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## Tongue Twister

How many of you have heard of the tongue twister that starts of “how much wood could a wood chuck chuck”. If you are familiar with that one you would probably finish the sentence with “if a wood chuck could chuck wood”. Tongue twisters of this sort are designed to test a person’s ability to get around the unique combination of letter and sounds so that as you repeat it rapidly it often begins to sound garbled.

Personally I haven’t heard any new tongue twisters being advocated – so I thought I would throw one on the table for discussion. It starts off like this “how much fire, can a firefighter fight?” Go ahead finish it for me – if a “firefighter could fight fire”. Well, that may not be as much as a tongue twister as the old woodchuck rhyme, but the fact is that it points out an interesting dilemma that we have in the fire service.

And that is that there is an ongoing debate about just exactly how many people it takes to put out a fire. This leads to another round of verbal jokes that fall into the category of “how many blank, blank does it take to screw into a light bulb?” You can quite possibly come up with your own version of how to fill in those blanks because everybody has their own version of that joke. But firefighting is not a joke. It is a lethal business that has consequences of both success and failure in a very, very short period of time. Contemporary wisdom is to focus a great deal of time and emphasis on response time as an indicator of how much firefighters are capable of dealing with. However that misses one of the major points of the discussion and that is that once firefighters are on the fire ground they have to perform for the fire – or other emergency – will continue to escalate.

In the emerging field of Standards of Response Cover this particular component of time is often referred to as “set up time”. It is the period of time that starts when the wheels stop in front of an emergency and ends when the fire officer in charge declares that the emergency is under control and that further threat to life and property has seized. It is every bit as important as response time. And there is a methodology to evaluate this period of time.

In literature on Standards of Cover you will hear a term called critical tasking. If you have been an instructor for any period of time in your fire service career you will probably recognize the fact that critical tasking looks an awful lot like a job analysis. In fact, there are many corollaries. The significant difference is that job analysis used to break down a job so that you can learn the various components in order to be able to do it in a training environment. Critical tasking is using that same job analysis to begin to predict the performance of an individual – or a group of individuals – when they arrive at the scene of a specific type of emergency.



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Those fire departments that are taking the issue of Standards of Response Cover seriously are also focusing on critical tasking as a key element of determining what their response performance is going to be. This is a field of endeavor that we in the fire community should be spending a great deal more time on. The reason is that critical tasking is the Petri dish of performance. This is where an organization can determine what its likely capacity to do the job is determined.

To think of distinction, we need to know that critical tasking is not the same as a training evolution. When we teach firefighters how to pull hose, raise ladders, wear breathing apparatus and perform the various skill sets that are used on the fireground, each of them is taught as an independent skill set. Critical tasking is the combination of those skill sets into a flow of performance that is reflected in an outcome, i.e., getting to the fire – getting a trapped victim out of crushed vehicle – or restoring airway circulation and life to a potentially terminal patient. I use the term Petri dish earlier in a symbolic way. And yet, it is also appropriate, because critical tasking is like experimentation. In the world of science doing something one time might be interesting – might even be considered miraculous – but science relies a great deal on repetition, redundancy and replication.

And there enters another discussion that is being generated in the fire service. Where is the science of what we do? Time and motion are both scientific concepts. In the fire service we utilize both to achieve our end objective. Therefore, it makes sense that in studying time and motion we might be able to restore some sense in a scientific reality of what we do in the fire ground.

One of the lessons I got in this field was in a first class cabin of a United Airlines. I was sitting in my seat minding my own business when the aircraft that I was relying on to get me home stopped at the end of the runway and turned onto the active in preparation for takeoff. I noticed that the gentleman to the right of my, briefcase on his lap had pulled out a stopwatch and was holding it in the palm of his hand. I thought that was somewhat strange behavior, but did not say anything at the time. As the aircraft started to accelerate down the runway I noted that he punched the time clock and stared intently at the sweep hand as we began to accelerate. If you fly a lot you know that there is a particular point in that take off in which the front wheels of the aircraft come off the ground and you experience a concept called rotation. As our 737 rotated, the gentleman that was my seatmate then punched the clock opened up his notebook and started writing down some notes. It piqued my curiosity.

In short order he advised me that he was an FAA accident investigator on his way to investigate a helicopter crash. I asked him what he was doing with the stopwatch, and he advised me that every time he gets on an aircraft he makes a notation in his notebook of the type of aircraft and the period of time it takes to engage in rotation. Simply stated, he informed me that one of his reasons for doing this is in the analysis of crashes he wanted to know what the performance was of the average air plane in take off. I don't remember the specific number for the aircraft that we were on but he told me that if the aircraft hadn't rotated by a certain time period it was likely that it was not going to and we were likely to



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have experienced a crash. That was a highly undesirable set of circumstances from my perspective.

And, we have the same phenomenon in our business. Those of you who have studied Standards of Cover know that we have a concept called cascade of events which has various time points and interval periods in which things either occur or do not occur that result in a positive or negative outcome at the scene of an emergency.

Putting this theory to test, I have personally engaged in a considerable amount effort to evaluate time stamps and activity intervals beginning with the wheel stop on the fireground. One such study that was conducted recently might serve a good example of how this type of research could contribute to our increasing knowledge of the efficiency and effectiveness for fire companies. In this particular case it was being conducted by a metropolitan fire agency as part of its overall department deployment planning.

Just as an aside, many firefighters today have heard of the “Dallas Study” that has been used by many individuals to be an indication of a similar area of interest. The Dallas study is now very antiquated and may or may not be particularly relevant to today’s fire service. However, the inquiry that was made in the Dallas study remains relevant and it all boils down to, what can be done in a certain time frame by a certain number of individuals?

Central to this whole concept is a very simplistic thought. That is that there I only 60 seconds in every minute. There are only sixty minutes every hour. Individuals can use up the element of time as a function of their own motion. Therefore, using this simplistic core value, if you arrive on the fireground with one person and they have five minutes to achieve an objective to only have five minutes to get it done. On the other hand if you show up at that same event with two people you have available to you ten minutes of time and motion. If you add an additional person and it now goes to fifteen minutes.

Going back to my silly comparison of wood chucks then critical tasking really becomes a matter of just how much activity can a given number of firefighters do if they are being asked to a specific set of activities.

But before we start to analyze how those units of minutes can contribute overall through performance perhaps we ought to also discuss one of the elements of practicality. Most all of us know that emergencies are like snowflakes. They all seem to be slightly different from one another and yet simultaneously they all look like snowflakes. The concept of critical tasking doesn’t mean that you have developed a set of time and motion analysis of every possible iteration of emergency conditions. However, it is true that there are certain “bread and butter” events that go on in most fire departments that are subject to public scrutiny and therefore are very representative of the community’s expectations of the fire service to perform.



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For purposes of this article I would submit that fighting a fire in a single family dwelling, responding to the scene of an emergency medical aid, and/or dealing with a person who is trapped in a vehicle accident are extremely well represented in most fire departments experience. Therefore, there are likely scenarios with the concept of critical tasking could be used to demonstrate anticipated performance.

The following are a brief description of a scenario from a critical tasking perspective. You will note by reading these that these are not described by who does the task as much as they are descriptions of points in time and intervals in which advance the department's ability to reduce the emergency back to a state of normalcy.

<u>IC Checklist</u>
<input type="radio"/> Size up / report
<input type="radio"/> Fast attack, 200' pre-connect to the door
<input type="radio"/> Provide for 2-in-2-out compliance
<input type="radio"/> Lay dual supply from 1 <sup>st</sup> engine to hydrant
<input type="radio"/> Place 150' pre-connect backup line in service—front door
<input type="radio"/> Ladder two sides of building
<input type="radio"/> Secure Utilities
<input type="radio"/> Perform vertical ventilation
<input type="radio"/> Exposure line to rear and one to roof
<input type="radio"/> Search and Rescue
<input type="radio"/> Establish RIC in place at door

Once a fire agency has identified a set of critical tasks of this nature, the next step is to go into the field and validate it. This validation process has two distinct elements. The first of these is to look at real fire scene data and the second is to measure anticipated performance using the drill ground. In the case of the former a department that is entering the critical tasking should look very carefully into its own experience base and review how fires have actually been fought in the past. In the case that we have described in this article in a single family dwelling the scenario is pretty straightforward. We were evaluating what happened in about the first twelve minutes of a working fire in a single family dwelling in which several conditions existed. The first of these was there was an IDLH in existence. Second, that there was that there was no immediate need to enter the building to perform a rescue. Thirdly, that the firefighters were expected to operate using appropriate safety precautions.

You might be moderately surprised to find that in many cases the training evolutions that are developed on the fireground are not the same as what happens on the fireground. There are fire departments that have a serious gap between the way they train and the way they actually fight fires.



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But, getting back to the basic premise of critical tasking, you are after system performance reliability. Therefore, it is important to evaluate that scenario, not once, not twice, but a sufficient number of times to be able to say with no fear or reservation, that this is what you would expect a fire company from your department to be able to do in a given time frame.

The next step is field validation. This is the same as my FAA guy with his stopwatch. Going out onto a drill ground and then running the same series of events over and over again to determine exactly what the level of predictability is. Without belaboring the specifics of the recent study mentioned in this article there are some very specific observations that can be drawn from observing critical task.

First and foremost is you practice what you preach. A critical task exercise will often point out that operational procedures, tradition, even the technology of how you have designed your fire apparatus and how you have equipped the fire company to operate will begin to be reflected in time and motion conditions. Returning to the concept of the number of minutes that are available to perform tasks, there is a significant difference in the performance of a one-person fire company in comparison to a two-person fire company in comparison to any other staffing level that a local agency chooses to deploy.

As one might expect there is tendency for us in the fire service to support the idea that more is better. What critical tasking points out is that it is not always the number of people on the scene that determines what you are able to accomplish as much as the sequence of what you choose to do things and how you appropriately or inappropriately use the very people you have.

There are many people who do not like to hear this but I believe that it is possible to demonstrate through critical tasking exercises that more people on the fire ground who are not very well organized are not as effective and as efficient as fewer people on the fire ground that are better organized. I am very much aware that this fuels the fire about the staffing questions but it does get back to the science of all of this. If we expect to obtain community support of what we consider to be our minimum staffing requirements we have to make sure that we have done everything we possibly can to be as effective and efficient with those resources as possible. A postposition on a fire truck today is an expensive proposition for the community. Asking for that kind of investment on our part should be based upon more than the fact that it is a good idea. As more and more fire departments buy into the idea of writing up a Standard of Cover document for their community. We will know more and more about how critical task plays itself out. There is a wealth of information to be obtained in critical tasking studies. But, they are blank pages in the fire science notebook today. We need to do more of this kind of experimentation; we need to document more of this kind of information. Deferring just a moment back to the opening line of this article, if we were going to measure what that woodchuck could accomplish we would probably use a measurement of volume such as a cord of wood. It also follows a critical tasking should be able to produce a volume on fire service I would characterize that as containment



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time. Containment time is that final time interval in the cascade of events we referred to earlier. The shorter period of time it is between the initiation of an emergency event and the containment time the more likely that firefighters lives will be protected, civilian lives will be saved and property loss will be held to an absolute minimum.