You,re playing in the high-rollers' room, now, where the stakes are greater than ever. This veteran of the reliability game deals you in on how to build a winning hand. Heinz P. Bloch, P.E., Process Machinery Consulting To some of us, Maintenance Technology is more than just the title of an important journal. It's a vocation…a craft…an attitude…a mindset… and a host of other things. More than a mere cookbook of procedures to follow, Maintenance Technology should be a thought-generator. Just as it should adjust the reader's focus to recognize that failure prediction is more valuable than incurring failures without advance warning, the Maintenance Technology concept should remind us that failure avoidance is-
in many, but clearly not all instances-the most cost-effective approach
.

Based on experience

So as not to get hung up in the semantics and arguable definitions of the issue, let us start with a personal recollection. In 1979, the plant to which I had been assigned in Texas was about to commission six major turbo-compressor trains ranging up to about 60,000 HP and approximately 5,600 rpm. Because the equipment trains incorporated contoured diaphragm couplings, the chief machinery engineer at company headquarters asked me to cooperate with his plans to develop coupling condition monitoring devices. He was thinking of non-contacting telemetric means of detecting crack formation and crack propagation in the alloy steel diaphragms. My position was to, in the future-as had been done in this instance-purchase couplings with generous service factors. Such couplings were known to have torque load capacities far in excess of those delivered by the steam turbines driving the various compressors. In essence, building safety (failure avoidance) into the basic design at low incremental cost will very often allow us to dispense with some, presumably necessary, and sometimes "traditional," surveillance requirements.

To be realistic, we concede that in the real-world environment, the reliability professional is rarely in a position to implement best practices by himself/herself. But, we still see it as his or her mission in life to move entire organizations in the right direction and to find tactful ways of questioning the erroneous mindset of the generally indifferent crowd. There is always a

management component involved and managers often only pursue short-term interests. Short-term interests are inevitably repair-focused.

Consistently good performance and high profitability, however, require that industrial enterprises totally abandon their repair focus and unequivocally endorse the reliability-focused approach. Predictive maintenance should not be embraced without forethought, because it often drifts into a "repair" focus. Modern, reliability-focused plants must adhere to a well-formulated or even formalized management philosophy. This is an indispensable requirement if tangible and lasting equipment reliability improvement results are expected.

Focus on uptime improvement

Adapting the thinking of W. Edwards Deming, the noted American statistician whose teachings on quality and profitability often were neglected at home, but venerated in post- WW II Japan, we give the following advice to the interested manager:

- Create constancy of purpose for improvement of product, equipment and service. Implement whatever organizational setup is needed to move from being a repair-focused facility to a reliability-focused one. Do this by teaching your reliability workforce to view every maintenance event as an opportunity to upgrade. Furthermore, make them accept the premise that component upgrading often results in total failure avoidance.
- Never allow costly experimentation, or "reinventing the wheel," when there is proof that an upgraded component, a good technical text or an experienced mentor could point the way to a proven solution [Ref. 1].
- Upgrading must result in downtime avoidance and/or maintenance cost reductions. Insist on being apprised of both feasibility and cost justification of suitable upgrade measures. A professional's best guess is acceptable; the claim that no data are available for equipment such as pumps-among the simplest machines on the face of the earth-shows indifference or lack of being informed.
- Unless your problem machine is indeed the only one in the world delivering a particular medium from "A" to "B," insist on determining the operating and failure experience of satisfactory machines and mechanical components elsewhere. That implies working only with experienced, cooperative vendors and a well-motivated reliability workforce.
- Adopt a new philosophy that makes mistakes and negativism unacceptable. Ask some serious questions when a critical process compressor or pump repair isn't done right three times in a row. Hold the responsible party accountable.
- Ask the responsible worker to certify that his or her work meets the quality and accuracy requirements stipulated in your work procedures and checklists.
- End the practice of awarding business to outside shops and service providers on the basis of price alone. Ask your reliability staff to use, acquire or develop, technical specifications for critical or high reliability components. Inspect the work product of your suppliers- you get not what you expect, but what you inspect.

- Constantly and forever improve the system of maintenance quality and responsiveness of contract/outsourced service providers. You must groom in-house reliability specialists- they must have competence in gauging the adequacy of maintenance quality and outsourced services. Make them the pseudo-owners (the accountable parties) of the equipment or service at issue.
- Allow global procurement based on adherence to sound specifications for critical components. These specifications must be used by your purchasing department. Accept cheaper substitutes only if it can be proven that their life-cycle costs are lower than those of the high-reliability components specified. Translation: Don't tolerate reliability professionals seeking cover under the "global procurement" excuse [Ref. 2].
- Insist on daily interaction of process/operating, mechanical/maintenance and reliability/ technical workforces. Institutionalize root cause failure analysis (RCFA) and make joint RCFA sessions mandatory for these three job functions. Do not accept this interaction to exist only in the form of e-mail! Until you have groomed a competent and well-trained failure analysis team, consider engaging an outside expert on an incentive-pay basis.
- Institute a vigorous program of training and education. As an example: For decades, the mechanic/machinist has been allowed to find and replace the defective pump component. Consequently, he or she has become an entirely repair-focused parts-changer. Train your engineers, technicians and maintenance workforce members to be reliability-focused! Firmly subscribe to the belief that repair-focused plants will soon perish!
- Institute leadership. Give guidance and direction. Impart resourcefulness to your reliability professionals. Become that leader or appoint that leader. The leader must be in a position to outline and delineate the approach to be followed by the reliability professional in, say, achieving extended pump run length-the subject of many relevant texts [Ref. 3].
- Drive out fear. Initiate guidance and action steps that show personal ethics and evenhandedness that will be valued and respected by your workforce. Institute both fairness and accountability at all levels. As a manager, take the lead. Eliminate roadblocks and impediments to progress. Realize what it is you are trying to do: Obtain a quantifiable increase in plant-wide equipment uptime, in pump MTBF, or whatever. Accept the premise that these aims are not utopian; they have long since been accomplished elsewhere. With good leadership, your organization can achieve these goals as well.
- Break down barriers between staff areas. Never tolerate the ill-advised competition among staff groups that causes them to withhold pertinent information from each other.
- Eliminate numerical quotas. No reasonable person will be able to solve 20 elusive pump problems in a 40-hour week. If a problem is worth solving, it's worth spending time to solve the problem. Don't use a 50-cent solution to solve a million-dollar problem.
- Accept the premise that an intellectual laggard "working" 70-hour weeks may not be as productive as a resourceful individual who really does perform in the standard 40-hour week. Realize that the 40-hour person, perhaps, operates at peak efficiency because he/she recharges his motivational batteries in his off-hours, whereas the laggard feeds his brain on figurative junk food.
- Remove barriers to pride of workmanship. Don't convey the message that jobs must be done quickly. Instead, instill the drive to do it right the first time and every time. To that end, make available the physical tools, written procedures, work process definitions and checklists used by Best-of-Class companies.

Going all in

Now, let's get back to the earlier reference about diaphragm couplings…Over many decades, there never has been any problem with the ones alluded to in this brief overview. It's just one of numerous examples proving that failure avoidance trumps failure prediction.

References

1. Bloch, Heinz P., Machinery Reliability Improvement, 3rd Edition, 1998, Gulf Publishing Company, Houston, TX (ISBN 0-88415- 661-3)
2. Bloch, Heinz P., and Alan Budris, Pump User's Handbook: Life Extension, 2nd Edition, 2006, Fairmont Publishing Company, Lilburn, GA (ISBN 0-88173-517-5)
3. Bloch, Heinz P., and Fred Geitner, Machinery Uptime Improvement, (2006) Elsevier-Butterworth- Heinemann, Stoneham, MA (ISBN 0-7506-7725-2)

Frequent contributor Heinz Bloch is wellknown to Maintenance Technology readers. The author of 17 comprehensive textbooks and over 340 other publications on machinery reliability and lubrication, he can be contacted directly at: hpbloch@mchsi.com