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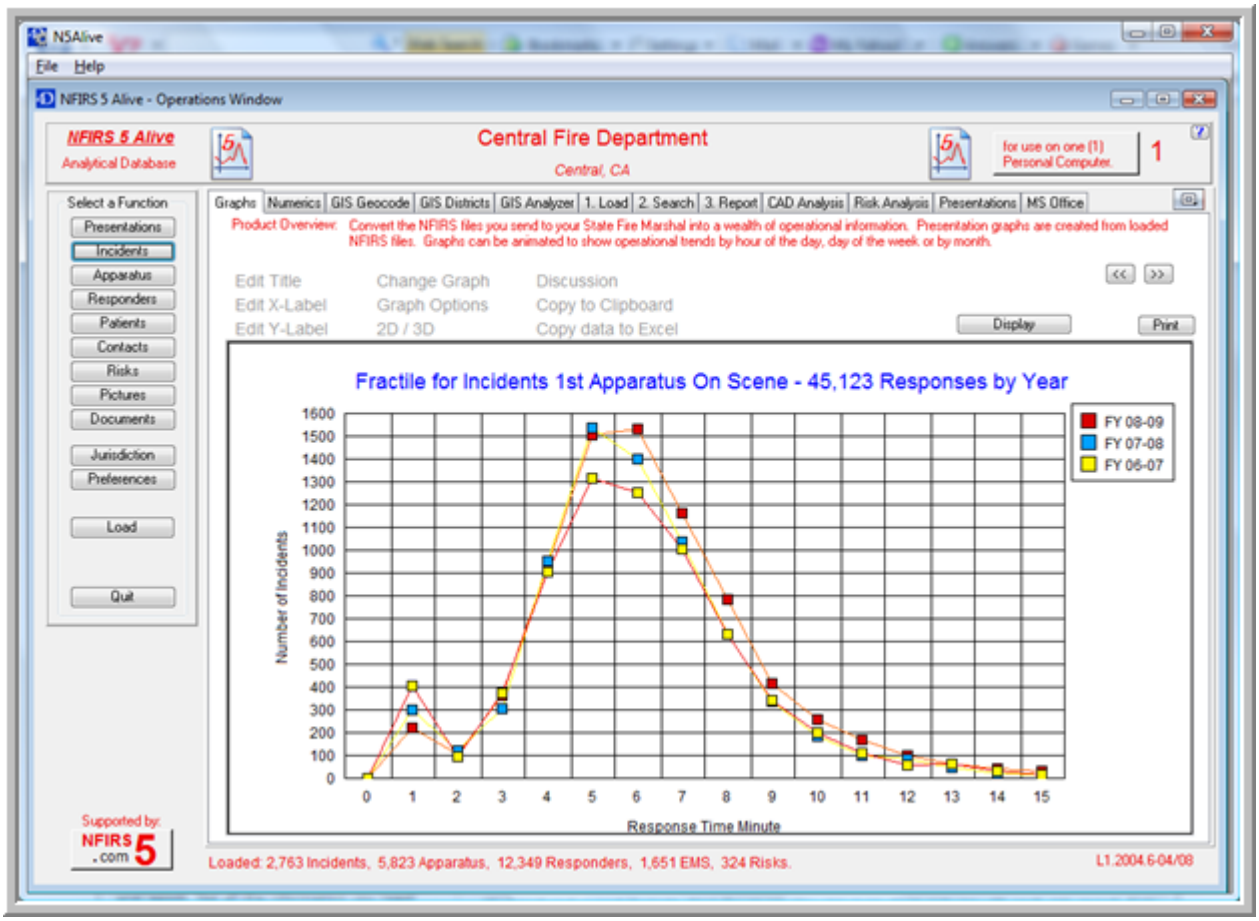

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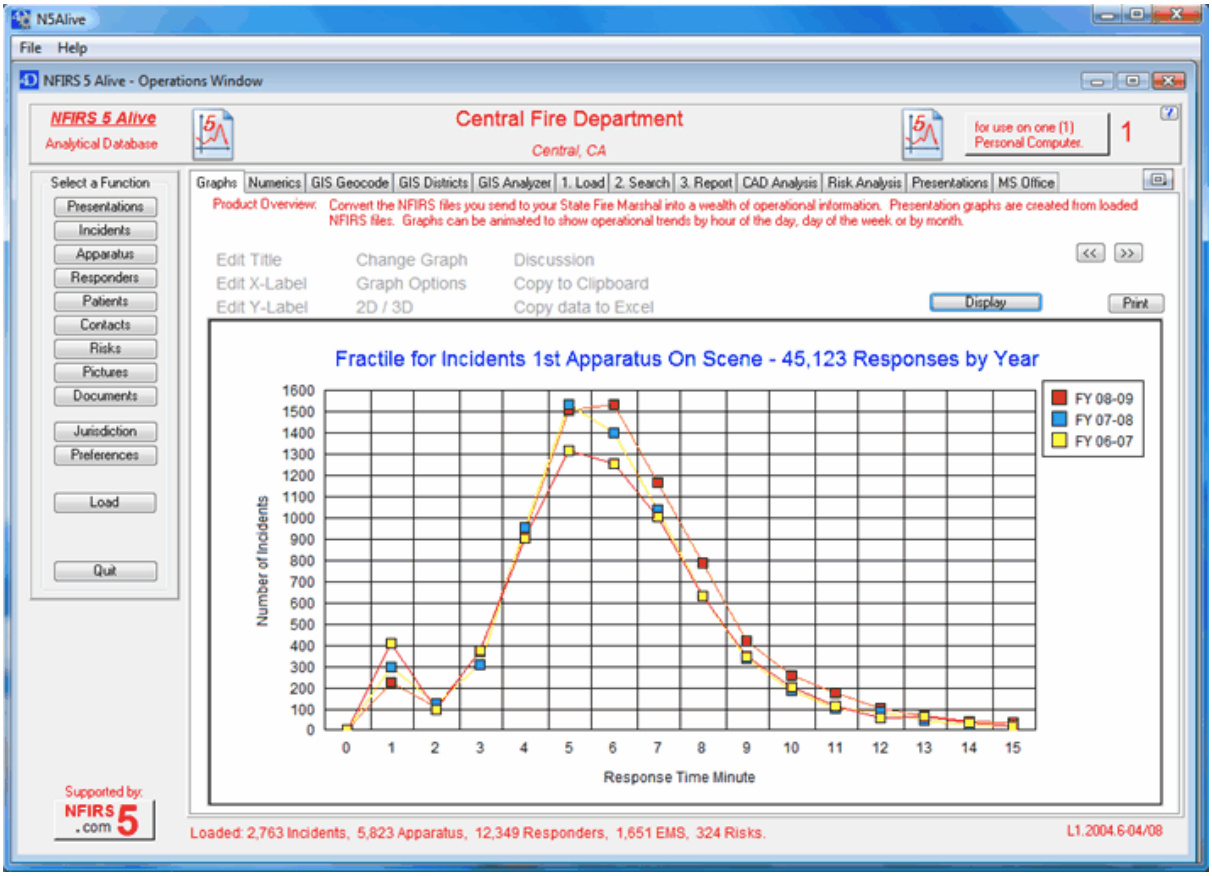
1 Best Practices Analysis

NFIRS 5 Alive

Best Practices Analysis



"Best Practices" is a term used to describe actions proven to be effective. "Best Practices Analysis" refers to using contemporary standards to analyze raw fire and EMS data.

Traditional "RMS" reports fail to address emerging standards. This white paper examines how applying the principles behind fire department accreditation, Standards of (Response) Cover and NFPA 1710 / 1720 can help fire departments increase overall effectiveness with new sources of quality information.

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NFIRS 5 Alive was designed as an easy-to-use tool for "best practices analysis". It's compatible with any NFIRS 5 reporting system.

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2 1. Classical Fire Analysis

1

Classical fire department analysis measures citizen demand for service and the fire department's response to the demand. ***NFIRS 5 Alive*** provides more than 7,200 graph and chart formats for classical analysis. Because of the variety and diversity of report formats ***NFIRS 5 Alive*** provides an unequaled classical analysis platform.

* Traditional Focus

* Example Classical Graphs

* Example Classical Charts

2.1 Traditional Focus

Traditional Reporting Focuses on Demand

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. Here's an example of traditional reporting.

	2003	2004	2005
Incidents	12,380	12,964	12,890
Fire	519	528	465
EMS	9,197	9,883	9,893
Other	2,664	2,553	2,532

Here's the same infomation in graph form:

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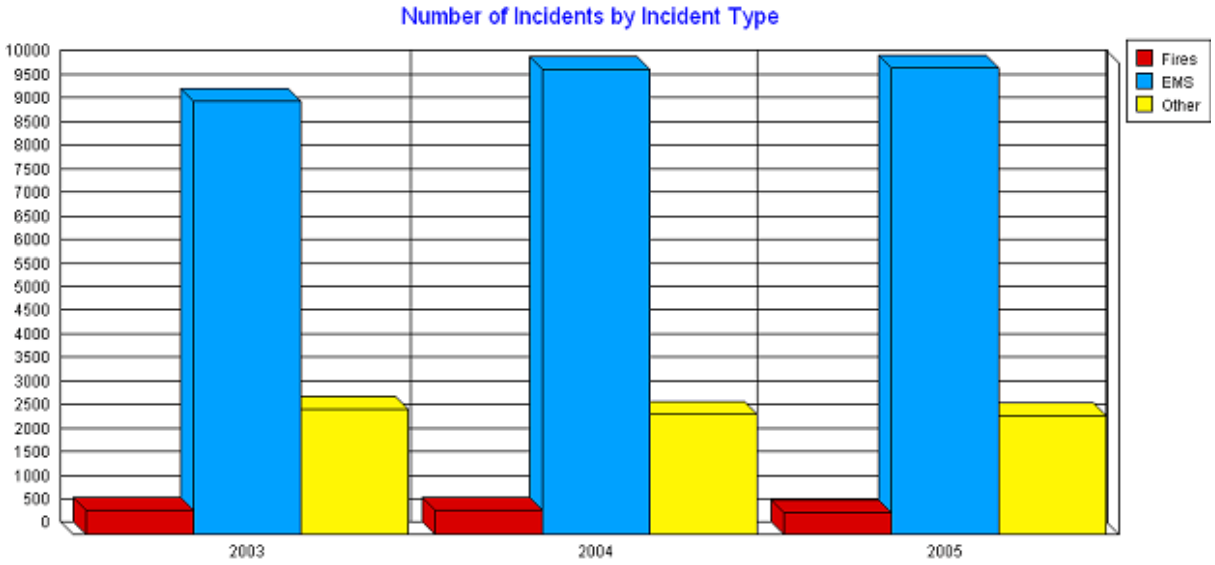

Today many fire departments are experiencing a leveling-off of fire activity. By contrast, most fire departments continue to see growth in the number of EMS incidents. Demand patterns are changing.

2.2 Example Classical Graphs

Classical Graphs Illustrate Demand Trends Over Time

Classical analysis can expose trends by quantifying incident activity 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 thoughout the morning leveling-off in the early evening followed by a decline into the late eveing hours. This is a "signature" pattern for most fire department operations.

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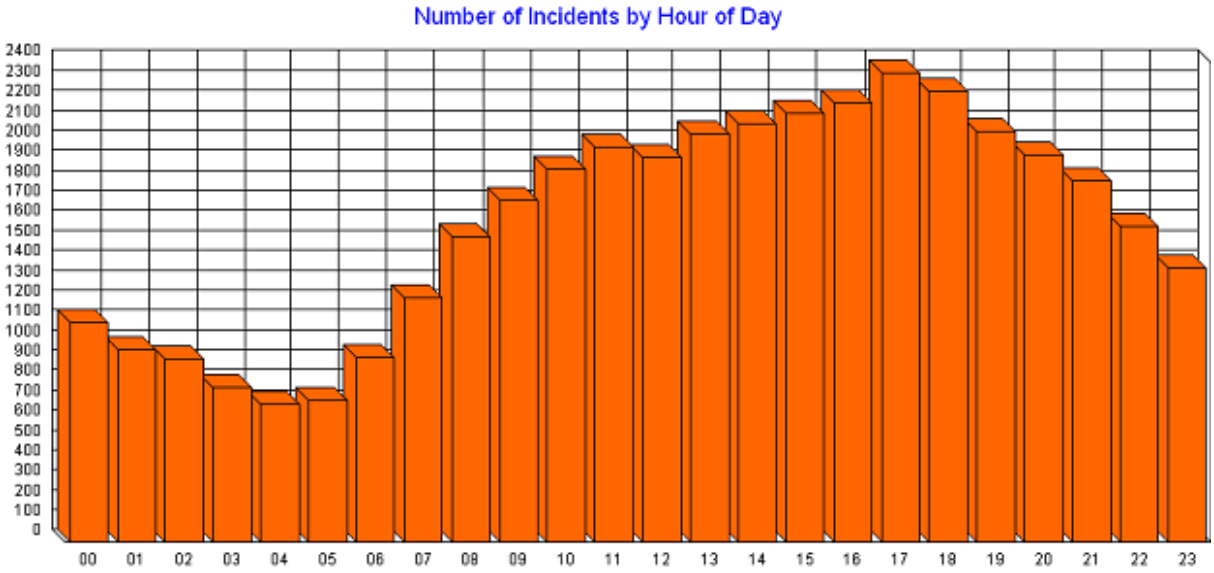
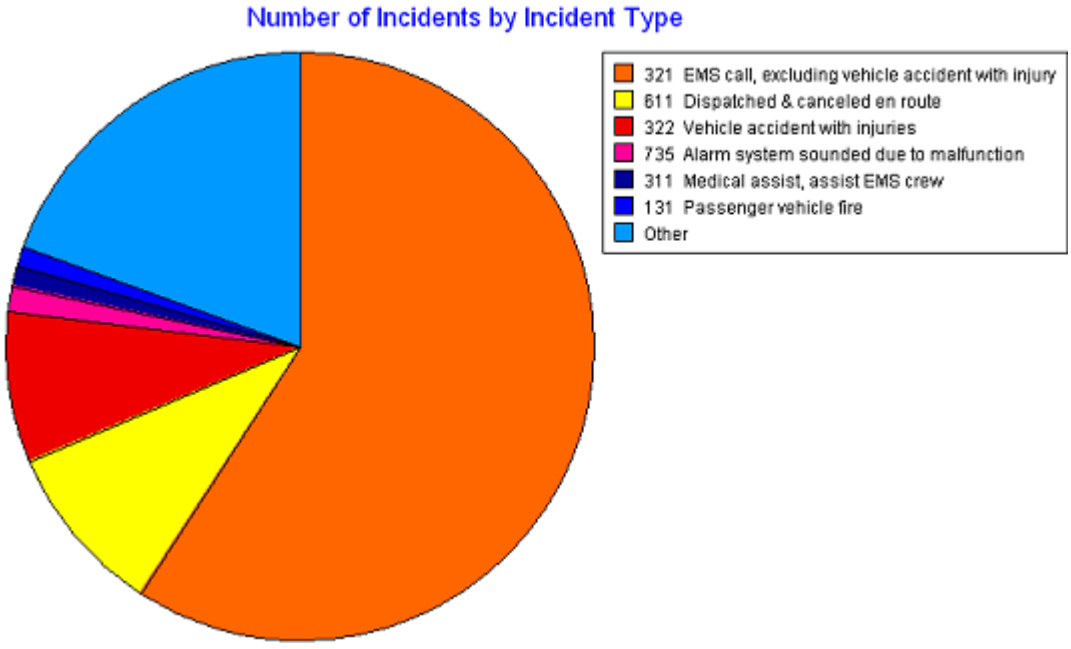


Classical analysis also provides information by breaking down incidents by type. Here we see the vast majority of incidents are "321 EMS call, excluding vehicle accident with Injuries". This single category dwarfs all other incident types.



The graphs above were created from all records in a single year. Although the next graph is also a simple 2D bar graph it proves the power of a graph can reside in the record search used to create the graph.

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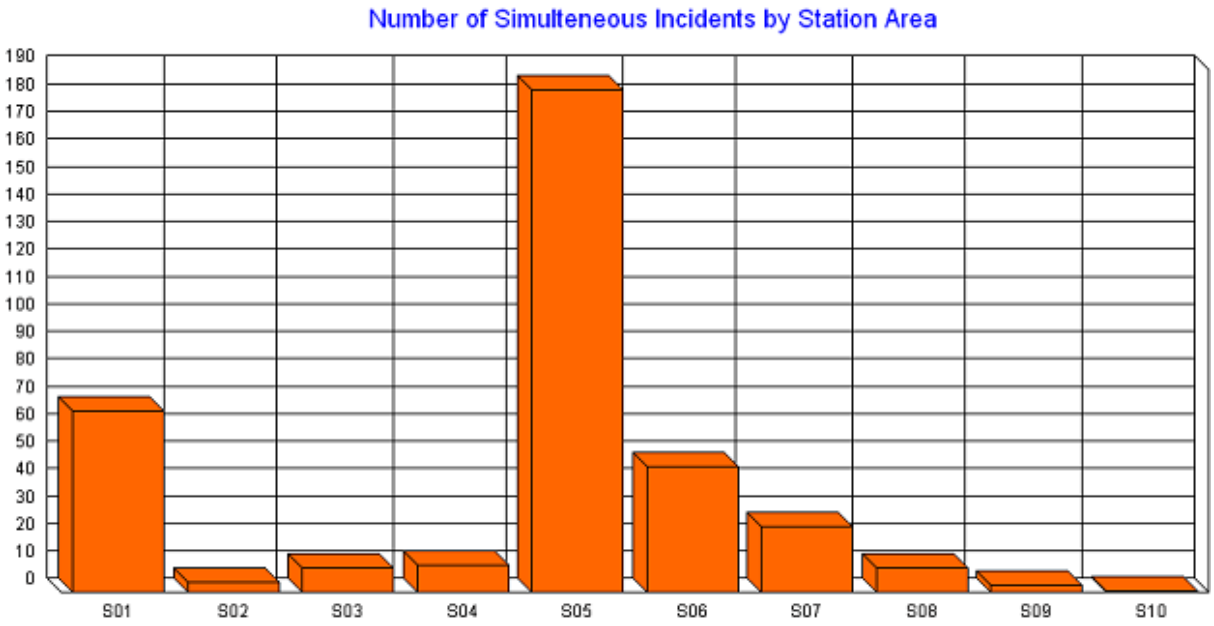
Searching for Power

Here ***NFIRS 5 Alive's*** instant "simultaneous" alarm search was used to locate only incidents that occurred when other incidents were underway. While the graph remain simple this powerful search tool uncovers some very useful information.



Types of 2D Graphs Available

When viewing 2D graphs you can quickly switch between:

- Area Graph
- Column Graph
- Line Graph
- Scatter Graph
- Pie Chart

2D Graphs can be presented, printed, converted into a web page, converted into an image file or copied into the clipboard for pasting into any document you wish.

3D Graphs Add an Extra Dimension

While 2D graphs measure data in two dimensions, like number of incidents by hour of day, a 3D graph adds a dimension. Here's an example of a 3D graph. This 3D graph measures the number of incidents by time by station.

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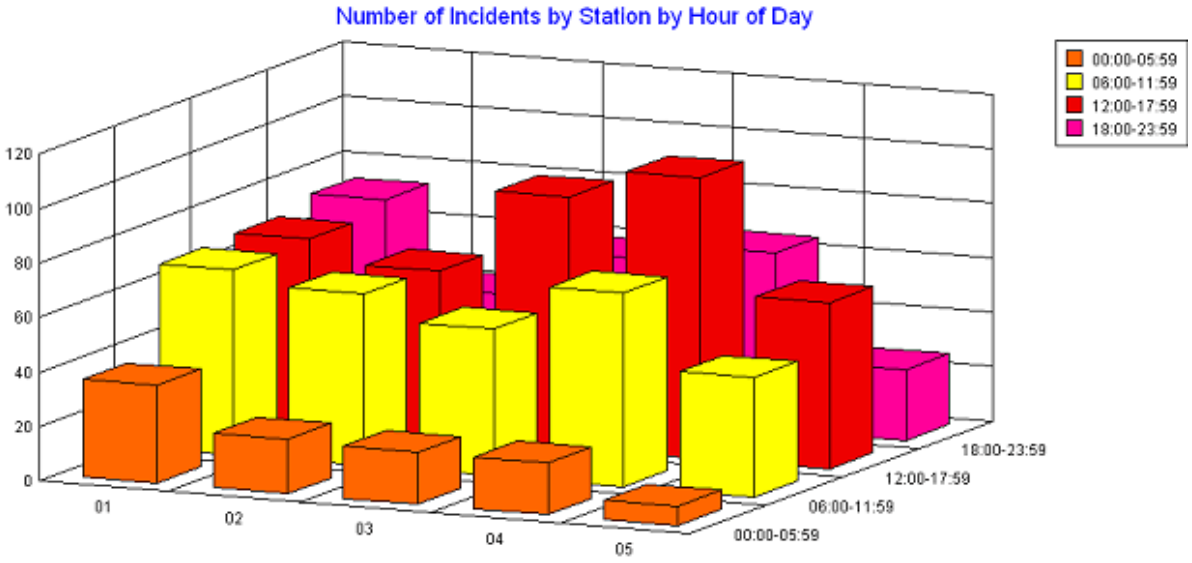

When viewing 3D graphs you can switch between:

- 3D Column Graph
- 3D Line Graph
- 3D Area Graph
- 3D Triangle Graph
- 3D Spike Graph

3D Graphs can be presented, printed, converted into a web page, converted into an image file or copied into the clipboard for pasting into any word processing document you wish.

Animation provides a 4th Dimension

Both 2D and 3D Graphs can be animated to illustrate trends by hour of the day, day of week and by month. In the 3D example above the graph can be animated to show trends by hour of the day so the user can actually see how response activity shifts from one station to another throughout the day.

Animated graphs are displayed in the "Presentations" module. Presentations works like a Microsoft PowerPoint slide show except ***NFIRS 5 Alive*** presentations can be animated to illustrate response trends over time.

While animated graphs cannot be printed on paper, they can be exported as separate ".gif" images and merged into "animated gif's" for presentation on your fire department's web site.

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2.3 Example Classical Charts

Charts Put Counts, Totals and Averages into List Form

Here are a few examples of classical numeric charts available in ***NFIRS 5 Alive***. Notice these charts can be used to illustrate counts, minimums, maximums, averages and totals.

Incident Type	Count
321 EMS call, excluding vehicle accident with injury	4,056
322 Vehicle accident with injuries	391
700 False alarm or false call, other	387
611 Dispatched & canceled en route	233
600 Good intent call, other	213
531 Smoke or odor removal	199
311 Medical assist, assist EMS crew	115
550 Public service assistance, other	115
500 Service Call, other	95
511 Lock-out	94
300 Rescue, emergency medical call (EMS) call, other	93
730 System malfunction, other	90
510 Person in distress, other	88
900 Special type of incident, other	83
743 Smoke detector activation, no fire - unintentional	80
740 Unintentional transmission of alarm, other	77
745 Alarm system sounded, no fire - unintentional	75
111 Building fire	75
553 Public service	72
520 Water problem, other	72
554 Assist invalid	69
733 Smoke detector activation due to malfunction	65
131 Passenger vehicle fire	63
735 Alarm system sounded due to malfunction	58
522 Water or steam leak	55
323 Motor vehicle/pedestrian accident (MV Ped)	54
463 Vehicle accident, general cleanup	46
444 Power line down	45
744 Detector activation, no fire - unintentional	35
551 Assist police or other governmental agency	34
100 Fire, other	33

Property Type	Count
419 1 or 2 family dwelling	6,870
429 Multifamily dwellings	2,557

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960	Street, other	1,067
961	Highway or divided highway	1,037
962	Residential street, road or residential driveway	950
311	24-hour care Nursing homes, 4 or more persons	779
888	Fire station	442
599	Business office	436
700	Manufacturing, processing	424
963	Street or road in commercial area	416
965	Vehicle parking area	404
215	High school/junior high school/middle school	292
213	Elementary school, including kindergarten	288
500	Mercantile, business, other	263
449	Hotel/motel, commercial	246
439	Boarding/rooming house, residential hotels	235
459	Residential board and care	219
331	Hospital - medical or psychiatric	179
519	Food and beverage sales, grocery store	176
340	Clinics, Doctors offices, hemodialysis centers	175
931	Open land or field	162
400	Residential, other	133
900	Outside or special property, other	126
161	Restaurant or cafeteria	117
131	Church, mosque, synagogue, temple, chapel	97
571	Service station, gas station	92
891	Warehouse	91
241	Adult education center, college classroom	85
342	Doctor, dentist or oral surgeon's office	81
460	Dormitory type residence, other	81
569	Professional supplies, services	79
141	Athletic/health club	76

This numeric chart provides a maximum and an average.

Company	Count	Max	Average Response Time
E2	1,958	24.88	4.20
E1	1,044	18.60	4.70
E6	885	27.58	4.15
E4	813	19.25	5.03
E3	558	15.22	4.57
E5	493	17.90	4.74
T1	119	27.08	5.25
BC1	115	22.98	4.71

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Here's a duration numeric by company.

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

Like graphs, **NFIRS 5 Alive** can print charts to paper, convert them into an HTML web page, allow charts to be copied and pasted directly into a word processing document or into an Excel spreadsheet.

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3 2. Contemporary Fire Analysis

2

Contemporary analysis is based on new fire department performance standards. It focuses on defining service levels, setting practical goals for service delivery and measuring compliance with those goals. While classical analysis can be viewed as passive monitoring, contemporay analysis requires active participation.

* New Standards Emerge

* Practical Baselines

* Community Expectations

* Speed & Weight

* Setting Obtainable Goals

* Monitoring Performance

3.1 New Standards Emerge

New Standards Drive the Development of Best Practices

National initiatives have raised the bar. Today fire departments are expected to adopt active management practices that set performance goals and measure compliance with those goals. Consider the following inititatives:

Fire Department Accreditation

Fire department accreditation establishes a set of "best practices" for fire departments. Departments successfully completing the accreditation process receive certification recognition for meeting standards of accreditation.

Major components of fire department accreditation include:

Deployment Rationale (Standard of Cover)
Systems Alignment
Program Evaluation
Relationship Analysis

Standards of (Response) Cover (SOC)

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Standards of Cover is a set of analysis techniques first developed in Europe and now used as part of the fire department accreditation process in the United States. Eight component parts include:

Existing deployment
Risk Identification
Service level objectives
Distribution
Concentration
Reliability
Performance
Overall evaluation

SOC is a very useful tool for fire departments experiencing level service demands, but it is essential for fire departments where growth is increasing demands for service. SOC provides excellent tools for projecting future demands and anticipating the resources required to meet those demands.

To see what other fire departments have done with this standard do an Internet search for:

"Standards of Response Cover"

You will see how fire departments have made use of this standard.

NFPA 1710 / 1720

The National Fire Protection Association has sponsored a fire department performance standard providing stated service level objectives in the following areas:

Call processing
Turnout time
Travel time
Total reflex time
4 firefighters on scene of fire
Full first alarm assignment on scene of fire
Arrival of first BLS unit
Arrival of first ALS unit

Each of these standards require a set of fairly complex calcuations each of which are performed in seconds by ***NFIRS 5 Alive***.

3.2 Practical Baselines

Practical Baselines Drive Performance Goals

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It takes about the same amount of time for an incipient fire to reach reach full-room involvement as it does for brain damage to occur after a person stops breathing. These facts provide a very compelling baseline for setting performance goals.

When an emergency occurs it doesn't matter to the community if a delay was caused by inefficient call handling, poor turnout time, poorly located engine companies or an insufficient number of companies. Any delay, whatever the cause, can be measured in the unnecessary loss of life and property. For this reason ***NFIRS 5 Alive*** allows the option of merging CAD data into NFIRS 5 data. This "calibrates" the dataset and allows the entire delivery spectrum to be analyzed.

Begin by setting baseline goals. Measure your department's ability to meet those goals. Where the department falls short correct the easiest short-falls first. For example, adding stations and engine companies may take years, but increasing the efficiency of call handling and shortening turnout time may have the same affect as adding a new station. Locate the problem areas. Start with the easy stuff.

3.3 Community Expectations

Community Expectations Have Budget Ties

Every community is different. Some are prosperous. Some are not. Some are motivated to invest heavily in public safety. Others are not.

Frequently the budget process disintegrates into a political battle. But contemporary analysis offers an alternative to the politics by focusing on performance.

Begin by making your fire department as efficient as possible. Do the best you can do with the resource you have on hand.

Next, outline a set of performance options for your community. For example, a budget increase of "X" percent will allow the addition of an engine company. Your analysis shows the additional engine company will allow the fire department to move from a 6-minute response percentage of 65% to a 6-minute response percentage of 80%. Conversely, if the fire department is forced to close an engine company your

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analysis shows a 20% decrease in your present 6-minute response time percentage.

Keep your budget process on track by focusing on performance.

3.4 Speed & Weight

Responses are Governed by Speed & Weight

The speed of a response is obvious and needs no explanation. The "weight" of a response is another matter.

Pick a location in the center of your community. How long does it take for:

The first company to arrive?
The second company to arrive?
A first-alarm assignment to arrive?
A first-alarm assignment plus one additional company?

"Concentration" describes the "density" of fire resources in certain parts of the community. If you have a very active city core chances are several fire stations are nearby. Because of this heavy concentration of resources the first company arrives on the scene quickly with a second company immediately following. A full first-alarm assignment arrives rapidly as well.

Now pick a location near a fire station located well outside the city core. How long does it take for:

The first company to arrive?
The second company to arrive?

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A first-alarm assignment to arrive?
A first-alarm assignment plus on additional company?

Chances are the closest engine company is available and responds quickly. But the second company takes a lot longer. In fact, the first company is going to have to handle things for quite a while. A full first-alarm assignment also takes a long time to assemble at this remote location.

While the speed of the first apparatus to reach the scene is the same in both scenarios, the "weight" of the response is much heavier in the city core. The concentration of fire department resources enable heavy responses. Therefore, it's appropriate to have the heaviest concentration around the most active areas. These are the areas most likely to require a "heavy" response.

The simple truth is many remote areas are going to have to survive with "lighter" responses. That's OK if these areas have fewer service demands and less significant incidents.

3.5 Setting Obtainable Goals

Set Goals that are Practical and Obtainable

Some communities make the mistake of setting unobtainable goals. Turnout time is one example.

A national standard may call for a fire & EMS turnout time of 1-minute or less 90% of the time. But is this practical for your fire department?

Remember, safety requirements call for full protective gear with every member strapped in place before the response begins. Is this practical at 2:30pm? How about at 2:30am? Can pushing this standard at 2:30am put your crew at greater risk?

Rather than adopting any particular national standard, begin by measuring current performance. Make obvious and easy changes first. Then set the performance bar just a bit higher. Measure continously and keep moving your performance objectives in the right direction.

3.6 Monitoring Performance

Monitor Performance Continuously

Ask any fire department software company. Calls for technical support about report creation increase dramatically in January. Fire departments make a mistake waiting until the close of the year to analyze data.

If you want to dramatically increase performance each incident should be monitored

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for compliance. If a single response falls outside of desired parameters it should be investigated immediately while the facts are known. Most of the time there will be an explanation. But frequently you will be able to learn about small problems that can be addressed to increase performance in the future.

So continue to create reports annually, quarterly and monthly. These reports provide the trend analysis you require. But also invest the time in checking each incident for compliance. There's a lot to be learned from individual responses.

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4 3. Fractiles

3

Averages, such as average response time, are used heavily in classical analysis. But one or two bad response times can skew a response time average. Fractiles, on the other hand, are popular contemporary performance measurements that are not subject to being disproportionally skewed by unusual incidents. This chapter focuses on fractiles.

* Fractiles Defined

* Fractile Graphs

* Chronological Comparisons

* Incident Type Comparisons

4.1 Fractiles Defined

Fractiles Provide Record Counts by Performance Level

Best practice standards such as "NFPA 1710" and "Standards of (Response) Cover" require fractile reporting. Here's an example of a fractile report that splits first apparatus arrival minutes into 15-second groups and provides a specfic count for each group.

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)

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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. If your goal is 90% compliance with a 6-minute response time standard it's not being met until 09:15. Responses over 12-minutes are frequently associated with isolated road networks or interstate highway responses.

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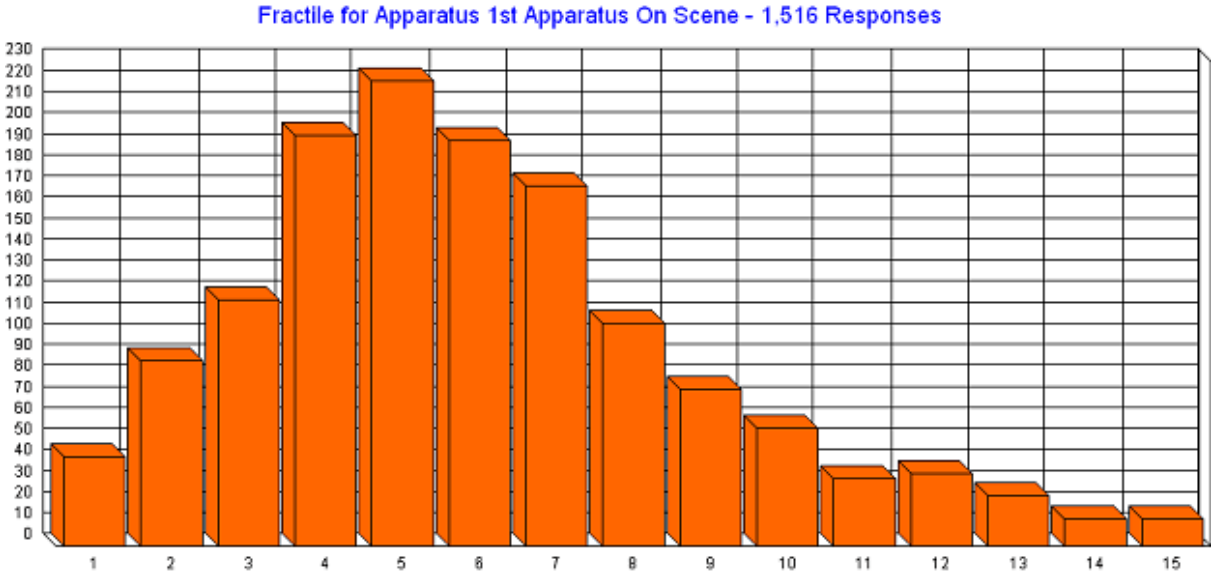
4.2 Fractile Graphs

Fractiles Easily Display in Graph Form

Here's an example 2D graph of a fractile report that splits response minutes into groups illustrating the number of minutes the first apparatus takes to reach the scene. A count of the number of incidents is displayed for each minute group.



Notice more incidents have a 5-minute response time than any other minute measurement. The numbers of incidents with more than a 5-minute response time tend to taper-down slowly. This "right-shifted" graph 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.

4.3 Chronological Comparisons

Fractiles Can Be Illustrated Chronologically

Here's a 3D graph that breaks down the number of incidents by time of day. In this case there are four time groups; early morning, late morning, early afternoon and evening. Notice each time group has it's own color and each can be seen in comparison with others.

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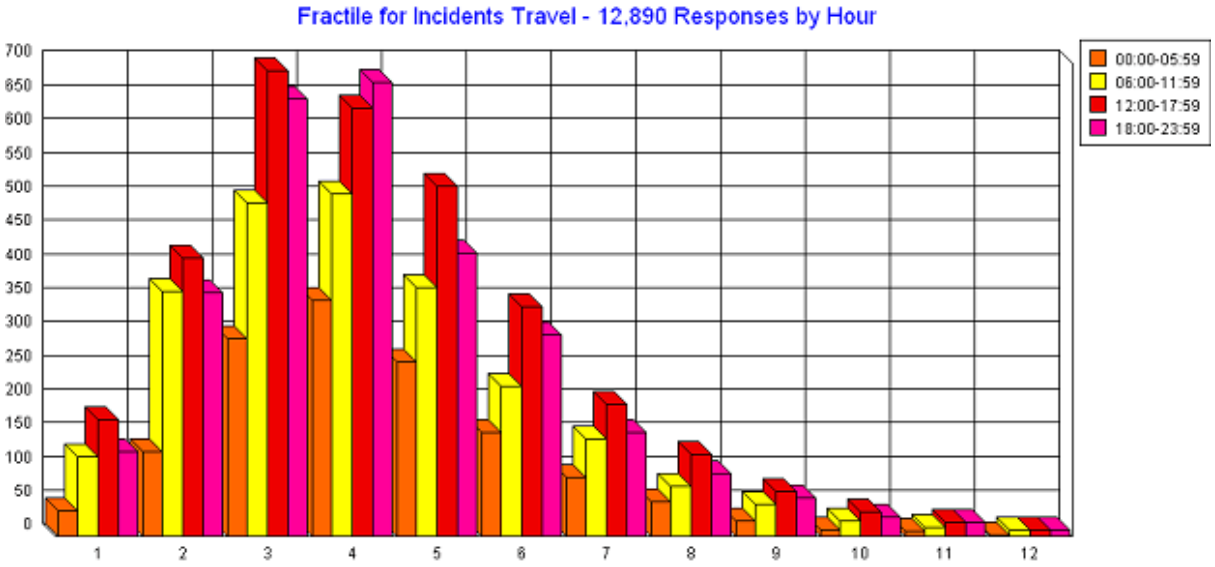
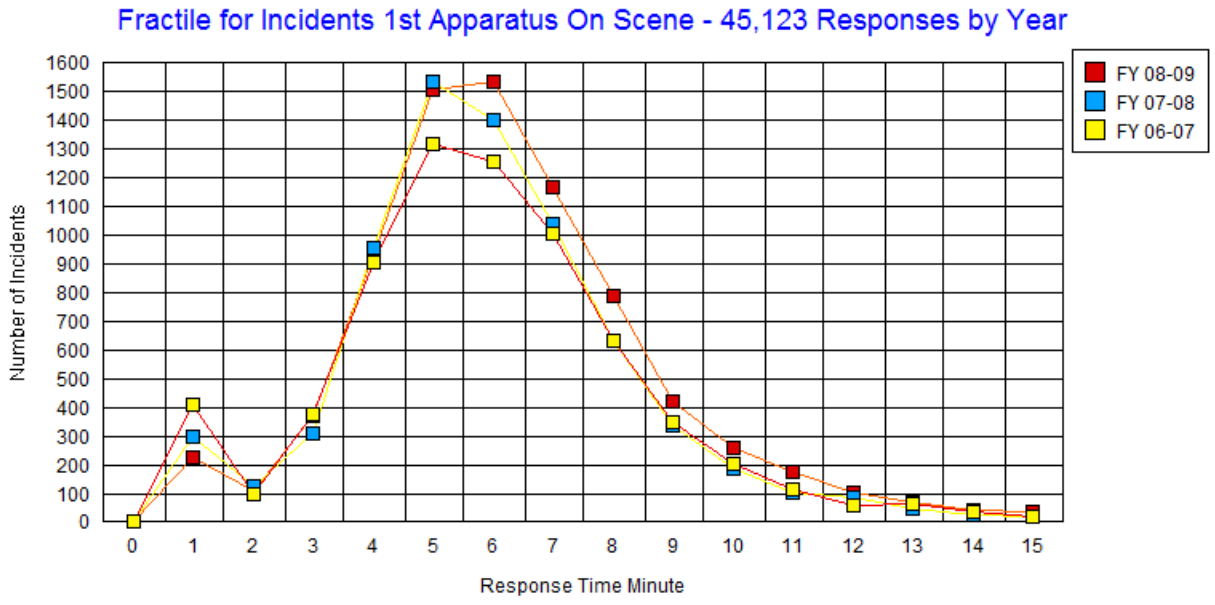


Notice how 4-minutes travel time is consistent for each time group except 12:00 - 17:59 (red color). During the afternoon time period the fire department actually arrives in 3-minutes more often than in 4-minutes.

Here's another chronological fractile graph.



Notice how the number of incidents is increasing with the passing of each fiscal year. However, the increase is mostly noted in 6-minute, 7-minute, 8-minute and 9-minute response times. This graph illustrates new activity being generated in locations a greater distance from existing fire department locations. This could be due to rapid development of outlying areas. But regardless of the cause it's a trend worth investigating.

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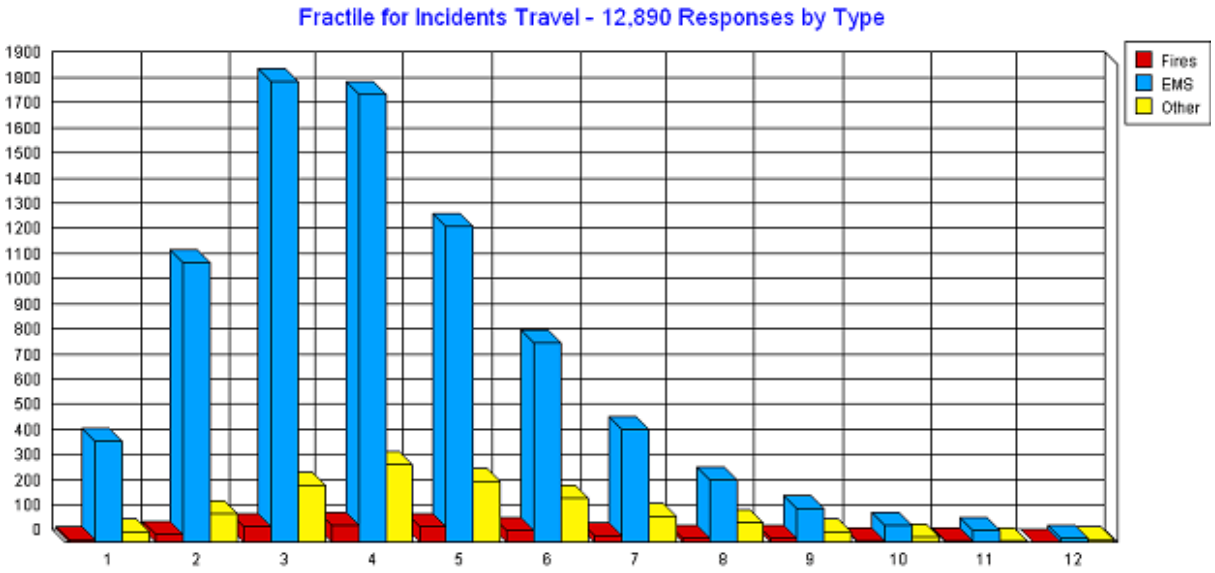
4.4 Incident Type Comparisons

Fractiles Can Also Be Illustrated by Incident Type

Here's another 3D graph that breaks down the number of incidents by incident type.



Again we can see an interesting trend. EMS incidents have a travel time peak at 3-minutes while other incident types have a travel time peak in 4-minutes. Perhaps ambulances are faster responding than heavier engine and ladder companies.

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5 4. Compliance

4

Compliance measures the percentage of responses that meet a pre-determined goal. All compliance graphs measure from 0%, to indicate no response met the goal, to 100% to indicate every response met the goal. Compliance testing is the heart of contemporary analysis.

* Chronological Comparisons

* Geographical Comparisons

* Deployment Compliance

* EMS Level Compliance

* EMS Transportation Compliance

5.1 Chronological Comparisons

Measuring Compliance Over Time

Both "NFPA 1710" and "Standards of (Response) Cover" require compliance reports. Let's say the department establishes a goal for the arrival of the first apparatus on the scene of fire and EMS incidents within 6.5 minutes 90% of the time. The Compliance report measures compliance with the 6.5 minute goal as a percentage, from 0% to 100%.

Here's a sample Compliance report. This chronological report illustrates the percentage of compliance with having the first apparatus arrive on the scene in 6.5 minutes or less by hour of the day. Notice how the fire department fails to meet 90% compliance any hour of the day.

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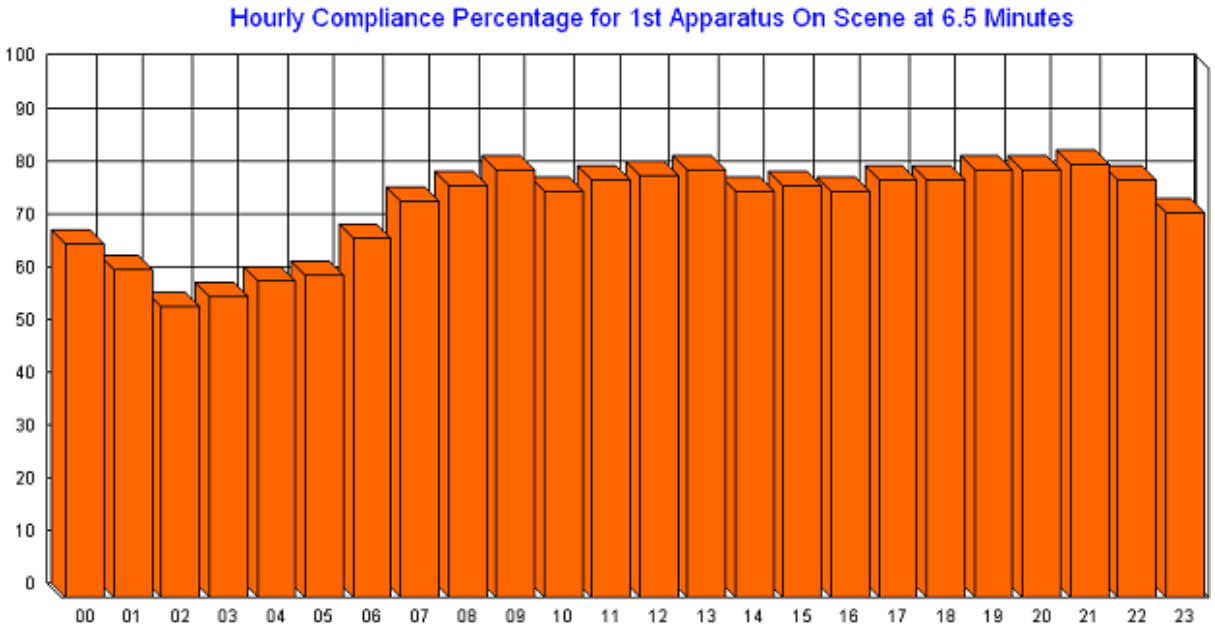
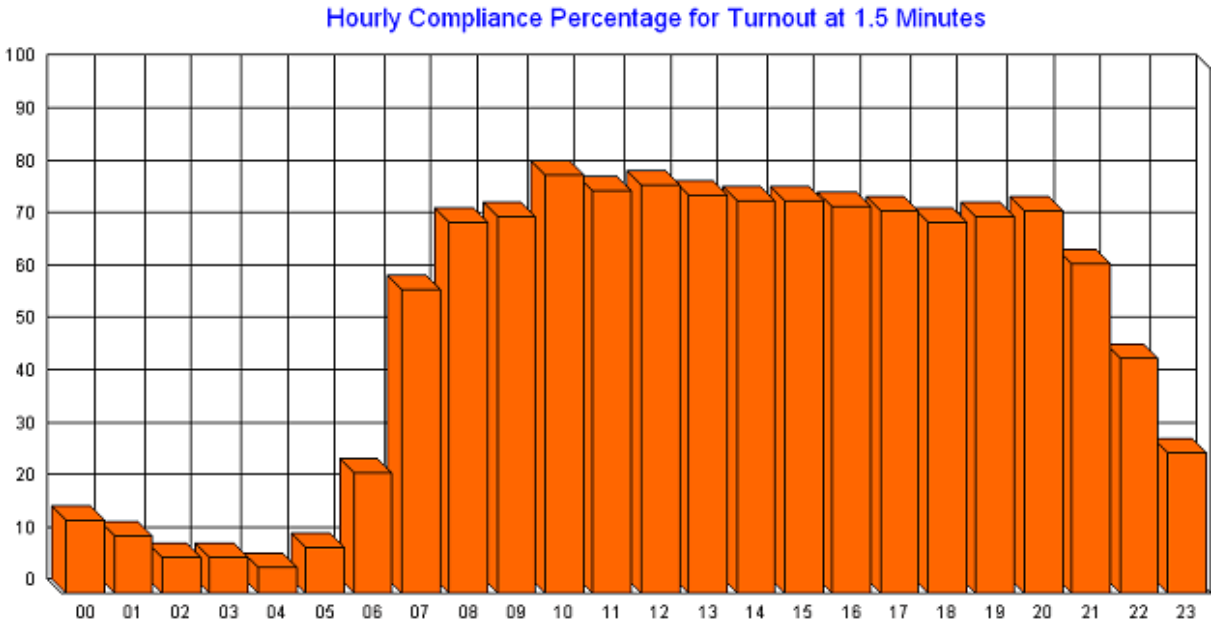


Here's another example of a chronological compliance graph. This one measures turnout time by hour of the day. Can you spot any trends here?



Chronological compliance does not have to be limited to hour of day alone. Here's another graph illustrating compliance by hour of day, but it's broken-down by year as well.

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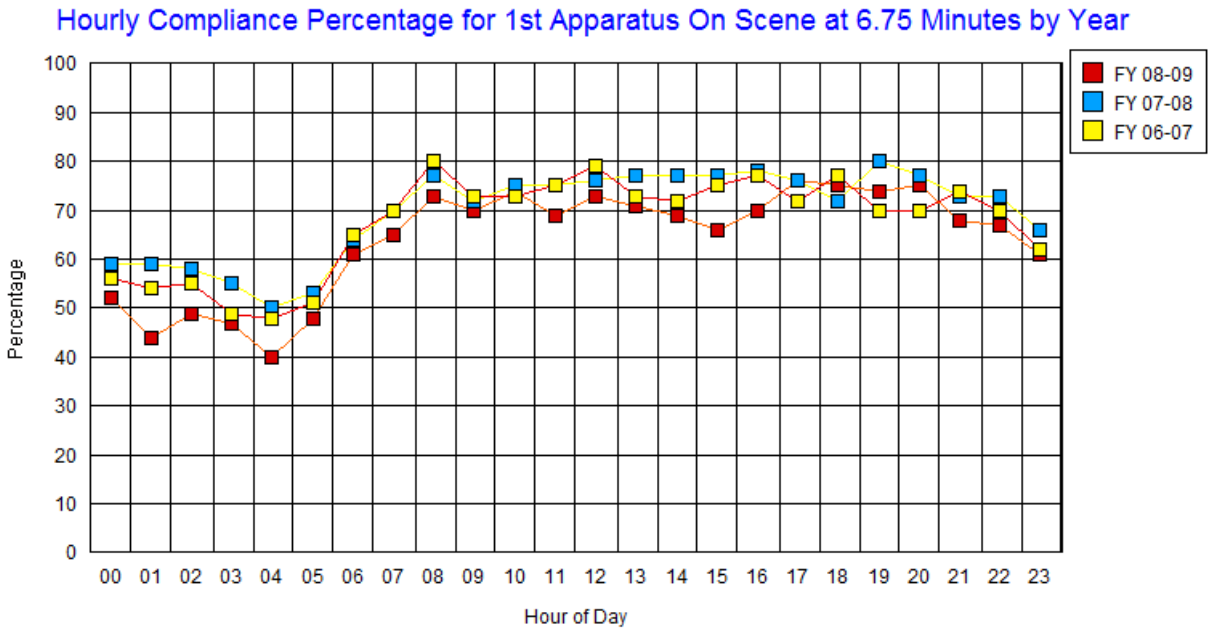

Here we see hourly compliance in the early morning hours declined in the most recent fiscal year.

5.2 Geographical Comparisons

Measuring Compliance Geographically

Geographic compliance can be measured with maps, but you don't have to have a geographic information system to spot trends.

Here's an example from a fire department with 11 fire stations. Notice how the percentage of complicance varies from station to station.

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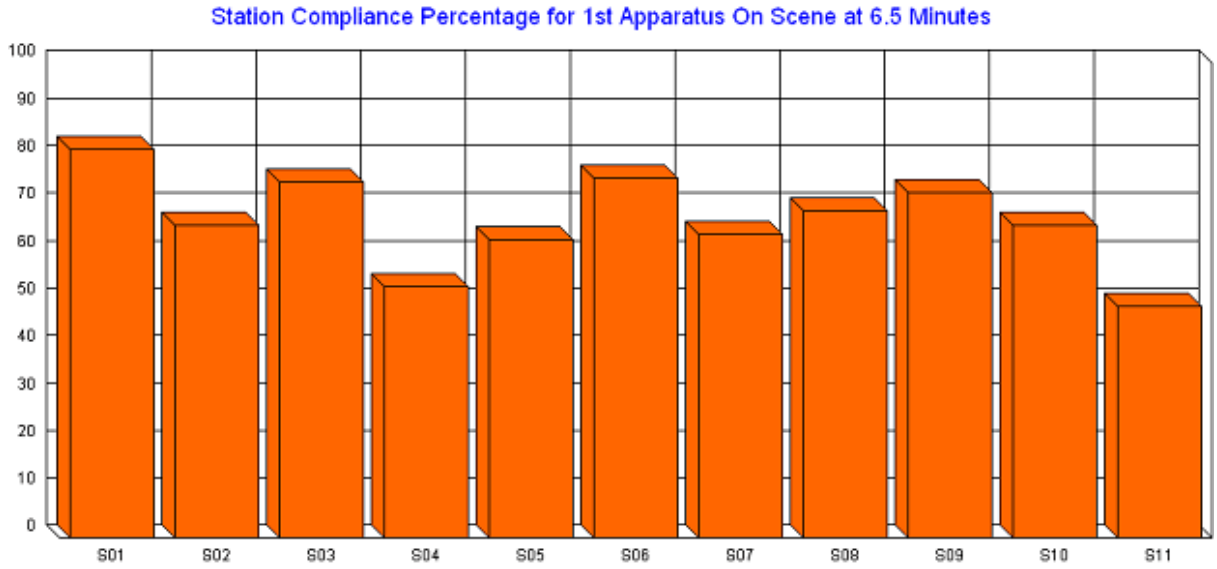

Normally, it's desirable to have the highest compliance in the city core where both the number and complexity of incidents is greatest. You cannot expect to have the same level of compliance in outlying station areas where there's a low population density spreadout over a greater distance.

5.3 Deployment Compliance

Deployment Compliance Measures Speed & Weight

As a type of compliance report Deployment Compliance has a Y-Axis (vertical) range of zero to 100%. But there's a twist in this report.

Deployment Compliance measures both the "speed" of a response as well as the "weight" of the response. Speed is measured in the first column where the first due apparatus arrives on the scene within 6-minutes 84.5% of the time.

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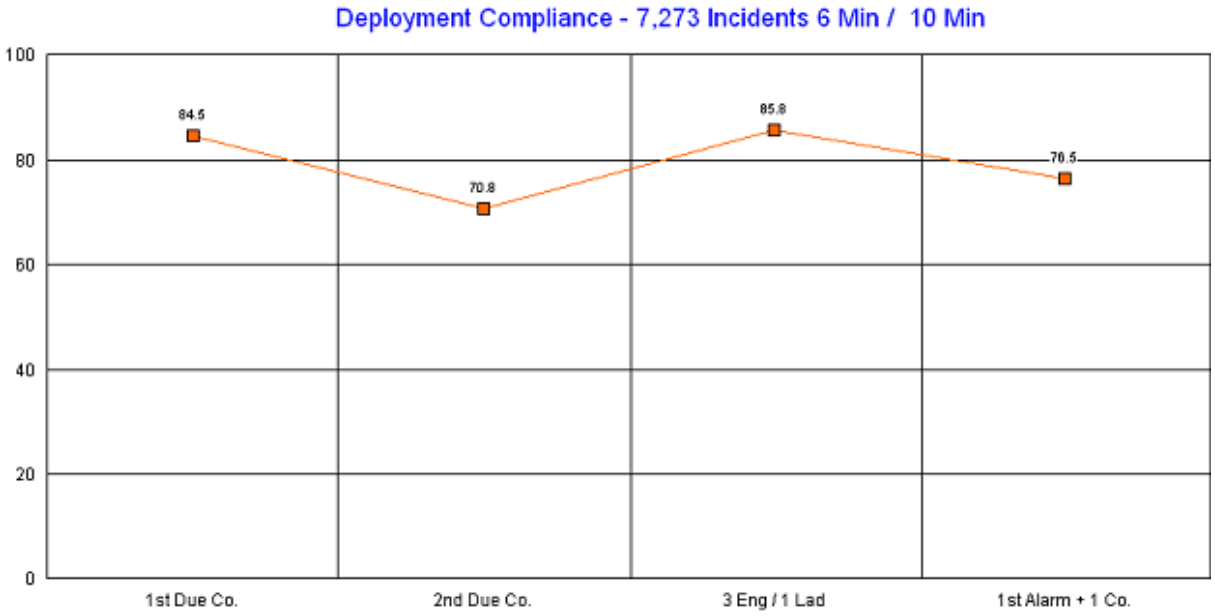

The weight of the response is measured in column 2 where incidents with a second-due apparatus are measured to evaluate the percentage of compliance with a 6-minute arrival goal. If the second apparatus scores close to the first there's solid backup and depth, i.e. weight.

The same relationship between speed and weight is illustrated in the third and fourth columns where the compliance for the arrival of a full first-alarm assignment within 10 minutes is measured against the same standard for the arrival of a full first-alarm assignment plus an additional engine or ladder company.

In general, the higher the line, the greater the level of compliance. If the light is fairly straight across the weight of the response is very high. If you have big drops in columns 2 and 4, the weight of the response is very light.

5.4 EMS Level Compliance

EMS Deployment Compliance Measures ALS / BLS

NFIRS 5 Alive provides powerful tools for in-depth analysis of EMS operations. Here's an example of a "BLS / ALS Compliance Report":

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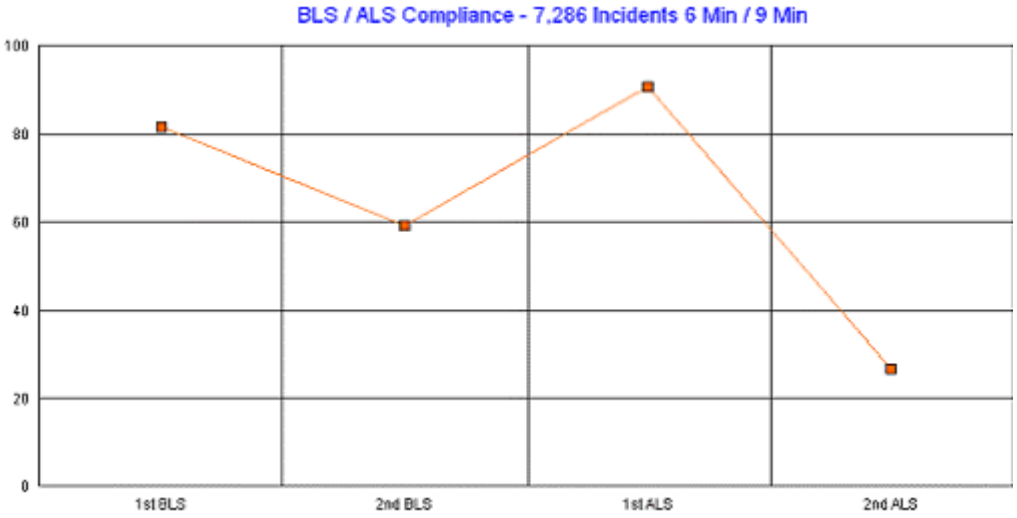

The title displays the number of EMS incidents being analyzed. Notice the user has selected a 6-minute goal (from the time of citizen request) for BLS to arrive on the scene. A 9-minute goal has been selected for ALS response.

Notice the BLS goal is met more than 80% of the time. In fact, a second BLS company arrives on the scene within the BLS goal, 60% of the time.

Over 90% of the time the ALS unit arrives on the scene within the established 9-minute goal. But if a second ALS unit is required it arrives on the scene within 9 minutes less than 30% of the time. There is a big drop-off when a second ambulance is needed. This indicates the "weight" of ALS response is very light.

5.5 EMS Transportation Compliance

IEMS Transportation Compliance Measures Transportation Goals

Here's an example of an "EMS Transport Compliance Report":

This report measures compliance percentages for EMS non-transport vs. ambulances. This report is essential if the fire department provides first responder service but depends on a private ambulance service for patient transportation.

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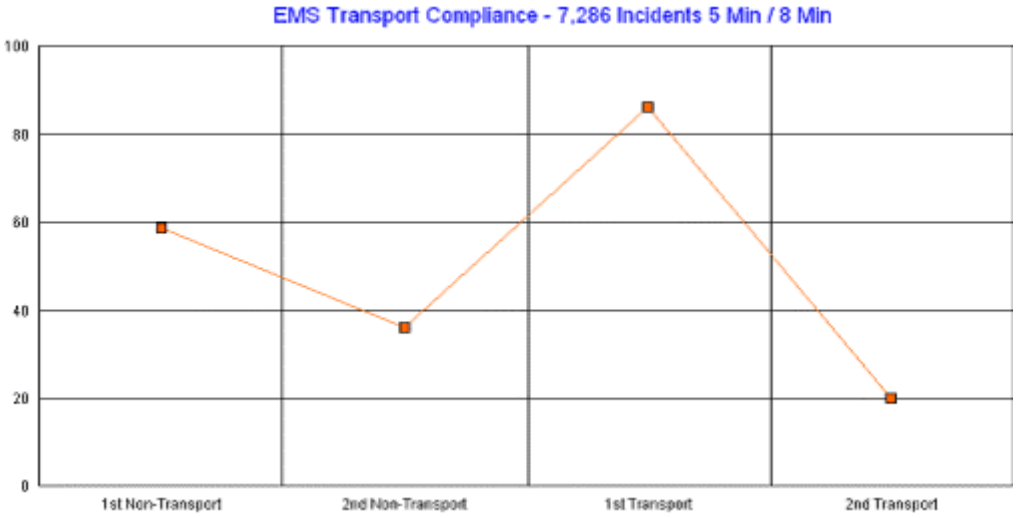

This fire department is testing a goal of 5-minute non-transport arrival and 8-minute ambulance arrival.

Notice the 5-minute goal for non-transport EMS response seems too aggressive since it's met less than 60% of the time. The 8-minute goal for arrival of the ambulance is realistic since it's met significantly more than 80% of the time.

This graph points out "light" ambulance coverage. Although there is high compliance when an EMS incident requires just one ambulance, compliance drops to less then 20% when a second ambulance is required.

When the same chart is run by station area or district geographic response patterns emerge. Once you realize the patterns you can revise deployment strategies to optimize transport performance.

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6 5. Response Reliability

5

"Response Reliability" is a type of compliance report that measures engine company response time compliance as well as availability compliance. By monitoring the intersections of these criteria station area patterns for speed and weight (depth of response) can be accurately documented.

* A High Concentration Graph

* A District Under Stress

6.1 A High Concentration Graph

A High Concentration of Resources Increases Response Reliability

Let's return to our example of concentrated fire department resources in the city core. 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.

Here's a response reliability line graph. First, let's take a look at the basics. The graph describes the effect a single engine company has on response time compliance within it's own station area. Fire departments are free to establish their own goals. For example, many fire departments select a goal of 6 minutes (1-minute call handling, 1-minute turnout time, 4-minute travel time) for the arrival of the first company on the scene. The "Response Reliability" graph uses 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 response district.
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

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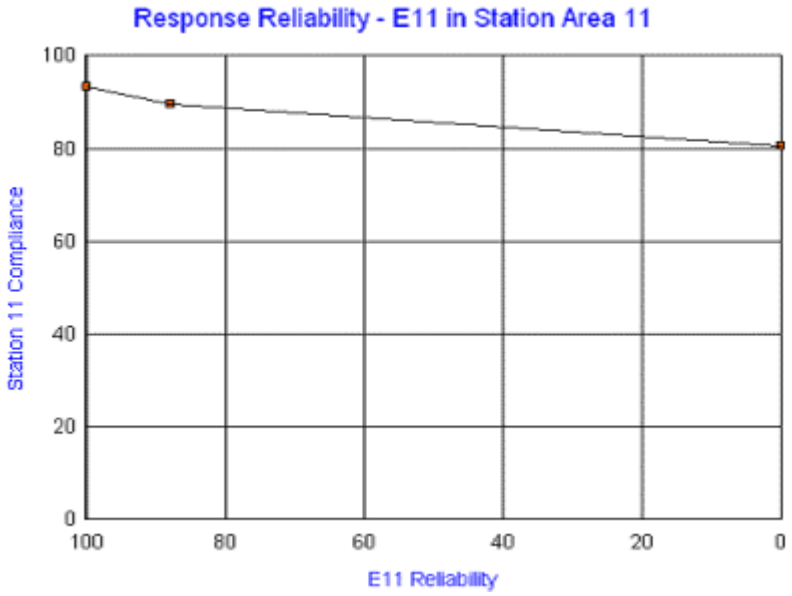
response area:



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.

6.2 A District Under Stress

When Concentration is Low Response Reliability Shows Signs of Stress

Using our example of an isolated station far from the city core we see how a lack of resource concentration affects response reliability performance.

Here's a response reliability graph for Engine 28. This station area is a bit isolated making the weight of response lighter. Response reliability is high at just over 90%. This means Engine 28 arrives first in it's district over 90% of the time. However, if Engine 28 is not available for response the 6-minute response time compliance in the station area drops to just over 50%. This station area suffers when Engine 28 is not available.

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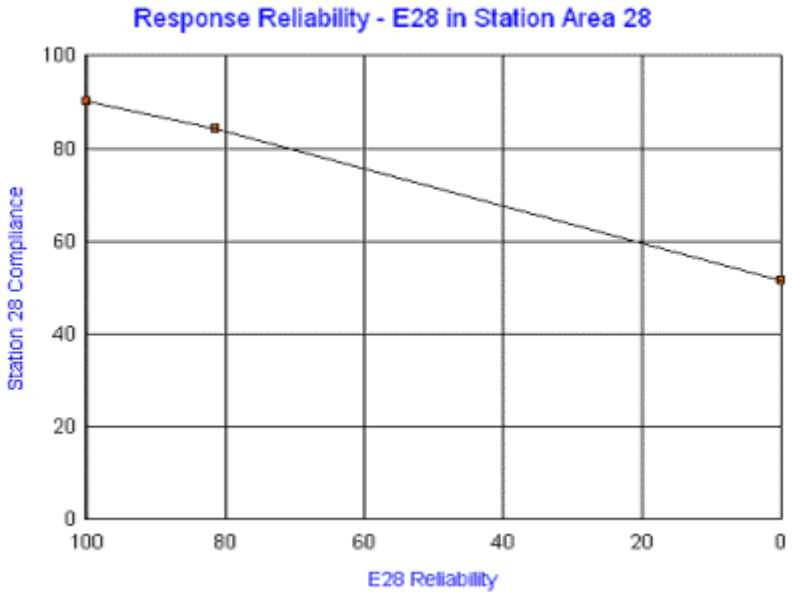

A downward deflection of the line in a response reliability graph indicates a lack of weight. Again, this is expected for low-volume isolated stations. But if you see this type of downward deflection in a busy engine company further analysis is warranted.

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7 6. Jurisdictional Profile

6

A "Jurisdictional Profile" is a comparison of response statistics within a particular jurisdiction. The comparison is extensive and includes graphs and charts for each of the following areas.

* By Department

* By Station & District

* By Address

* By Vehicle

* By Member

7.1 By Department

The "Multi-FDID" Version Can Compare Fire Department Performance

The Jurisdictional Profile compares fire department statistics by area. Areas include fire departments, stations, districts, addresses, vehicles and members.

If your jurisdiction incorporates multiple fire departments the vital statistics for each fire department are available for comparison. If you have a single fire department jurisdiction statistics are summarized as illustrated in the example below:

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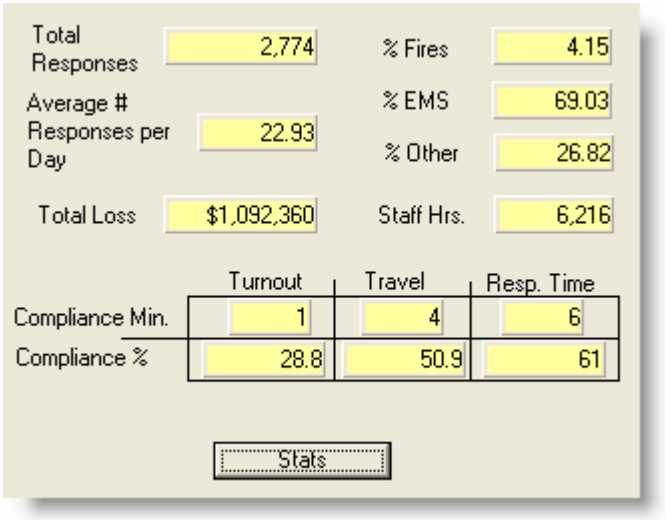

You can press the "Stats" button to quickly copy all department statistics to a clipboard for pasting into an Excel spreadsheet or word processor.

The Jurisdictional Profile can be calculated for a month, a year, 5-years or any time period you wish. This allows you to track chronological trends in comparative statistics.

7.2 By Station & District

Easily Make Station & District Comparisons

Here's a sample of some of the station statistics generated in the Jurisdictional Profile. These stats were pasted into an Excel spreadsheet. The %Turnout, % Travel, % Response Time columns all track the compliance percentage for turnout time, travel time and response time respectively.

The software tracks average response time as well as median response time. Average duration is also tracked by station.

Station	Responses	% Fire	% EMS	% Other	Per Day	% Turnout	% Travel	% Resp.	Ave. RT	Median RT	Ave. Dur.	Staff Hrs	$ Loss	Ave. Loss
S07	603	3.32%	79.27%	17.41%	4.98	29.70%	49.40%	68.30%	5.64	5.23	21.33	1,014.39	17,400	870
S04	352	3.41%	76.99%	19.60%	2.91	31.80%	55.10%	62.50%	5.91	5.32	26.99	765.07	26,500	2,208.00
S06	319	6.90%	66.46%	26.65%	2.64	25.40%	47.30%	55.50%	6.63	5.75	29.44	742.71	14,820	674
S02	315	6.35%	63.17%	30.48%	2.6	27.00%	55.20%	60.60%	7.91	5.57	33.5	1,120.77	740,350	37,018.00
S03	308	2.92%	61.36%	35.71%	2.55	27.30%	51.60%	62.30%	6.03	5.45	24.29	734.2	143,520	15,947.00
S08	256	3.91%	58.20%	37.89%	2.12	29.70%	50.80%	45.10%	7.02	6.32	25.11	413.19	4,500	450
S09	244	4.10%	74.59%	21.31%	2.02	27.50%	48.80%	59.40%	6.35	5.65	32.15	779.64	38,020	3,802.00
S01	180	2.22%	75.56%	22.22%	1.49	29.40%	43.30%	66.10%	5.66	5.38	26.4	280.8	35,000	8,750.00
S10	120	4.17%	45.00%	50.83%	0.99	26.70%	55.80%	68.90%	5.57	5.02	23.57	252.06	71,750	14,350.00
S05	36	2.78%	69.44%	27.78%	0.3	38.90%	50.00%	41.70%	7.38	6.83	26.67	63.88	0	0

District statistics track the same statistics as above but for each district reported in NFIRS 5 data.

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7.3 By Address

Addressing Problem Areas

In its Jurisdictional Profile ***NFIRS 5 Alive*** compares all response addresses and identifies addresses receiving multiple responses. Those responses are then summarized and displayed in the software.

Here's part of the history of responses to a single address:

Date: 12/31/04 Incident Number: 0009617 Incident Type: 611 Dispatched & canceled en route.
Date: 12/29/04 Incident Number: 0009574 Incident Type: 611 Dispatched & canceled en route.
Date: 12/26/04 Incident Number: 0009482 Incident Type: 322 Vehicle accident with injuries.
Date: 12/25/04 Incident Number: 0009434 Incident Type: 322 Vehicle accident with injuries.
Date: 12/24/04 Incident Number: 0009414 Incident Type: 322 Vehicle accident with injuries.
Date: 12/23/04 Incident Number: 0009385 Incident Type: 611 Dispatched & canceled en route.
Date: 12/18/04 Incident Number: 0009259 Incident Type: 321 EMS call, excluding vehicle accident with injury.
Date: 12/16/04 Incident Number: 0009221 Incident Type: 611 Dispatched & canceled en route.
Date: 12/16/04 Incident Number: 0009209 Incident Type: 611 Dispatched & canceled en route.
Date: 12/15/04 Incident Number: 0009173 Incident Type: 322 Vehicle accident with injuries.
Date: 12/14/04 Incident Number: 0009163 Incident Type: 611 Dispatched & canceled en route.
Date: 12/13/04 Incident Number: 0009135 Incident Type: 322 Vehicle accident with injuries.
Date: 12/12/04 Incident Number: 0009094 Incident Type: 322 Vehicle accident with injuries.
Date: 12/04/04 Incident Number: 0008891 Incident Type: 611 Dispatched & canceled en route.
Date: 11/27/04 Incident Number: 0008682 Incident Type: 322 Vehicle accident with injuries.

Addresses is an excellent tool for arson investigation. It also helps you to identify addresses requesting frequent EMS assistance.

7.4 By Vehicle

Compare Vehicle Statistics and Edit Vehicle Profiles

NFIRS 5 Alive extracts information about each vehicle appearing in NFIRS 5 data. Here's a sample of Vehicle response statistics copied into Excel.

Vehicle	Responses	Station	% Fire	%EMS	% Other	In-Station	% Turnout	% Travel	% Respon	Avg. RT	Median RT	Avg. Durati
E7	660	S07	6.30%	75.40%	18.10%	87.10%	27.90%	50.20%	59.80%	5.78	5.48	18.48
E3	433	S03	6.70%	58.20%	35.10%	66.10%	27.00%	52.20%	46.30%	6.39	6.2	19.46
L6	413	S06	10.40%	64.10%	25.40%	74.80%	26.20%	100.00%	85.20%	6.39	6.23	23.32
E4	392	S04	6.10%	73.70%	20.10%	83.70%	29.30%	52.00%	56.00%	5.9	5.67	21.64
E2	364	S02	7.10%	62.00%	30.70%	83.50%	29.40%	52.70%	50.80%	6.08	5.98	23.68
E9	287	S09	8.70%	67.60%	23.60%	80.80%	25.10%	50.90%	48.60%	5.89	6.02	24.9
E8	280	S08	7.10%	58.20%	34.60%	87.10%	29.60%	52.50%	37.90%	6.58	6.58	21.85
E1	274	S01	8.30%	68.20%	23.30%	62.80%	25.50%	47.80%	53.30%	6.14	5.83	22.07
E10	185	S10	15.60%	47.50%	36.70%	62.20%	29.70%	48.60%	47.50%	6.33	6.15	20.3
E5	70	S05	14.20%	62.80%	22.80%	48.60%	31.40%	55.70%	31.40%	7.14	7.52	22.08

By double-clicking on a vehicle you can see performance graphs and charts. Here's a sample response time compliance graph.

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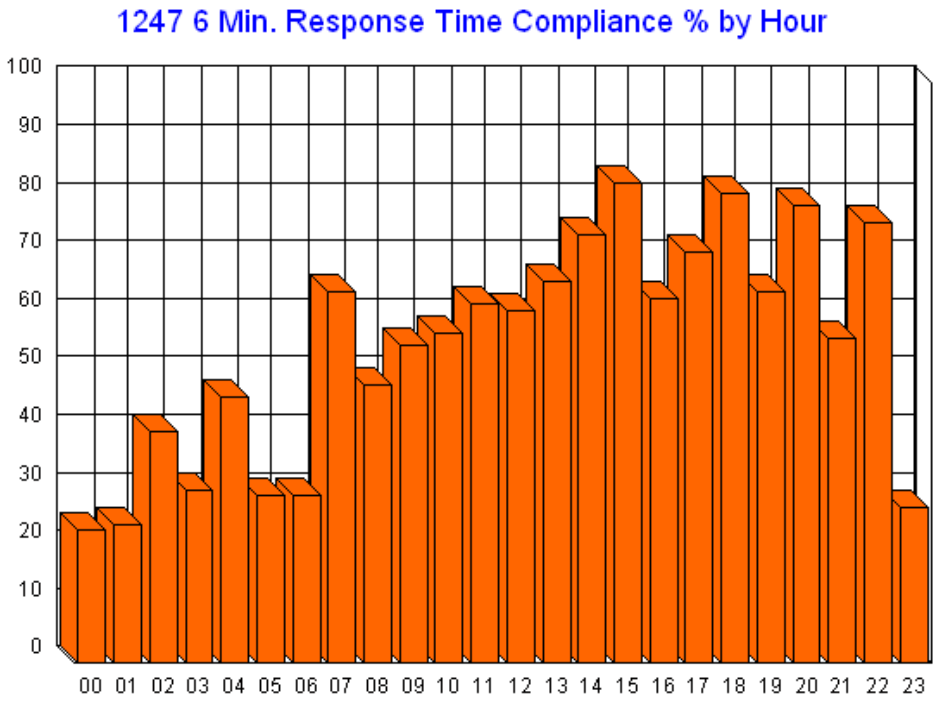
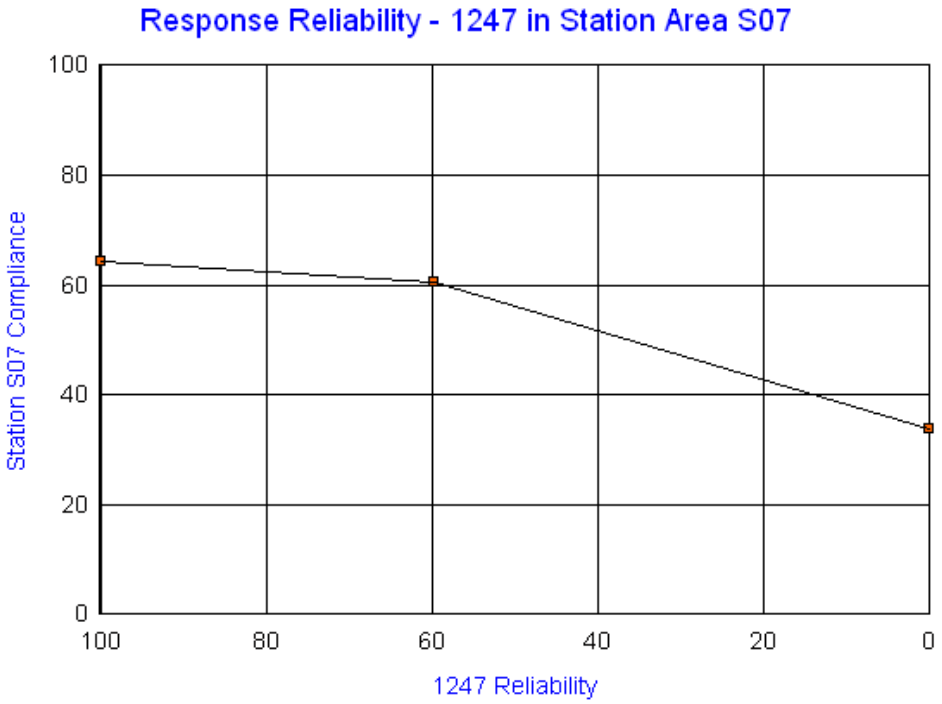


Here's a response reliability graph that was created during Jurisdictional Profiling.



You can edit each vehicle's profile by adding the group (Engines, Ladders, EMS or Other), first due station area, fire due districts, EMS capability, etc. Profiles can be reset and the Jurisdictional Profile rerun to test different response scenarios.

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7.5 By Member

Members Tracks Firefighter Response Statistics

NFIRS 5 Alive's Jurisdictional Profile tracks comparative statistics right down to the individual responder. Here's a sample of the statistics available. Member's names have been removed.

Employ ID	Responses	% Fire	% EMS	% Other	Median Dur.	Total Duration	Hours
116	246	8.13%	69.92%	21.95%	17.12	4,912.55	81.88
114	237	6.75%	73.42%	19.83%	17.42	4,604.75	76.75
72	235	8.09%	73.62%	18.30%	15.05	4,473.09	74.55
81	225	6.67%	75.11%	18.22%	16.7	3,986.54	66.44
46	222	5.41%	78.83%	15.77%	17.43	4,084.31	68.07
59	214	7.48%	71.03%	21.50%	17.52	4,243.62	70.73
124	213	7.04%	75.59%	17.37%	15.65	4,103.25	68.39
49	201	4.98%	65.67%	29.35%	17.67	4,385.20	73.09
41	197	7.11%	75.63%	17.26%	17.62	3,937.44	65.62
63	194	6.70%	74.74%	18.56%	14.45	3,380.27	56.34
115	193	8.29%	76.17%	15.54%	15.88	4,014.14	66.9

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8 7. Risk Analysis

7

Risk Analysis is a vital part of any Standard of Cover (SOC) or fire department accreditation study. ***NFIRS 5 Alive*** includes a complete Risk Analysis module.

* ISO Spreadsheets

* Incident History

* GIS Views of Risk

8.1 ISO Spreadsheets

Risk Analysis is a vital part of any Standard of Cover (SOC) or fire department accreditation study. ***NFIRS 5 Alive*** now includes a complete Risk Analysis module.

Import ISO spreadsheets, merge RMS Occupancy data or even community tax data. Automatically assemble incident history and response time performance for each building location. Export risk data to field units and import their inspection results.

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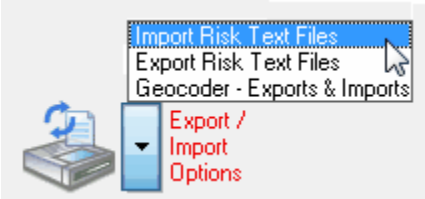
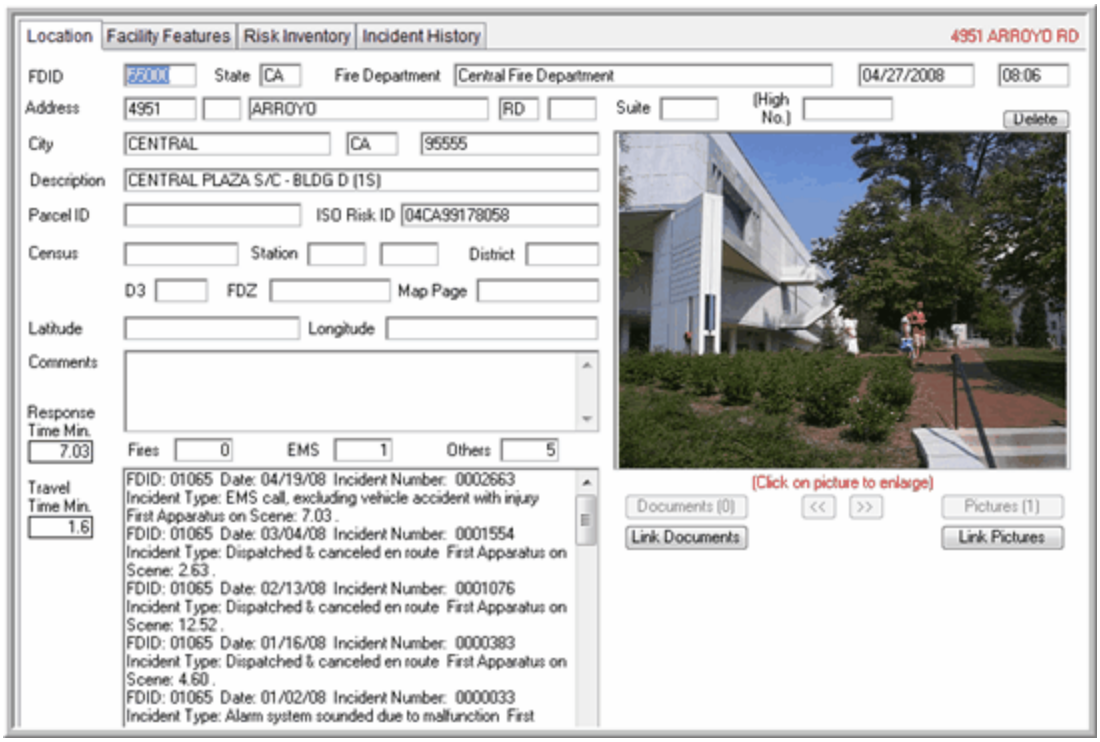
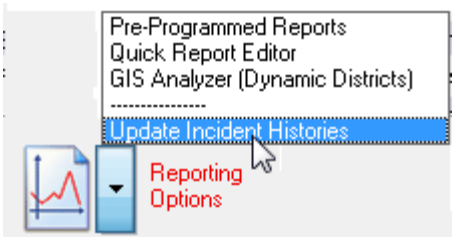


8.2 Incident History



Once Risks are imported a single file operation can be used to update the incident history of each risk.



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8.3 GIS Views of Risks

Once loaded Risks may be viewed geographically. This is especially powerful when KML files are used to visualize Risks plotted by icon on a satellite view of the jurisdiction.

One risk KML associates icons by number of stories. This allows plotting the location of buildings by height. It's an excellent resource for optimizing the location of truck companies.

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9 8. Time Analyzer

8

NFPA 1710 sets performance standards for fire departments. The standards themselves are fairly complex requiring not only compliance testing on several subsets of records, but also compliance testing based on the number of fire fighters as they arrive on the scene and level of EMS response as it arrives on the scene. ***NFIRS 5 Alive*** includes a single button subroutine that quickly performs NFPA 1710 calculations and reports the results in text form.

* NFPA 1710 Calculations

* Structure Fire Analysis

* EMS Analysis

9.1 NFPA 1710 Calculations

Looking at the Incidents to Analyze

Each report calculation uses NFPA standards as defaults. However, you are free to modify goals to meet your community's requirements. For example, a 1-minute turnout time default can be modified to 1.5 minutes.

The NFPA 1710 report begins by identifying the incidents to be examined. Not all incidents in a selected group of incidents are measured for NFPA 1710 compliance. For example, aid incidents and incidents not categorized as fire or EMS responses are not measured. Here's a sample summary of the first part of the report that identifies incidents being measured:

Deployment Delivery & Response Time Objectives Compliance Report 05/19/06

Number of Incidents Examined: 2,763
Number of Incidents within Jurisdiction: 2,724
Number of Structure Fires & EMS Incidents: 1,919
Number of Structure Fires: 55
  Number of Structure Fires with a full response: 31
Number of EMS Incidents: 1,864

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Number of EMS Incidents with ALS response: 471

Now the number of Structure Fires & EMS Incidents is analyzed for Call Processing compliance. This is a measurement of the effectiveness of CAD.

Call Processing Compliance Calculations for Structure Fires & EMS Incidents
0 - Number of incidents tested for Call Processing Compliance: 1,919
0 - Call Processing Compliance at 1 minute: 82.51% (1,583)
0 - Minutes required to reach 90% compliance Call Processing objective of 1 minute: 1.18

The report continues with a measurement of turnout time (from dispatch until the apparatus begins responding to the scene).

Turnout Time Compliance Calculations for Structure Fires & EMS Incidents
1 - Number of incidents tested for Turnout Time Compliance: 1,919
1 - Turnout Time Compliance at 1 minute: 28.14% (540)
1 - Minutes required to reach 90% compliance with turnout objective of 1 minutes: 2.4
Cumulative compliance for 1,919 Fire and EMS incidents: 28.14% (540)

9.2 Structure Fire Analysis

Measuring the Response to Structure Fires

Here are sample measurements for the response to structure fires.

Structure Fire Compliance Calculations
2 - Minutes required to reach 90% compliance for Travel Time objective of 4 minutes: 5.38
2 - Number of Structure Fires tested for 4-F/f personnel compliance: 55
2A - Compliance for 4-fire fighters on-scene in 4 minutes travel time: 74.54% (41)
2 - Number of Structure Fires tested for 13 / 14 compliance: 31
2B - Compliance full assignment (13 / 14 F/f's) on-scene 8 minutes travel time: 100.00% (31)
Cumulative compliance for 55 Structure Fires: 25.80% (8)

9.3 EMS Analysis

Measuring the Response to EMS Incidents

Here are sample measurements for the response to EMS incidents.

EMS Compliance Calculations

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3 - Number of EMS incidents tested for BLS Compliance: 1,864
3 - BLS capability on scene in 4 minutes travel time: 27.30% (509)
3 - Minutes required to reach 90% compliance BLS Travel Time objective of 4 minutes: 6.47
4 - Number of EMS incidents tested for ALS Compliance: 471
4 - ALS response of 4 ALS / BLS F/f's on scene in 8 minutes travel time: 99.57% (469)
4 - Number of EMS incidents with transport capability on scene: 1776
4 - Arrival of EMS transport vehicle in 8 minutes travel time: 87.8% (1,559)
Cumulative compliance for 1,864 EMS incidents: 27.77% (517)

Total compliance for 1,919 Structure Fires & EMS Incidents: 7.97% (153)

Notice total compliance, that quantifies incidents meeting every applicable response criteria, is a fairly low percentage. Keep objectives realistic to maintain a continuous focus on improvement.

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10 9. Staff Analyzer

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Staff analysis models fire department staffing levels by monitoring key factors affecting staffing demand. Staffing demands are illustrated in animated models that display demand shifts by hour of day, day of week and month.

* Simultaneous Incidents

* Responders per Incident

* Total Responders

* Comparative Staffing Graphs

10.1 Simultaneous Incidents

Simultaneous Incidents Affect Staffing

If incidents occurred one at a time you would only need to staff for the most complex incident you are likely to face. Unfortunately, in the real world incidents frequently occur simultaneously. Simultaneous incidents place great demands on staffing, so staff analysis begins with understanding simultaneous incident patterns.

Here's a text breakdown of simultaneous incidents created in ***NFIRS 5 Alive***. It covers the incidents that occurred without any other incidents occurring at the same time ("Simultaneous Incidents 000") through a situation where 5-incidents ("Simultaneous Incidents 004") were occurring at the same time.

Here's a text report that was created in the Staff Analyzer:

There are 2,763 Incident records being analyzed.

Simultaneous Incidents: 000
Incidents: 1,684
Percentage: 60.95%.
Culmulative percentage: 60.95%.
Median first due minutes: 5.43
First due compliance %: 61.22%
Structure Fires: 16 1.00%.

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All Fires: 67 4.00%.
EMS Incidents: 1,180 70.10%.
Other Incidents: 437 26.00%.
Median Duration: 20.98

Simultaneous Incidents: 001
Incidents: 816
Percentage: 29.53%.
Culmulative percentage: 90.48%.
Median first due minutes: 5.52
First due compliance %: 61.03%
Structure Fires: 3 .40%.
All Fires: 32 3.90%.
EMS Incidents: 560 68.60%.
Other Incidents: 224 27.50%.
Median Duration: 21.50

Simultaneous Incidents: 002
Incidents: 216
Percentage: 7.82%.
Culmulative percentage: 98.30%.
Median first due minutes: 5.43
First due compliance %: 59.72%
Structure Fires: 2 .90%.
All Fires: 13 6.00%.
EMS Incidents: 141 65.30%.
Other Incidents: 62 28.70%.
Median Duration: 22.30

Simultaneous Incidents: 003
Incidents: 42
Percentage: 1.52%.
Culmulative percentage: 99.82%.
Median first due minutes: 5.72
First due compliance %: 59.52%
Structure Fires: .00%.
All Fires: 3 7.10%.
EMS Incidents: 27 64.30%.
Other Incidents: 12 28.60%.
Median Duration: 24.77

Simultaneous Incidents: 004
Incidents: 4
Percentage: .14%.
Culmulative percentage: 99.96%.
Median first due minutes: 5.65
First due compliance %: 50.00%

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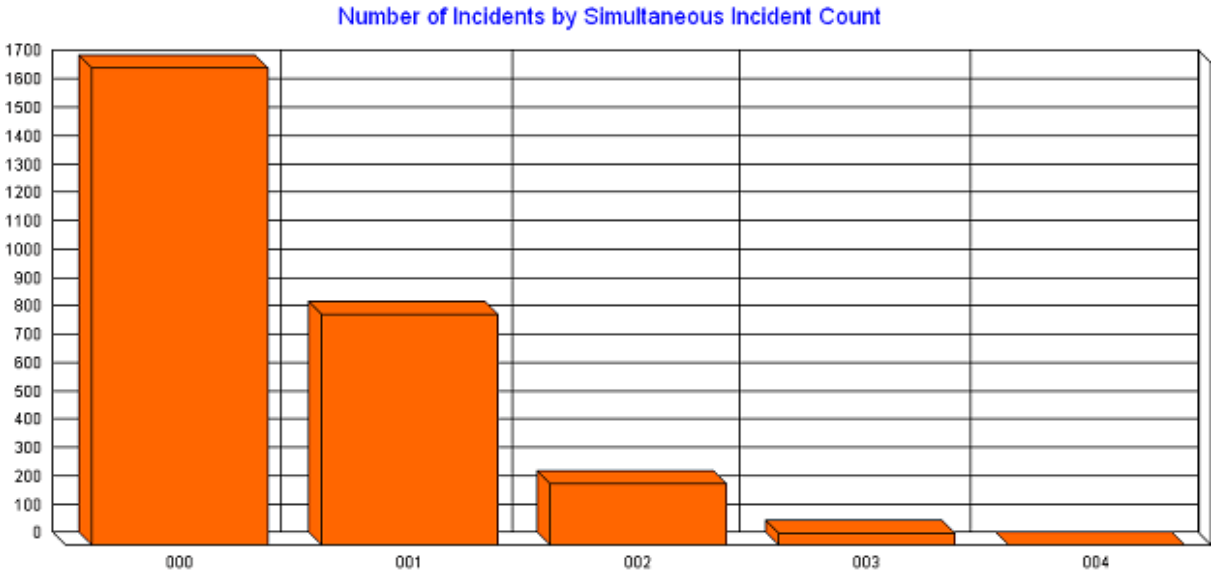
Structure Fires: .00%.
All Fires: .00%.
EMS Incidents: 4 100.00%.
Other Incidents: .00%.
Median Duration: 22.50

Below you can see the number of simultaneous incidents represented in a 2D bar chart. In this fire department most incidents occur and are cleared before other incidents occur. But the chart does chronical up to 4-simultaneous incidents by number.



Using a cumulative graph you can see 90% of all incidents involve either no simultaneous activity or just 1 simultaneous incident.

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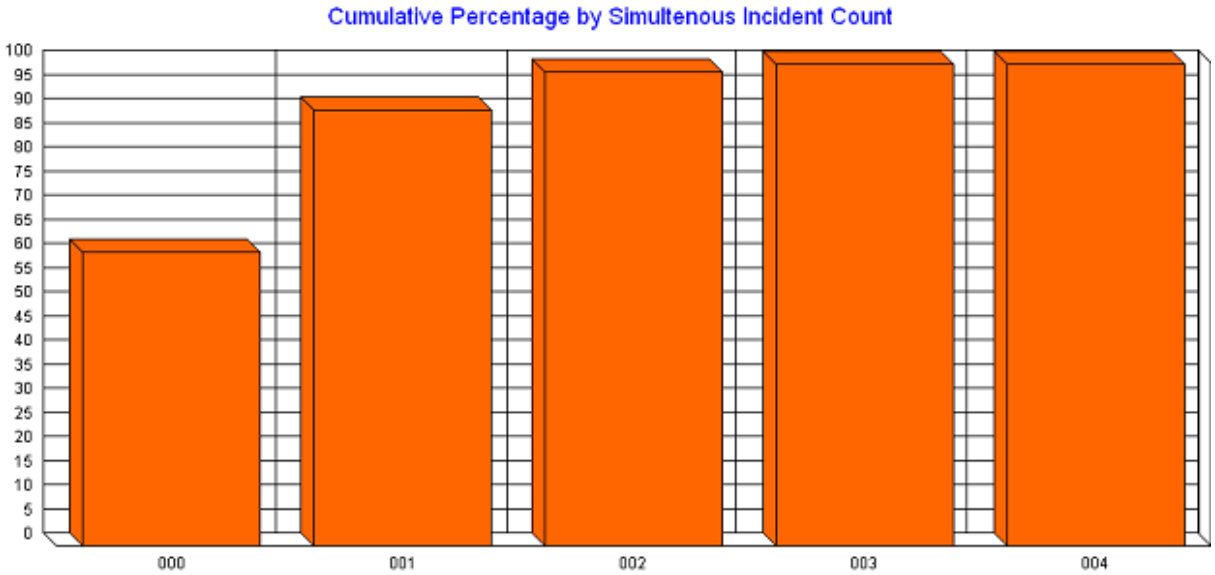
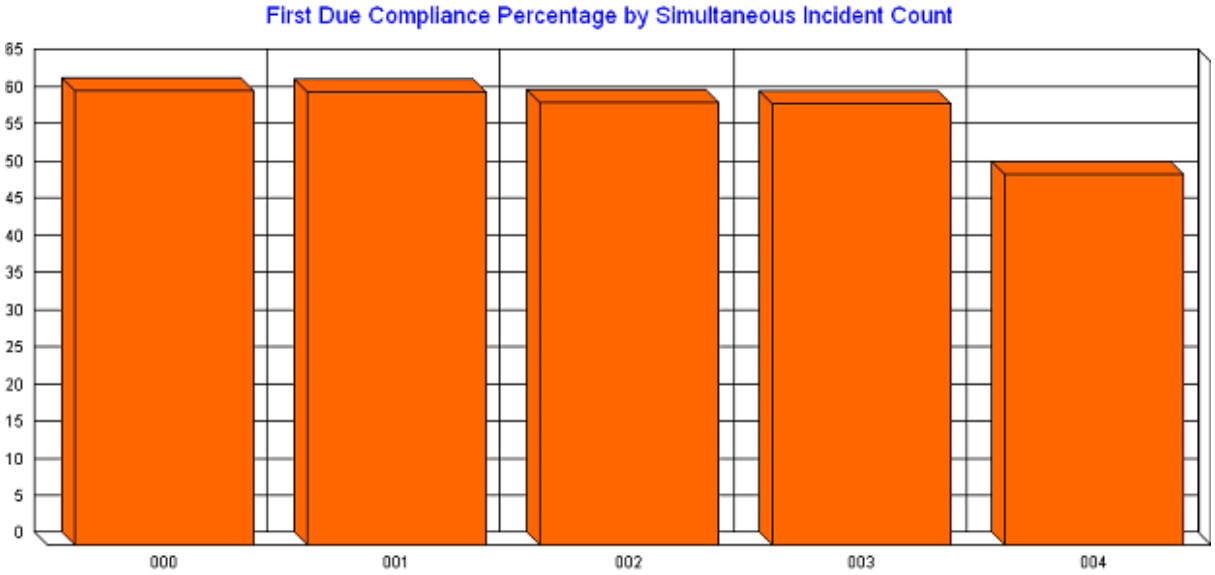


This chart shows how an increasing number of simultaneous incidents affects 6-minute response time compliance in the fire department. Notice zero, one, two and three simultaneous incidents are tolerated well. However, the burden of 4-simultaneous runs drags response time compliance down significantly.



10.2 Responders per Incident

Measuring the Number of Responders per Incident

The next area measures the number of firefighters responding to incidents. Here's a report in text format. Notice the number includes some "Cancelled in Route"

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incidents that technically had no responders arrive on the scene. These are listed in the "Responders per Incident: 000" category. The number of responders increments from there.

There are 2,763 Incident records being analyzed.

Responders per incident: 000
Incidents: 21
Percentage: .76%.
Culmulative percentage: .76%.
Median first due minutes: 5.17
First due compliance %: 61.90%
Structure Fires: .00%.
All Fires: 3 14.30%.
EMS Incidents: 13 61.90%.
Other Incidents: 5 23.80%.
Median Duration: 19.90

Responders per incident: 002
Incidents: 8
Percentage: .29%.
Culmulative percentage: 1.05%.
Median first due minutes: 4.95
First due compliance %: 75.00%
Structure Fires: .00%.
All Fires: .00%.
EMS Incidents: 6 75.00%.
Other Incidents: 2 25.00%.
Median Duration: 19.45

Responders per incident: 003
Incidents: 705
Percentage: 25.52%.
Culmulative percentage: 26.57%.
Median first due minutes: 5.72
First due compliance %: 55.04%
Structure Fires: 1 .10%.
All Fires: 18 2.60%.
EMS Incidents: 464 65.80%.
Other Incidents: 223 31.60%.
Median Duration: 22.50

Responders per incident: 004
Incidents: 1,543
Percentage: 55.85%.
Culmulative percentage: 82.41%.
Median first due minutes: 5.42

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First due compliance %: 62.41%
Structure Fires: 1 .10%.
All Fires: 34 2.20%.
EMS Incidents: 1,129 73.20%.
Other Incidents: 380 24.60%.
Median Duration: 20.47

Responders per incident: 005
Incidents: 25
Percentage: .90%.
Culmulative percentage: 83.32%.
Median first due minutes: 5.30
First due compliance %: 68.00%
Structure Fires: .00%.
All Fires: 1 4.00%.
EMS Incidents: 17 68.00%.
Other Incidents: 7 28.00%.
Median Duration: 19.72

Responders per incident: 006
Incidents: 35
Percentage: 1.27%.
Culmulative percentage: 84.58%.
Median first due minutes: 4.22
First due compliance %: 77.14%
Structure Fires: .00%.
All Fires: .00%.
EMS Incidents: 33 94.30%.
Other Incidents: 2 5.70%.
Median Duration: 20.77

[The text report continues as above for up to 26 fire fighters]

Here are two sample graphs that measures responses per incident.

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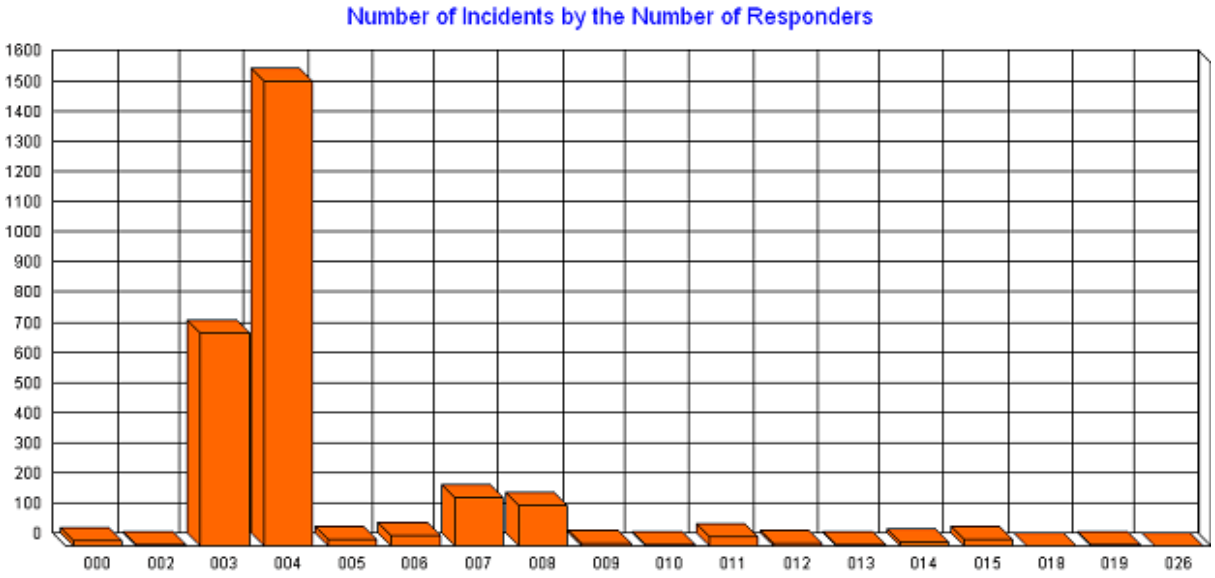
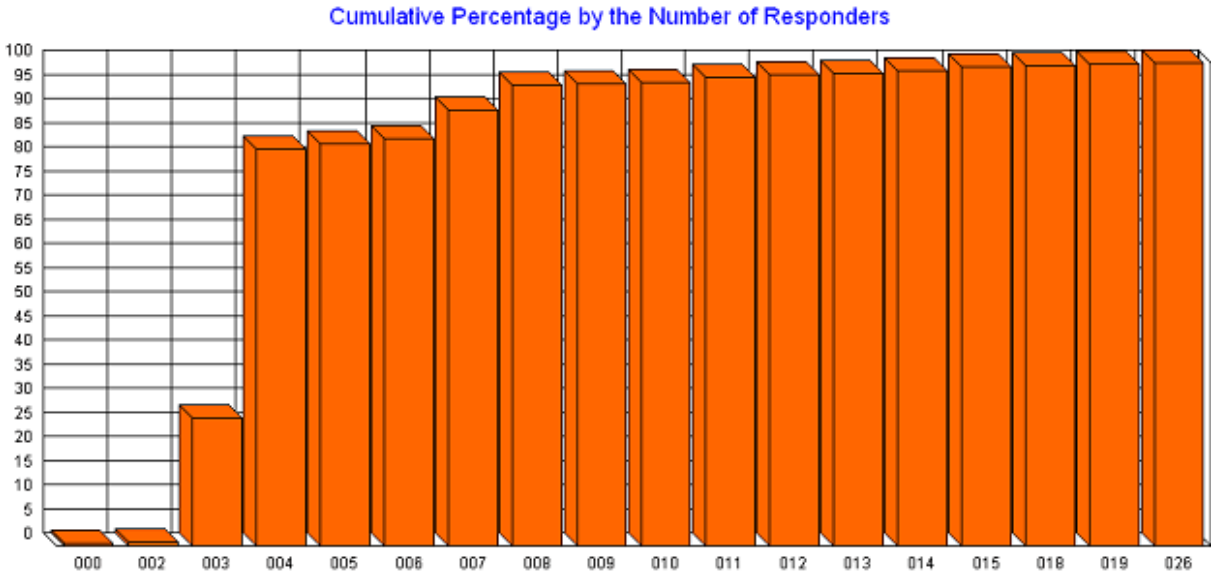


Notice there are 3 or 4 responders on most incidents. Slight rises in 7 and 8 responder incidents indicates single incidents where additional companies are added to the response.



The graph above is cumulative. Notice 90% of all incidents can be handled with 7 or fewer responders.

10.3 Total Responders

Measuring the Total Number of Responders

The next area measures the total number of firefighters responding to one or more incidents at any time. This measurement takes into account the increase in staffing

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requirements caused by simultaneous incidents.

Here's a report in text format. Notice the number includes some "Cancelled in Route" incidents that technically had no responders arrive on the scene. These "no responder" incidents are listed in the "Total Responders: 000" category. The number of responders required increments from there.

There are 2,763 Incident records being analyzed.

Total responders: 000
Incidents: 17
Percentage: .62%.
Culmulative percentage: .62%.
Median first due minutes: 5.33
First due compliance %: 58.82%
Structure Fires: .00%.
All Fires: 3 17.60%.
EMS Incidents: 10 58.80%.
Other Incidents: 4 23.50%.
Median Duration: 20.93

Total responders: 002
Incidents: 3
Percentage: .11%.
Culmulative percentage: .72%.
Median first due minutes: 4.07
First due compliance %: 33.33%
Structure Fires: .00%.
All Fires: .00%.
EMS Incidents: 1 33.30%.
Other Incidents: 2 66.70%.
Median Duration: 7.65

Total responders: 003
Incidents: 411
Percentage: 14.88%.
Culmulative percentage: 15.60%.
Median first due minutes: 5.63
First due compliance %: 56.93%
Structure Fires: 1 .20%.
All Fires: 13 3.20%.
EMS Incidents: 271 65.90%.
Other Incidents: 127 30.90%.
Median Duration: 22.37

Total responders: 004
Incidents: 983

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Percentage: 35.58%.
Culmulative percentage: 51.18%.
Median first due minutes: 5.40
First due compliance %: 62.36%
Structure Fires: 1 .10%.
All Fires: 16 1.60%.
EMS Incidents: 736 74.90%.
Other Incidents: 231 23.50%.
Median Duration: 20.27

Total responders: 005
Incidents: 14
Percentage: .51%.
Culmulative percentage: 51.68%.
Median first due minutes: 5.30
First due compliance %: 78.57%
Structure Fires: .00%.
All Fires: 1 7.10%.
EMS Incidents: 11 78.60%.
Other Incidents: 2 14.30%.
Median Duration: 26.52

Total responders: 006
Incidents: 92
Percentage: 3.33%.
Culmulative percentage: 55.01%.
Median first due minutes: 5.45
First due compliance %: 61.96%
Structure Fires: .00%.
All Fires: 2 2.20%.
EMS Incidents: 61 66.30%.
Other Incidents: 29 31.50%.
Median Duration: 22.17

Total responders: 007
Incidents: 286
Percentage: 10.35%.
Culmulative percentage: 65.36%.
Median first due minutes: 5.27
First due compliance %: 64.34%
Structure Fires: .00%.
All Fires: 7 2.40%.
EMS Incidents: 199 69.60%.
Other Incidents: 80 28.00%.
Median Duration: 20.35

[The text report continues as above for up to 63 fire fighters]

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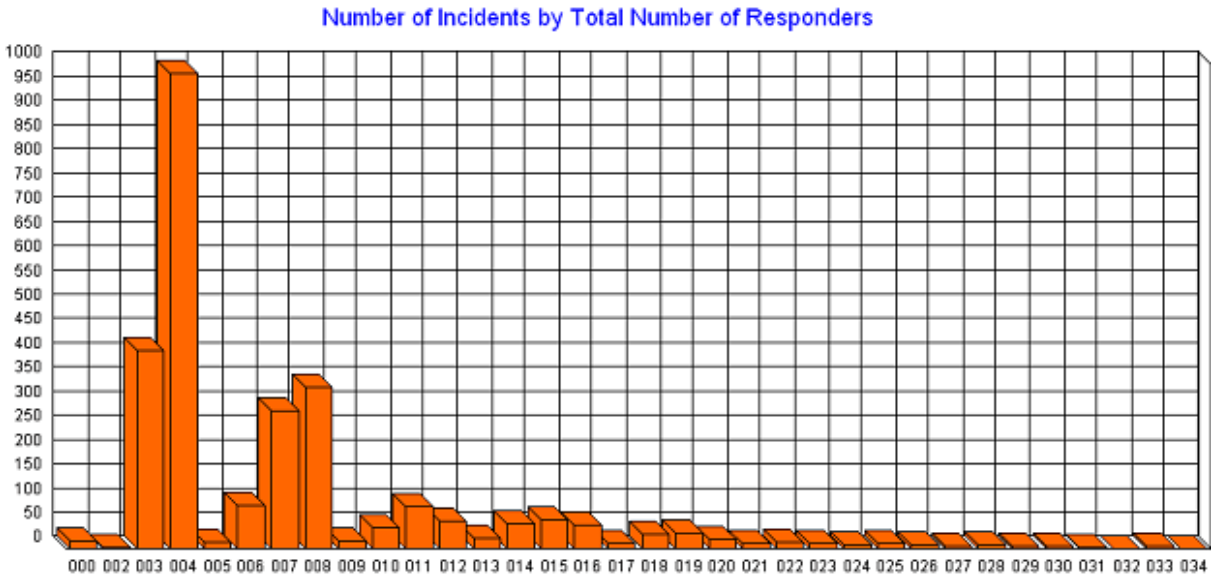
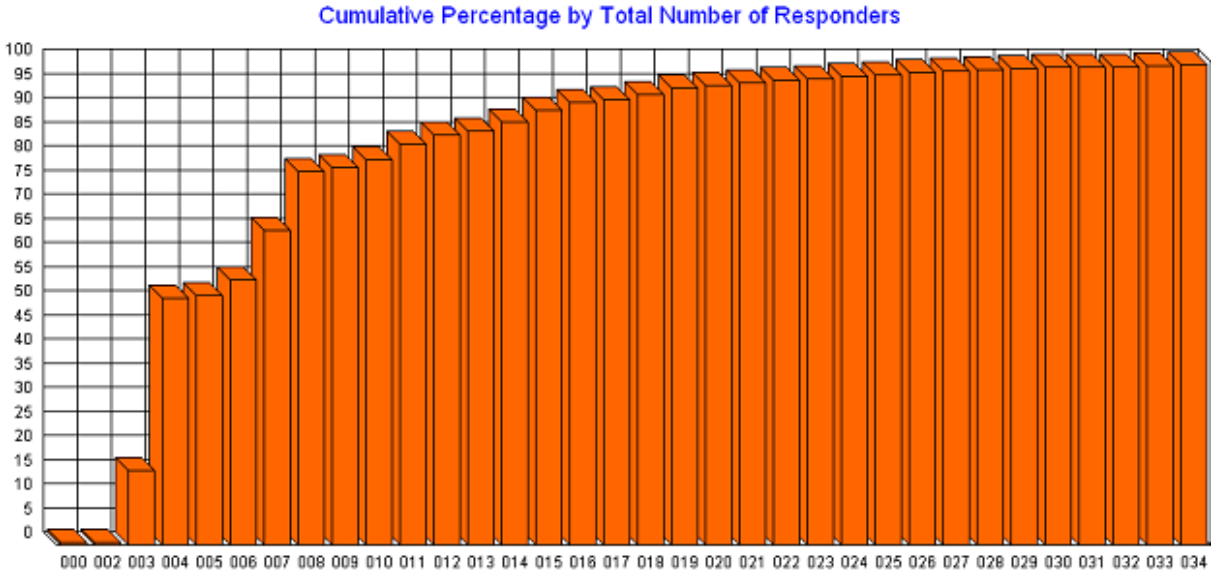
Here are two sample graphs that measures the total number of responders required when simultaneous incidents are included in the mix.



Again 3 or 4 responders are used often. Because of the affect of simultaneous incidents there is a rise in the times when 6, 7 and 8 total responders are required.



The graph above is cumulative. Notice 90% of all incidents, taking into account simultaneous incidents, can be handled with 15 or fewer responders. This dramatically illustrates the effect of simultaneous incidents on staffing. 90%

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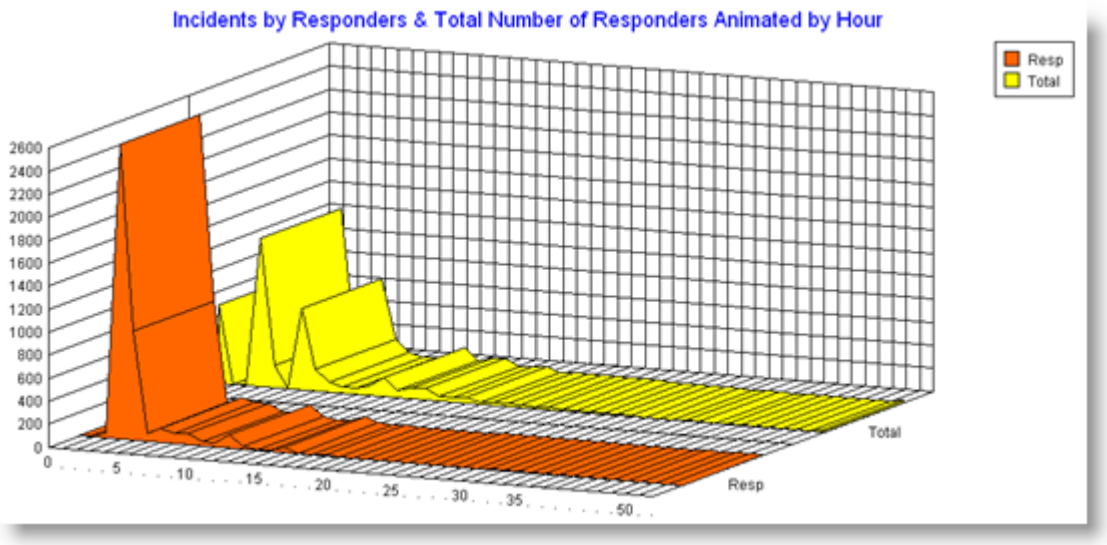
coverage was reached with 7 responders when staffing is calculated on a per incident basis only. Here, where overlapping or simultaneous incidents are considered, the requirement more than doubles to 15 responders needed to cover 90% of incident activity.

10.4 Comparative Staffing Graphs

Comparative Staffing Graphs Model Staffing Requirements

The comparative staffing graph assembles information on the number of responders required by incident as well as the total number of responders required given the fire department's pattern of simultaneous incidents. There are three comparative staffing graphs. Each is animated and each provides a visual representation of staffing requirements by hour of day, by day of week or by month.

Here's an example graph:



The red 3D area graph illustrates the number of incidents (vertical axis) by the number of people required to handle the incidents (horizontal axis). The red shows responder demand without any simultaneous incidents. The yellow illustrates total responder staffing requirements and includes the increased demands posed by simultaneous incidents. Any movement of the graph to the right and higher indicates increased responder demand.

These three animated graphs can be used to anticipate total staffing requirements over time. While staff analysis tells you when demand occurs, it only measures total staffing requirements. To find out where to deploy resources move to the next chapter, "Aid Analysis".

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11 10. Aid Analyzer

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While staffing analysis provides information about the total number of responders required for fire department staffing, it does not provide information about where staff should be deployed. Aid analysis begins by analyzing aid between jurisdictions then shifts to model the flow of fire department resources between stations.

* Department Aid

* Station-to-Station Aid

11.1 Department Aid

Balancing Aid Between Fire Departments

The aid analyzer begins by examining department aid statistics. Here's an example of the information generated in text form.

Department Aid Report

Total Incidents: 2,763
Incidents Involving Aid: 73 Percentage: 2.64%
Aid Incidents for Fires: 13 Percentage: 17.81%
Aid Incidents for EMS: 34 Percentage: 46.58%
Aid Incidents for Others: 26 Percentage: 35.62%
Incidents Involving Aid Received: 34 Percentage: 46.58%.
Incidents Involving Requested Aid Received: 6 Percentage: 8.22%
Incidents Involving Automatic Aid Received: 28 Percentage: 38.36%
Incidents Involving Aid Given: 39 Percentage: 53.42%.
Incidents Involving Requested Aid Given: 20 Percentage: 27.40%
Incidents Involving Automatic Aid Given: 19 Percentage: 26.03%
Incidents Involving Other Types of Aid Given: Percentage: .00%

Here's information displayed by type in graph form:

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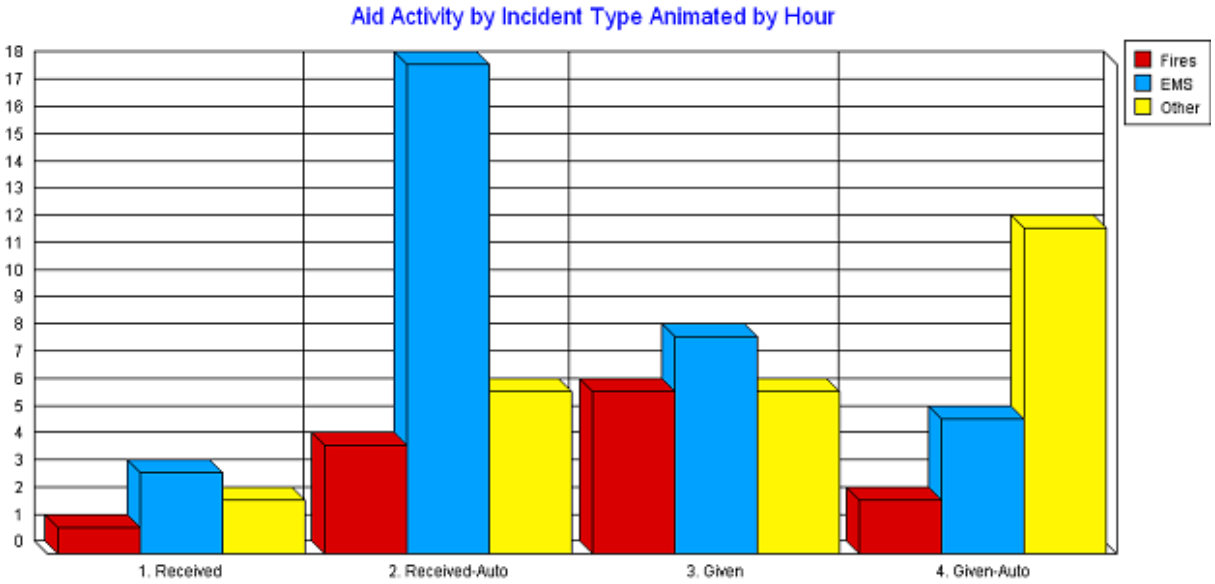

Notice the department receives most aid for EMS responses. Perhaps EMS resources are too low. This area should be highlighted for more analysis.

Notice the aid graph above is animated by hour of day. You can continue your investigation to see what time of day additional EMS resources are required from outside jurisdictions. Other animated graphs include by day of week and by month.

11.2 Station-to-Station Aid

Modeling the Movement of Station-to-Station Aid

The aid analyzer now illustrates the flow of resources between fire stations within a jurisdiction. Here's a sample of this analysis in text form:

Station S01
Apparatus responses to other station areas: 1,264
Responses given for Fires: 49 Percentage: 3.88%
Responses given for EMS: 1,112 Percentage: 87.97%
Responses given for Other: 103 Percentage: 8.15%
Apparatus responses from other station areas: 89
Responses received for Fires: Percentage: .00%
Responses received for EMS: 73 Percentage: 82.02%
Responses received for Other: 16 Percentage: 17.98%

Station S02
Apparatus responses to other station areas: 59
Responses given for Fires: 8 Percentage: 13.56%
Responses given for EMS: 32 Percentage: 54.24%
Responses given for Other: 19 Percentage: 32.20%
Apparatus responses from other station areas: 433

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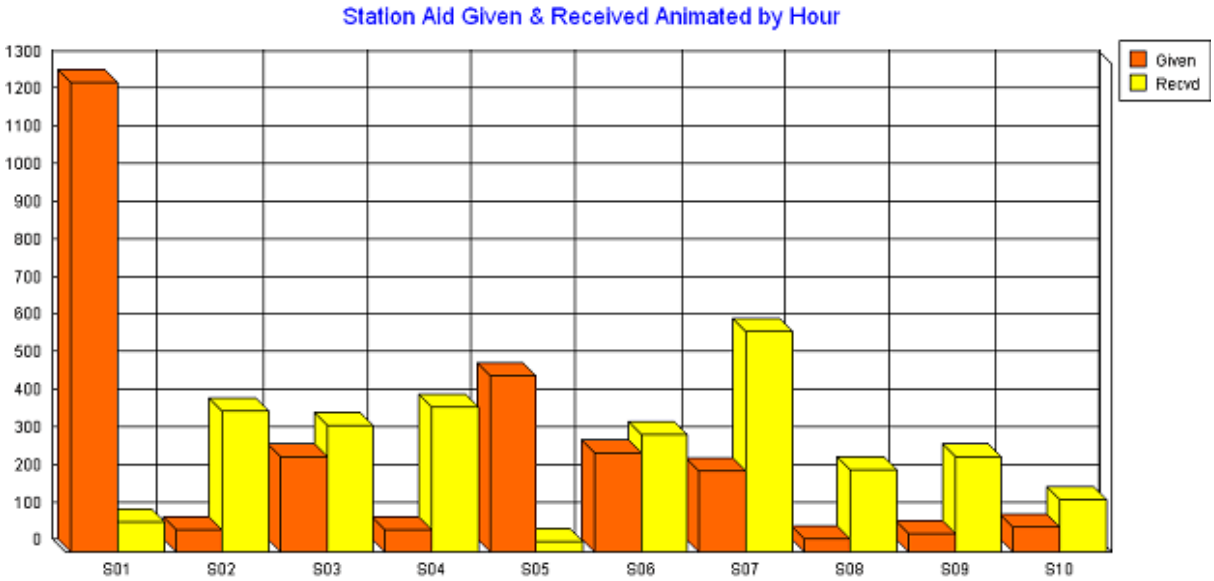
Responses received for Fires: 58 Percentage: 13.39%
Responses received for EMS: 306 Percentage: 70.67%
Responses received for Other: 69 Percentage: 15.94%

Station S03
Apparatus responses to other station areas: 259
Responses given for Fires: 20 Percentage: 7.72%
Responses given for EMS: 179 Percentage: 69.11%
Responses given for Other: 60 Percentage: 23.17%
Apparatus responses from other station areas: 375
Responses received for Fires: 37 Percentage: 9.87%
Responses received for EMS: 275 Percentage: 73.33%
Responses received for Other: 63 Percentage: 16.80%

[The text report continues for 10 fire stations]

Here's a 2D bar graph that illustrates station-to-station aid activity. Note, only responses that cross station boundaries are calculated in this graph.



This chart is animated so you can easily follow station movements by hour of day. Other similar charts are animated by day of week and by month.

Notice how Station 1 supplies more resources than it receives. Station 7 receives more resources than it provides. Monitoring the shifts in resources over time will help you deploy resources effectively.

Aid statistics can be copied directly into Excel for display purposes:

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Station	Respon	Given Fire	Given EMS	Given Other	Recv'd	Recv'd Fire:	Recv'd EMS	Recv'd Other
S01	1,264	49	1,112	103	89		73	16
S02	59	8	32	19	433	58	306	69
S03	259	20	179	60	375	37	275	63
S04	64	13	36	15	416	41	337	38
S05	472	19	430	23	32	6	24	2
S06	281	22	232	27	359	48	267	44
S07	218	26	162	30	619	49	528	42
S08	36	10	21	5	264	10	226	28
S09	55	15	21	19	280	41	218	21
S10	70	24	34	12	160	10	91	59

Aid analysis provide a solid historical model for resource deployment.

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12 11. GIS Analyzer

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NFIRS 5 Alive does not provide a native mapping capability, but it is designed to create files that display locations on maps provided over the Internet and by desktop GIS applications like Microsoft MapPoint and Streets & Trips.

* Geocoding Records

* Dynamically Defined Districts

* GIS KML Export Files

* Creating Address Files

* Displaying Addresses on a Map

12.1 Geocoding Records

The GIS Analyzer connects you to GIS resources available on the Internet. The analyzer begins with geocoding addresses. If your fire department geocodes incidents in CAD data you can simply import those geocodes and skip this step. Otherwise, the GIS Analyzer will connect you to a variety of web-based geocoding services that will assign a geocode to the addresses in the Incidents, Apparatus and

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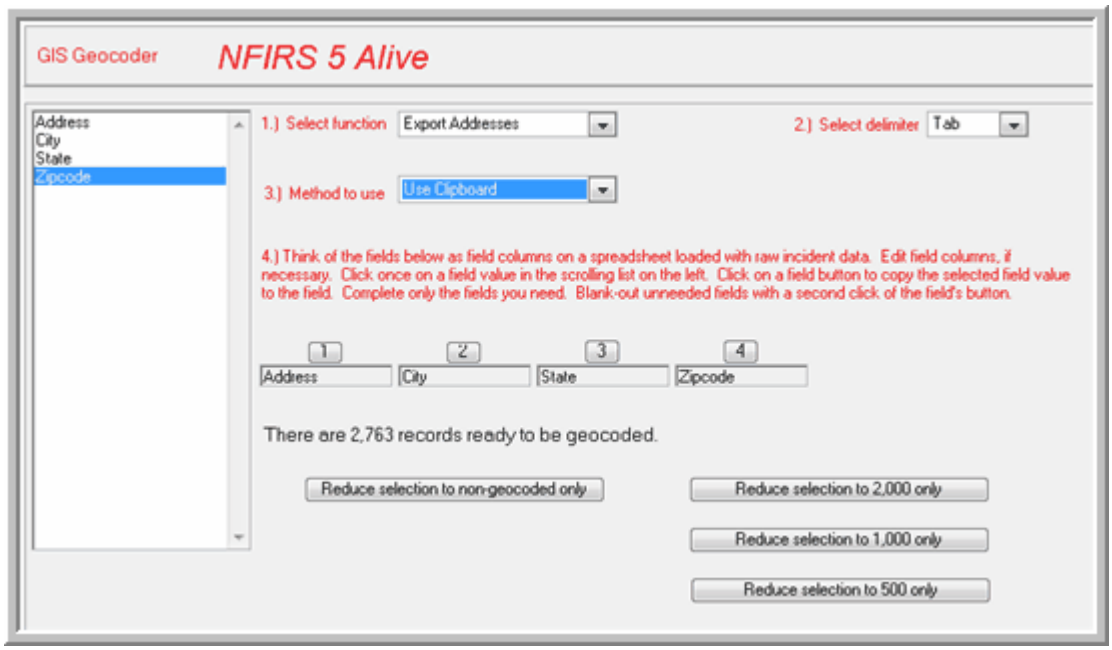
Risks modules.



In practice, it seems only about 50% of fire department responses are to unique addresses. So if you have 10,000 incidents only about 5,000 geocodes will be necessary to geocode a solid majority of your addresses.

12.2 Dynamically Defined Districts

After addresses are geocoded the GIS Analyzer can be used to set-up a grid of Dynamically Defined Districts (D3 districts). This system will track performance in "nodes" giving you a complete picture of performance broken down into hundreds of D3 districts.

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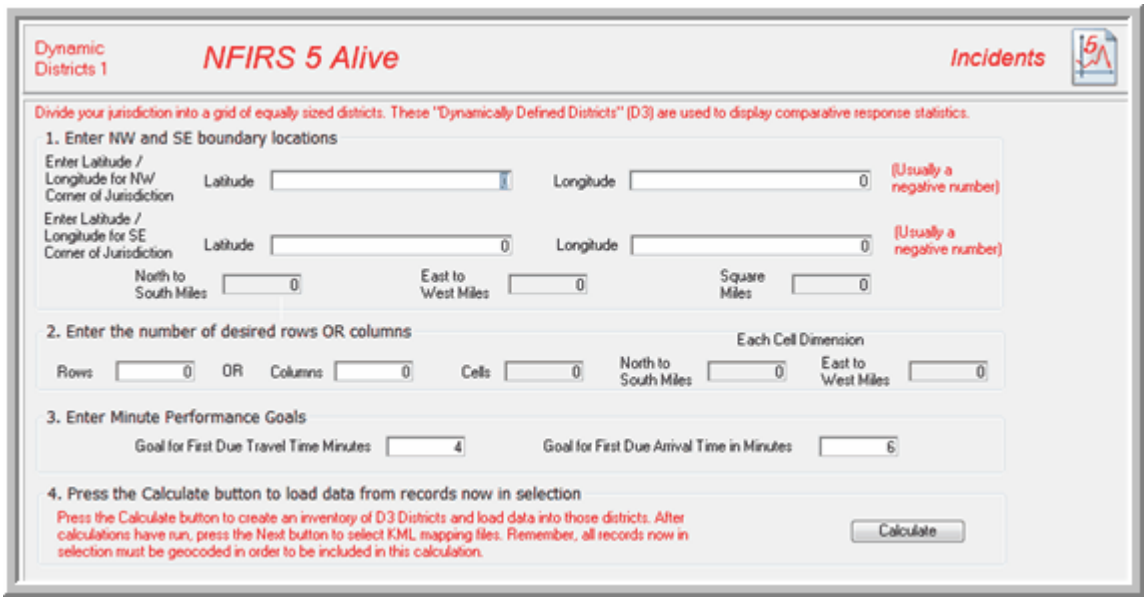

If you enter lats / longs for the most NW point in your jurisdiction and the most SE point in your jurisdiction. ***NFIRS 5 Alive*** will create a grid of cells (any density you wish) over your jurisdiction. Each of these cells is a "Dynamically Defined District" or D3 District.

D3 Districts can lay flat over a map of your jurisdiction or they can be made into a 3D rectangle where the height of the rectangle indicates the relative number of incidents in district and the color indicates the performance being measured.

12.3 GIS KML Export Files

Once the geocodes and D3 districts are established the GIS Analyzer will organize your data into KML exports. These geographic exports are read by a web-based GIS application that plots your incidents on their maps. The results are not just points on a map, but a powerful animated display of your performance in a very detailed GIS browser.

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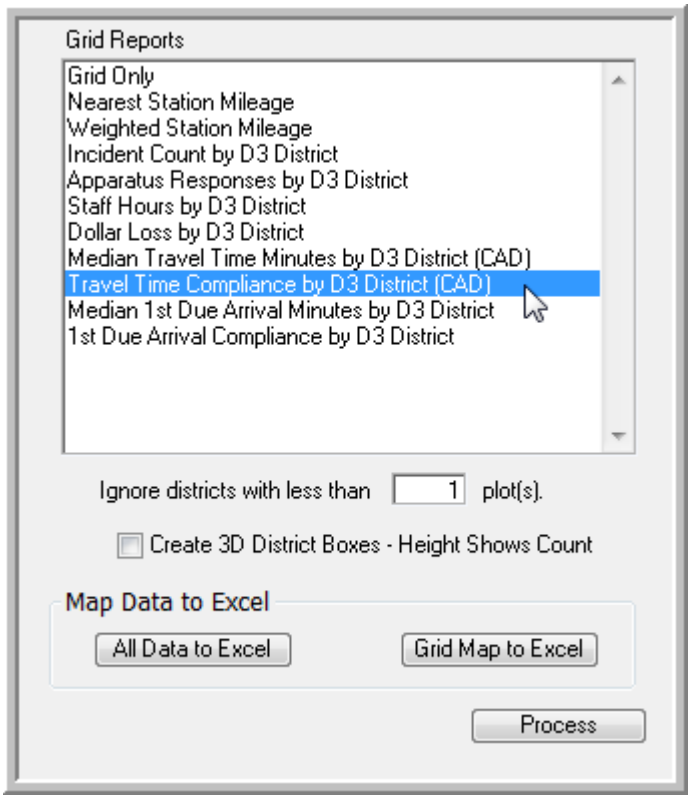

NFIRS 5 Alive tracks response statistics for each D3 District and creates the following map reports:

- Grid over the area showing only D3 Districts with a pre-set minimum number of incidents
- Colored D3 Districts showing distance from nearest fire station to the center of each D3 District.
- "Weighted" distance from the nearest 3 fire stations to the center of each D3 District.
- Incident Count by D3 District color-coded by number of incidents
- Apparatus Responses by D3 District color-coded by number of responses
- Staff Hours by color-coded D3 District
- Dollar Loss by color-coded D3 District color coded by dollar loss
- Median Travel Time Compliance by D3 District color-coded by compliance percentage

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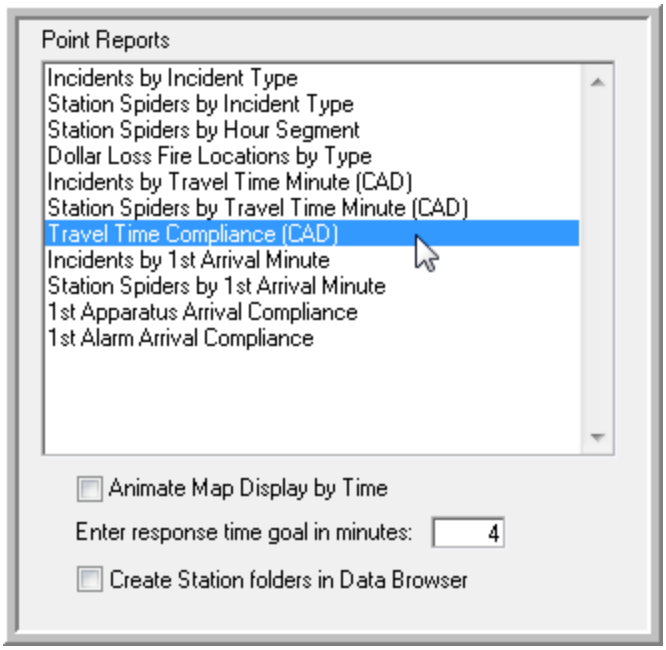
- Median 1st Arriving Apparatus Response Time by D3 District color-coded by response time
- First Due Apparatus Compliance by D3 District by compliance percentage



Mapping Icons

In addition to D3 Districts *NFIRS 5 Alive* compiles KML files that locates incidents by type. Examples of KML reports that place icons on incident locations include:

- Incidents color-coded by incident type
- Incidents color-coded by dollar loss
- Incidents color-coded by travel time minute
- Incidents color-coded by travel time compliance
- Incidents color-coded by first arrival minute
- Incidents color coded by first arrival compliance
- Incidents by arrival of full-first arrival assignment compliance

Spiders

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"Spiders" are lines draw from the originating station to the incident location. Spider lines may be color-coded by incident type, duration of response or compliance percentage.

12.4 Creating Address Files

Create Address Files with a Couple of Clicks

If you want to skip geocoding you can get NFIRS 5 Alive records to display on a map. ***NFIRS 5 Alive*** will create address files broken-down by any criteria you select. When processed, address files are placed in a dedicated "Maps" folder.

Here's the Mapping Analysis layout where you select the address files you wish to create.

Here are the files broken down by type as they appear in the Map folder.

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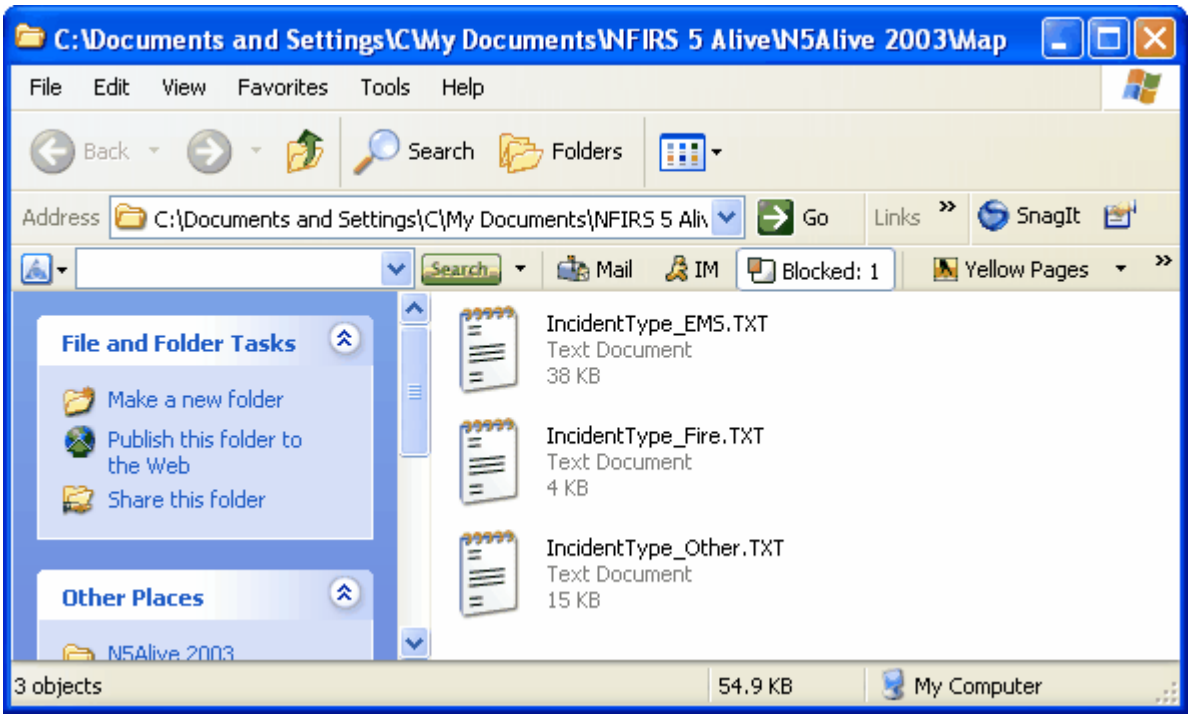

12.5 Displaying Addresses on a Map

How to Display Addresses on a Map

Most GIS systems operate the same way. Here's the process for Microsoft's Streets & Trips.

1. Select Import Data Wizard from the Data menu.
2. Assign a pushpin color to each address file.
3. View your map.

Remember, you can zoom-in for a close-up image of your incidents.

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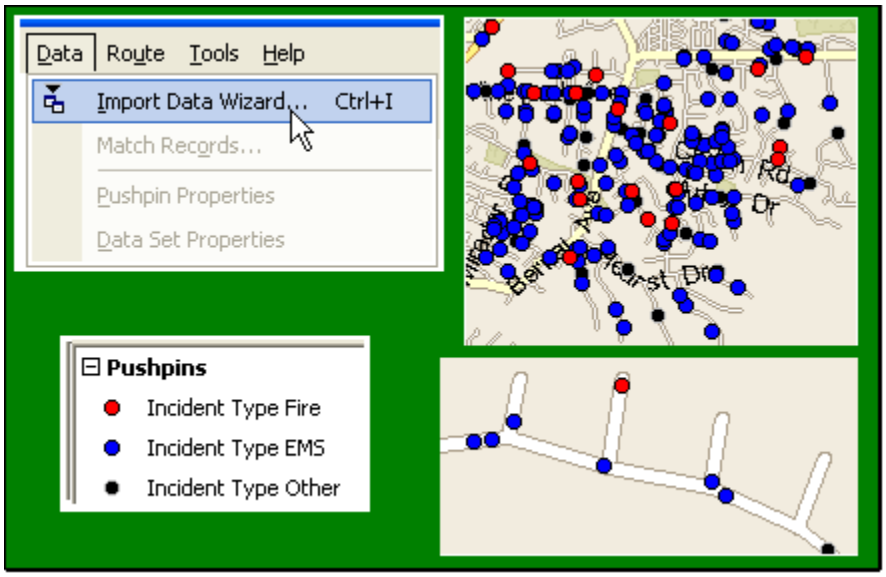

Here Microsoft's inexpensive "Streets & Trips 2005" software provides "pushpin" analysis of response activity. NFIRS 5 Alive assembles map files based on call type, response time, travel time, hour of day or other user selected criteria. Once file data is imported the user simply selects an appropriate 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.

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13 12. Performance Monitoring

12

Performance monitoring requires more than simply running periodical reports. ***NFIRS 5 Alive*** provides an inventory of monitoring tools to help you locate problem areas and use web technology to post performance results.

* Locating Problem Areas

* Posting Fire Stats on the Web

13.1 Locating Problem Areas

Batch Processing Helps to Locate Problem Areas

Traditional "RMS reports" operate individually and print reports to paper. ***NFIRS 5 Alive*** takes a different approach. ***NFIRS 5 Alive*** allows you to select any number of "classical" reports from an inventory of more than 7,200 report formats. All selected reports processed in batch mode and presented sequentially on screen for rapid scanning.

Contemporay reports may be executed from processes that automatically produce dozens of related reports in seconds. Again, all reports are sent to the Presentations module for sequential scanning.

Any report may be deleted, printed, copied into a word processing document, or converted into a web page. Numeric reports may be exported directly in an Excel spreadsheet.

Using Animation to Spot Trends

Hundreds of ***NFIRS 5 Alive*** reports are animated. This allows the user to see a visual representation of trends by hour of day, day of week and by month. Animation is a big help when it comes to identifying problem areas.

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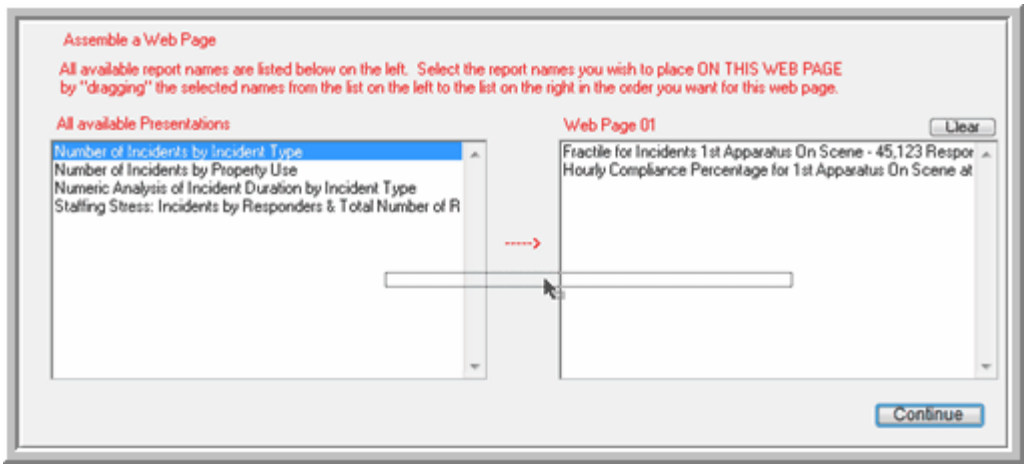
13.2 Posting Fire Stats on the Web

Posting Fire Stats to the Intranet and the Internet

Web browsers have the ability to point to files on the Internet as well as files saved anywhere on your fire department's local area network (LAN). Many fire departments use LAN based web sites to post internal information that's not intended for public distribution. LAN-based web sites are called "Intranet" sites.

NFIRS 5 Alive has the ability to create HTML web pages for both Intranet and Internet web sites. In fact, it will create, maintain and update multiple intranet web sites without the use of any addtional software.

Here's how easy it is to convert presentations to web pages. First, select the Presentations you wish to convert into web pages. Hold down the "Ctrl" key to select as many Presentations as you wish.



A dialog will appear. You can create as many web pages for your intranet site as you wish. Simply drag the Presentation titles from the list of the selected presentations on the left into the list of presentations to put on each web page on the right.

Fire department members can add the fire department "Stats" page to their browser "Favorites". This allows instant distribution of the latest stats without printing a single sheet of paper.

More information about ***NFIRS 5 Alive*** is available from:

www.nfirs5.com

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