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Too Little or Too Much

How do you know if you got the right amount when adding an ingredient to the soup? Well you might ask the question, right amount of what? Imagine that you are going to cook something on your stove tonight and you have to add seasoning. How much seasoning do you have to add to get just that right taste? What happens if you put in too little? What happens if you put in too much?

At the level of discussing your culinary skills, that doesn't mean much – It's a matter of taste. But when it comes to talking about how much your community needs fire protection, a whole bunch of other questions begin to bubble to the surface that not only have significance, they are at the center of many of our discussions today about public fire protection policy. What is the minimum size of a fire department and is it possible to become too large of as an organization and not be effective in delivering services? - or does a fire department ever reach the point where it is so expensive that it can no longer be sustained over a lengthy period of time and there has to be significant cuts?

This is not an idle discussion. To the contrary it is one that is playing itself out in city council and fire district board meetings all around this country. The first thing that we should establish is the fact that there is a correlation between a couple of factors in our communities with regard to what kind of fire protection you are going to be able to provide. The two variables that we need to talk about at the very outset of this discussion are people and property.

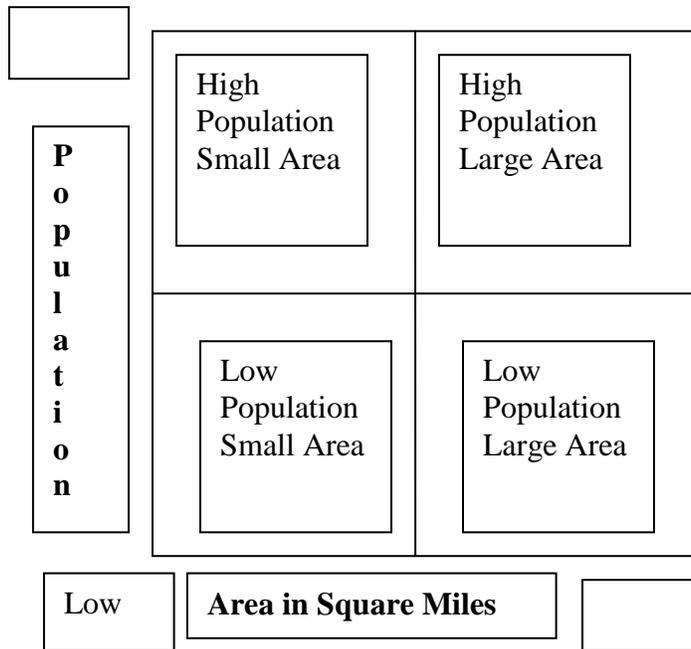
I know it is an old joke – but how many people have heard the cliché that there are three main causes of fire, men, women and children? Well, the reality is that if the demand for fire protection services is almost always a function of population, unless you are strictly protecting a wild land environment. Property on the other hand really boils down to two things, distance and access.

Now let's take those two variables and plop them on the old four-quadrant box that we have been using for years in risk assessment.



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Our box would look something like this. Low to high population, and then small to large areas. What you end up with is four boxes. The boxes on the lower left are low population and small areas. The upper left hand side of the box is high populations and small areas. The one to the lower right would be classified, as low population; large areas and the one to the upper right are large populations and large areas.

In the case of this model we might consider that the lines that divide this box up into four separate quadrants represents thresholds in which a person stops being one of those and turns into another. For example, if you have a fire department that has a low population in a limited area it has the possibility of migrating in either direction. You can either get more people in it or it can become a larger area.

There has been a lot of discussion about how can we best approach setting some scientific parameters for what these four different scenarios represent. Yet in the development of those scenarios none of those factors are actually talked about.

To be specific to what I am referring to is the fact that a house is a house, is a house. If you have a home sitting in a remote area of Montana it is still a single family dwelling and if that same house were plopped down in the center of Los Angeles California it would still be the same house. What is different about both of those scenarios is the fact that the amount of money that is available to provide a level of service to that house varies drastically depending upon the funding mechanisms that are in place.

In conducting numerous discussions about these phenomena it has been noted that those areas that



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essentially have a very low population distributed in a very wide-open area tend to have a classification of either a rural or frontier type atmosphere.

That was pretty obvious. One can get in a small airplane and fly over many parts of this country especially at night and see just a spot of light from time to time, several miles apart. The realization there is that nobody is going to be able to respond in a timely fashion to any request for a fire regardless of what the flashover curve looks like inside that building.

And of course, there is that scenario in which you have a lot of people crammed into a very small area. While it is tempting for us to think of that in terms of our own scenarios here in the United States, one of my initial observations of this phenomenon was in Hong Kong in the 1980's. They have taken the word density and turned it into a whole new definition. And, there is even some precedent of this out of the history books. If you have ever studied the Great Fire of Rome in 66AD it was really a situation of over population and high-density substandard construction that resulted in the devastation of that community.

These areas tend to be classified as our urban service level.

One area that is not talked about nearly as much as it could be is the one in the lower left hand corner. And that is a small number of people in a very small area. I have coined the term for this; "enclave" fire protection. It is a classic example of crossroads of America fire protection. It is where there is a small community that has developed a small population base and may or may not even have any form of governance whatsoever. In other articles I have even alluded to the fact that this is the origin of most of the volunteer fire service in this country. There is absolutely no requirement in most of the land use policies of rural America that says you have got to put a fire station and then build a town around it. It starts out just the opposite. People start building property and nobody cares about fire protection until some event occurs that spawns a reaction.

In developing this model and trying to put some degree of logic behind everything, I have examined the physical attributes of literally hundreds of fire departments. Having studied some 500 of them in the process of about the last twenty years I have noted that there are some dimensions of fire departments that tend to reproduce themselves over and over again. While I am not willing to submit that they are benchmarks for fire protection, I will say that they are very definitely the leading indicators of why fire departments are the way that they are and that pushing them in a direction of developing effective performance almost always requires that these attributes all line up along the way.

First off we can start off with a very simple premise. How far can a fire truck go if you send a fire truck somewhere? The answer, it will go as far as it possibly can as long as it has a road to operate on and that you tell it when to stop. Utilizing a fire station as a center of this discussion it is easy to see that as a



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road network in a community starts to reach out from the location of a fire station that there is a very definite perimeter for how far that fire truck can respond and still get there in a reasonable timeframe. That is part of the science of us understanding the concept of distribution coverage with departments. What does that mean in the real world? Well, it is almost impossible for you to have a fire station that covers more than about 9 to 10 square miles and still be able to get there within the time constraints that many of us think are appropriate for structural fire response. Therefore, if you have got a fire station that protects more than ten square miles there are going to be lengthy response times.

And if we move to another attribute – financial stability it is also a fact that fire departments are not free. They cost money. That is true even of a volunteer fire department. There is no fire department that I know of that has lived entirely off the idea of still providing bucket brigades from the 1600's. In order to purchase a piece of fire equipment whether it is used or new, someone has to raise the funds. Volunteers while they may or may not be compensated for their time still have to be protected with liability insurance and workers compensation. Full time paid firefighters working in a fire station have a cost factor that is reasonably predictable and directly linked to policy decisions to add more or less people on individual engine companies.

Where this leads us is the idea that there is a minimum amount of money it takes to operate a volunteer fire company and a minimum of money it takes to operate a full time fire company. Somewhere in between those two are combination fire companies that somehow or other emerge from one and eventually disappear into the other. In other writings I have discussed the fact that most volunteer fire departments will remain volunteer as long as the workload on the volunteers is reasonably within the lifestyle of those volunteers. The minute you start asking them to go to more and more calls with less and less time to do their regular occupation they begin to erode and disappear.

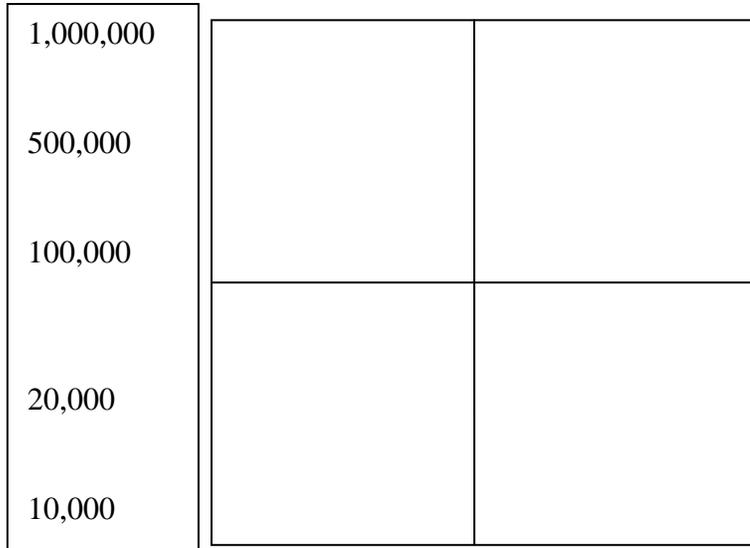
That leads us to another conclusion and that is that almost all communities that have less than 10,000 people in them, regardless of the size of the community, rely predominately on volunteer or combination firefighting forces. Communities that are in excess of 20,000 population can almost unbearably be counted on to not be able to sustain a volunteer fire force for a lengthy period of time without strong management and leadership from the top.

Utilizing this as a queue to how to make our boxes work, I have now established on the left hand side of this box a set of indices. They go from zero to 10,000, 10,000 to 20,000, 20,000 to 100,000, 100,000 to 500,000, and 500,000 to 1,000,000 +. That represents the population that can or will be protected by a fire station.



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10 ---20---40---60---80---100---Infinity

Utilizing this same logic we have now indexed the bottom of our chart on the left hand side starting with 10 square miles per station and moving across to 20, 40, 60, 80 and 100 square miles protected by a fire station.

Any fire department in the country can now be plotted within the confines of this model and you can see where you are in terms of what is your potential service level that is almost impossible to ignore.

The way to use this model is simply to take two parameters. Take your population and your area and plot them on this diagram and see where you fall.

If all 33,000 fire departments existed in the United States were plotted on this graph we would soon be able to ascertain that there are dots all over the place. This is not to imply that if you found yourself in one of these four quadrants that that is the level of service that you want – because there is another variable that we have to take into consideration and that is value to be protected.

As we mentioned earlier, people are the causes of demand for service but property is what is at risk. Therefore, assessed valuation of a community is very often an indication of the ability of the community to protect itself. This translates into the idea that those communities that have an adequate tax base can afford a level of protection that may place them in one of the other quadrants. This is sort of like a booster rocket approach. Even if you are fairly small and have a very low population and you happen to

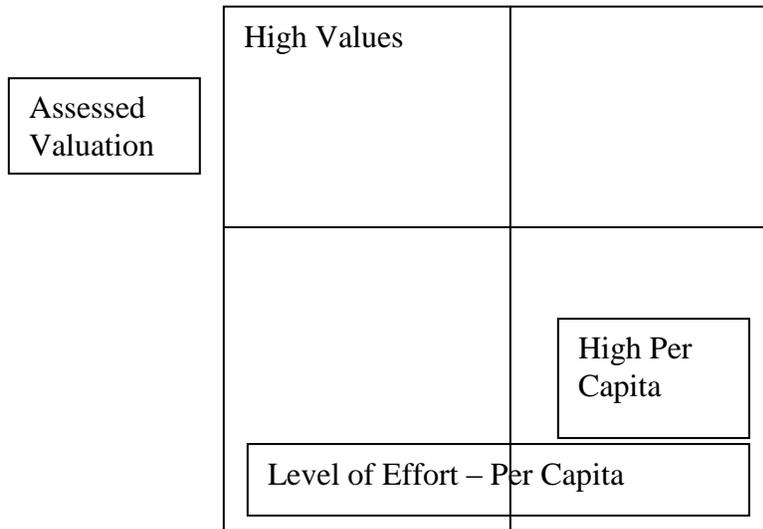


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live in a wealthy community you may be able to afford something that someone down the street with exactly the same population and square mileage cannot afford.

This may get a little tricky but what I am suggesting is that we now turn our four-box model into a three-dimensional model by adding two more attributes. On the left hand side we will place the attribute of assessed valuation and the lower access we will now place the attribute of level of effort.



Assessed valuation is a number that is easily derived from assessor parcel information. Level of effort is easily derived from looking at the amount of money that a community is willing to spend on its fire department on a per capita basis. Per capita is a reflection of the population divided into the budget that has been adopted.

Let us say for example that the assessed valuation is 10 million dollars. And, let us say that in one community the locals choose to make sure that ten dollars of their tax money is going into fire protection and another community that has the same assessed valuation puts one hundred dollars into it. You have two different levels of service.

In order to create a multi-dimensional variability on this chart we have taken the left hand side and classified the assessed valuation by starting with one million dollars for AV and then doubling it for each increment on the left hand axis, i.e., 1 million 2, 4, 6, 8, 10, 20, 40, 60, 80 and 100 +. The lower axis on per capita we start with 1.00 and double it on that axis. It would be 1, 2, 4, 6, 8, 10, 20, 40, 60, 80, 100 and 200.

Now if we went back and plotted our same number of fire departments that we have per area and population and added the dimension of AV and level of effort you will see a stratification of fire services



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that reflects the real world.

While I have alluded to the fact that this is a model, in fact it is really not as much a model as it is an expression of reality. Now comes the really tricky part. As we started this article off, we talked about too much or too little. Now we get into the question of public policy and the decisions that are made by those people who are elected to serve the interests of those being protected. In its most simplistic way the model works this way. If you have a lot to protect and you are not willing to invest in fire protection, you might as well expect to lose some of it. If you are trying to protect everything and you can't afford it, you might as well expect to have system failure. The balance point is somewhere in between those two. In spite of the fact that people have been writing about the fire protection vocation for some three hundred years now, I have yet to run across anyone who has actually come up with a real strong rule of thumb about how much is too much and how little is too little. However, I have been able to witness out in the communities that those departments that are adequately funded are adequately linked to the communities value and quality of life look, feel and behave entirely different than those that are underfunded and adequately supported and actually do not contribute to the quality of life in any way whatsoever.

From a pragmatic point of view my belief is that most fire departments start off at one point on this chart and start moving in a specific direction because of the influences of the community. For example, you might start off with a low population in a very small area but all of a sudden your AV starts to increase and your per capita cost start going up and that takes you off in a different tangent. This is nothing more than the incremental decision making process that could and should be part of land use planning. Unfortunately many fire departments and the land use planners might as well be living on different planets rather than operating under the roof with the same jurisdiction.

This kind of approach to modern fire protection should be used to develop at least two baselines and benchmarks. The first of these is the idea that you need to collect developmental fees on increases in population and increases in area being protected for the very simple reason that fire trucks and firehouses don't grow on trees. They have to be bought with money that is derived by those who are benefiting from that growth. Secondly, the ability to sustain a staffing level has to be planned and visualized over a period much longer than the annual budget. Long range planning in the fire service is not a widely accepted concept yet it is essential to the success of any fire department that expects to remain viable as all of these other factors continue to occur.

In closing this article this article I would suggest that you might want to take a little time and just fill out this simple questionnaire:

- A. How much area do you protect?
- B. What is your population?



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- C. What is your assessed valuation?
 - D. What is your per capita fire effort today?

Just knowing the answer to those four questions should provide you with some insight as to where you might find yourself in the overall array of fire protection. If you are on the low end of the population area and you have adequate funding to do your job consider yourself to be one of the lucky. If you find that you are one of those that have a whole heck of a lot of responsibility and you are barely able to make ends meet, you have my sympathy. In both cases the resolution of this particular issue resides in the hands of those who accept or reject our arguments for modern fire protection. Welcome to the real world of political advocacy.