

Time

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Time is a precious resource. This is not a revelation that is groundbreaking, certainly even within the realm of engineering investigations. Most investigations of any importance are time sensitive, many are time critical, and a few are time starved. Time is almost never on the side of the investigator, particularly now in the era of the 24 h news cycle and “always on” streams of information, data, and communication.

As the time pressure has increased, so too has the speed of many of the analytical tools that we rely upon to conduct our investigations. Digital imaging, increased computational horsepower, and the multitude of advances in specimen preparation and diagnostic tools have allowed the failure investigation community to dramatically reduce the time required to conduct very competent failure investigations. To this end, our profession has been able to satiate the desires of those utilizing our services to the extent that

the dramatizations of popular culture (CSI and similar television shows) have essentially become the expectation of many who engage failure analysts.

We, as a community, are oftentimes our own worst enemy. Buckling to the expectations of our clients and customers, we have helped to fuel the effect of increased speed expectations to a point that is, in some cases, unreasonable. Having made this statement, I would be the first to admit that I am guilty of this transgression on a fairly regular basis. I tend not to be fearful of a challenging timeline, and often profess that the timeline is not an impediment, even though recognizing that my statements will require longer hours and at times less sleep than I, or the team I am working with, would desire.

Having admitted to falling victim to the increased expectations for speed, I will also admit that there is one aspect of the investigative timeline that cannot be accelerated unreasonably, and that is the critical thinking required to come to a clear and accurate conclusion. Even when timelines are compressed, I make every effort to build in time to step back and critically evaluate the data learned and the implications of the data on an investigation. This is critical to hypothesis testing and evaluation, and ensuring sound conclusions are reached.

Two common shortcomings I have observed in investigations are either the failure to step back and think critically by those who should be in a position to do so, or more commonly, the substitution of data and factual conclusions for engineering conclusions. As an example, the following types of conclusions might be found as the result of a purported “Comprehensive Failure Analysis:”

- The chemical composition of the component met specification requirements.

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- The mechanical properties of the component are consistent with typical values for the material in its specified condition.
- The *root cause* of failure is fatigue cracking of the component.

Clearly, these simplified hypothetical conclusions do not come close to answering root cause type questions. I would also submit that these types of conclusions do not elevate to the level of a failure analysis. In reality, investigations of this type would be more duly named failure mode determinations and material property evaluations. Failure analysis sure *sounds* better, but it is inaccurate in this context.

We cannot accept, even in the face of time pressures, to substitute this watered down product as a failure analysis,

just as we cannot accept overstated conclusions that have no basis. We owe it to ourselves to do one of two things:

- Either we accept that it takes time to do things right, including applying critical thinking to our analysis, and communicate that proper analysis takes time to our clients and customers, or;
- We don't overstate what the outcome of our work really is and accept that not everything we do is Failure Analysis.

There should be not lost pride for calling a piece of work something other than a failure analysis. There should be considerable lost pride for calling things that fall well below our standards of care a true Failure Analysis.