A Quantitative Assessment of Driver Detention Times in Commercial Motor Vehicle Operations

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Background

- Detention time
  - Excessive delays CMV drivers experience when loading/unloading cargo
  - Industry commonly defines detention time as:
    - "any time drivers have to wait beyond 2 hours, which is the average time it takes to load or unload their cargo." – GAO, 2011
- Leads to reduced available driving time & lost revenue for drivers
- Drivers may violate HOS limits, improperly log their driving and duty times, and/or drive faster to make up for lost time
- Many factors contribute to detention time
  - E.g., facility limitations, poor service, facility scheduling

Relationship to Fatigue

- This study did not directly investigate fatigue
- Main goal of HOS regulations is to reduce driver fatigue and fatigue-related crashes
  - Risk of fatigue-related crash increases with the number of driving hours
- Excessive loading/unloading delays result in:
  - Longer working hours
  - HOS violations
  - Tight schedules
  - Driver frustration/ stress

→ FATIGUE

Research Objectives

- Quantitatively assess average CMV driver detention times
  - Duration and frequency of detention time
- Stratification variables:
  - Operation size (small, medium, large)
  - Operation type (for-hire, private, TL, LTL)
  - Freight type (dry bulk, refrigerated, van, liquid bulk, mixed, flatbed)

Method

- Two third-party technology vendors provided data
- GPS used to identify known delivery locations
  - Arrival and departure times at these locations
  - Couldn't separate waiting time from loading/unloading time
- Vendors provided 6 months of data
  - Vendor A: January – June 2013
  - Vendor B: December 2012 – May 2013
- Only Vendor A provided freight type information

Data Filtering

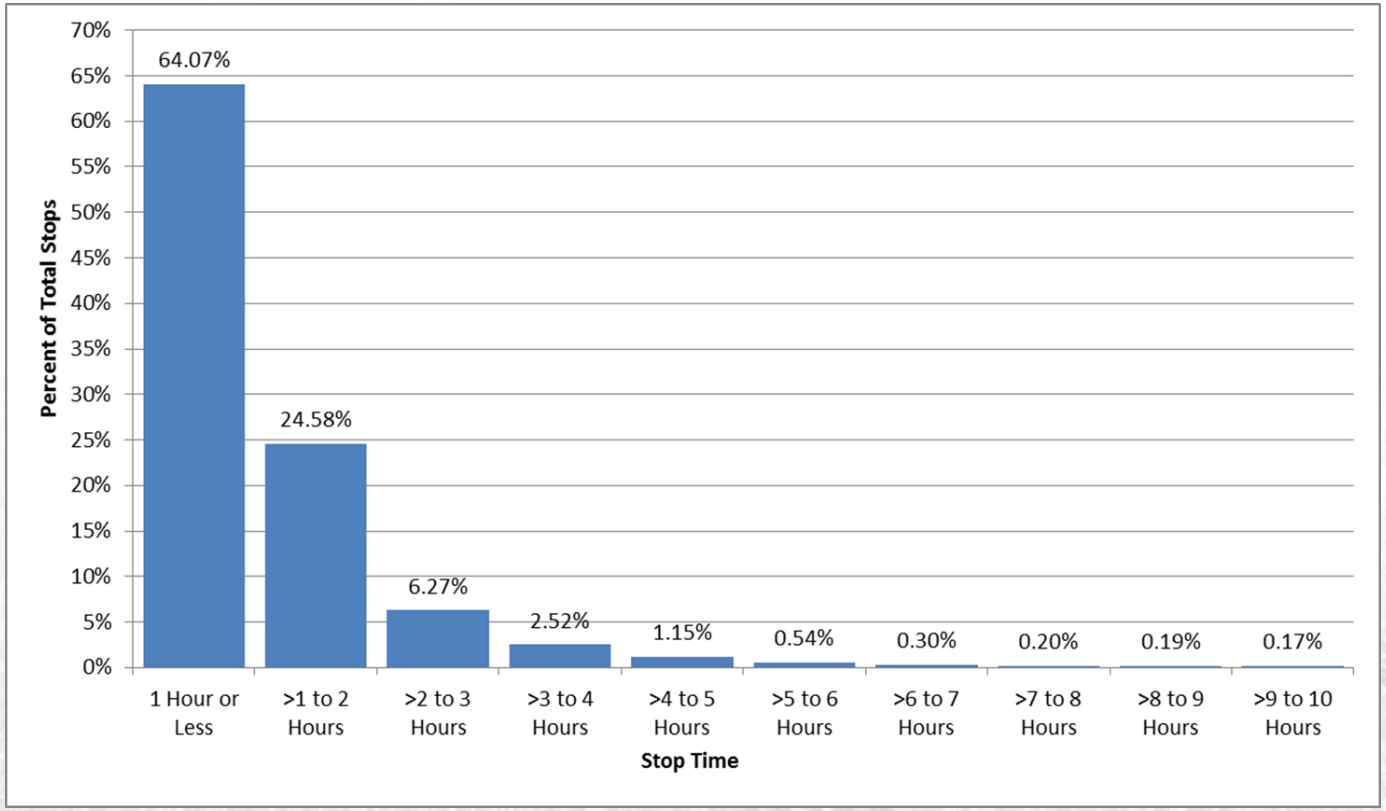
- Initial data set contained a large number of unrealistic values
  - E.g., zero, negative values, or values greater than 24 hours
- Industry experts advised setting lower and upper boundaries
  - Lower: 30 minutes – minimum time to load/unload
  - Upper: 10 hours – maximum stop time (arbitrary)
- Data filtering reduced data set by almost two-thirds
- Third boundary was set at 2 hours to reflect detention time
  - "Not detained" – 30 minutes to 2 hours
  - "Detained" – over 2 hours up to 10 hours
  - Allowed for comparisons of detained vs. not detained

Summary of the Data

	# of carriers	# of stops	% of stops
Operation Size	*n = 31*	*n = 1,348,897*	*n = 1,348,897*
Small	2	271	0.02
Medium	23	277,667	20.58
Large	6	1,070,959	79.40
Operation Type	*n = 31*	*n = 1,348,897*	*n = 1,348,897*
For-Hire TL	18	516,148	38.26
LTL	6	46,644	3.46
Private	7	786,105	58.28
Freight Type	*n = 28*	*n = 1,052,938*	*n = 1,052,938*
Bulk	2	23,368	2.22
Bulk/Tank	3	62,727	5.96
Mixed	1	69	0.01
Reefer	6	51,752	4.92
Van	8	242,258	23.01
Van/Flatbed	3	30,585	2.90
Van/Reefer	5	642,169	60.99

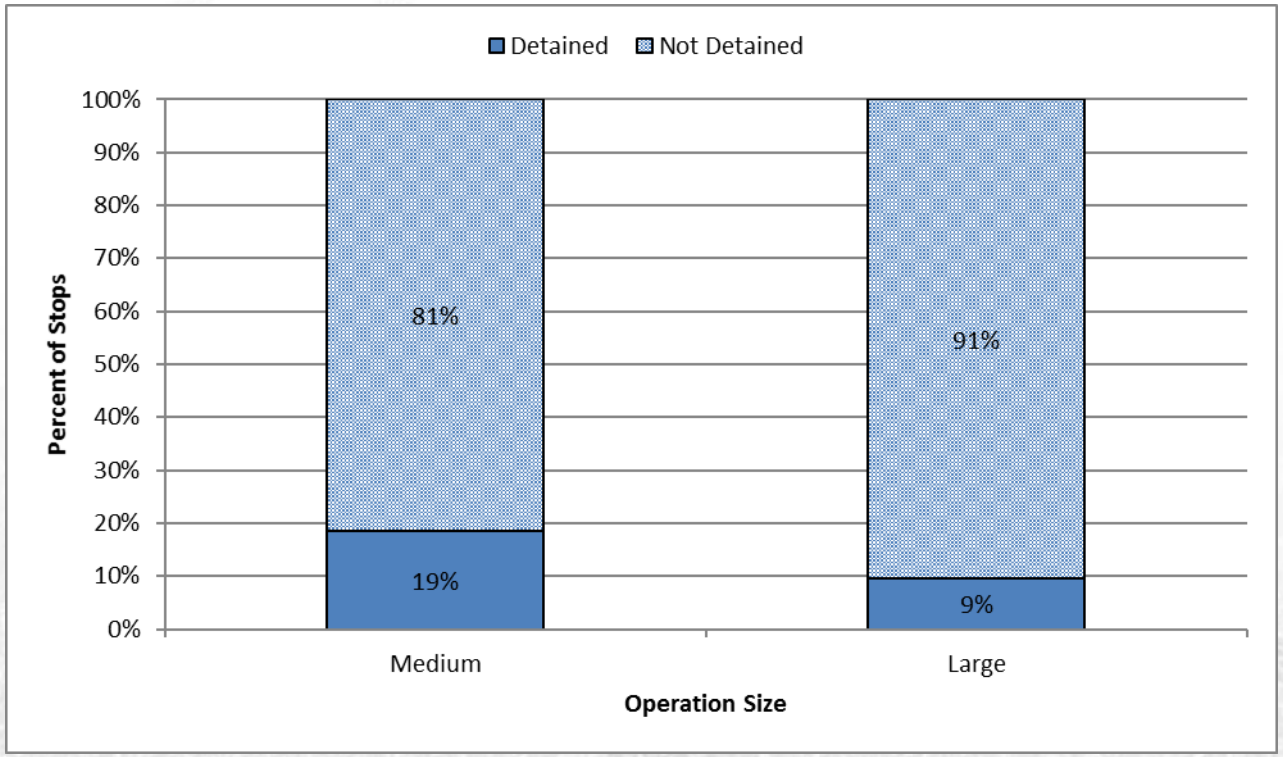
- Total of 31 carriers
- Nearly 1.35 million stops
- Majority of carriers were:
  - medium sized (51-500 trucks)
  - For-hire TL
  - Reefer and van freight type
- Majority of stop time data:
  - Large carriers (500+ trucks)
  - Private
  - Van/reefer combined

Overall Stop Time & Detention Time



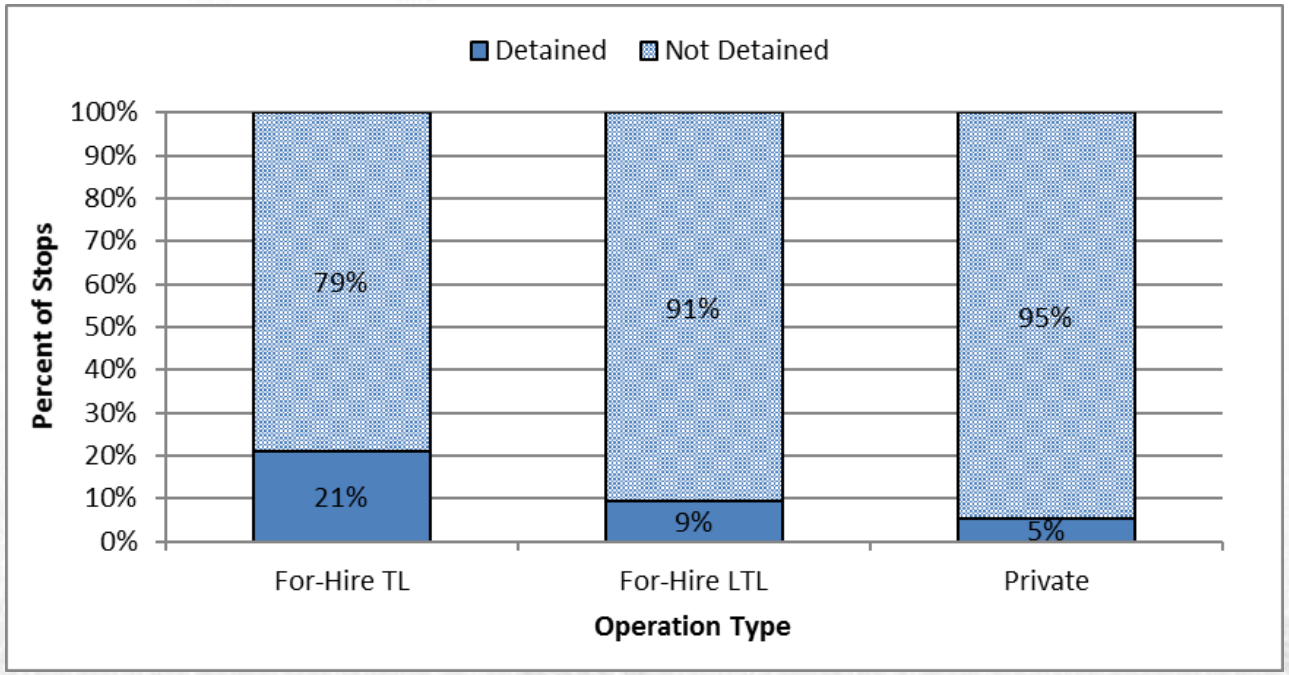
- ~89% of the stops were between 30 mins & 2 hours
- 11% of all stops were over 2 hours
- Average detention time = 1.4 hours
  - In addition to the 2 hours loading/unloading time
- Approximately 1 in every 10 stops results in a stop time of 3.4 hours
  - Loading/unloading + waiting

Detention Time by Operation Size



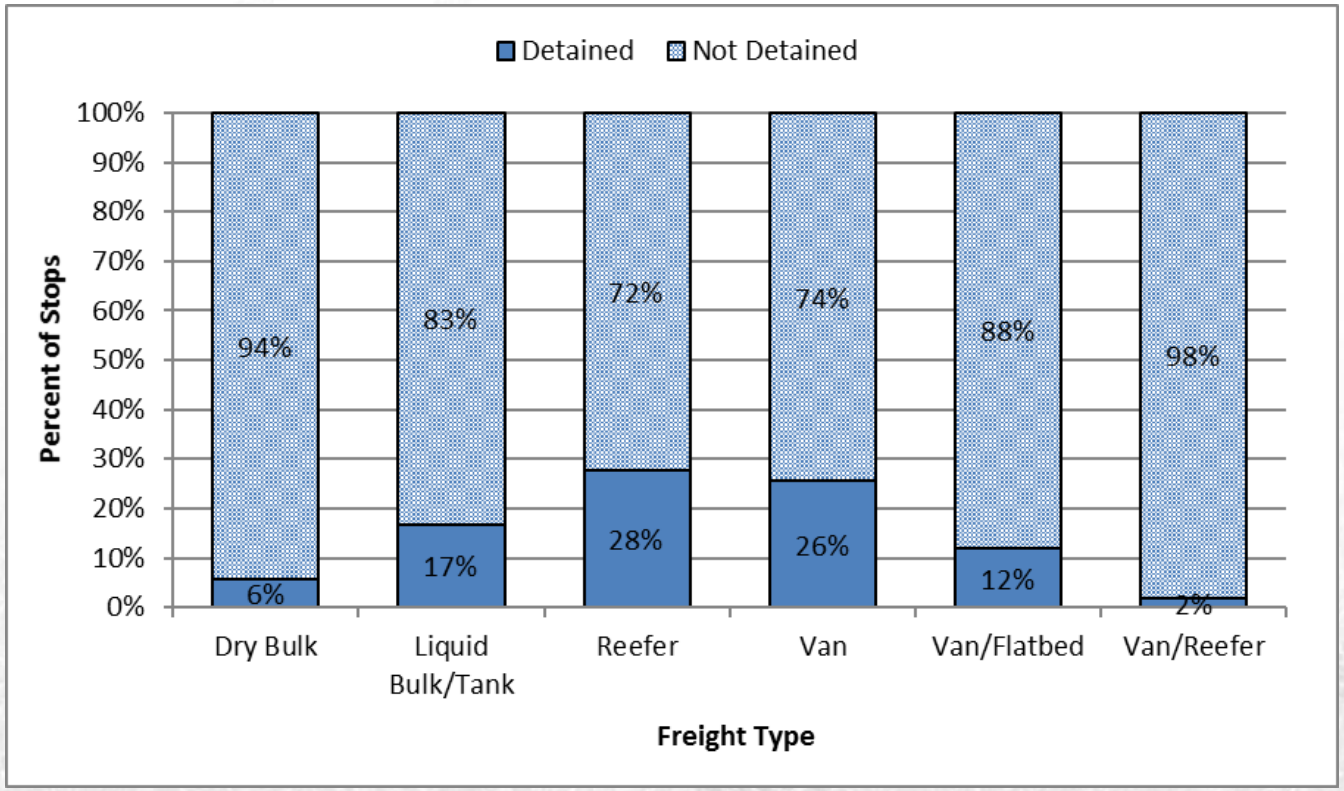
- Average detention time
  - Medium carriers: 1.5 hours
  - Large carriers: 1.3 hours
- Similar duration but different frequency of detention time
  - Medium carriers: 19% of stops
  - Large carriers: 9% of stops
- Odds ratio
  - Medium vs. large = 2.17

Detention Time by Operation Type



- Average detention time
  - TL: 1.5 hours
  - LTL: 1.5 hours
  - Private: 1.2 hours
- Similar duration but different frequency of detention time
  - TL: 21% vs. Private: 5%
- Odds ratios
  - TL vs. LTL = 2.6
  - TL vs. Private = 4.9
  - LTL vs. Private = 1.9

Detention Time by Freight Type



- Average detention time
  - Reefer: 1.7 hours
  - Van: 1.6
  - Dry & Liquid Bulk: 1.1 hours
- Reefer & Van freight types
  - longest average duration
  - most frequent detention time
- Odds ratios
  - Reefer vs. Dry Bulk = 6.3
  - Reefer vs. Liquid Bulk= 1.9
  - Reefer vs. Van = 1.1
  - Van vs. Dry Bulk = 5.7
  - Van vs. Liquid Bulk = 1.7

Discussion

- Unique method to identify detention time
  - Only study (known to us) to obtain objective measures of detention time
- Previous studies based on self-report data from interviews
  - Makes it difficult to directly compare results
- Is 1.4 hours of detention time problematic?
  - Majority of stops completed in 1 hour or less (64%)
  - Problem is the snowball effect ➡ miss next delivery window so get held up again, run out of hours, etc.
  - Temptation to try and make up for lost time

Discussion

- Drivers of refrigerated trucks were worse off than others
  - Detained more frequently and for longer durations
  - Van freight (i.e., dry goods, not temperature controlled) not far behind
  - One in every four stops resulted in detention time
- Potential effects of cumulative stop time
  - Multiple stops per shift
  - Each stop just under 2 hours so doesn't qualify as "detention time"
  - Cumulative total still adds up to a sizeable chunk of daily working limit

Caveats

- Lack of data from small carriers and owner-operators
- Not possible to separate waiting time from loading/unloading time
  - Need button press system to tease the two apart
- Only included stops from known delivery locations where drivers were logged as on-duty
  - No way to know what drivers were doing at stops
  - E.g., If a driver changed duty status to off-duty because of excessive waiting or loading/unloading time, that stop was not included
- Need to link stop time data to crashes, violations, & work hours

Thanks for listening!

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