SafeClear Performance Report 2008

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Executive Summary

Introduction

In January 2005, the City of Houston launched its SafeClear traffic incident management program. The program aimed to combat many of the problems that arose from the 'free-for-all' that occurred as tow operators raced towards disabled vehicles on Houston freeways. By improving tow operator response (dividing Houston freeways into segments with assigned operators responsible for their own segments), policy makers believed that they could reduce collisions.

An analysis conducted in 2006 looked at the first year of the program and concluded that the program was successful – i.e. SafeClear was having the desired effect of reducing collisions, congestion, and crash clearance times. The SafeClear Performance Report for 2008 took another look at the SafeClear program as part of continued evaluation efforts.

Key Findings

- Program performance metrics are consistent with those of previous years.
- With regards to performance metrics, the program is meeting the majority of established goals; however, there is room for improvement – in 2008, 89.8% of tows were responded to within 6 minutes, just short of the 90% goal.
- There is evidence that tow operators adjust their behavior to the price of gasoline, patrolling less as that sort of activity becomes more costly (see page 4).
- The SafeClear program continues to have an impact on reducing collisions on Houston area freeways.
    - Valuing the cost of a collision at $34,000 per collision, the reduction of approximately 120 collisions per month attributed to the SafeClear program results in savings to the public of $4,080,000 per month ($48,960,000 per year).
- Response time (i.e. how fast tow operators arrive at disabled vehicles) is correlated with the volume of collisions – a one minute decrease in average response time yields approximately 80 fewer collisions per month.

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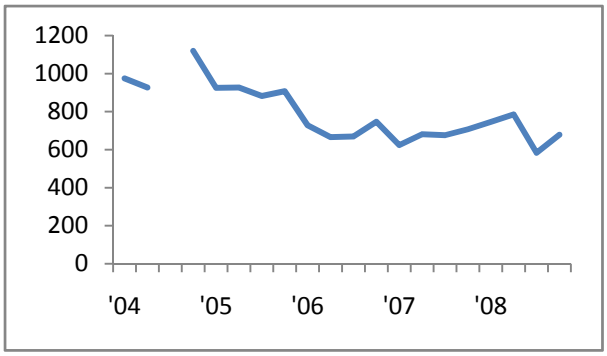
Overview

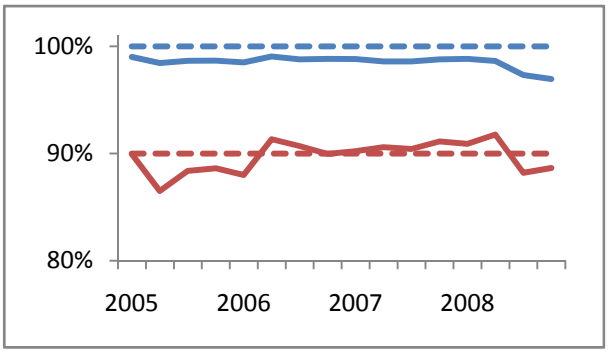
Collisions

Collision totals represent total crashes on Houston freeways.



Response Time

The amount of time between notification of the tow operator and arrival at the disabled vehicle.

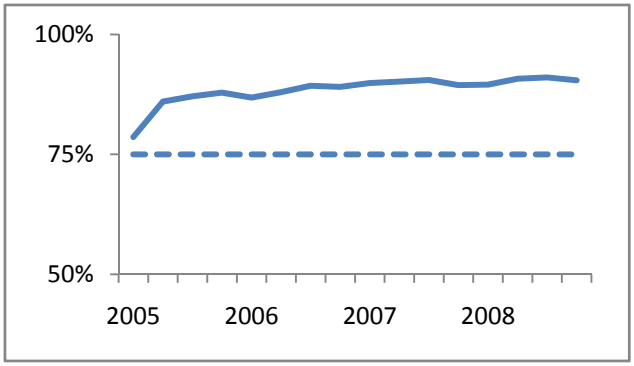


Goals:

100% within 20 min	✗	Actual – 97.9%
90% within 6 min	✗	Actual – 89.8%

Clearance Time

The amount of time between the arrival of the tow operator at the vehicle and the removal of the vehicle.

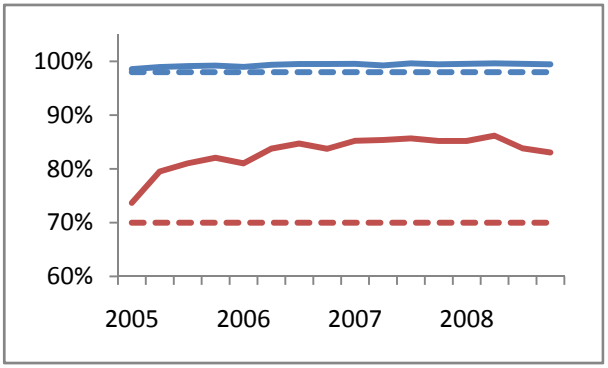


Goals:

75% within 20 min	✓	Actual – 90.5%

Duration

The amount of time elapsed between the notification of the tow operator and the removal of the disabled vehicle.



Goals:

98% within 90 min	✓	Actual – 99.5%
70% within 20 min	✗	Actual – 84.5%

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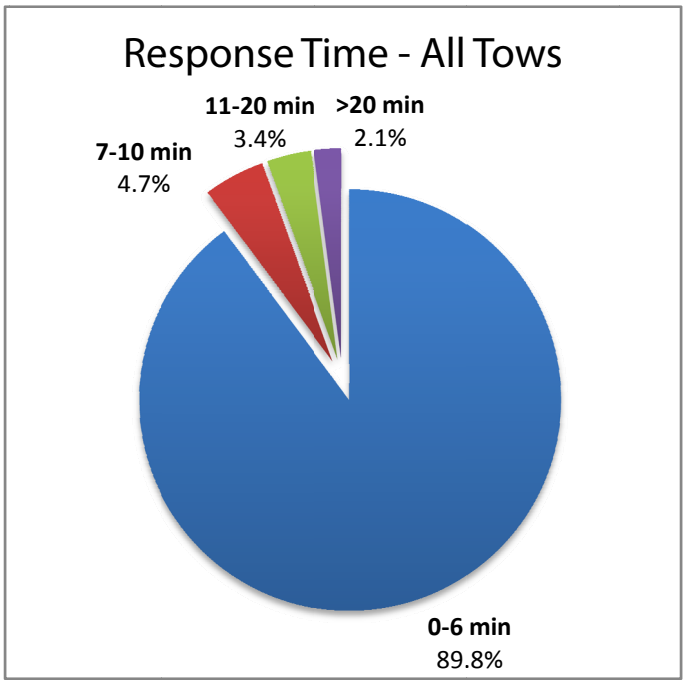
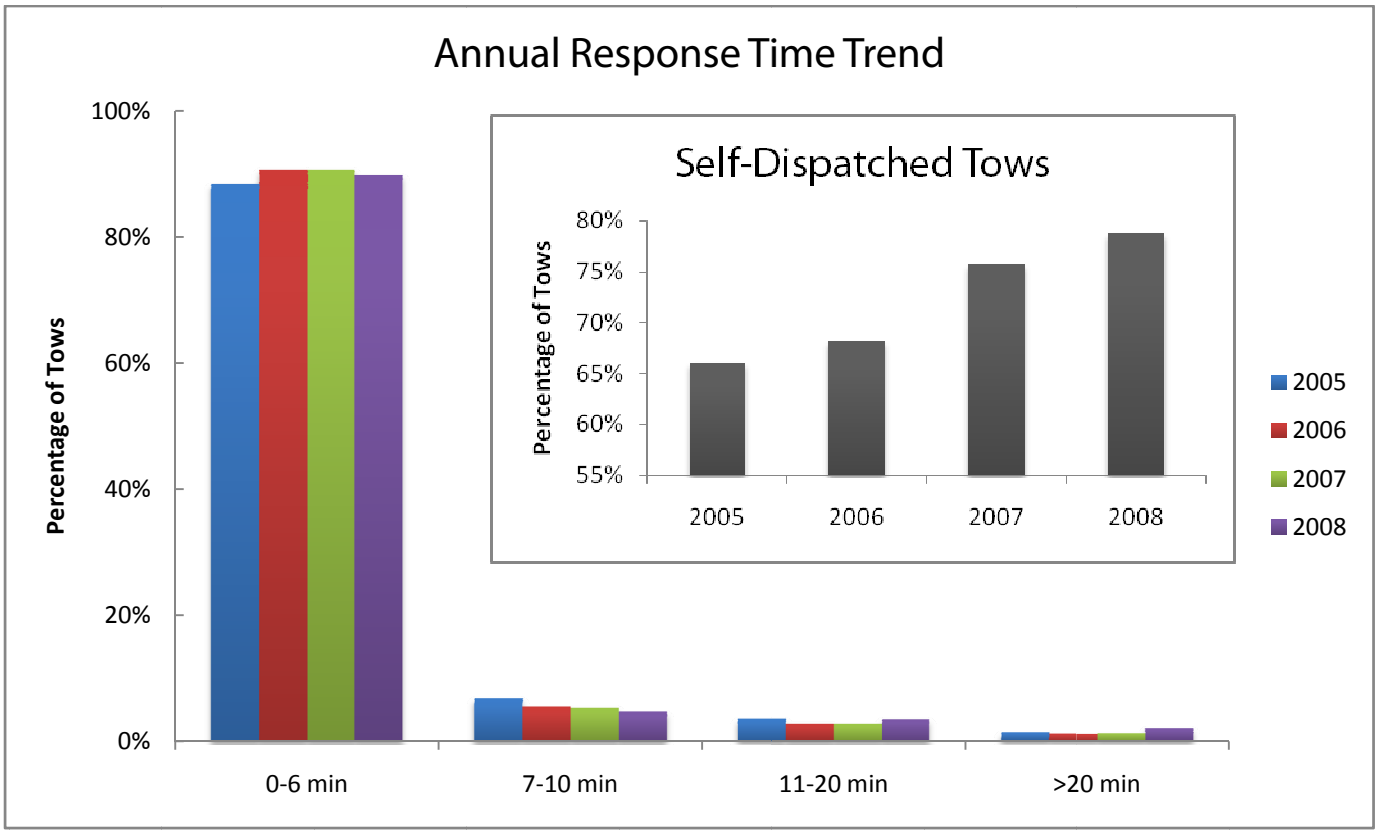
Response Time



- In 2008, 89.8% of all tows were responded to within six minutes.
- This number is consistent with performance in previous years, but falls just short of the 90% goal.
- Average response time was 1 minute 50 seconds (this figure includes self-dispatched tows).
- Discussed later in this report, response time is a driving force behind the SafeClear program: the quicker the response time, the fewer collisions on Houston freeways.



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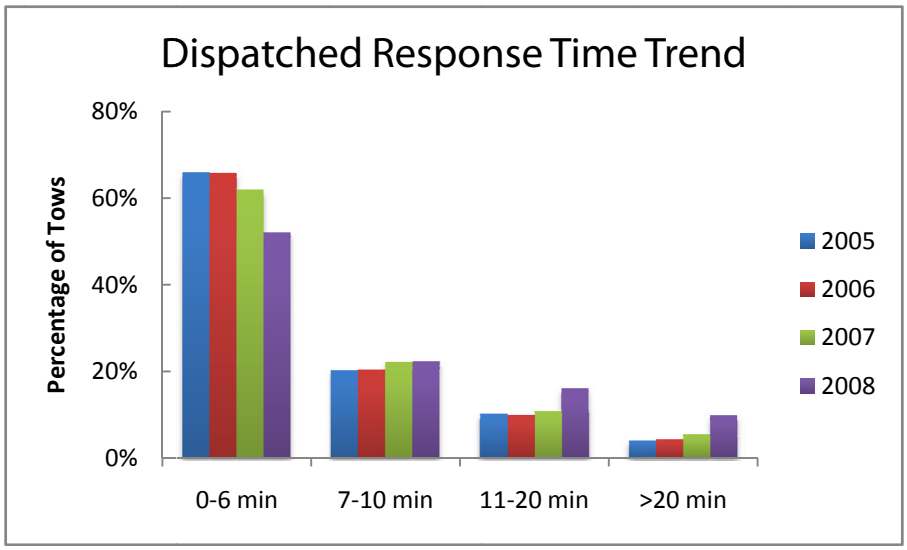
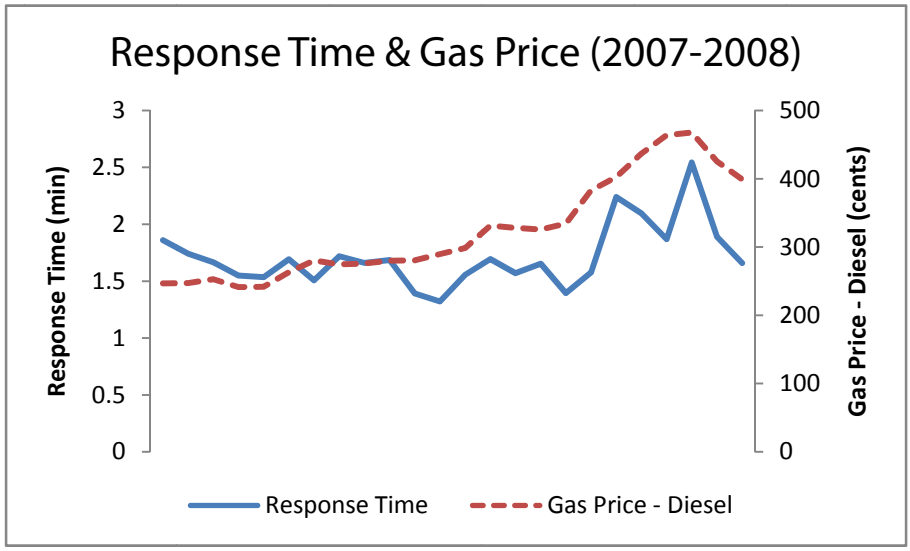


As in 2007, the proportion of dispatched SafeClear tows fell considerably in 2008 after remaining relatively constant between 2005 and 2006.

Dispatched response time is when a tow truck is called to assist a disabled vehicle by *Transtar*. Response time includes dispatched tows and situations when a tow truck operator locates a disabled vehicle (i.e. zero minute response time).



As the figure to the left shows, there is a correlation between gas price and response time. We hypothesize that as the price of a gallon of diesel increases (and with it, the cost of doing business for tow operators), operators adjust their behavior accordingly – patrolling highways less which results in a higher response time.

* In this graph, the gas price variable is lagged 3 months, reflecting the possibility of tow operators adjusting performance to pricing trends.

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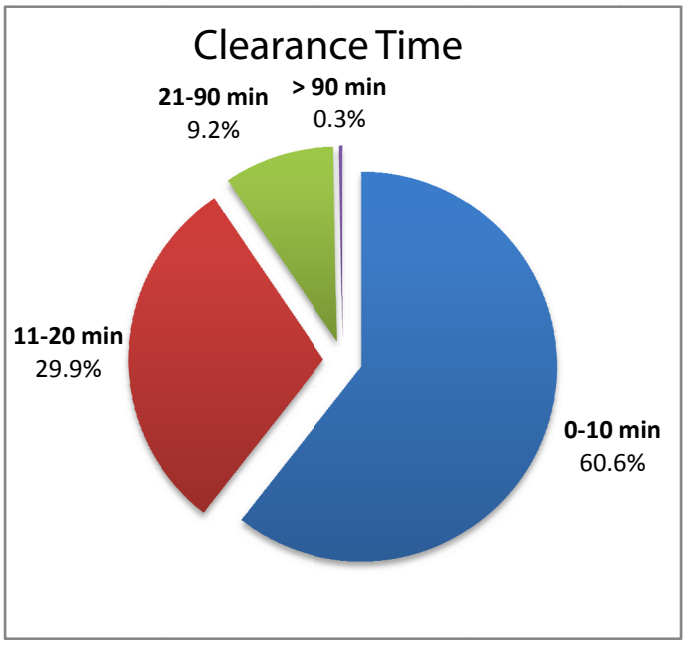
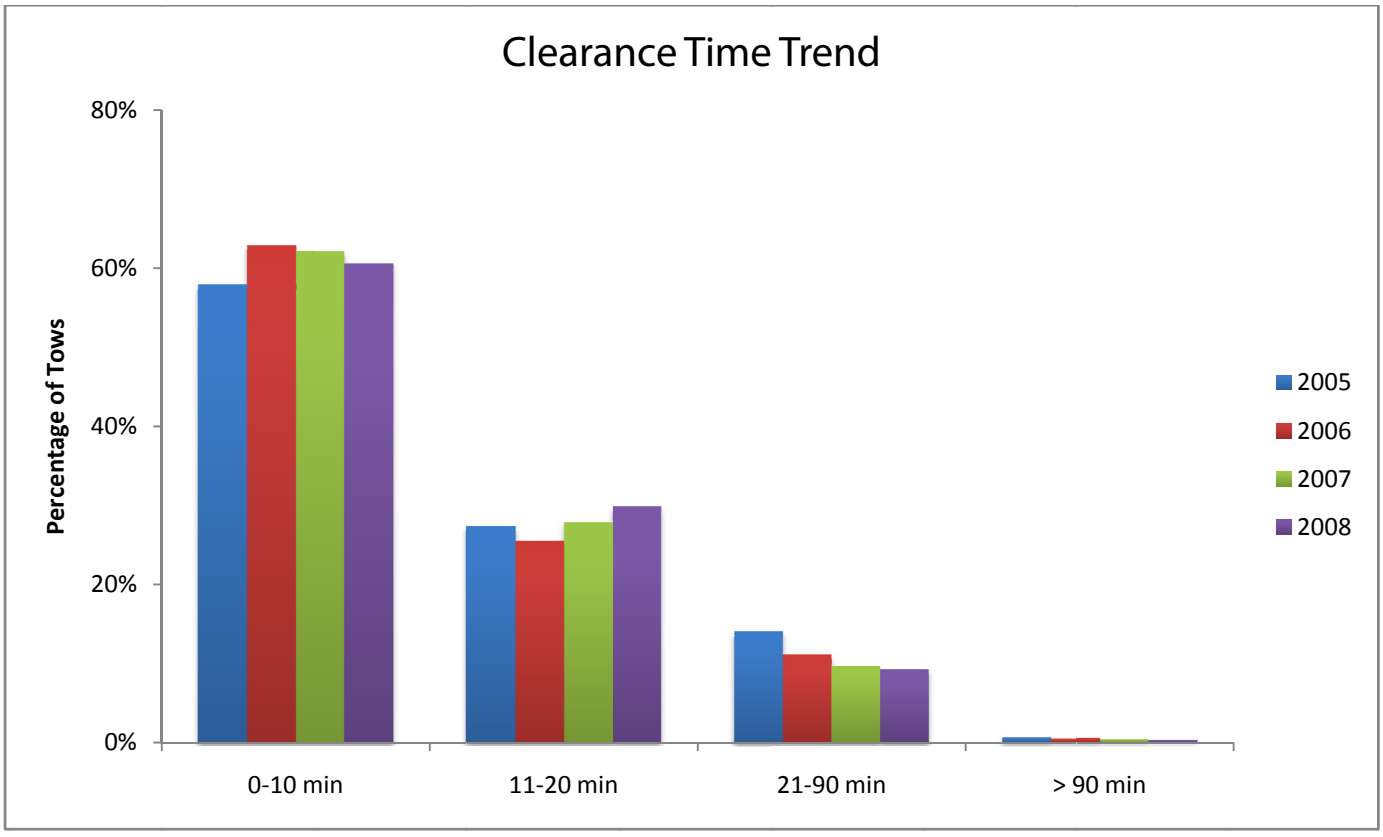
Clearance Time



- In both 2007 and 2008, the proportion of tows falling within the 0-10 minute category fell relative to their 2006 levels.
- This shift was accompanied by an increase in the percentage of tows falling within the 11-20 minute category.
- Overall program efficacy does not appear to have been significantly affected by the shift, perhaps because this reduction in the 0-10 minute category was also accompanied by a reduction in the proportion of tows falling within the 21-90 minute category.



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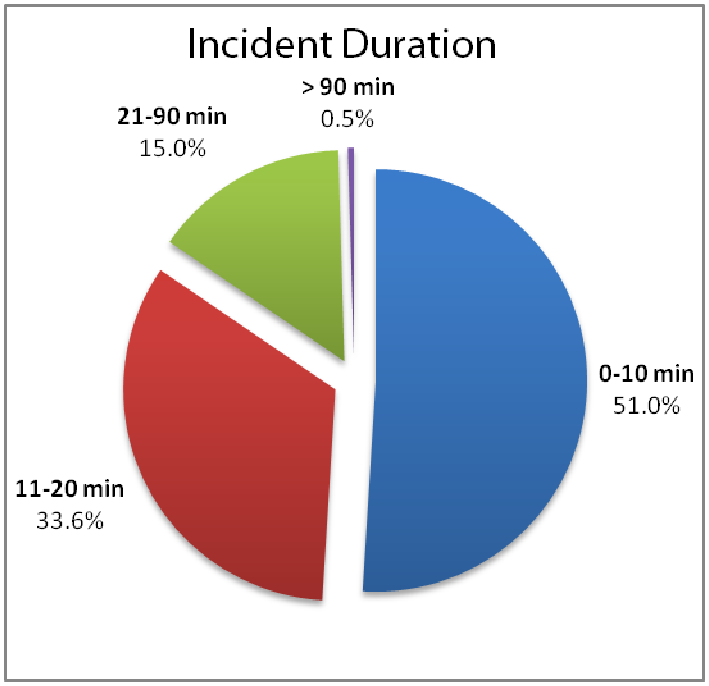
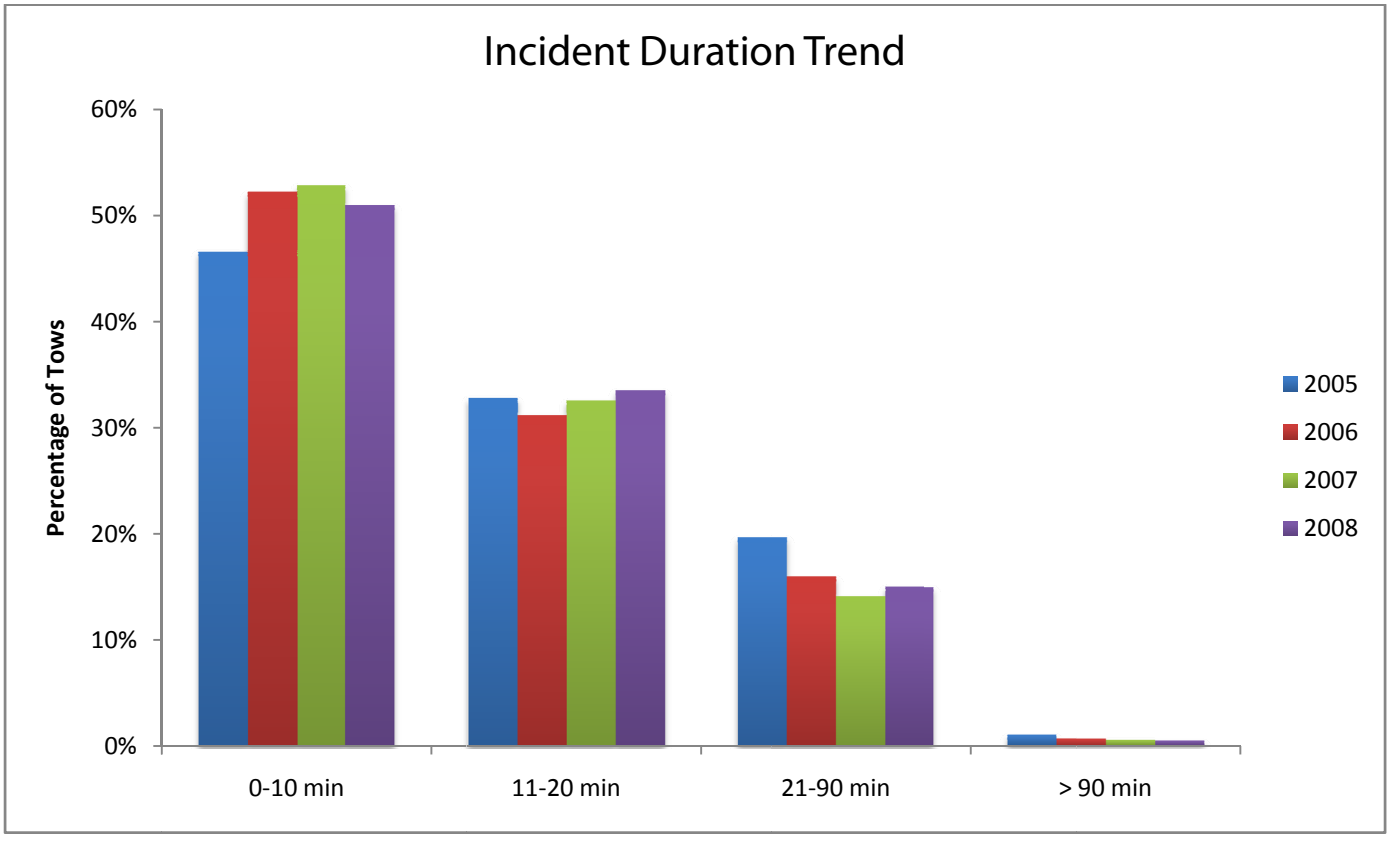
Incident Duration



- 51% of incidents were cleared within 10 minutes.
- Incident duration times are about the same in 2007 and 2008 but substantially better than in 2005.
- In 2005, once incident in 70 lasted more than 90 minutes; by 2008, only one incident in 200 lasted more than minutes - the result of locating and removing disabled vehicles more quickly.



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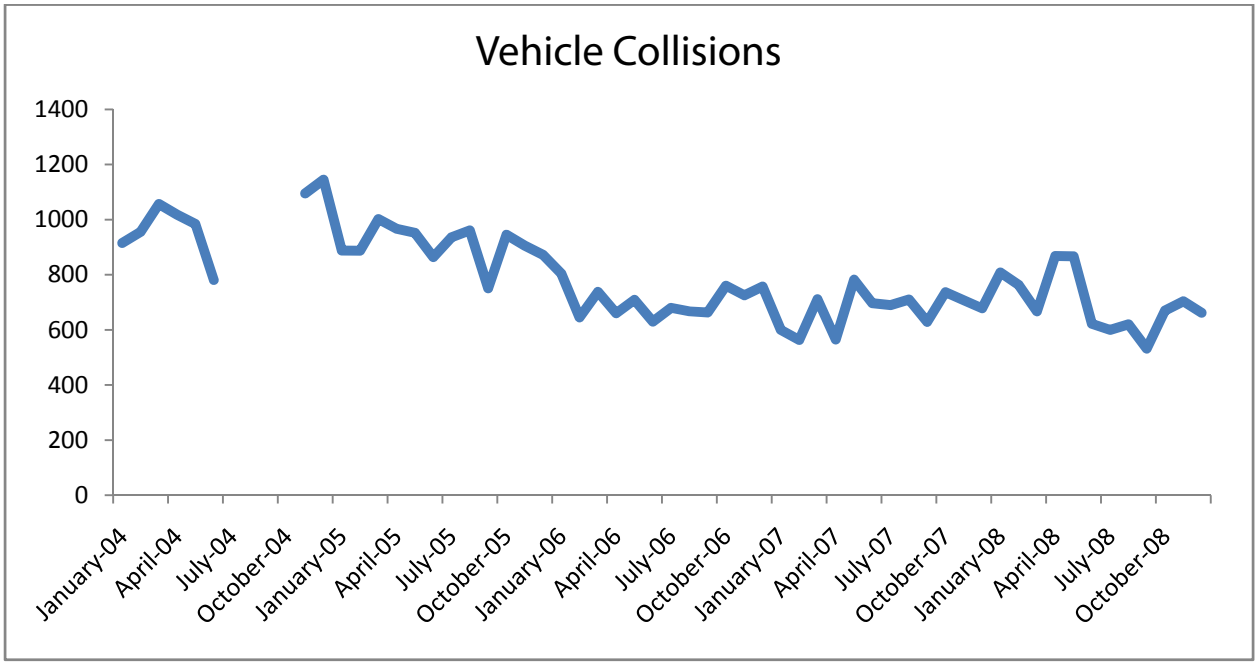
Collision Analysis



The chart above shows monthly collisions totals on Houston freeways between 2004 and 2008. This data has been obtained from the Texas Department of Transportation's (TxDOT) Crash Record Information System (CRIS). Data for four months in 2004 (July, August, September, and October) is not complete and is excluded.

One of the goals of the SafeClear program is to facilitate a reduction in "secondary" collisions that occur during bottlenecking. While collisions increased in 2008, this increase was minor; total collisions on Houston freeways for 2008 were consistent with observations from 2007. Additionally, the data show a "leveling off" of collisions after initial reductions seen when the program started in 2005.

Despite the gap in the data series, one can see visual evidence of a reduction in collisions after the SafeClear program's inception in January 2005. On the next page, this conclusion is confirmed by statistical analysis - the SafeClear program is significantly contributing to a reduction of collisions on Houston area freeways. Valuing the cost of a collision at $34,000 per collision, the reduction of approximately 120 collisions per month attributed to the SafeClear program results in savings to the driving public of $4,080,000 per month ($48,960,000 per year).

Program Effect

Predicting Monthly Collisions

Variable	Coefficient	Std. Error	T-Value	Significance
Constant	1065.0	314.2	3.39	.001*
SafeClear program	-118.6	52.8	-2.25	.029*
Rain days per month	-9.2	4.8	-1.90	.063*
Gas price (unleaded)	- 0.1	.3	-.39	.697
Vehicle miles travelled	.01	.0	.33	.745
Time (counter, 0-60)	-4.6	1.3	-3.60	.001*

*=significant

Regression analysis covering the period 2004-2008 shows that the SafeClear program has continued to contribute to a reduction in monthly collisions in Houston. The above model shows that the SafeClear program leads to approximately 120 fewer collisions per month.

The Adjusted R-Square value for this model is .545.

Response Time Effect

Predicting Monthly Collisions

Variable	Coefficient	Std. Error	T-Value	Significance
Constant	798.0	123.4	6.47	.000*
Time	-4.2	1.2	-3.60	.001*
Response Time	79.5	42.8	1.86	.070*

*=significant

This regression analysis shows the impact of response time. An increase of one minute in response time leads to, on average, approximately 80 more collisions per month.

The Adjusted R-Square value for this model is .402.

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Segment Performance

		Outliers Removed				
			Averages		Response Time Six Min. or Less	
Segment*	N	N	Response Time	Dispatched Response Time	N	% (Including Self-Dispatched)
1	2,132	2,109	1.51	9.31	1,957	91.79%
2	657	647	1.55	12.68	598	91.02%
3	774	765	2.58	9.44	653	84.37%
4	1,080	1,064	2.48	9.12	931	86.20%
5	1,123	1,116	1.27	7.70	1,049	93.41%
6	922	903	2.76	9.01	786	85.25%
7	1,855	1,832	1.96	10.37	1,622	87.44%
8	2,031	2,001	2.14	8.57	1,794	88.33%
9	1,546	1,522	1.06	8.24	1,453	93.98%
10	1,205	1,193	2.14	9.51	1,069	88.71%
11	5,104	5,044	1.32	9.84	4,697	92.03%
12	1,095	1,084	2.24	8.76	967	88.31%
13	729	717	2.42	9.43	631	86.56%
14	41	41	2.78	12.67	35	85.37%
15	2,924	2,875	2.28	8.61	2,550	87.21%
16	1,649	1,636	1.81	9.21	1,484	89.99%
17	883	877	1.68	8.50	802	90.83%
18	4,879	4,854	0.90	9.09	4,634	94.98%
19	2,130	2,109	1.31	10.59	1,959	91.97%
20	3,101	3,063	2.59	8.38	2,643	85.23%
21	2,392	2,364	2.26	7.97	2,114	88.38%
22	4,047	4,004	1.85	8.36	3,664	90.54%
23	1,018	1,004	1.51	7.68	936	91.94%
24	360	359	1.43	9.87	329	91.39%
25	3,350	3,313	1.41	8.33	3,095	92.39%
26	2,835	2,794	1.78	8.88	2,551	89.98%
27	2,287	2,251	2.47	9.24	1,951	85.31%
28	3,283	3,248	2.57	8.80	2,843	86.60%
29	845	830	1.93	7.54	752	88.99%
Overall	**56,277**	**55,619**	**1.83**	**8.86**	**50,549**	**89.82%**

* 253 cases were missing a segment identifier

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Notes on Data, Sources & Methodology

Unlike previous reports, collision data for this report was collected from the TxDOT's Crash Record Information System. We believe that this source provides greater data reliability.

In 2006, record keeping for the SafeClear program migrated to the Regional Incident Management System at Houston Transtar. Records for 2008, 2007, and most of 2006 are, therefore, in a different format than records from 2005 and early 2006. The differences in the record keeping systems have been reconciled and are not believed to affect the accuracy of this report.

Data Validity

In 2008, 902 cases were excluded due to invalid or missing data (1.6% of all cases).

	2005	2006	2007	2008
Invalid Cases	4,242 (7.0%)	2,529 (4.6%)	1,771 (3.2%)	902 (1.6%)
Valid Cases	56,175 (93.0%)	52,259 (95.4%)	53,860 (96.8%)	56,350 (98.4%)
Total	60,417 (100%)	54,788 (100%)	55,631 (100%)	57,432 (100%)

Economic Cost of a Collision: Component Costs

The following table features a breakdown of the component costs found in "The *Economic Impact of Motor Vehicle Crashes 2000*". The values do not represent the intangible consequences of crashes and should not be used alone to produce cost-benefit ratios. The amounts in the table are in 2000 USD. For this report, the final figure of $27,355 in average costs was converted to 2009 USD using a Consumer Price Index multiplier of 1.24. Using this CPI multiplier, the average cost of a collision is $33,920.20. Remaining calculations (i.e. monthly and annual savings) use a rounded version of this number, $34,000, to avoid falsely implying a non-existent level of accuracy.

Unit Cost Component	Property-Damage Only Vehicles	Injuries in Crashes	Fatalities in Crashes	Weighted Average for All Crashes
Economic Costs - Injury Components				
Medical	$0	$4,514	$22,095	$2,169
Emergency services	31	90	833	61
Market productivity	0	5,201	595,358	4,307
Household productivity	47	1,585	191,541	1,370
Insurance administration	116	1,533	37,120	893
Workplace	51	398	8,702	240
Legal	0	1,012	102,138	794
SUBTOTAL	245	14,334	957,787	9,834
Economic Costs - Non-Injury Components				
Travel delay	803	797	9,148	827
Property damage	1,484	3,029	10,273	2,230
SUBTOTAL	2,287	3,826	19,421	3,057
Additional Components				
Quality-adjusted life years (QALY) cost	0	14,810	2,389,179	14,464
SUBTOTAL	0	14,810	2,389,179	14,464
TOTAL AVERAGE COST PER CRASH	$2,532	$32,970	$3,366,387	$27,355
Number of Reported Vehicles or Injuries of Each Type	7.0 million	6.1 million	41,820	13.2 million

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Data Sources & Notes

Monthly Collision Data

Source: Texas Department of Transportation's Crash Record Information System.

Special thanks to Jeff Kaufman at the Houston-Galveston Area Council.

SafeClear Data

Source: Houston Police Department/Houston Transtar.

Special thanks to Sgt. Jimmy Horton, HPD.

Regional Monthly Gas Prices

Source: Energy Information Administration, U.S. Department of Energy.

Collision Costs

Source: *The Economic Impact of Motor Vehicle Crashes 2000***.** National Highway Traffic Safety Administration.

CPI multiplier of 1.24 from the Bureau of Labor Statistics (U.S. Department of Labor) used to convert average cost from 2000 USD to 2009 USD.

Rain Data

Source: KHOU/wunderground.com

Rainfall totals are from Houston Intercontinental Airport. A 0.1" threshold was used to determine the number of rainy days.

Vehicle Miles Travelled (VMT)

Source: US Department of Transportation, Federal Highway Administration

VMT totals are for urban arterial roads in Texas.

Additional Notes

For some measurements (e.g. some averages) outlying data was excluded. This exclusion standard, established in previous reports, seeks to exclude data more than three standard deviations from the mean (Response Time > 42 min. or Clearance Time > 74 min. or Incident Duration > 86 min.).