Improving Fire Rescue Performance

A Practical Guide for Decision Makers

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A Practical Guide for Decision Makers

by Michael Fay

Fire officers seldom have an affinity for statistics. Stats seem dry, overly complex and too time consuming to be used for day-to-day decision making. That's a shame.

Today's technology automates statistical analysis using mobile devices to deliver just the stats needed to just the decision makers who need them. All that's necessary is an understanding of the operational meaning behind today's best practices graphs, charts and maps.

This manual removes the complexity from performance statistics by explaining how basic stats relate to fire department operations. With this information you will be equipped to use performance stats to improve your fire rescue operation.

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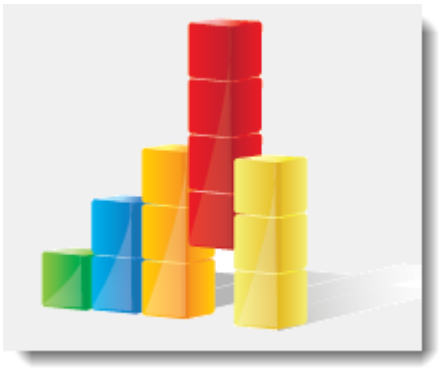
Demand for Service



"Demand for Service" or simply "Demand" quantifies requests for service from the public. It also quantifies the assignment and use of fire department resources responding to those service requests.

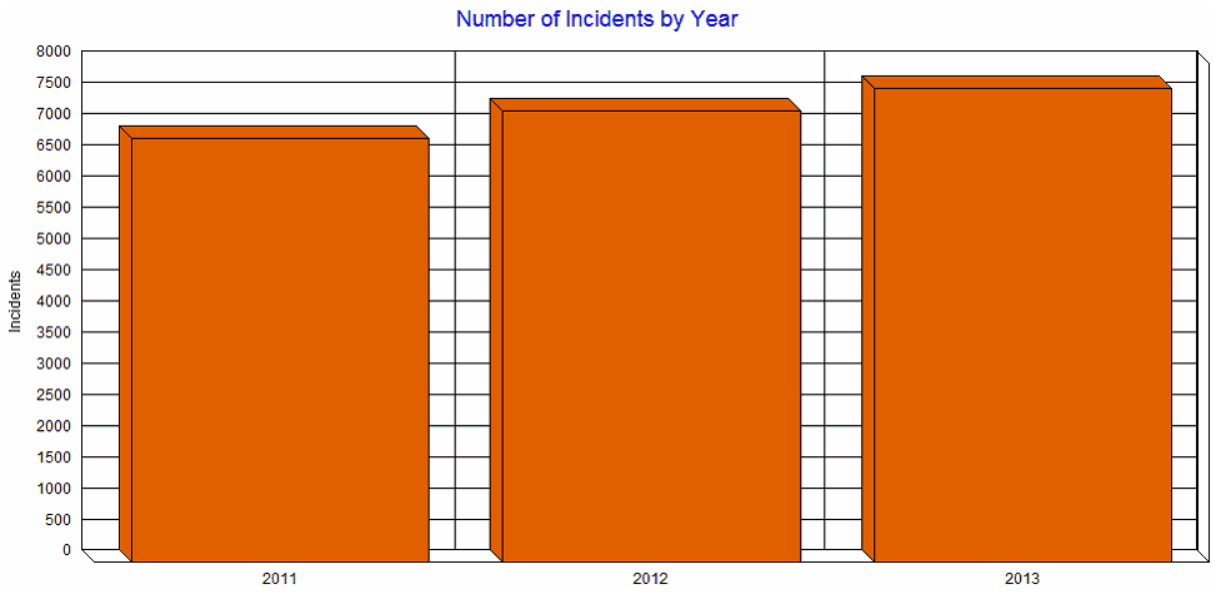
Demand stats include incident counts, incident counts over time, incident counts by incident type, maps of incident activity, apparatus assignment and response, station hourly activity, unit hour utilization, simultaneous incidents, aid between fire departments as well as responses outside home fire station districts.

1.1 Demand by Incident Type

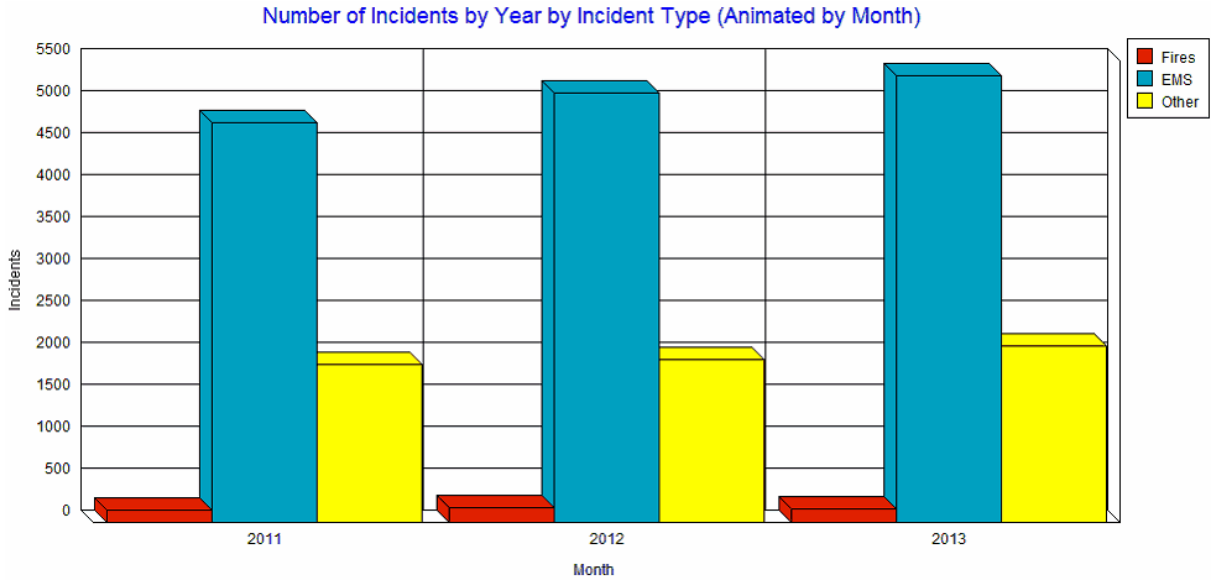
Demand for Service

Before computers were commonly available fire departments used sequential incident numbering to keep track of the number of annual incidents. Some departments used a separate numbering sequence for fire and EMS incidents. Few fire departments missed the opportunity to show how the number of incidents dramatically increased from year to year. This increased activity was used to justify increasing budgets.

Here's an example of a bar chart showing an increasing number of incidents:

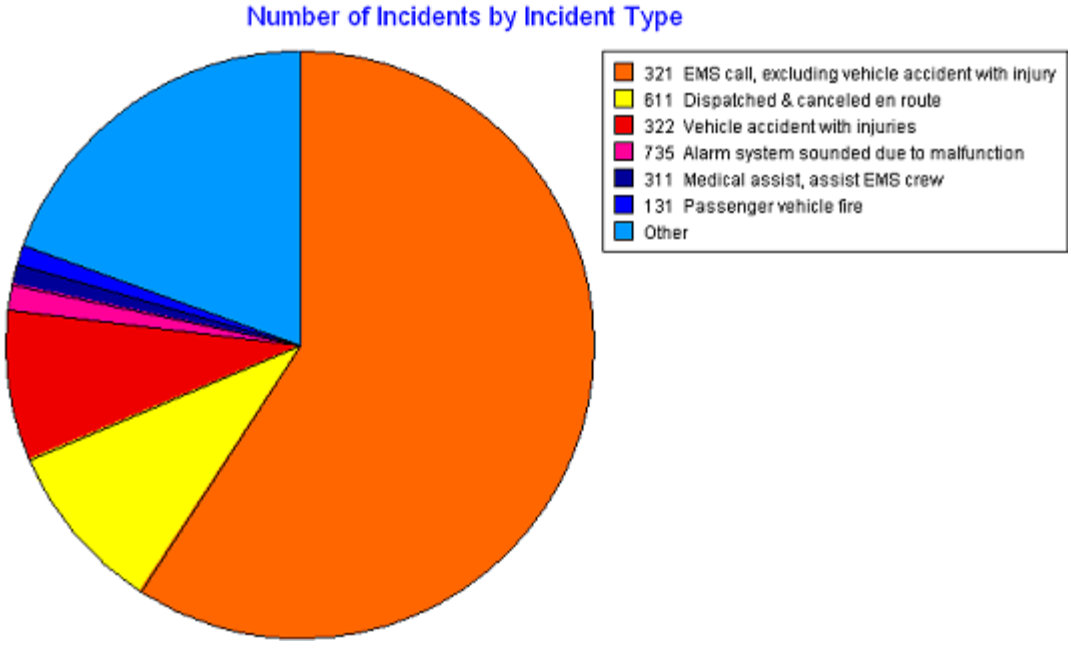


The bar chart below breaks down incident counts by incident type. Notice the number of EMS incidents rises dramatically while other incident types rise more slowly. Fires remain relatively flat:



In this case the rapid escalation of EMS incidents can help decision makers anticipate greater EMS demand in the future.

We can use a pie chart to look more closely. Below we see the vast majority of incidents are "321 EMS call, excluding vehicle accident with Injuries". This single category dwarfs all other incident types. We can also see the second most numerous incident type is "611 Dispatched & canceled en route". Perhaps a change in dispatching procedures might reduce the number of responses that fail to reach the scene before being turned around.



But the pie chart above is static. It doesn't illustrates shifts from year-to-year. The chart below allows us to monitor trends for the past 3-years. Notice both EMS incidents and "Canceled En Route" incidents are increasing year-to-year:

Incident Type
Count

Incidents: Count - Year by Incident Type

There are 21,667 Incident records being analyzed.

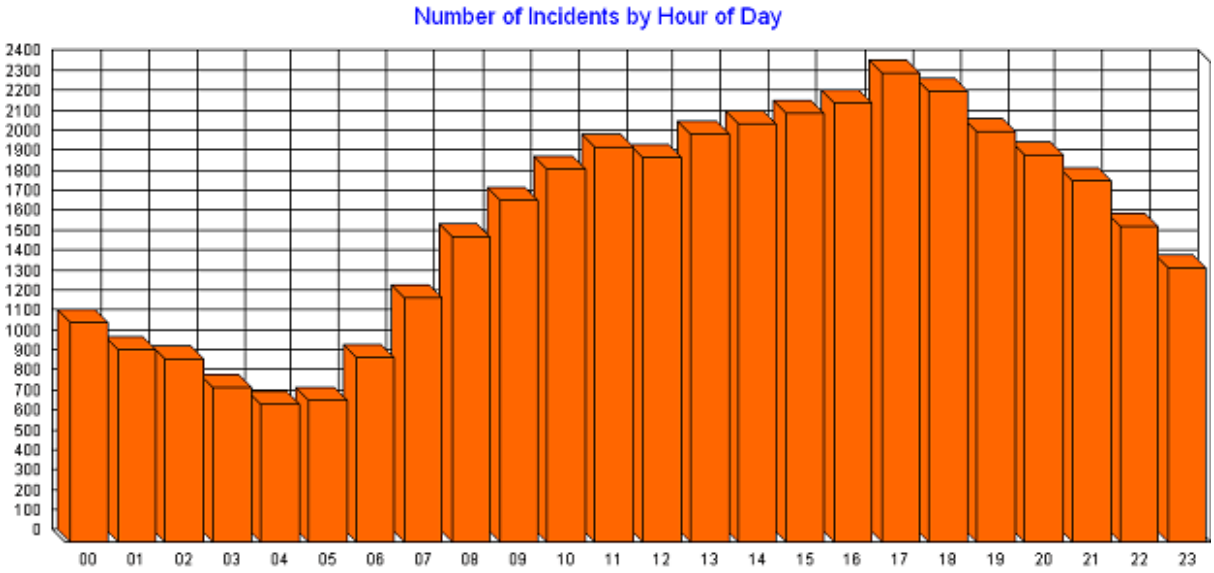
Year	2011	2012	2013	Totals
Incident Type				
321 EMS call, excluding vehicle accident with injury	4,432	4,724	4,922	14,078
611 Dispatched & canceled en route	1,140	1,296	1,321	3,757
322 Vehicle accident with injuries	205	203	198	606
554 Assist invalid	120	88	128	336
324 Motor vehicle accident no injuries	91	111	123	325
600 Good intent call, other	74	63	77	214
622 No incident found on arrival of incident address	49	45	50	144
561 Unauthorized burning	60	33	51	144
700 False alarm or false call, other	57	35	39	131
510 Person in distress, other	43	28	39	110
651 Smoke scare, odor of smoke	27	40	38	105
541 Animal problem	27	34	37	98
320 Emergency medical service, other (conversion only)		44	53	97
111 Building fire	30	42	23	95
571 Cover assignment, standby, moveup	24	25	29	78
142 Brush, or brush and grass mixture fire	21	19	34	74
500 Service Call, other	25	16	29	70
900 Special type of incident, other	21	14	25	60
131 Passenger vehicle fire	19	18	20	57
323 Motor vehicle/pedestrian accident (MV Ped)	20	19	17	56
550 Public service assistance, other	11	9	31	51

511 Lock-out	12	16	19	47
522 Water or steam leak	10	11	20	41
520 Water problem, other	13	12	11	36
143 Grass fire	16	6	13	35
412 Gas leak (natural gas or LPG)	10	11	13	34
743 Smoke detector activation, no fire - unintentional	10	10	12	32
745 Alarm system sounded, no fire - unintentional	12	10	8	30
300 Rescue, emergency medical call (EMS) call, other	15	9	6	30
151 Outside rubbish, trash or waste fire	10	17	3	30
154 Dumpster or other outside trash receptacle fire	4	13	12	29
113 Cooking fire, confined to container	8	14	7	29
735 Alarm system sounded due to malfunction	6	11	10	27
531 Smoke or odor removal	5	7	14	26
100 Fire, other	9	9	7	25

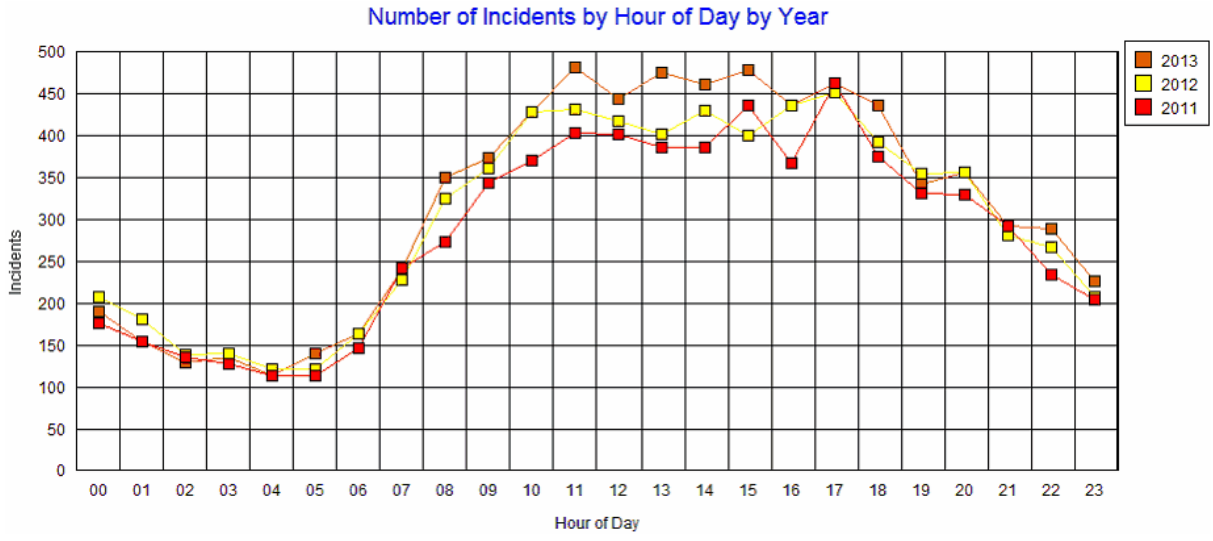
1.2 Demand Over Time

Demand Over Time

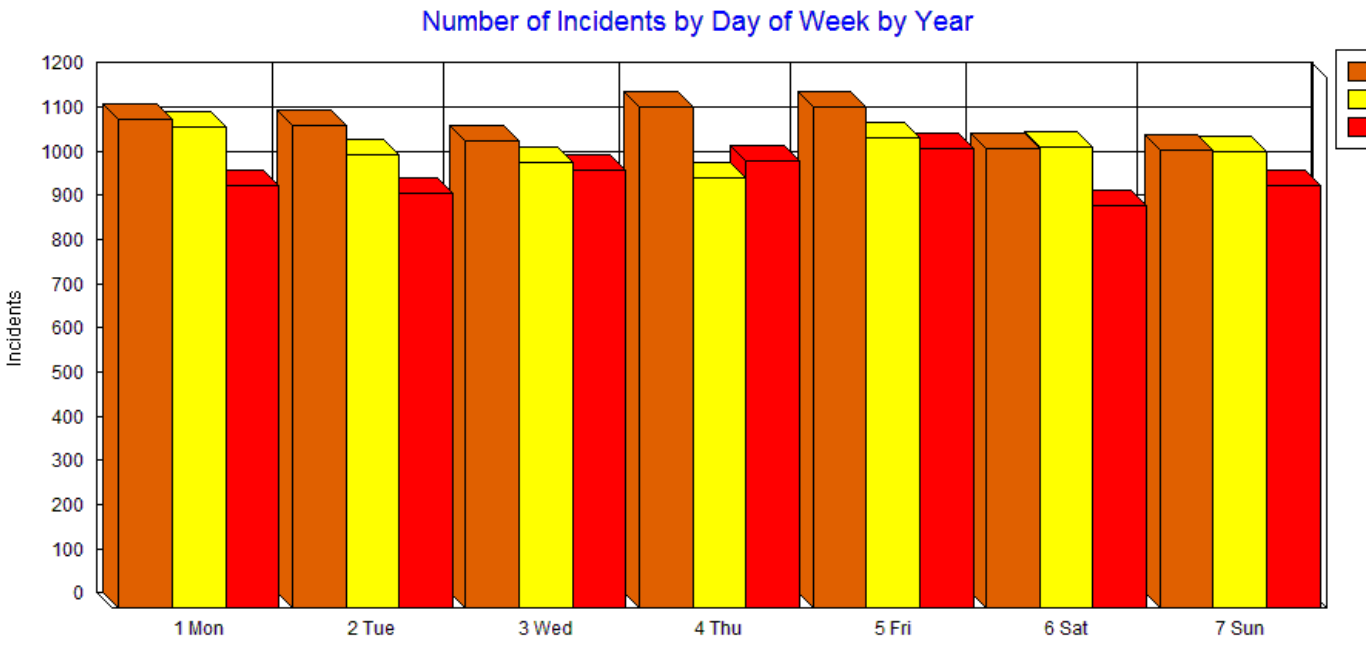
The 2D bar graph below illustrates the number of incidents by hour of day. The pattern shows a declining numbers of incidents into the early morning followed by a rapid rise throughout the morning leveling-off in the early evening followed by a decline into the late evening hours. This is the "signature" hourly pattern for most fire department operations.



The line chart below illustrates demand by hour of the day by year. This is very interesting because it shows that the number of incidents is increasing but not increasing equally in every hour of the day. The biggest increases year-to-year (areas where the lines separate) are during business hours:



If we track this further we see that the biggest increases 2012 to 2013 occur Tuesday - Friday and not on the weekends. The brown bars are 2013 and the yellow 2012. Notice the difference between these two bars Tuesday - Friday:



The "Temporal Activity Heatmap" below shows the hour of day vertically and the day of week horizontally. The spreadsheet was created by ***StatsFD*** and pasted into Microsoft Excel where "Conditional Formatting" was selected to color each cell. Here we see another view of increased incident activity during business hours. The redder the number the higher the number of incidents:

	Incident Activity							
	1 Mon	2 Tue	3 Wed	4 Thu	5 Fri	6 Sat	7 Sun	Total
00:00-00:59	24	19	25	20	29	35	38	190
01:00-01:59	20	21	13	24	13	35	29	155
02:00-02:59	15	20	19	18	18	13	27	130
03:00-03:59	18	17	17	19	22	20	23	136
04:00-04:59	21	12	17	19	11	20	14	114
05:00-05:59	22	22	23	16	18	19	20	140
06:00-06:59	28	26	21	21	24	27	17	164
07:00-07:59	42	35	40	36	34	24	29	240
08:00-08:59	52	54	62	62	40	35	46	351
09:00-09:59	49	50	64	72	55	47	37	374
10:00-10:59	58	66	62	74	69	49	51	429
11:00-11:59	57	69	48	102	67	62	77	482
12:00-12:59	78	63	74	52	63	63	51	444
13:00-13:59	83	73	51	74	55	65	74	475
14:00-14:59	76	66	67	56	78	61	57	461
15:00-15:59	67	85	76	66	67	62	56	479
16:00-16:59	59	63	57	72	69	55	61	436
17:00-17:59	77	68	54	64	74	66	60	463
18:00-18:59	67	59	53	64	69	65	60	437
19:00-19:59	52	52	49	41	65	40	44	343
20:00-20:59	56	36	59	46	52	56	51	356
21:00-21:59	35	38	42	45	51	40	42	293
22:00-22:59	29	46	31	35	54	54	40	289
23:00-23:59	22	33	36	38	37	27	34	227
Total	1,107	1,093	1,060	1,136	1,134	1,040	1,038	7,608

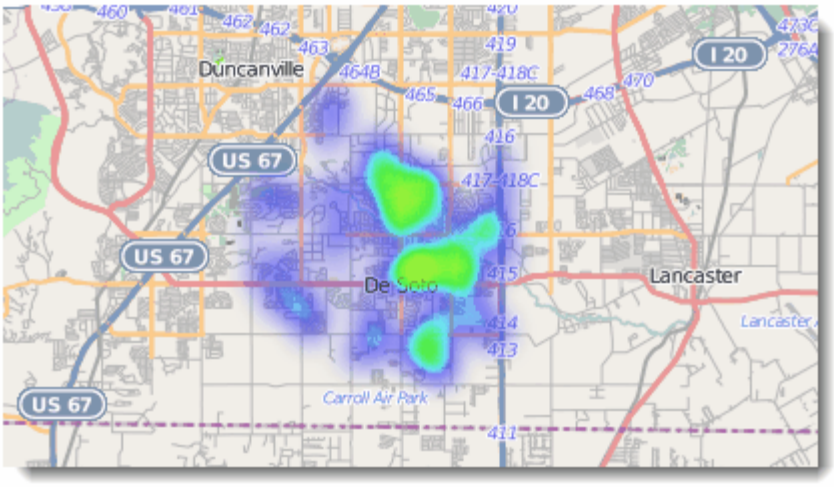
We have just used demand stats to determine EMS incidents are rising sharply as are the number of incidents during business hours. Most of these increases take place during the regular work week.

1.3 Geographic Demand

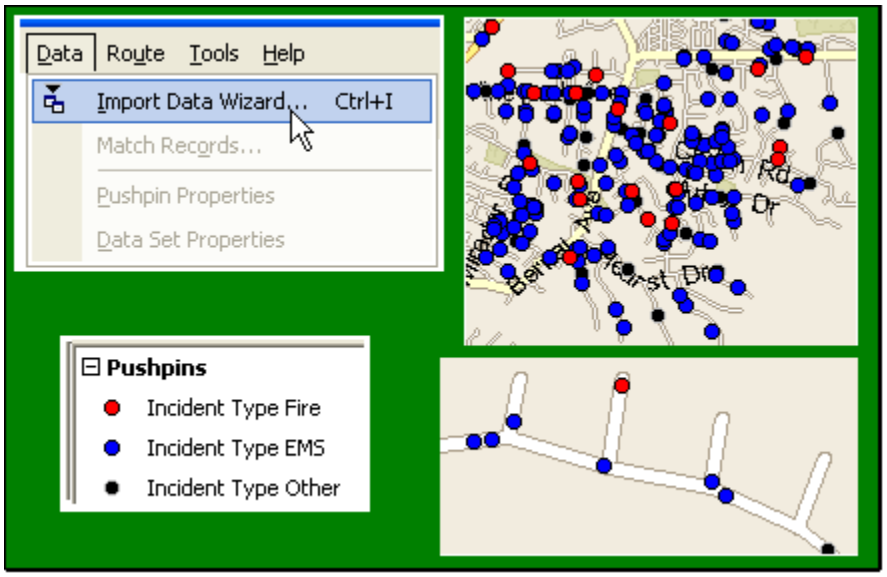
Geographic Demand

Maps can be used to help visualize activity geographically. The map below was created as an HTML document in ***StatsFD***. It's a "heat map" which uses brighter colors to illustrate increased incident activity. You can create a heat map using any

selection of records you wish. This feature is also available for automatic reporting where maps can be updated hourly and sent to mobile devices.



The next map is visualized in Microsoft's inexpensive "Streets & Trips" software. The file necessary to view these incidents in Microsoft's software was created in ***StatsFD***. Here incident activity is shown by icons with one icon representing one incident :

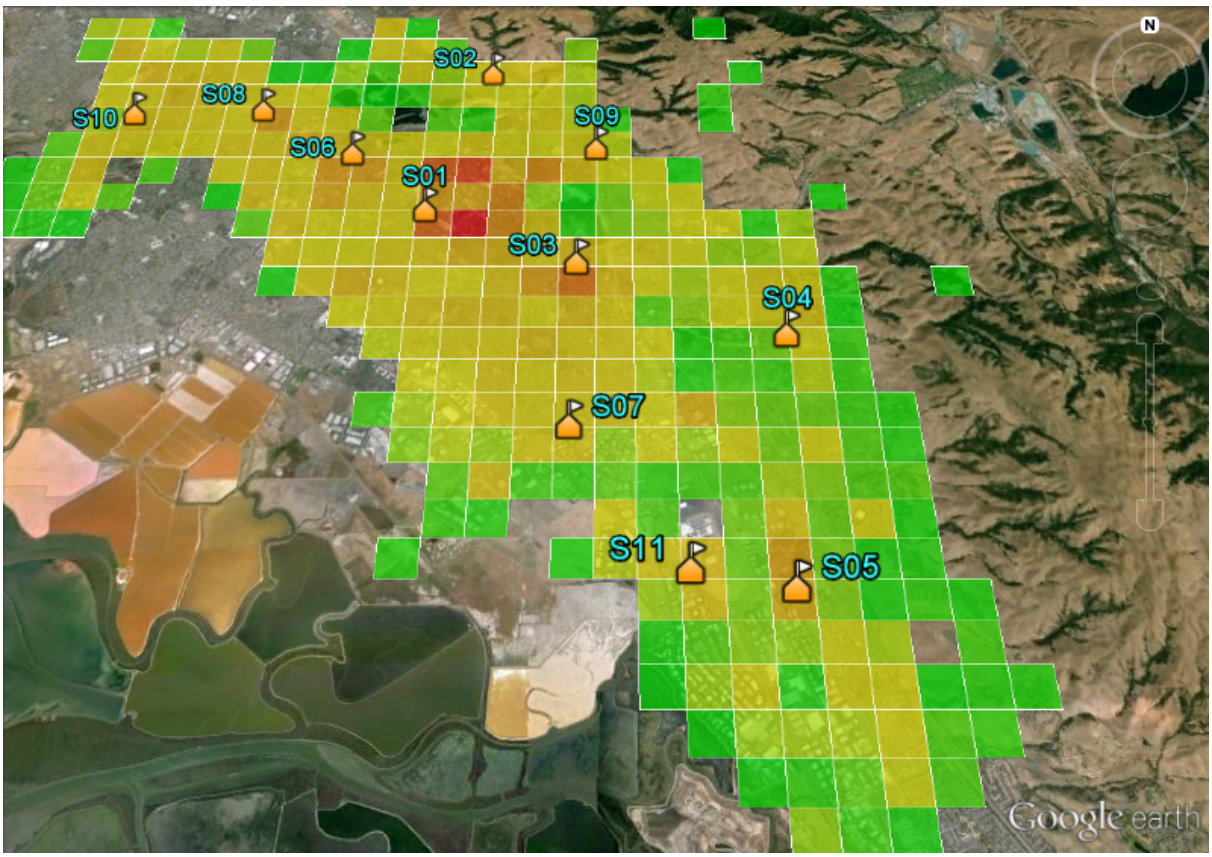


Here Microsoft's inexpensive "Streets & Trips 2005" software provides "pushpin" analysis of response activity. NFIRS 5 Alive assembles map files based on call type, response time, travel time, hour of day or other user selected criteria. Once file data is imported the user simply selects an appropriate pushpin design for each location category. NFIRS 5 Alive map location files can be used with a variety of mapping and GIS products for flexible geographical analysis.

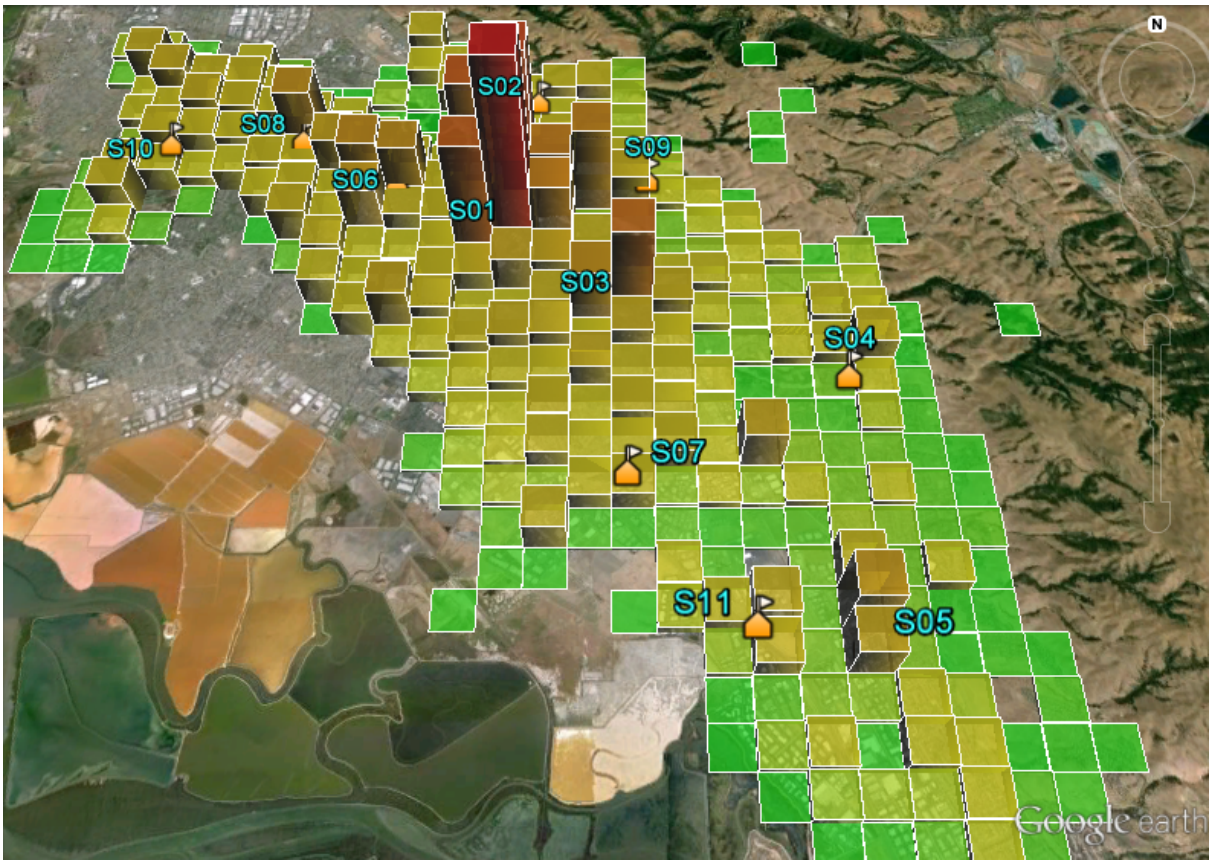
The next two demand maps are visualized in Google Earth. Google Earth is an

online mapping system made available by Google, Inc.

StatsFD creates "KML" files for modeling 2D or 3D demand patterns. Those KML files can be opened in Google Earth to see visual representations of incident activity. Here's an example of a grid overlay constructed by ***StatsFD***. It illustrates 2D demand where red colors show areas of higher demand:



Here's the same map where an option has been selected to illustrate incident activity in 3D. The "taller" and redder the area the greater the number of incidents. Later on we'll see how the height of an area can show demand while the color of the area shows performance:



1.4 Resource Demand

Resource Demand

Fire departments have three primary resources:

1. Stations
2. Apparatus
3. Personnel

For each resource demand stats can include the number of incidents, duration of incidents, activity percentage and total staff hours.

Here ***StatsFD*** breaks down company incident counts and duration minutes.

Company	Count	Min	Max	Average	Total
E2	2,112	.45	474.95	26.52	56,013.58
E1	1,254	3.18	1,198.20	32.40	40,628.94
E6	1,055	.13	989.35	28.90	30,486.46
E4	931	2.40	989.35	30.52	28,418.33

E5	730	1.20	474.95	31.06	22,675.31
E3	699	2.60	502.63	30.76	21,503.41
BC1	579	1.13	1,198.20	40.27	23,317.43
T1	475	3.00	989.35	41.98	19,940.89

The chart below was created in ***StatsFD*** and loaded into Microsoft Excel. Excel's conditional formatting was used to color the spreadsheet by cell value. This chart illustrates the percentage of activity by hour by station. Notice there is a wide range of activity by station and by hour of the day. This type of chart can be a very important deployment tool because it not only only identifies when, but also where high levels of activity occur.

Station	S01	S06	S03	S07	S10	S04	S08	S09	S05	S02	S11
0:00	10.55%	4.45%	4.51%	3.78%	4.44%	7.46%	1.76%	2.54%	1.50%	1.33%	1.73%
1:00	6.48%	4.17%	4.23%	3.44%	9.52%	8.67%	2.52%	2.21%	1.42%	1.15%	0.93%
2:00	11.79%	3.41%	5.63%	5.72%	9.04%	2.08%	5.48%	1.17%	2.52%	2.43%	0.85%
3:00	4.75%	8.24%	10.40%	2.38%	2.58%	7.82%	2.34%	2.76%	8.24%	1.44%	0.70%
4:00	6.32%	2.43%	2.91%	1.11%	2.15%	7.12%	2.21%	7.76%	1.46%	1.21%	0.97%
5:00	4.48%	8.76%	2.16%	8.88%	2.42%	1.19%	1.85%	2.09%	1.11%	1.53%	1.01%
6:00	7.75%	9.39%	3.07%	2.82%	2.95%	2.25%	2.23%	2.60%	2.33%	1.27%	0.99%
7:00	8.52%	9.93%	4.19%	2.94%	3.79%	3.36%	3.38%	1.93%	2.41%	2.13%	2.06%
8:00	17.72%	16.58%	4.58%	7.35%	10.67%	3.93%	12.29%	2.60%	10.48%	2.12%	3.01%
9:00	18.27%	16.70%	5.07%	12.85%	4.78%	11.03%	9.65%	3.46%	4.18%	3.79%	2.37%
10:00	34.96%	6.23%	7.47%	5.36%	5.61%	3.84%	8.57%	6.02%	4.84%	2.74%	2.31%
11:00	18.10%	11.70%	6.82%	5.85%	10.70%	7.25%	4.24%	18.57%	3.94%	3.68%	1.41%
12:00	15.87%	7.00%	8.54%	7.50%	5.74%	9.93%	4.83%	10.24%	12.56%	2.84%	1.85%
13:00	27.12%	19.41%	7.69%	7.87%	3.83%	4.06%	18.13%	5.13%	3.51%	9.36%	2.15%
14:00	41.65%	6.57%	20.81%	13.66%	11.71%	10.54%	4.59%	4.28%	3.88%	4.40%	1.64%
15:00	21.53%	5.20%	14.21%	8.82%	3.27%	2.00%	4.73%	4.39%	4.03%	8.82%	1.88%
16:00	20.80%	12.44%	26.13%	8.88%	3.57%	9.53%	3.87%	5.17%	7.26%	1.72%	2.14%
17:00	38.83%	12.95%	6.12%	7.03%	7.05%	4.48%	5.91%	16.36%	6.11%	6.98%	1.97%
18:00	23.18%	7.50%	7.25%	11.82%	5.09%	3.39%	6.62%	3.62%	4.22%	3.87%	2.92%
19:00	11.91%	5.97%	6.60%	8.93%	6.78%	3.50%	4.93%	3.49%	5.09%	8.16%	1.30%
20:00	15.03%	6.35%	7.63%	4.97%	5.74%	5.32%	5.12%	4.34%	3.50%	10.04%	1.29%
21:00	12.13%	5.97%	6.55%	4.41%	12.40%	3.28%	4.00%	3.27%	2.97%	3.73%	1.39%
22:00	16.17%	4.66%	4.64%	4.32%	4.75%	2.89%	4.52%	4.25%	3.09%	3.10%	1.66%
23:00	6.95%	5.72%	4.98%	3.52%	3.39%	2.49%	3.10%	2.82%	3.75%	8.20%	0.82%
Overall	16.70%	8.41%	7.59%	6.42%	5.91%	5.31%	5.29%	5.05%	4.35%	4.00%	1.64%
Incident	3,079	1,395	1,559	1,259	1,151	776	1,087	917	907	592	421

Here's the same type of chart that focuses on engine company unit hour utilization.

This provides another deployment dimension. Each primary engine is listed in a column. Each row is an hour of the day. The redder the color the greater the activity by hour.

Vehicle	E1	E6	E3	E7	E8	E4	E9	E10	E2	E5
0:00	1.02%	0.74%	0.97%	1.88%	0.41%	0.28%	0.57%	0.66%	0.22%	0.31%
1:00	1.12%	0.59%	0.76%	0.77%	0.48%	2.65%	0.38%	0.47%	0.23%	0.23%
2:00	0.89%	0.68%	0.93%	0.51%	1.06%	0.42%	0.24%	0.65%	0.45%	0.41%
3:00	1.83%	0.32%	1.88%	0.73%	1.59%	0.34%	0.38%	0.42%	0.24%	0.33%
4:00	2.06%	0.45%	0.55%	0.23%	0.34%	0.11%	0.27%	0.35%	0.21%	0.35%
5:00	1.91%	1.52%	0.40%	0.56%	0.46%	0.19%	0.43%	0.29%	0.19%	0.35%
6:00	1.19%	0.60%	0.58%	0.64%	1.52%	0.39%	0.40%	0.54%	0.23%	0.50%
7:00	1.35%	0.68%	0.84%	0.71%	0.62%	0.53%	0.37%	0.58%	0.39%	0.48%
8:00	2.59%	2.95%	0.82%	1.18%	2.24%	0.69%	0.51%	0.65%	0.37%	0.74%
9:00	4.84%	2.01%	0.96%	1.81%	0.71%	0.72%	0.63%	1.72%	0.64%	0.85%
10:00	3.04%	2.45%	1.34%	0.98%	1.35%	1.73%	2.08%	0.98%	1.67%	0.86%
11:00	4.15%	2.05%	2.38%	1.89%	1.90%	0.90%	4.35%	1.91%	2.01%	0.65%
12:00	2.18%	2.32%	3.80%	0.85%	1.18%	1.73%	0.88%	0.86%	0.52%	2.30%
13:00	7.72%	2.51%	1.40%	3.56%	2.01%	2.10%	0.91%	2.90%	0.63%	0.73%
14:00	6.76%	2.32%	2.43%	1.13%	0.99%	1.85%	0.85%	0.97%	0.84%	0.73%
15:00	2.92%	1.01%	2.20%	2.39%	0.90%	0.33%	1.91%	0.45%	1.56%	0.82%
16:00	5.40%	3.51%	1.29%	1.01%	0.77%	1.85%	1.83%	1.19%	2.68%	2.12%
17:00	3.17%	2.17%	2.29%	3.43%	2.05%	0.91%	0.97%	1.09%	1.68%	1.17%
18:00	4.73%	2.57%	3.51%	2.34%	2.03%	0.63%	1.87%	0.97%	1.11%	0.77%
19:00	4.77%	2.16%	1.24%	2.84%	0.91%	1.44%	0.68%	2.30%	3.49%	0.84%
20:00	1.81%	1.27%	1.24%	0.90%	2.05%	1.95%	1.89%	1.09%	0.71%	0.57%
21:00	1.79%	2.61%	1.19%	1.15%	3.21%	2.07%	0.78%	1.30%	0.61%	0.63%
22:00	2.63%	1.90%	0.86%	0.67%	0.91%	0.62%	0.81%	0.78%	0.59%	0.61%
23:00	1.23%	0.99%	0.86%	0.68%	1.70%	0.51%	0.43%	0.52%	0.33%	0.73%
Overall	2.96%	1.68%	1.45%	1.37%	1.31%	1.04%	1.02%	0.98%	0.90%	0.75%
Responses	2,866	1,649	1,745	1,500	1,282	938	1,097	1,165	739	1,060

Understanding how and when fire department resources are being utilized is a key ingredient in fine-tuning your fire rescue deployment strategy.

1.5 Simultaneous Demand

Simultaneous Demand

Overlapping or simultaneous incidents stress resources. As the number of simultaneous incidents rises the greater the impact on resources and performance.

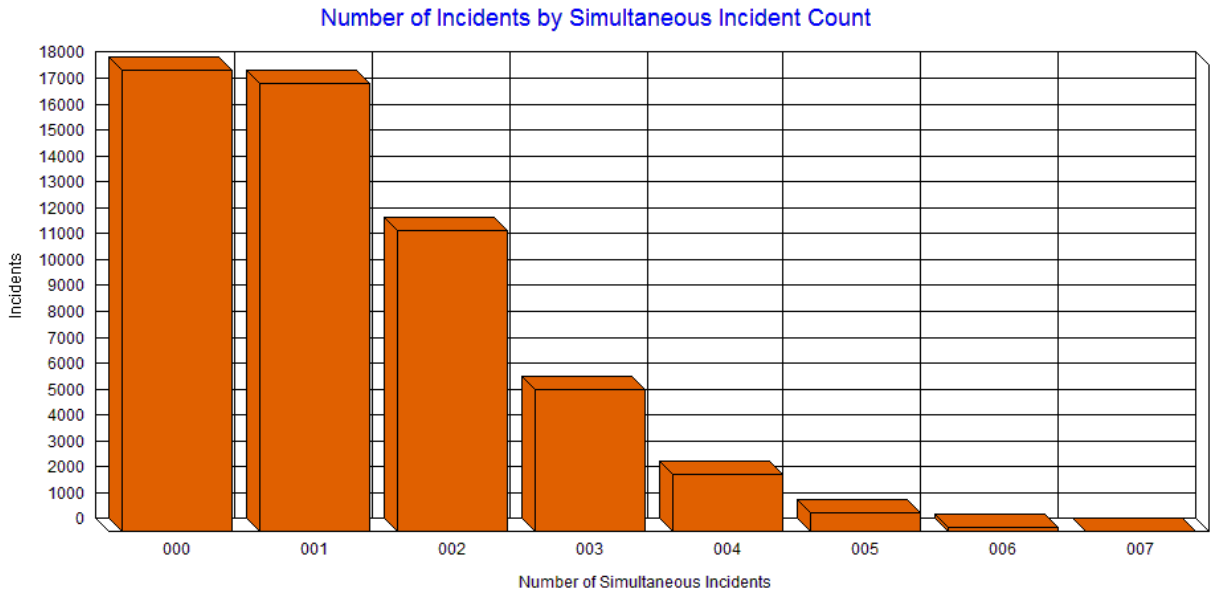
Consider this simultaneous demand alarm pattern:

1 or more simultaneous incidents	70.37%
2 or more simultaneous incidents	39.69%
3 or more simultaneous incidents	17.71%
4 or more simultaneous incidents	06.68%
5 or more simultaneous incidents	02.14%
6 or more simultaneous incidents	00.60%

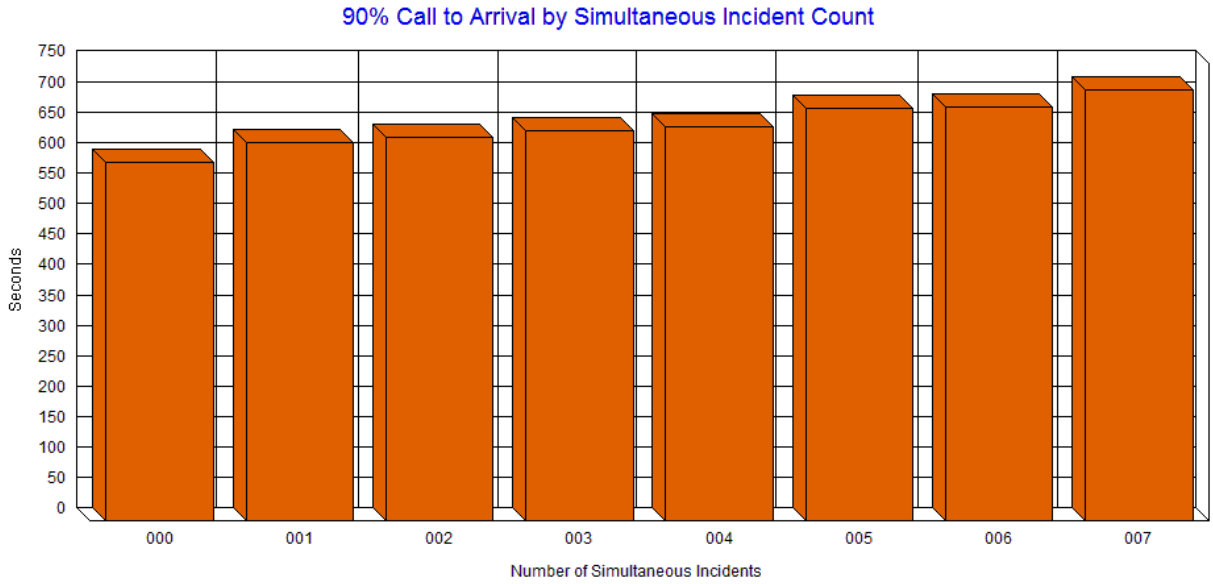
Notice as the number of simultaneous incidents increases the percentage of time drops. The correct way to the finding on row 4 would be:

"A new incident occurs 6.68% of the time when 4 or more incidents were underway."

The graph below illustrates the number of incidents that occurred when zero "000" through seven "007" incidents were underway. Notice the higher the number of simultaneous incidents, the less frequently it occurs:

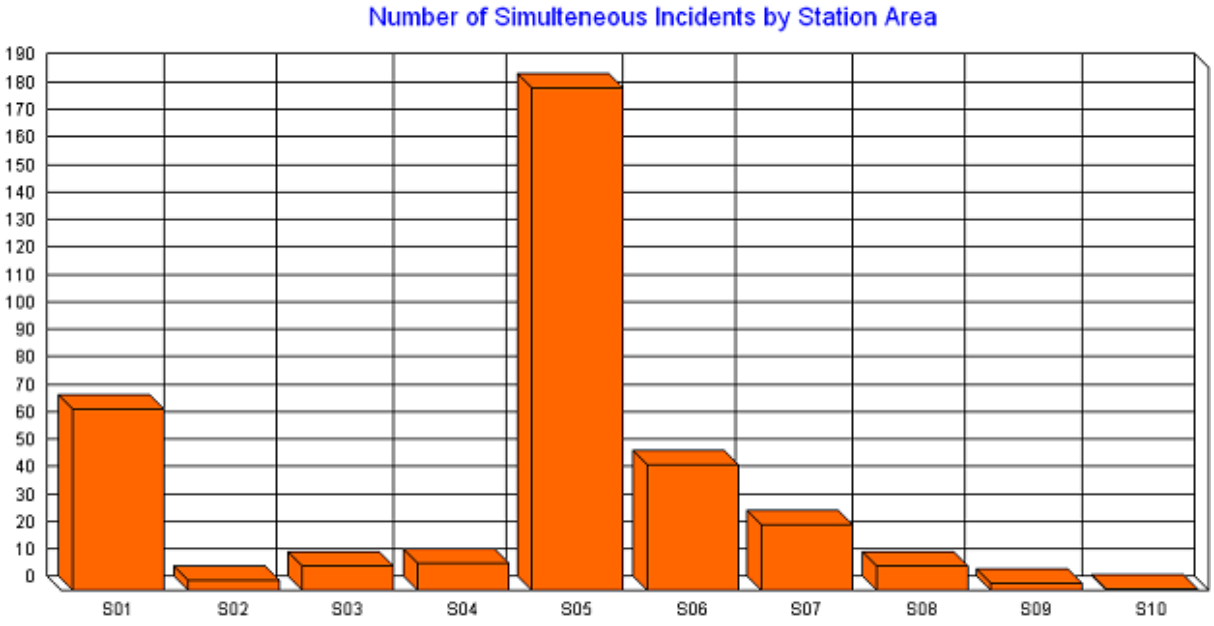


Now we can measure how the number of simultaneous incidents underway affects performance. Here 90% Call to Arrival (discussed in the next two chapter) is measured for each level of simultaneous incidents. Notice the time from call to arrival increases as the number of simultaneous incidents increases. This is a good measurement of how overlapping incident activity affects Call to Arrival performance:



When simultaneous incidents occur within the fire department they have an impact, but there is a disproportional impact when simultaneous incidents occur within a specific station area.

Here ***StatsFD's*** has created a graph showing the number of simultaneous incidents occurring within a specific station area. Notice S05 is much more likely to experience simultaneous incidents thereby greatly stressing home resources. S05 would be a good candidate for two or more companies:



1.6 Agency & Station Aid

Agency & Station Aid

While aid (historically called mutual aid) measures resources moving between fire departments, it can also measure resource movements between fire stations. Let's look at aid at the fire department level first.

Here ***StatsFD*** has broken down department aid by aid type by year. Since multiple years of data are available aid trends can be identified. This fire department has a good balance between aid given and received. Notice the big jump in Aid Received in 2013:

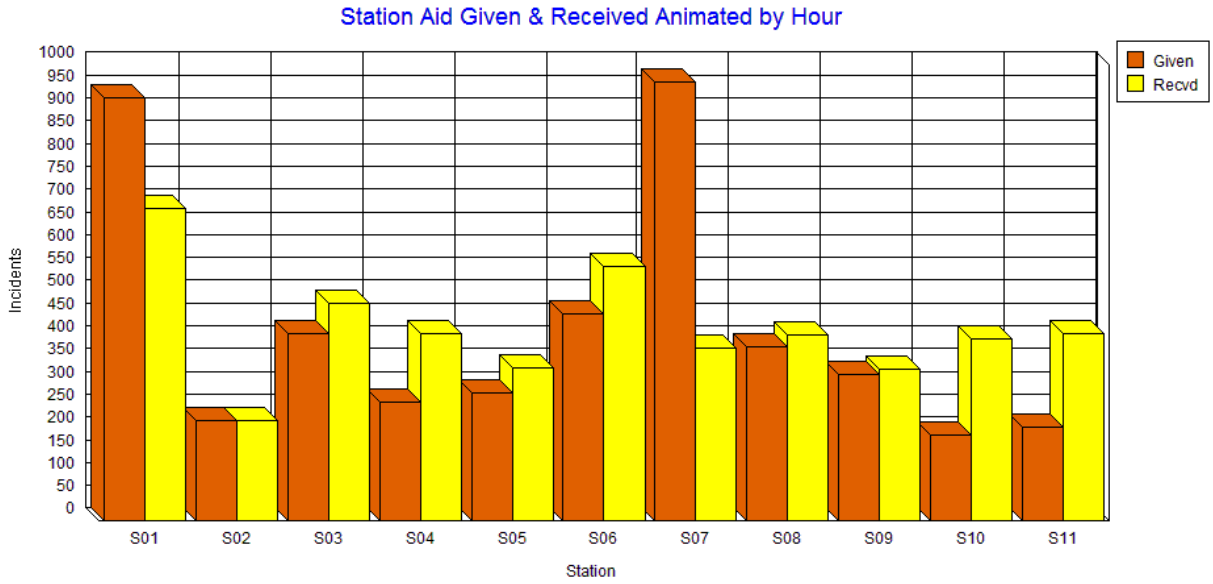
Incidents: Count - Year by Aid Type

There are 21,667 Incident records being analyzed.

Year	2011	2012	2013	Totals
Aid Type				
1 Received	48	28	73	149
2 Automatic Aid Received	1,201	1,184	1,148	3,533
3 Given	196	244	269	709
4 Automatic Aid Given	1,435	1,564	1,630	4,629
5 Other Aid Given	11	5	4	20
N None	3,921	4,222	4,484	12,627
Totals	6,812	7,247	7,608	21,667

Station-to-Station Aid

It's important to monitor resource movement between fire stations. In the graph below apparatus resources leaving the station area are tracked in red; apparatus resources entering a station from other station areas are tracked in yellow. Responses by home apparatus are not tracked, only aid out and in is being tracked.

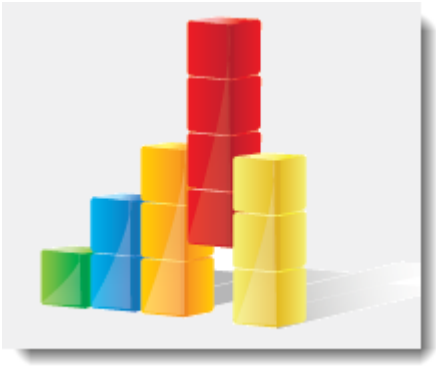


Notice S01 and S07 are big providers of resources. Both of these stations are dual company stations with both an Engine and a Ladder company. Many of the lower volume fire stations are net resource consumers. This includes S03, S04, S06, S10 and S11.

2 2. Performance Basics

2

Performance Basics



When calculating demand it's appropriate to look at all types of activity. However, when calculating performance you do not want to include every incident in your performance calculations. Before running performance measurements you must exclude out of jurisdiction and non-emergency responses. You should also set outlier limits and exclude atypical incidents that fall outside of those outlier limits. This chapter examines the basics of performance analysis.

* Distribution & Concentration

2.1 Defining Emergencies

Defining Local Emergencies

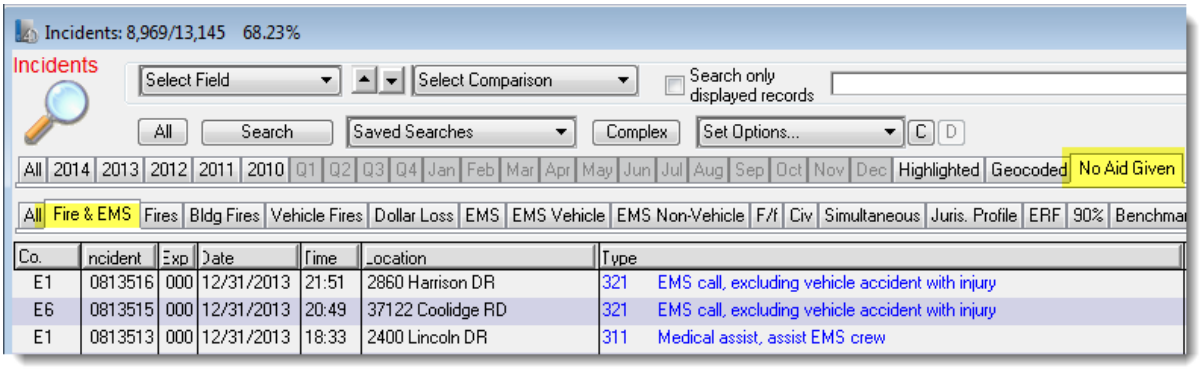
To accurately understand performance capabilities you must restrict performance measurements to local emergency incidents only. If you include non-emergencies and incident originating in other jurisdictions you will skew your performance calculations.

Ideally your agency tracks response priority by responding apparatus. For example, a structure fire may have a high response priority for all responding apparatus while a reported fire alarm problem may have a high priority for the first arriving apparatus and a lower priority for other responding apparatus.

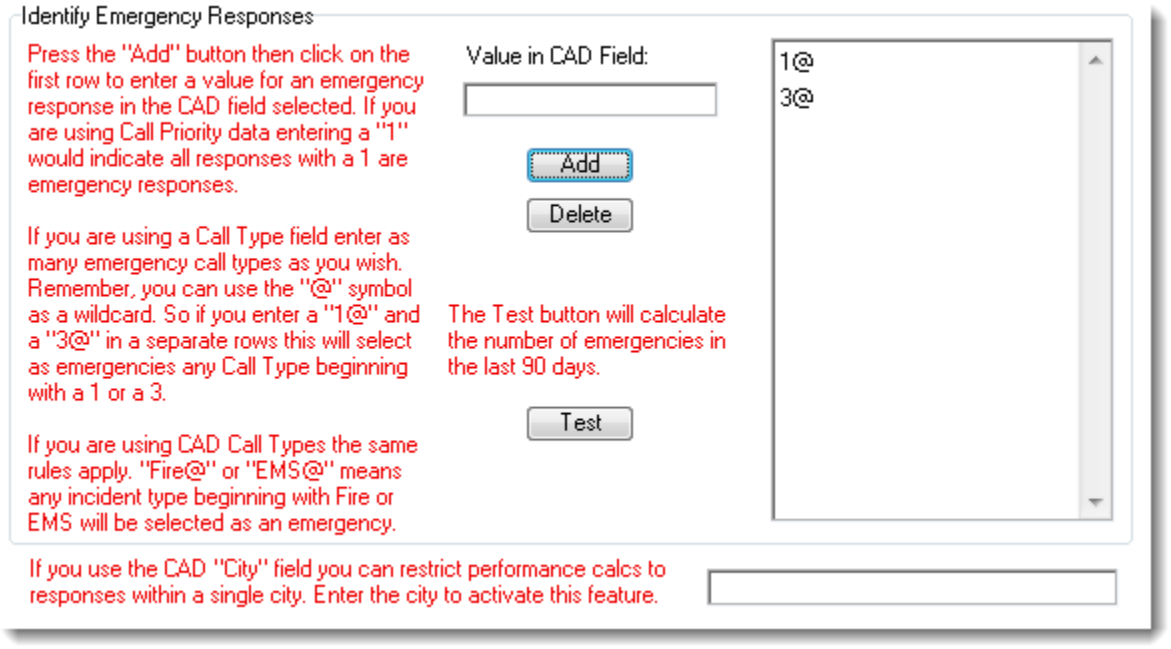
If you track response priority by apparatus you should only measure performance for high priority (emergency) incidents. If an apparatus is downgraded during it's response it should not be used for performance calculations.

If response priority is not available you can restrict performance measurements to fire and EMS incidents only. Simply select any NFIRS 5 incident type beginning with a "1" (fire) or a "3" (EMS) when selecting records for analysis.

To filter incidents for manual performance analysis simple press the "No Aid Given" tab followed by the "Fire & EMS" tab. This will quickly filter-down incidents to only in-jurisdiction fire & EMS incidents:



When operating in automatic mode you have the ability to filter response records by your own call priority field or by call type field. You can also enter a "City" at the bottom of the form to filter out incidents in other jurisdictions:

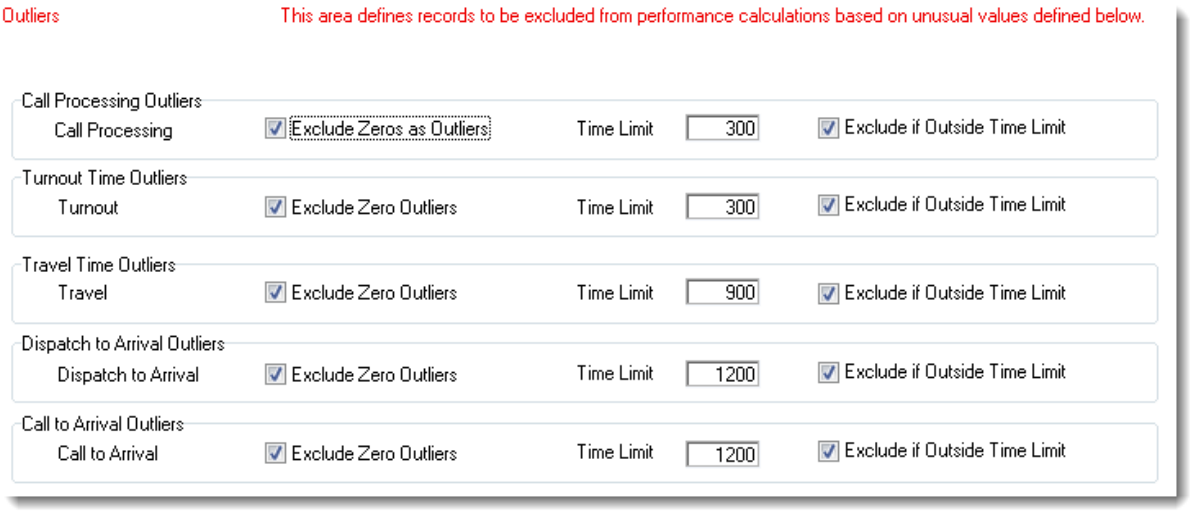


2.2 Outlier Settings

Outlier Settings

There are 86,400 seconds in a day (24 X 60 X 60). If you see an incident with a call processing time of 86,283 seconds you most likely have a situation where the time of the call and the time of dispatch were transposed.

In an effort to restrict performance analysis to only that set of times that are typical of an operation we set-up a list of outliers. Here's a set of outliers setup in ***StatsFD:***



Outliers are user configurable limits used to identify and remove atypical incident times. Here we see 5-minute (300 second) outlier limit set for Call Processing and Turnout. The Travel Time outlier is set to 15-minutes with 20-minutes each for Dispatch to Arrival and Call to Arrival.

Notice we have accepted the option to exclude all categories where the amount of time for a response component was calculated as zero seconds. These zero second times are generally created when a timestamp is missing.

2.3 Timestamps

Timestamps

Fire department performance boils down to three basic components:

1. Call Processing
2. Turnout
3. Travel Time

These components can be combined to perform other performance measurements. Let's look at each component.

Call Processing / Call Handling Time

Call Processing measures dispatch center performance.

1st Timestamp: Dispatch Center first becomes aware of a request for assistance.

2nd Timestamp: Assigned apparatus made aware of location and nature of the

emergency.

Discussion: If initial requests for assistance are received by a **PSAP** (Public Safety Access Point) the typical number of seconds for routing to the dispatch center should be calculated and reported along with any call processing report. Since dispatch centers receive request via 911, radio, direct-line, alarm systems, etc. the 1st timestamp should be the earliest time every request type is time stamped. Frequently the earliest timestamp is the "Create Time" for the CAD record.

In order to respond assigned companies must know the location and nature of their response. The closest time stamp to the companies receiving this information will terminate the performance measurement for call processing and start the timestamp for turnout.

Turnout Time

Turnout measures the time it takes for a company to assemble for response.

1st Timestamp: Assigned apparatus is made aware of location and nature of emergency.

2nd Timestamp: Apparatus begins response - wheels turning.

Discussion: Turnout time is a critical measurement and should be accurately time stamped. Crew notified times should be fairly easy to capture, but every effort should be made to make sure the 2nd timestamp is "wheels turning" and not simply a radio or MDT acknowledgement made before travel to the scene actually begins.

Travel Time

Travel measures the time it takes for a company to cover the distance from their location at dispatch to the location of the incident.

1st Timestamp: Apparatus begins response - wheels turning.

2nd Timestamp: Apparatus arrives on the scene.

3rd Timestamp (Optional): Responding personnel make patient contact.

Discussion: Travel time is a key measurement for the location of station facilities. Accurate travel times can help assure accurate location of facilities.

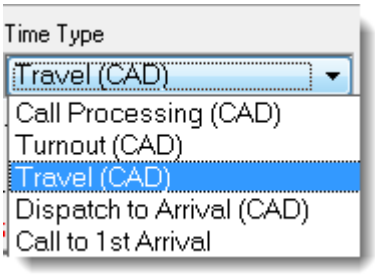
In some neighborhoods patient contact occurs immediately after arrival on the scene. In urban areas, however, when the apparatus stops on the scene the travel time to the patient may still be seconds or minutes away. This is especially true in

high-rise housing situations.

Where a variety of housing types exist it's a good idea to have a patient contact timestamp that accurately identifies the start of patient care.

Time Types

In addition to the three basic performance components ***StatsFD*** tracks other time types:



Dispatch to Arrival is easily calculated as is Call to 1st Arrival:

Dispatch to Arrival: Turnout + Travel Time

Call to 1st Arrival: Call Processing + Turnout + Travel Time

Call Duration Measurements

Duration is a measurement that includes aspects of both demand & performance. Cutting the amount of time at incidents dramatically cuts down on incident overlap thus saving resources.

Scene Duration

Scene Duration measures the amount of time it takes to render assistance and ready the apparatus for another response.

1st Timestamp: Apparatus arrives on the scene.

2nd Timestamp: Apparatus is available for response.

Discussion: Efficient operations on the scene allow apparatus to clear and become available for other responses more quickly. This reduces the resource drain of simultaneous (overlapping) alarms.

Total Duration

Total Duration measures the amount of time it takes to handle an incident from the time of call until the apparatus is available for response.

1st Timestamp: The Dispatch Center first becomes aware of a request for assistance.

2nd Timestamp: Apparatus is available for response.

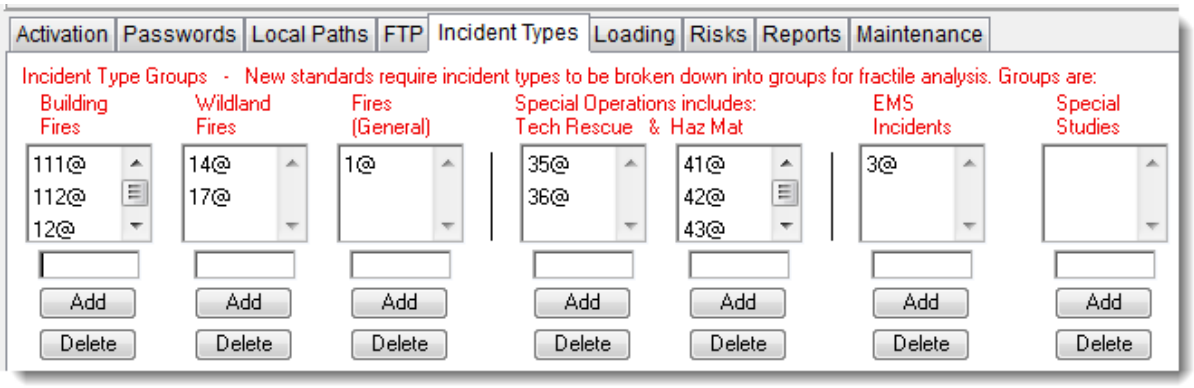
Discussion: Total Duration monitors the entire incident handling process from notification through unit available. This measurement can be broken down by incident type and location to help determine the resources required for different types of incidents in different areas of the community.

2.4 Incident Types

Incident Types

Different types of incidents require different types of resources for response. It is vital to measure performance for each major incident type.

The following incident types are recognized for Standard of Cover (SOC) studies and accreditation:



The first three types are "Fires". This includes "Building Fires", "Wildland Fires" and "Other Fires".

The next two types fall in the category of "Special Operations" these include "Technical Rescue" and "Hazardous Materials".

The last group is "EMS" incidents.

There's also a "Special Studies" group that allows users to study any additional set of incident types.

Notice each type is defined by multiple NFIRS 5 Incident Type codes. The "@" symbol is used as a wild card in the code. Since Incident Types can have an extra locally defined district and code beginning with "111" is classified as a building fire. Any code beginning with a "1" is a fire.

By identifying "Incident Types" you have the ability to quickly break down performance by major incident type to meet SOC and accreditation requirements.

2.5 Operational Divisions

Operational Divisions

It is valuable to split analysis so comparisons can be made between various operational divisions. Here are some common divisions:

Department (Data split by Fire Department Identification Number, FDID)

The first division of a regional fire rescue service is by fire department. Department performance measurements can the be used as a comparison between operational elements within the each agency. In ***StatsFD*** geographic and operational divisions are tracked under the Jurisdiction button:

Stations Areas

When completing an **NFIRS 5** report the Station field should always represent the geographic location of the incident. "Station" does not refer to assigned station of the first company to reach the scene. Geographic station divisions gives you an opportunity to verify performance by geographically. Station stats are always available under the Jurisdiction button in ***StatsFD***.

Latitudes and Longitudes / D3 District

Today it is best practice to track every incident by its decimal latitude and longitude.

Decimal lats and longs give you a variety of analysis tools not available to users of X / Y state plane data. One thing ***StatsFD*** can do with lats and longs is to create a grid of geographic "cells" that can be overlayed on a map of your jurisdiction. Each cell within the grid can by processed for response performance. Since the grid can be resized dynamically, its a great way to model demand and performance. In ***StatsFD*** these geographic cells are called "D3 Districts" or Dynamically Defined Districts.

See more about Geographic models in Chapter 3.

Protection Levels

Protection Levels are geographic divisions calculated by population density. It is possible in ***StatsFD*** to move every D3 District into the following population density groupings:

Metropolitan
Urban
Suburban
Rural
Wildland

When every incident is associated with a Protection Level it is possible to run Benchmark & Baseline performance reports as outlined later in Chapter 6.

FDZ

FDZ stands for "Fire Demand Zone" and can be any geographic division you wish to use. So if you track a geographic division in your CAD or RMS data you should map it to import into the FDZ or other geographic field..

Map Page

A Map Page may refer to a real map page system used in your fire rescue agency. Or, it may simply be used for any division you track in your CAD or RMS data.

Zip

Performance by zip code can easily be tracked in ***StatsFD***.

2.6 Data Splits

Data Splits

Data splits include the incident types and operational divisions discussed earlier. They also include other pre-defined and user defined data elements. Data Splits allow performance to be compared in many different ways. For example, if you data split by station you will be able to compare performance by station. Here are common data splits used in ***StatsFD***:

by Aid Type
by Aid Type_Yr
by Aid Type_Shift
by City
by City_Yr
by City_Shift
by D3 District
by D3 District_Yr
by D3 District_Shift
by Day of Week
by Day of Week_Yr
by Day of Week_Shift
by District
by District_Yr
by District_Shift
by FDID
by FDID_Yr
by FDID_Shift
by FDZ
by FDZ_Yr
by FDZ_Shift
by First Company
by First Company_Yr
by First Company_Shift
by Hour of Day
by Hour of Day_Yr
by Hour of Day_Shift
by Map Page
by Map Page_Yr
by Map Page_Shift
by Month
by Month_Yr
by Month_Shift
by Property Use
by Property Use_Yr
by Property Use_Shift
by Protection Level

by Protection Level_Yr
by Protection Level_Shift
by Shift
by Shift_Yr
by Station
by Station_Yr
by Station_Shift
by Station / Activity
by Station / Activity Yr
by Station / Activity_Shift
by Station / Level
by Station / Level_Yr
by Station / Level_Shift
by User Alpha 1
by User Alpha 1_Yr
by User Alpha 1_Shift
by User Alpha 2
by User Alpha 2_Yr
by User Alpha 2_Shift
by User Alpha 3
by User Alpha 3_Yr
by User Alpha 3_Shift
by User Alpha 4
by User Alpha 4_Yr
by User Alpha 4_Shift
by User Alpha 5
by User Alpha 5_Yr
by User Alpha 5_Shift
by Year
by Year_Month
by Year_Shift
by Zip
by Zip_Yr
by Zip_Shift
by Activity Level
by Activity Level_Yr
by Activity Level_Shift

by Incident Type...

If by Incident Type is selected you may select one or more of the following incident types:

by Building Fires
by Wildland Fires
by All Fires
by Tech Rescue

by Hazardous Materials Response
by Special Operations
by EMS

with additional options by Year and by Shift

Data Splits allow the types of comparisons necessary to identify opportunities for performance improvement.

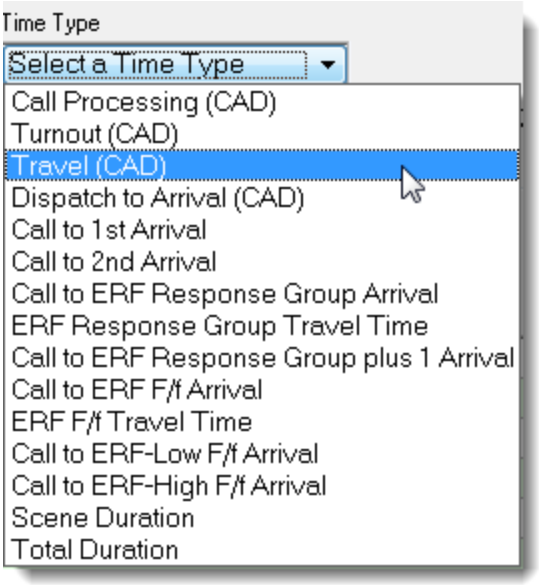
2.7 Distribution & Concentration

Distribution & Concentration

Distribution measures the performance of the first arriving apparatus. Since most incidents have at least one first arriving apparatus the timestamps for that apparatus are stored with the incident for distribution performance.

Concentration focuses on the arrival of fire department teams. So, for example, the time it takes for a second apparatus to arrive on the scene is considered a concentration measurement. Here's another example. If the 1st alarm assignment to a building fire is established as 3-Engines, 1-Ladder and 1-EMS apparatus the timestamp for the arrival of the final component of that 1st alarm assignment is used for this 1st alarm concentration measurement.

Here's a set of Time Types and a list of those that are Distribution and Concentration Measurements:



Distribution Measurements

Call Processing
Turnout
Travel
Dispatch to Arrival
Call to 1st Arrival
Total Duration (last unit clear)

Concentration Measurements

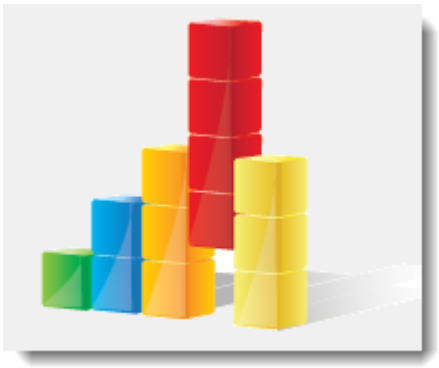
Call to 2nd Arrival
Call to ERF Response Group Arrival
ERF Response Group Travel Time
Call to ERF Response Group plus 1 Arrival
Call to ERF F/f Arrival
ERF F/f Travel Time
Call to ERF-Low F/f Arrival
Call to ERF-High F/f Arrival

ERF stands for Effective Response Force and covered in-depth in Chapter 5.

3 3. 90% Performance Measures

3

90% Performance Measures



"90% Performance" refers to the amount of time necessary to perform a specific response component for 90% of incidents being calculated. Let's use an example:

Let's say the performance being measured is travel time for 1,000 records. The most accurate way to calculate 90% performance is to list all 1,000 travel times from the quickest to the slowest. Once ordered on the list you move 90% of the way down the list toward the longest time. For 1,000 records 90% down the list would be record 900. The Travel Time in record 900 is your 90% travel time performance.

* 90% Spreadsheet Summaries

* 90% Worksheeets

* 90% Geographic Models

3.1 90% Spreadsheet Summary

90% Spreadsheet Summaries

The 90% Spreadsheet below was produced by ***StatsFD***. This is a fixed report documenting department-wide calculations of different performance measurements by year. Notice department-wide call processing time for all incident types is a sluggish 03:04 (3 minutes, 4 seconds) for 30,724 incidents. If we look at fire and EMS incidents the time drops to 03:00 for 23,588 fire and EMS incidents:

You see performance includes ERF Travel and Call to Arrival by both F/f arrival and company assembly definitions.

Here's a real time saver. In addition to the department-wide report below the 90% Spreadsheet report will create the same breakdown by station for every station you select.

StatsFD also includes a similar 90% spreadsheet for reporting many of the same performance measurements by company and shift.

This is a powerful statistical tool.

All Incidents - Department-Wide				
90% Baseline Performance	Overall	2011	2012	2013
Call Processing	03:04 (30,724)	03:08 (7,747)	02:59 (7,662)	02:58 (7,677)
Turnout	02:35 (30,546)	02:18 (7,698)	02:42 (7,488)	02:56 (7,376)
Travel-Distribution	08:48 (30,657)	08:48 (7,699)	09:09 (7,449)	08:46 (7,428)
Travel-2nd Arrival	09:48 (21,831)	09:48 (5,447)	09:52 (5,307)	09:32 (5,541)
Travel-ERF Response Group	17:08 (73)	17:08 (16)	21:24 (20)	15:46 (20)
Travel-ERF F/f Arrivals	20:31 (60)	20:31 (13)	20:42 (16)	15:46 (20)
Dispatch to Arrival	10:30 (32,076)	10:21 (8,046)	10:58 (7,860)	10:49 (7,845)
Call to Arrival-Distribution	12:15 (32,021)	12:07 (8,068)	12:41 (7,803)	12:27 (7,811)
Call to Arrival-2nd Arrival	13:17 (22,037)	13:14 (5,504)	13:23 (5,347)	13:18 (5,579)
Call to Arrival-ERF Response Group	20:51 (73)	20:51 (16)	24:09 (20)	18:55 (20)
Call to Arrival-ERF F/f Arrivals	28:33 (60)	25:46 (13)	30:29 (17)	18:55 (19)

Fire & EMS - Department-Wide				
90% Baseline Performance	Overall	2011	2012	2013
Call Processing	03:00 (23,588)	03:04 (5,880)	02:55 (6,070)	02:53 (5,937)
Turnout	02:36 (23,890)	02:18 (5,971)	02:42 (6,155)	02:55 (5,970)
Travel-Distribution	08:45 (23,786)	08:43 (5,892)	09:06 (6,124)	08:43 (6,007)
Travel-2nd Arrival	09:51 (18,659)	09:55 (4,604)	09:58 (4,703)	09:32 (4,819)
Travel-ERF Response Group	17:08 (73)	17:08 (16)	21:24 (20)	15:46 (20)
Travel-ERF F/f Arrivals	20:31 (60)	20:31 (13)	20:42 (16)	15:46 (20)
Dispatch to Arrival	10:27 (24,063)	10:18 (5,981)	10:53 (6,192)	10:42 (6,055)
Call to Arrival-Distribution	12:11 (23,978)	12:01 (5,951)	12:35 (6,165)	12:20 (6,037)

Call to Arrival-2nd Arrival	13:22 (18,852)	13:21 (4,660)	13:28 (4,741)	13:22 (4,852)
Call to Arrival-ERF Response Group	20:51 (73)	20:51 (16)	24:09 (20)	18:55 (20)
Call to Arrival-ERF F/f Arrivals	28:33 (60)	25:46 (13)	30:29 (17)	18:55 (19)

EMS - Department-Wide

90% Baseline Performance	Overall	2011	2012	2013
Call Processing	03:00 (22,949)	03:03 (5,734)	02:54 (5,914)	02:53 (5,784)
Turnout	02:36 (23,227)	02:18 (5,816)	02:42 (5,990)	02:55 (5,816)
Travel-Distribution	08:45 (23,134)	08:42 (5,742)	09:05 (5,961)	08:43 (5,853)
Travel-2nd Arrival	09:51 (18,157)	09:55 (4,488)	09:58 (4,575)	09:32 (4,702)
Dispatch to Arrival	10:26 (23,396)	10:15 (5,826)	10:52 (6,027)	10:42 (5,899)
Call to Arrival-Distribution	12:09 (23,321)	12:00 (5,802)	12:34 (6,001)	12:20 (5,882)
Call to Arrival-2nd Arrival	13:21 (18,345)	13:19 (4,541)	13:28 (4,613)	13:21 (4,735)

All Fires - Department-Wide

90% Baseline Performance	Overall	2011	2012	2013
Call Processing	03:14 (639)	03:10 (146)	03:20 (156)	03:13 (153)
Turnout	02:36 (663)	02:25 (155)	02:41 (165)	03:00 (154)
Travel-Distribution	09:17 (652)	09:23 (150)	09:32 (163)	08:49 (154)
Travel-2nd Arrival	10:15 (502)	09:56 (116)	10:18 (128)	09:46 (117)
Travel-ERF Response Group	17:08 (73)	17:08 (16)	21:24 (20)	15:46 (20)
Travel-ERF F/f Arrivals	20:31 (60)	20:31 (13)	20:42 (16)	15:46 (20)
Dispatch to Arrival	11:10 (667)	11:44 (155)	11:15 (165)	09:51 (156)
Call to Arrival-Distribution	12:58 (657)	13:06 (149)	13:31 (164)	12:43 (155)
Call to Arrival-2nd Arrival	13:36 (507)	13:38 (119)	13:29 (128)	13:23 (117)
Call to Arrival-ERF Response Group	20:51 (73)	20:51 (16)	24:09 (20)	18:55 (20)
Call to Arrival-ERF F/f Arrivals	28:33 (60)	25:46 (13)	30:29 (17)	18:55 (19)

Building Fires - Department-Wide

90% Baseline Performance	Overall	2011	2012	2013
Call Processing	02:42 (137)	02:16 (29)	02:54 (41)	02:54 (30)
Turnout	02:36 (138)	02:34 (30)	02:29 (43)	02:50 (30)
Travel-Distribution	08:58 (138)	08:58 (29)	10:19 (42)	06:46 (30)
Travel-2nd Arrival	09:19 (129)	10:24 (29)	07:18 (37)	07:18 (28)
Travel-ERF Response Group	17:08 (73)	17:08 (16)	21:24 (20)	15:46 (20)
Travel-ERF F/f Arrivals	20:31 (60)	20:31 (13)	20:42 (16)	15:46 (20)
Dispatch to Arrival	10:12 (138)	09:53 (29)	11:55 (42)	08:46 (30)
Call to Arrival-Distribution	12:52 (139)	11:24 (28)	15:36 (43)	11:10 (31)
Call to Arrival-2nd Arrival	12:39 (128)	13:09 (28)	13:32 (37)	11:14 (28)
Call to Arrival-ERF Response Group	20:51 (73)	20:51 (16)	24:09 (20)	18:55 (20)
Call to Arrival-ERF F/f Arrivals	28:33 (60)	25:46 (13)	30:29 (17)	18:55 (19)

Wildland Fires - Department-Wide

90% Baseline Performance	Overall	2011	2012	2013
Call Processing	03:11 (130)	03:10 (33)	02:38 (26)	03:13 (26)
Turnout	02:32 (137)	02:21 (37)	02:34 (28)	02:49 (26)
Travel-Distribution	08:28 (139)	08:30 (38)	07:07 (28)	07:52 (26)

Travel-2nd Arrival	10:35 (96)	10:15 (25)	10:27 (22)	09:46 (17)
Dispatch to Arrival	09:54 (140)	09:47 (38)	09:54 (29)	09:30 (26)
Call to Arrival-Distribution	12:43 (140)	13:33 (38)	09:37 (28)	11:14 (26)
Call to Arrival-2nd Arrival	13:23 (96)	13:22 (25)	11:55 (22)	13:23 (17)

Technical Rescue - Department-Wide

90% Baseline Performance	Overall	2011	2012	2013
Call Processing	03:23 (31)	03:19 (4)	01:53 (7)	03:23 (3)
Turnout	02:27 (38)	02:56 (5)	03:06 (7)	01:34 (6)
Travel-Distribution	07:56 (33)	07:56 (3)	05:31 (7)	07:46 (6)
Travel-2nd Arrival	09:16 (24)	07:56 (3)	06:54 (3)	09:53 (5)
Dispatch to Arrival	10:40 (34)	08:00 (3)	07:04 (7)	07:50 (6)
Call to Arrival-Distribution	14:08 (32)	11:19 (3)	08:22 (7)	14:30 (5)
Call to Arrival-2nd Arrival	14:08 (24)	11:19 (3)	08:33 (3)	14:37 (4)

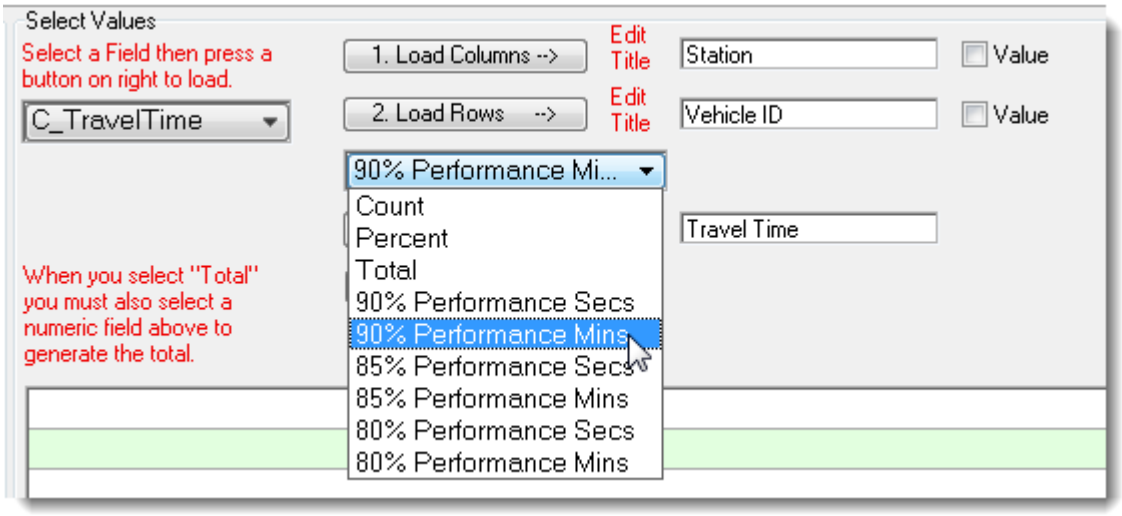
Haz Mat - Department-Wide

90% Baseline Performance	Overall	2011	2012	2013
Call Processing	03:05 (869)	03:05 (198)	03:08 (141)	03:22 (181)
Turnout	02:25 (892)	02:04 (204)	02:50 (148)	02:47 (184)
Travel-Distribution	08:22 (914)	08:35 (209)	09:00 (153)	09:11 (184)
Travel-2nd Arrival	09:40 (675)	09:04 (152)	09:56 (105)	09:40 (132)
Dispatch to Arrival	09:46 (919)	09:57 (210)	10:05 (153)	10:48 (186)
Call to Arrival-Distribution	11:51 (913)	12:14 (210)	12:21 (150)	12:40 (186)
Call to Arrival-2nd Arrival	13:10 (678)	13:03 (153)	13:24 (104)	14:00 (133)

3.2 90% Worksheets

90% Worksheets

While the 90% spreadsheet summary is a fixed report that gives you a lot of performance information the 90% worksheet report is totally user-defined. It's easy to set up and a great tool for identifying 90% performance trends. Here's the setup screen:



In Apparatus we selected Stations for the columns and Vehicle ID's (Companies) for the rows. We selected 90% Performance Minutes for the reporting format and Travel Time our performance measurement. Here's the resulting chart:

Apparatus: 90% Performance Minutes - Station per Vehicle ID
There are 8,545 Apparatus records being analyzed.

Station Vehicle ID	S01	S02	S03	S04	S05
E1	04:35 (1,686)	11:41 (12)	06:54 (43)	09:53 (9)	
E2	05:31 (16)	05:22 (348)		08:47 (3)	
E3	06:32 (38)	04:58 (4)	04:33 (921)	09:15 (23)	
E4	05:37 (2)		13:14 (34)	05:37 (376)	13:07 (28)
E5				12:47 (25)	06:52 (469)

Notice we have 5 fire stations (columns) and five engine companies (rows). E1 responded into Station 1's territory 1,686 times with a 90% performance measure of 04:35. That's good performance within it's home district. But the chart also shows us E1 traveled into S02 12 times, into S03 43 times and S04 9 times. For each station we can see how long the 90% travel time was for E1. Performance for all other selected Engines is outlined for each of the 5 station areas.

The Worksheet Analyzer provides powerful analysis capabilities since it covers all performance measures with any fields you select for rows and columns. You can use this analyzer to track down the story behind the calculations in the 90% Spreadsheet Summary.

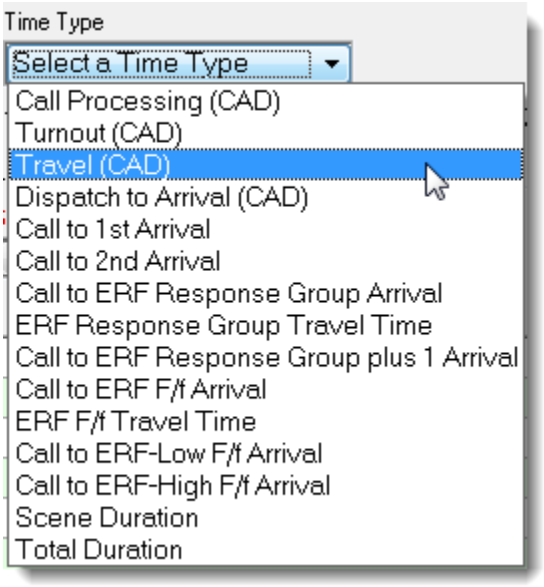
As a bonus any Worksheet Analyzer report you create can be stored and used in automatic mode. You then have the option to update worksheet reports hourly, daily,

weekly or monthly - automatically.

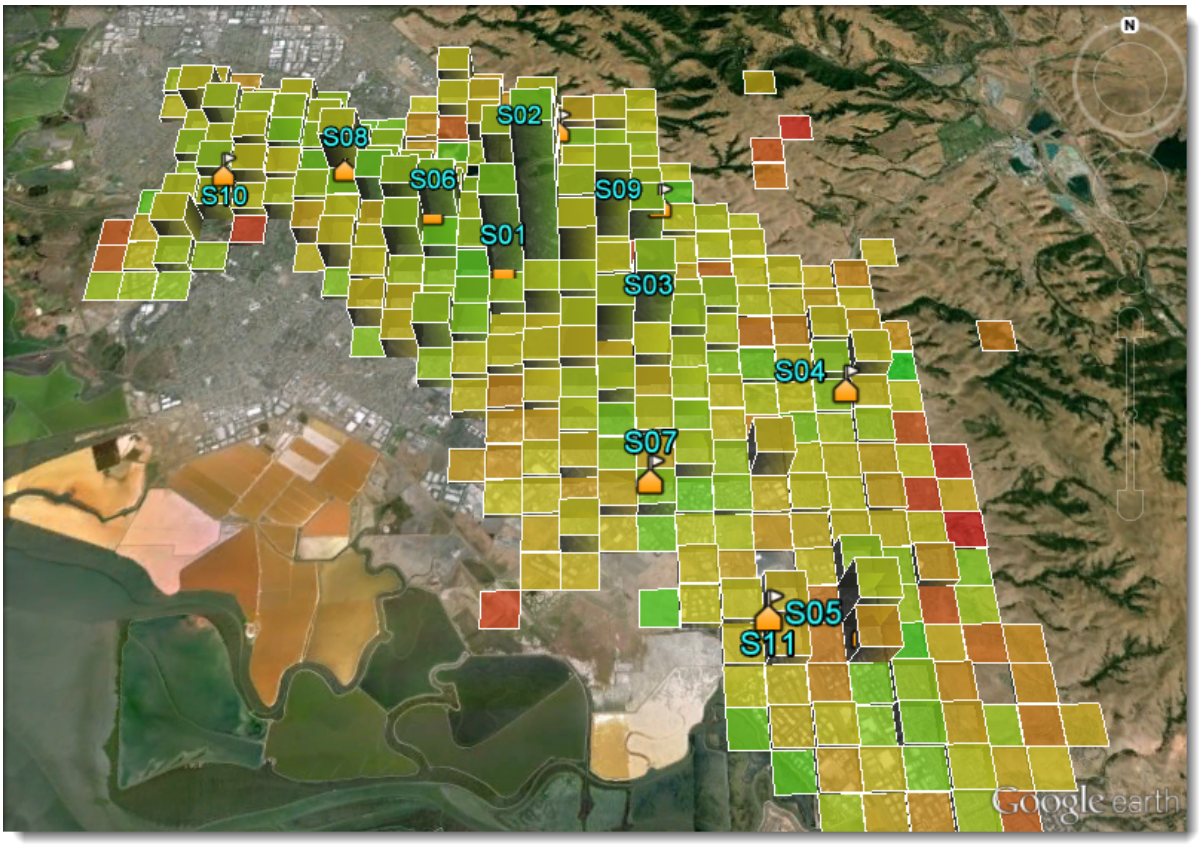
3.3 90% Geographic Models

90% Geographic Models

Within ***StatsFD*** geographic models can be constructed for any of the following performance measurements:



Here we see a Travel Time model where the height of a D3 District indicates relative call volume and the color of the D3 District measures relative 90% travel time performance within the D3 District. Here a green color indicates good travel times trending to yellow for average travel times trending to red for poorer travel times:



In the map above you can click check-boxes to show only those D3 Districts meeting a pre-set travel time goal. You can then add progressive 30-second time segments to the goal as you watch additional D3 Districts appear on the map.

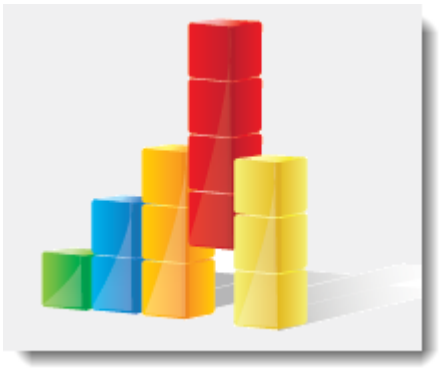
Below is a close-up of the same map with the D3 District shapes turned-off and center of each D3 District displaying the number of seconds to 90% travel time compliance.

Each geographic model offers quite a few more options for visualizing performance. Each of these models is a KML file created in ***StatsFD*** and opened in Google Earth which provides the geographic visualizations.

4 4. Fractiles & Compliance

4

Fractiles & Compliance



Fractiles refers to performance calculations in which the number of incidents meeting progressive time increments is converted into a percentage of all incidents being tested. Each time increment has a calculated "compliance percentage" or "compliance".

Here's an example. We have 1,000 incidents. Each incident has a valid travel time. Each incident is ordered so the fastest travel duration is listed first.

In this example, we may see that 100 incidents have a Travel Time of 60-seconds or less. So at 1-minute we can say there is a 10% travel time compliance. If number of incidents with travel times less than or equal to 120 seconds is 300 then we can say there is a 30% travel time compliance at 2-minutes. And so on...

* Fractile Waterfall

* Setting Fractile Goals

* Fractile Graphs

* Fractile Matricies

* Fractile Maps

4.1 Fractile Waterfall

Fractiles Waterfall

Example: Click Here

Best practice standards such as "NFPA 1710" and "Standards of (Response) Cover" require fractile reporting. ***StatsFD*** can export these reports at text, Excel cells or as HTML as in the example above.

Below is an example of a text fractile "waterfall" that examines first apparatus arrivals in 15-second progressions and provides a specific count for the number of arrivals in each progression.

There are 5,497 Apparatus records being analyzed.
12 records were ignored because of a zero time value.

1st Apparatus On Scene <= 00:00:00 .0% (0)
1st Apparatus On Scene <= 00:00:15 .3% (15)
1st Apparatus On Scene <= 00:00:30 .5% (29)
1st Apparatus On Scene <= 00:00:45 .9% (47)
1st Apparatus On Scene <= 00:01:00 1.5% (85)
1st Apparatus On Scene <= 00:01:15 2.9% (158)
1st Apparatus On Scene <= 00:01:30 4.2% (230)
1st Apparatus On Scene <= 00:01:45 5.9% (321)
1st Apparatus On Scene <= 00:02:00 7.7% (421)
1st Apparatus On Scene <= 00:02:15 9.3% (510)
1st Apparatus On Scene <= 00:02:30 11.2% (615)
1st Apparatus On Scene <= 00:02:45 13.7% (753)
1st Apparatus On Scene <= 00:03:00 15.9% (874)
1st Apparatus On Scene <= 00:03:15 18.9% (1,039)
1st Apparatus On Scene <= 00:03:30 23.0% (1,263)
1st Apparatus On Scene <= 00:03:45 27.1% (1,485)
1st Apparatus On Scene <= 00:04:00 31.7% (1,741)
1st Apparatus On Scene <= 00:04:15 37.0% (2,028)
1st Apparatus On Scene <= 00:04:30 41.3% (2,268)
1st Apparatus On Scene <= 00:04:45 46.6% (2,558)
1st Apparatus On Scene <= 00:05:00 51.7% (2,836)
1st Apparatus On Scene <= 00:05:15 56.1% (3,079)

1st Apparatus On Scene <= 00:05:30 59.5% (3,265)
1st Apparatus On Scene <= 00:05:45 63.6% (3,487)
1st Apparatus On Scene <= 00:06:00 67.4% (3,695)
1st Apparatus On Scene <= 00:06:15 70.5% (3,865)
1st Apparatus On Scene <= 00:06:30 73.7% (4,042)
1st Apparatus On Scene <= 00:06:45 76.4% (4,192)
1st Apparatus On Scene <= 00:07:00 78.9% (4,330)
1st Apparatus On Scene <= 00:07:15 80.8% (4,432)
1st Apparatus On Scene <= 00:07:30 82.5% (4,523)
1st Apparatus On Scene <= 00:07:45 83.9% (4,601)
1st Apparatus On Scene <= 00:08:00 85.5% (4,691)
1st Apparatus On Scene <= 00:08:15 86.8% (4,760)
1st Apparatus On Scene <= 00:08:30 87.8% (4,815)
1st Apparatus On Scene <= 00:08:45 88.9% (4,875)
1st Apparatus On Scene <= 00:09:00 89.5% (4,909)
1st Apparatus On Scene <= 00:09:15 90.2% (4,948)
1st Apparatus On Scene <= 00:09:30 90.9% (4,988)
1st Apparatus On Scene <= 00:09:45 91.5% (5,021)
1st Apparatus On Scene <= 00:10:00 92.1% (5,049)
1st Apparatus On Scene <= 00:10:15 92.6% (5,079)
1st Apparatus On Scene <= 00:10:30 93.3% (5,117)
1st Apparatus On Scene <= 00:10:45 93.6% (5,136)
1st Apparatus On Scene <= 00:11:00 93.9% (5,151)
1st Apparatus On Scene <= 00:11:15 94.2% (5,169)
1st Apparatus On Scene <= 00:11:30 94.4% (5,180)
1st Apparatus On Scene <= 00:11:45 94.8% (5,198)
1st Apparatus On Scene <= 00:12:00 94.9% (5,208)

Median 1st Apparatus On Scene 00:04:55 (4.92 minutes)
Average 1st Apparatus On Scene 00:05:54 (5.89 minutes)

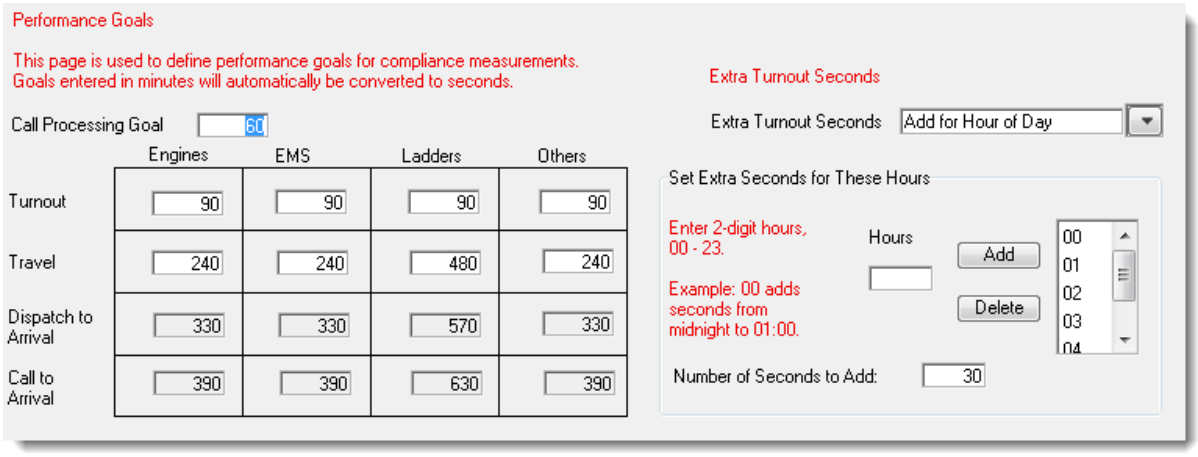
At 6-minutes the first apparatus reached the scene 67.4% of the time. 90% compliance occurred at 09:15.

One powerful feature is that waterfalls can be "data split" into separate columns by 76 different criteria. So, using the above example, you can data split this department waterfall into waterfall columns for each fire station, for each 1st arriving company, for each shift, etc. There's virtually not limit to the type of fractile analysis you can do.

4.2 Setting Fractile Goals

Setting Fractile Goals

The fractile waterfall will provide performance compliance at different time increments, but compliance comparisons require you to set a performance goals. Here's an example of performance goals set in ***StatsFD***.



In this example Call Processing goals are set to 60 seconds, Turnout to 90 seconds and Travel to 240 seconds. Notice different goals can be set for Engines, EMS rigs, Ladders and Other vehicle types.

Turnout seconds can be added for "Special Ops" incident types or for hour of the day. In this case 30 seconds are added for early morning incidents.

The goals you set should be obtainable yet they should challenge responders to motivate performance improvement.

4.3 Fractile Tables

Fractile Tables

When you data split fractile waterfalls into columns you can generate a lot of numbers. Sometimes you just want to compare performance within each data split side-by-side. That when you can select a fractile table. The chart below illustrates a data split by station:

Station	AM1	AM2	PM1	PM2	% @ 240 secs	Secs. to 90%
S01	77.68% (251)	85.03% (568)	84.64% (762)	82.89% (491)	83.49% (2,072)	275
S03	76.07% (163)	74.07% (243)	78.55% (359)	84.22% (298)	78.73% (1,063)	285
S06	84.37% (128)	84.57% (214)	83.72% (301)	84.42% (276)	84.22% (919)	275
S10	64.16% (120)	71.21% (198)	66.82% (208)	72.28% (249)	69.29% (775)	315
S08	84.09% (88)	87.92% (207)	87.5% (248)	87.90% (215)	87.33% (758)	255
S07	77.88% (104)	77.72% (193)	69.69% (264)	84.45% (193)	76.65% (754)	310
S05	60.34% (58)	69.23% (143)	61.23% (178)	70.94% (148)	66.03% (527)	415
S09	73.13% (67)	80.98% (142)	77.17% (184)	85.49% (131)	79.77% (524)	285
S04	64.40% (59)	64.56% (127)	78.4% (125)	72.72% (121)	70.83% (432)	340
S02	72.41% (58)	71.42% (105)	79.24% (106)	73.38% (124)	74.30% (393)	330
S11	45.83% (24)	51.25% (80)	51.56% (64)	56.36% (55)	52.01% (223)	360

The first column is the station. Notice the stations are not in alphabetical order because the user selected the option to display the most active station first.

The next four columns illustrate both the compliance percentage and number of incidents by time of day. This allows you to compare performance over a 24-hour cycle. Here are the 4 6-hour segments represented above:

AM1 00:00:00 - 05:59:59
AM2 06:00:00 - 11:59:59
PM1 12:00:00 - 17:59:59
PM2 18:00:00 - 23:59:59

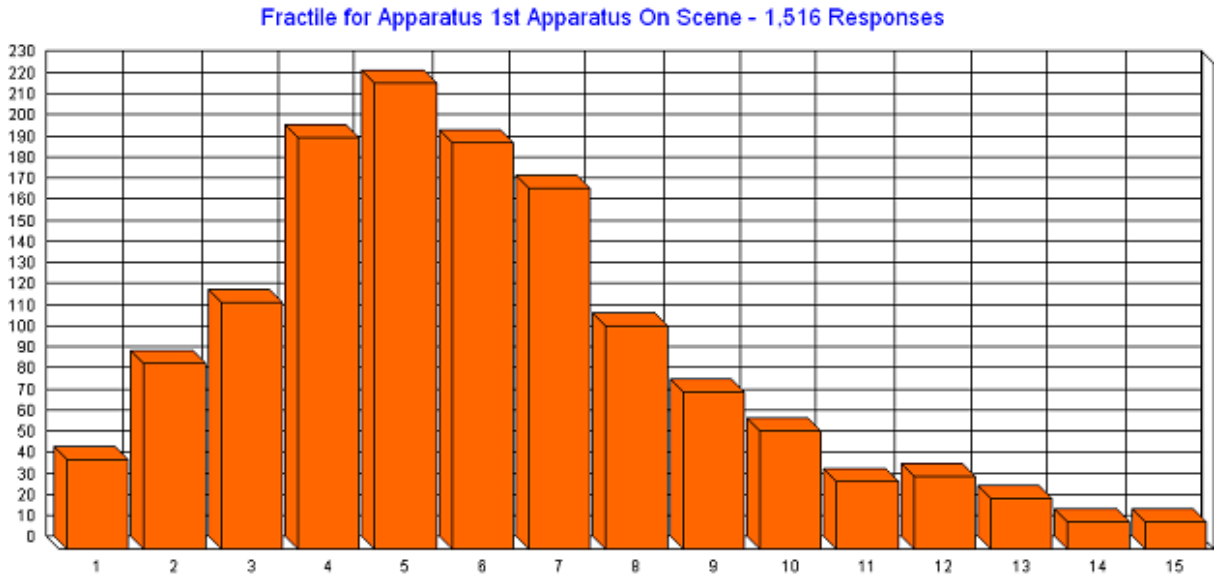
The column title "% @ 240" shows you the percentage of compliance with the goal. In this case the goal was 4-minute travel time which is 240 seconds (4 X 60). The number in the column represents the number of incidents used to obtain this measure.

The final column shows the number of seconds necessary to reach 90% compliance. In this case all calculations are rounded-off to the nearest 5-second interval.

4.4 Fractile Graphs

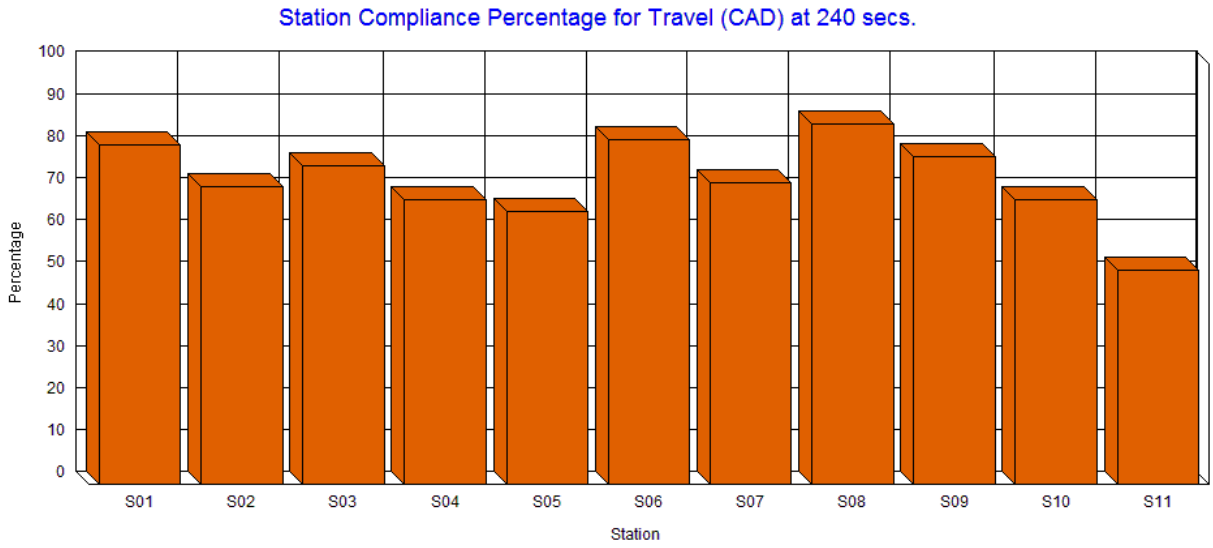
Fractile Graphs

Here's an example 2D fractile graph. This graph splits response time into 1-minute segments illustrating the number of incidents in each segment. This is the graphical equivalent of a fractile waterfall and does not require a goal to calculate the graph.

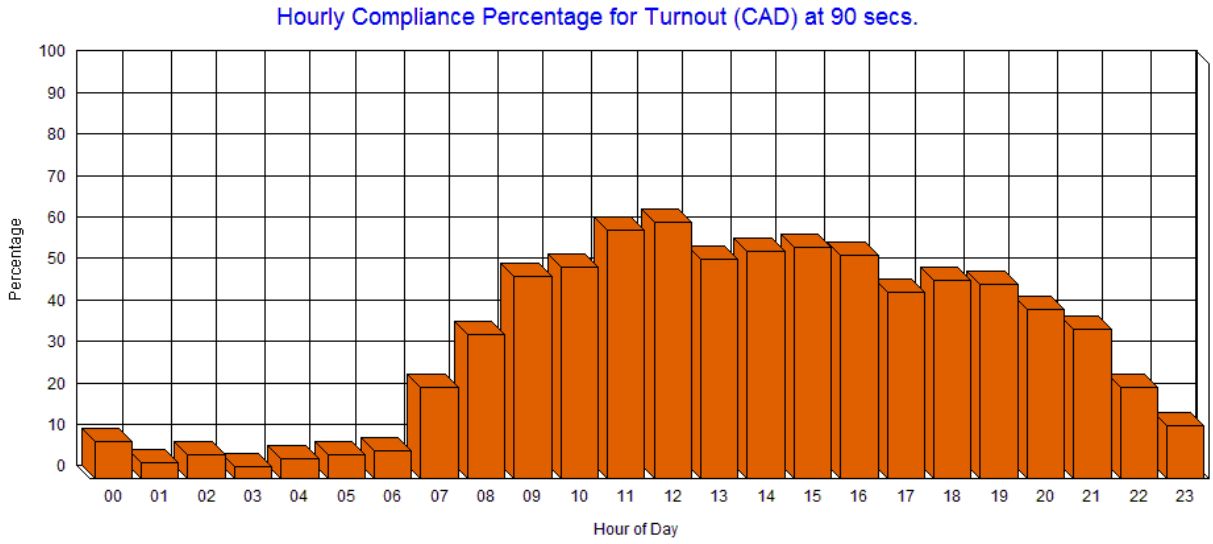


Notice more incidents have a 5-minute response time than any other minute increment. The numbers of incidents with more than a 5-minute response time tend to taper-down slowly. This is a "right-shifted" graph. It illustrates a response pattern where many incidents occur close to the fire station, but a significant number of responses are to more remote areas and require a longer response time. Right-shifted response time graphs indicate areas with isolated response locations.

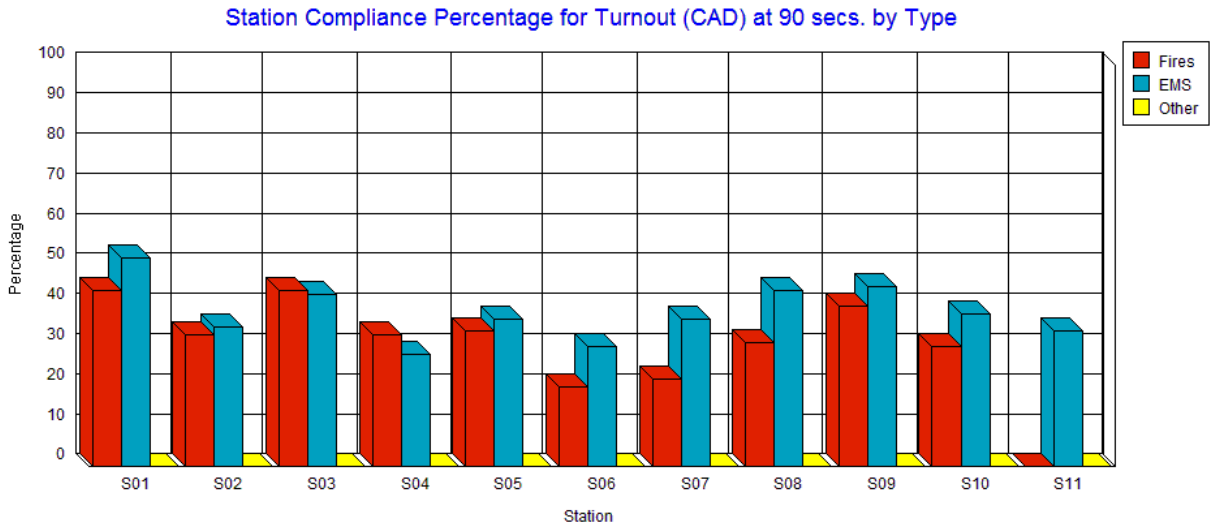
Now we shift to a fractile report that require a goal. On the left side of the graph we see the compliance percentage from 0% to 100%. We are comparing compliance with a 4-minute (240-second) travel time goal by station area. Notice Station 08 has the highest compliance percentage while S11 has the lowest compliance percentage.



The graph below uses a 90-second goal to illustrate turnout compliance by hour of the day. Here we see 90% turnout time compliance suffers in the early morning, but even in the middle of the day turnout time at 90-seconds struggles to reach 60% compliance.



The graph below uses a 90-second turnout time goal to examine the difference between fire and EMS incidents. In this case, non-emergency "Other" incident types have been eliminate from selection.



Notice turnout time compliance varies from station-to-station. But more interesting is the variance between EMS turnout and fire turnout. With a few exceptions EMS turnout has a higher compliance than turnout to fire. This may indicate longer gear-up times necessary for fire incidents.

4.5 Fractile Matrices

Fractile Matrices

Example: Click Here

StatsFD prints matrix reports to PDF as in the example above.

Below is a "matrix" report format. The plural of matrix is "matrices". Below is a Distribution Matrix for Station S01. There is a lot of information on this page:

Distribution Matrix — Station S01 — 01/01/13 - 12/31/13 Station Distribution by Performance Type — All Incident Types			
Call Processing @ 01:00	Turnout @ 01:30	Travel @ 04:00	Call to Arrival @ 06:30
89.4%	54.2%	81.5%	82.7%
Compared to Dept % All Incidents 0.5%	Compared to Dept % All Incidents 11.9%	Compared to Dept % All Incidents 5.9%	Compared to Dept % All Incidents 7.1%
01:03 for 90% compliance	02:28 for 90% compliance	04:50 for 90% compliance	07:38 for 90% compliance
2,638 / 314 Pass / Fail	1,435 / 1,213 Pass / Fail	2,187 / 498 Pass / Fail	2,458 / 515 Pass / Fail
% Compliance Time of Day 89 / 90 / 89 / 88 AM1 / AM2 / PM1 / PM2	% Compliance Time of Day 29 / 53 / 65 / 50 AM1 / AM2 / PM1 / PM2	% Compliance Time of Day 76 / 83 / 82 / 79 AM1 / AM2 / PM1 / PM2	% Compliance Time of Day 66 / 86 / 85 / 81 AM1 / AM2 / PM1 / PM2

There are four rows providing in-depth information for Call Processing, Turnout, Travel and Call to Arrival. The first rows provide the goals and compliance percentage. Compliance percentages of 90% or higher are green, 80% to 90% are yellow and less than 80% are red.

The second row compares the Station's compliance percentage to the department's percentage. If the Station is doing better or the same as the department the resulting percentage is displayed in green. If the station's performance is worse than department performance the percentage is displayed in red.

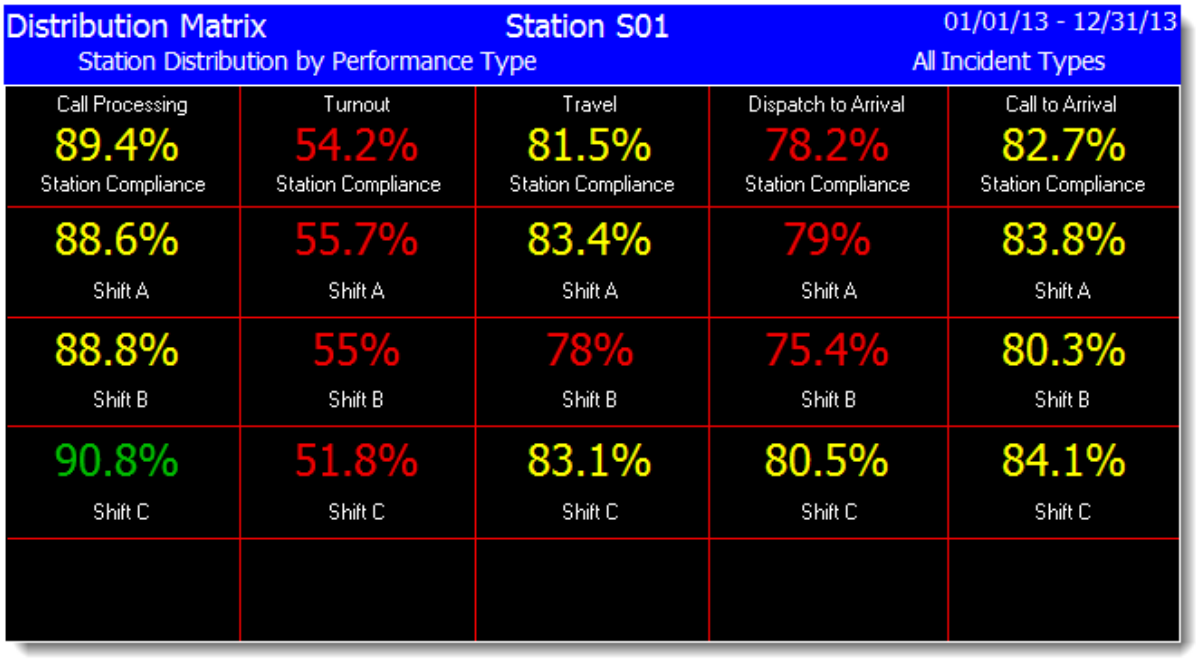
The third row shows time to 90% compliance in each of the four categories. The color of this row matches the color of the percentage displayed in row 1.

The third row shows in blue the number of incidents passing and failing the goal listed in row 1.

The last row divides the 24-hour day into 4 6-hour segments displaying the compliance percentage for that segment. The segments cover early morning, morning, afternoon and evening segments.

Shift Fractiles

The Distribution Matrix below illustrates compliance by shift. It can handle up to 4-on-duty shifts. This report allows you to compare individual shift performance to performance of the station. Similar reports are available for vehicles.



Distribution Matrix — Station S01 — 01/01/13 - 12/31/13 Station Distribution by Performance Type — All Incident Types				
Call Processing	Turnout	Travel	Dispatch to Arrival	Call to Arrival
89.4% Station Compliance	54.2% Station Compliance	81.5% Station Compliance	78.2% Station Compliance	82.7% Station Compliance
88.6% Shift A	55.7% Shift A	83.4% Shift A	79% Shift A	83.8% Shift A
88.8% Shift B	55% Shift B	78% Shift B	75.4% Shift B	80.3% Shift B
90.8% Shift C	51.8% Shift C	83.1% Shift C	80.5% Shift C	84.1% Shift C

Fractile Distribution and Concentration

The Concentration Matrix report below illustrates compliance by company types. Distribution (1st Arrival) measurements are found in the first row while concentration measurements are found in the remaining rows.

Concentration Matrix	Station S01		01/01/13 - 12/31/13
Minutes to 90% Travel Time / Responses			All Incident Types
Any Apparatus	Primary EMS	Primary Engines	Primary Ladders
04:50 2,651 1st Arrival	05:52 76 1st EMS Arrival	04:37 2,191 1st Engine Arrival	05:51 525 1st Ladder Arrival
05:14 106 2nd Arrival	06:39 14 2nd EMS Arrival	06:15 59 2nd Engine Arrival	06:40 4 2nd Ladder Arrival
05:38 69 3rd Arrival	3rd EMS Arrival	05:19 25 3rd Engine Arrival	3rd Ladder Arrival
06:34 43 4th Arrival	4th EMS Arrival	05:25 16 4th Engine Arrival	4th Ladder Arrival

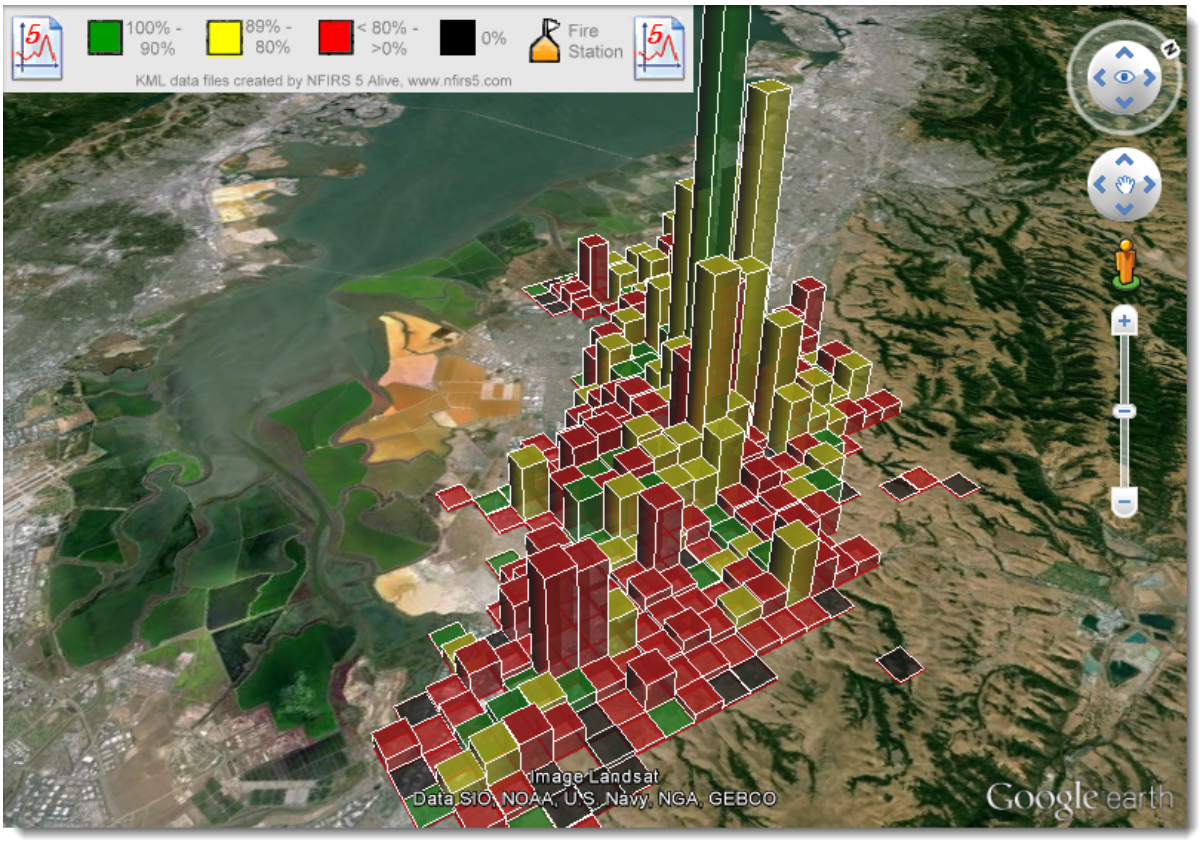
Each cell in the matrix shows the minutes to 90% compliance followed in blue by the number of apparatus responses used to calculate performance. The higher the number in blue the less volatile the 90% performance measurement.

4.6 Fractile Maps

Fractile Maps

The 3D map below uses some random data to generate a travel time compliance map. The KML code for this model was produced by ***StatsFD***. The KML file is being viewed in Google Earth.

Note D3 Districts in Green have 90% - 100% compliance. Districts in yellow have an 89% - 80% compliance. Red D3 Districts have a compliance less than 80%. Finally areas with zero compliance are colored in black. The "height" of each D3 District indicates relative call volume. This model may be zoomed and rotated.

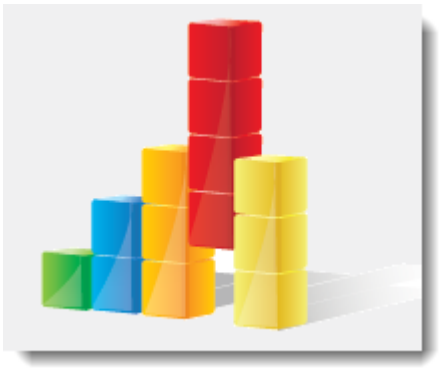


Many low volume areas are away from fire stations may have lowered travel time compliance. However, it is important to locate and address areas where call volume is higher, but performance compliance is lower.

5 5. Effective Response Force

5

Effective Response Force



An Effective Response Force (ERF) is a team of fire department resources used as an initial response to building fires. ERF may be defined as a combination of apparatus or as a minimum number of personnel. Either way the arrival of the last apparatus or the last fire fighter necessary to complete the ERF is considered the timestamp for the arrival of the ERF on the scene of an emergency.

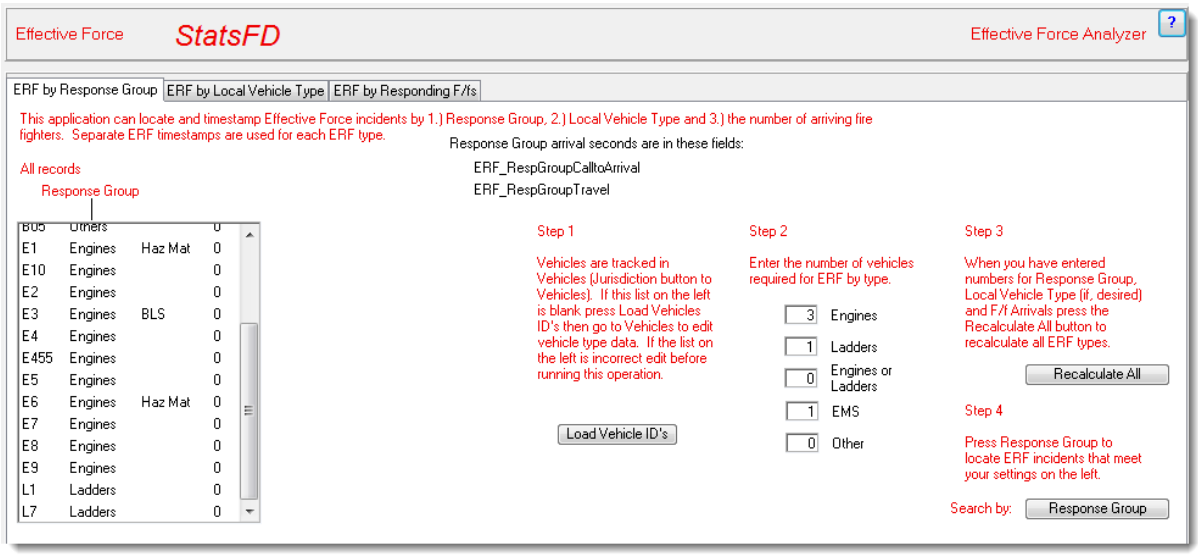
5.1 ERF Definitions

ERF Definitions

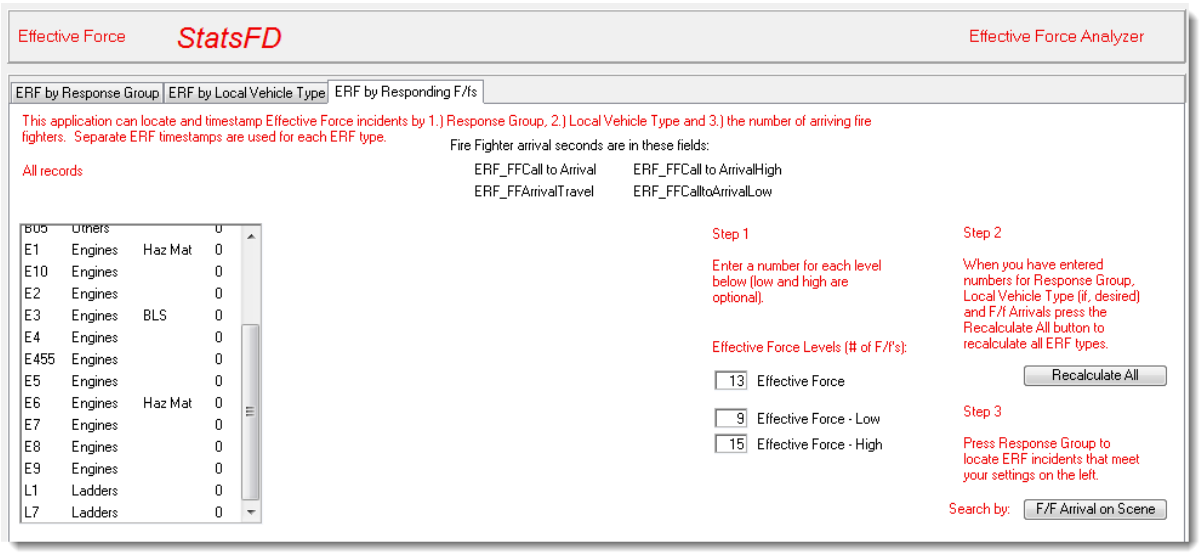
Effective Response Force can be defined by an apparatus inventory or as a minimum number of fire fighters arriving on the scene.

StatsFD offers two method to inventory ERF apparatus. The first allows you to set the number of Engines, Ladders, Engines or Ladders, EMS and Other apparatus necessary to establish an ERF. The reason "Engines or Ladders" is an option is to allow quints to be used as an engine or ladder in order to complete an ERF. The second way to inventory ERF apparatus is to enter any apparatus type you wish and select the number of those apparatus types required for an ERF. This gives you great flexibility.

Below is a view of the form used to select an ERF by apparatus inventory:



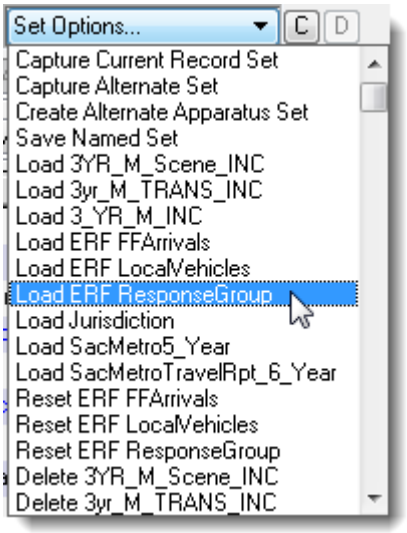
Next is a view of the form used to select the number of fire fighters arriving on the scene. Options exist for defining "Low" and "High" fire fighter counts for special studies:



5.2 ERF Record Sets

ERF Record Sets

Record sets are simply groups of records which can be referenced by a name. After you enter your ERF criteria ***StatsFD*** will create a set of incident records for up to 3 ERF definitions.



Here we can choose to load the "ERF_ResponseGroup" set which is the set of incident records where the defined inventory of apparatus arrived on the scene.

At this point you may further refine the set by limiting it to a certain date range, building fires only, dollar loss fires only, etc.

When you have refined the ERF record set simply select "Reset ERF ResponseGroup" to reset the ERF record set to only the incidents you want to include.

The same process can be followed for the other two ERF sets:

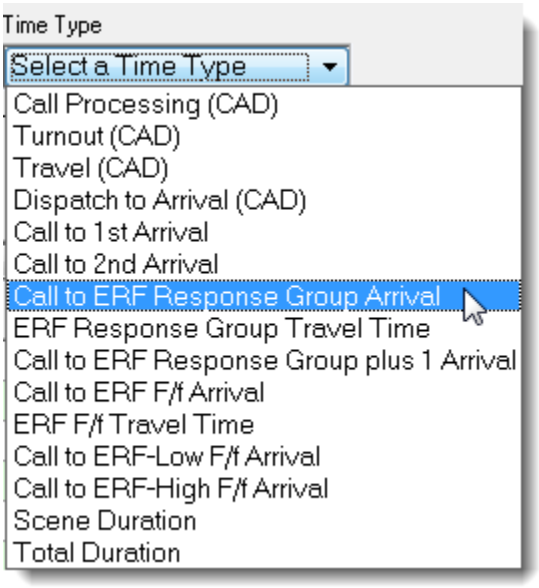
ERF FFArrivals
ERF LocalVehicles

The ERF record sets you defined remain in the system and can be recalled at any time.

5.3 ERF Reports

ERF Reports

ERF reports can be created in the Time Analyzer. Here's a list of available 6 available ERF waterfall reports beginning with "Call to ERF Response Group Arrival":



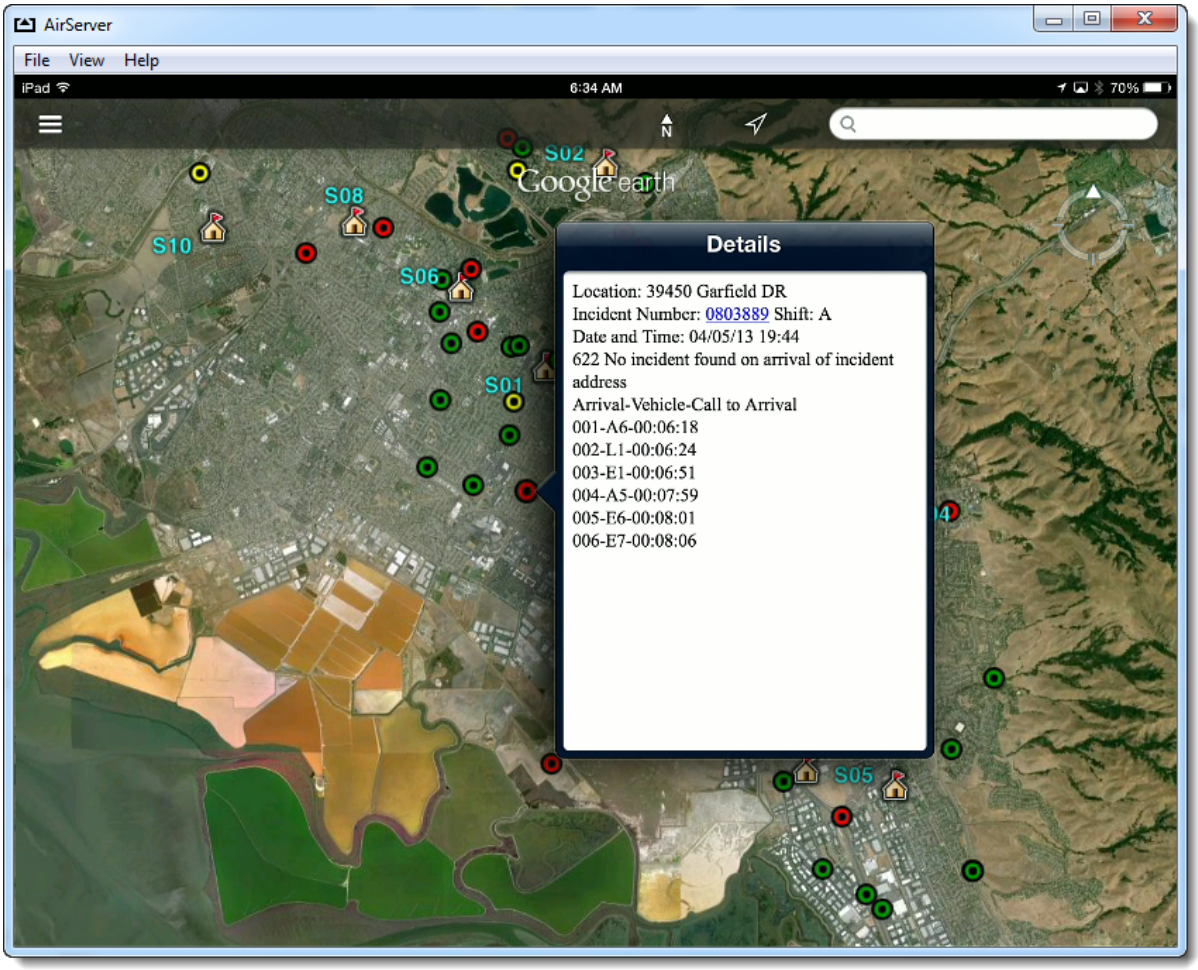
Like any waterfall report ERF reports can be data split by 76 criteria including station, year, station_year, etc.

5.4 ERF Maps

ERF Maps

ERF Incidents, like any set of incidents, can be sent to a map. But ***StatsFD*** takes mapping a step further. The map below shows all multiple apparatus incidents with green showing two apparatus, yellow showing three apparatus and red showing four or more apparatus. Here's where this gets interesting.

StatsFD created the KML automatically. It's updated hourly and saved in a "Dropbox" folder. The map below was then opened in Dropbox on an iPad using the Google Earth application. The user then pressed on a red icon to view the arrival sequence for apparatus responding to a red icon incident:



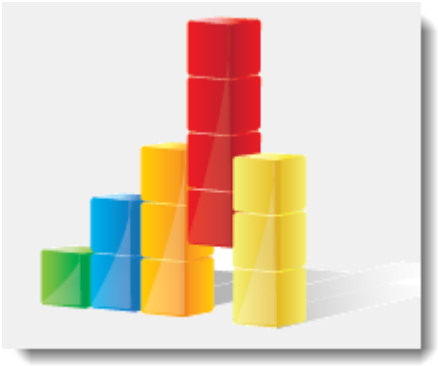
The KML for the map is created automatically, updated hourly and delivered to authorized mobile devices any where in the world through Dropbox. While an iPad was used in this example the same applies to iPhones, Android Phones and most tablets.

There will be more on automatic reporting in Chapter 8.

6 6. Benchmarks & Baselines

6

Benchmarks & Baselines



Benchmarks & Baselines measures performance against operational goals (Benchmarks) and minimum performance expectations (Baselines) over various population densities. The measurements include "Overall" performance plus breakdowns for "Metropolitan", "Urban", "Suburban" and "Rural" population densities. Distribution performance is measured for "Call Processing", "Turnout", "Travel", "Dispatch to Arrival" and "Call to Arrival". Concentration measurements are established for "2nd Apparatus Arrival", "ERF Travel" and "ERF Call to Arrival".

By evaluating both operational goals and minimum performance expectations over different population densities you get a more complete performance picture of your operation's capabilities and vulnerabilities.

* B & B Concentration

6.1 B & B Populations

B & B Populations

Example: Click Here

The example is a PDF document created by ***StatsFD***. It contains random data which may result in zeros when parsed into very small segments. But it gives you an idea of the capabilities of the Benchmarks & Baselines report.

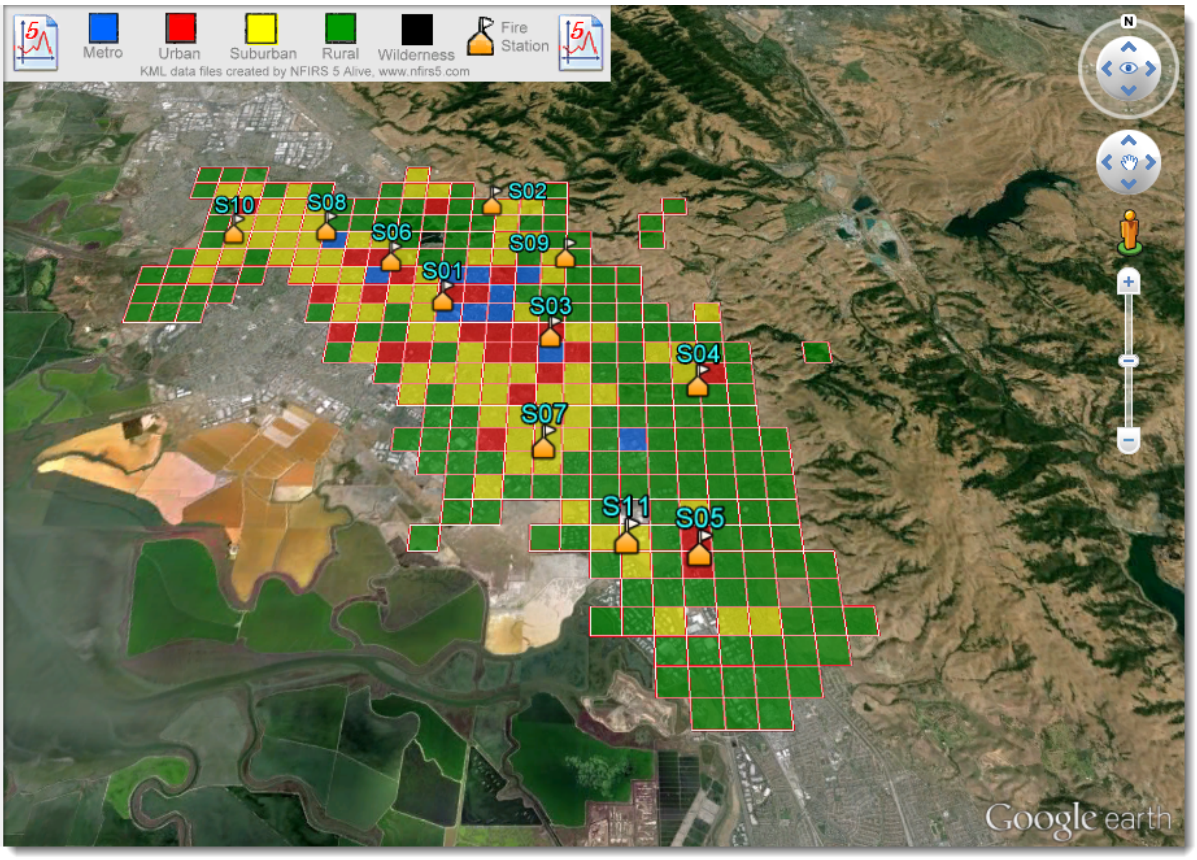
The first task in any Benchmarks & Baselines calculation is to determine the population density at the location of each incident being analyzed. This sounds like a huge task, but it may be easier than it sounds. There are four population densities:

1. Metropolitan
2. Urban
3. Suburban
4. Rural

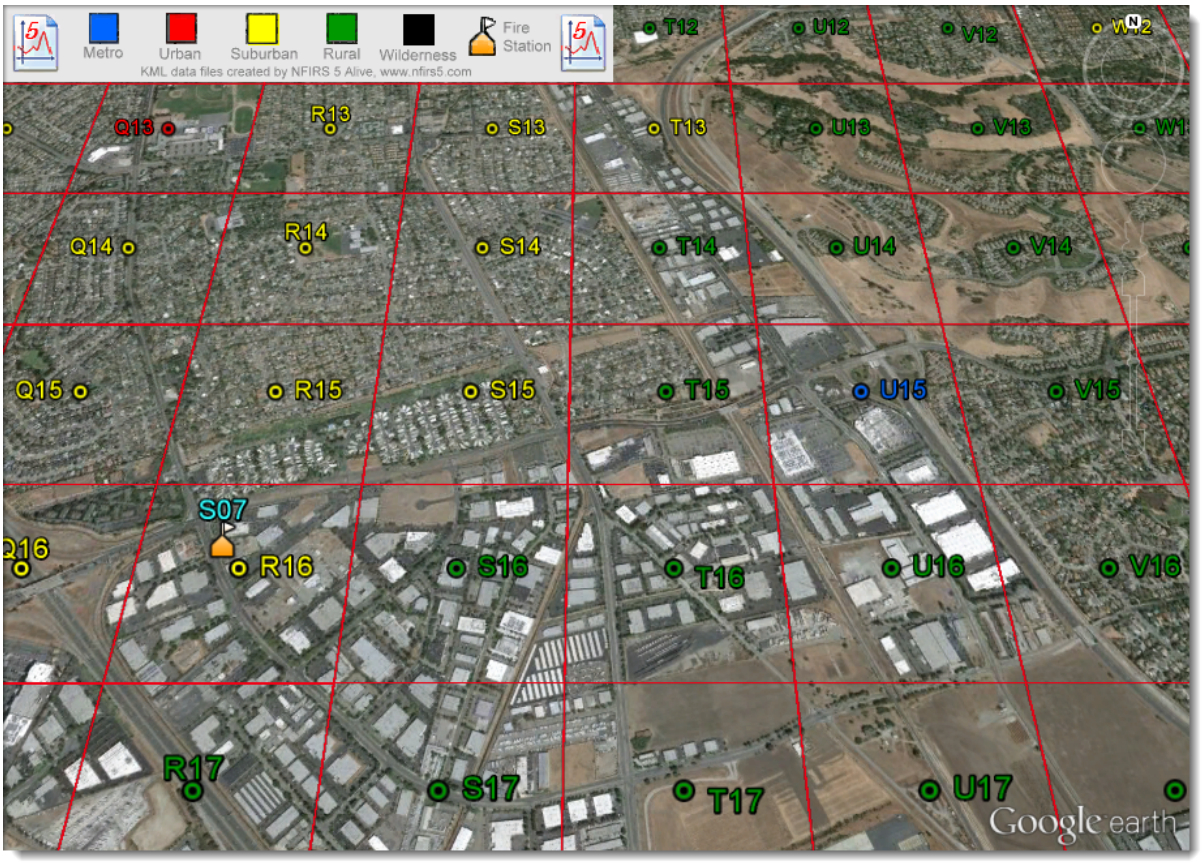
If your fire department is suburban your entire district may have a suburban population density so nothing needs to be done. However, most larger cities will have two, three or sometimes even four population density types. You need some way to associate the appropriate population density with each incident.

Some fire departments use census tract information which provides a population density by census tract. If you track census tracts in your NFIRS 5 data this can make associating a population density an easy task.

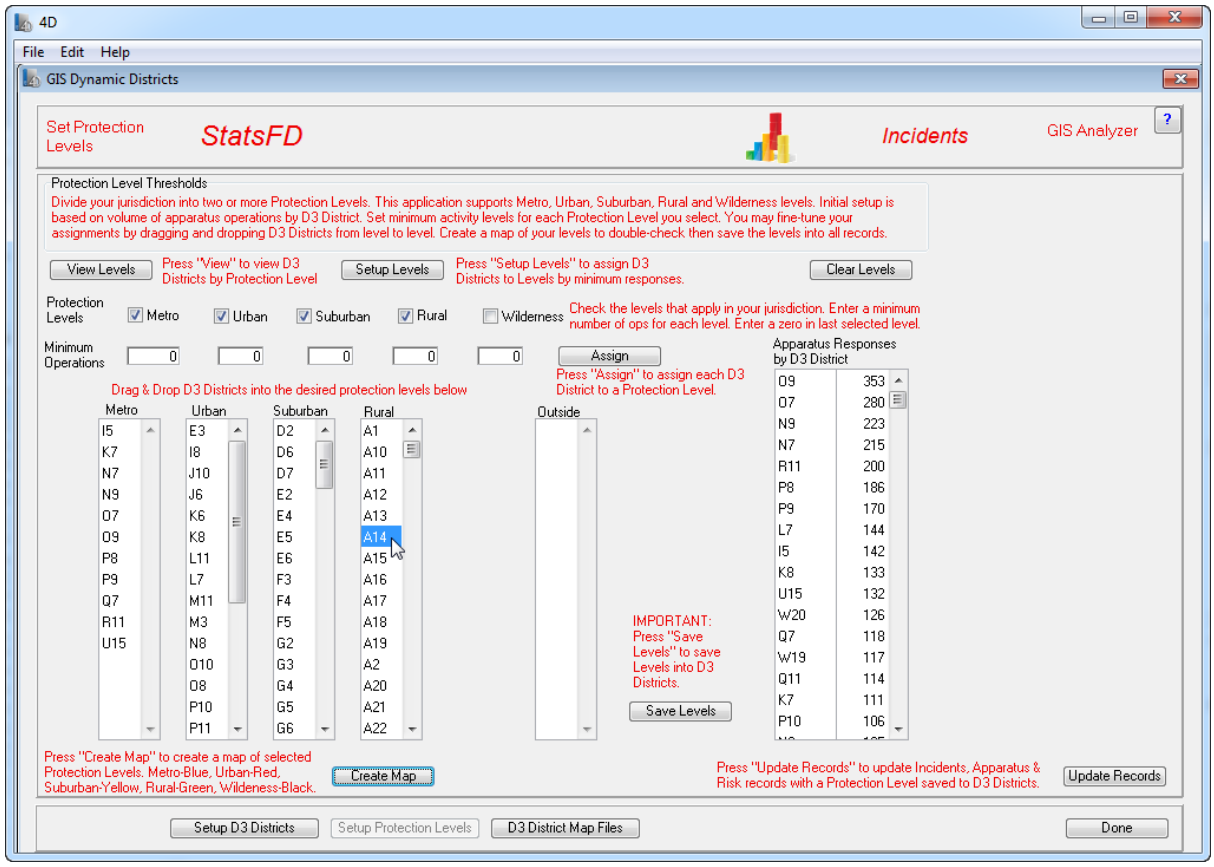
StatsFD allows you to select one or more of the population levels found it your fire department's response area. You can then use D3 Districts to create population maps. The map below "roughs-in" population densities by using incident volume. The broad assumption is made that very heavy incident loads will be experienced in more dense population levels. So incident counts by D3 district are used to make a preliminary "rough guess" at the population levels.



You may now switch-off the color squares and visualize each D3 District label. The color of the D3 District label tells you the population "rough guess". But knowing the identity and location of each D3 District you can put it into whatever population density that's appropriate.



Here's the drag and drop interface that's used to move each D3 District into a population (or Protection Level) of your choosing.

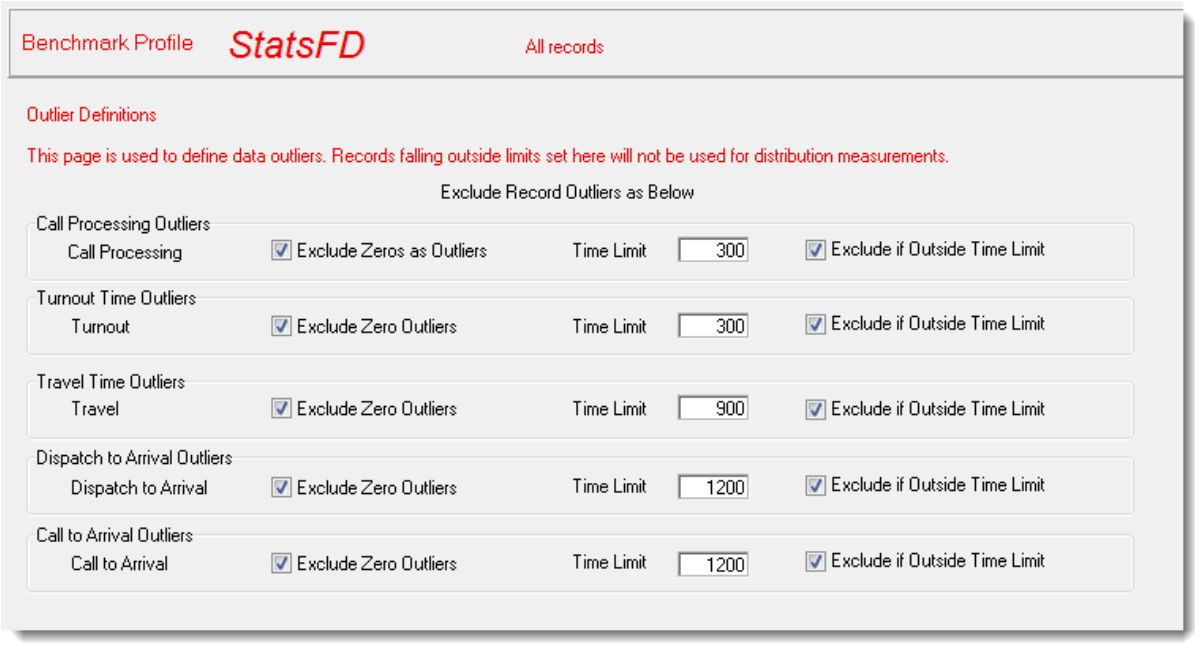


You may move D3 Districts around and print out the map as often as you wish until each D3 District is assigned to a population density. When the task is complete save your settings and press the Update Records button to assign a "Protection" level to each Incident and Apparatus record by assigned D3 District.

6.2 B & B Outlier Settings

B & B Outlier Settings

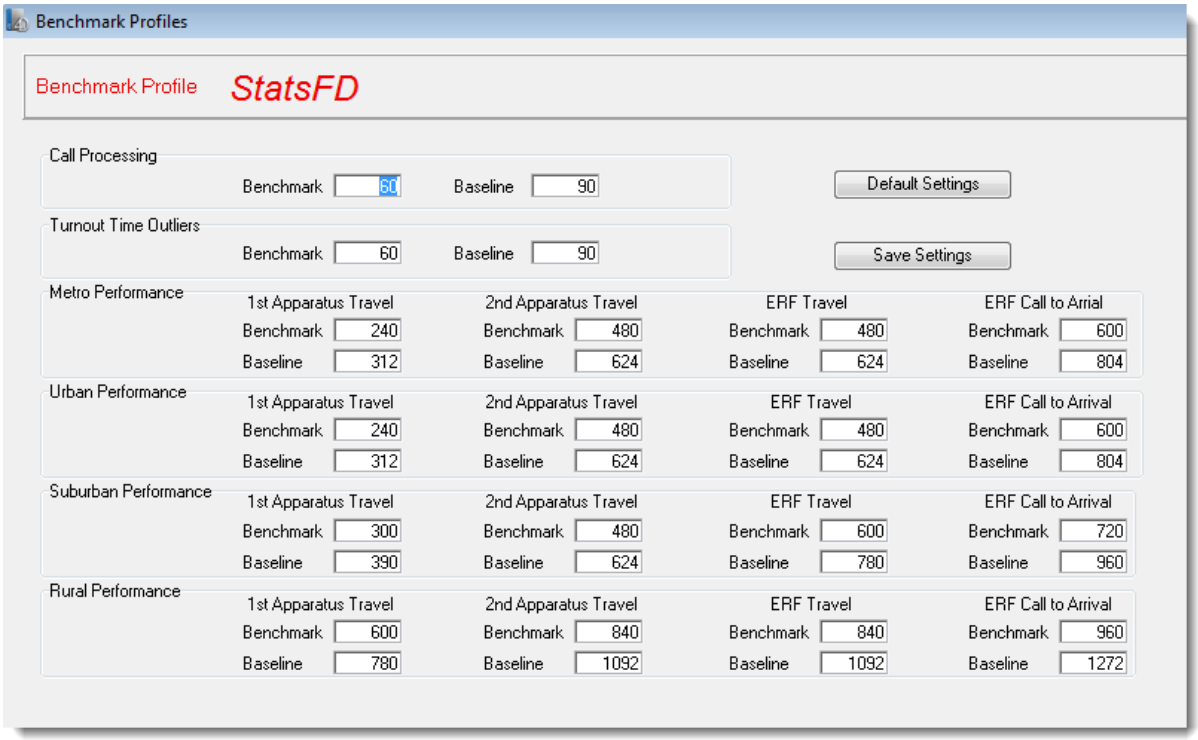
By default the Benchmarks & Baselines report uses your default outlier settings. You may, however, adjust those settings as you wish before running the report.



6.3 B& B Goals

B & B Goals

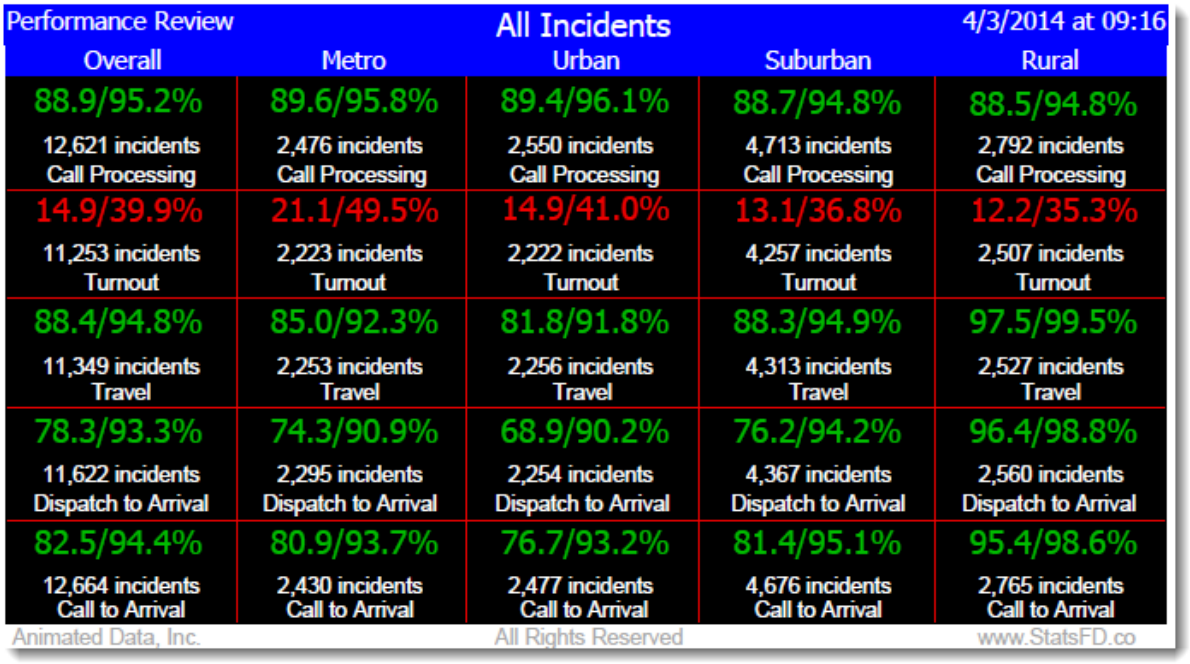
Benchmarks & Baselines uses its own set of goals. Simply enter you goals you wish:



6.4 B & B Distribution

B & B Distribution

The Benchmarks & Baselines report prints to a PDF document. Below is a sample page showing distribution performance:



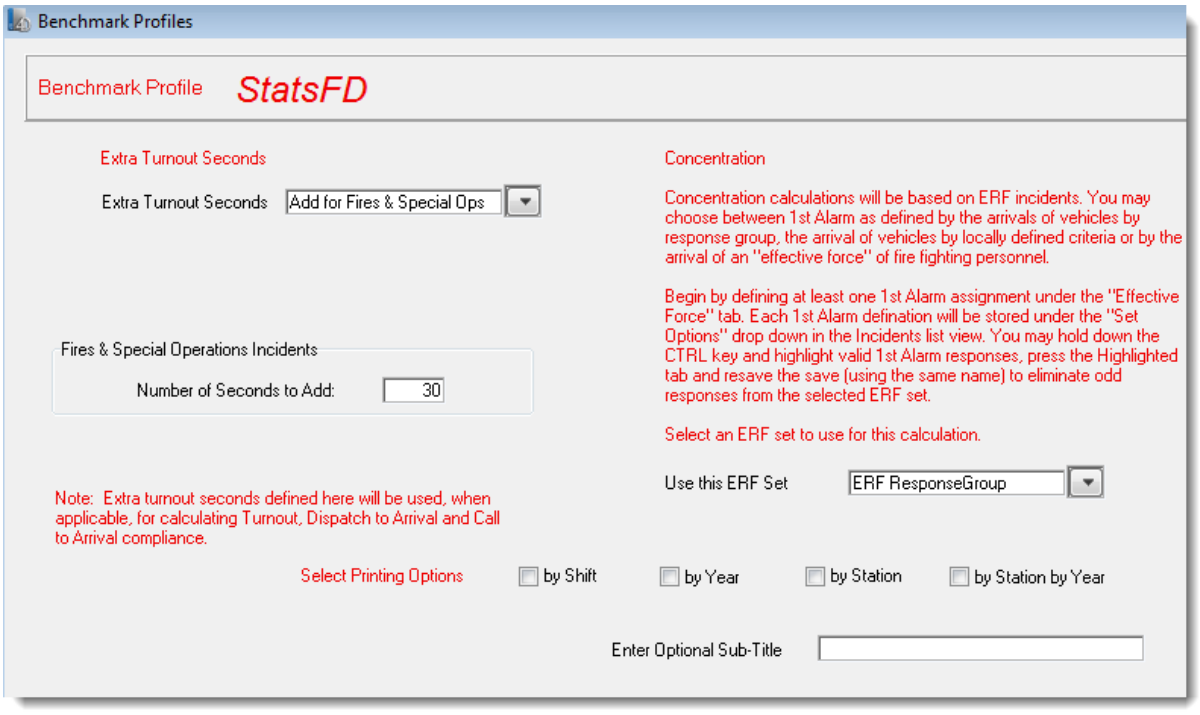
Performance Review		All Incidents		4/3/2014 at 09:16
Overall	Metro	Urban	Suburban	Rural
88.9/95.2%	89.6/95.8%	89.4/96.1%	88.7/94.8%	88.5/94.8%
12,621 incidents Call Processing	2,476 incidents Call Processing	2,550 incidents Call Processing	4,713 incidents Call Processing	2,792 incidents Call Processing
14.9/39.9%	21.1/49.5%	14.9/41.0%	13.1/36.8%	12.2/35.3%
11,253 incidents Turnout	2,223 incidents Turnout	2,222 incidents Turnout	4,257 incidents Turnout	2,507 incidents Turnout
88.4/94.8%	85.0/92.3%	81.8/91.8%	88.3/94.9%	97.5/99.5%
11,349 incidents Travel	2,253 incidents Travel	2,256 incidents Travel	4,313 incidents Travel	2,527 incidents Travel
78.3/93.3%	74.3/90.9%	68.9/90.2%	76.2/94.2%	96.4/98.8%
11,622 incidents Dispatch to Arrival	2,295 incidents Dispatch to Arrival	2,254 incidents Dispatch to Arrival	4,367 incidents Dispatch to Arrival	2,560 incidents Dispatch to Arrival
82.5/94.4%	80.9/93.7%	76.7/93.2%	81.4/95.1%	95.4/98.6%
12,664 incidents Call to Arrival	2,430 incidents Call to Arrival	2,477 incidents Call to Arrival	4,676 incidents Call to Arrival	2,765 incidents Call to Arrival

The first column illustrates "Overall" performance while the remaining four columns show calculations for Metro, Urban, Suburban and Rural population areas.

The first row shows Call Processing with the Benchmark first followed by the Baseline calculation. The number of incidents in each population density is displayed. The second through fifth rows repeat the process for Turnout, Travel, Dispatch to Arrival and Call to Arrival.

Baselines less than 90% cause the entire calculation to be printed in red. This allows you to quickly spot trouble areas.

The real power here is in the report setup area:



Notice you can add turnout seconds for Fire & Special Ops or by the hour of the day. You can select the ERF set you wish to use in the report. You can even select to have the report broken down by Shift, by Year, by Station and by Station by Year. This can produce a comprehensive analysis in one operation printed to PDF for each reading and distribution.

6.5 B & B Concentration

B & B Concentration

Below is an example of the Benchmark and Baseline concentration calculation:

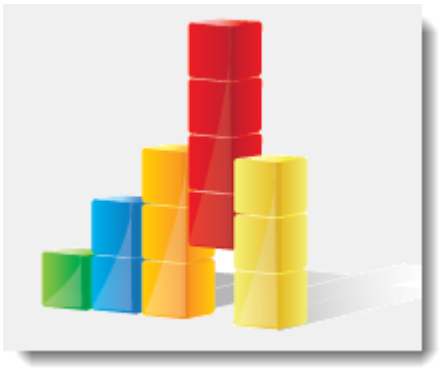
Performance Review	All ERF Incidents			4/3/2014 at 09:16
Overall	Metro	Urban	Suburban	Rural
79.4/85.7%	81.8/81.8%	61.1/83.3%	81.0/81.0%	100.0/100.0%
63 incidents 1st Apparatus Arrival	11 incidents 1st Apparatus Arrival	18 incidents 1st Apparatus Arrival	21 incidents 1st Apparatus Arrival	13 incidents 1st Apparatus Arrival
96.7/98.4%	90.9/100.0%	94.4/94.4%	100.0/100.0%	100.0/100.0%
61 incidents 2nd Apparatus Arrival	11 incidents 2nd Apparatus Arrival	18 incidents 2nd Apparatus Arrival	20 incidents 2nd Apparatus Arrival	12 incidents 2nd Apparatus Arrival
76.2/84.1%	54.5/72.7%	66.7/77.8%	81.0/85.7%	100.0/100.0%
63 incidents ERF Travel	11 incidents ERF Travel	18 incidents ERF Travel	21 incidents ERF Travel	13 incidents ERF Travel
58.7/71.4%	36.4/54.5%	55.6/72.2%	66.7/76.2%	69.2/76.9%
63 incidents ERF Call to Arrival	11 incidents ERF Call to Arrival	18 incidents ERF Call to Arrival	21 incidents ERF Call to Arrival	13 incidents ERF Call to Arrival
42 $5,210,900 Bldg Fires / Loss	5 $616,000 Bldg Fires / Loss	13 $1,850,400 Bldg Fires / Loss	14 $784,100 Bldg Fires / Loss	10 $1,960,400 Bldg Fires / Loss
Animated Data, Inc.	All Rights Reserved			www.StatsFD.co

The column structure is the same, but the rows measure 1st Apparatus Arrival, 2nd Apparatus Arrival, ERF Travel and ERF Call to Arrival. The fifth row shows the number of building fires as well as the dollar loss for each population level.

7 7. Response Reliability

7

Response Reliability



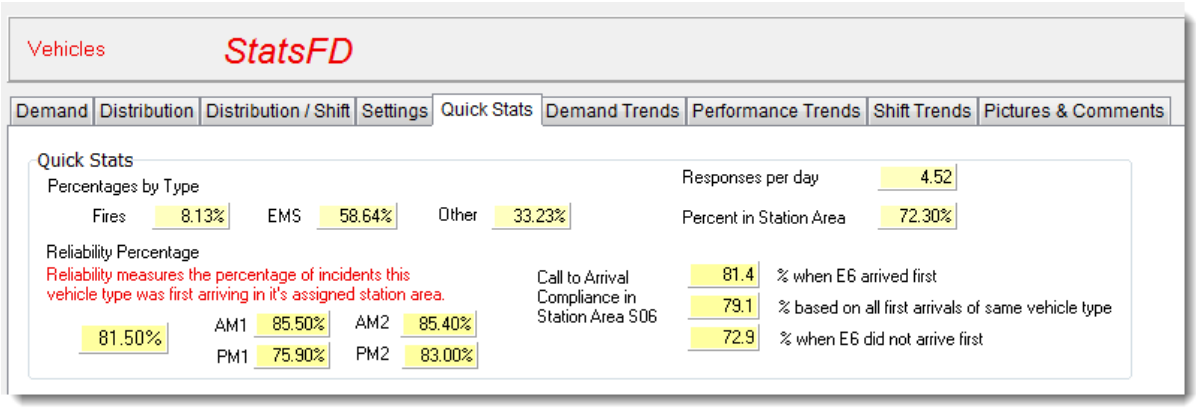
"Response Reliability" refers to the percentage of time a home engine company is the first engine company to reach the scene of an emergency. For example, the more frequently Engine 5 is the first engine to arrive on the scene in Station 5's area the higher the response reliability percentage for E5.

Response Reliability as a percentage does not tell you much about the operation of the engine. To gain practical information about first arriving engine companies in a station you must mix response reliability with performance.

7.1 Reliability Performance

Reliability Performance

In Chapter 4 the Distribution Matrix was introduced. This matrix is created by running a Jurisdictional Profile. The profile automatically calculates the reliability percentages for each engine company tracked in the Vehicles module under the Jurisdiction button. Here's what it looks like:



In this case the Overall Reliability percentage for this Engine is 81.50%. That figure is broken down by 6-hour time segments throughout the 24-hour day.

To the right of the percentages is a breakdown of the Call to Arrival compliance percentages when 1.) E6 arrived first, 2.) based on all engine first arrivals in Station 6's territory and finally 3.) when another engine company arrived first from an outside station area.

These reliability and performance numbers are transferred to a graph in the next section.

7.2 Reliability Graph

Reliability Graph

It's easy to image an engine company in a busy downtown station making many responses into it's own district. If it's unavailable to respond other engines quickly enter the district and maintain overall compliance with the response time standard.

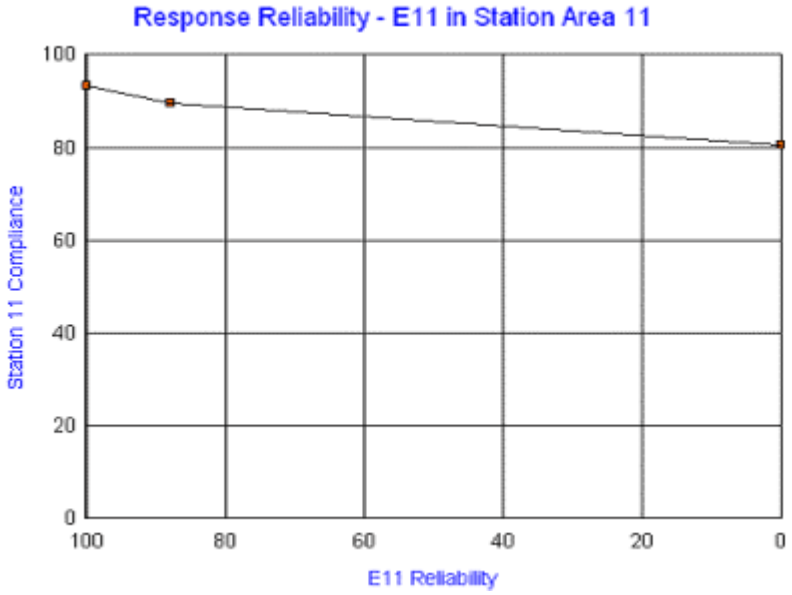
Below is a response reliability line graph. Call to Arrival compliance is tracked vertically from 0 to 100 percent. Reliability is tracked horizontally from 100 to zero percent.

The "Response Reliability" graph uses 3 points to plot three compliance measurements from left to right:

1. The percentage of compliance when the subject engine was first on the

scene.
2. The percentage of compliance for all engine responses within the station area.
3. The percentage of compliance when the subject engine was not able to respond.

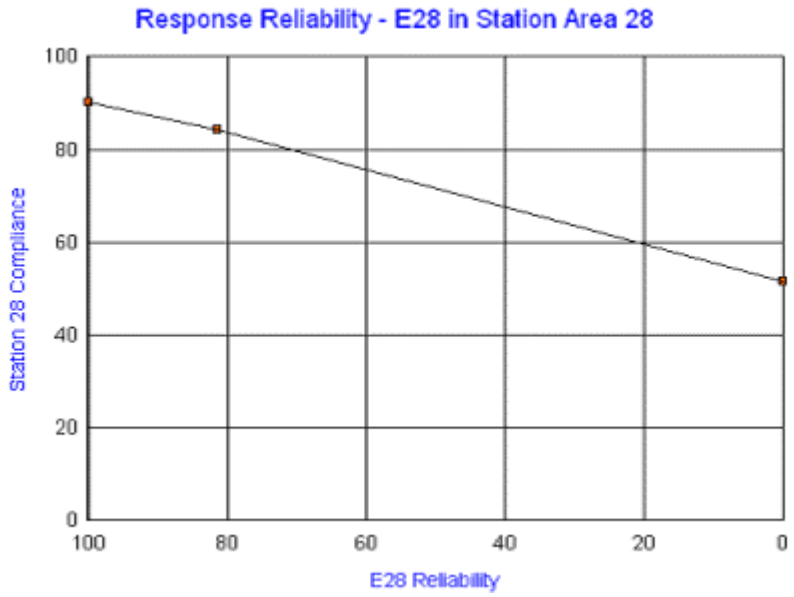
Here's an example response reliability graph for Engine 11 within Station 11's response area:



This example graph shows Station Area 11 has good response "speed" and a good "weight" of response. Speed is measured by the percentage of compliance with a 6-minute response time goal. When Engine 11 is first to respond (first point) the "speed" (measure of compliance percentage) is well over 90%. When all responses in the district are taken as a whole response time compliance remains relatively high at 85% (middle point). The percentage does not diminish greatly even when Engine 11 is not available to respond (right point).

Notice the line between the points is comparatively flat. A flat line indicates good response weight since Station 11 compliance remains above 80% even when Engine 11 is not available to respond. This indicates heavy engine company concentration (backup) from adjoining districts. Responses within this district have substantial weight.

This graph is a different story.



Station 28 is more isolated. Here we see performance is good when E28 arrives first. Because E28 is a slow company it arrives first for most of its incidents so the overall arrival percent remains high. But if E28 is not available to respond compliance drops well below 60%.

The Response Reliability graph is a good tool for relating reliability to performance.

7.3 Out of Area Responses

Out of Area Responses

Each ***StatsFD*** apparatus record tracks whether or not the apparatus crossed a station boundary during it's response to the scene of an incident. This allows ***StatsFD*** to take reliability to another level.

If you calculate the 90% Travel Time Compliance for 1st arrival home resources by station area and compare it to the 90% Travel Time Compliance for "Out of Area" 1st arrival apparatus you can see the amount of additional travel time (Delta) it takes for 90% compliance when outside resources are called to cover.

Consider the following:

Rank	Station	Delta
1st	S12	04:00

2nd	S05	02:46
3rd	S07	02:44
4th	S10	02:23
5th	S02	02:19
6th	S03	01:53
7th	S09	01:48
8th	S11	01:29
9th	S04	01:18
10th	S06	01:11
11th	S01	00:50
12th	S08	00:20

Above stations are ranked by those with the longest delays caused by waiting for outside resources.

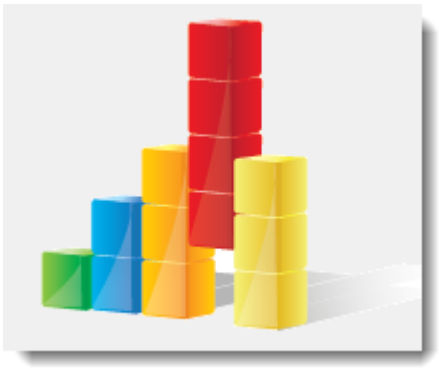
We see Station S08 resources are having the least impact on distribution performance. There is only a 20-second difference between the travel time of 1st arrival home apparatus and 1st arriving out of area apparatus. This can occur when the station is located near other fire stations providing good coverage.

In contrast, Station S12 is geographically isolated. When E12 is not available to respond you can expect travel time to be a full 04:00 longer.

8 8. Automatic Reporting

8

Automatic Reporting



Go behind the scenes of any fast food restaurant and you will see live performance data on a large color monitor. At a glance any employee can get instant feedback on their performance so everyone can better work as a team - constantly improving performance.

The same system that builds teams in a commercial environmental can be used in the fire service. We can use technology to work as a team to better save lives and property.

8.1 RMS Interface Options

RMS Interface Options

Producing daily stats can be a real chore unless, of course, the stats produce themselves. Automatic loading, processing and publishing is what ***StatsFD*** was designed to do.

ODBC Connection

StatsFD can connect to SQL RMS systems to selectively download response data. ***StatsFD*** uses the same read only ODBC connection used by Crystal Reports and other analytical packages. The only two differences are ***StatsFD's*** reports are all pre-configured and they process themselves automatically.

StatsFD has already been setup to work with many fire RMS systems. Setup scripts can be emailed and installed in minutes.

Data Downloads

StatsFD can also be configured to import response data from a folder. This works with older, non-SQL, RMS packages. Frequently a query can be stored in the RMS system to automatically produce the files that are detected and loaded by ***StatsFD***.

NFIRS 5 Data

StatsFD has the ability to load standard NFIRS 5 transaction files. When in automatic mode all the data necessary to create automatic reports is loaded

automatically. But if you want to dig deeper using NFIRS 5 data elements simply place the NFIRS 5 transaction in the NFIRS5 folder and it will be loaded and merged automatically.

8.2 Performance Trends

Performance Trends

Example: Click Here

When in automatic reporting mode the example PDF is create and updated daily.

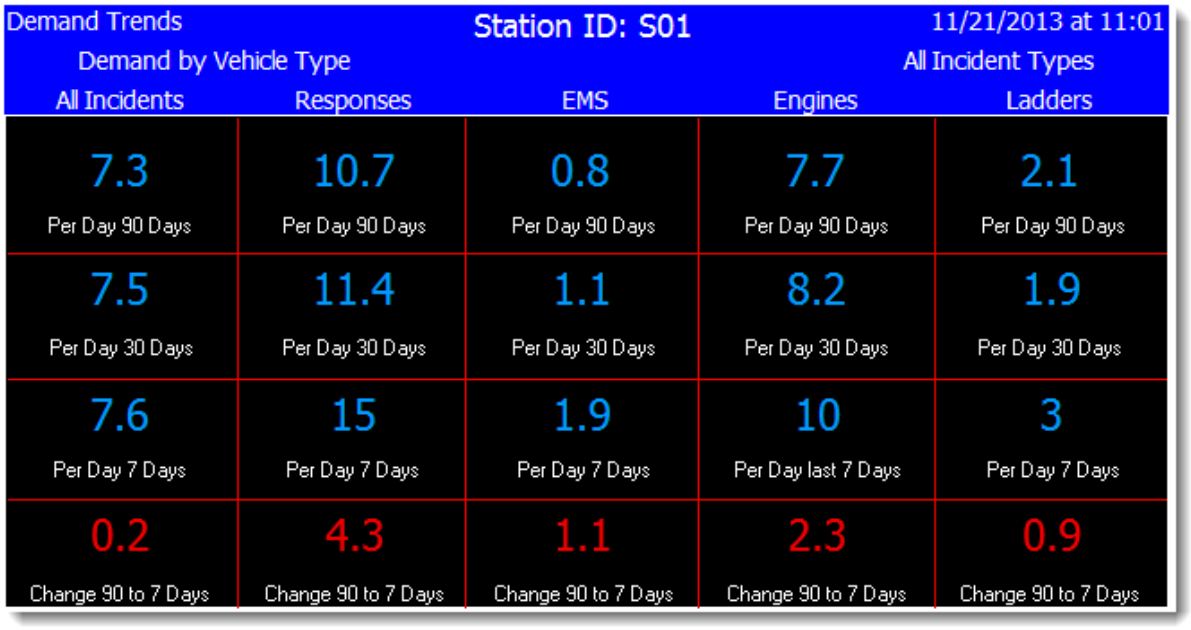
Up to this point we have been examining past performance sometimes called retrospective analysis. Now, with automatic downloading of data, we are shifting perspective from the past to the present. Performance trends seeks to measure whether performance, up to this present day, is trending better, poorer or about the same.

In ***StatsFD*** performance trend lines are established by looking at different performance measurements over the past 90-days and comparing that longer-range performance with performance over the past 7-days. If 90-day performance is better performance is on the decline. If 7-day performance is better then performance is improving.

The goal is to detect performance trends to the present day so problem areas are identified and addressed immediately. In ***StatsFD*** performance trends are generated daily and automatically.

Demand Trends

The first trend measurement is demand. This measurement establishes whether the number of incidents and apparatus responses is rising, falling or remaining about the same.



Demand Trends	Station ID: S01	11/21/2013 at 11:01		
Demand by Vehicle Type		All Incident Types		
All Incidents	Responses	EMS	Engines	Ladders
7.3 Per Day 90 Days	10.7 Per Day 90 Days	0.8 Per Day 90 Days	7.7 Per Day 90 Days	2.1 Per Day 90 Days
7.5 Per Day 30 Days	11.4 Per Day 30 Days	1.1 Per Day 30 Days	8.2 Per Day 30 Days	1.9 Per Day 30 Days
7.6 Per Day 7 Days	15 Per Day 7 Days	1.9 Per Day 7 Days	10 Per Day last 7 Days	3 Per Day 7 Days
0.2 Change 90 to 7 Days	4.3 Change 90 to 7 Days	1.1 Change 90 to 7 Days	2.3 Change 90 to 7 Days	0.9 Change 90 to 7 Days

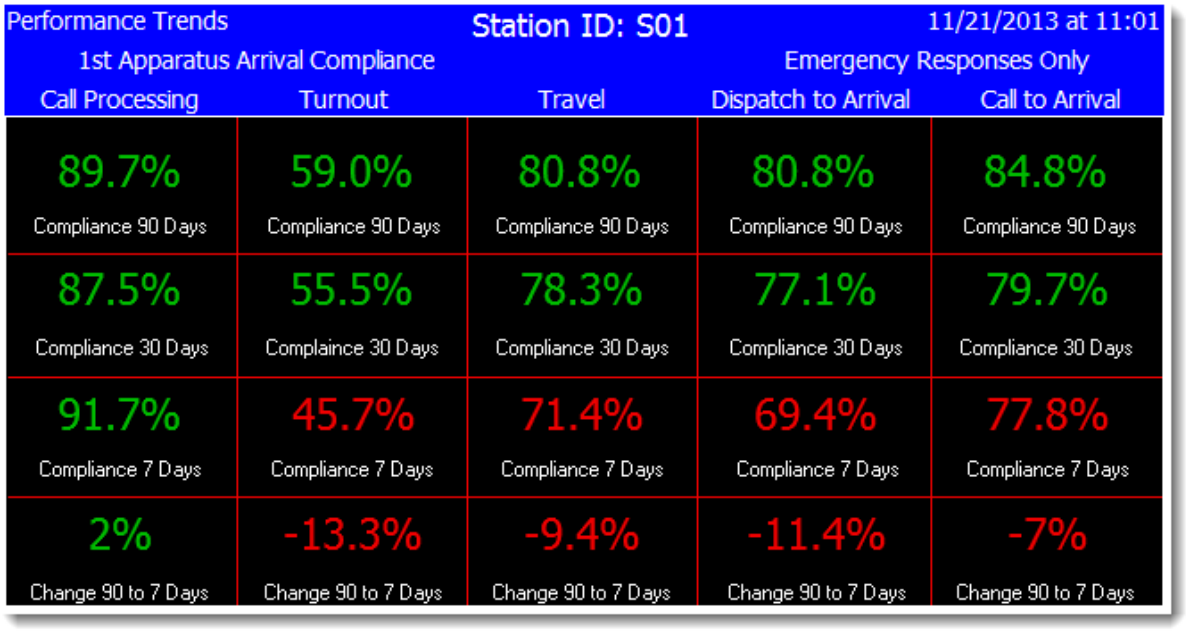
Performance Trends

Performance trends measure compliance with:

- Call Processing
- Turnout
- Travel
- Dispatch to Arrival
- Call to Arrival

The last row shows performance in green if it is staying the same or improving. It shows performance in red if it is in decline.

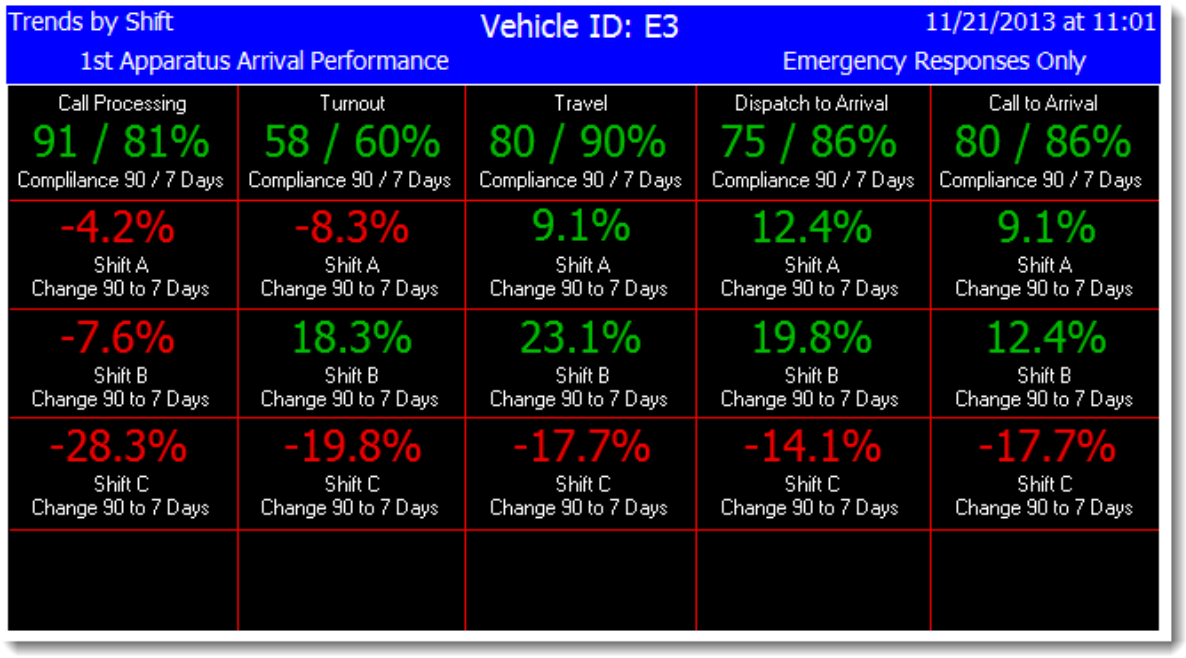
Red areas will always spotlight performance declines:



Performance Trends	Station ID: S01			11/21/2013 at 11:01
1st Apparatus Arrival Compliance			Emergency Responses Only	
Call Processing	Turnout	Travel	Dispatch to Arrival	Call to Arrival
89.7% Compliance 90 Days	59.0% Compliance 90 Days	80.8% Compliance 90 Days	80.8% Compliance 90 Days	84.8% Compliance 90 Days
87.5% Compliance 30 Days	55.5% Complaince 30 Days	78.3% Compliance 30 Days	77.1% Compliance 30 Days	79.7% Compliance 30 Days
91.7% Compliance 7 Days	45.7% Compliance 7 Days	71.4% Compliance 7 Days	69.4% Compliance 7 Days	77.8% Compliance 7 Days
2% Change 90 to 7 Days	-13.3% Change 90 to 7 Days	-9.4% Change 90 to 7 Days	-11.4% Change 90 to 7 Days	-7% Change 90 to 7 Days

Shift Trends

In order closely identify problem areas performance trends can measure right down to vehicle and shift:



Trends by Shift	Vehicle ID: E3			11/21/2013 at 11:01
1st Apparatus Arrival Performance			Emergency Responses Only	
Call Processing	Turnout	Travel	Dispatch to Arrival	Call to Arrival
91 / 81% Complillance 90 / 7 Days	58 / 60% Compliance 90 / 7 Days	80 / 90% Compliance 90 / 7 Days	75 / 86% Compliance 90 / 7 Days	80 / 86% Compliance 90 / 7 Days
-4.2% Shift A Change 90 to 7 Days	-8.3% Shift A Change 90 to 7 Days	9.1% Shift A Change 90 to 7 Days	12.4% Shift A Change 90 to 7 Days	9.1% Shift A Change 90 to 7 Days
-7.6% Shift B Change 90 to 7 Days	18.3% Shift B Change 90 to 7 Days	23.1% Shift B Change 90 to 7 Days	19.8% Shift B Change 90 to 7 Days	12.4% Shift B Change 90 to 7 Days
-28.3% Shift C Change 90 to 7 Days	-19.8% Shift C Change 90 to 7 Days	-17.7% Shift C Change 90 to 7 Days	-14.1% Shift C Change 90 to 7 Days	-17.7% Shift C Change 90 to 7 Days

Here we see an opportunity to improve performance by pay attention to E3 "C" shift.

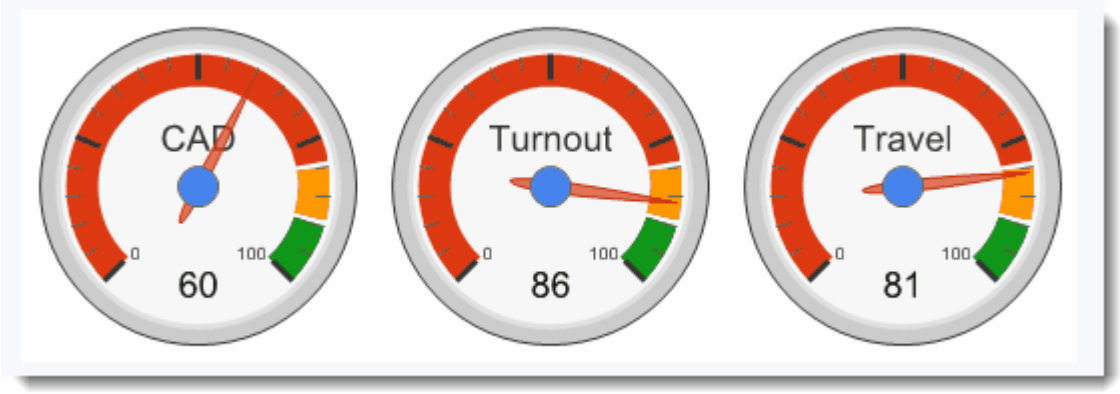
8.3 Performance Dashboard

Performance Dashboard

Example: Click Here

The dashboard example is automatically created and updated every hour in ***StatsFD*** . The dashboard gives immediate performance feedback to responders.

Each time ***StatsFD*** imports data if automatically performs an analysis and displays the results on an HTML dashboard. You can click around the dashboard to see virtually live performance results.



Gauges and graphs are used to monitor data quality, performance and missed goals.

Missed Turnout Goals - 3 Days

Related links are listed below the chart. If you wish to explore other demand and performance areas click on a tab above.

This table lists all Incidents that failed the Turnout goal. Click on a column title to sort. Only valid turnout timestamps are listed.

	Incident #	Date_Time	Company	Location	Inc Type	Secs	MM:SS
1	0029080	2012_05/18_04:14	E1	412 S Jackson	321	0181	03:01
2	0029005	2012_05/17_15:35	E4	1721 E Hoover	321	0162	02:42
3	0029082	2012_05/18_05:42	E7	3678 E Van Buren BLVD	321	0144	02:24
4	0028913	2012_05/17_05:50	E1	207 N Madison AVE	321	0140	02:20
5	0028705	2012_05/16_05:56	E1	900 S Roosevelt PKY	321	0140	02:20
6	0029067	2012_05/18_00:36	R6	775 Madison	321	0136	02:16
7	0029141	2012_05/18_12:32	R1	Cleveland & McKinley	324	0132	02:12
8	0028892	2012_05/17_00:04	R1	Ford & Reagan	321	0131	02:11
9	0028683	2012_05/16_00:49	E3	1045 N Arthur	321	0131	02:11
10	0028907	2012_05/17_03:34	R6	1742 Jefferon	321	0128	02:08
11	0029069	2012_05/18_00:51	E3	965 N Monroe ST	321	0126	02:06

In addition to the dashboard ***StatsFD*** allows you create reports in the Time Analyzer and Worksheet Analyzer that can be executed hourly, daily, weekly and monthly. All these reports can then be reviewed on a variety of PCs and mobile devices.

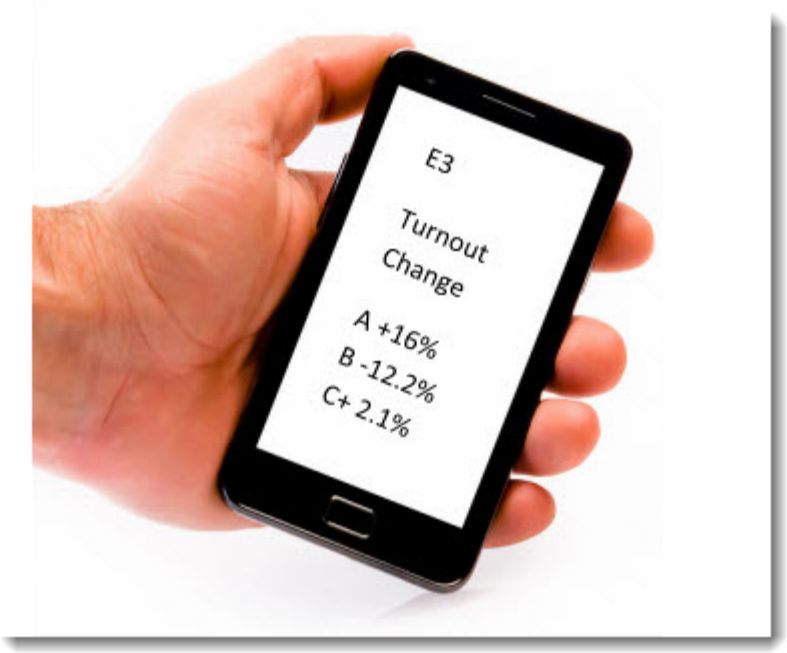
"Push" analytics is a unique feature of ***StatsFD***.

8.4 Targeted Emails / Texts

Targeted Emails / Texts

StatsFD can be configured with its own email address. This allows the application to send performance summaries as well as in-depth performance reports to just the people who need them. Like dashboard reports email reports can be scheduled hourly, daily, weekly and monthly.

Taking advantage of mobile technology ***StatsFD*** can also send performance updates as text messages. Since the application is "shift aware" it knows which shift is working and can send performance updates to specific shift officers at the end of their shift.



8.5 StatsFD

StatsFD

StatsFD has been number-crunching fire department accreditations for 11-years. It has been used to perform more than 100 fire department studies for a well-known consulting group. It's a real veteran with a wealth of experience ready to deliver information in ways not available from less experienced systems.

Get to know ***StatsFD*** through the following links.

Click the link below for an introductory video:

www.StatsFD.com

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