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Think of a maintenance department in terms of an NFL football team. The maintenance manager, much like a head coach, is in charge of team strategy. The maintenance supervisor, similar to an assistant coach, acts as a scheduler off the field of play. The maintenance planner is the quarterback, directing play on the field. Maintenance trades fill the offensive-line positions. Equipment operators make up the defensive line. PM and PdM job plans constitute the maintenance department's all-important playbook, used to put the team in a winning position on a daily basis.

In maintenance, as in football, once you are in front of the 8-ball—*in a winning position*—you must strive to defend, sustain or improve your lead. In football, this is accomplished through great defense. Although the defensive line typically doesn't enjoy the same "celebrity status" as those who play in offensive positions, in winning organizations, it is recognized as an integral part of a team's success. Likewise, in the maintenance world, recognized "Best-Practice," "bowl-winning" maintenance teams attribute a portion of their success to the partnership relationship developed with the equipment operator, often dubbed by these departments as the "first line of defense."

The operator role

To some degree, we are all operators. For example, most of us operate a vehicle of some sort, be it a car, motorcycle, bicycle, lawnmower, etc. We also take on an operator role when we use a computer or appliance of some type. As operators, we are capable of recognizing when our equipment is in a significantly reduced-performance or failed state that requires us to cease operations and seek immediate reparations that will allow us to continue operational use of the equipment.

Embracing the role of a human operator, we will invariably become attached to our equipment—*and be quite sensitive to and understanding of its idiosyncrasies*. With continued use, we get to know every sound, vibration and smell of our equipment as it performs its duties on a daily basis.

Because we are also blessed with a sixth sense—*intuition*—we instinctively know when our equipment is not operating within its "sweet spot." We may not be able to readily identify or articulate the problem, but our intuition tells us our equipment is underperforming. At this point

we are faced with two choices: #1) ignore the problem until it manifests itself into a costly repair; or #2) call in an equipment diagnostic expert who, with any luck, will be able to translate our intuitive cues and diagnose and remedy any potential failure situation mode at a fraction of the cost of choice #1. In many cases, a simple adjustment or a little tuning or tightening is all that's needed to restore our personal equipment and systems to their operational "sweet spots."

It's the same with our industrial equipment—*only the cost of failure is usually much higher!* We not only have to contend with the cost of the repair, we also have to deal with the cost of downtime. Industrial equipment operators know instinctively when their equipment is underperforming, and if the maintenance department does not have an early-defense agreement with operators to evaluate their potential-failure intuition and do so in a timely manner, it will suffer needlessly.

Best practices

In a Best-Practice maintenance environment, operators are encouraged to let the maintenance department know when they believe the equipment is underperforming. The planner utilizes a discrete questioning process that enables the maintainer to quickly diagnose the potential problem. The process is similar to the approach taken by an automobile service department. When dealing with a vehicle operator who has no mechanical or electrical knowledge, but instead relies on his/her primary senses, information is gathered by asking the following questions:

- Problem symptom(s)?—*describes what is happening that causes the requestor to believe there is a problem*
- Primary sensory information?—*is important for determining the true nature and criticality of the problem, including:*
- Vibration—*visual, feeling, touch*
- Noise—*hearing*
- Unusual odors—*smell*
- Smoke—*visual, smell*
- Heat—*feeling, touch, smell*
- Fluid Loss—*visual, touch, smell*
- Performance loss —*visual (gauges)*

- Immediate impact on equipment operability/availability (Downtime, Limp Mode, No Effect)?— *allows the planner to prioritize the work more effectively*
- Immediate impact on safety?—*allows the planner to prioritize the work more effectively*

These questions can be scripted within a maintenance-request form to assist a help desk or maintenance clerk in distributing to the correct authority when a planner is not available or not in use.

A stronger voice

Taking the operator-defense concept one stage further, through an RCM (Reliability Centered Maintenance) approach, a maintenance department can anticipate potential events in which failure can manifest itself as primary sense information (listed above) to the operator. This prior knowledge allows the department to build and put in place a responsive action job plan. The operator also can be helped toward quicker problem determination through the use of interactive early-detection "telltale" devices that might include:

- Bolt-line marking on torqued bolts and aligned equipment fasteners. When alignment markers are no longer aligned, the fastener loosens and will also manifest itself as vibration. This can be a result of under- or over-tightening, loss of alignment, equipment jam or external damage, etc.
- Heat-crayon marking of critical items. An item is marked with an invisible crayon that materializes once its operating temperature has been surpassed. By writing the word "fail," an operator can quickly and accurately identify a problem for maintenance.
- Gauge marking identifying an acceptable operating performance range on the gauge. By line marking an upper and lower acceptable limit on the gauge, the operator is able to see at a glance whether the gauge needle is in the safe operating window or is in need of maintenance attention.

Affording operators a voice—*and allowing them to act on their intuition*—is a crucial component in building a true "Best-Practice," championship type of maintenance operation.
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