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Maintenance
Management
Newsletter

"Forty-Second Boyd" and the Inverse-Square Rule for Deferred Maintenance Effort

By David Tod Geaslin
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When I read ***"Boyd – The Fighter Pilot that Changed the Art of War"*** by Robert Coram, I recognized a useful tool. Through analysis and preparation in advance, **Col. John Boyd USAF** could defeat aerial opponents with the advantage over him in 40-seconds by getting **inside their decision-cycle** and pressing the continually improving advantage. He had analyzed the options in advance had such a complete knowledge of all of the potential outcomes of the fight that he could act faster than his opponent and always be several steps ahead. The outcome became inevitable. This knowledge was formalized in his **Energy–Maneuverability Theory**. He also simplified the process of winning by getting inside the decision-cycle of an adversary with his famous **OODA loop**. This refers to the decision cycle of **observe**, **orient**, **decide**, and **act**. His contributions to the success of aerial combat and Marine Corps ground combat by offering a known path to success have shown to work. His message, *"Make decisions faster than you adversary and you can win."*

What if your opponent is not an intelligent human?
What if your opponent is a dumb machine?

If you are responsible for the maintenance of machines, facilities, or natural resources how is it possible to get inside the decision-cycle to fail of these single-minded adversaries that are trying to grind themselves into pieces every minute they are in operation?

The obvious answer is preventive, remedial, predictive, and preemptive maintenance and we are getting better tools to forecast the condition of the assets every day; however, the real challenge is not knowing the condition of the machines **but getting the permission to take the machines out of production for repairs before they fail**. A maintenance manager can provide reams of charts and graphs to the operational authority for permission and the information seems to bounce off them.

The most challenging task in managing maintenance is to get the right information to executive management that can be understood in **60-seconds**. If that can be accomplished, the executives will listen for an additional **five minutes**.

It is in those **six minutes** that a maintenance manager must make and prove their case for the time and resources needed to get inside the decision-cycle of the machines to fail and restore those parts of the machines that were consumed during the creation of wealth for the investors so they can continue to create more wealth in the future.

The modern technology used to create wealth has become so complex that it is unreasonable to expect executive leadership to sustain a working knowledge of the technical details so a maintenance manager must translate the technical details into concise financial terms that can be digested in 60-seconds.

The Geaslin Group has created a series of special management tools to transfer the significance of technical and mechanical needs into **rules of consequence** and **financial ratios** that will quickly deliver the gravity and urgency of seemingly small maintenance needs across multiple levels of the organizational chart.

We teach how to deliver to the executive management a **core belief** for managing maintenance that will produce the lowest maintenance cost per unit of production possible and prove that all other options will create a higher cost. Understanding this core belief will allow an executive to cease being a spectator in the management of maintenance and actively participate in the managing of the production assets that are creating wealth of the investors.

In 2001, I discovered the **Inverse-Square Rule for Deferred Maintenance**. When used correctly, this tool offers the maintenance manager historical proof positive of the exponential costs associated with operating an asset to failure. This tool then uses that past knowledge to predict the cost for allowing an asset to operate to failure by simply squaring the cost of the primary failure part to know the total cost for the company to recover from the first level of operating to failure. Squaring that value will predict the cost of allowing the breakdown event to progress to the next level of failure. And, squaring that value will predict the cost of allowing the breakdown to progress to the next level of failure.

When this exponentially escalating cost in money and energy has been accepted as true by the executive management, the disastrous effects of deferring maintenance should be readily obvious and the time and resources needed for an early intervention should be granted.

But there is a fly in the ointment. Not every maintenance item that is deferred completes the journey to failure before it is repaired. When the effort is applied to computing the rule and the ratio, you will discover that those few machines that are allowed to operate to failure (Breakdowns) will account for 60% of your maintenance dollars spent.

How do you apply a risk factor to the decision-making process that can be communicated in sixty-seconds?

I teach using the cost numbers gathered while proving the Inverse-Square Rule to compute the **True Risk/Reward Ratio for Deferred Maintenance**. This is quite simple. Divide the early intervention cost (The cost to fix it before it fails.) into the total breakdown cost to the company. When my clients use this method with their numbers, they are stunned that the risk/reward ratio is seldom less than 60:1. **Offering this absolute knowledge, the proof of consequence for not repairing the asset, to executive leadership will allow them to see the benefit to be gained from getting inside the decision-cycle of the machine to fail.**

From the time a machine is assembled it begins failing by corrosion or storage damage. The machine begins wearing out from the first moment of operation and the optimum life is finite but cannot be cannot be predicted no matter how many accurate data points are collected because of the **nonlinear forces** it must operate in.

So, if it is not possible to predict when a machine will fail, we must act at the earliest possible moment to get inside the machine's decision-cycle to fail. You must pretend you are in a submarine and feel a drop of water on your head and act quickly.

I offer a maintenance philosophy and management techniques to create a body of knowledge within an organization that will offer a distinct maintenance path to creating the lowest maintenance post per unit of production possible. Using these computations allows anyone within the organization to see the dramatic and exponential consequences of deferring maintenance and operating an asset to failure.

To win at maintenance, all you have to do is convince your executive leadership that the consequences of deferring maintenance is exponential to the whole organization and that early intervention stops this dramatic penalty. To employ my philosophy does not require your leadership to change anything but their minds as to the real risk/reward ratios and allow the maintenance manager to intervene early.

1. Know the energy states of your maintenance options.
2. Decide to get inside the decision-cycle of your machines to fail.
3. Execute an early intervention.
4. Avoid the exponentially escalating expenses that square with each successive level of failure.
5. And, plow back the exponential savings in man/hours and money into more early interventions.

Winning at maintenance is just that simple.

If you should be interested in understanding my computations, I will send you an Excel spreadsheet to run your own computations to confirm the validity. I will require that you spend about ten minutes on the phone with me to explain the functions on the spreadsheet to be sure your data is applied and interpreted correctly. If you should care to visit, I am at your service.

The author:

David Geaslin is a graduate of The University of Texas at Austin with degrees in Industrial Management & Marketing; a former Marine Corps Aviator and Aircraft Maintenance Officer (1968-1975); the CEO of his maintenance service company for 15 years; and has consulted offering coaching and seminars in the management of maintenance since 1990. He lives in Gonzales, TX and travels offering his services wherever needed.