

Effects of Bus Transit Operators Schedule on Safety



Overview of Previous the Project

- Evaluate the adequacy of 8-hour minimum rest time
- mine the maximum of 12-hour driving time
- Assess the maximum of 12-hour on duty time

Objective

- Examine additional hours driving outside the transit agency
- Evaluate the split time and its effects on operator's fatigue
- Estimate optimum daily split time

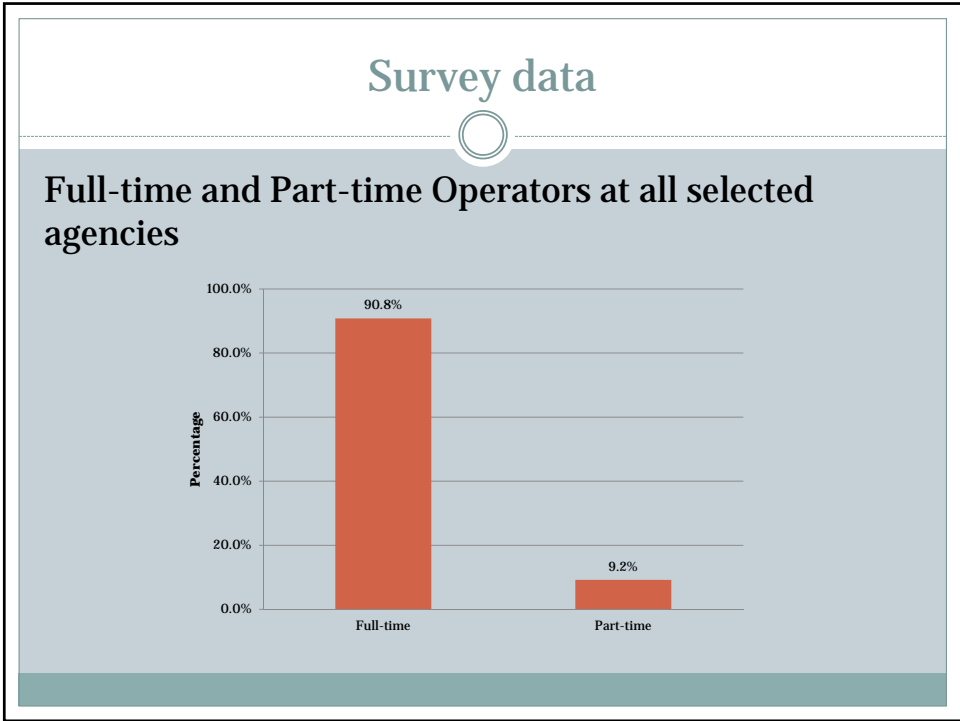
Research

Data collection process

- **Selected agencies:**
 - JTA (Jacksonville)
 - HART (Tampa)
 - LYNX (Orlando)
 - Miami Dade
 - Tallahassee
- **Types of data collected:**
 - Operators schedule involved in preventable accidents/incidents
 - Regular schedules of all drivers
 - Questionnaires survey

Overall data

Agencies	No. of drivers		
	Accident	Survey	Total
JTA(JACKSONVILLE)	127	49	350
LYNX (ORLANDO)	137	58	363
HART (TAMPA)	100	97	329
MIAMI	205	144	608
TALLAHASSEE	104	62	



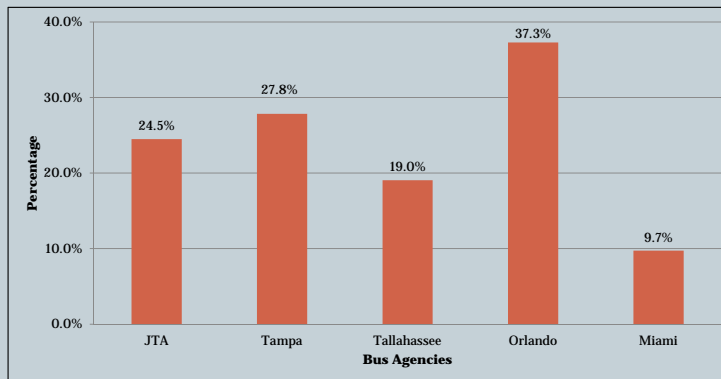
Survey data

Split time

Agent	No. of comment related to split time	total # of survey	Percentage
JTA	12	49	24.5%
Tampa	27	97	27.8%
Tallahassee	12	63	19.0%
Orlando	22	59	37.3%
Miami	14	144	9.7%

Survey data

Percentage of drivers concern about splits



Survey data

What operators most concerned about?

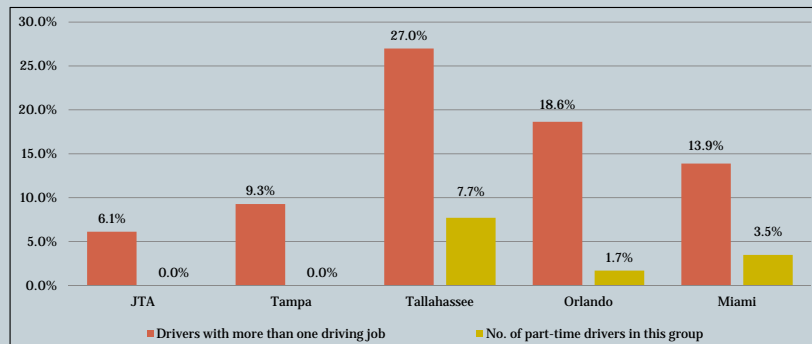
- 21.1% of drivers from all agencies commented about split time and hope to remove or reduce it.
- Operators from Miami Dade did not significantly concern about splits (got paid during split hours).
- 3 drivers in this group at Tampa agency are part-time while there only 1 part-time driver at Miami agency.

Operators with more than one driving job

Agency	Total	No. of drivers involved 2nd driving job	Percentage	% Part-time	Part-time
JTA	49	3	6.1%	0.0%	0
Tampa	97	9	9.3%	0.0%	0
Tallahassee	63	17	27.0%	7.7%	4
Orlando	59	11	18.6%	1.7%	1
Miami	144	20	13.9%	3.5%	5

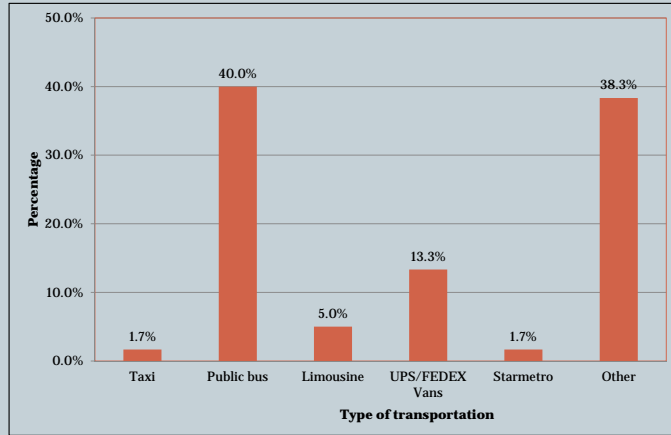
Survey data

Proportions of drivers involved with more than one driving job



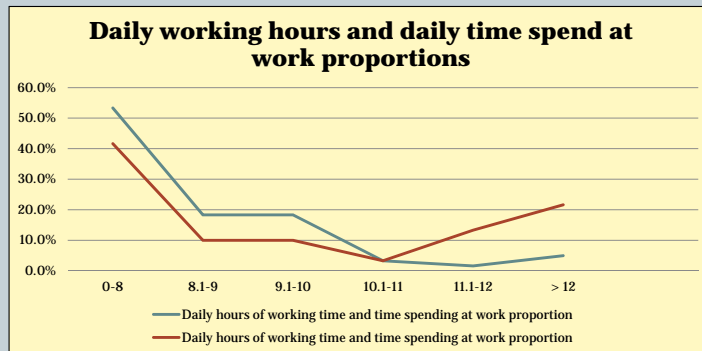
Survey data

Types of secondary driving job



Survey data

Daily hours of working time and time spending at work of drivers with more than 1 driving job



Survey data

- **Survey Results:**

- 21.1% of drivers from all agencies do not like splits schedules accept drivers from Miami Dade location.
- Revealed a reasonable number of operators who have another driving job outside their current agencies.
- Type of secondary driving transportation were listed as: Public Buses, UPS/FEDEX Vans, Limousine, Taxi, and “Other”
- There is a noticeable trend between real working time and time spend at work.

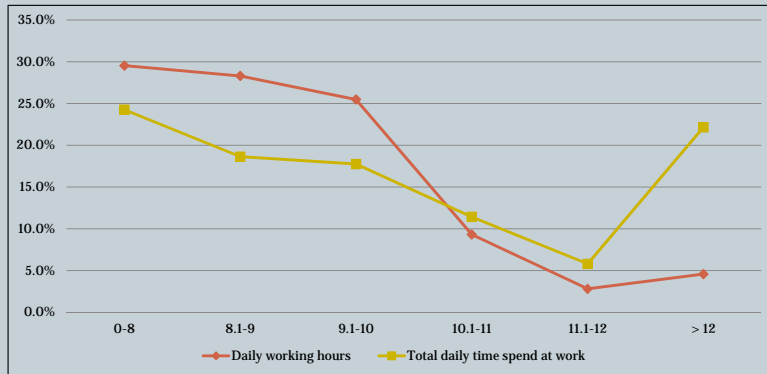
Schedules data

Drivers' schedules during the week of accident occurrence

Agencies	Drivers involved in accidents		
	Fleet size	With split	Without split
JTA	127	84	43
Miami	205	142	63
Orlando	137	88	49
Tampa	100	45	55
Tallahassee			

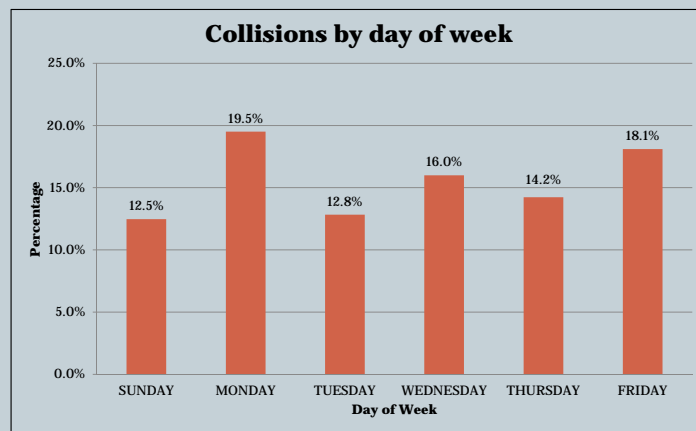
Schedules data

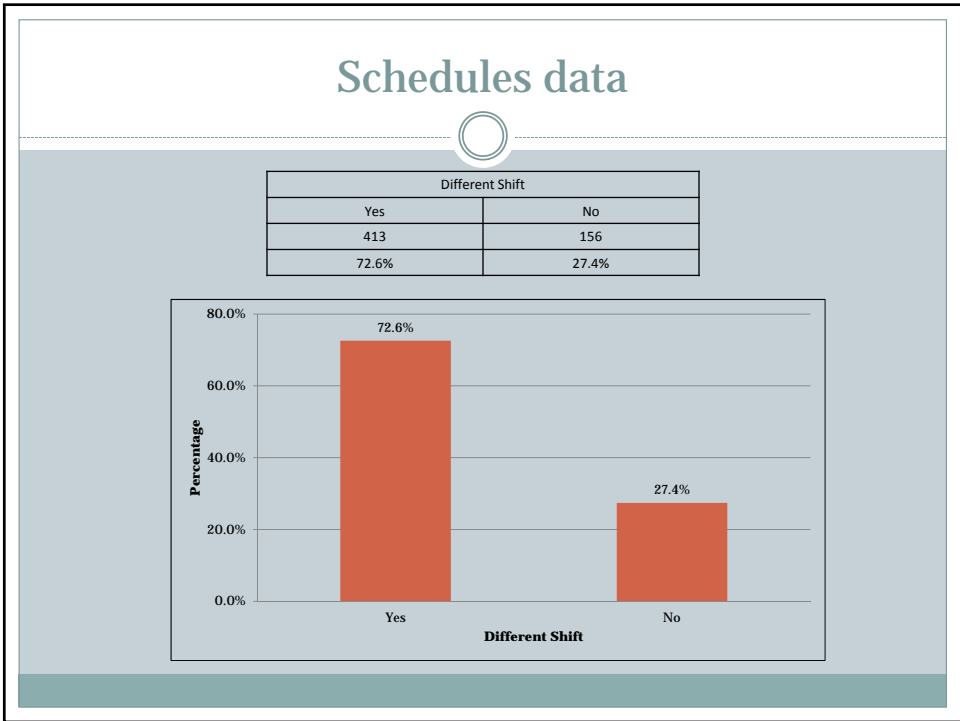
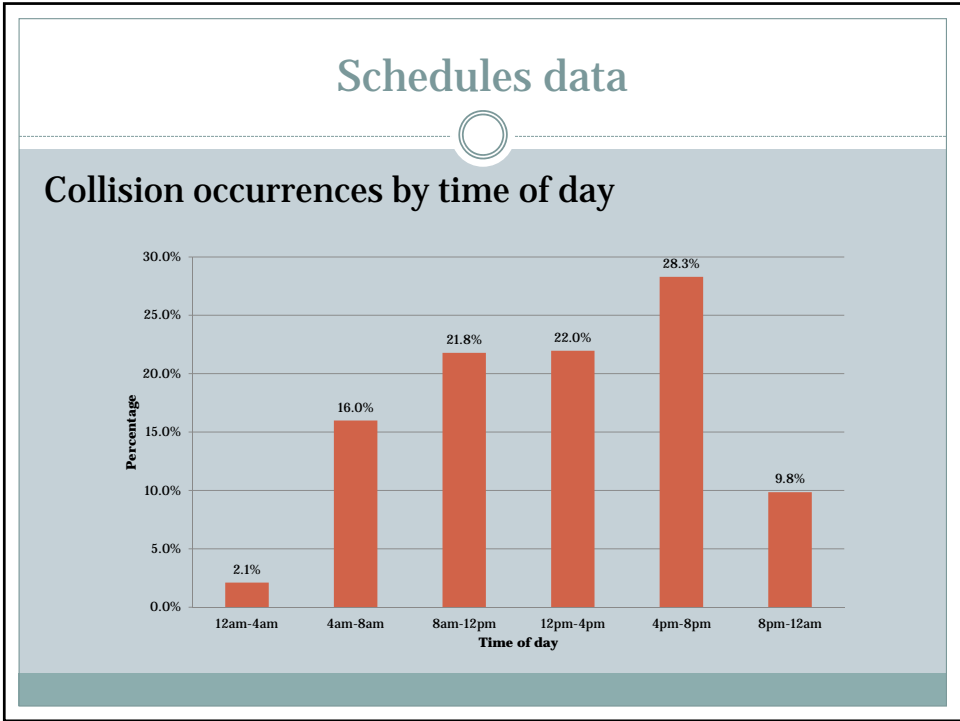
A comparison between daily working hours and total daily time spend at work



Schedules Data

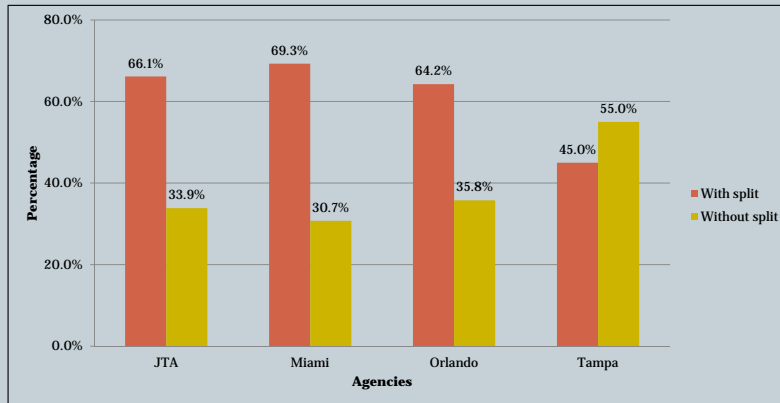
Collision Occurrences by day of week





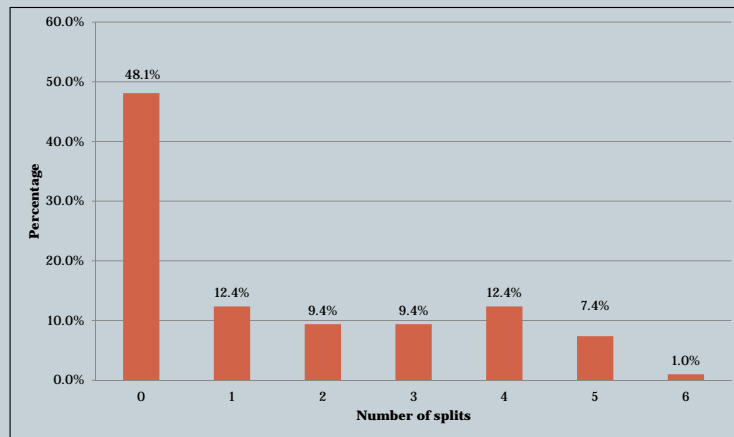
Schedules data

A comparison of drivers involved in accident with vs. without split



Schedules data

Number of splits of the week before accident



Schedules data

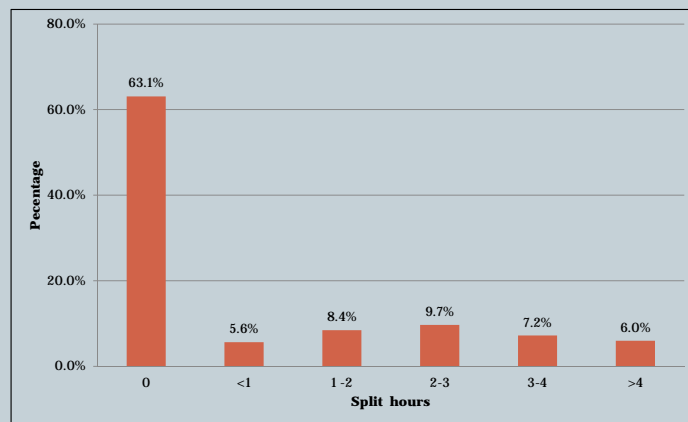


Split time during the day of accident					
0	<1	1-2	2-3	3-4	>4
359	32	48	55	41	34
63.1%	5.6%	8.4%	9.7%	7.2%	6.0%

Schedules data



Split hours during the day of accident

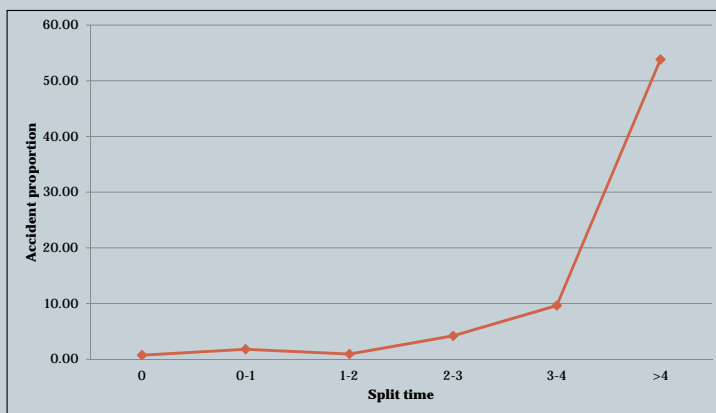


Schedules data

Split time	Number of accidents	Accident Proportion	Driving time	Time proportion	Accident proportion relative to time proportion
0	359	0.63	8959.6	0.85	0.74
0-1	32	0.06	329.1	0.03	1.81
1-2	48	0.08	943.3	0.09	0.94
2-3	55	0.10	242.6	0.02	4.21
3-4	41	0.07	79.0	0.01	9.64
>4	34	0.06	11.7	0.00	53.82
Total	569	1.00	10565	1.00	-

Schedules data

Accident Proportion relative to Exposure by Daily Split time



Conclusions

- **Schedules data results:**
 - An obvious trend between real working time and time spend at work of operators involved in accidents.
 - Collisions occurred most frequently between 4pm to 8pm.
 - Operators have different shifts had a higher chance of involving in accidents.
 - Accident rate relatively increase when drivers had longer split time.
 - The favorable period for split time is between 1 to 2 hours.

Recommendations

Questions

