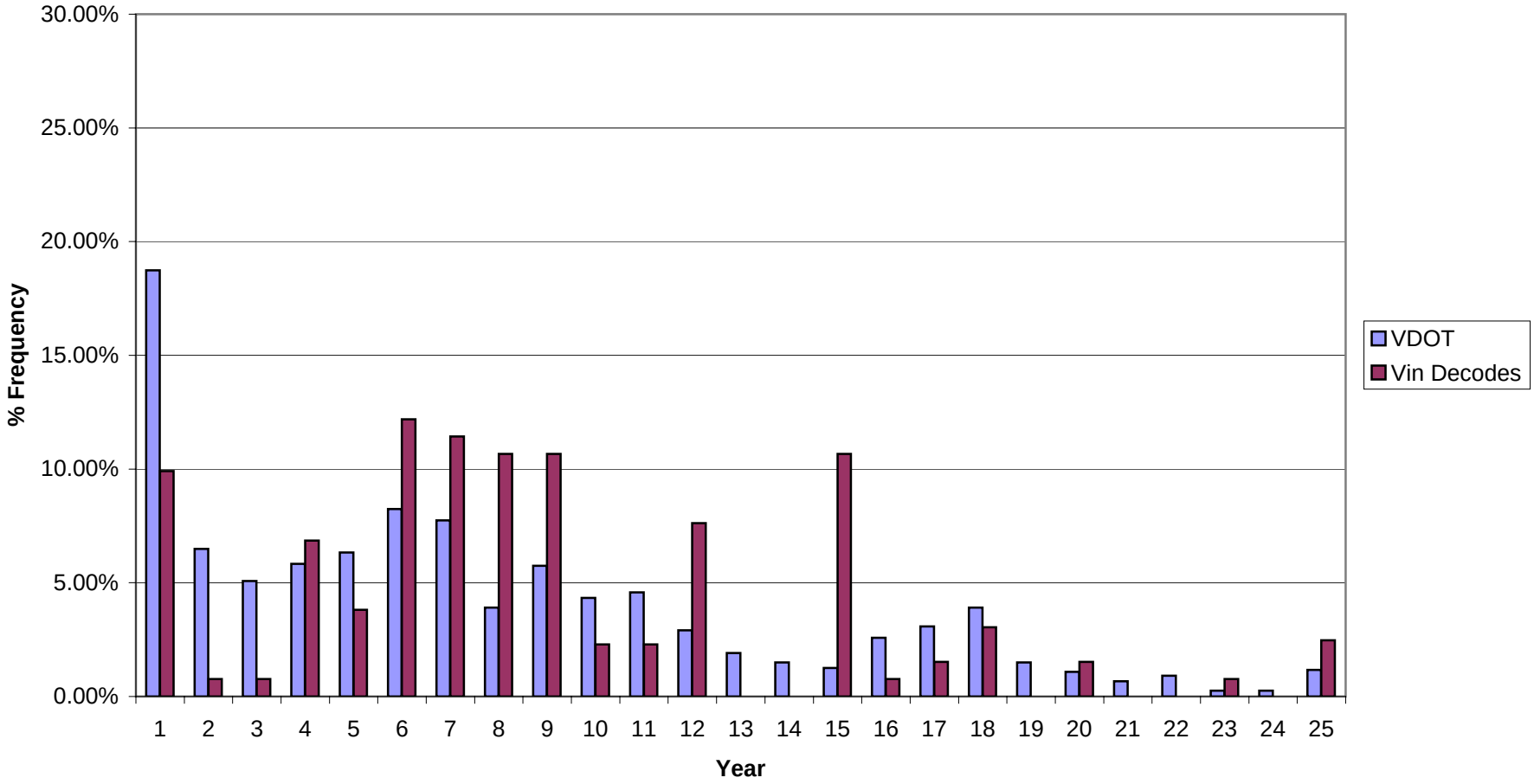
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = HDBS
Number of Decoded Vins = 238



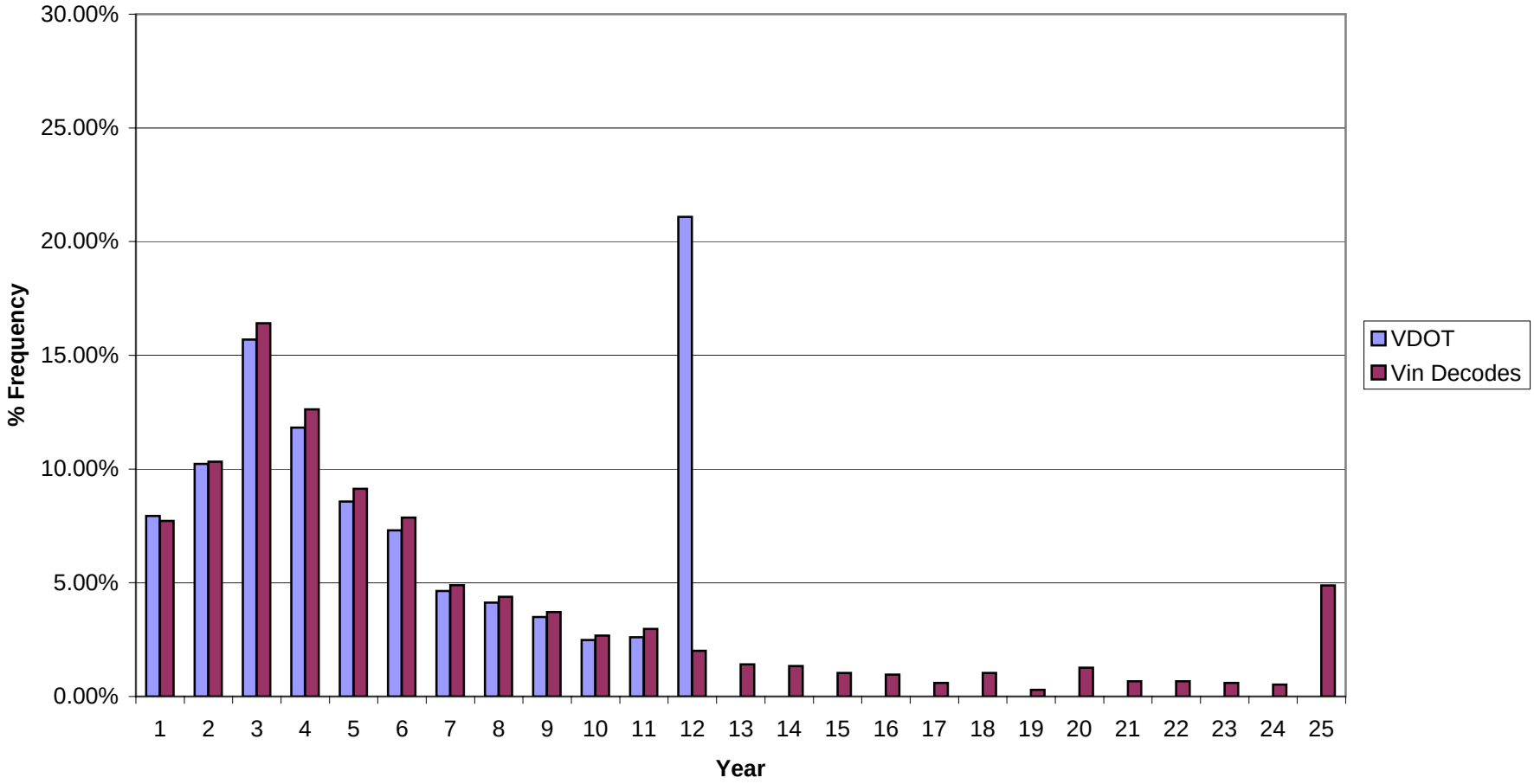
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = HDBT
Number of Decoded Vins = 281



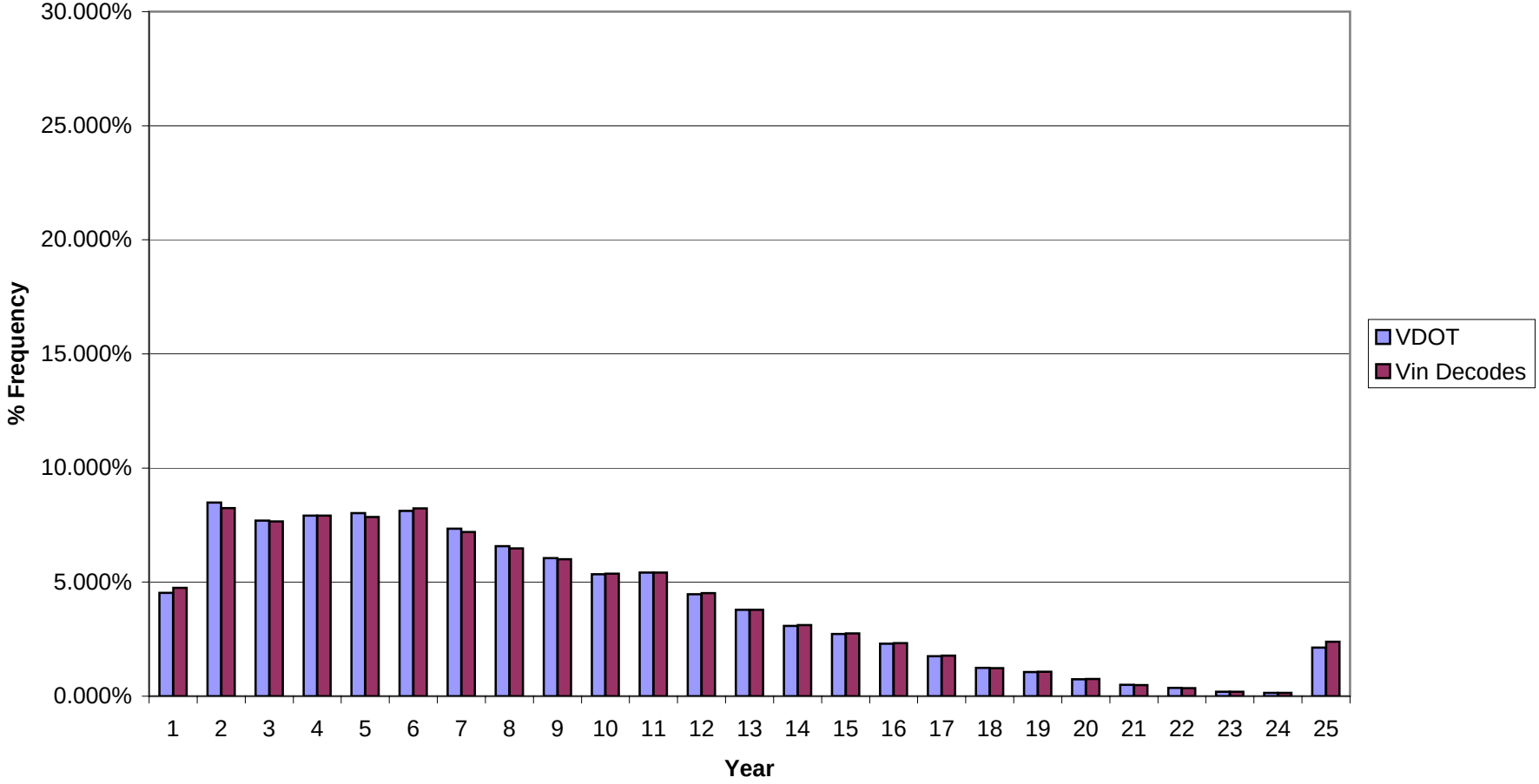
ATTACHMENT 7A

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ALEX
Vehicle Type = MC
Number of Decoded Vins = 1,281



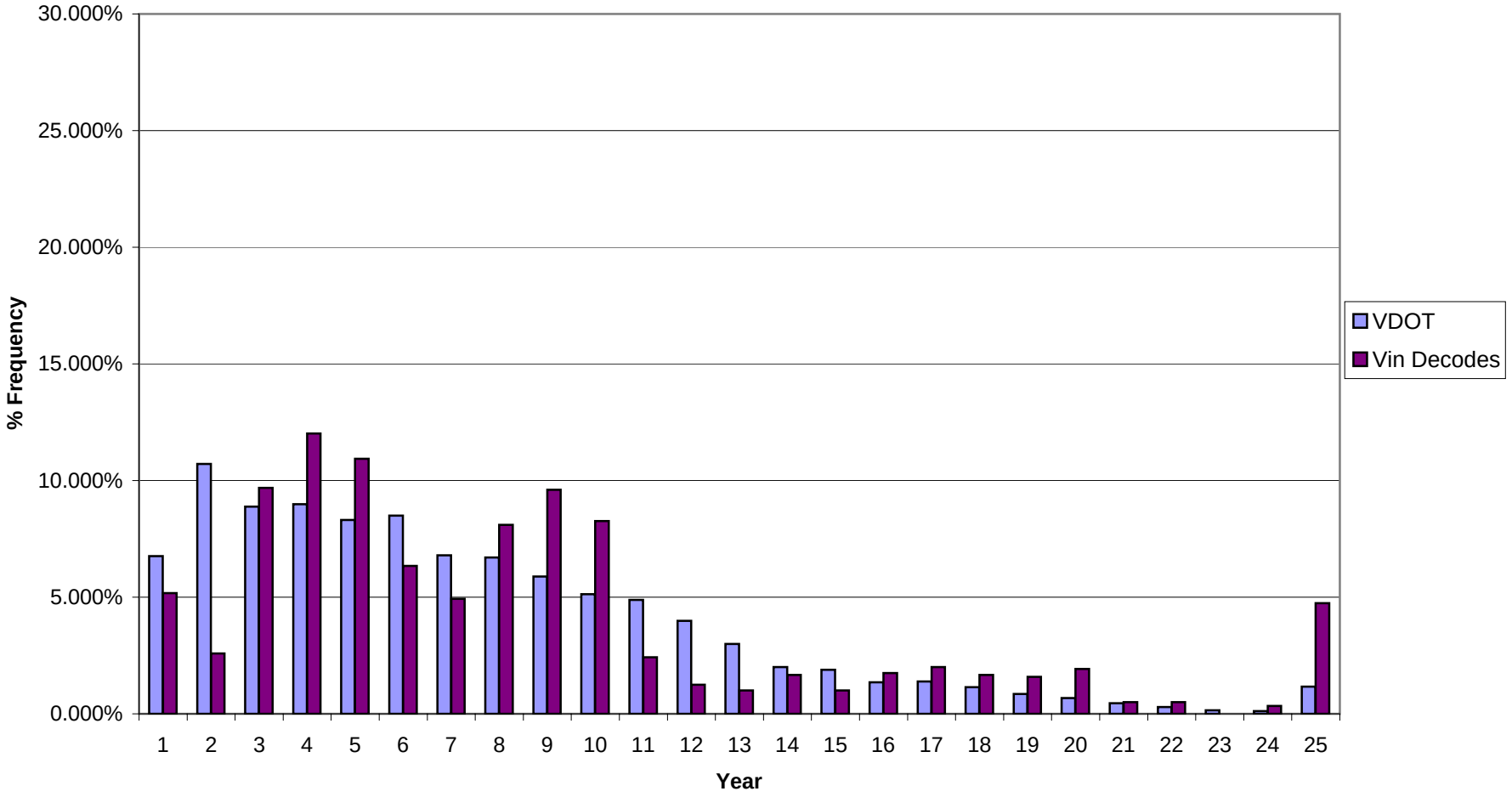
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = LDV
Number of Decoded Vins = 83,001



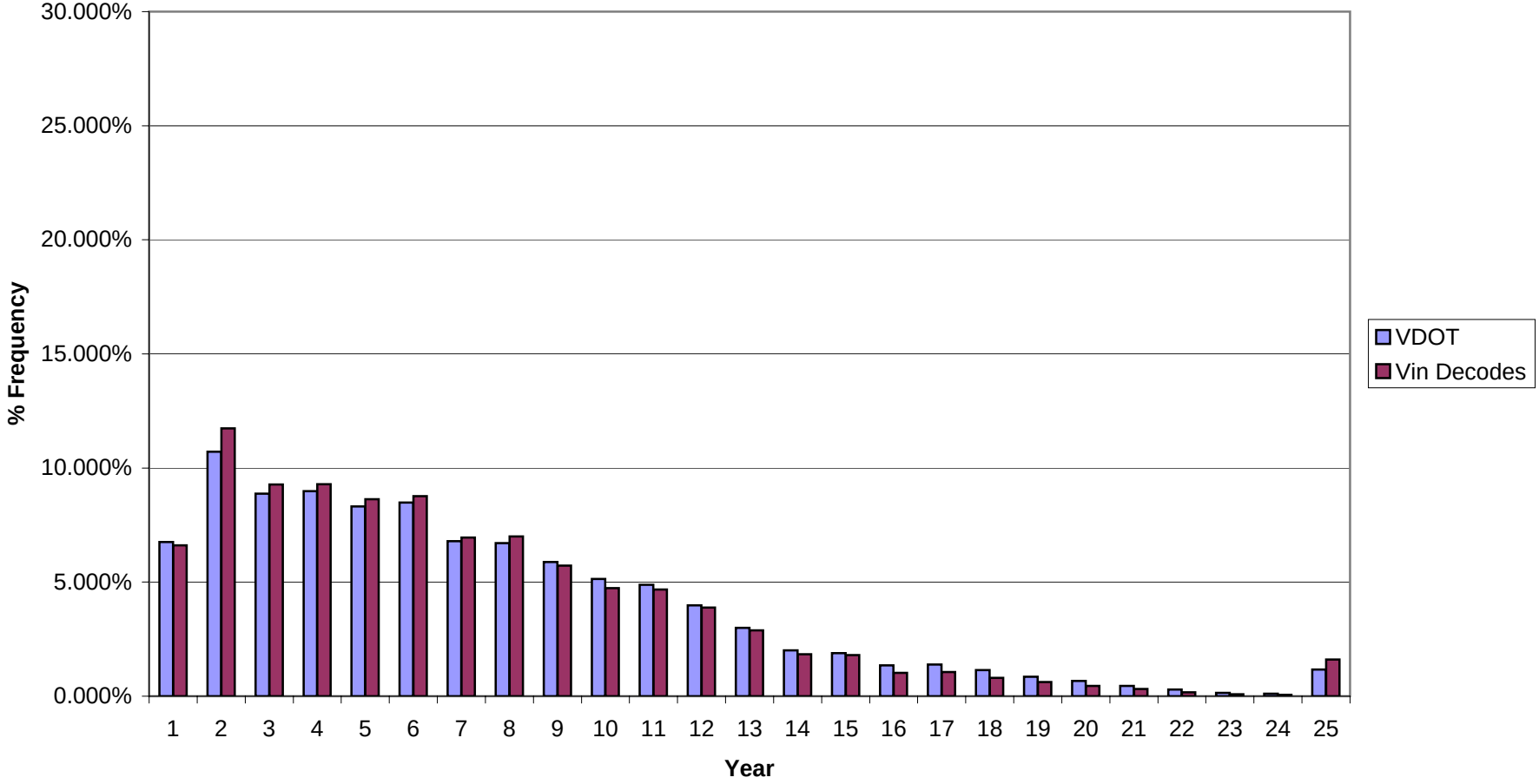
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = LDT1
Number of Decoded Vins = 1,142



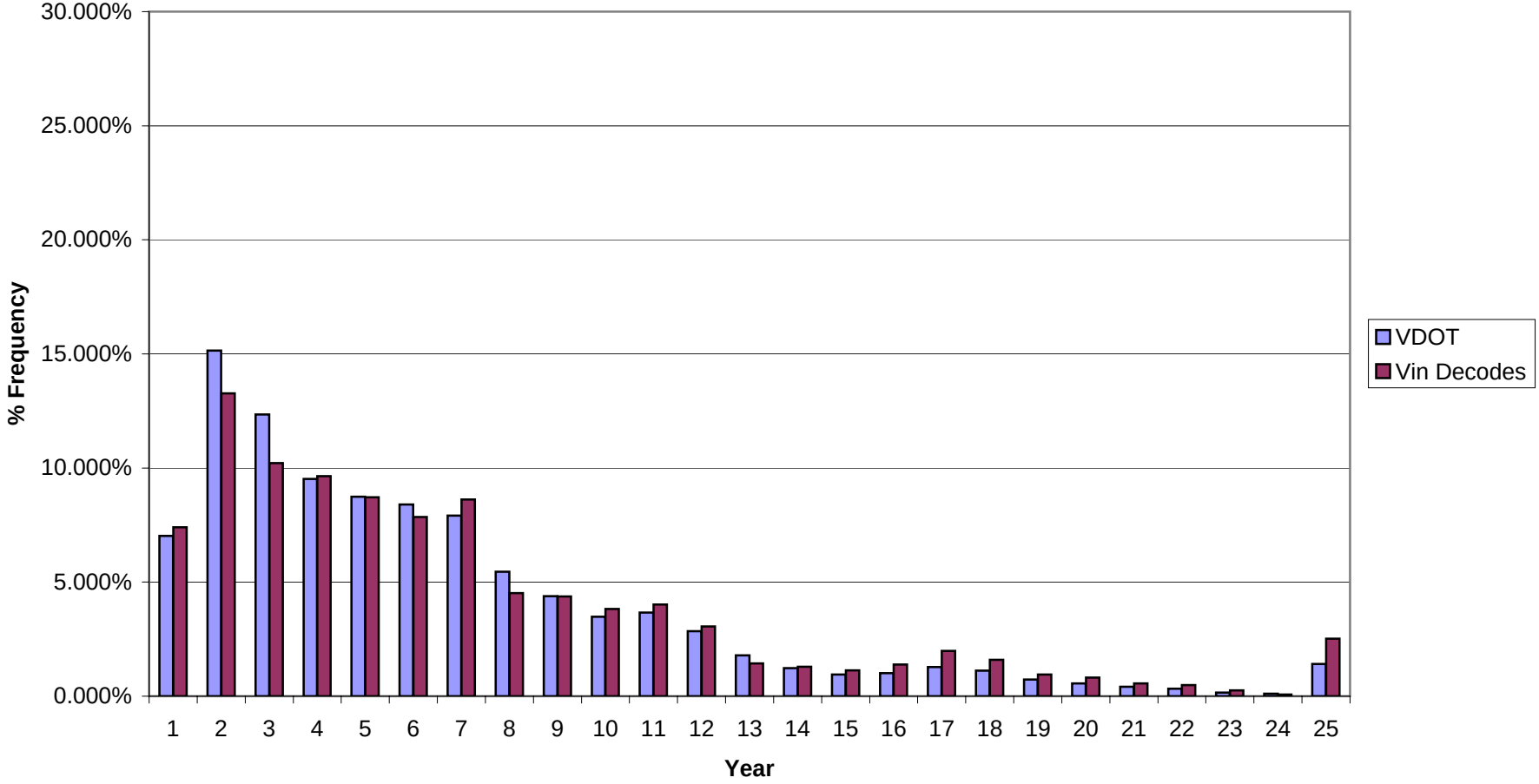
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = LDT2
Number of Decoded Vins = 28,581



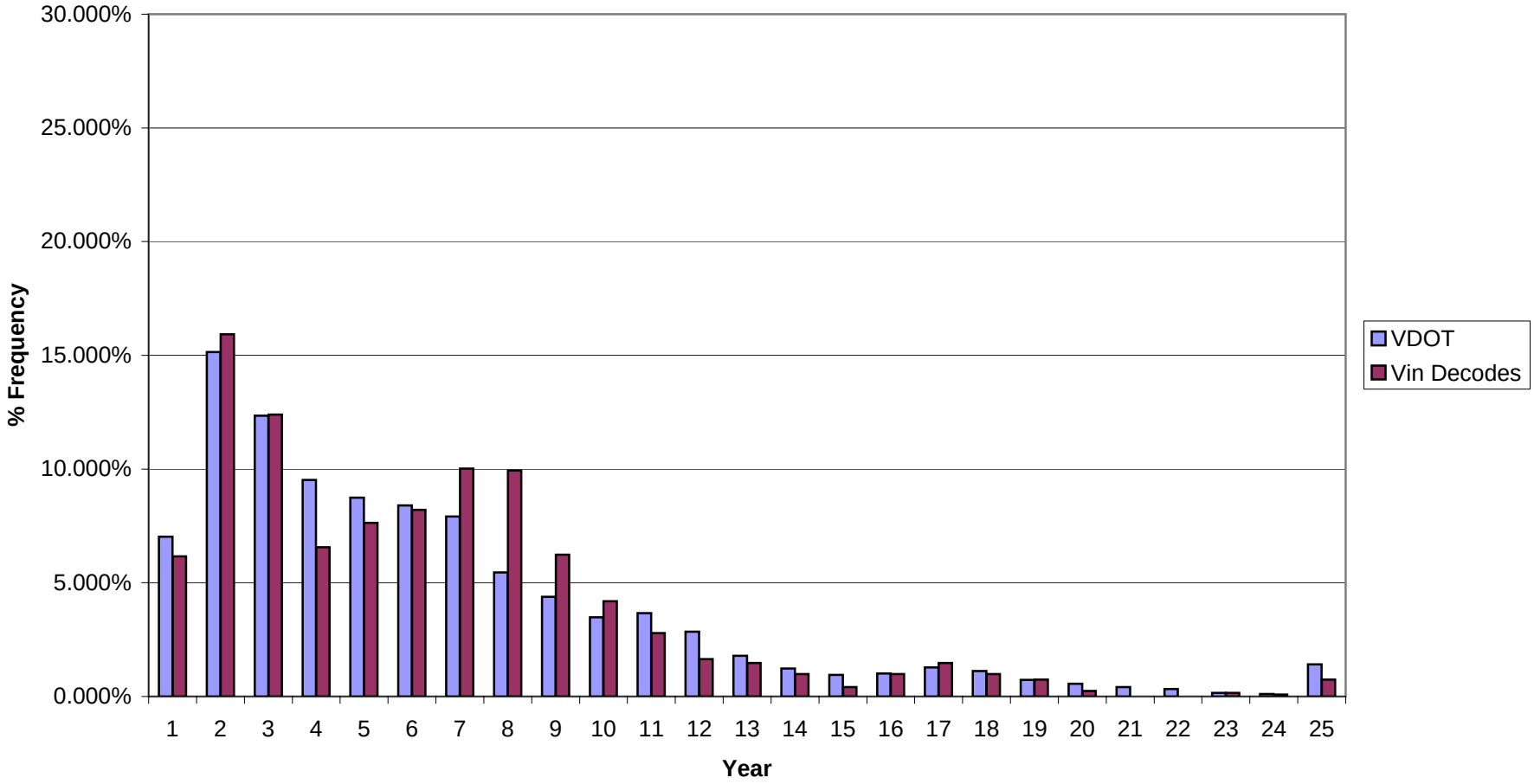
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = LDT3
Number of Decoded Vins = 5,001



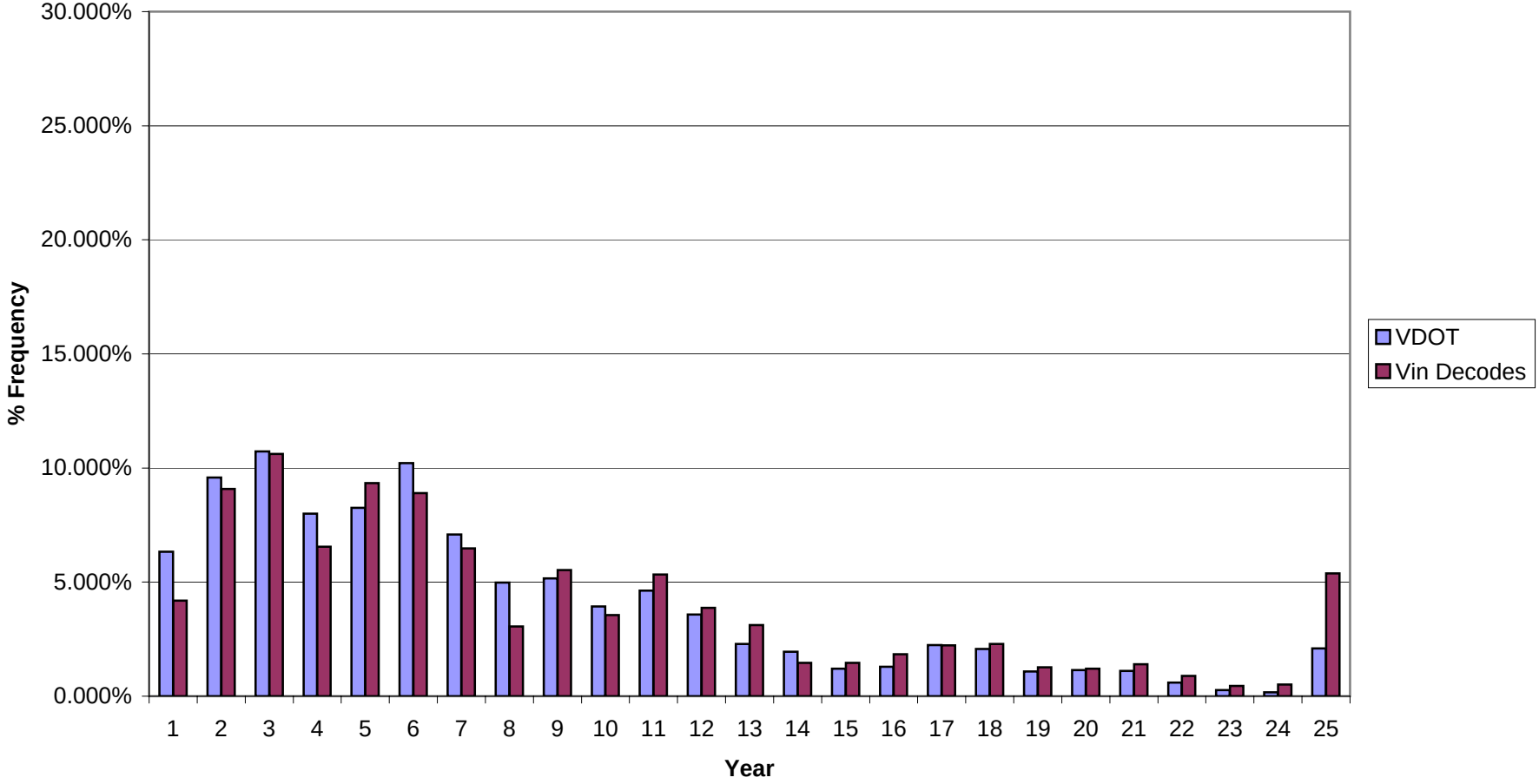
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = LDT4
Number of Decoded Vins = 1,210



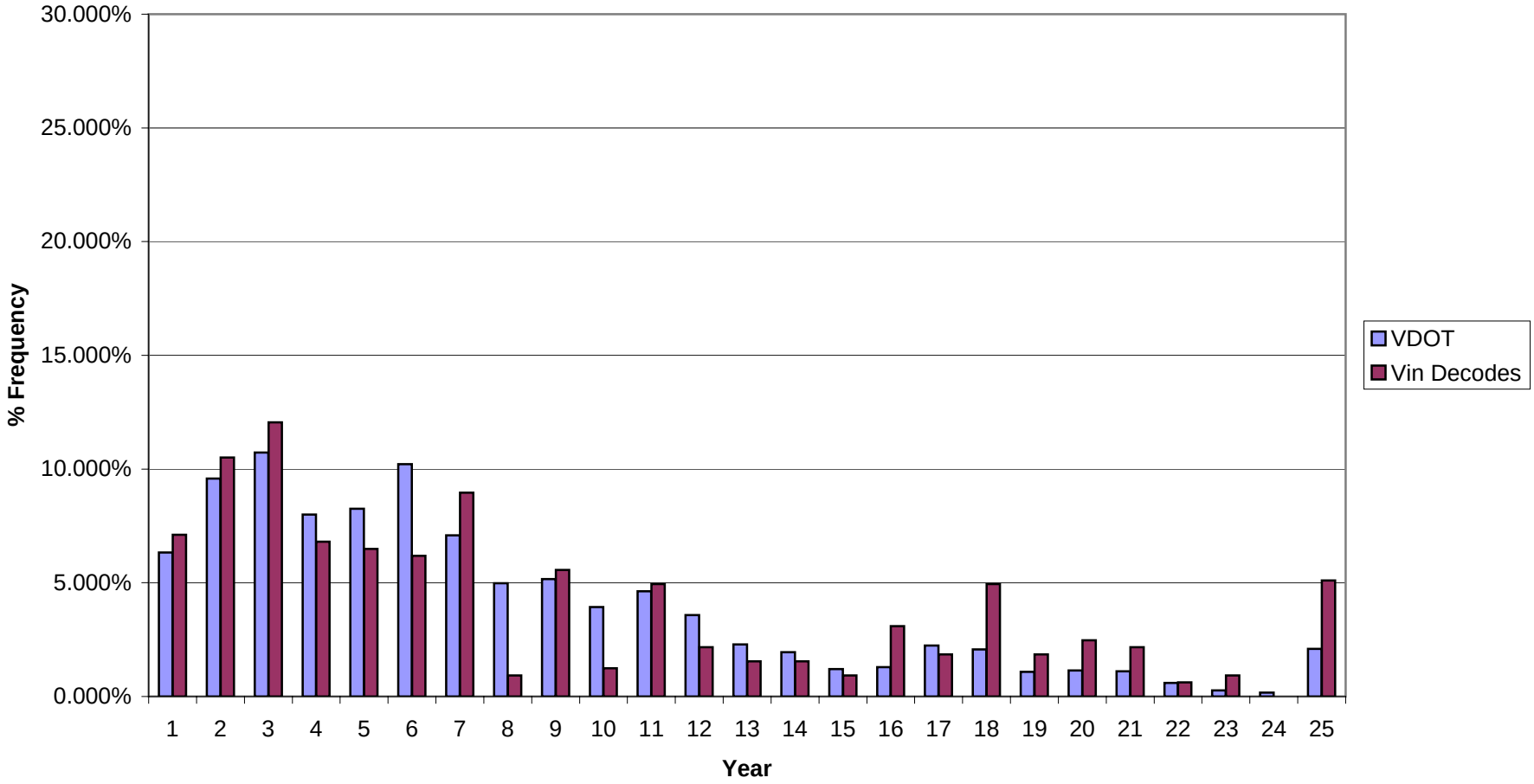
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = HDV2B
Number of Decoded Vins = 1,376



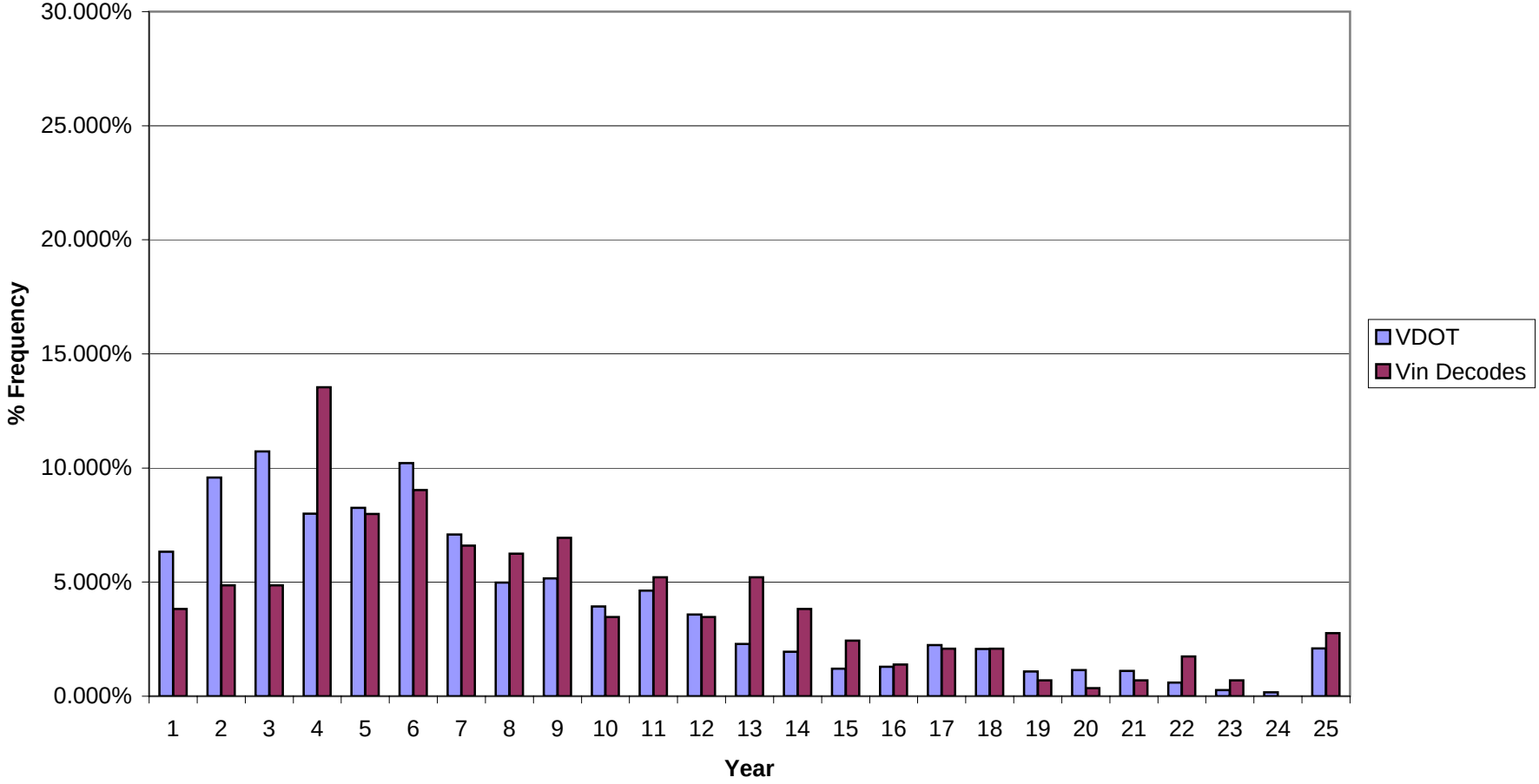
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = HDV3
Number of Decoded Vins = 264



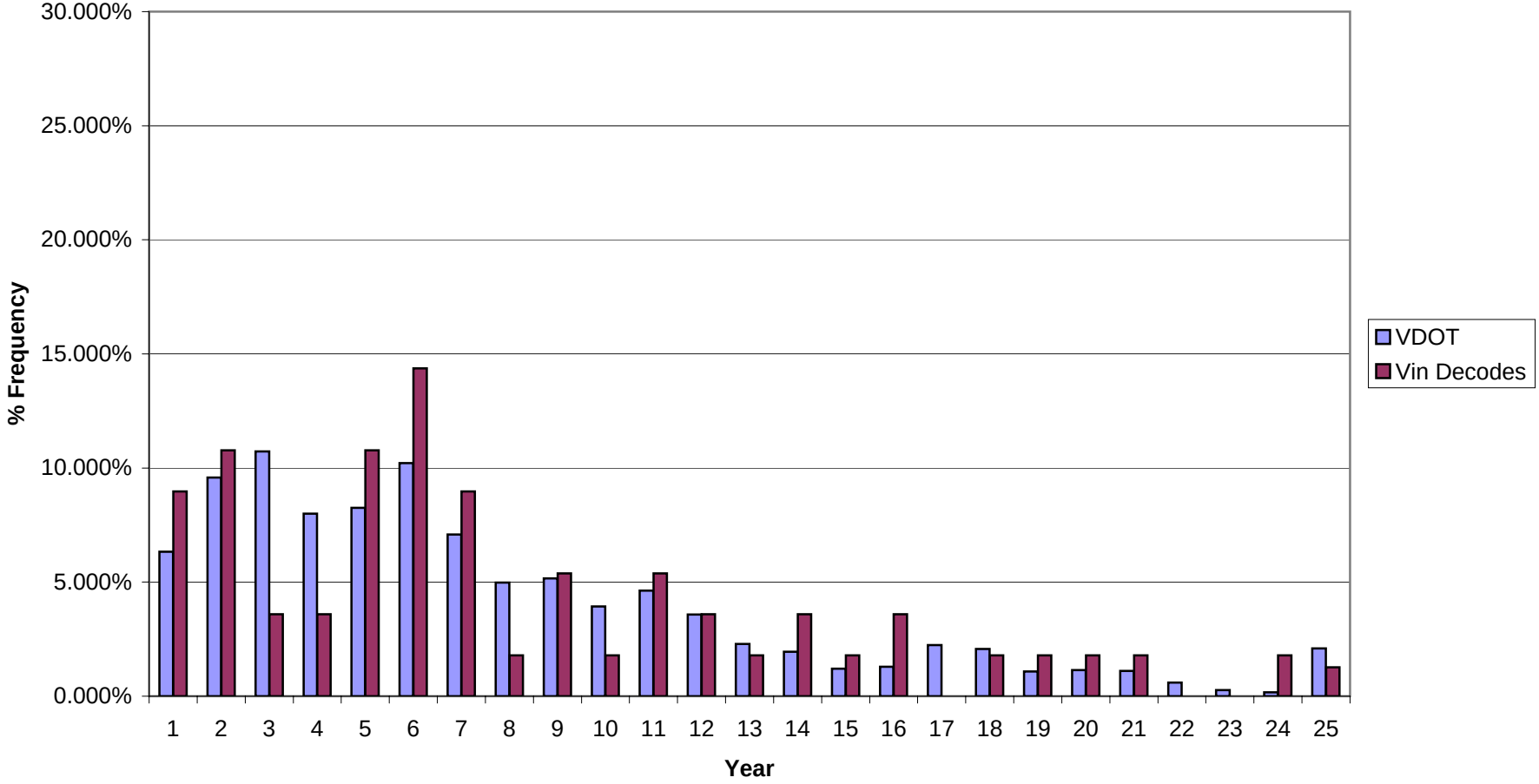
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = HDV4
Number of Decoded Vins = 280



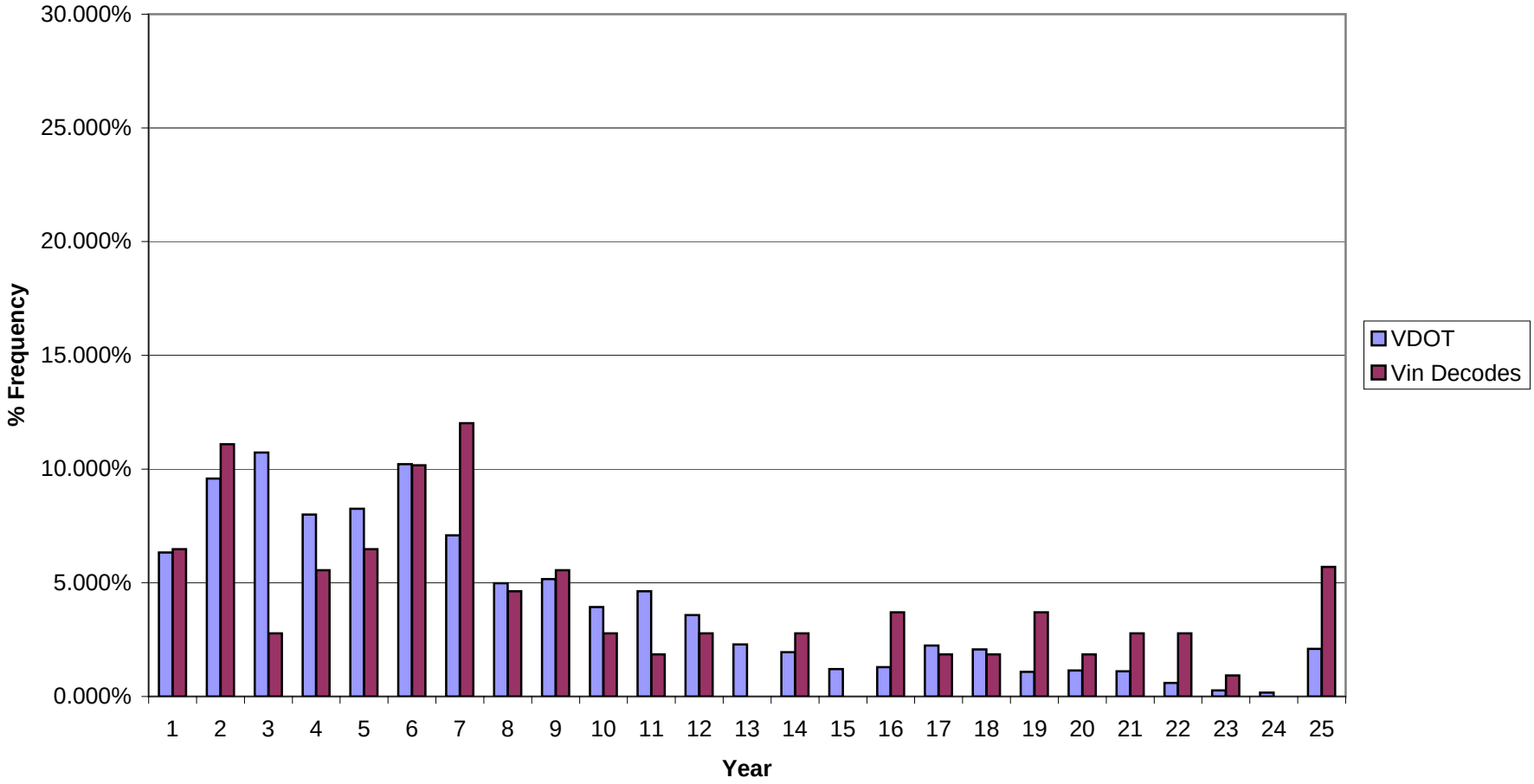
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = HDV5
Number of Decoded Vins = 55



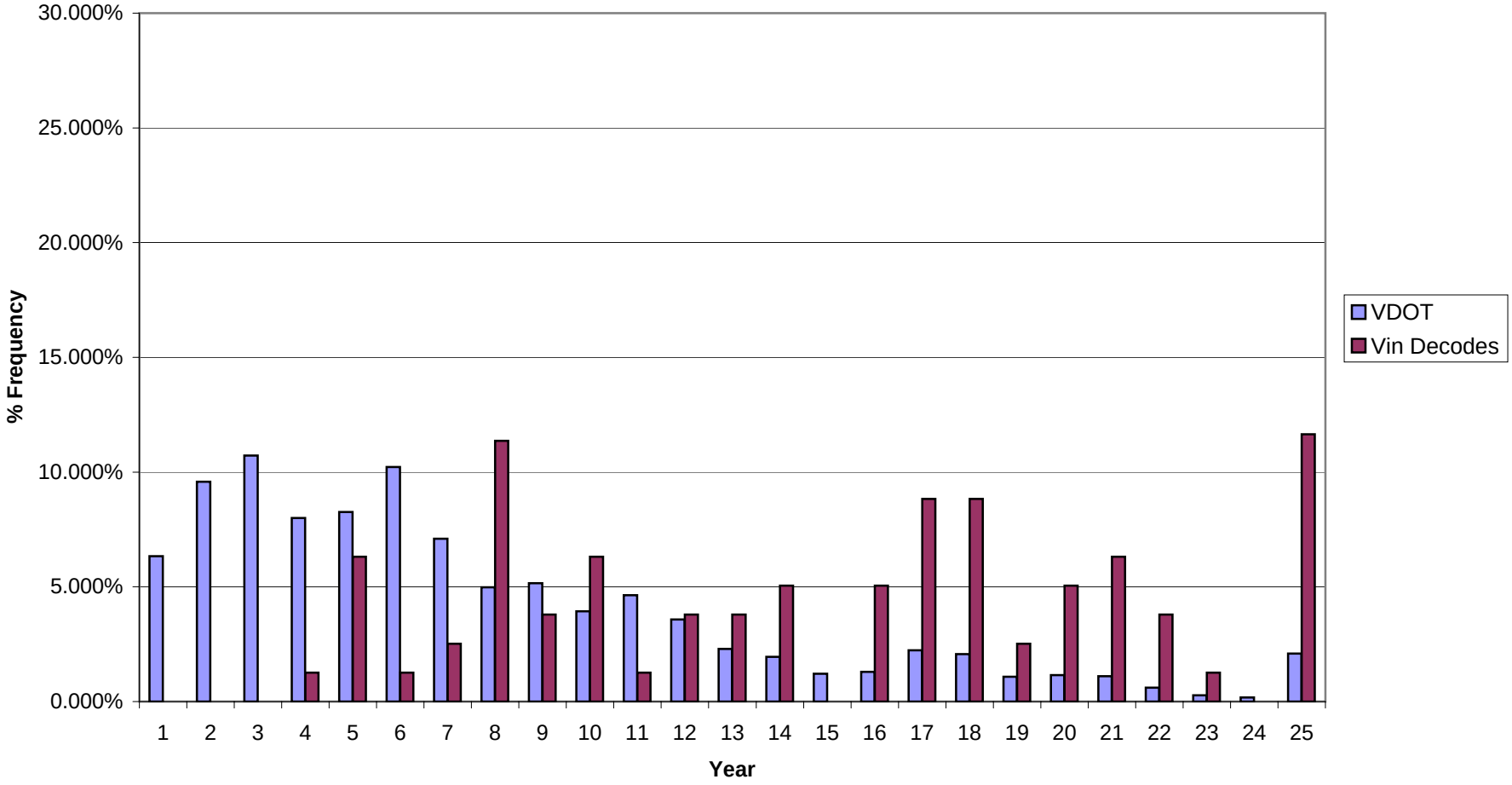
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = HDV6
Number of Decoded Vins = 95



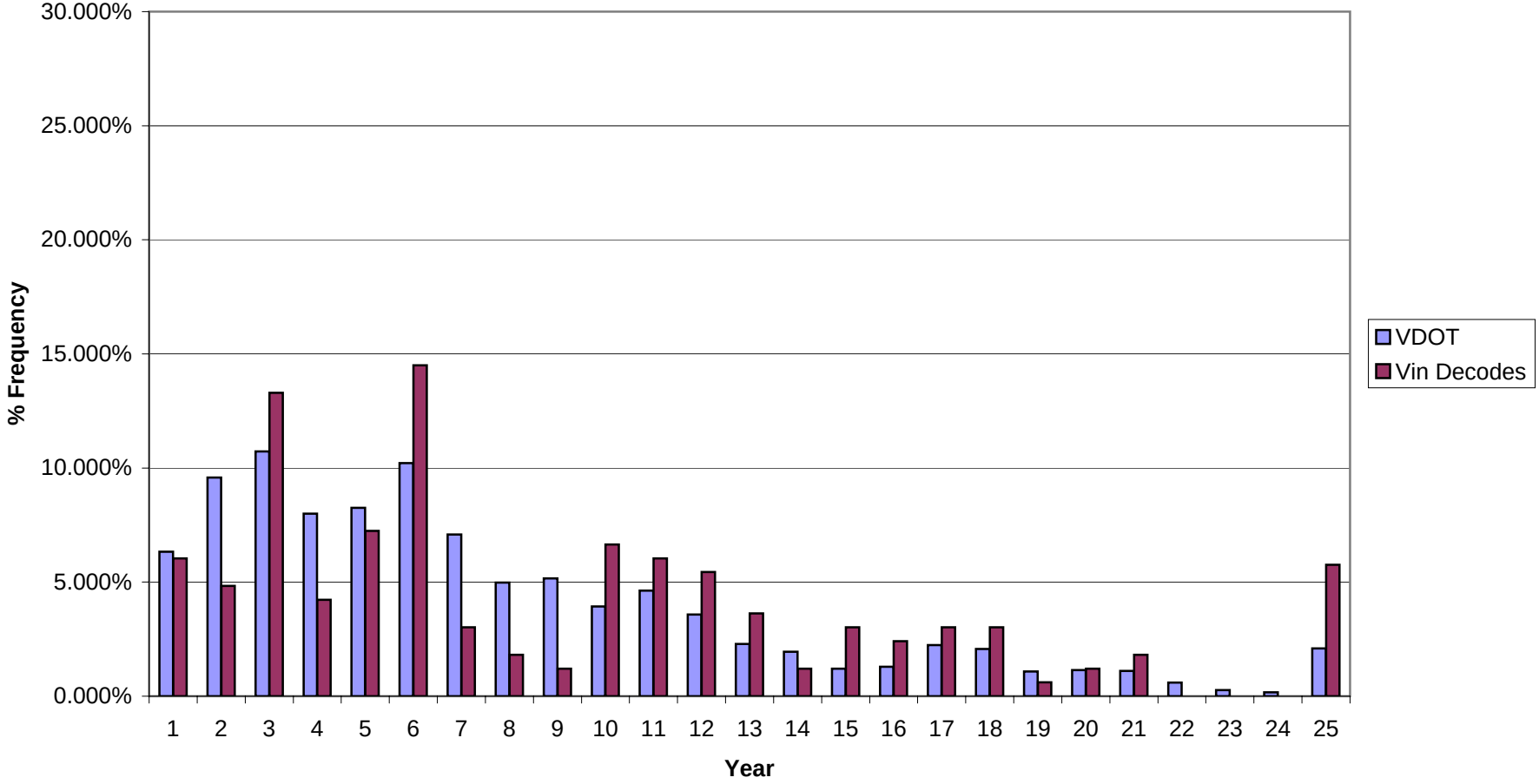
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = HDV7
Number of Decoded Vins = 70



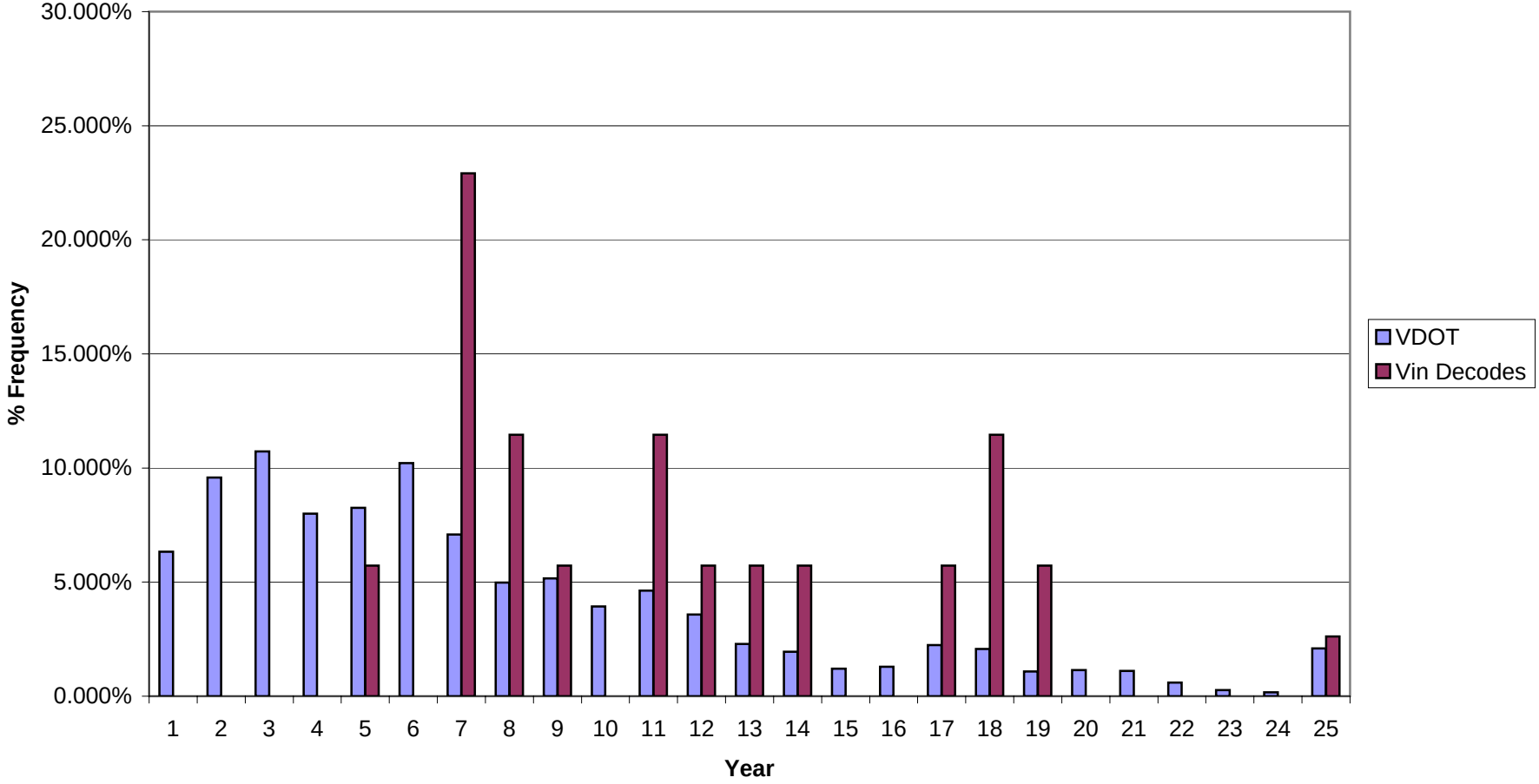
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = HDV8A
Number of Decoded Vins = 156



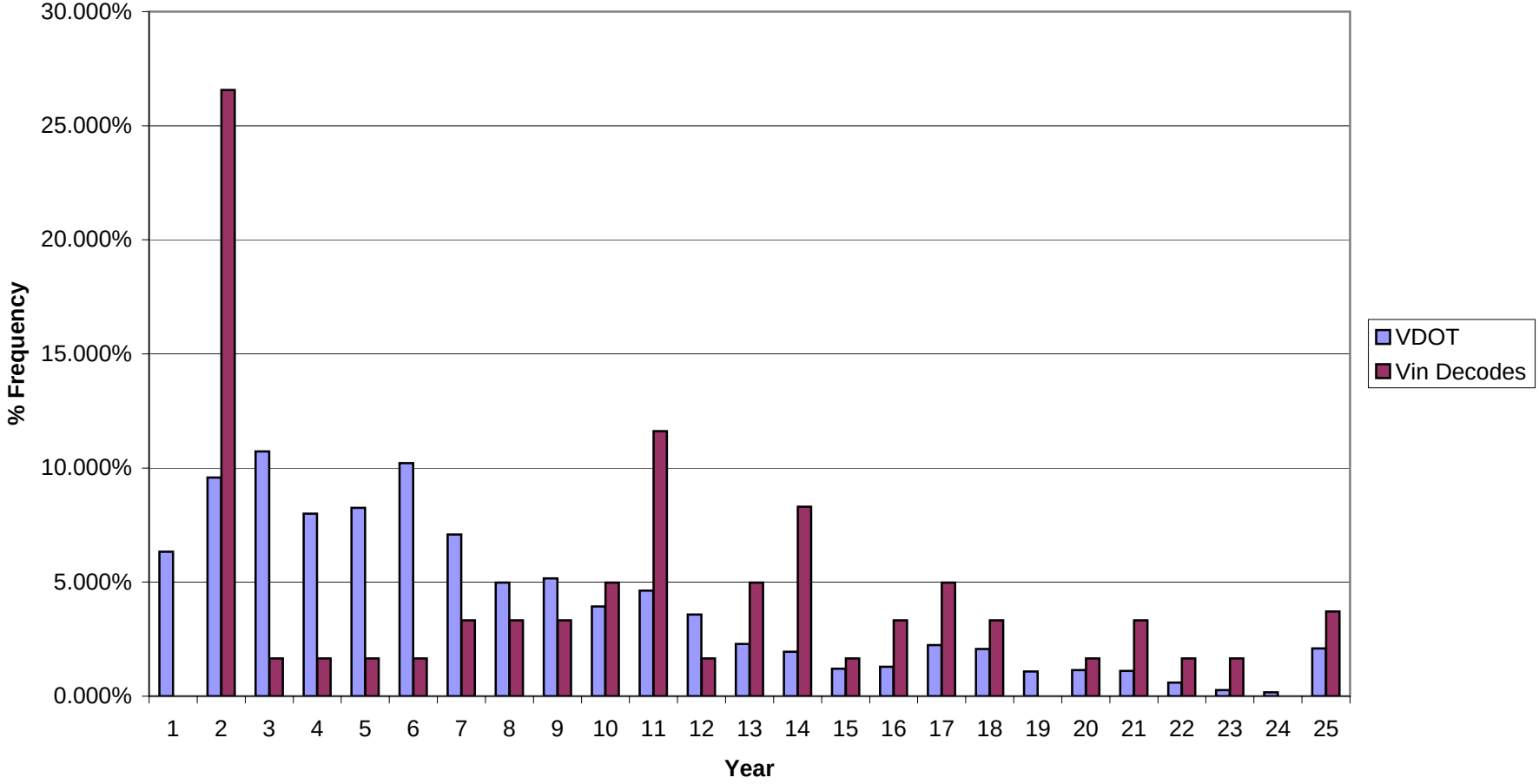
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = HDV8B
Number of Decoded Vins = 17



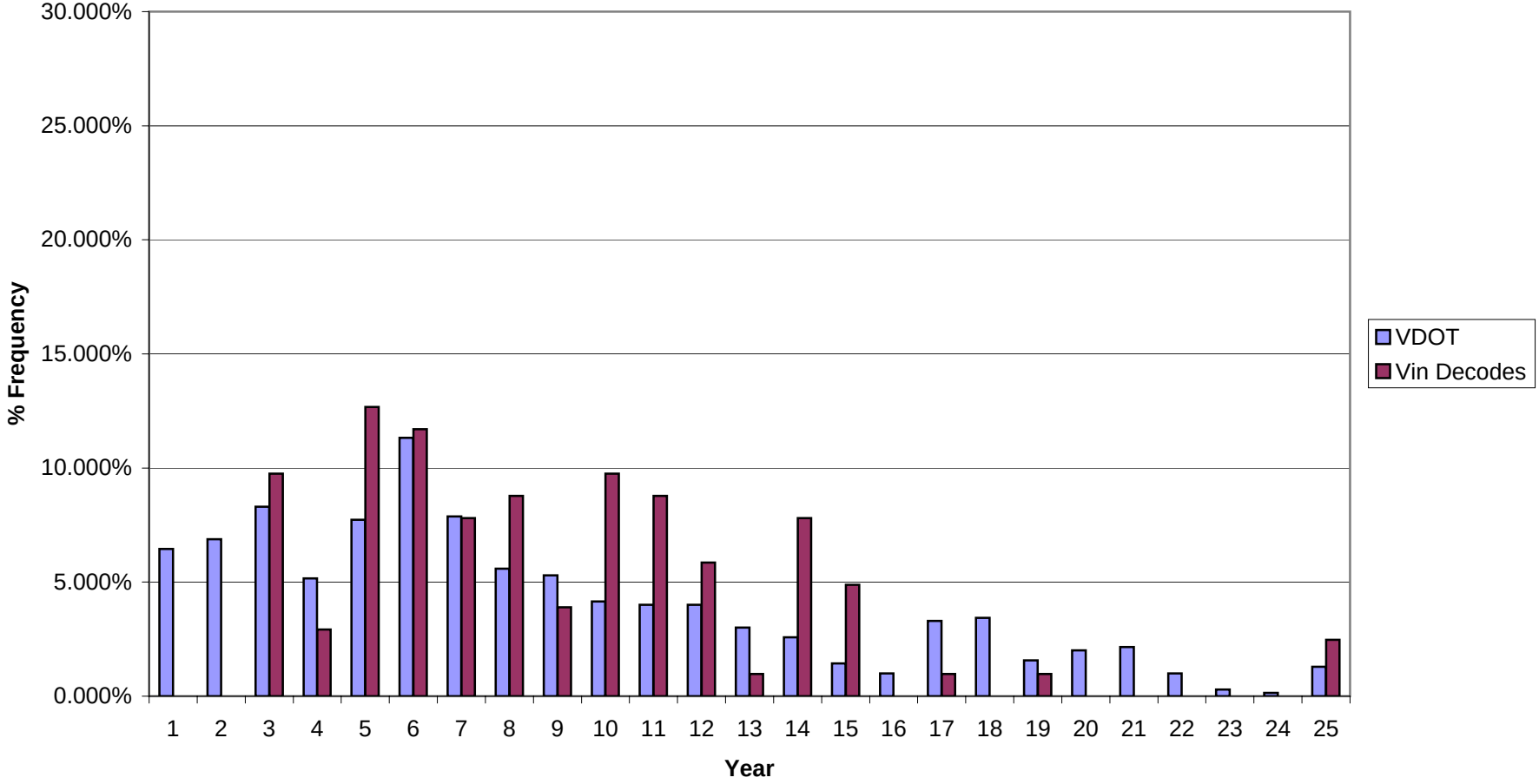
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = HDBS
Number of Decoded Vins = 139



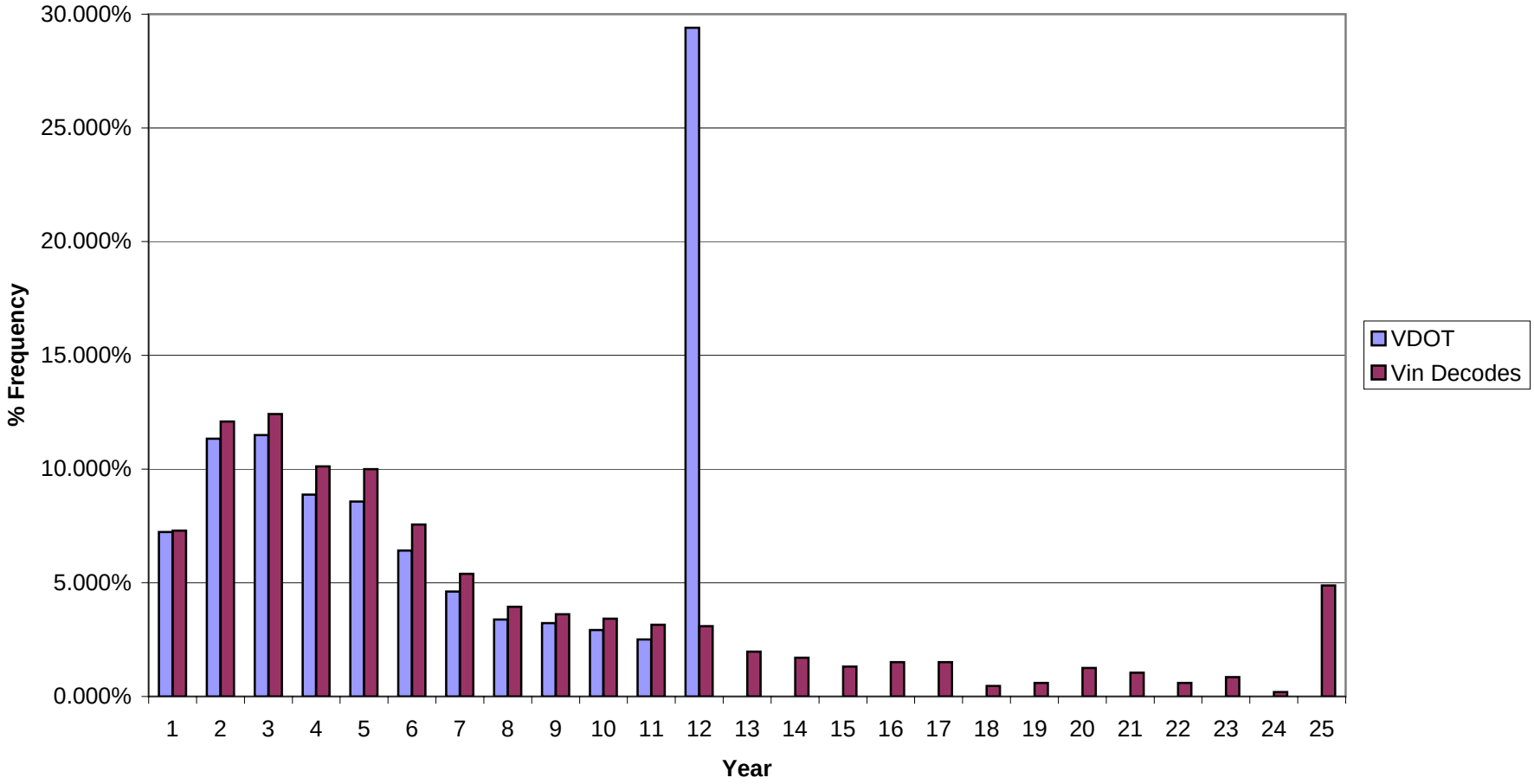
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = HDBT
Number of Decoded Vins = 182



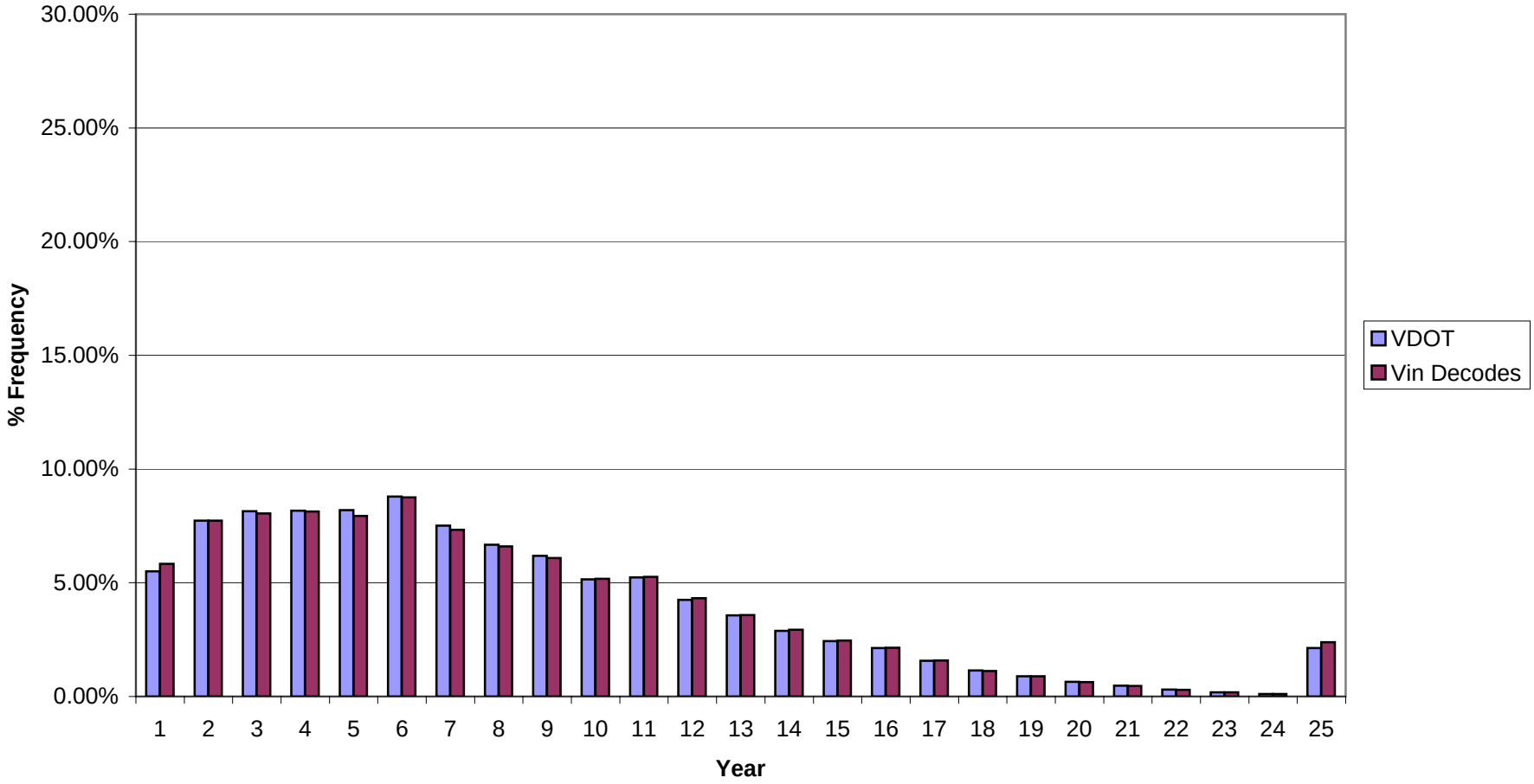
ATTACHMENT 7B

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = ARL
Vehicle Type = MC
Number of Decoded Vins = 1,447



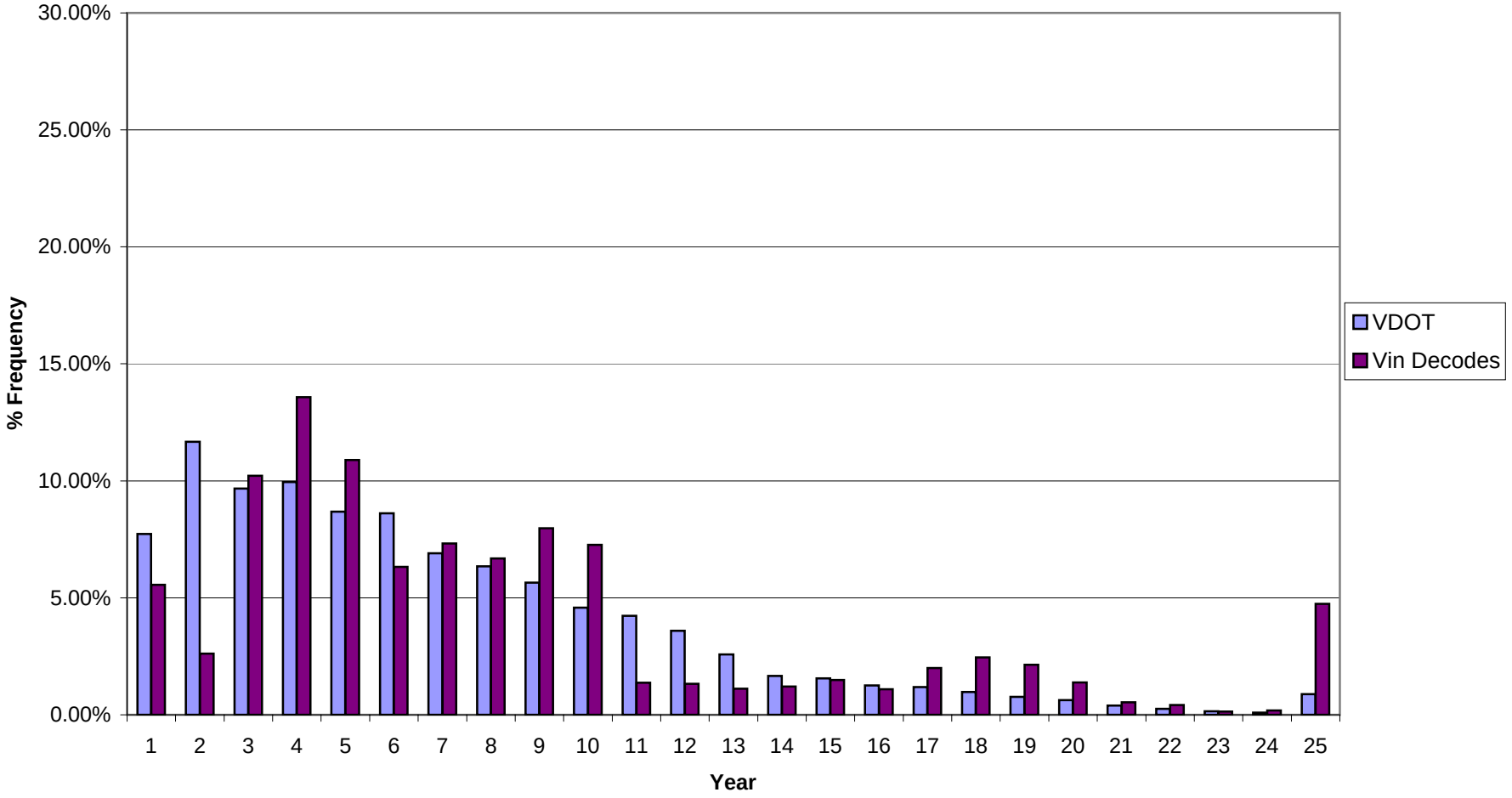
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = LDV
Number of Decoded Vins = 437,485



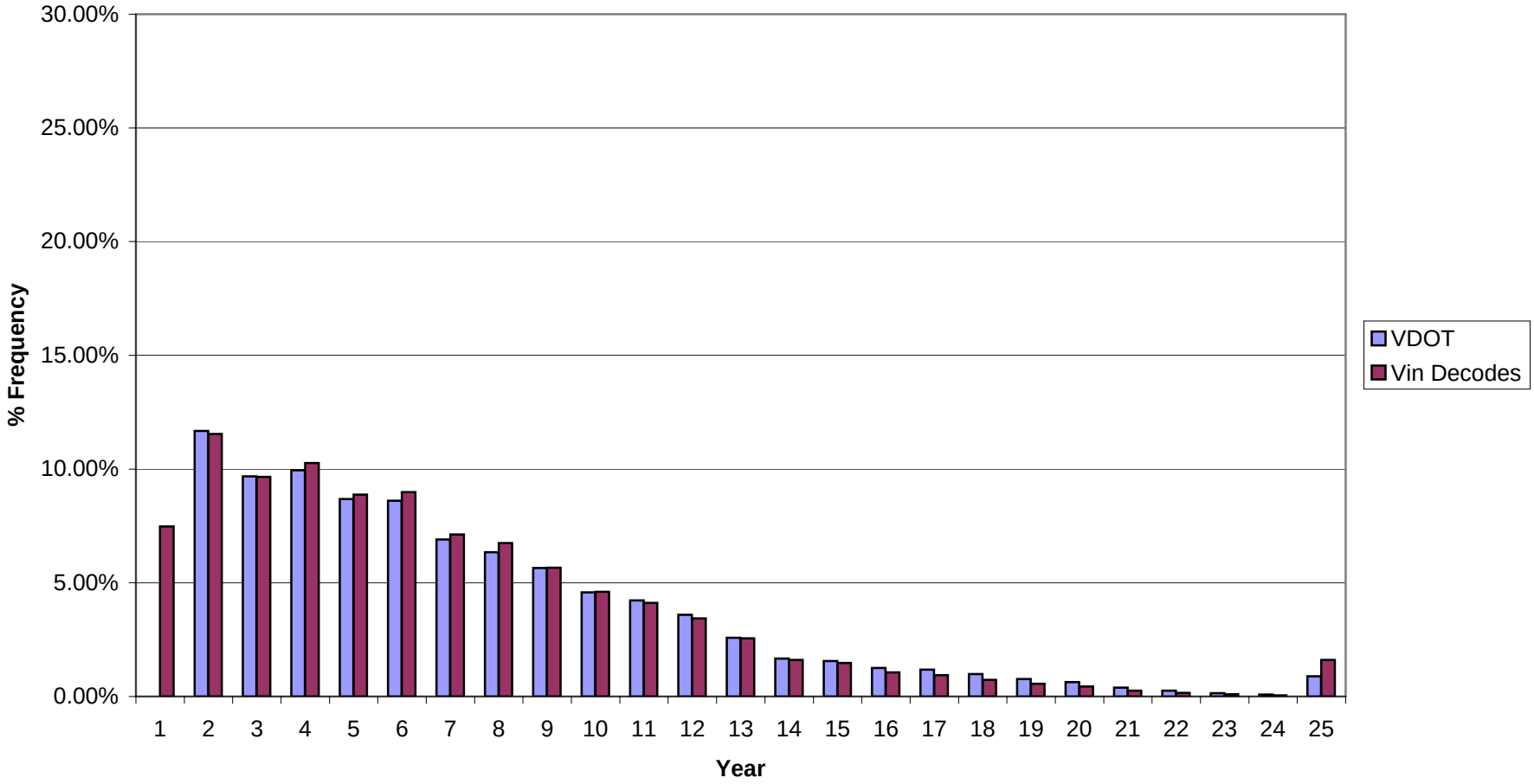
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = LDT1
Number of Decoded Vins = 6,224



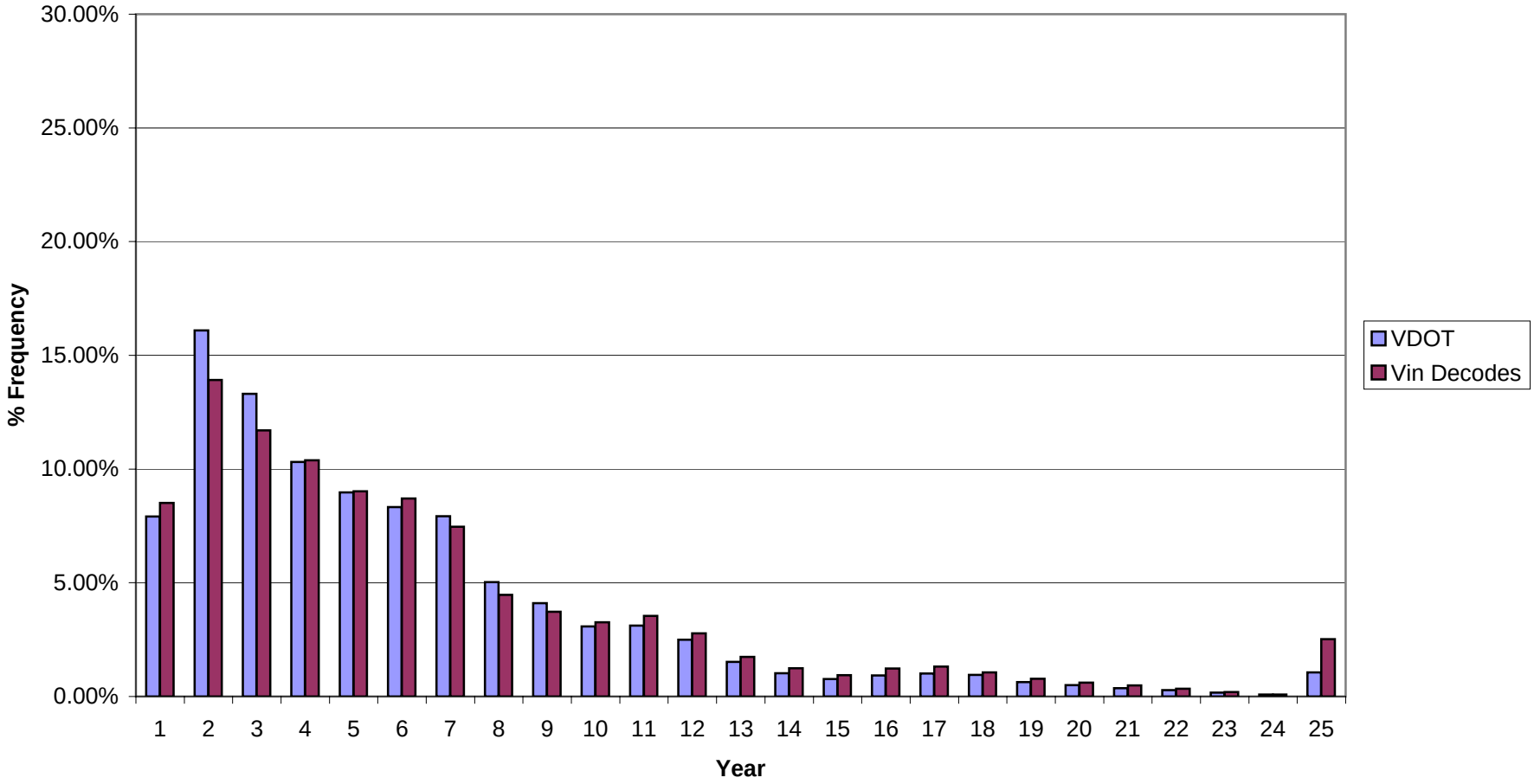
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = LDT2
Number of Decoded Vins = 201,269



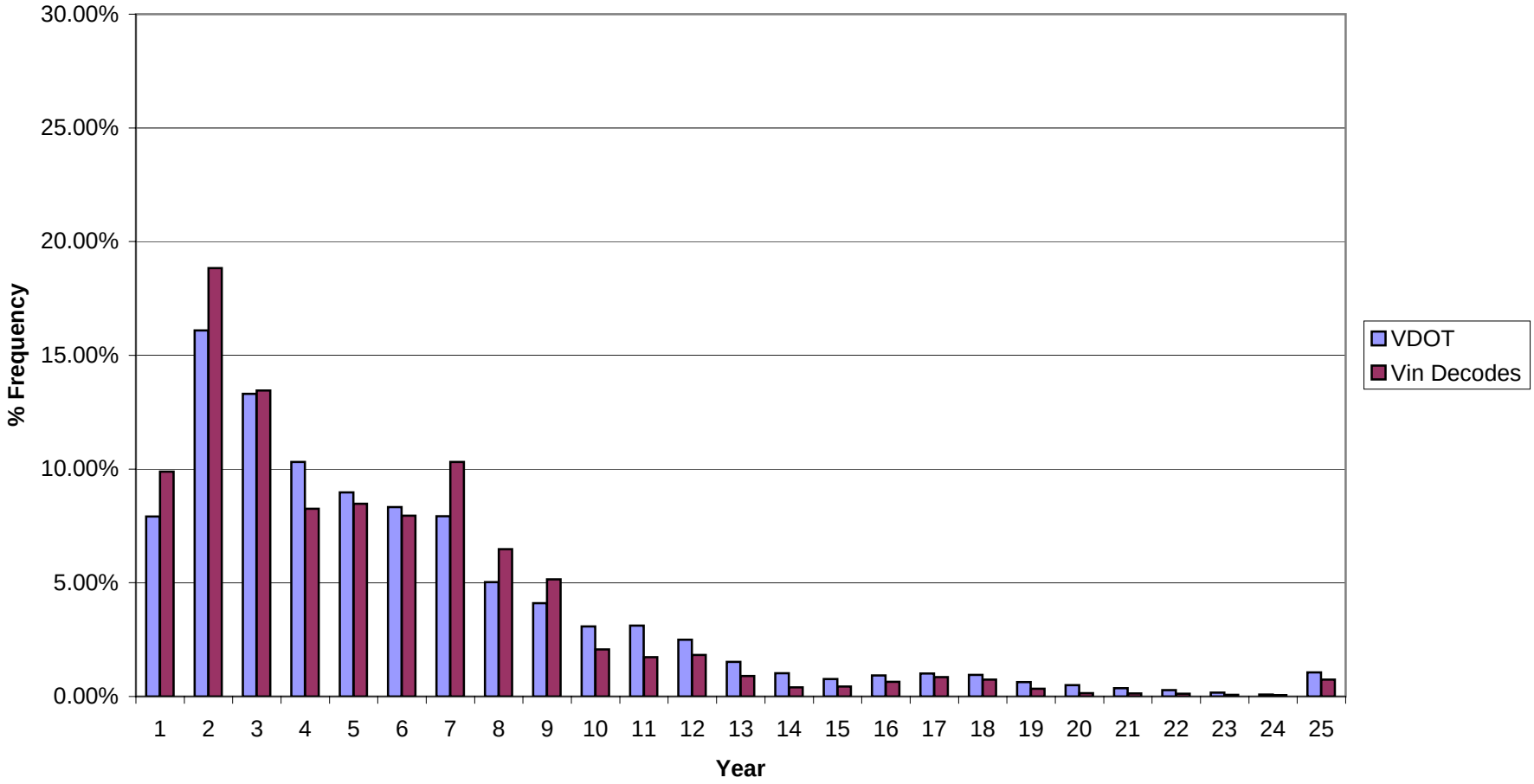
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = LDT3
Number of Decoded Vins = 45,544



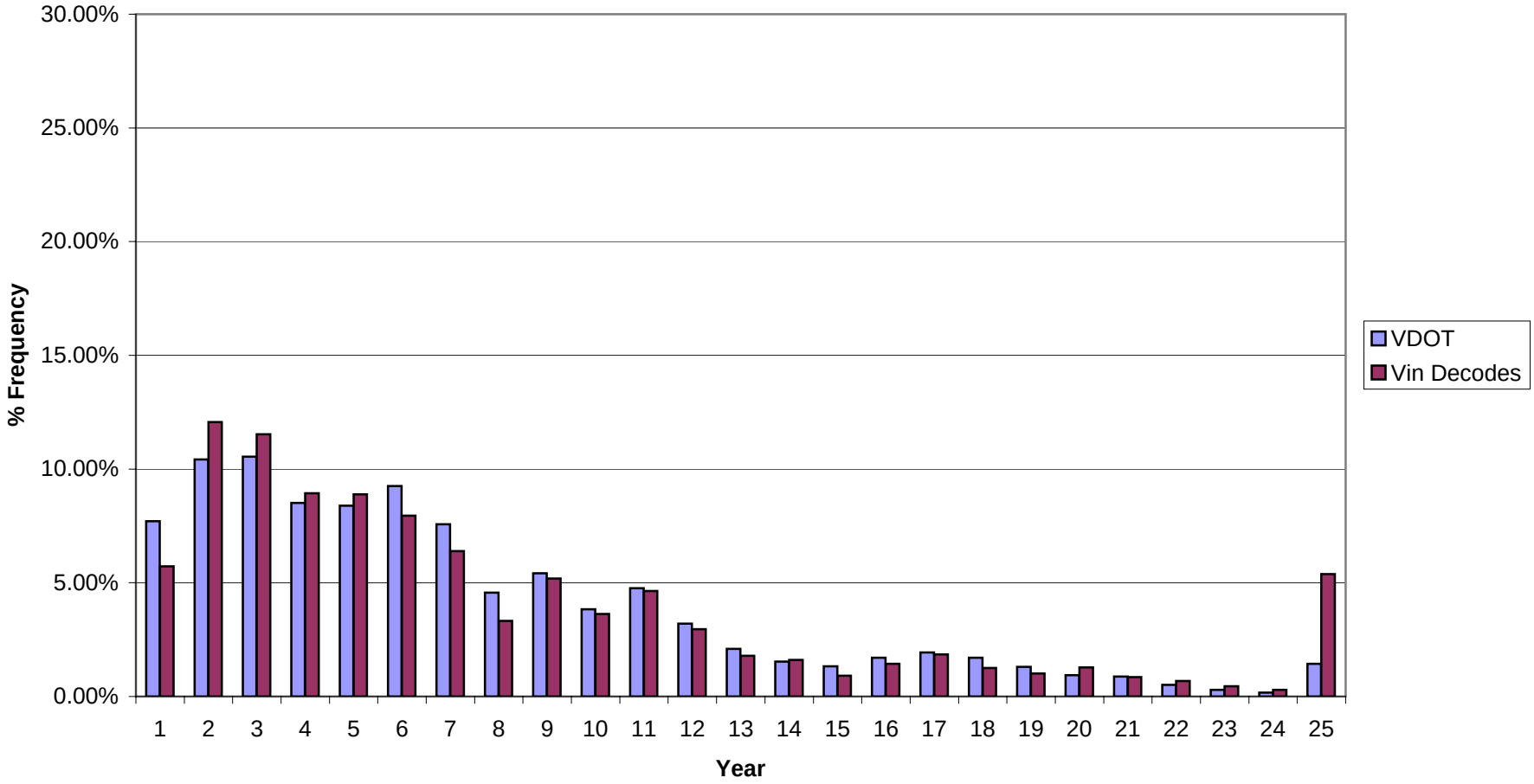
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = LDT4
Number of Decoded Vins = 13,188



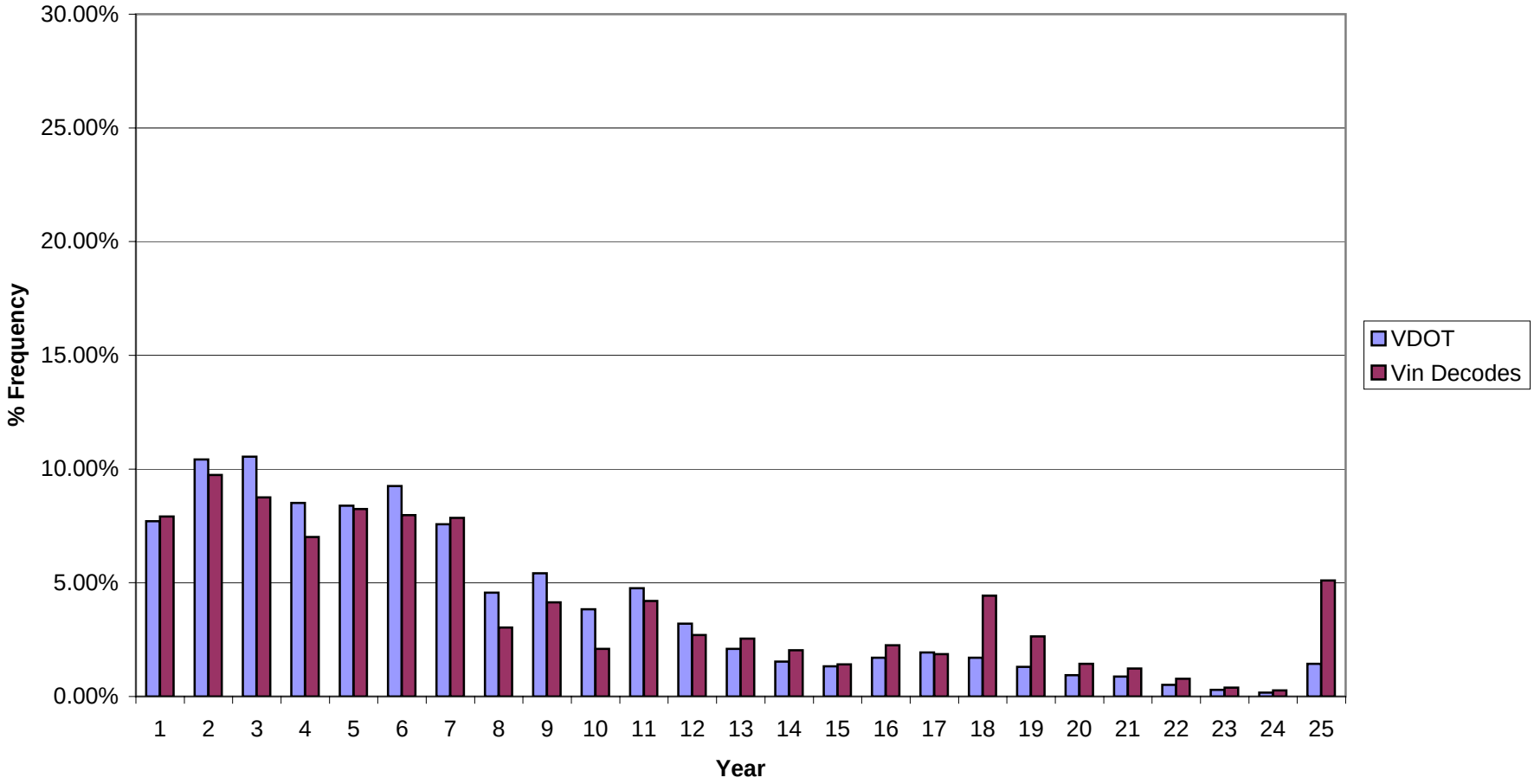
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = HDV2B
Number of Decoded Vins = 14,527



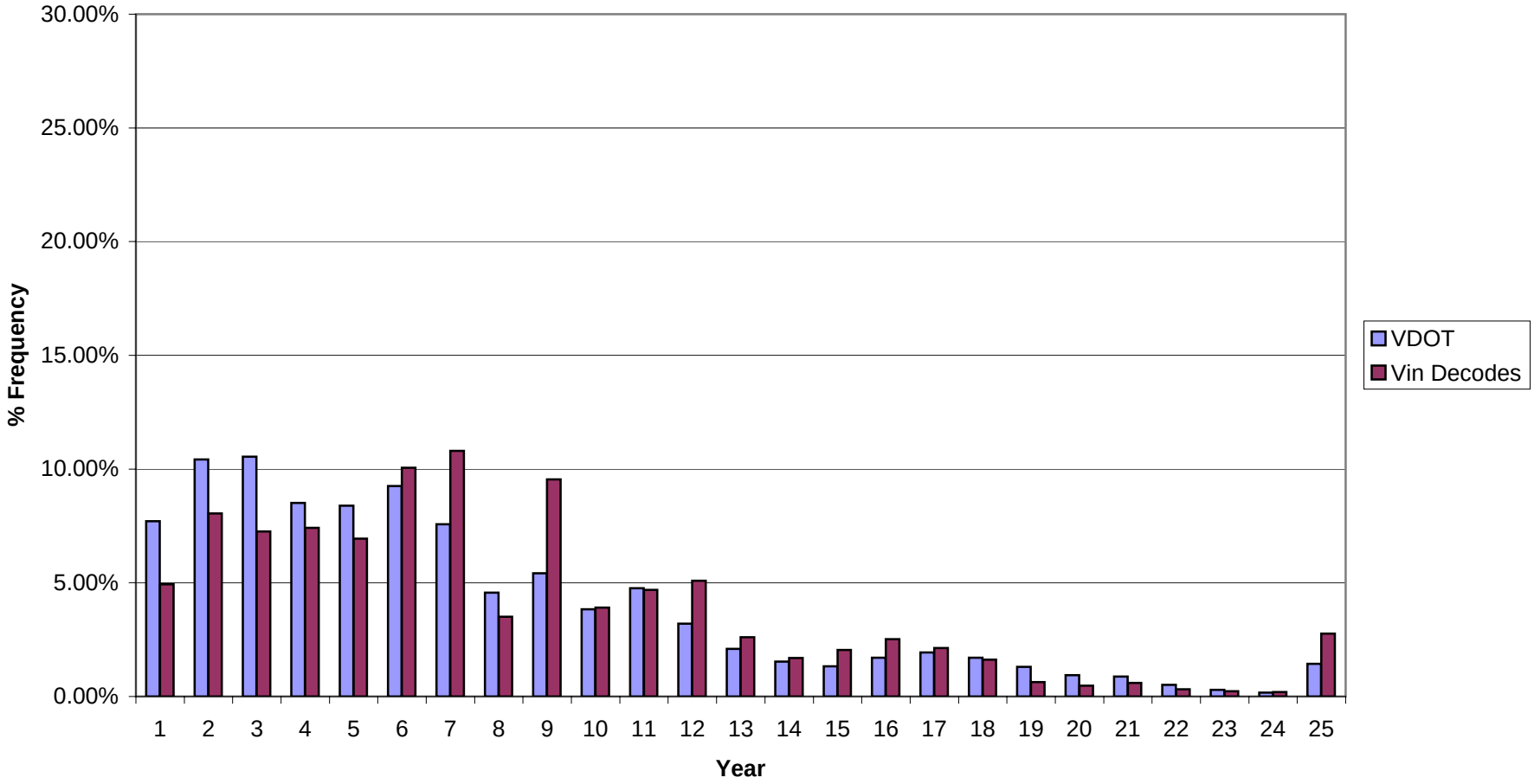
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = HDV3
Number of Decoded Vins = 2,928



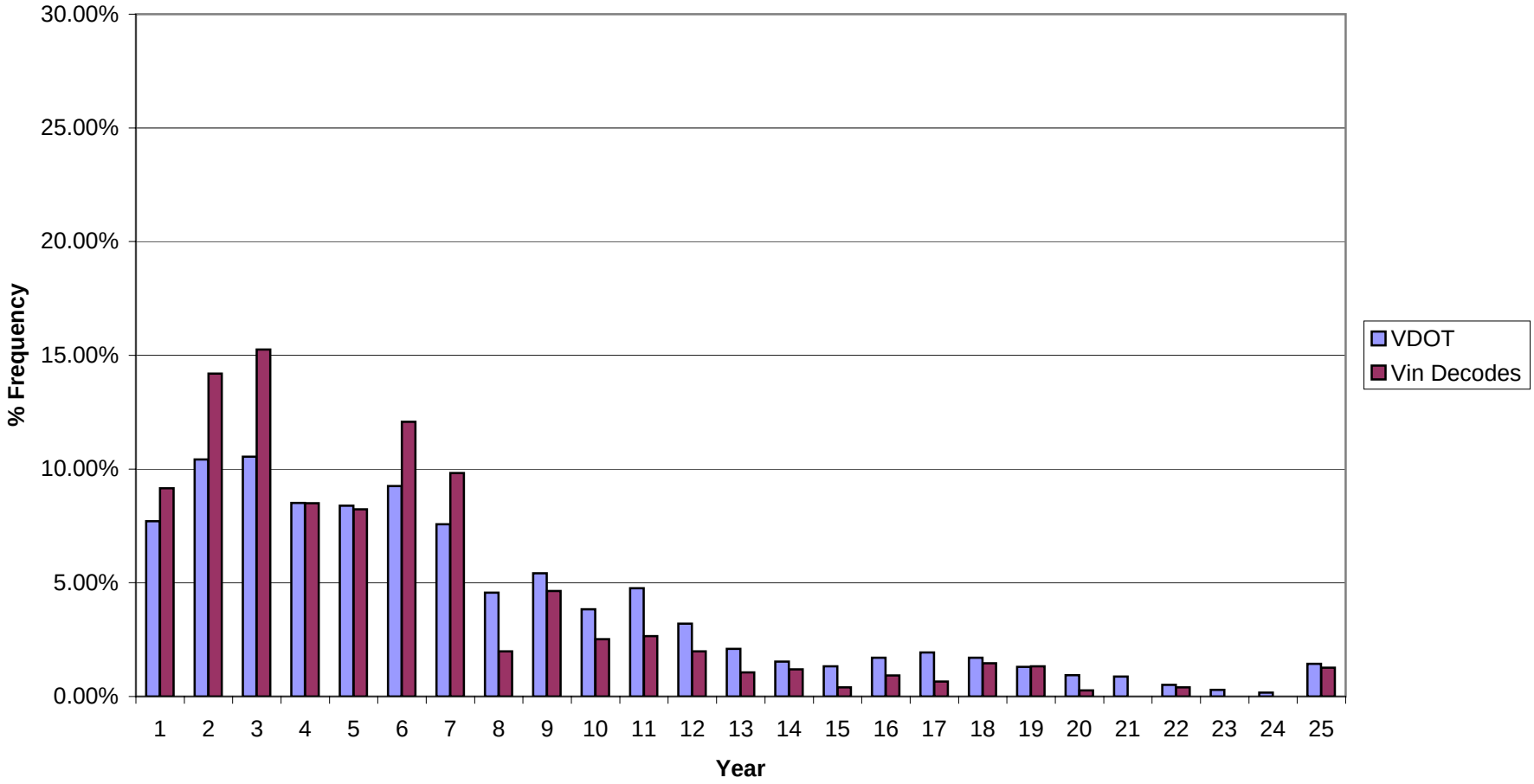
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = HDV4
Number of Decoded Vins = 2,466



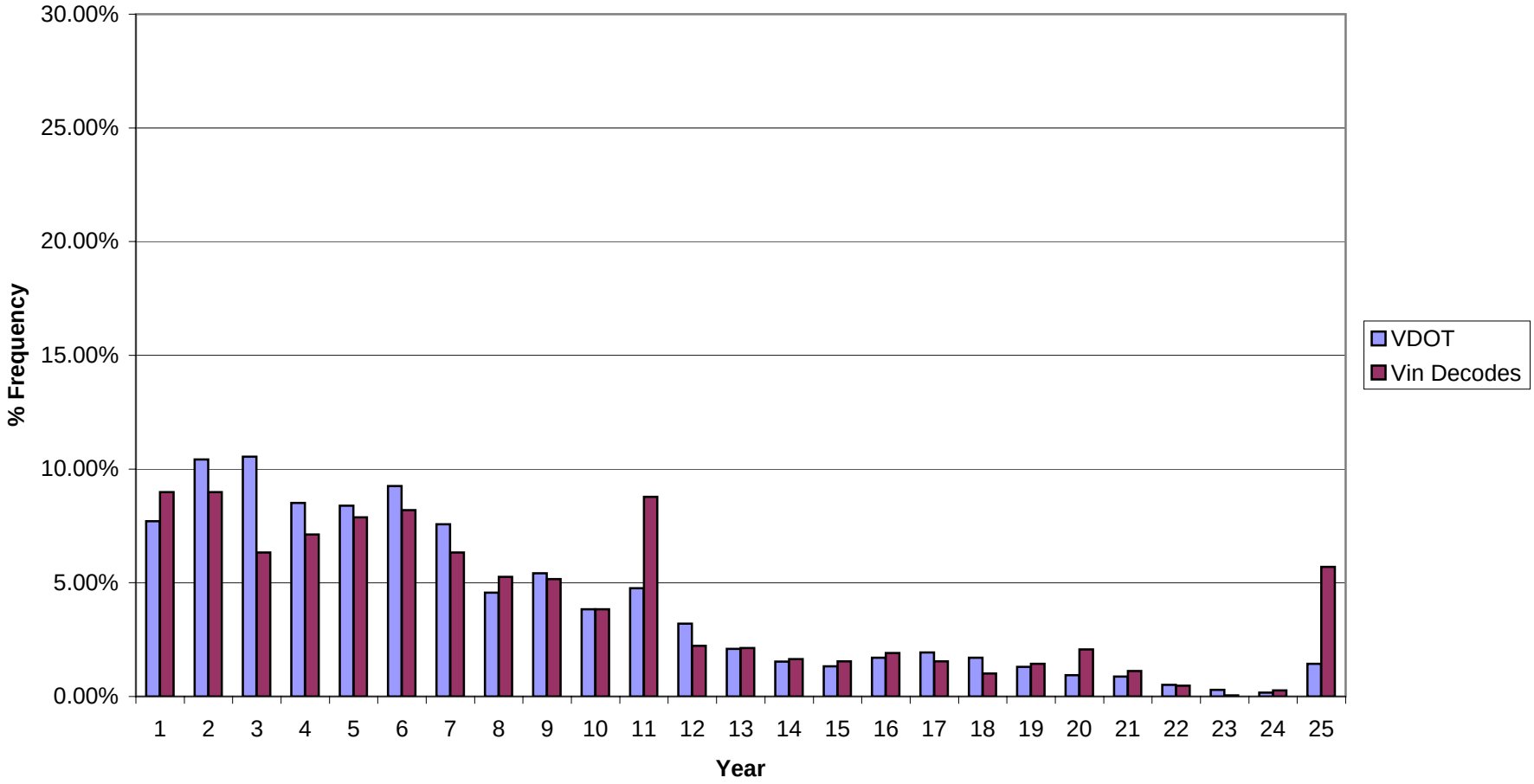
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = HDV5
Number of Decoded Vins = 744



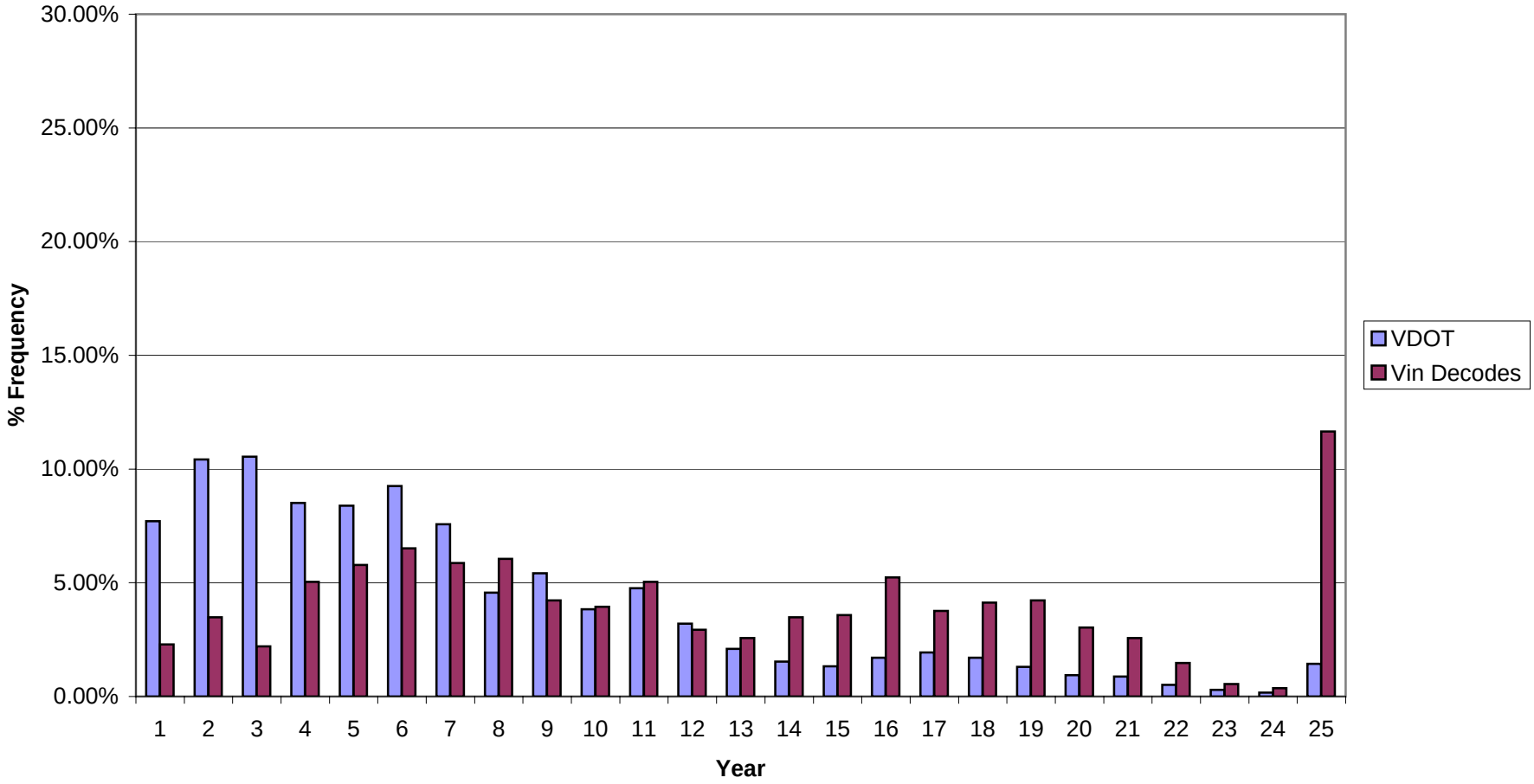
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = HDV6
Number of Decoded Vins = 1,680



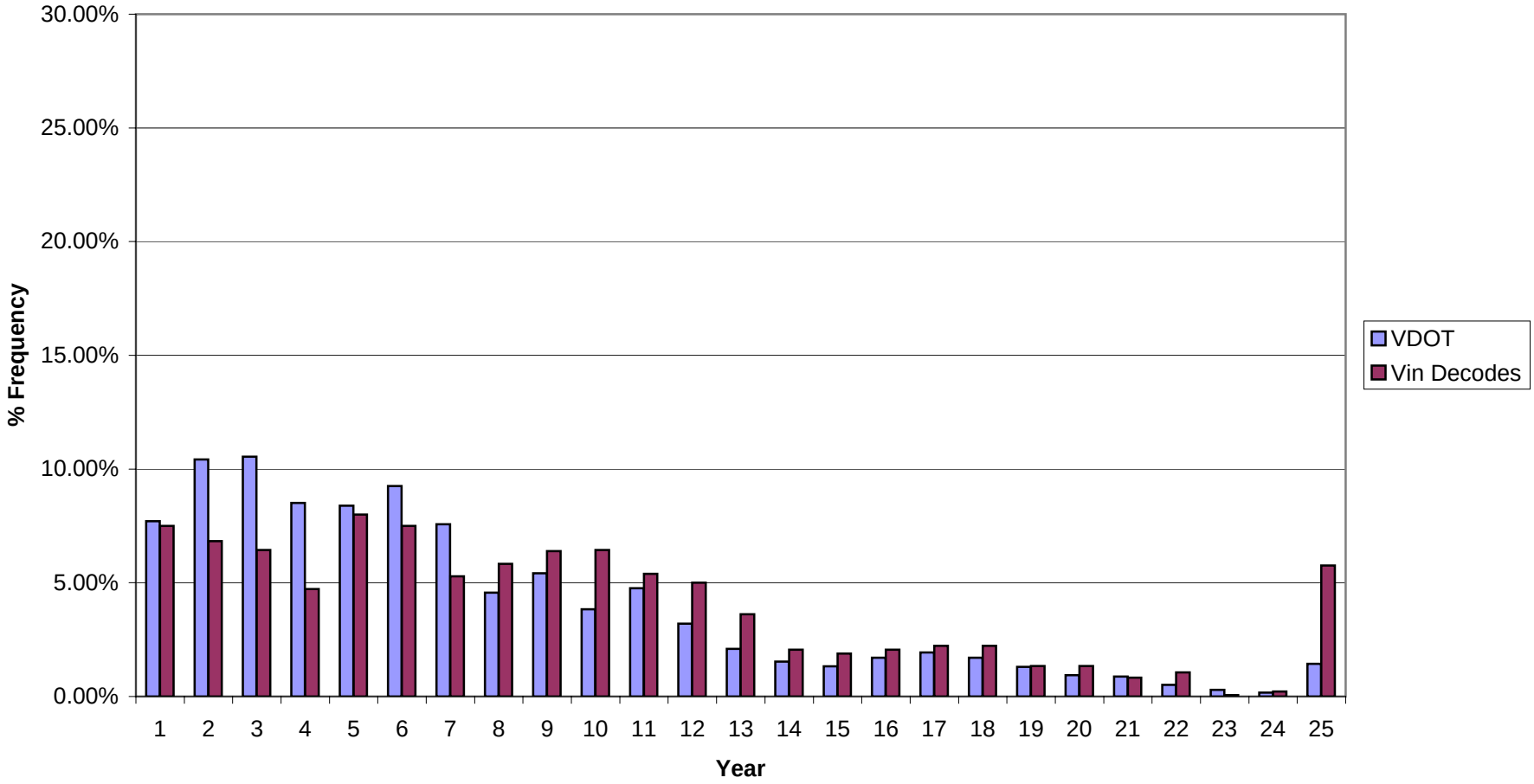
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = HDV7
Number of Decoded Vins = 963



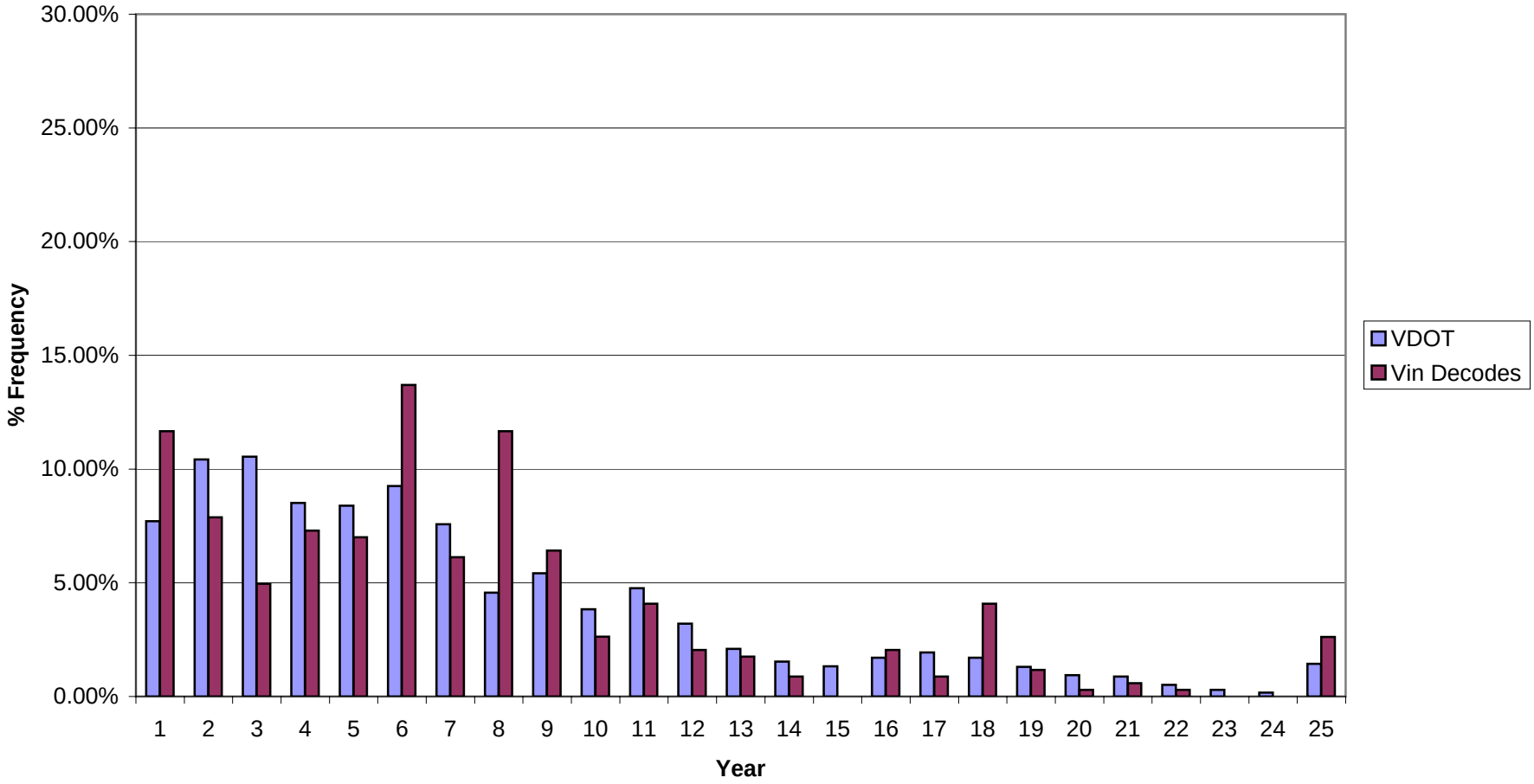
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = HDV8A
Number of Decoded Vins = 1,696



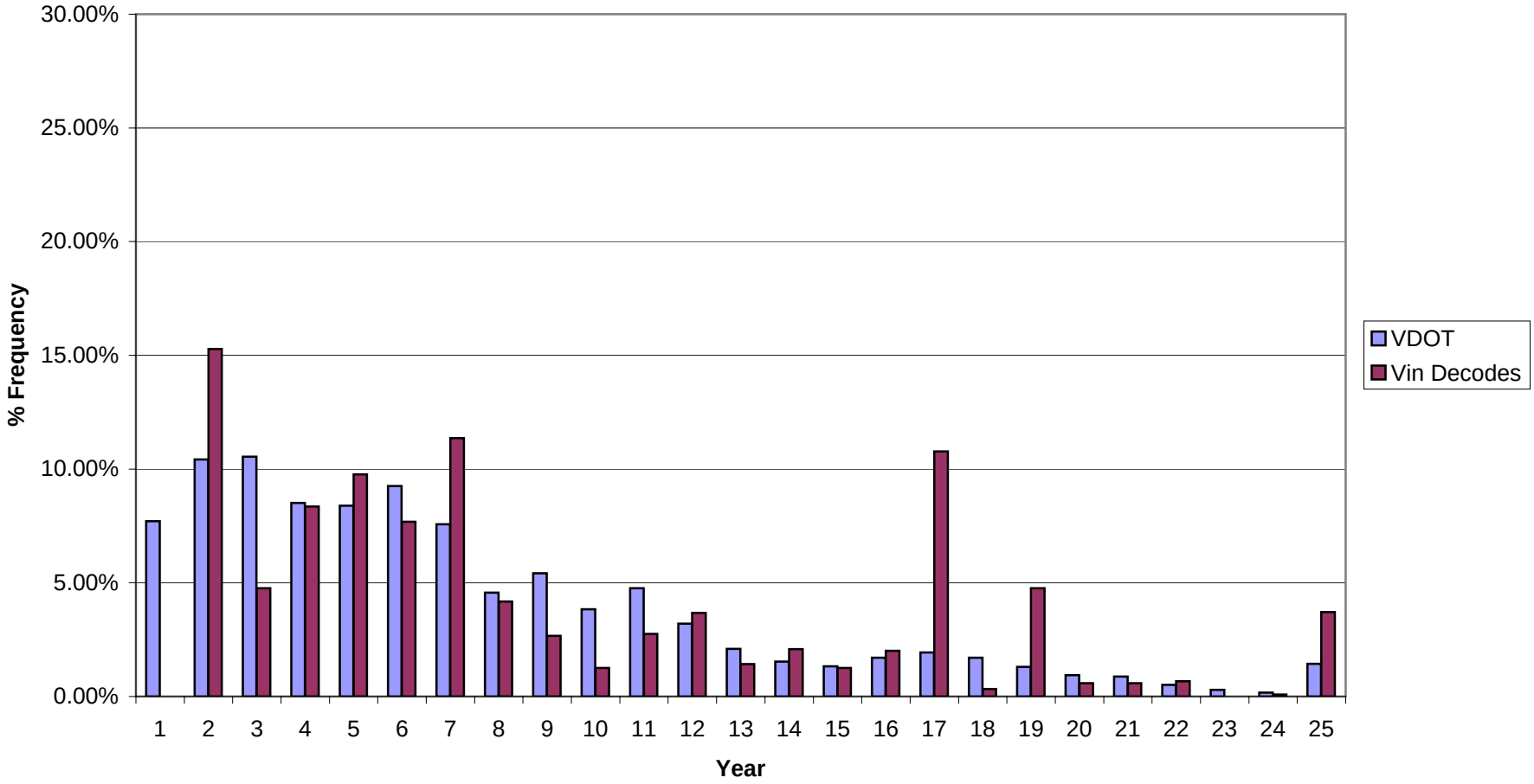
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = HDV8B
Number of Decoded Vins = 334



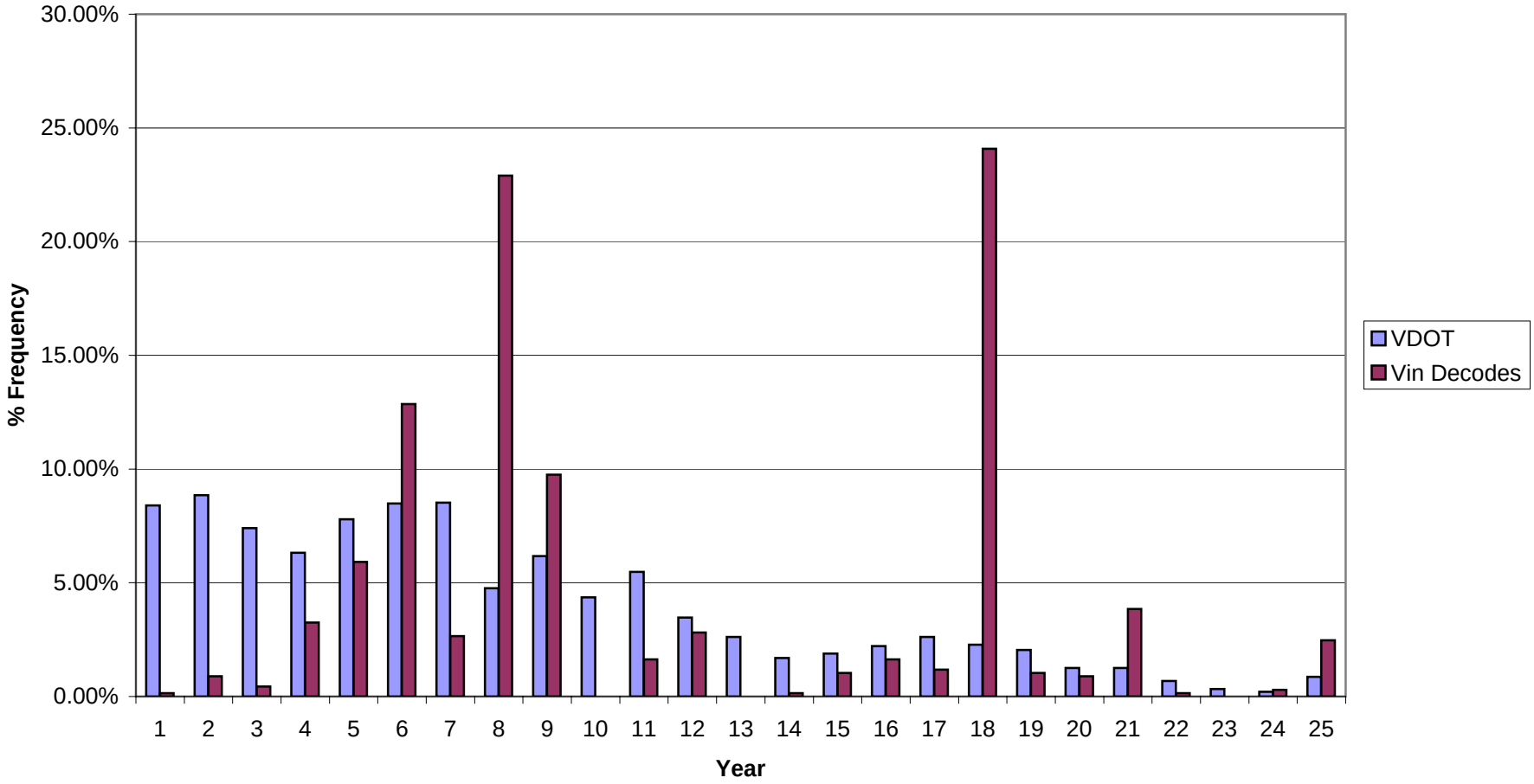
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = HDBS
Number of Decoded Vins = 1,767



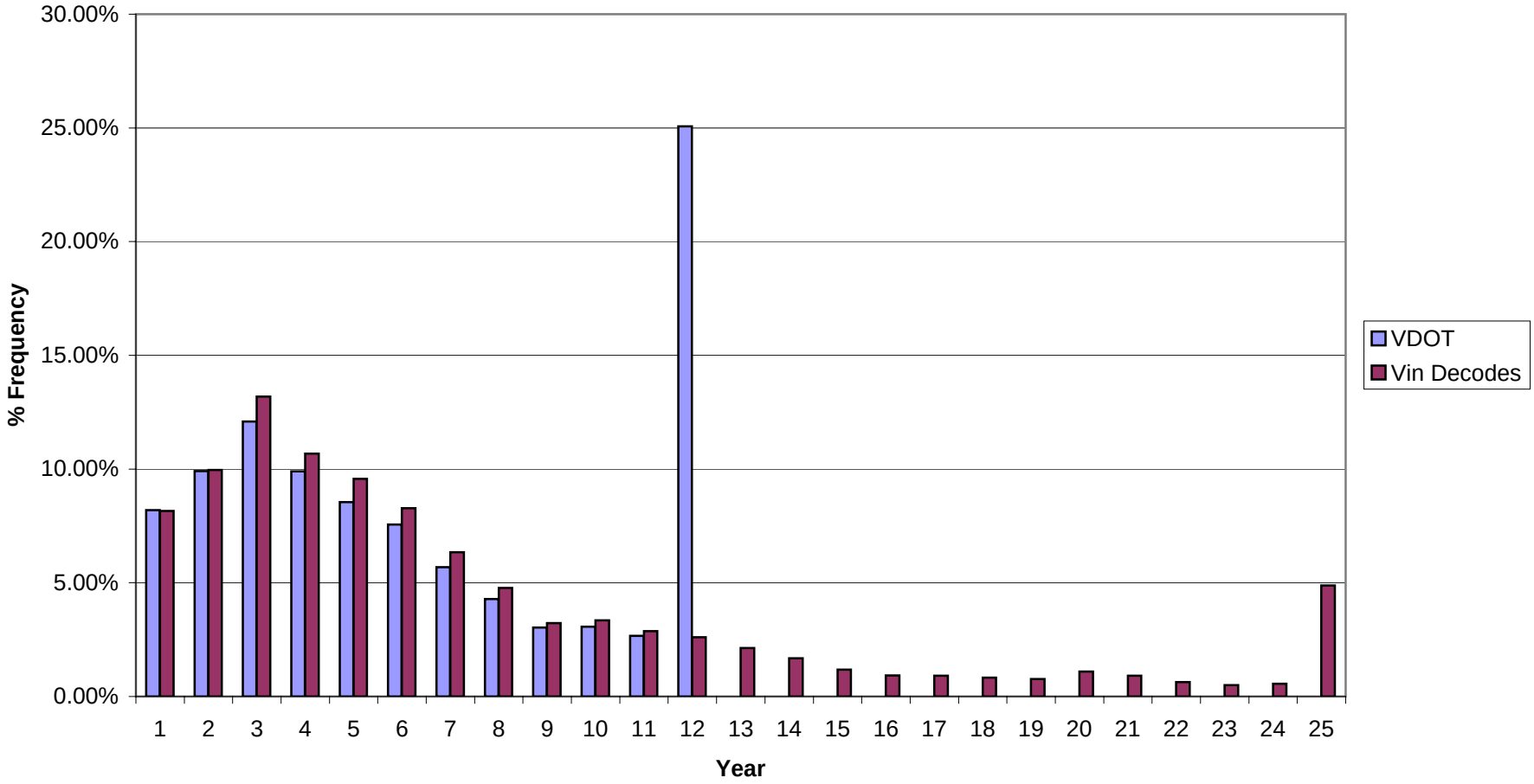
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = HDBT
Number of Decoded Vins = 1,287



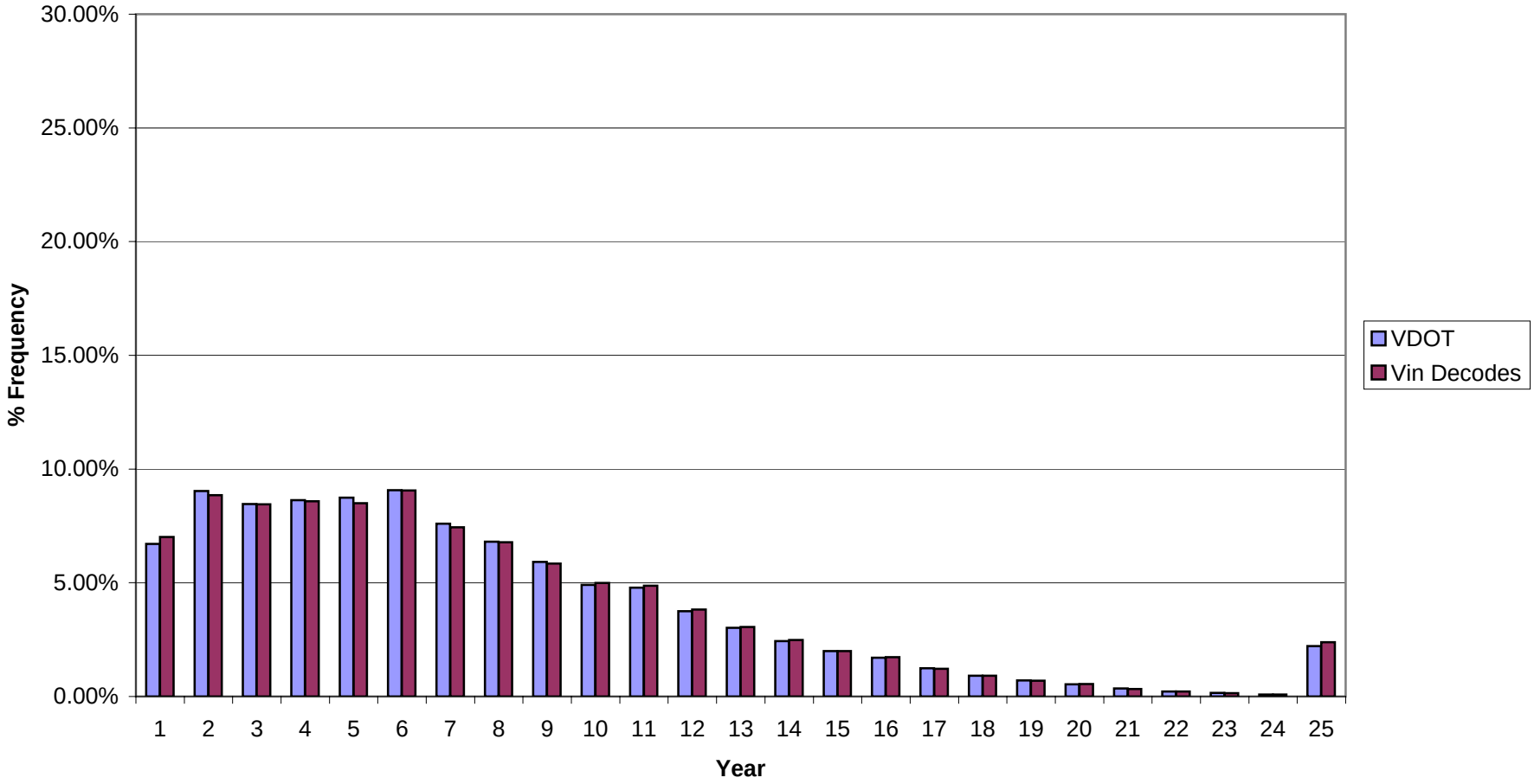
ATTACHMENT 7C

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = FFX
Vehicle Type = MC
Number of Decoded Vins = 10,275



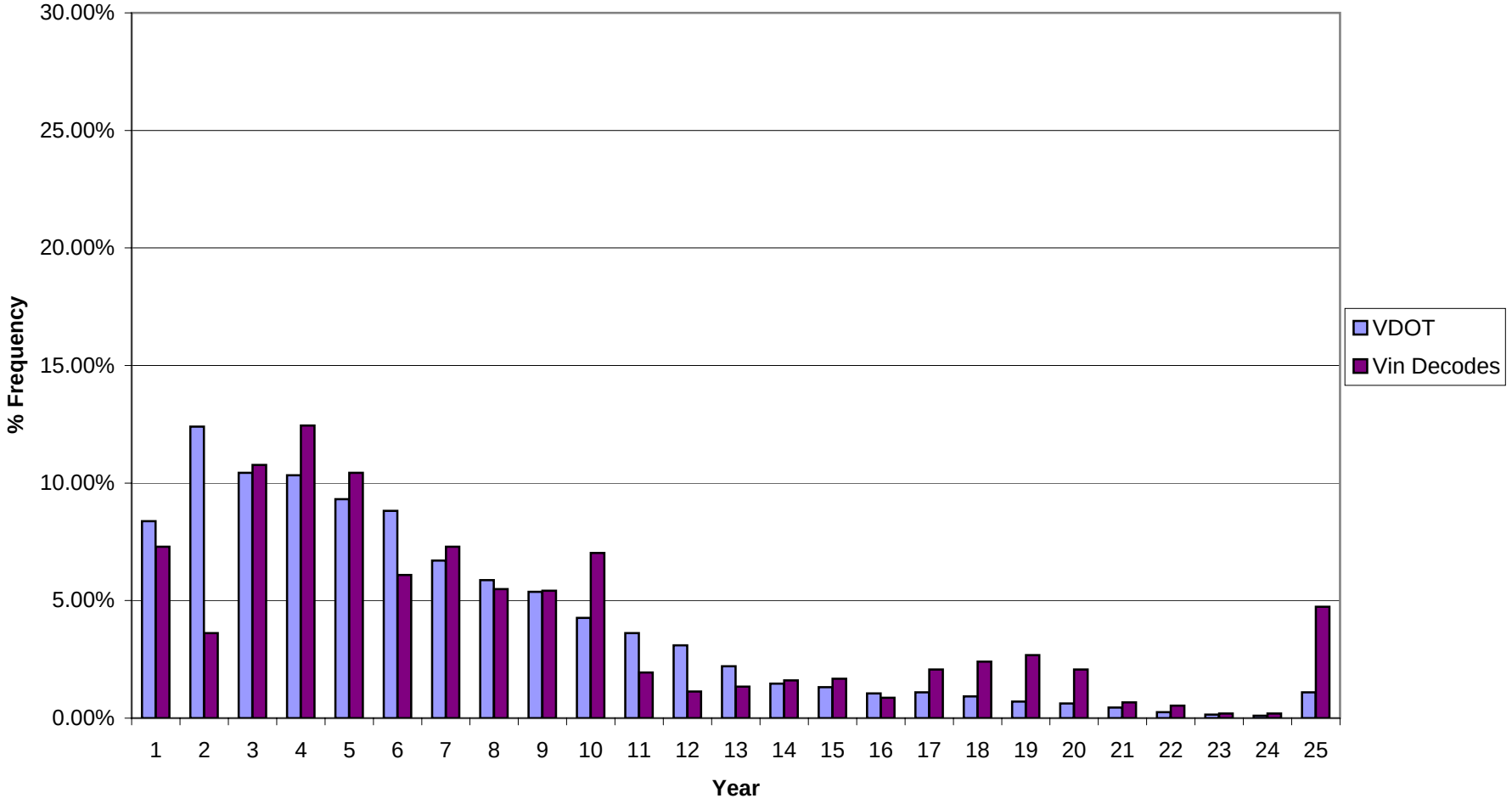
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = LDV
Number of Decoded Vins = 92,847



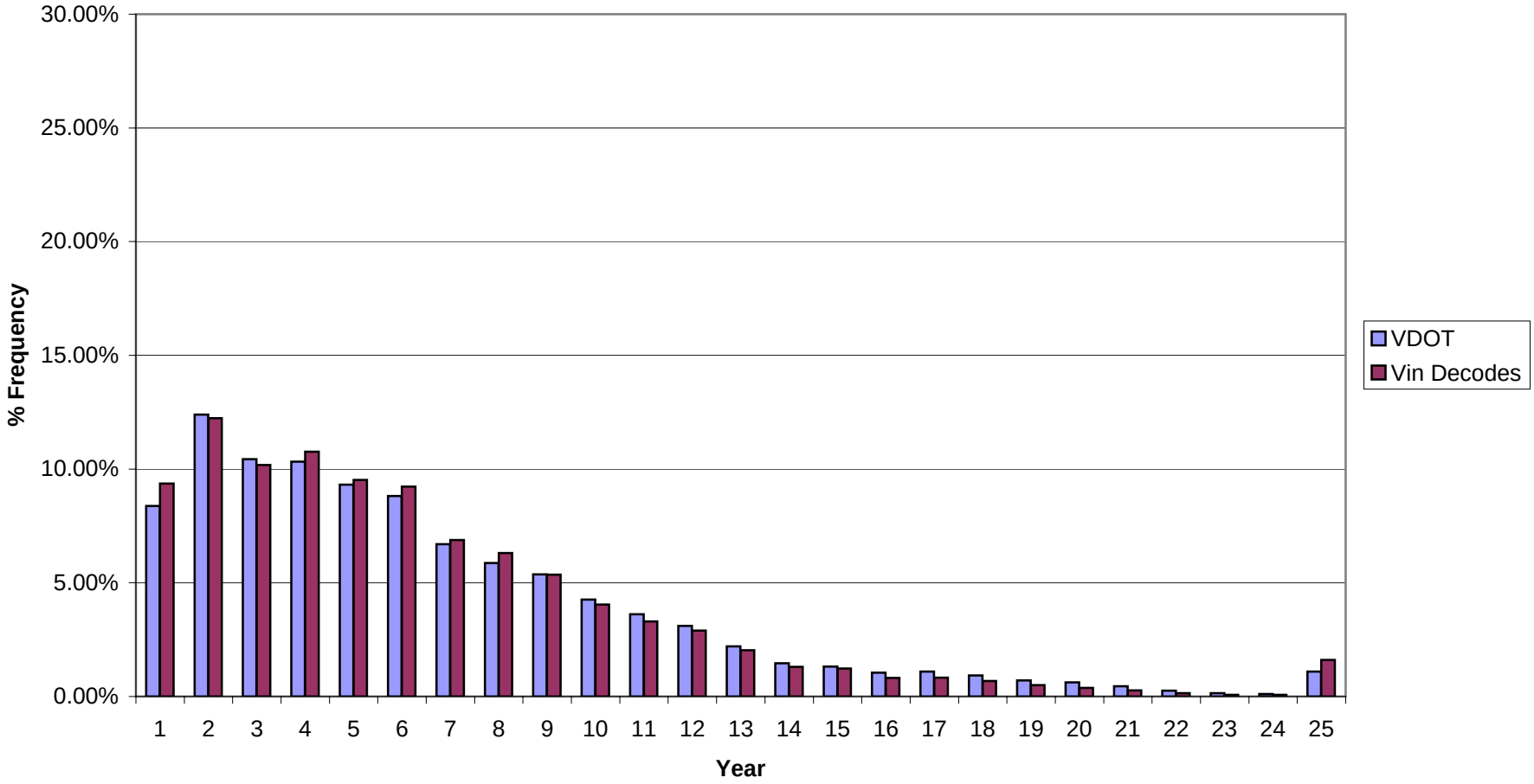
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = LDT1
Number of Decoded Vins = 1,429



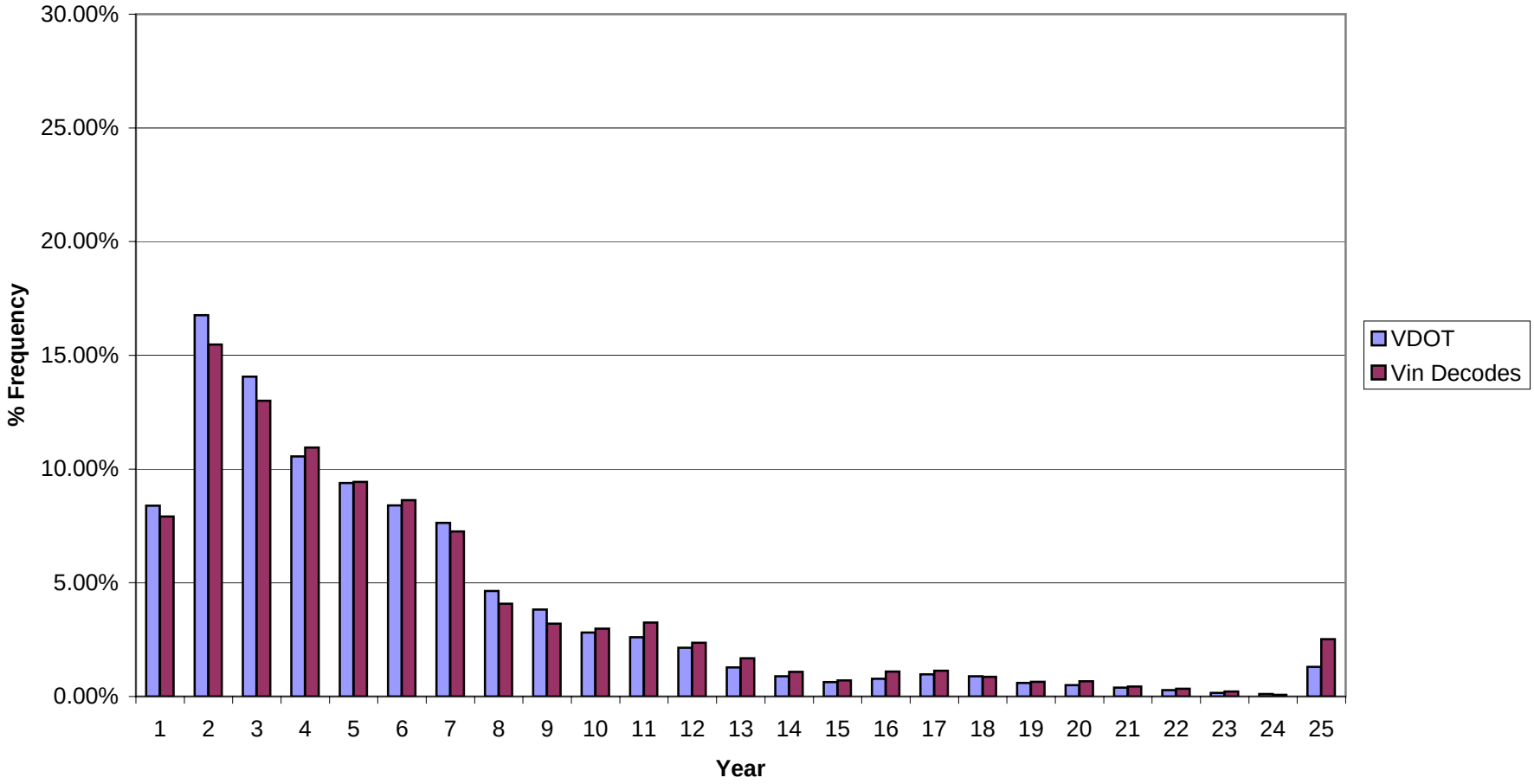
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = LDT2
Number of Decoded Vins = 56,439



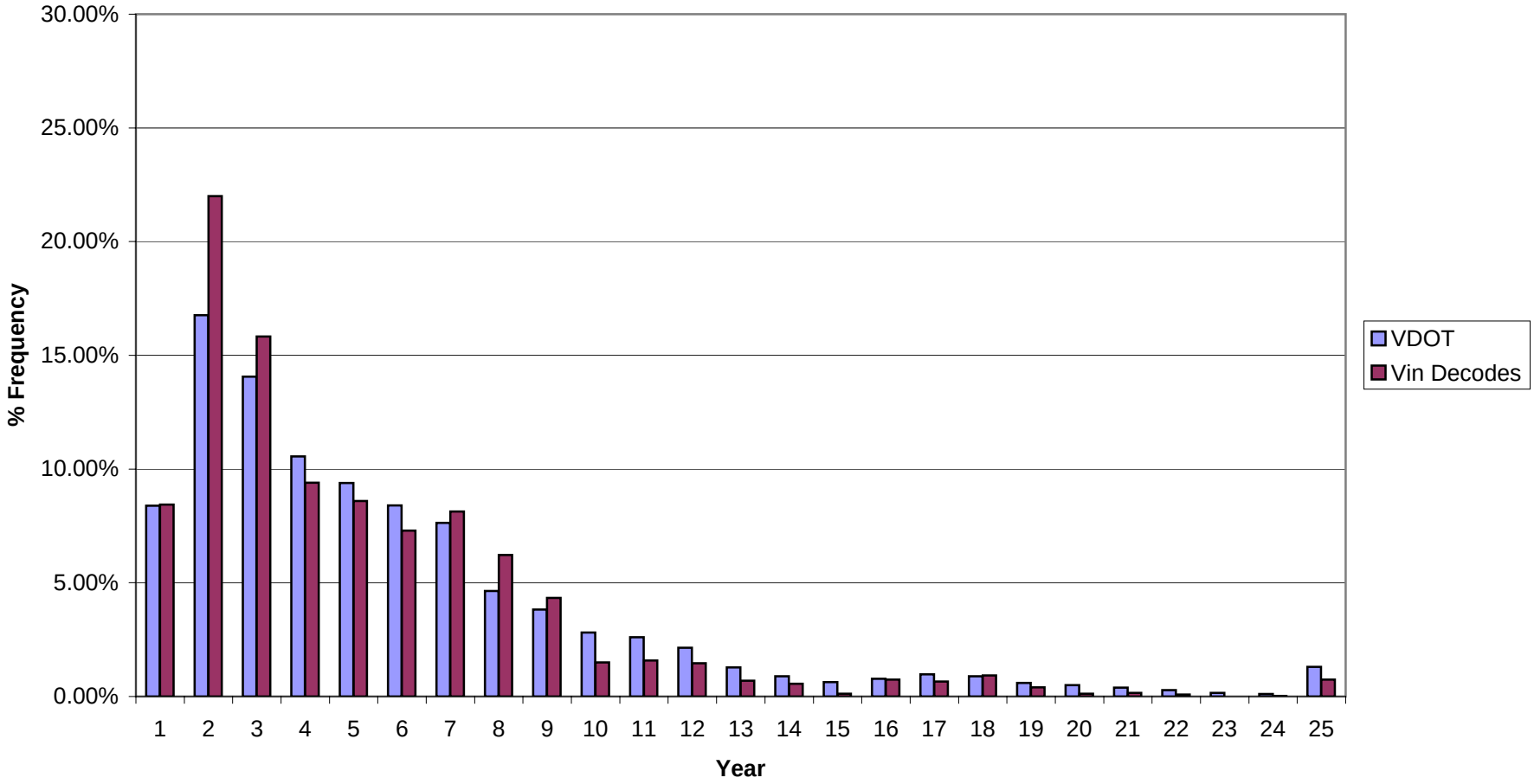
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = LDT3
Number of Decoded Vins = 15,717



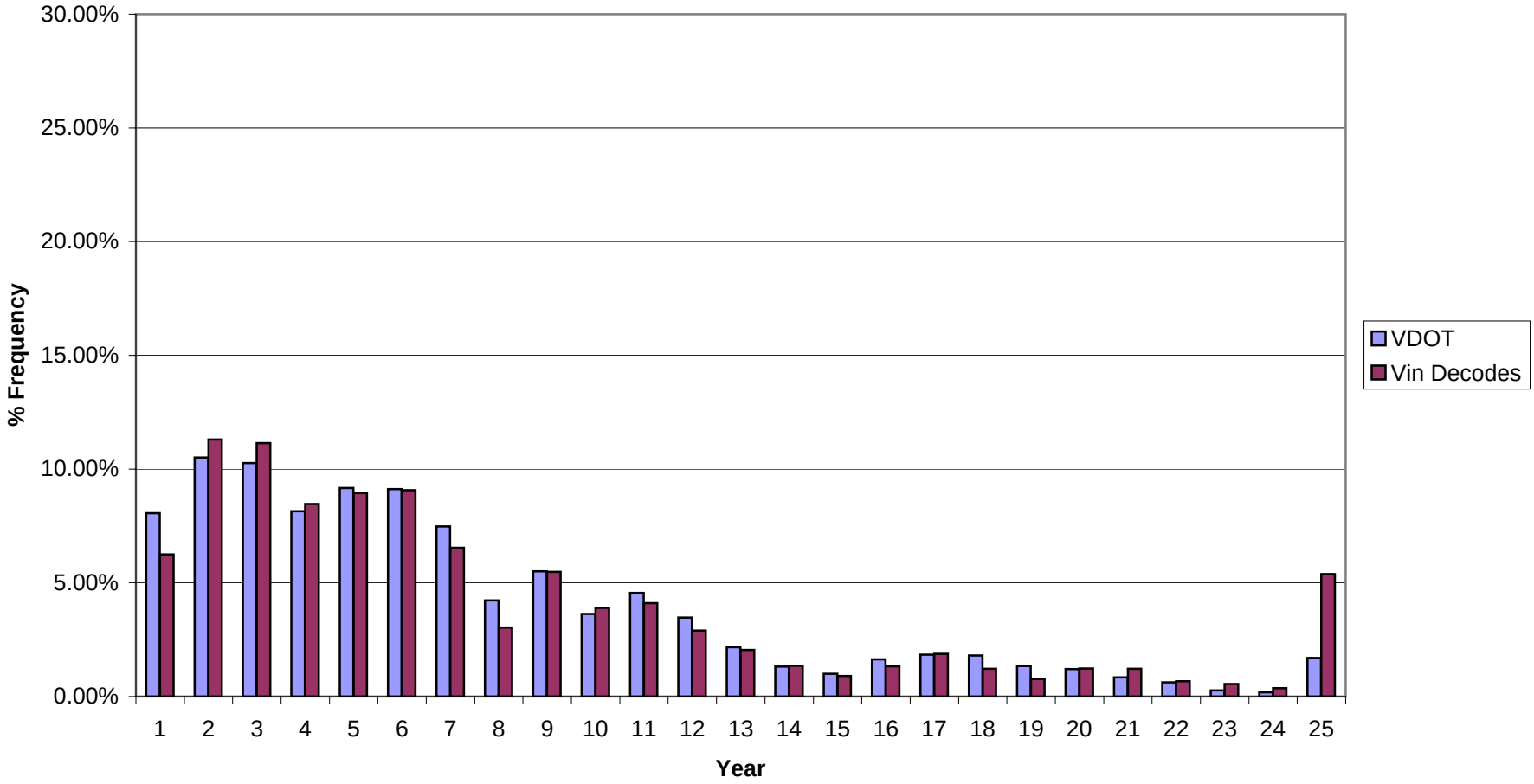
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = LDT4
Number of Decoded Vins = 4,965



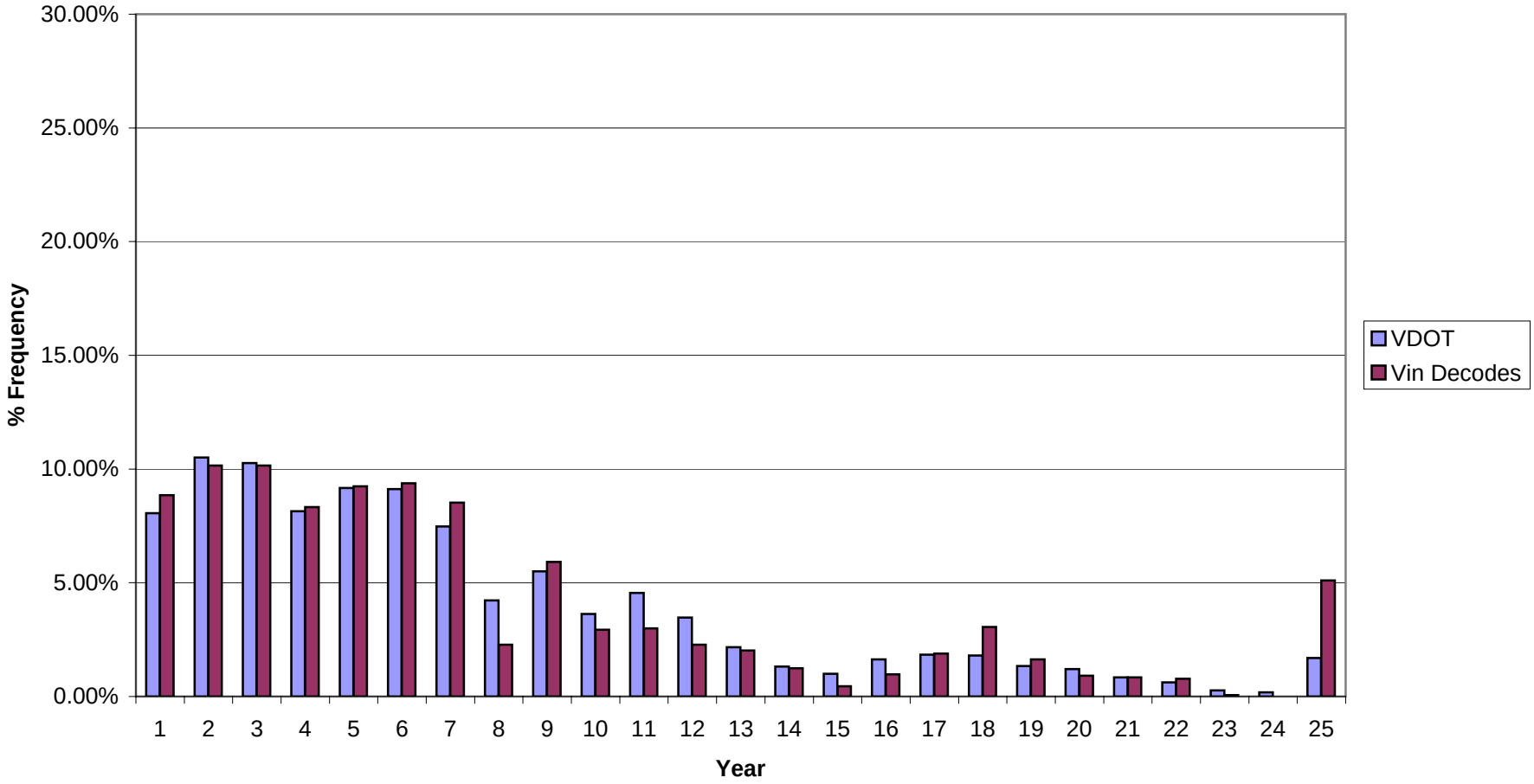
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = HDV2B
Number of Decoded Vins = 6,195



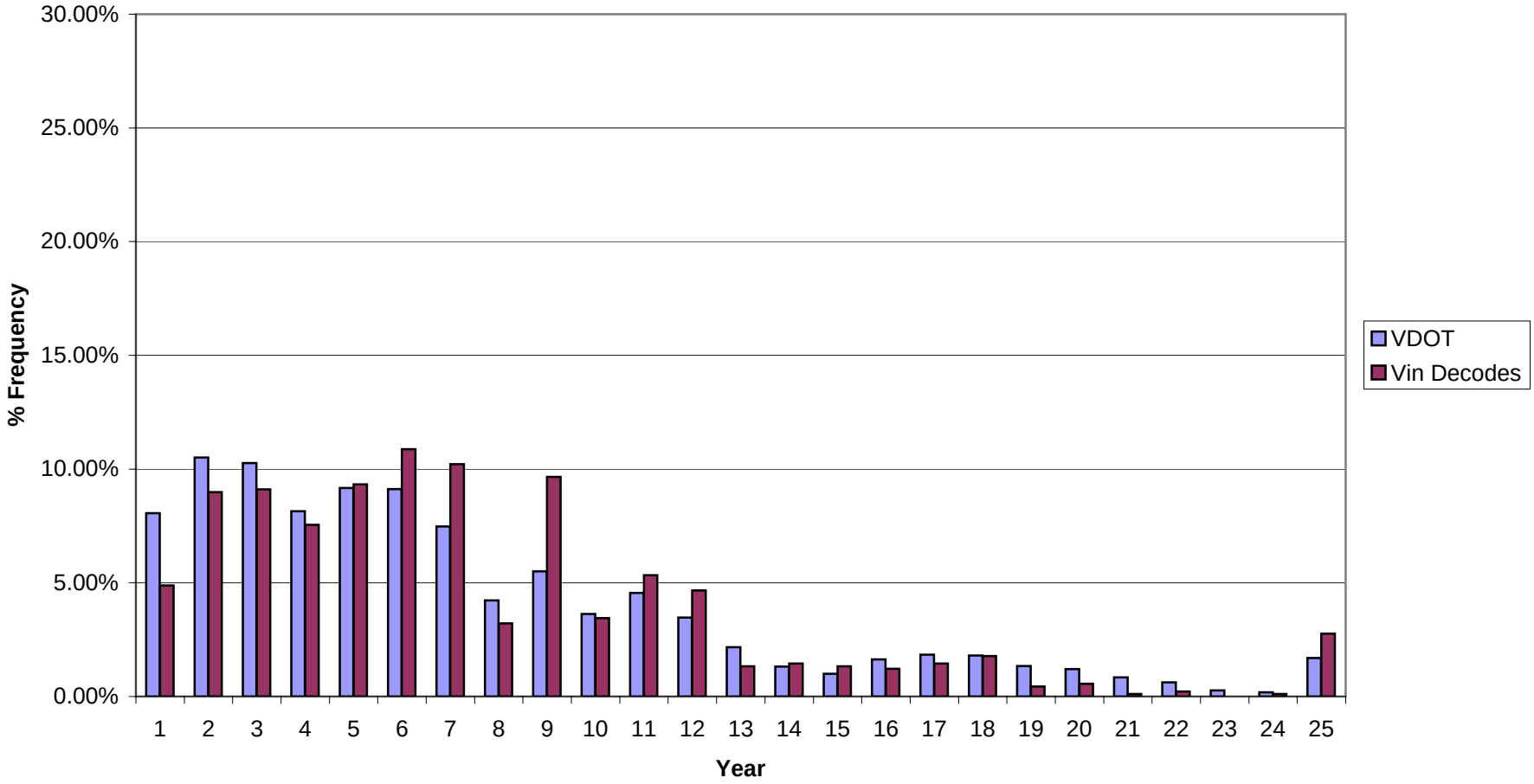
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = HDV3
Number of Decoded Vins = 1,404



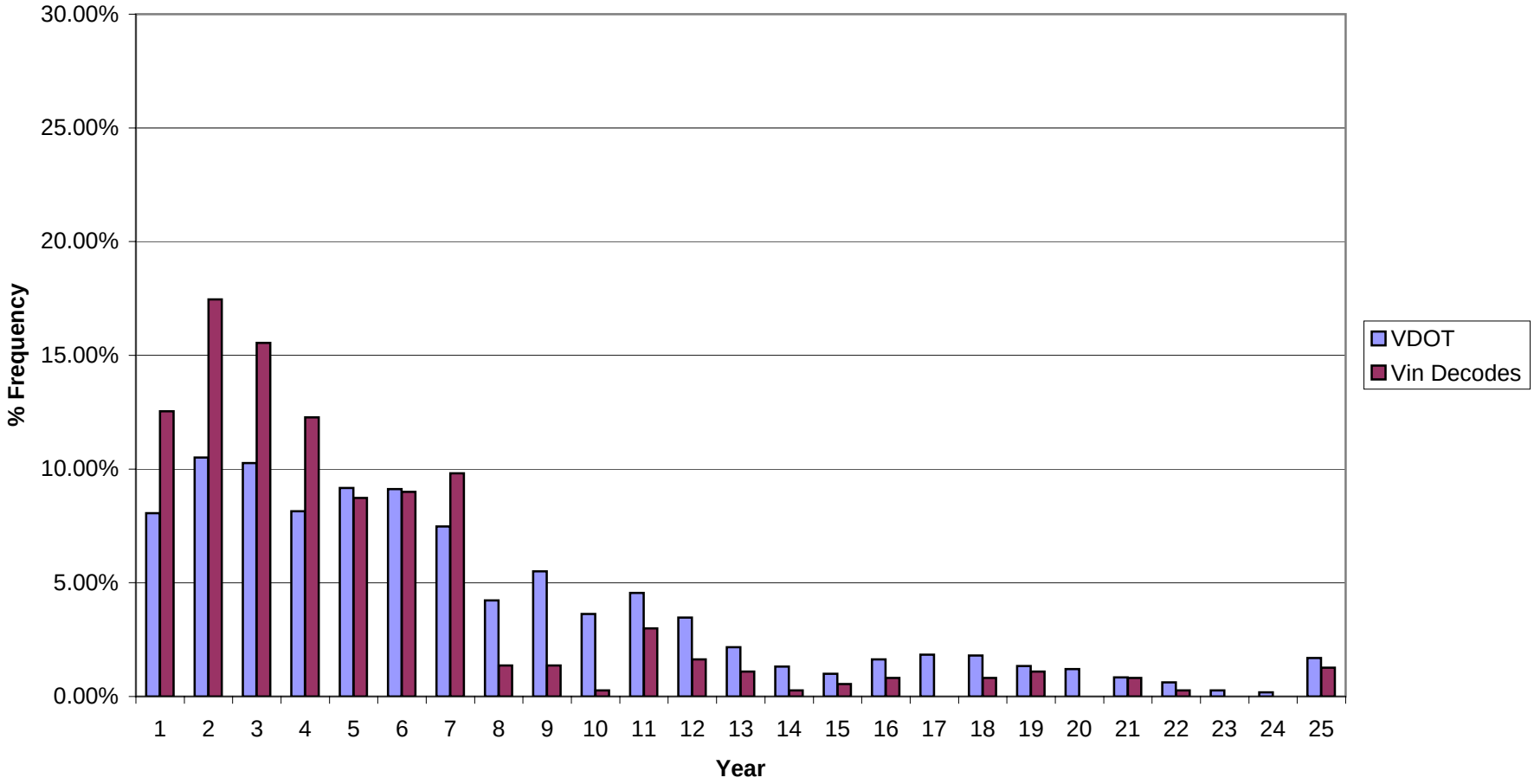
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = HDV4
Number of Decoded Vins = 876



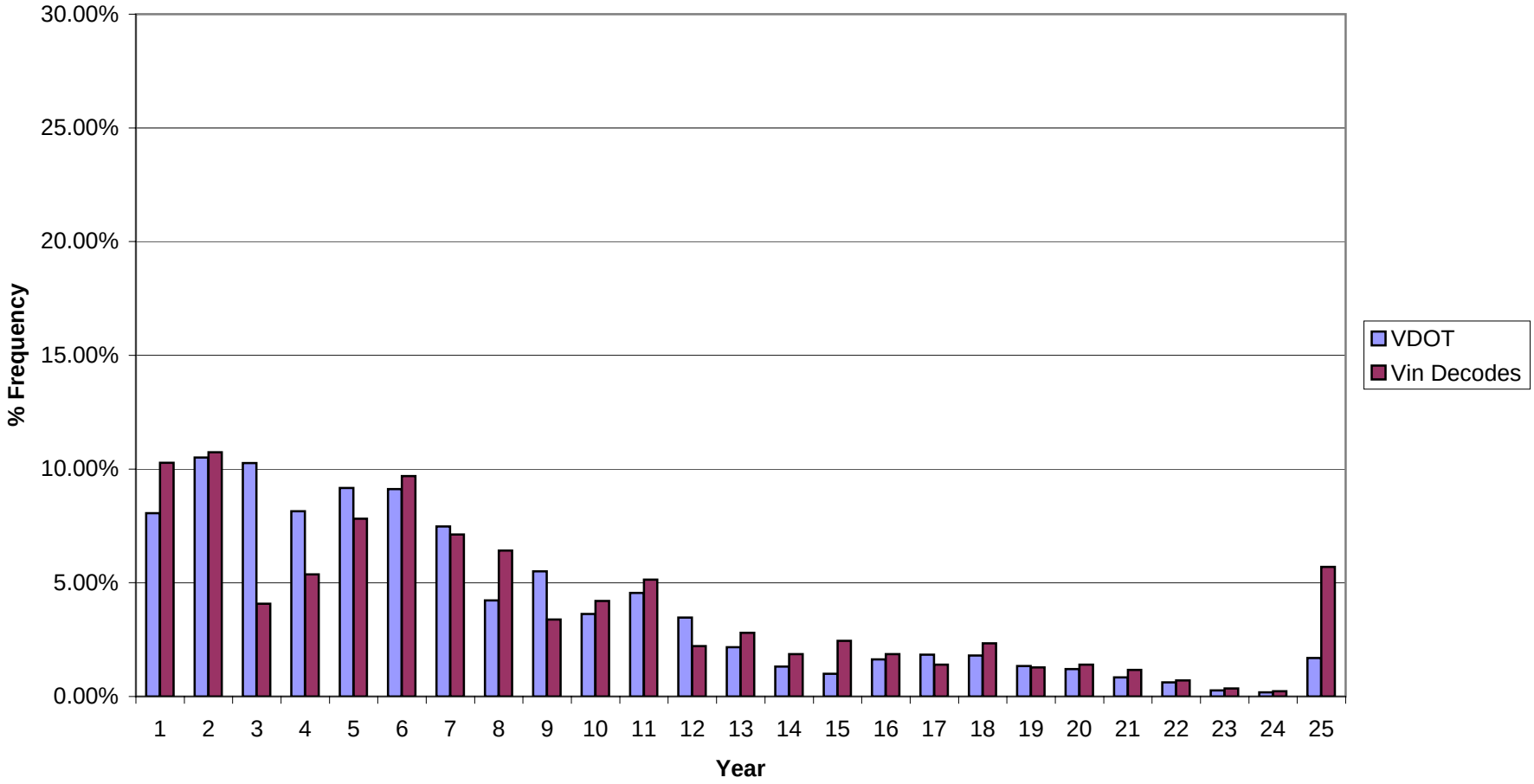
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = HDV5
Number of Decoded Vins = 362



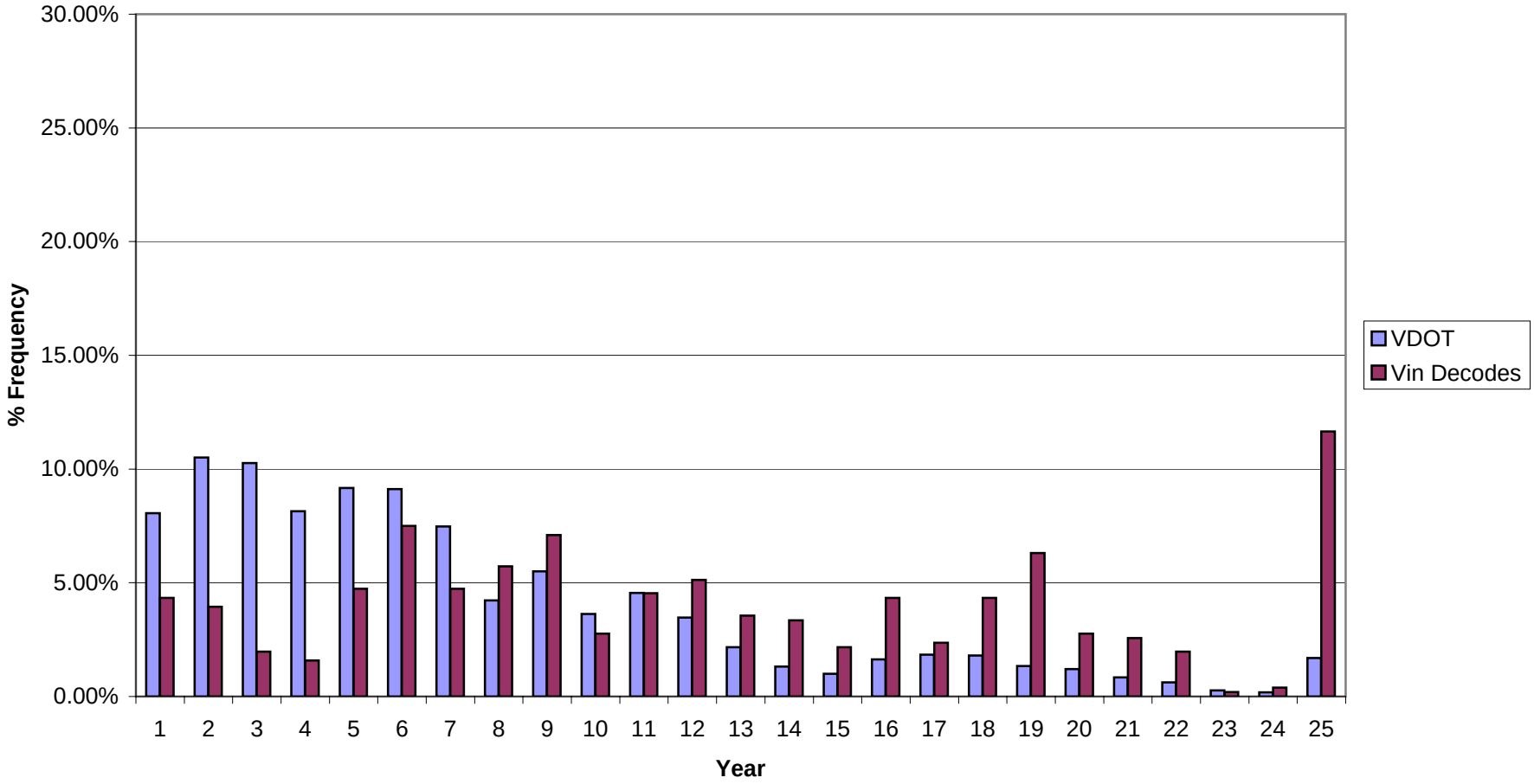
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = HDV6
Number of Decoded Vins = 798



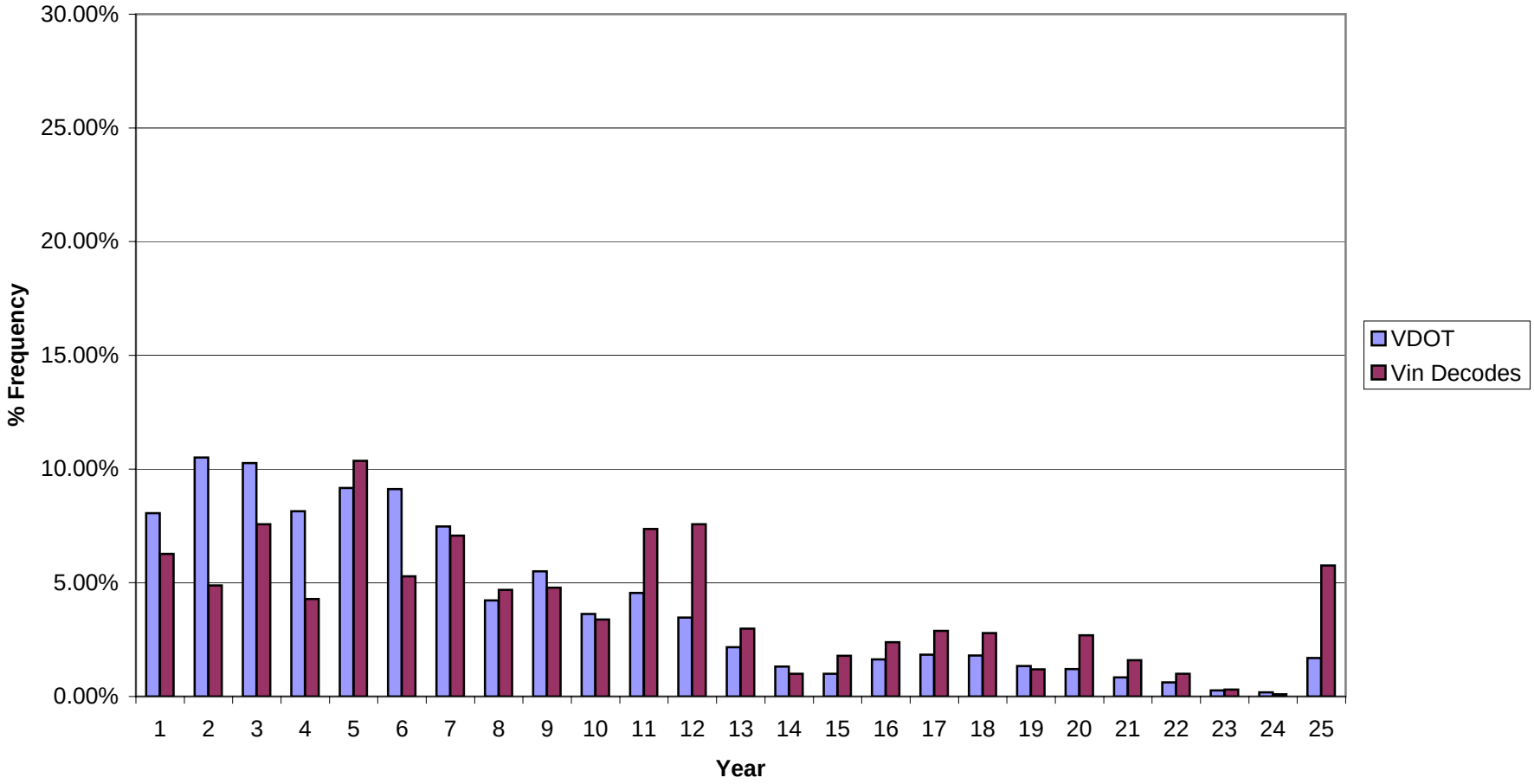
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = HDV7
Number of Decoded Vins = 448



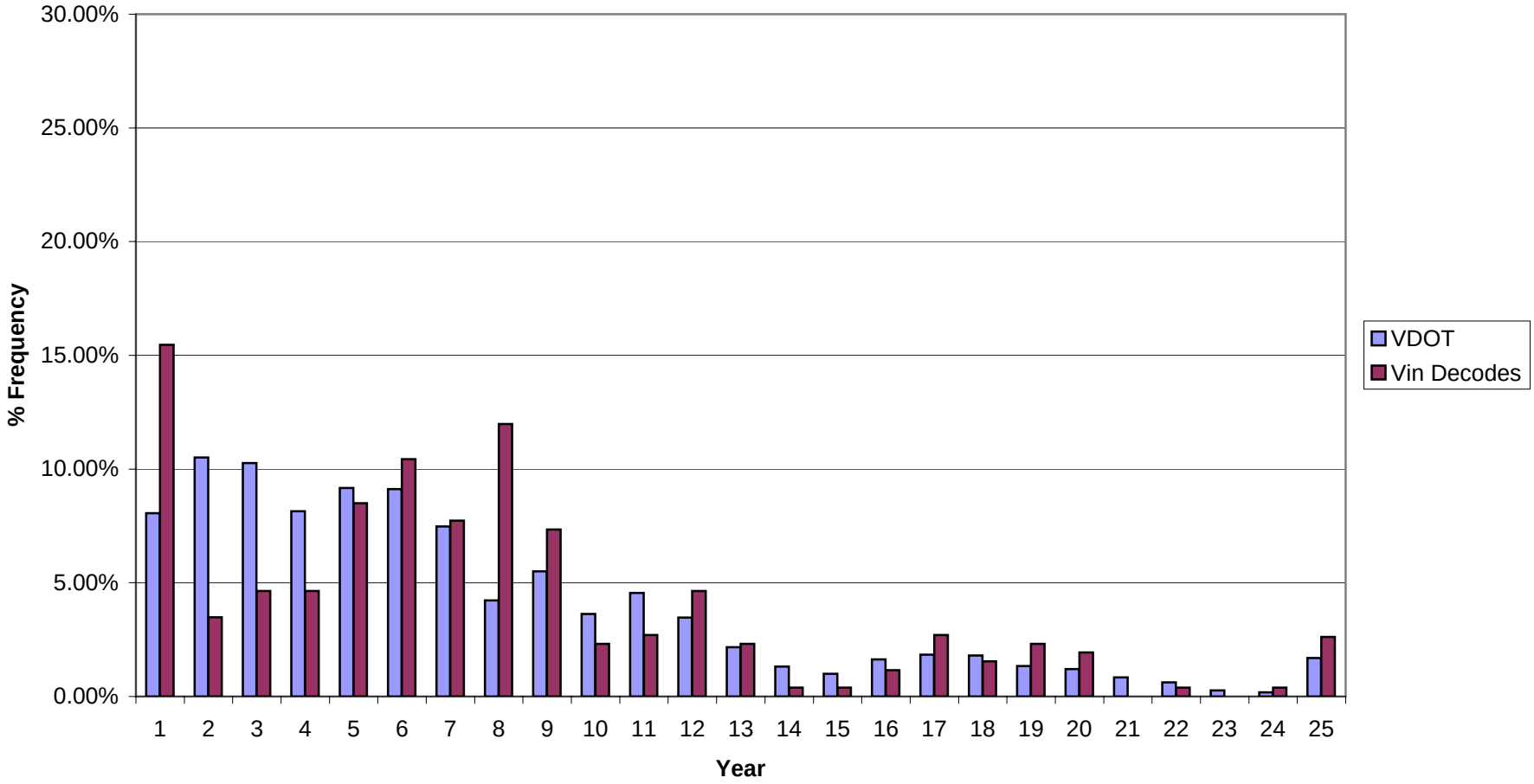
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = HDV8A
Number of Decoded Vins = 946



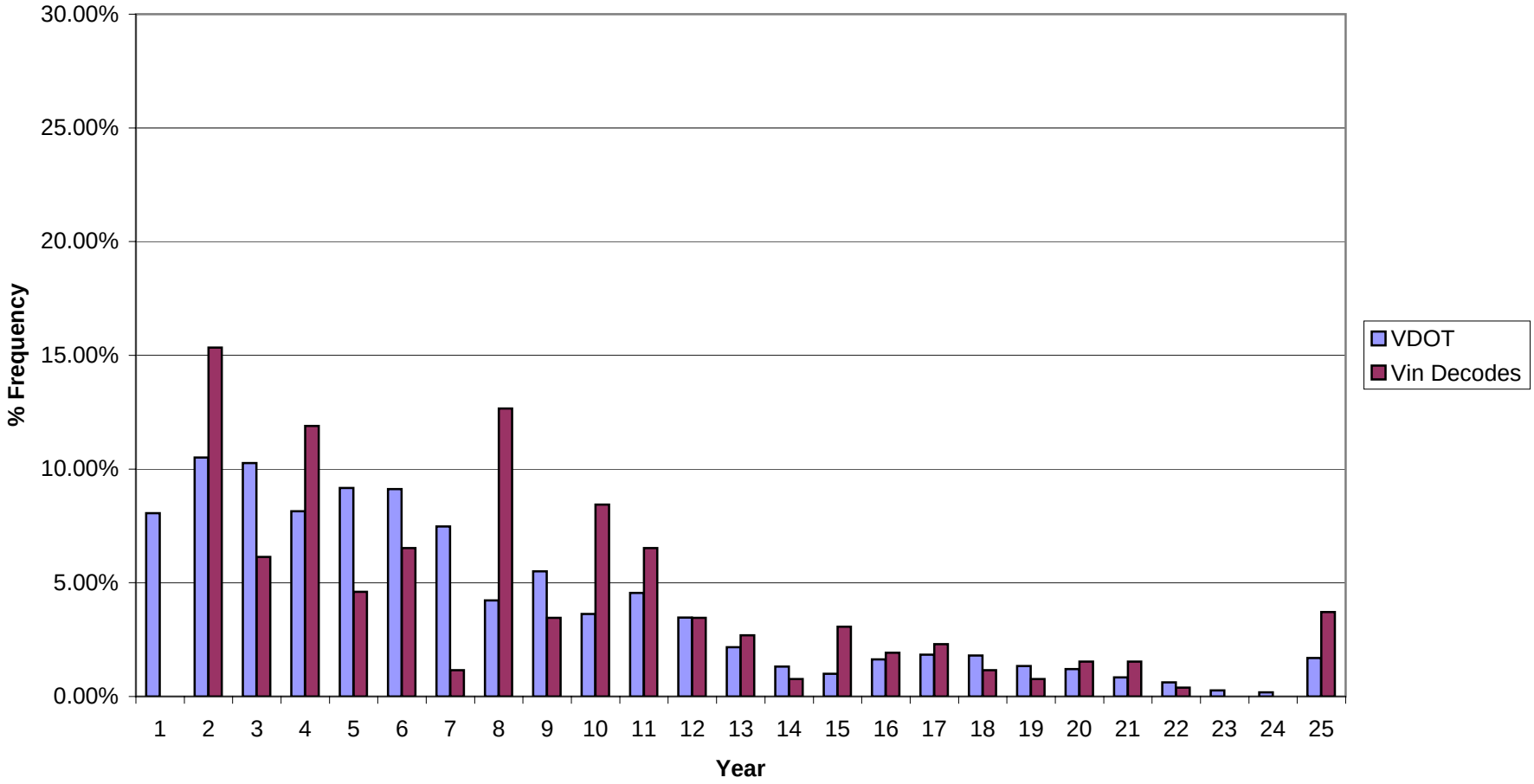
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = HDV8B
Number of Decoded Vins = 252



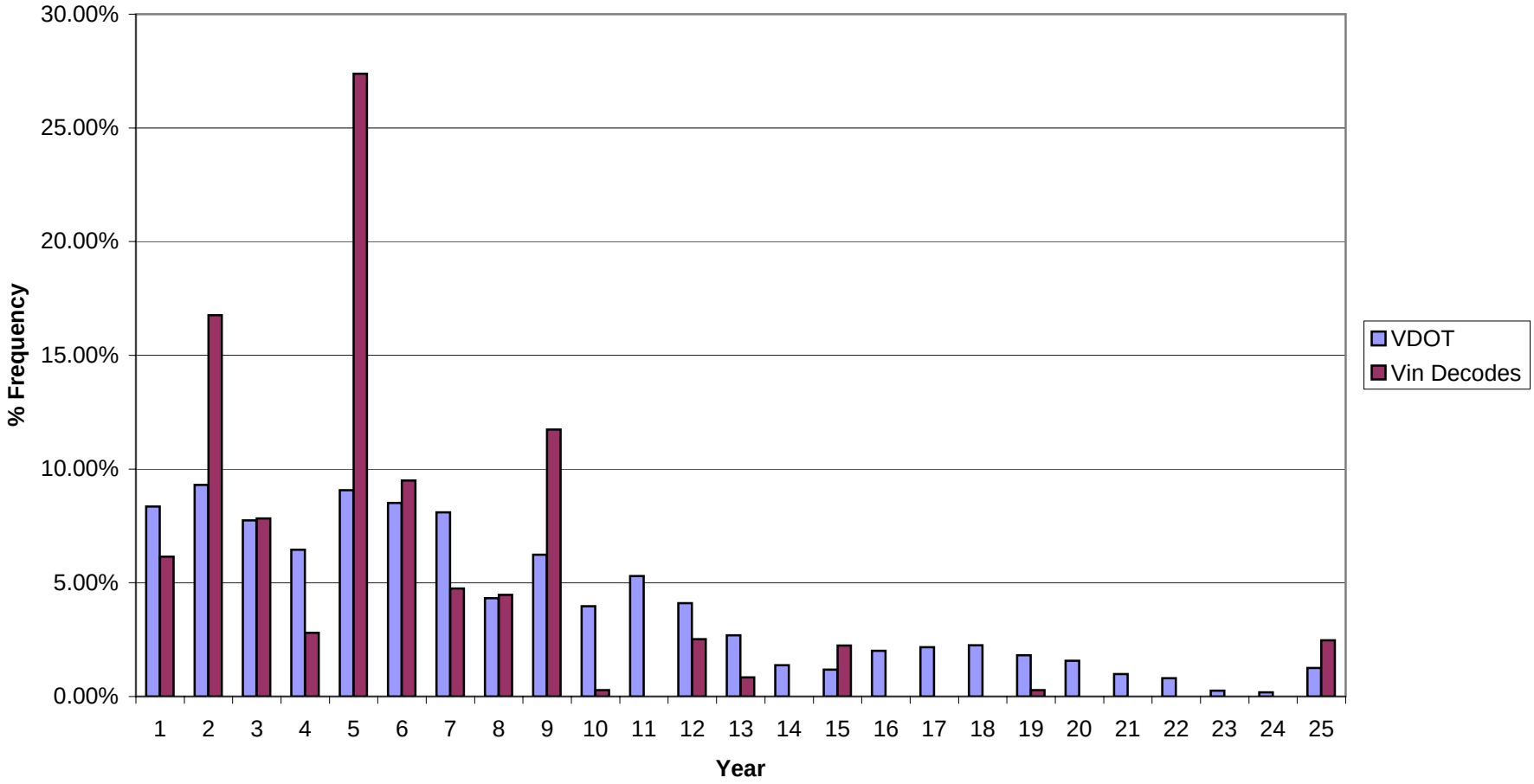
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = HDBS
Number of Decoded Vins = 447



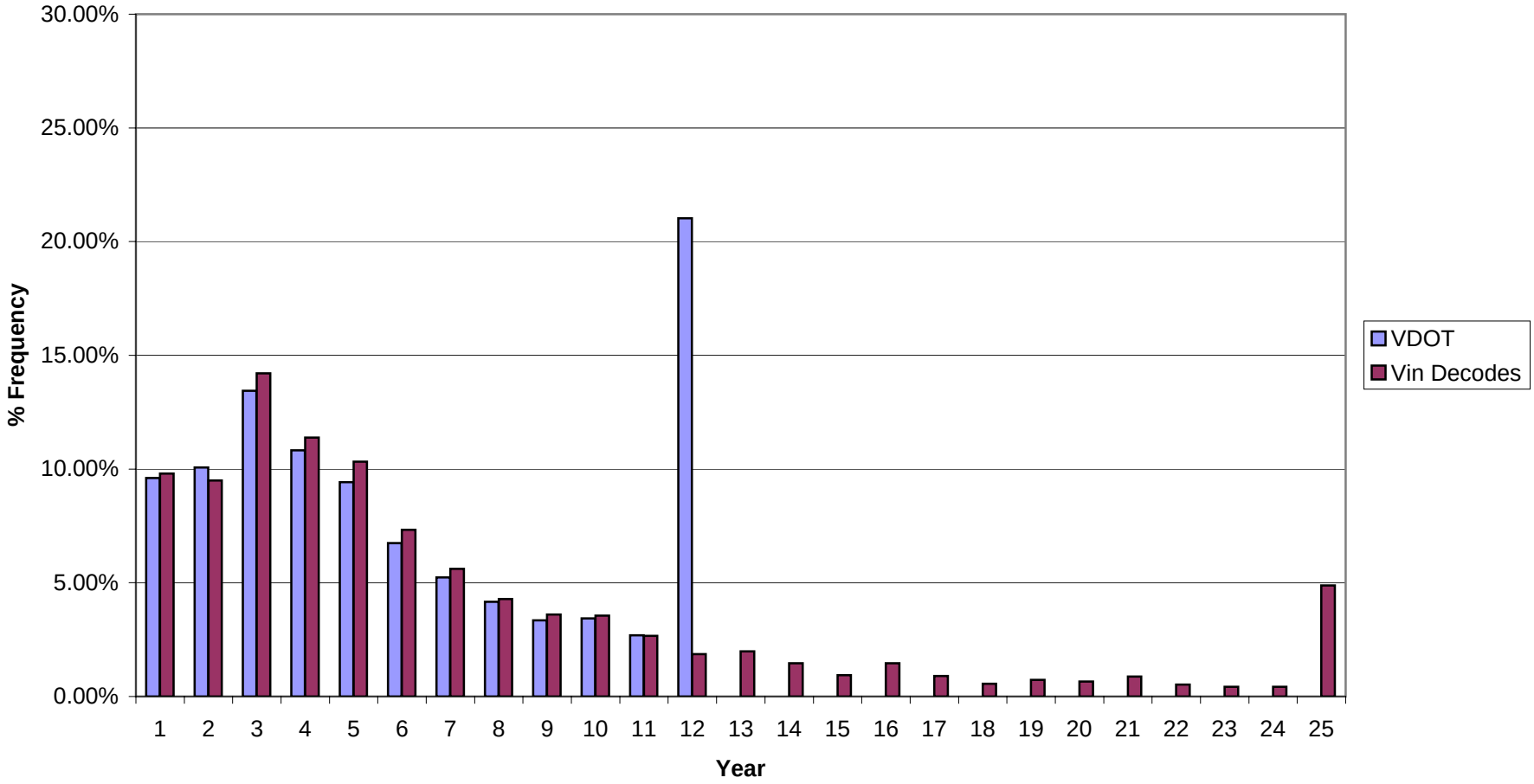
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = HDBT
Number of Decoded Vins = 539



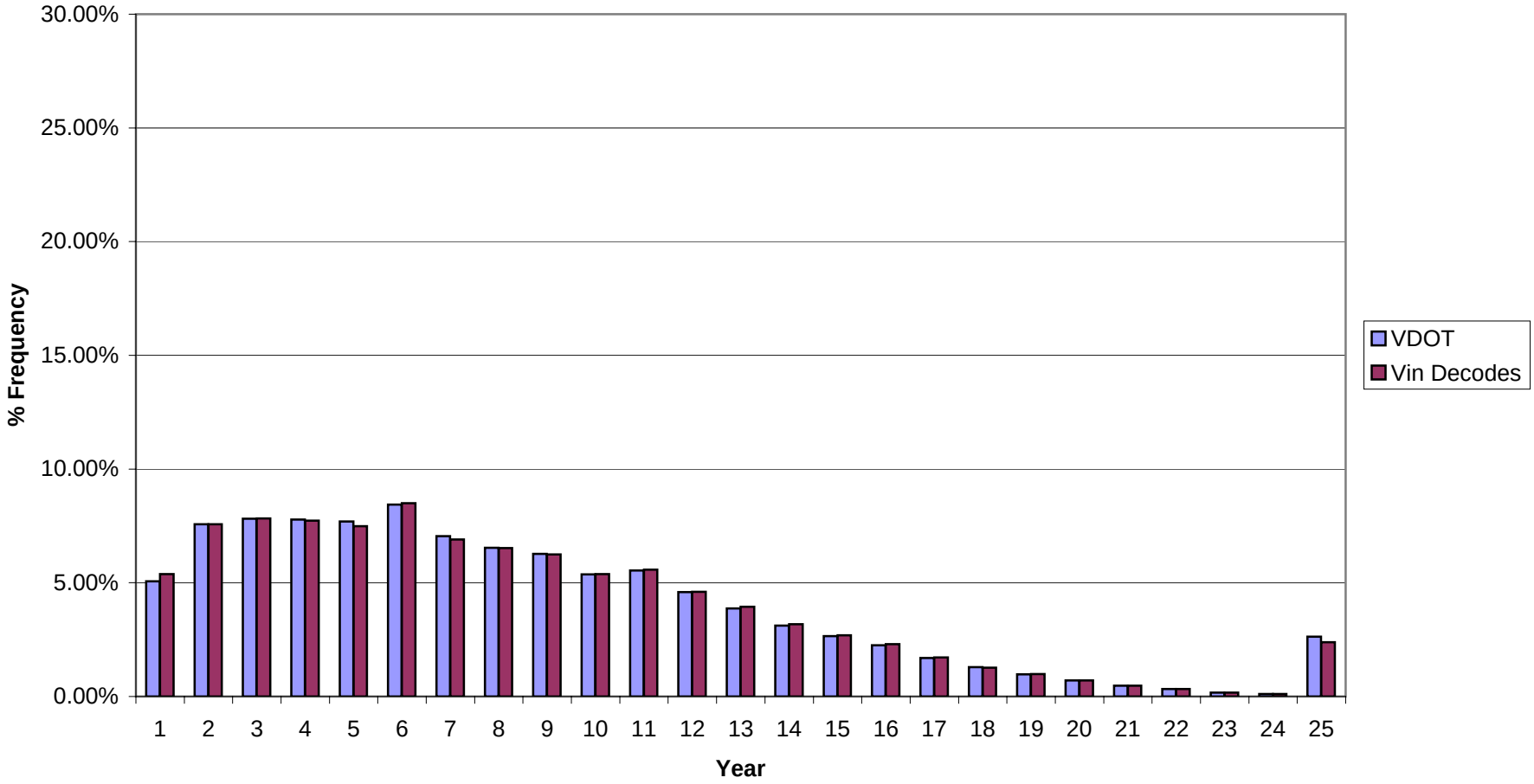
ATTACHMENT 7D

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = LDN
Vehicle Type = MC
Number of Decoded Vins = 3,775



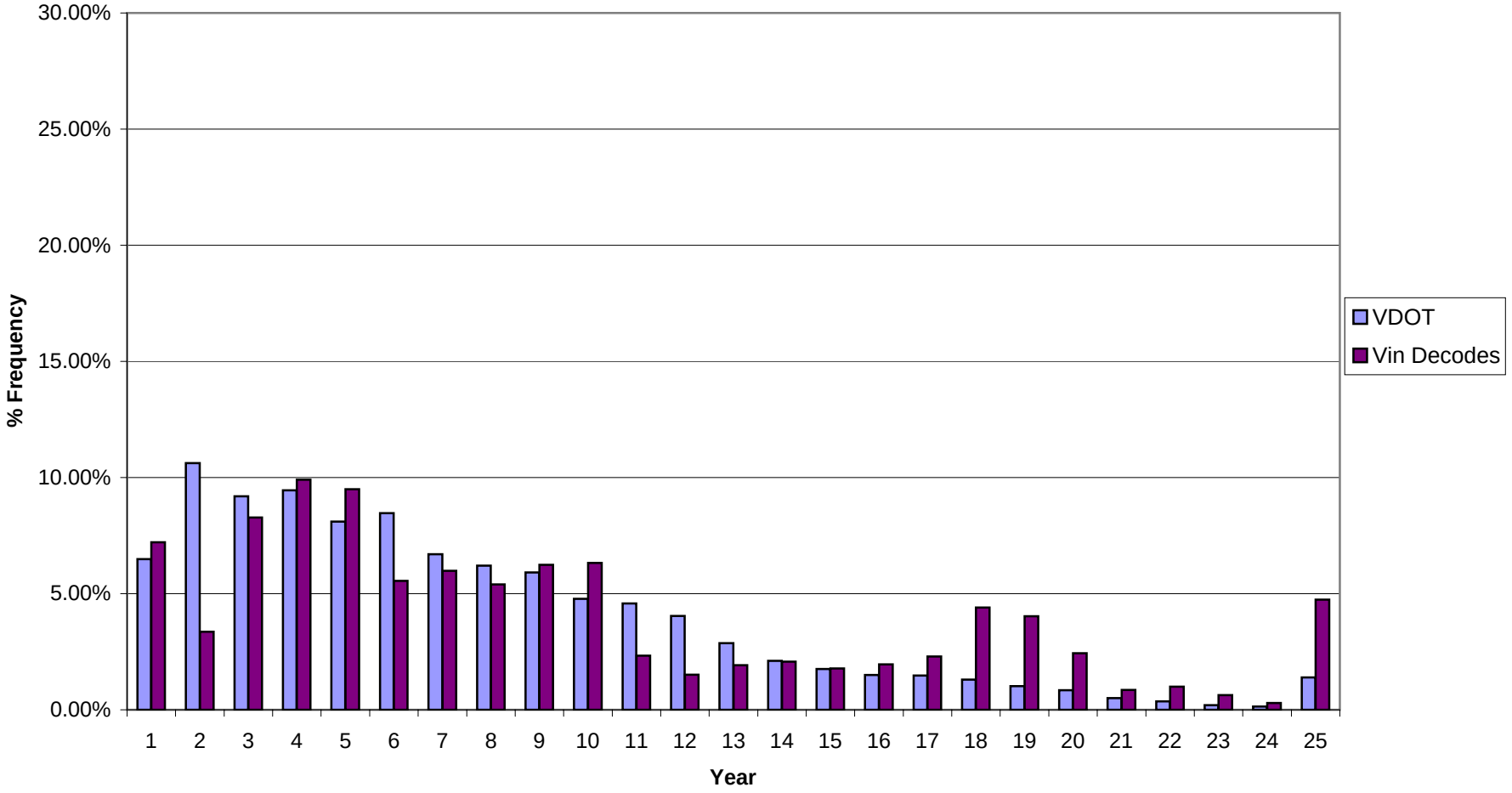
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = LDV
Number of Decoded Vins = 145,737



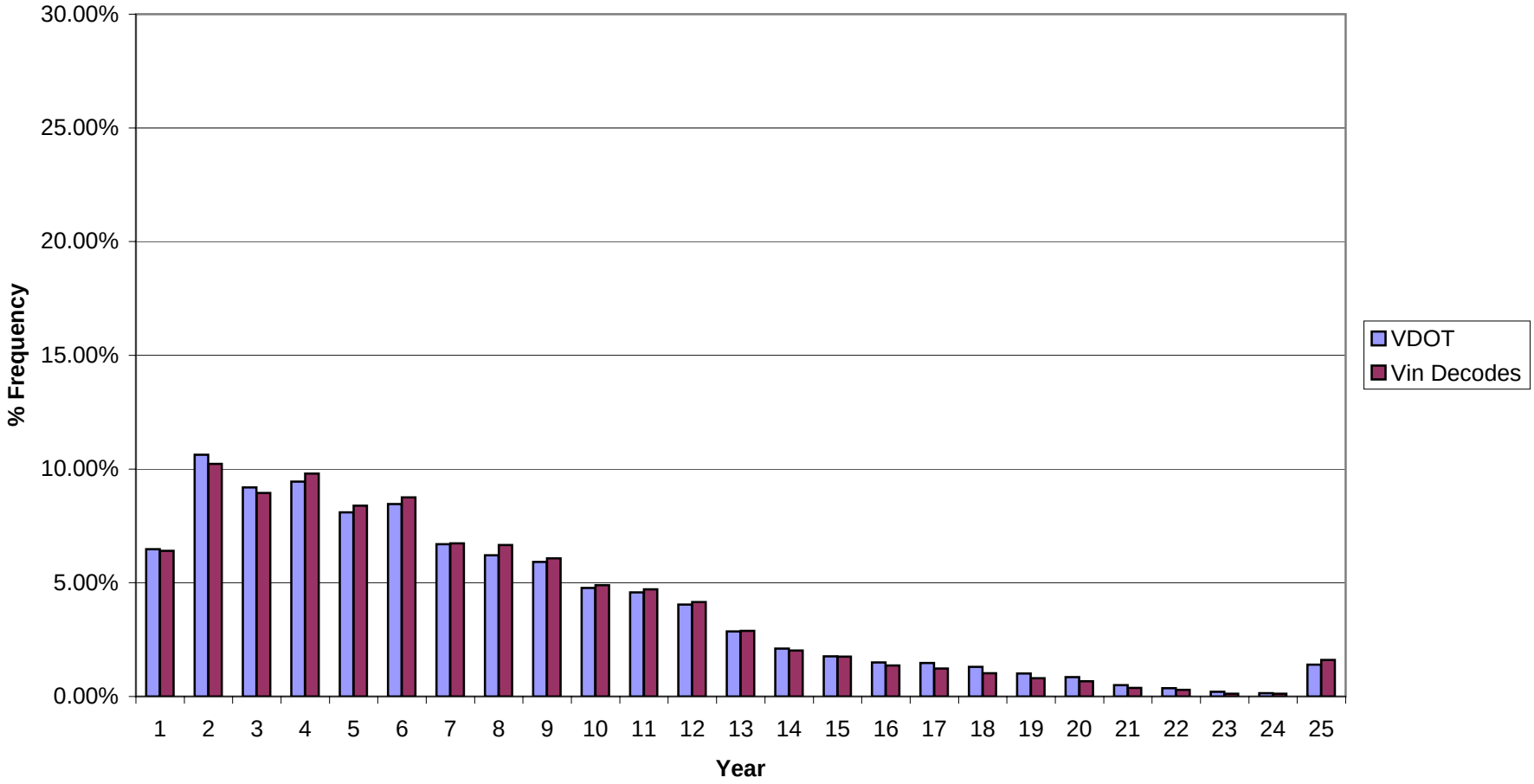
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = LDT1
Number of Decoded Vins = 2,587



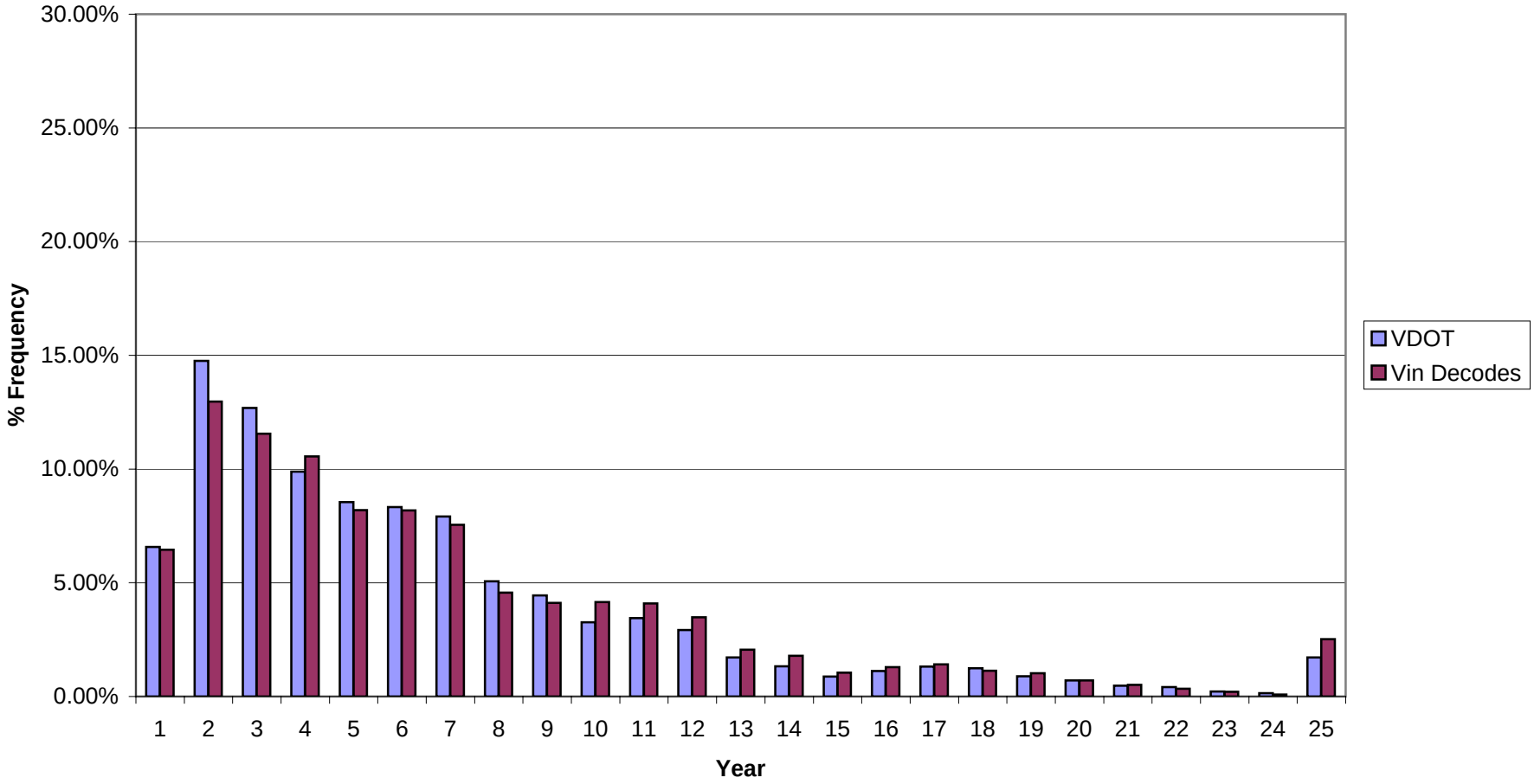
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = LDT2
Number of Decoded Vins = 85,170



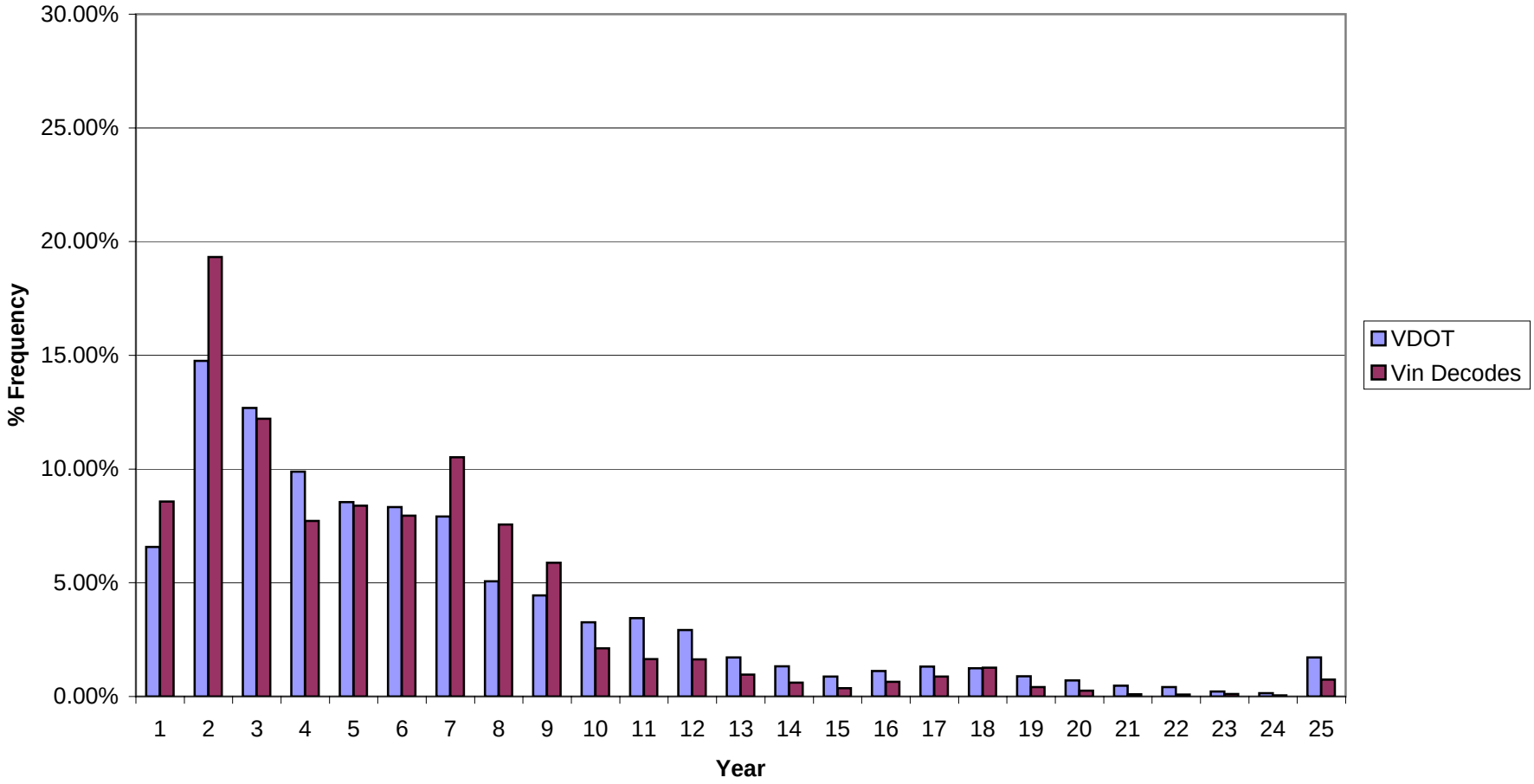
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = LDT3
Number of Decoded Vins = 25,426



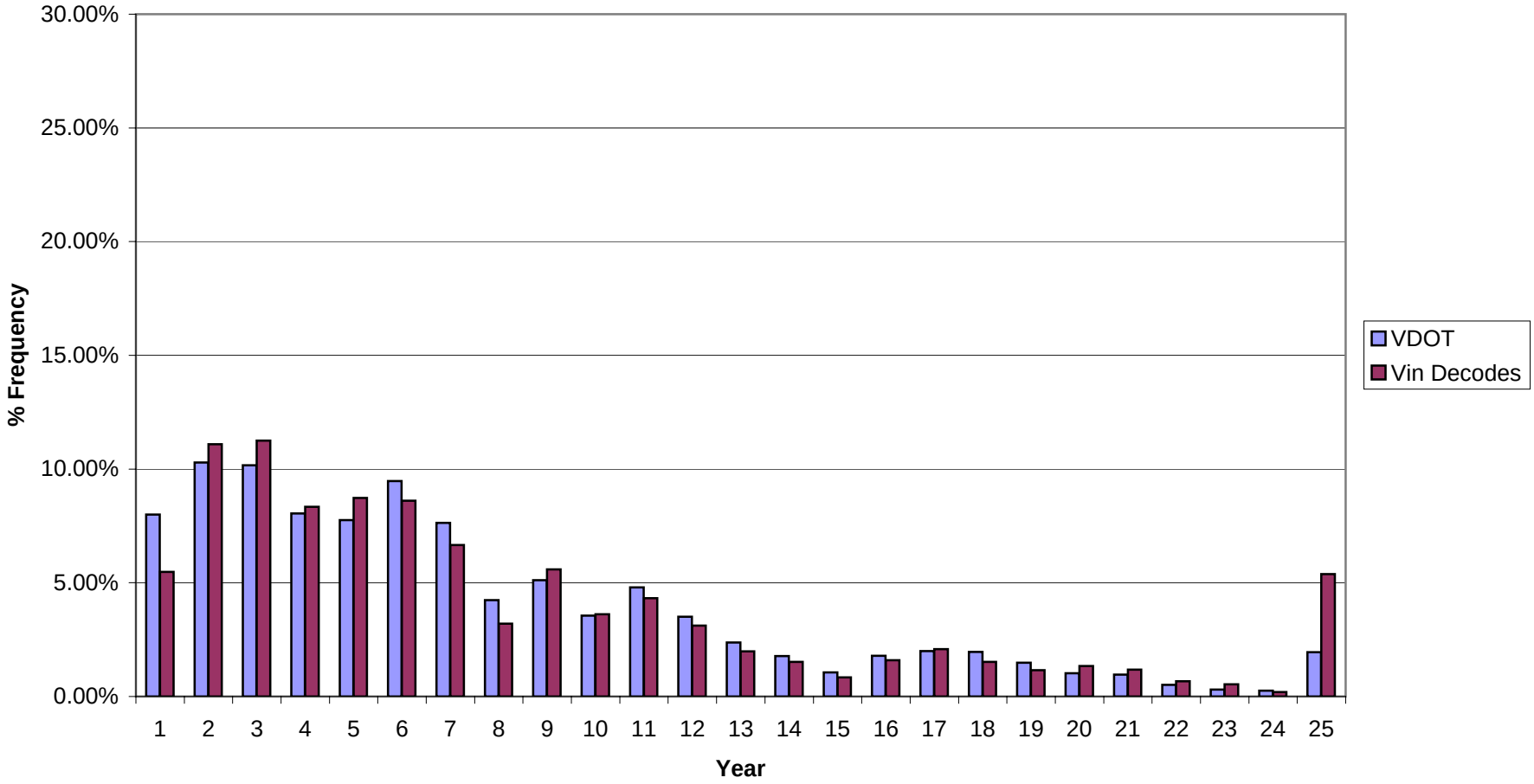
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = LDT4
Number of Decoded Vins = 7,369



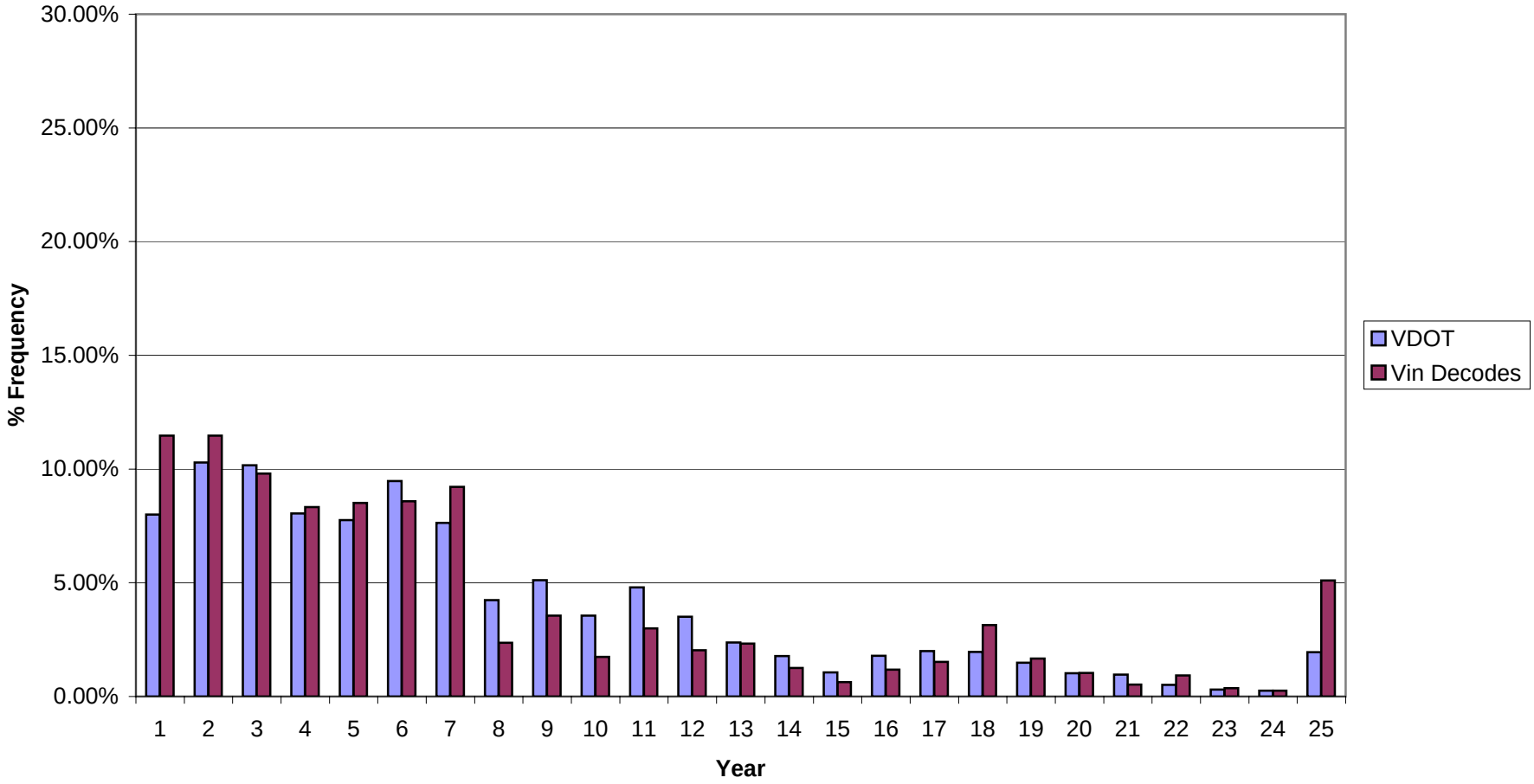
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = HDV2B
Number of Decoded Vins = 9,562



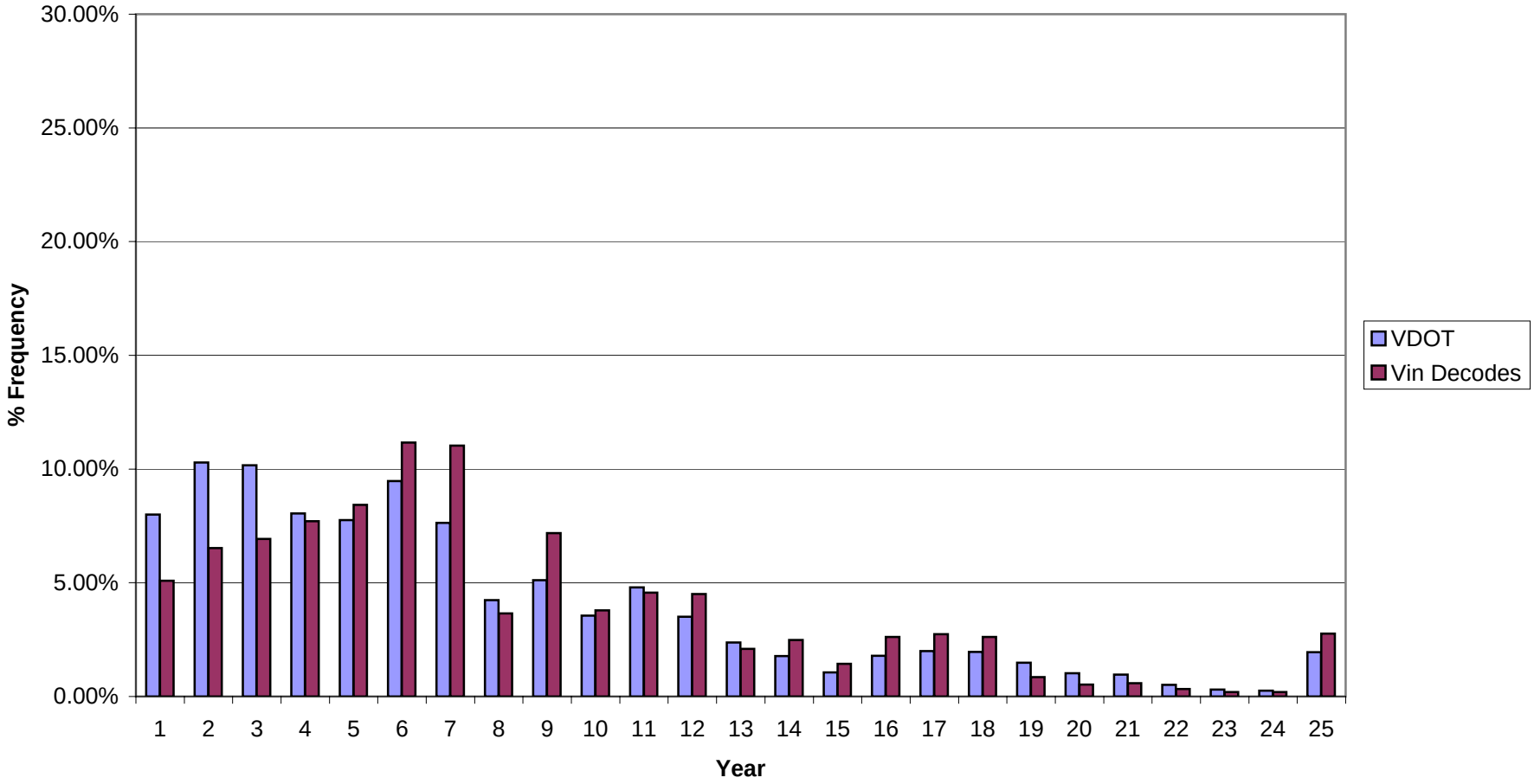
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = HDV3
Number of Decoded Vins = 2,447



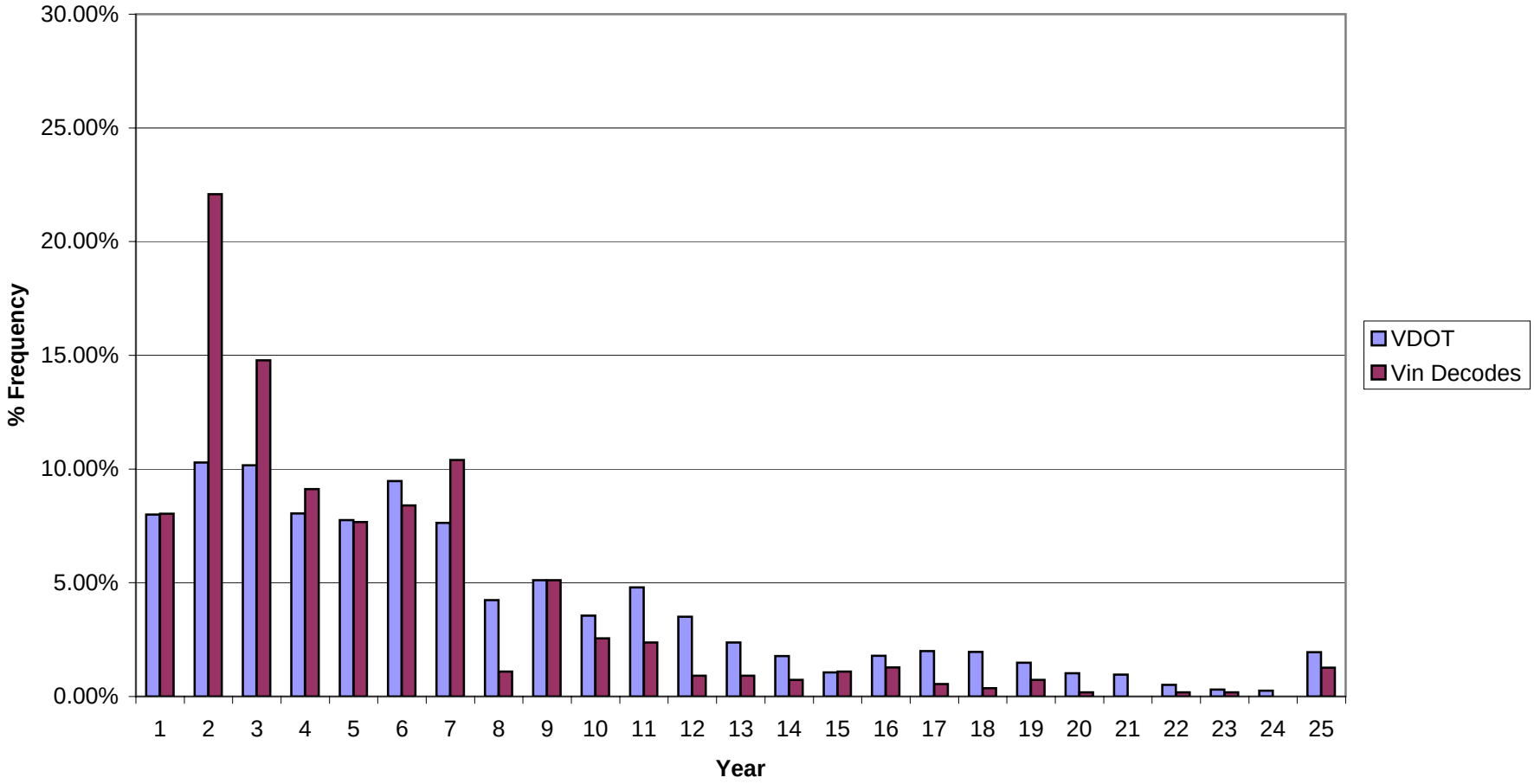
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = HDV4
Number of Decoded Vins = 1,489



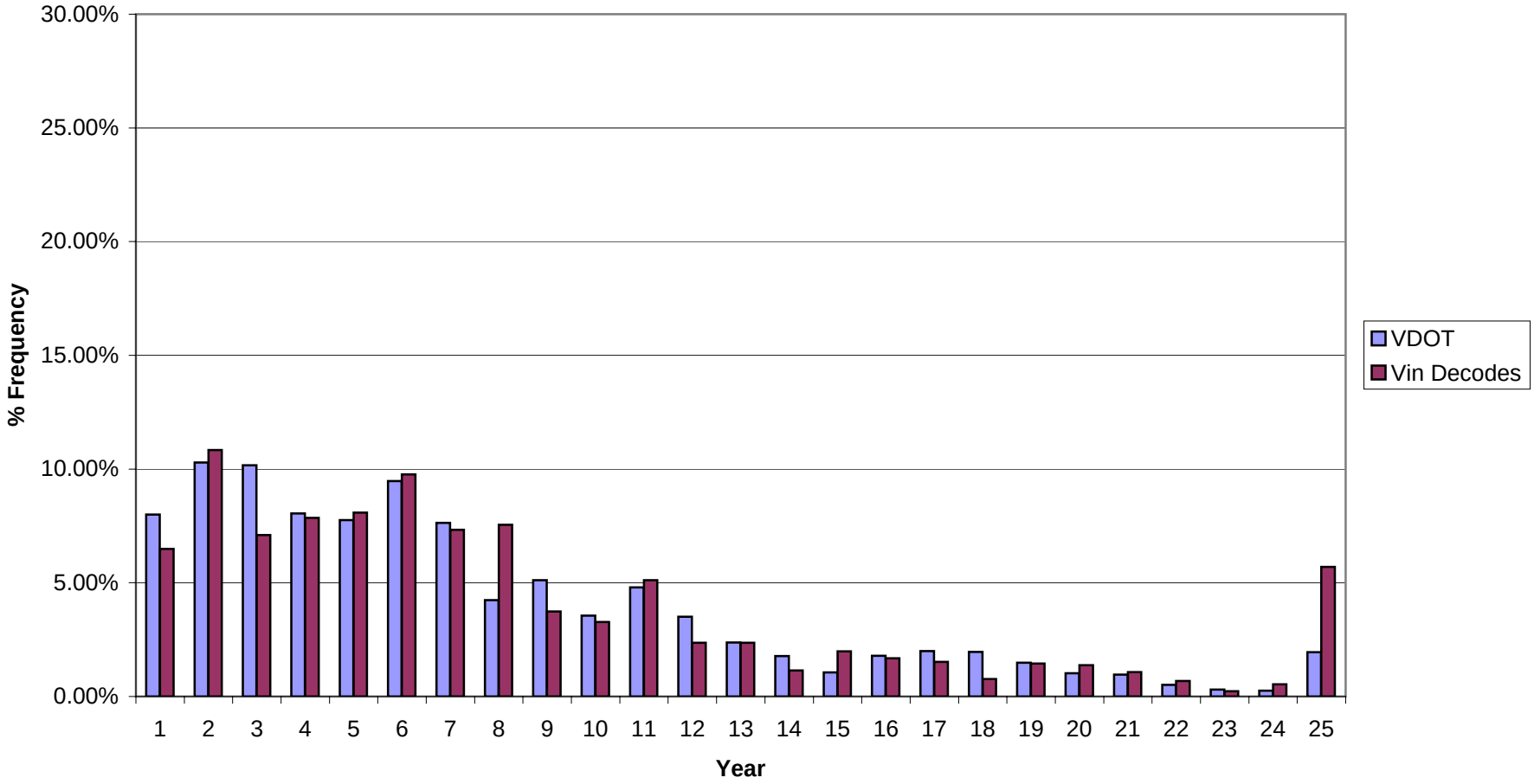
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = HDV5
Number of Decoded Vins = 541



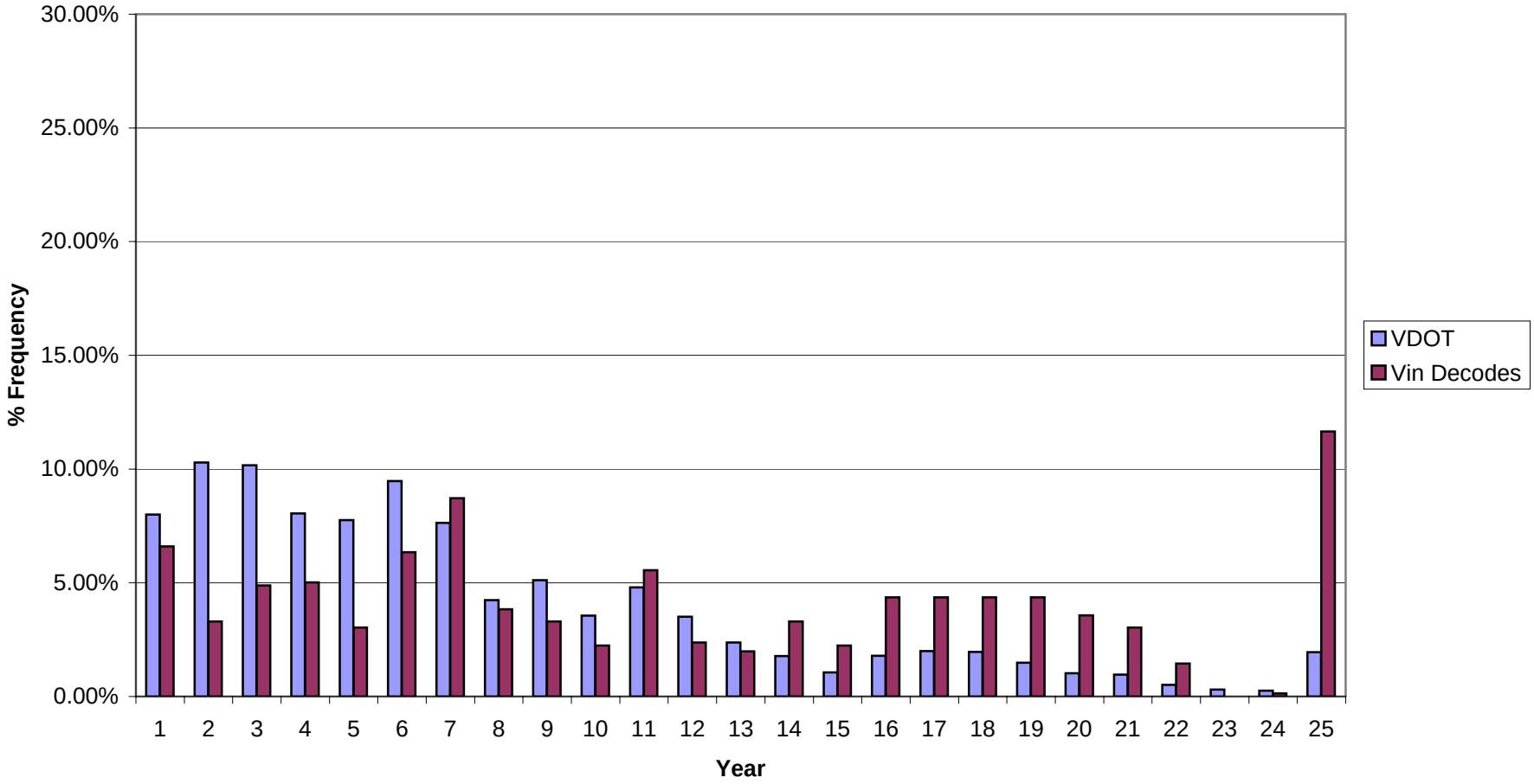
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = HDV6
Number of Decoded Vins = 1,211



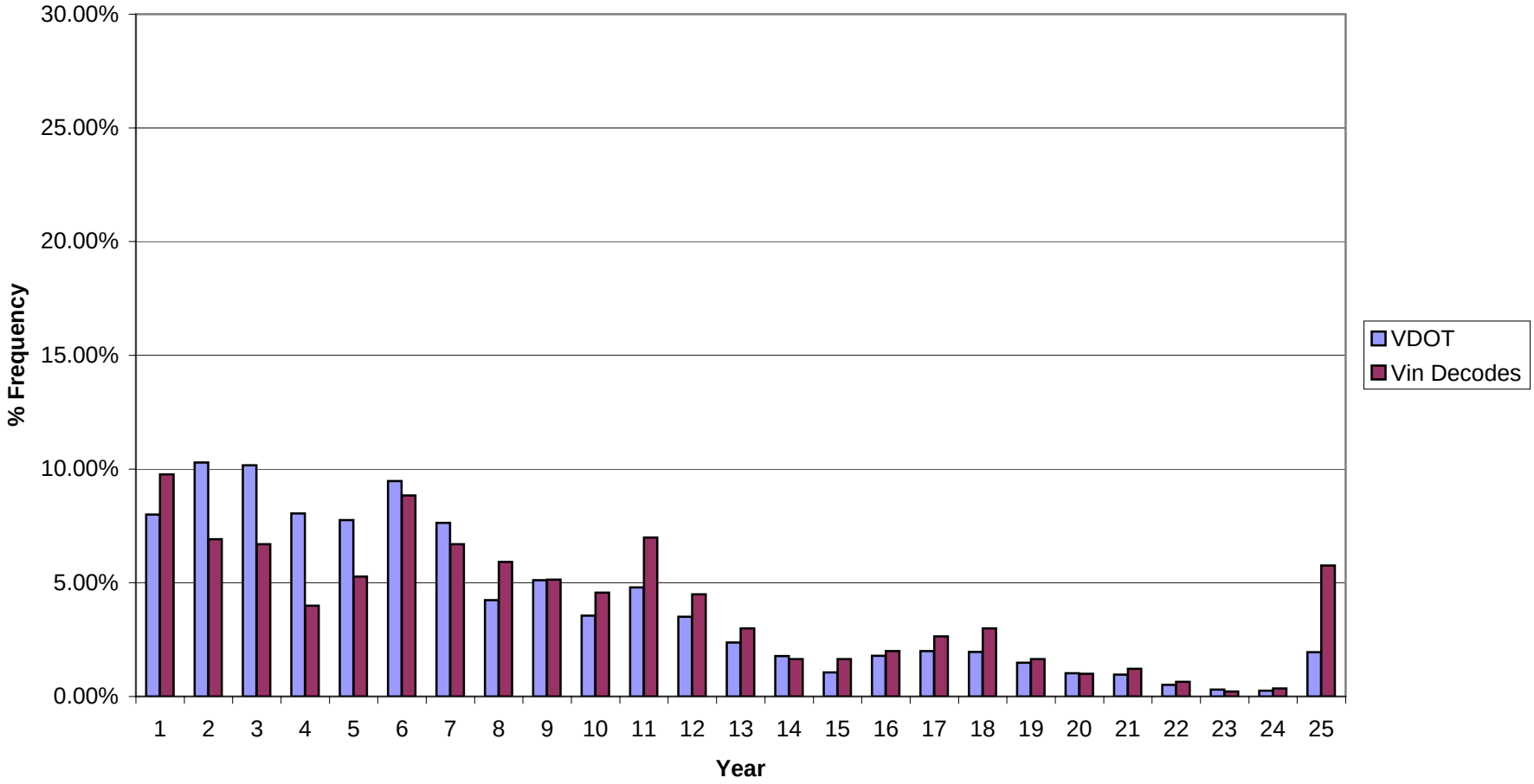
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = HDV7
Number of Decoded Vins = 669



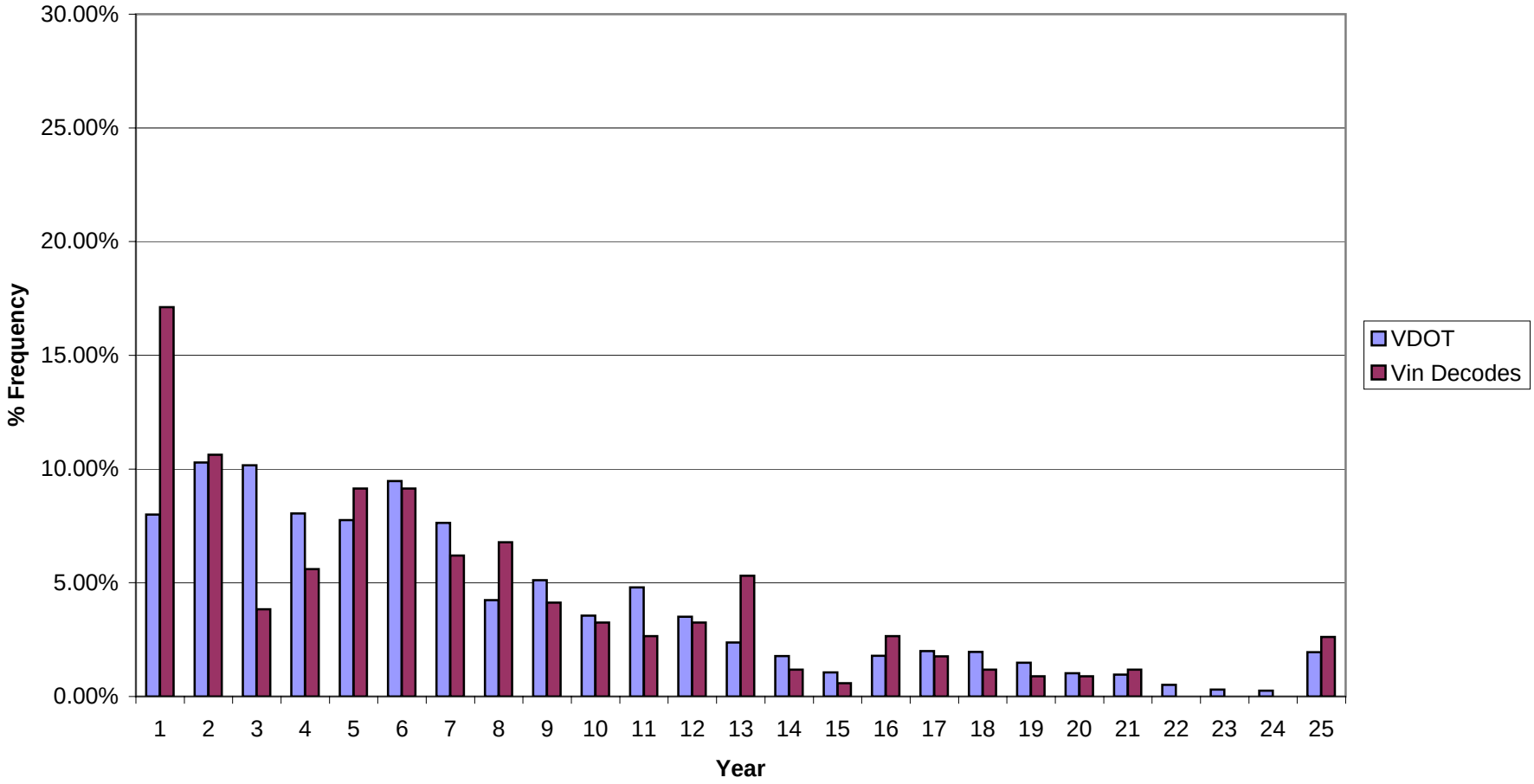
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = HDV8A
Number of Decoded Vins = 1,322



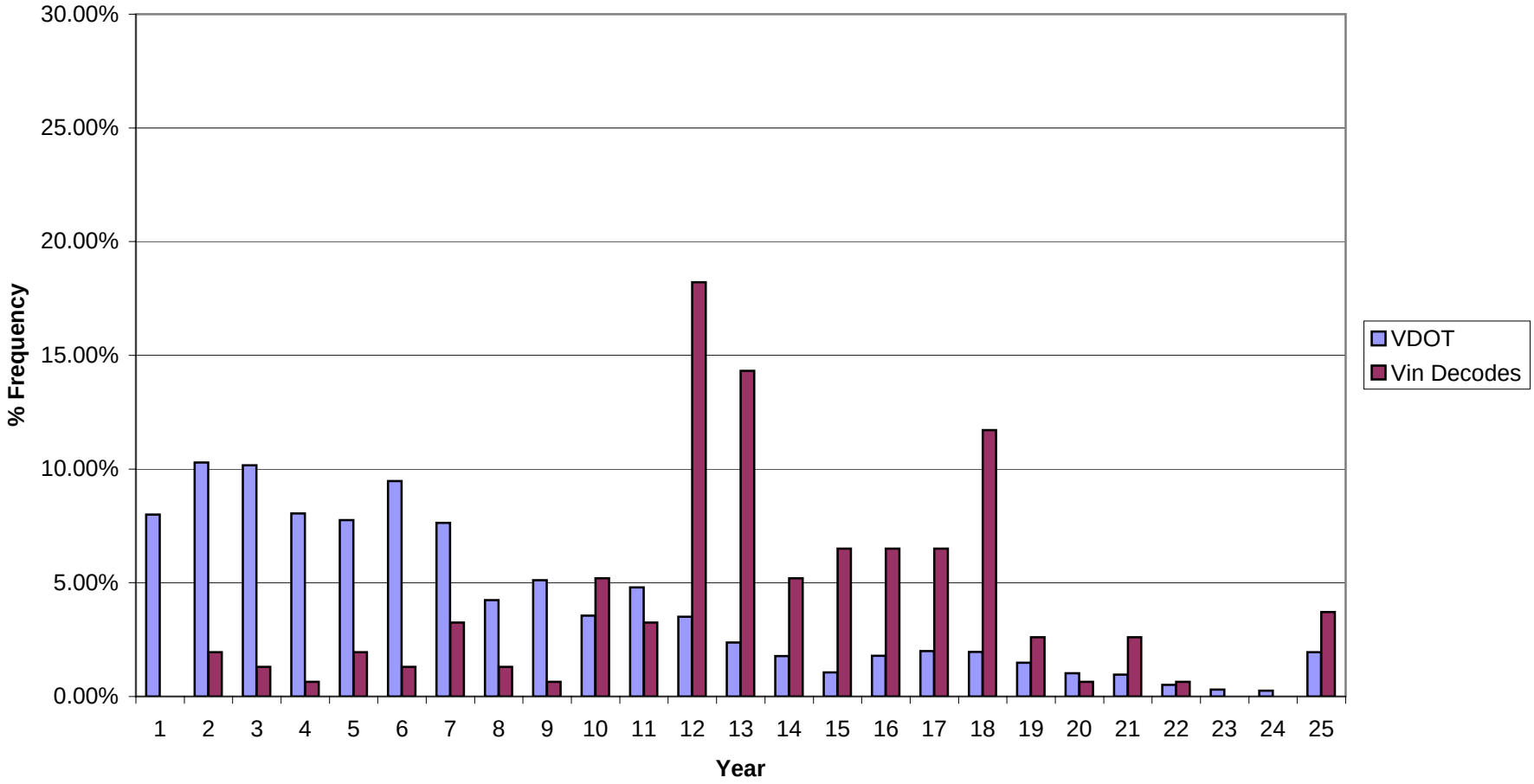
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = HDV8B
Number of Decoded Vins = 330



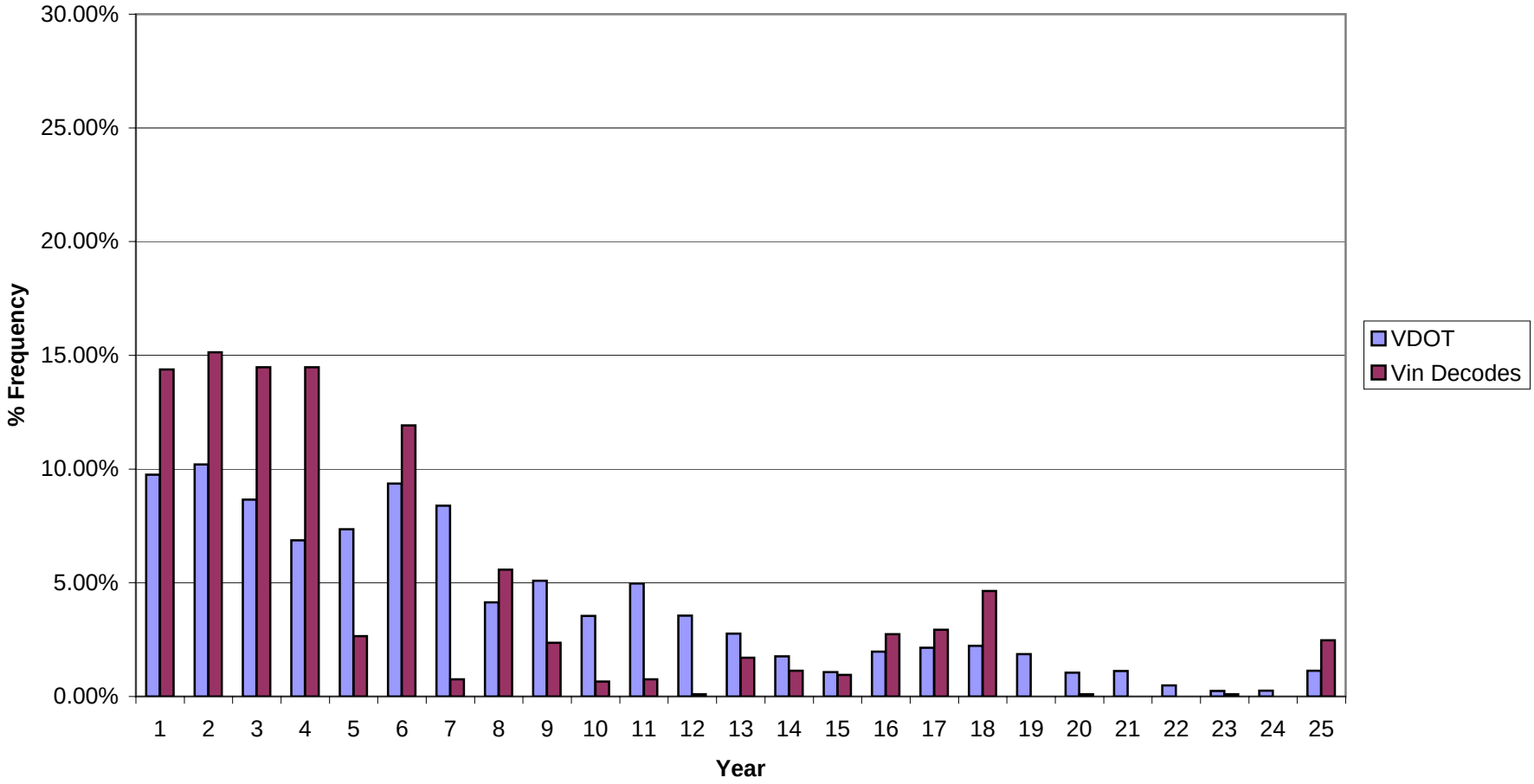
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = HDBS
Number of Decoded Vins = 512



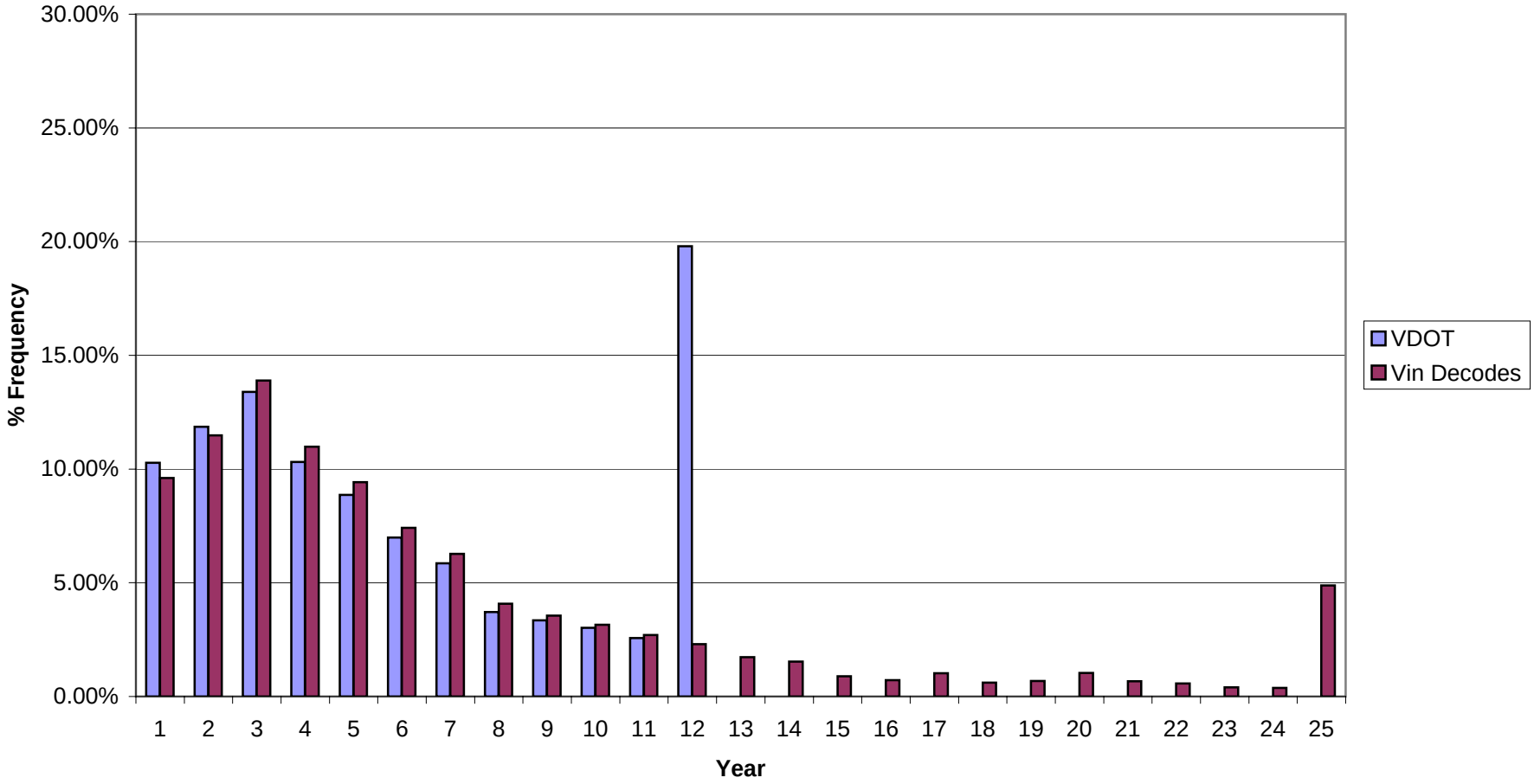
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = HDBT
Number of Decoded Vins = 1,413



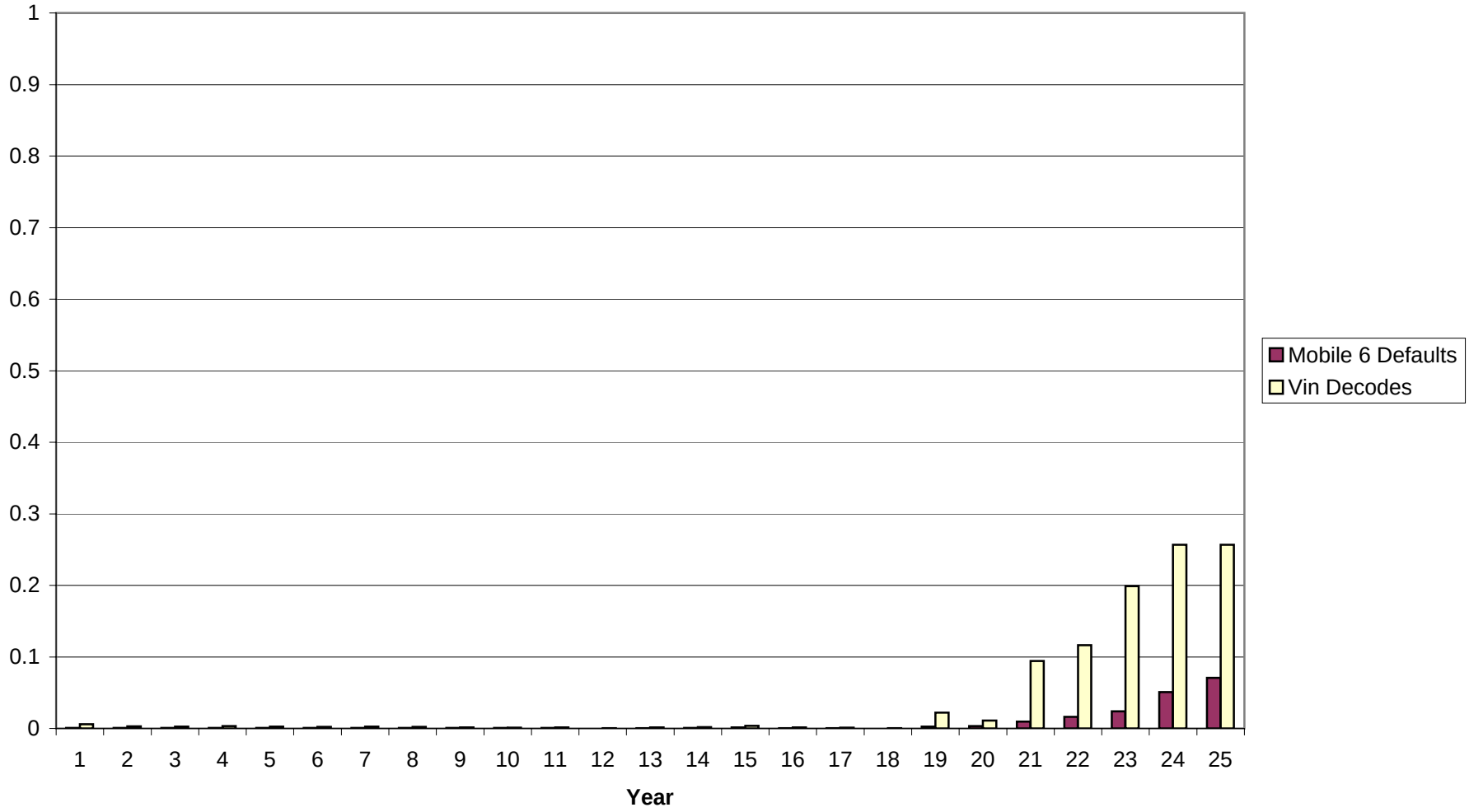
ATTACHMENT 7E

Comparison of Vehicle Age Distributions (VDEQ / VDOT vs. Vin Decodes)
Developed from 2005 Vehicle Registration Data
Jurisdiction = PW
Vehicle Type = MC
Number of Decoded Vins = 6,967



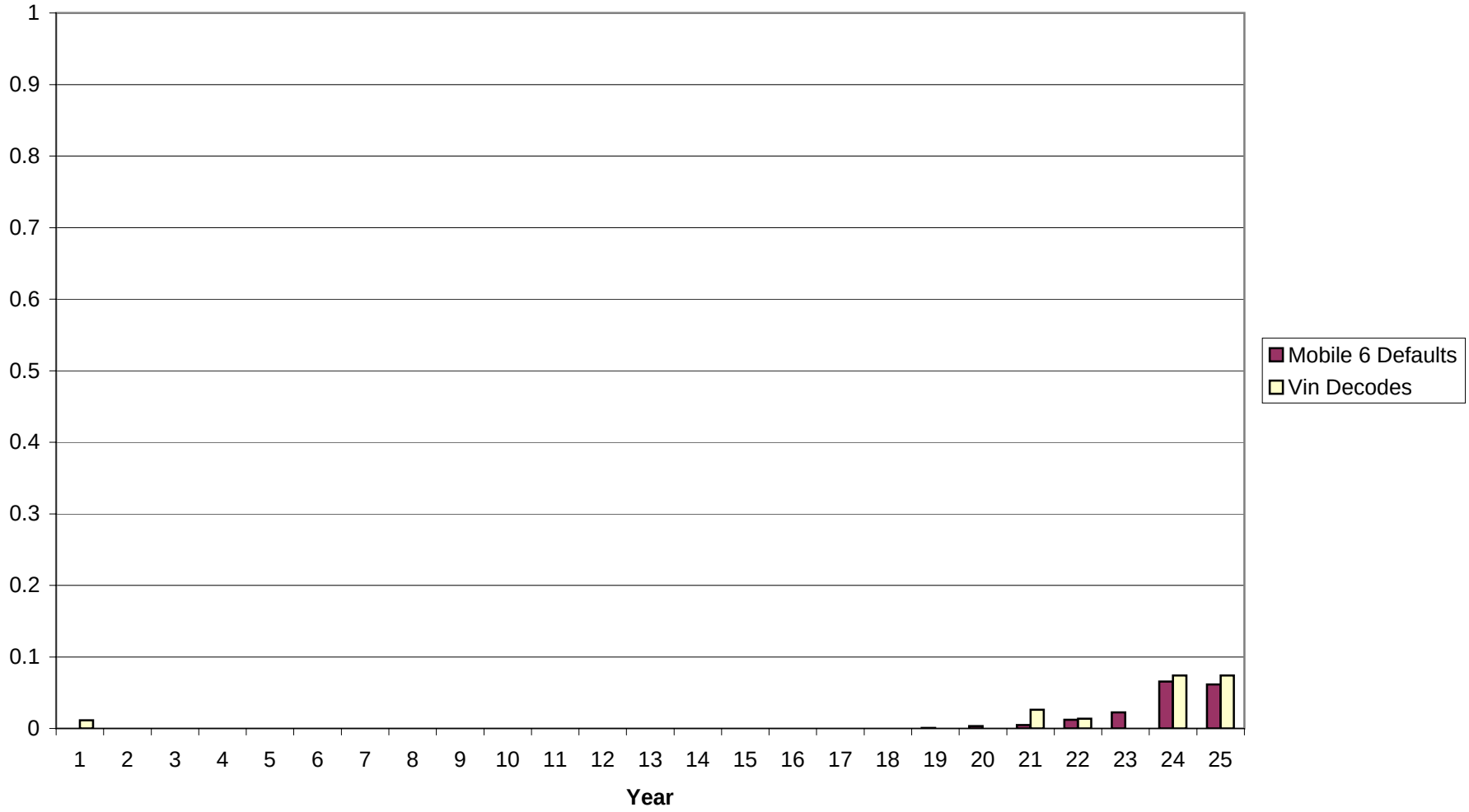
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = LDV



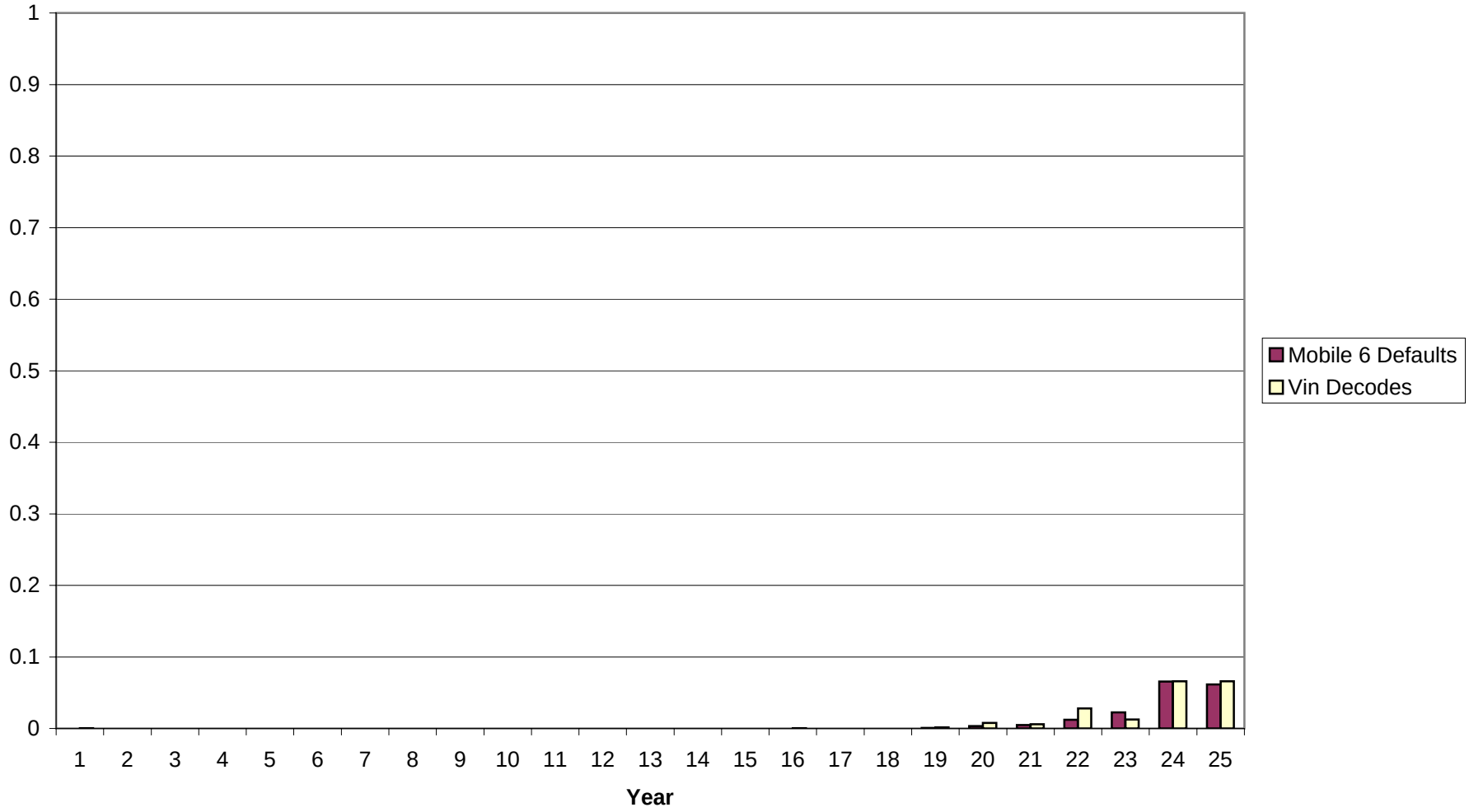
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = LDT1



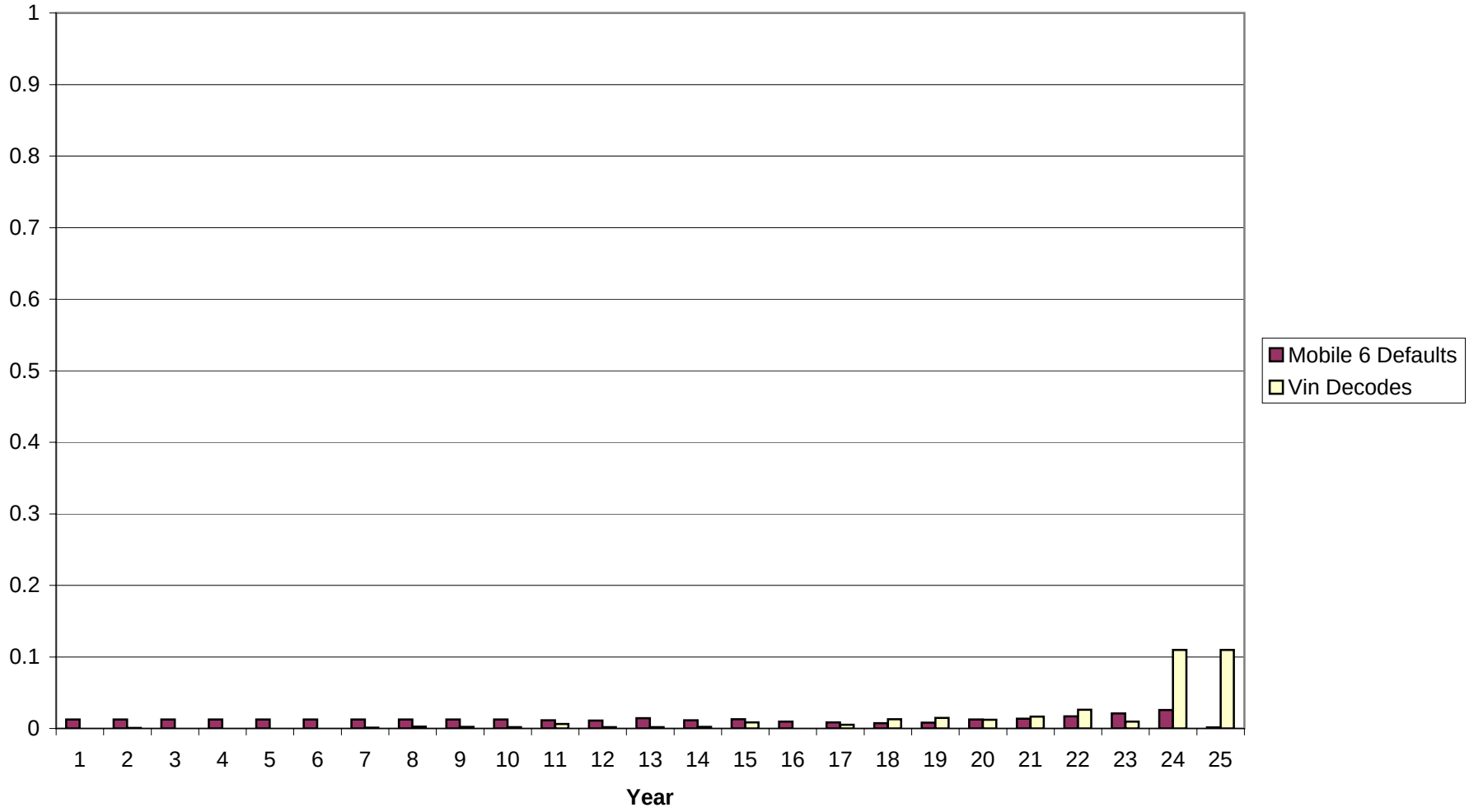
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = LDT2



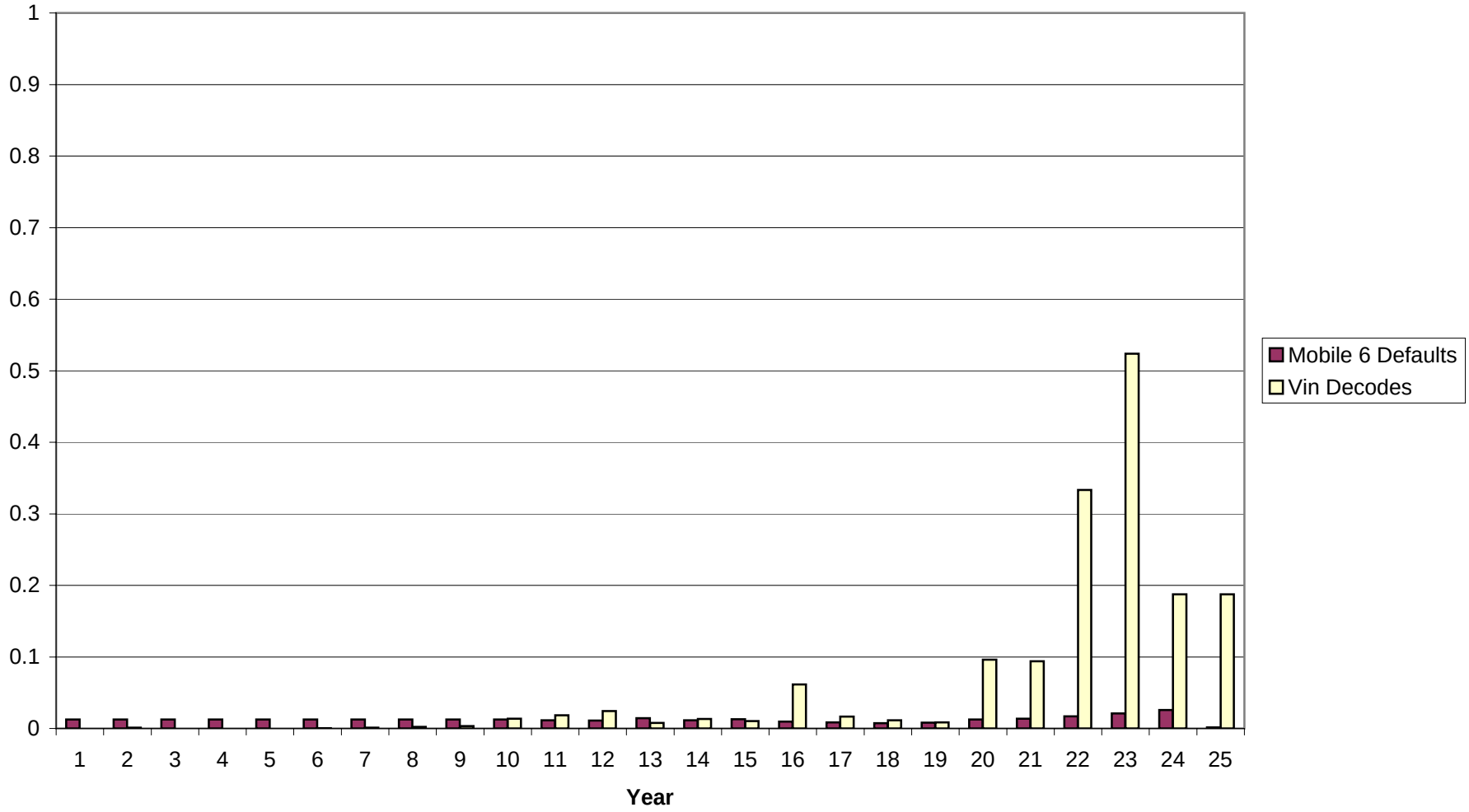
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = LDT3



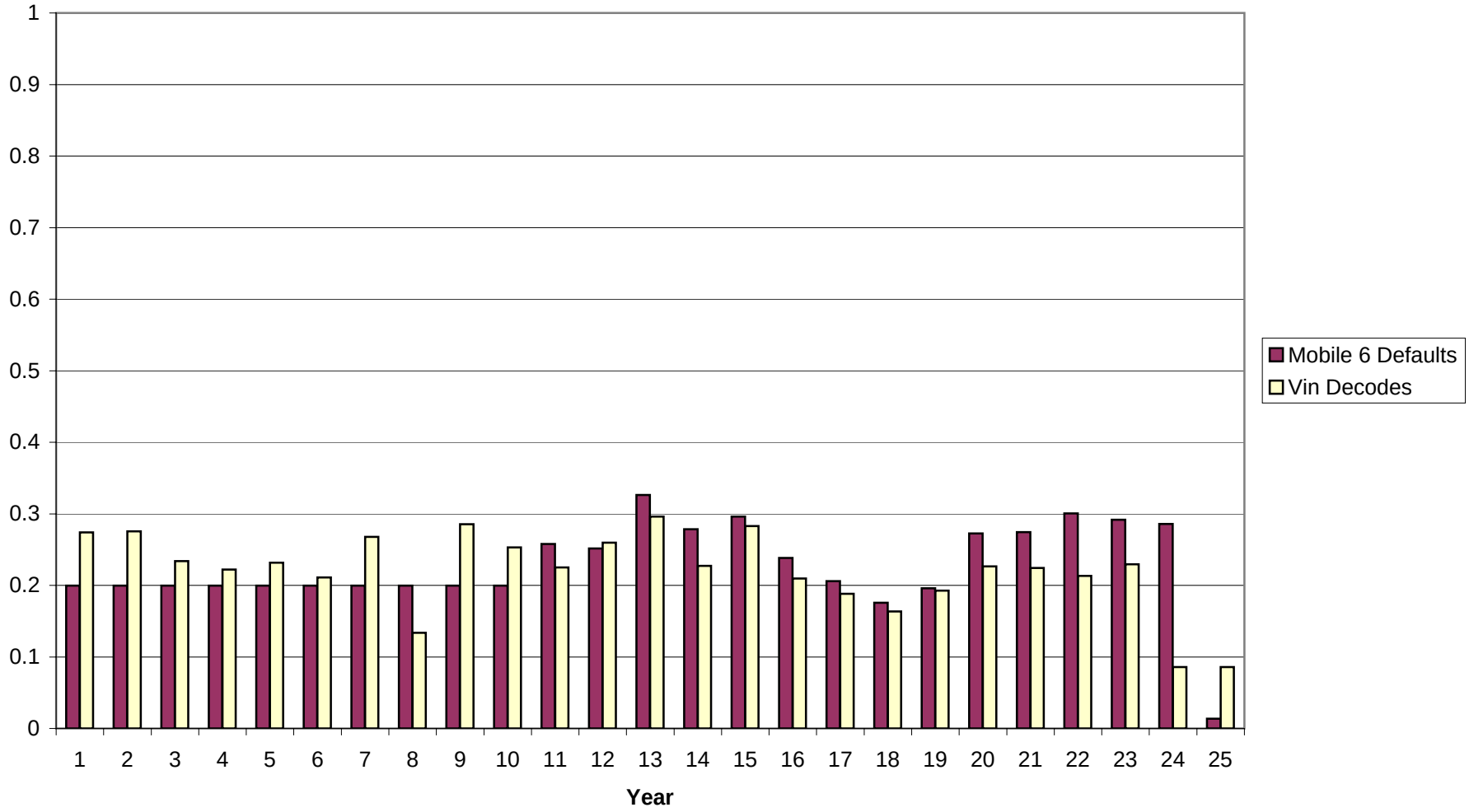
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = LDT4



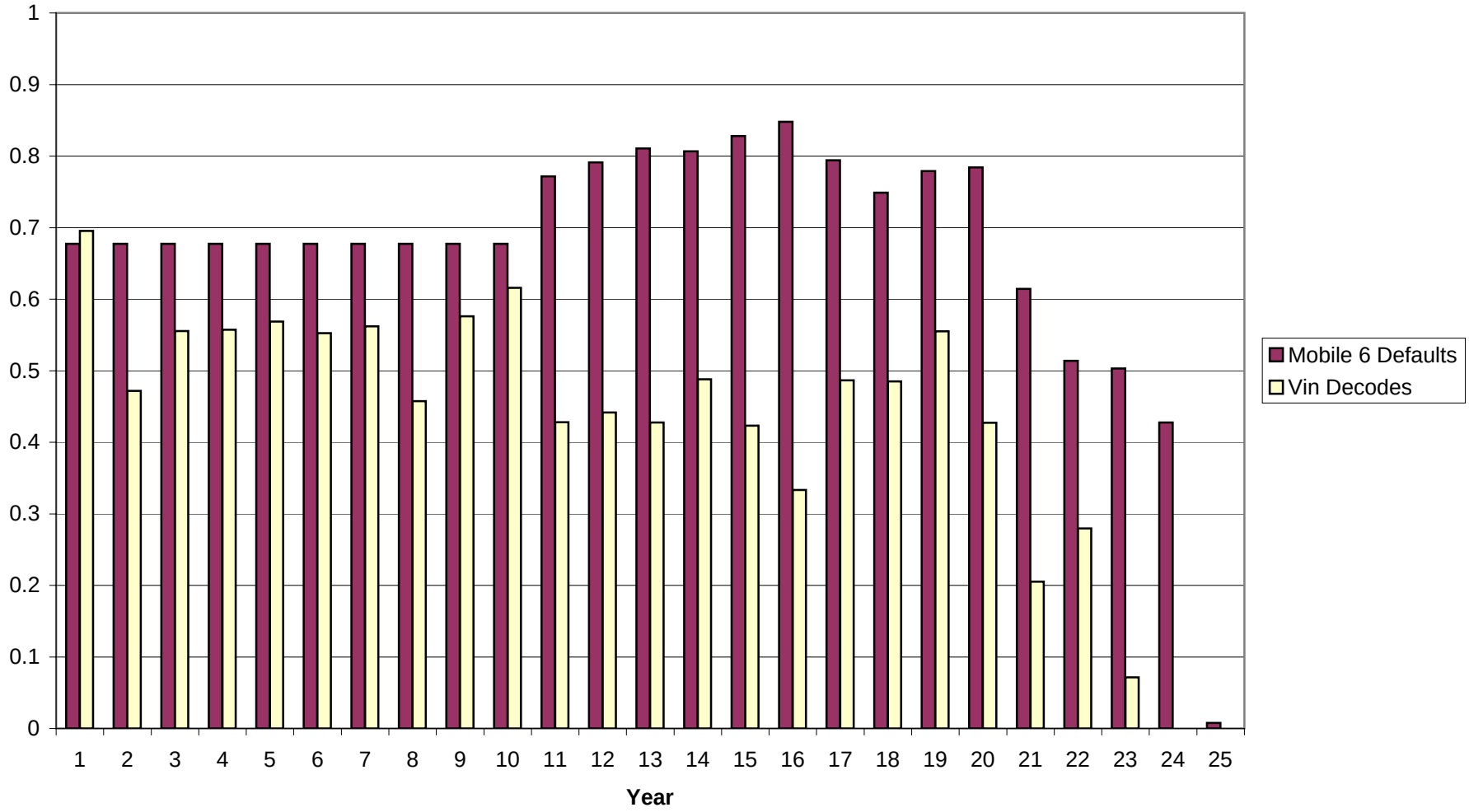
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = HDV2B



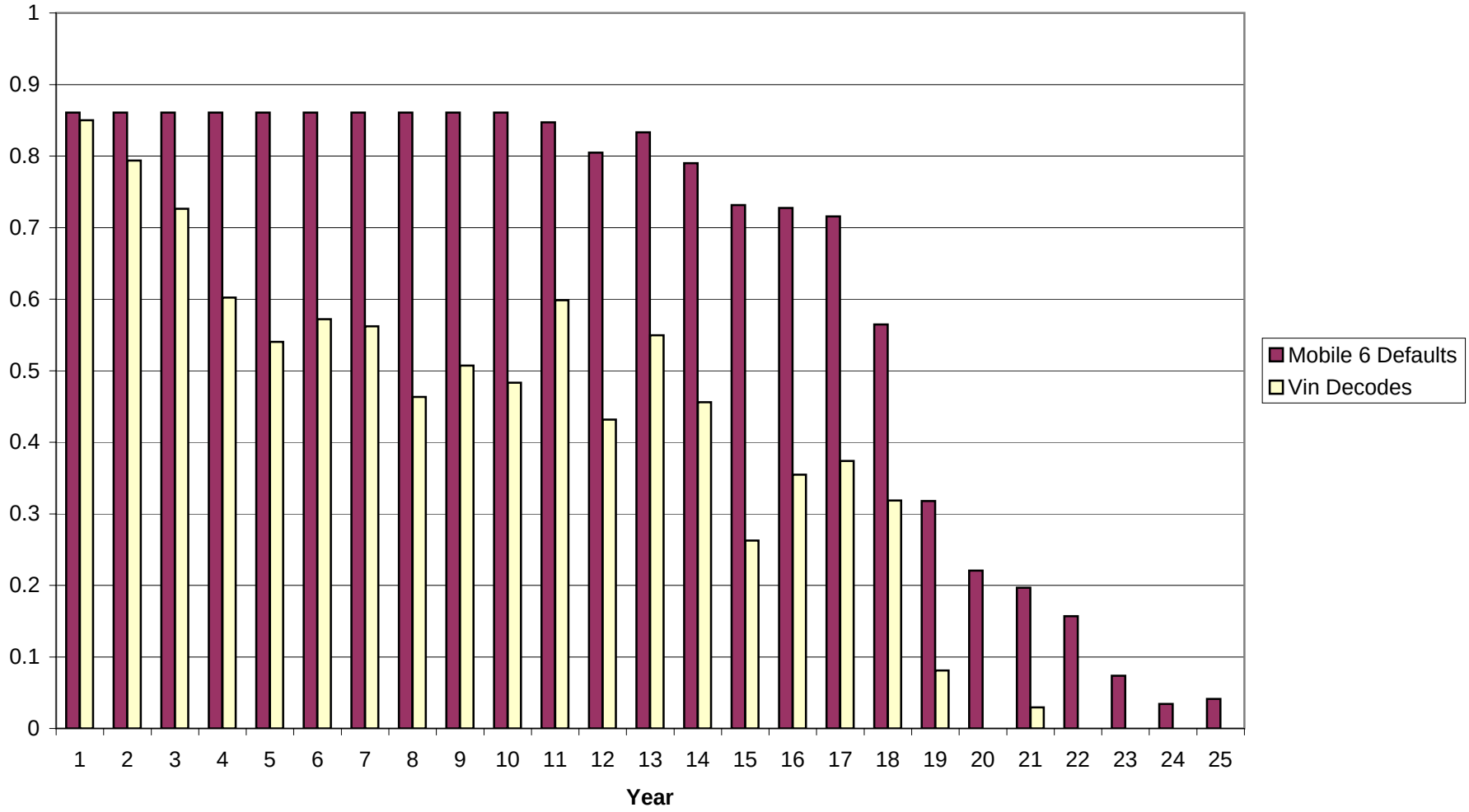
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = HDV3



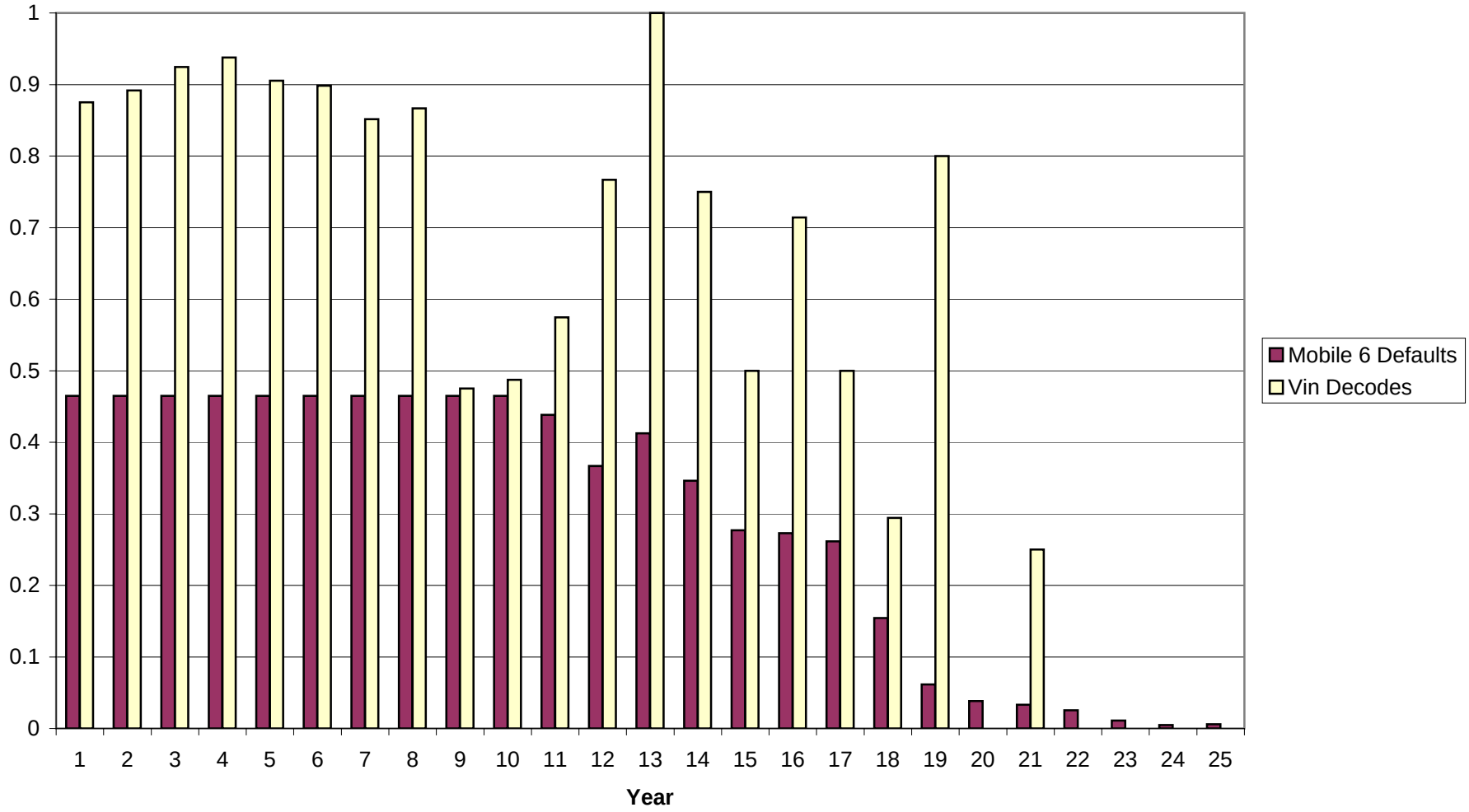
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = HDV4



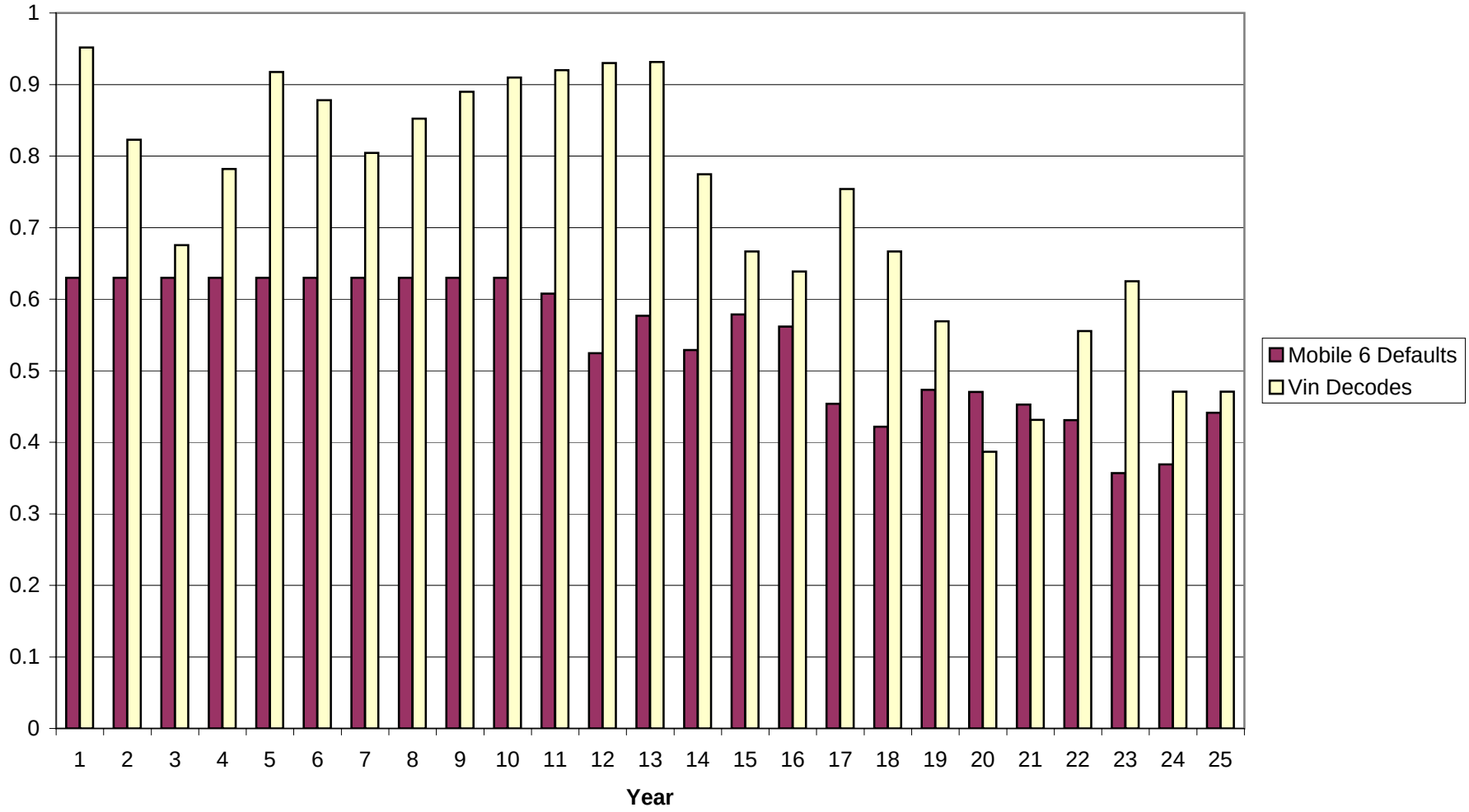
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = HDV5



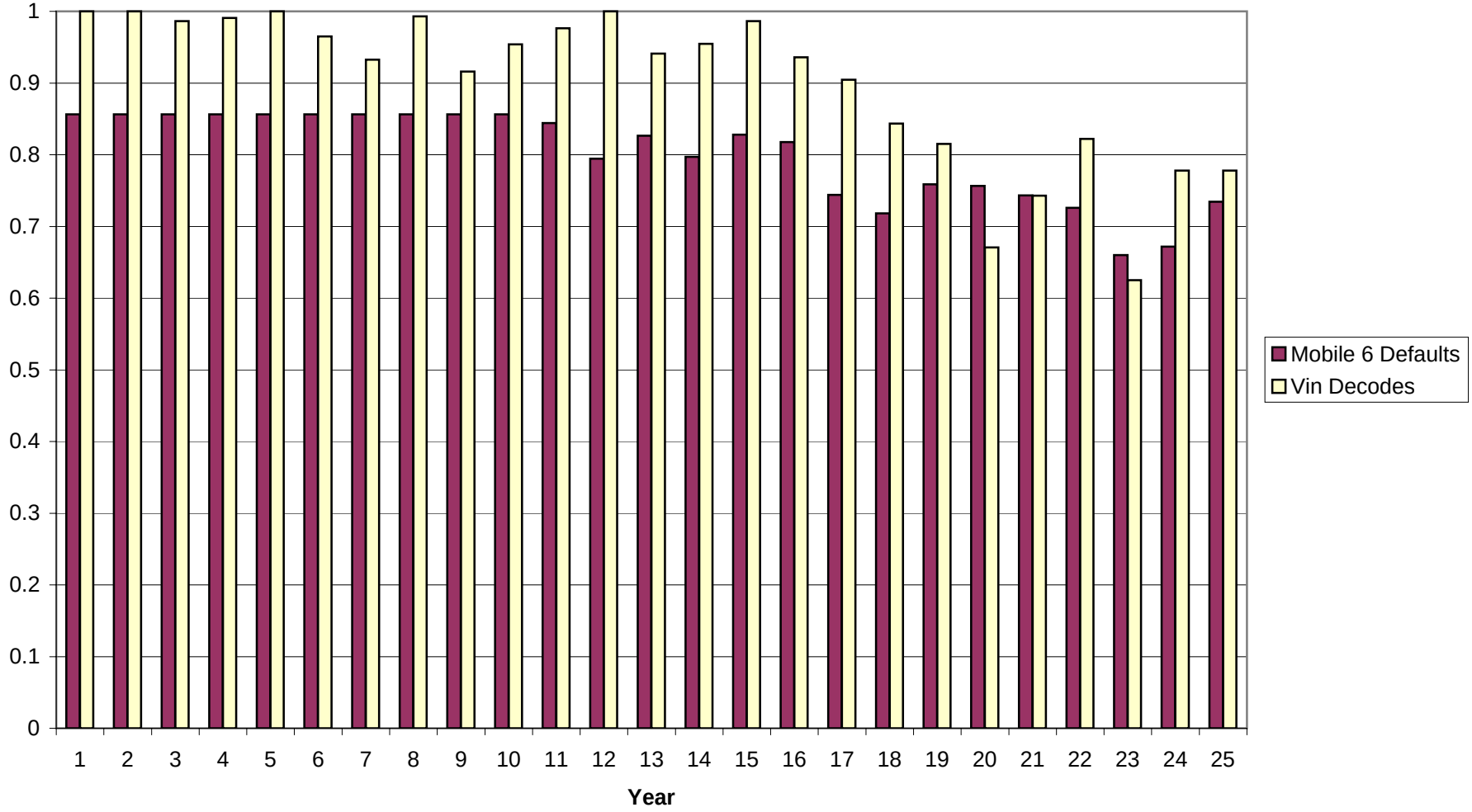
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = HDV6



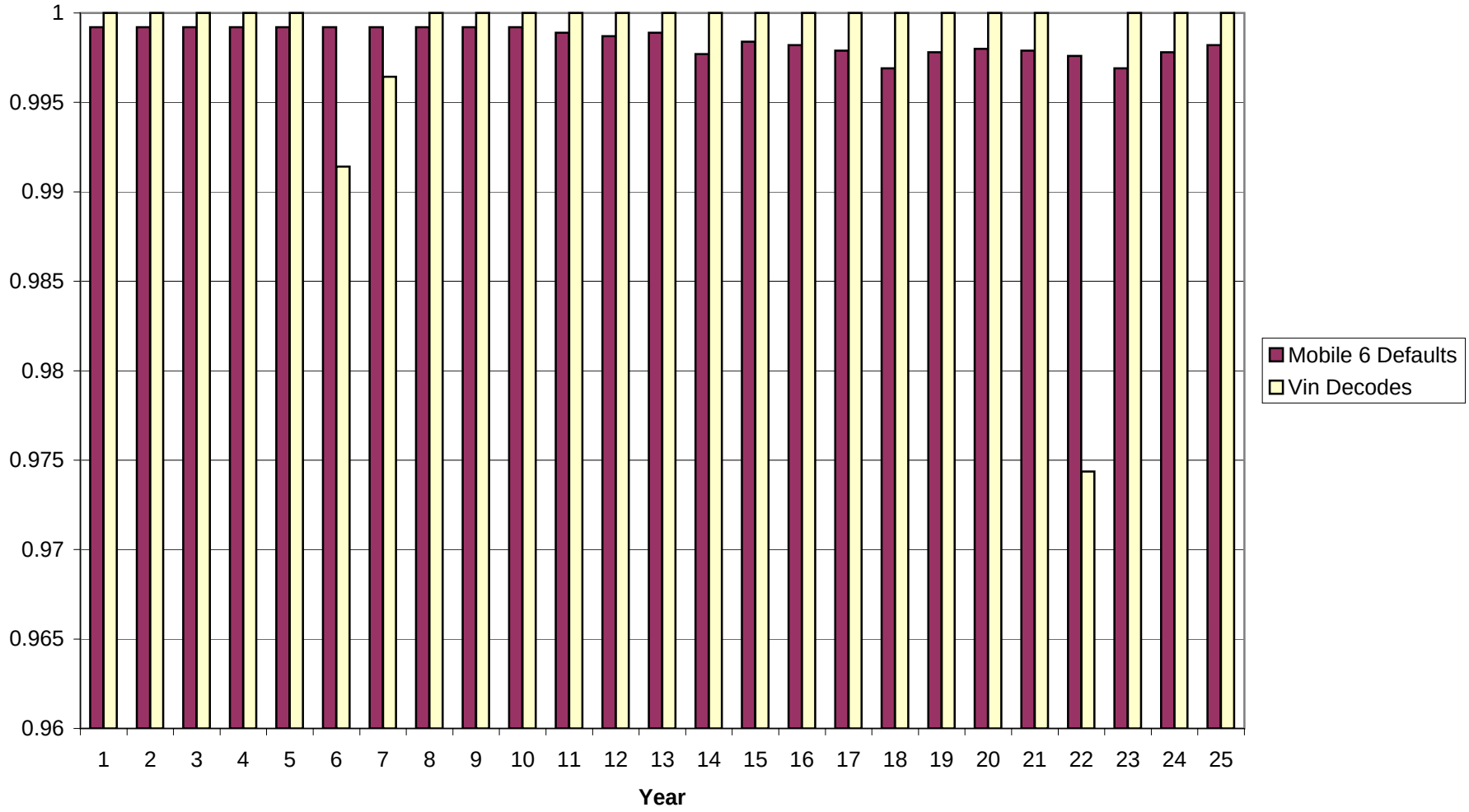
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = HDV7



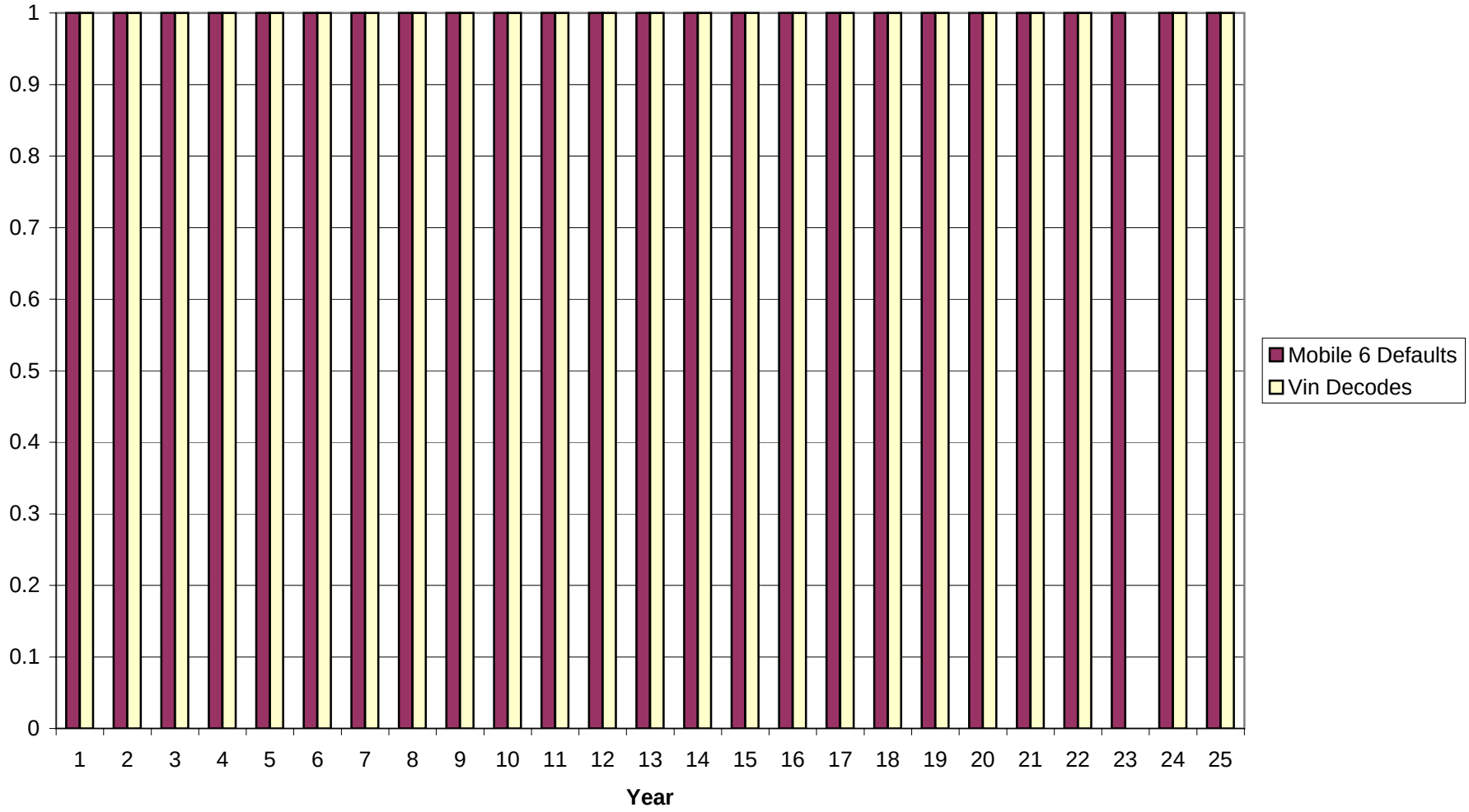
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = HDV8A



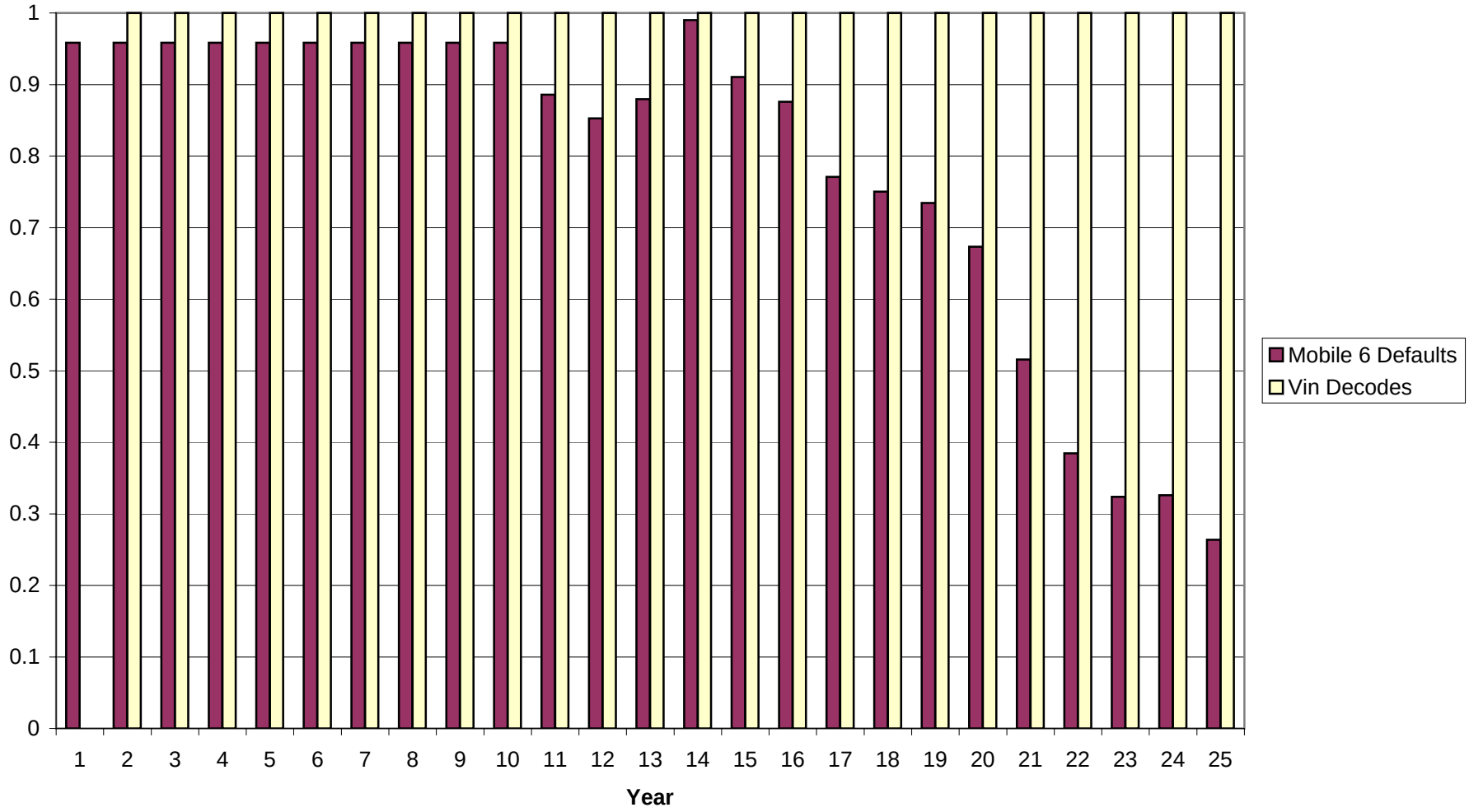
ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = HDV8B



ATTACHMENT 8

Diesel Sales Fractions
Northern Virgina Jurisdictions Combined
Vehicle Type = HDBS



ATTACHMENT 9

alx.rdt

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        0.0041 0.0023 0.0014 0.0009 0.0239
* LDT1
      2 0.0607 0.0276 0.1077 0.1086 0.0893 0.0543 0.0782 0.0819 0.1077 0.0773
        0.0230 0.0221 0.0156 0.0166 0.0202 0.0064 0.0120 0.0129 0.0101 0.0083
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* LDT2
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        0.0019 0.0014 0.0008 0.0005 0.0160
* LDT3
      4 0.1954 0.1424 0.0982 0.0836 0.0697 0.0785 0.0650 0.0406 0.0347 0.0303
        0.0306 0.0220 0.0140 0.0131 0.0086 0.0091 0.0100 0.0097 0.0061 0.0049
        0.0033 0.0025 0.0019 0.0006 0.0252
* LDT4
      5 0.1759 0.1852 0.1095 0.0478 0.0710 0.0690 0.0843 0.0770 0.0558 0.0212
        0.0153 0.0239 0.0100 0.0080 0.0013 0.0086 0.0080 0.0073 0.0073 0.0027
        0.0000 0.0007 0.0013 0.0013 0.0075
* HDV2B
      6 0.1348 0.1066 0.0972 0.0852 0.0616 0.0841 0.0611 0.0355 0.0475 0.0334
        0.0345 0.0319 0.0272 0.0230 0.0068 0.0099 0.0172 0.0104 0.0089 0.0104
        0.0084 0.0052 0.0031 0.0021 0.0538
* HDV3
      7 0.0648 0.0678 0.1297 0.0825 0.0472 0.0707 0.0619 0.0265 0.0531 0.0324
        0.0884 0.0560 0.0088 0.0029 0.0118 0.0265 0.0354 0.0206 0.0265 0.0147
        0.0088 0.0088 0.0029 0.0000 0.0510
* HDV4
      8 0.1748 0.0366 0.0451 0.0761 0.0648 0.0705 0.0930 0.0366 0.0902 0.0254
        0.0479 0.0395 0.0169 0.0254 0.0169 0.0141 0.0225 0.0282 0.0056 0.0113
        0.0197 0.0056 0.0028 0.0028 0.0276
* HDV5
      9 0.0470 0.1881 0.1175 0.0000 0.0705 0.1058 0.1175 0.0353 0.1058 0.0470
        0.0000 0.0235 0.0235 0.0000 0.0000 0.0235 0.0000 0.0000 0.0705 0.0118
        0.0000 0.0000 0.0000 0.0000 0.0127
* HDV6
     10 0.2663 0.0439 0.0470 0.0721 0.0752 0.0564 0.0564 0.0407 0.0313 0.0376
        0.0689 0.0157 0.0219 0.0188 0.0157 0.0157 0.0063 0.0094 0.0125 0.0125
        0.0094 0.0000 0.0000 0.0094 0.0570
* HDV7
     11 0.0000 0.0122 0.0183 0.0305 0.0183 0.0853 0.0427 0.0548 0.0548 0.0487
        0.0427 0.0061 0.0244 0.0244 0.0366 0.0548 0.0731 0.1645 0.0366 0.0061
        0.0061 0.0305 0.0000 0.0122 0.1165
* HDV8A
     12 0.0977 0.0439 0.0488 0.0732 0.0488 0.0635 0.0732 0.0488 0.0244 0.0635
        0.0537 0.0537 0.0293 0.0244 0.0244 0.0293 0.0439 0.0293 0.0146 0.0293
        0.0146 0.0049 0.0049 0.0000 0.0576
* HDV8B
     13 0.0375 0.0749 0.0375 0.0000 0.0375 0.1873 0.1124 0.1873 0.1124 0.0749
        0.0000 0.0375 0.0000 0.0375 0.0000 0.0000 0.0000 0.0375 0.0000 0.0000
        0.0000 0.0000 0.0000 0.0000 0.0262
* HDBS
     14 0.0000 0.0481 0.0578 0.0578 0.0193 0.0000 0.0193 0.0193 0.0289 0.0481
        0.1252 0.0674 0.1444 0.0578 0.0578 0.0385 0.0385 0.0289 0.0770 0.0289
        0.0000 0.0000 0.0000 0.0000 0.0371
* HDBT
     15 0.0991 0.0076 0.0076 0.0686 0.0381 0.1219 0.1143 0.1067 0.1067 0.0229
        0.0229 0.0762 0.0000 0.0000 0.1067 0.0076 0.0152 0.0305 0.0000 0.0152
        0.0000 0.0000 0.0076 0.0000 0.0247
* MC
     16 0.0772 0.1032 0.1641 0.1262 0.0913 0.0787 0.0490 0.0438 0.0371 0.0267
        0.0297 0.0200 0.0141 0.0134 0.0104 0.0097 0.0059 0.0104 0.0030 0.0126
        0.0067 0.0067 0.0059 0.0052 0.0489
```

ATTACHMENT 9

arl.rdt

```
REG DIST
* LDV
      1 0.0475 0.0824 0.0766 0.0791 0.0785 0.0823 0.0719 0.0648 0.0600 0.0537
        0.0541 0.0452 0.0379 0.0312 0.0275 0.0233 0.0178 0.0123 0.0107 0.0076
        0.0049 0.0036 0.0019 0.0014 0.0239
* LDT1
      2 0.0518 0.0259 0.0968 0.1202 0.1094 0.0634 0.0493 0.0810 0.0960 0.0827
        0.0242 0.0125 0.0100 0.0167 0.0100 0.0175 0.0200 0.0167 0.0159 0.0192
        0.0050 0.0050 0.0000 0.0033 0.0474
* LDT2
      3 0.0661 0.1173 0.0928 0.0928 0.0864 0.0876 0.0696 0.0700 0.0572 0.0473
        0.0468 0.0388 0.0289 0.0184 0.0180 0.0103 0.0106 0.0080 0.0062 0.0045
        0.0032 0.0018 0.0008 0.0007 0.0160
* LDT3
      4 0.0741 0.1327 0.1021 0.0965 0.0871 0.0785 0.0861 0.0452 0.0437 0.0382
        0.0401 0.0306 0.0144 0.0129 0.0113 0.0138 0.0199 0.0160 0.0095 0.0082
        0.0057 0.0049 0.0025 0.0008 0.0252
* LDT4
      5 0.0616 0.1593 0.1240 0.0657 0.0763 0.0821 0.1002 0.0993 0.0624 0.0419
        0.0279 0.0164 0.0148 0.0099 0.0041 0.0099 0.0148 0.0099 0.0074 0.0025
        0.0000 0.0000 0.0016 0.0008 0.0075
* HDV2B
      6 0.0419 0.0909 0.1061 0.0654 0.0934 0.0890 0.0648 0.0305 0.0553 0.0356
        0.0534 0.0388 0.0311 0.0146 0.0146 0.0184 0.0222 0.0229 0.0127 0.0121
        0.0140 0.0089 0.0044 0.0051 0.0538
* HDV3
      7 0.0711 0.1051 0.1206 0.0680 0.0649 0.0618 0.0896 0.0093 0.0556 0.0124
        0.0495 0.0216 0.0155 0.0155 0.0093 0.0309 0.0185 0.0495 0.0185 0.0247
        0.0216 0.0062 0.0093 0.0000 0.0510
* HDV4
      8 0.0382 0.0486 0.0486 0.1354 0.0799 0.0903 0.0660 0.0625 0.0695 0.0347
        0.0521 0.0347 0.0521 0.0382 0.0243 0.0139 0.0208 0.0208 0.0069 0.0035
        0.0069 0.0174 0.0069 0.0000 0.0276
* HDV5
      9 0.0898 0.1077 0.0359 0.0359 0.1077 0.1436 0.0898 0.0180 0.0539 0.0180
        0.0539 0.0359 0.0180 0.0359 0.0180 0.0359 0.0000 0.0180 0.0180 0.0180
        0.0180 0.0000 0.0000 0.0180 0.0127
* HDV6
     10 0.0647 0.1109 0.0277 0.0555 0.0647 0.1017 0.1202 0.0462 0.0555 0.0277
        0.0185 0.0277 0.0000 0.0277 0.0000 0.0370 0.0185 0.0185 0.0370 0.0185
        0.0277 0.0277 0.0092 0.0000 0.0570
* HDV7
     11 0.0000 0.0000 0.0000 0.0126 0.0631 0.0126 0.0252 0.1136 0.0379 0.0631
        0.0126 0.0379 0.0379 0.0505 0.0000 0.0505 0.0884 0.0884 0.0252 0.0505
        0.0631 0.0379 0.0126 0.0000 0.1165
* HDV8A
     12 0.0604 0.0483 0.1329 0.0423 0.0725 0.1450 0.0302 0.0181 0.0121 0.0664
        0.0604 0.0544 0.0362 0.0121 0.0302 0.0242 0.0302 0.0302 0.0060 0.0121
        0.0181 0.0000 0.0000 0.0000 0.0576
* HDV8B
     13 0.0000 0.0000 0.0000 0.0000 0.0573 0.0000 0.2291 0.1146 0.0573 0.0000
        0.1146 0.0573 0.0573 0.0573 0.0000 0.0000 0.0573 0.1146 0.0573 0.0000
        0.0000 0.0000 0.0000 0.0000 0.0262
* HDBS
     14 0.0000 0.2656 0.0166 0.0166 0.0166 0.0166 0.0332 0.0332 0.0332 0.0498
        0.1162 0.0166 0.0498 0.0830 0.0166 0.0332 0.0498 0.0332 0.0000 0.0166
        0.0332 0.0166 0.0166 0.0000 0.0371
* HDBT
     15 0.0000 0.0000 0.0975 0.0293 0.1268 0.1170 0.0780 0.0878 0.0390 0.0975
        0.0878 0.0585 0.0098 0.0780 0.0488 0.0000 0.0098 0.0000 0.0098 0.0000
        0.0000 0.0000 0.0000 0.0000 0.0247
* MC
     16 0.0730 0.1209 0.1242 0.1012 0.0999 0.0756 0.0539 0.0394 0.0362 0.0342
        0.0316 0.0309 0.0197 0.0171 0.0131 0.0151 0.0151 0.0046 0.0059 0.0125
        0.0105 0.0059 0.0085 0.0020 0.0489
```

ATTACHMENT 9

ffx.rdt

```
REG DIST
* LDV
      1 0.0583 0.0773 0.0804 0.0814 0.0793 0.0876 0.0733 0.0659 0.0609 0.0517
        0.0526 0.0433 0.0357 0.0293 0.0246 0.0215 0.0158 0.0112 0.0089 0.0064
        0.0047 0.0030 0.0018 0.0011 0.0239
* LDT1
      2 0.0556 0.0261 0.1021 0.1358 0.1089 0.0633 0.0733 0.0668 0.0797 0.0726
        0.0137 0.0132 0.0112 0.0121 0.0149 0.0109 0.0200 0.0246 0.0213 0.0138
        0.0054 0.0041 0.0014 0.0018 0.0474
* LDT2
      3 0.0747 0.1154 0.0966 0.1027 0.0887 0.0899 0.0713 0.0674 0.0566 0.0460
        0.0411 0.0344 0.0255 0.0161 0.0147 0.0105 0.0094 0.0073 0.0056 0.0044
        0.0026 0.0016 0.0010 0.0005 0.0160
* LDT3
      4 0.0852 0.1392 0.1170 0.1039 0.0902 0.0870 0.0746 0.0446 0.0373 0.0326
        0.0354 0.0278 0.0174 0.0124 0.0094 0.0123 0.0131 0.0106 0.0078 0.0061
        0.0049 0.0034 0.0020 0.0009 0.0252
* LDT4
      5 0.0989 0.1884 0.1345 0.0825 0.0848 0.0795 0.1031 0.0648 0.0515 0.0207
        0.0173 0.0182 0.0090 0.0041 0.0044 0.0064 0.0085 0.0074 0.0034 0.0015
        0.0013 0.0012 0.0007 0.0006 0.0075
* HDV2B
      6 0.0572 0.1206 0.1153 0.0894 0.0889 0.0795 0.0639 0.0333 0.0519 0.0362
        0.0463 0.0296 0.0178 0.0161 0.0091 0.0143 0.0184 0.0125 0.0101 0.0128
        0.0085 0.0068 0.0045 0.0029 0.0538
* HDV3
      7 0.0791 0.0974 0.0875 0.0701 0.0824 0.0797 0.0785 0.0303 0.0414 0.0210
        0.0420 0.0270 0.0255 0.0204 0.0141 0.0225 0.0186 0.0443 0.0264 0.0144
        0.0123 0.0078 0.0039 0.0027 0.0510
* HDV4
      8 0.0493 0.0804 0.0726 0.0741 0.0694 0.1006 0.1080 0.0351 0.0954 0.0390
        0.0469 0.0509 0.0260 0.0170 0.0205 0.0252 0.0213 0.0162 0.0063 0.0047
        0.0059 0.0032 0.0024 0.0020 0.0276
* HDV5
      9 0.0916 0.1420 0.1526 0.0849 0.0823 0.1208 0.0982 0.0199 0.0464 0.0252
        0.0265 0.0199 0.0106 0.0119 0.0040 0.0093 0.0066 0.0146 0.0133 0.0027
        0.0000 0.0040 0.0000 0.0000 0.0127
* HDV6
     10 0.0899 0.0899 0.0633 0.0713 0.0787 0.0819 0.0633 0.0527 0.0516 0.0383
        0.0878 0.0223 0.0213 0.0165 0.0154 0.0191 0.0154 0.0101 0.0144 0.0207
        0.0112 0.0048 0.0005 0.0027 0.0570
* HDV7
     11 0.0229 0.0349 0.0220 0.0505 0.0578 0.0651 0.0587 0.0606 0.0422 0.0395
        0.0505 0.0294 0.0257 0.0349 0.0358 0.0523 0.0376 0.0413 0.0422 0.0303
        0.0257 0.0147 0.0055 0.0037 0.1165
* HDV8A
     12 0.0750 0.0683 0.0645 0.0472 0.0800 0.0750 0.0528 0.0583 0.0639 0.0645
        0.0539 0.0500 0.0361 0.0206 0.0189 0.0206 0.0222 0.0222 0.0133 0.0133
        0.0083 0.0106 0.0006 0.0022 0.0576
* HDV8B
     13 0.1166 0.0787 0.0496 0.0729 0.0700 0.1370 0.0612 0.1166 0.0641 0.0262
        0.0408 0.0204 0.0175 0.0087 0.0000 0.0204 0.0087 0.0408 0.0117 0.0029
        0.0058 0.0029 0.0000 0.0000 0.0262
* HDBS
     14 0.0000 0.1528 0.0476 0.0835 0.0977 0.0768 0.1136 0.0418 0.0267 0.0125
        0.0276 0.0367 0.0142 0.0209 0.0125 0.0200 0.1077 0.0033 0.0476 0.0058
        0.0058 0.0067 0.0000 0.0008 0.0371
* HDBT
     15 0.0015 0.0089 0.0044 0.0325 0.0591 0.1286 0.0266 0.2291 0.0975 0.0000
        0.0163 0.0281 0.0000 0.0015 0.0103 0.0163 0.0118 0.2409 0.0103 0.0089
        0.0384 0.0015 0.0000 0.0030 0.0247
* MC
     16 0.0816 0.0996 0.1318 0.1067 0.0957 0.0828 0.0634 0.0477 0.0323 0.0335
        0.0287 0.0260 0.0213 0.0168 0.0118 0.0093 0.0091 0.0083 0.0077 0.0110
        0.0091 0.0064 0.0050 0.0056 0.0489
```

ATTACHMENT 9

ldn.rdt

```
REG DIST
* LDV
      1 0.0701 0.0885 0.0845 0.0858 0.0849 0.0906 0.0744 0.0678 0.0584 0.0499
        0.0488 0.0382 0.0305 0.0248 0.0200 0.0173 0.0122 0.0091 0.0069 0.0055
        0.0033 0.0022 0.0015 0.0008 0.0239
* LDT1
      2 0.0729 0.0361 0.1077 0.1244 0.1044 0.0609 0.0729 0.0549 0.0542 0.0702
        0.0194 0.0114 0.0134 0.0161 0.0167 0.0087 0.0207 0.0241 0.0268 0.0207
        0.0067 0.0054 0.0020 0.0020 0.0474
* LDT2
      3 0.0936 0.1223 0.1018 0.1076 0.0953 0.0923 0.0688 0.0631 0.0536 0.0404
        0.0330 0.0289 0.0204 0.0130 0.0123 0.0081 0.0083 0.0069 0.0050 0.0038
        0.0026 0.0014 0.0007 0.0007 0.0160
* LDT3
      4 0.0791 0.1548 0.1301 0.1094 0.0944 0.0863 0.0726 0.0408 0.0321 0.0298
        0.0325 0.0236 0.0168 0.0109 0.0071 0.0110 0.0114 0.0087 0.0065 0.0066
        0.0043 0.0033 0.0022 0.0007 0.0252
* LDT4
      5 0.0843 0.2201 0.1583 0.0939 0.0859 0.0730 0.0813 0.0622 0.0434 0.0150
        0.0158 0.0146 0.0070 0.0056 0.0012 0.0074 0.0066 0.0092 0.0040 0.0012
        0.0016 0.0008 0.0000 0.0002 0.0075
* HDV2B
      6 0.0624 0.1130 0.1114 0.0846 0.0894 0.0907 0.0653 0.0303 0.0547 0.0389
        0.0411 0.0290 0.0205 0.0135 0.0090 0.0132 0.0187 0.0122 0.0077 0.0123
        0.0122 0.0067 0.0055 0.0036 0.0538
* HDV3
      7 0.0885 0.1015 0.1015 0.0833 0.0924 0.0937 0.0853 0.0228 0.0592 0.0293
        0.0299 0.0228 0.0202 0.0124 0.0046 0.0098 0.0189 0.0306 0.0163 0.0091
        0.0085 0.0078 0.0007 0.0000 0.0510
* HDV4
      8 0.0488 0.0899 0.0910 0.0755 0.0932 0.1088 0.1021 0.0322 0.0966 0.0344
        0.0533 0.0466 0.0133 0.0144 0.0133 0.0122 0.0144 0.0178 0.0044 0.0056
        0.0011 0.0022 0.0000 0.0011 0.0276
* HDV5
      9 0.1255 0.1746 0.1555 0.1227 0.0873 0.0900 0.0982 0.0136 0.0136 0.0027
        0.0300 0.0164 0.0109 0.0027 0.0055 0.0082 0.0000 0.0082 0.0109 0.0000
        0.0082 0.0027 0.0000 0.0000 0.0127
* HDV6
     10 0.1027 0.1074 0.0408 0.0537 0.0782 0.0969 0.0712 0.0642 0.0338 0.0420
        0.0514 0.0222 0.0280 0.0187 0.0245 0.0187 0.0140 0.0233 0.0128 0.0140
        0.0117 0.0070 0.0035 0.0023 0.0570
* HDV7
     11 0.0434 0.0394 0.0197 0.0158 0.0473 0.0749 0.0473 0.0572 0.0710 0.0276
        0.0454 0.0513 0.0355 0.0335 0.0217 0.0434 0.0237 0.0434 0.0631 0.0276
        0.0256 0.0197 0.0020 0.0039 0.1165
* HDV8A
     12 0.0628 0.0488 0.0757 0.0428 0.1036 0.0528 0.0707 0.0468 0.0478 0.0339
        0.0737 0.0757 0.0299 0.0100 0.0179 0.0239 0.0289 0.0279 0.0120 0.0269
        0.0159 0.0100 0.0030 0.0010 0.0576
* HDV8B
     13 0.1546 0.0348 0.0464 0.0464 0.0850 0.1043 0.0773 0.1198 0.0734 0.0232
        0.0270 0.0464 0.0232 0.0039 0.0039 0.0116 0.0270 0.0155 0.0232 0.0193
        0.0000 0.0039 0.0000 0.0039 0.0262
* HDBS
     14 0.0000 0.1534 0.0614 0.1189 0.0460 0.0652 0.0115 0.1266 0.0345 0.0844
        0.0652 0.0345 0.0269 0.0077 0.0307 0.0192 0.0230 0.0115 0.0077 0.0153
        0.0153 0.0038 0.0000 0.0000 0.0371
* HDBT
     15 0.0615 0.1677 0.0783 0.0279 0.2739 0.0950 0.0475 0.0447 0.1174 0.0028
        0.0000 0.0252 0.0084 0.0000 0.0224 0.0000 0.0000 0.0000 0.0028 0.0000
        0.0000 0.0000 0.0000 0.0000 0.0247
* MC
     16 0.0980 0.0950 0.1421 0.1139 0.1033 0.0733 0.0562 0.0428 0.0360 0.0355
        0.0267 0.0186 0.0199 0.0146 0.0093 0.0146 0.0091 0.0055 0.0073 0.0066
        0.0088 0.0053 0.0043 0.0043 0.0489
```

ATTACHMENT 9

pw.rdt

```
REG DIST
* LDV
      1 0.0538 0.0757 0.0783 0.0773 0.0748 0.0850 0.0690 0.0652 0.0625 0.0538
        0.0558 0.0461 0.0394 0.0318 0.0269 0.0230 0.0172 0.0127 0.0098 0.0071
        0.0048 0.0033 0.0017 0.0011 0.0239
* LDT1
      2 0.0721 0.0336 0.0828 0.0991 0.0950 0.0554 0.0599 0.0540 0.0625 0.0632
        0.0233 0.0152 0.0192 0.0207 0.0177 0.0196 0.0229 0.0440 0.0403 0.0244
        0.0085 0.0100 0.0063 0.0030 0.0474
* LDT2
      3 0.0641 0.1023 0.0895 0.0980 0.0839 0.0875 0.0673 0.0666 0.0607 0.0489
        0.0471 0.0415 0.0289 0.0202 0.0176 0.0136 0.0123 0.0102 0.0080 0.0067
        0.0038 0.0029 0.0013 0.0012 0.0160
* LDT3
      4 0.0646 0.1297 0.1155 0.1056 0.0819 0.0819 0.0755 0.0456 0.0412 0.0415
        0.0410 0.0348 0.0206 0.0179 0.0105 0.0130 0.0141 0.0113 0.0102 0.0071
        0.0051 0.0034 0.0020 0.0009 0.0252
* LDT4
      5 0.0857 0.1932 0.1221 0.0772 0.0839 0.0795 0.1052 0.0756 0.0588 0.0212
        0.0165 0.0163 0.0096 0.0061 0.0036 0.0065 0.0088 0.0127 0.0042 0.0026
        0.0009 0.0008 0.0011 0.0005 0.0075
* HDV2B
      6 0.0548 0.1109 0.1124 0.0834 0.0873 0.0861 0.0666 0.0320 0.0559 0.0362
        0.0432 0.0312 0.0198 0.0152 0.0084 0.0159 0.0208 0.0152 0.0115 0.0134
        0.0118 0.0067 0.0054 0.0020 0.0538
* HDV3
      7 0.1147 0.1147 0.0980 0.0832 0.0851 0.0858 0.0921 0.0237 0.0355 0.0174
        0.0300 0.0203 0.0233 0.0126 0.0063 0.0118 0.0152 0.0314 0.0166 0.0104
        0.0052 0.0092 0.0037 0.0026 0.0510
* HDV4
      8 0.0509 0.0653 0.0692 0.0771 0.0842 0.1117 0.1104 0.0366 0.0718 0.0379
        0.0457 0.0451 0.0209 0.0248 0.0144 0.0261 0.0274 0.0261 0.0085 0.0052
        0.0059 0.0033 0.0020 0.0020 0.0276
* HDV5
      9 0.0803 0.2208 0.1478 0.0912 0.0766 0.0839 0.1040 0.0109 0.0511 0.0255
        0.0237 0.0091 0.0091 0.0073 0.0109 0.0128 0.0055 0.0036 0.0073 0.0018
        0.0000 0.0018 0.0018 0.0000 0.0127
* HDV6
     10 0.0648 0.1083 0.0710 0.0786 0.0809 0.0977 0.0732 0.0755 0.0374 0.0328
        0.0511 0.0237 0.0237 0.0114 0.0198 0.0168 0.0153 0.0076 0.0145 0.0137
        0.0107 0.0069 0.0023 0.0053 0.0570
* HDV7
     11 0.0660 0.0330 0.0489 0.0502 0.0304 0.0634 0.0872 0.0383 0.0330 0.0225
        0.0555 0.0238 0.0198 0.0330 0.0225 0.0436 0.0436 0.0436 0.0436 0.0357
        0.0304 0.0145 0.0000 0.0013 0.1165
* HDV8A
     12 0.0977 0.0691 0.0670 0.0399 0.0527 0.0884 0.0670 0.0592 0.0513 0.0456
        0.0699 0.0449 0.0299 0.0164 0.0164 0.0200 0.0264 0.0299 0.0164 0.0100
        0.0121 0.0064 0.0021 0.0036 0.0576
* HDV8B
     13 0.1712 0.1062 0.0384 0.0561 0.0915 0.0915 0.0620 0.0679 0.0413 0.0325
        0.0266 0.0325 0.0531 0.0118 0.0059 0.0266 0.0177 0.0118 0.0089 0.0089
        0.0118 0.0000 0.0000 0.0000 0.0262
* HDBS
     14 0.0000 0.0195 0.0130 0.0065 0.0195 0.0130 0.0325 0.0130 0.0065 0.0520
        0.0325 0.1822 0.1431 0.0520 0.0651 0.0651 0.0651 0.1171 0.0260 0.0065
        0.0260 0.0065 0.0000 0.0000 0.0371
* HDBT
     15 0.1438 0.1514 0.1447 0.1447 0.0265 0.1192 0.0076 0.0558 0.0237 0.0066
        0.0076 0.0009 0.0170 0.0114 0.0095 0.0274 0.0293 0.0464 0.0000 0.0009
        0.0000 0.0000 0.0009 0.0000 0.0247
* MC
     16 0.0961 0.1148 0.1390 0.1098 0.0942 0.0741 0.0627 0.0408 0.0355 0.0315
        0.0270 0.0231 0.0173 0.0153 0.0089 0.0072 0.0102 0.0061 0.0068 0.0104
        0.0067 0.0057 0.0040 0.0038 0.0489
```

ATTACHMENT 9

va.dsf

DIESEL FRACTIONS :

0.0061 0.0030 0.0027 0.0035 0.0026 0.0021 0.0026 0.0023 0.0013 0.0013
0.0014 0.0003 0.0014 0.0018 0.0038 0.0014 0.0011 0.0004 0.0219 0.0110
0.0943 0.1164 0.1988 0.2568 0.2568
0.0113 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0260 0.0135 0.0000 0.0741 0.0741
0.0005 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000 0.0002 0.0000 0.0000 0.0016 0.0077
0.0060 0.0279 0.0124 0.0660 0.0660
0.0000 0.0006 0.0000 0.0000 0.0000 0.0000 0.0009 0.0025 0.0024 0.0017
0.0063 0.0017 0.0017 0.0022 0.0085 0.0000 0.0053 0.0130 0.0146 0.0123
0.0167 0.0262 0.0098 0.1098 0.1098
0.0000 0.0013 0.0000 0.0000 0.0000 0.0005 0.0011 0.0020 0.0033 0.0136
0.0185 0.0244 0.0077 0.0132 0.0102 0.0615 0.0166 0.0115 0.0086 0.0962
0.0938 0.3333 0.5238 0.1875 0.1875
0.2740 0.2754 0.2338 0.2220 0.2318 0.2109 0.2679 0.1337 0.2856 0.2529
0.2250 0.2596 0.2962 0.2274 0.2827 0.2096 0.1884 0.1637 0.1926 0.2264
0.2242 0.2134 0.2295 0.0857 0.0857
0.6954 0.4717 0.5553 0.5573 0.5687 0.5525 0.5621 0.4575 0.5762 0.6158
0.4281 0.4417 0.4278 0.4882 0.4231 0.3333 0.4867 0.4851 0.5549 0.4272
0.2051 0.2794 0.0714 0.0000 0.0000
0.8500 0.7937 0.7264 0.6023 0.5402 0.5722 0.5622 0.4634 0.5071 0.4831
0.5985 0.4318 0.5496 0.4561 0.2626 0.3548 0.3740 0.3186 0.0811 0.0000
0.0294 0.0000 0.0000 0.0000 0.0000
0.8750 0.8917 0.9245 0.9379 0.9054 0.8984 0.8516 0.8667 0.4750 0.4872
0.5745 0.7667 1.0000 0.7500 0.5000 0.7143 0.5000 0.2941 0.8000 0.0000
0.2500 0.0000 0.0000 0.0000 0.0000
0.9516 0.8228 0.6755 0.7821 0.9176 0.8782 0.8046 0.8524 0.8901 0.9096
0.9200 0.9300 0.9314 0.7746 0.6667 0.6386 0.7538 0.6667 0.5692 0.3867
0.4314 0.5556 0.6250 0.4706 0.4706
1.0000 1.0000 0.9865 0.9907 1.0000 0.9651 0.9325 0.9930 0.9160 0.9540
0.9766 1.0000 0.9412 0.9545 0.9863 0.9360 0.9048 0.8433 0.8151 0.6709
0.7429 0.8222 0.6250 0.7778 0.7778
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