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In today's world, we expect to be able to step into a car, turn the key and drive virtually non-stop across the country at high speed, with little thought as to the vehicle's ability to make the journey. Many of us remember when this wasn't possible. A few short decades ago, the same excursion would have required significant preparatory work, coupled with plenty of automotive TLC throughout the trip!

Similarly, industrial machine design has changed drastically in the past few decades, with the introduction of new materials and electronic "whiz-bang" technology that automatically micro-manages our equipment systems for us. No longer do operators have to constantly adjust and tend their machinery.

The net gain of this design revolution has been more reliable and operator-friendlier equipment. This relief of duty, however, has resulted in the loss of many skilled individuals who used to take care of the equipment's needs. Ironically, enhanced equipment reliability and ease of use could be making us complacent about our approach to maintenance. Consequently, there seem to be just as many unexpected failures now as in the past. (Have you tried to get your car into the shop lately?)

On a recent trip to England, I was invited to tag along as a guest operator/maintainer on the world's oldest and largest in situ compound, double-acting, triple-expansion steam engine. My adventure was courtesy of the City of Wigan and Bill Rowland and Mike Presho, who lovingly maintain and operate the awesome, fully restored 19th-century mechanical marvel in their charge. Built at the pinnacle of the industrial revolution to power 1250 carding and spinning machines simultaneously through an elaborate line-shafting system, the 2100 hp steam-producing monster was in service at the Trencherfield spinning mill for over 60 continuous years. Because the engine supplied power to every moving piece of equipment in the mill, as well as power for a small generator for rudimentary lighting, any failure or downtime associated with it was catastrophic to the mill and its workforce—*which didn't get paid when the engine lay idle.*

These days, although the engine runs in a living museum setting with only the flywheel load, it's still cared for and operated under the same method statement as it was during its production years: "Run like a Religion!"

Amazingly, the mill engine's efficiency was 86%, which was maintained throughout its working life through never-ending attentiveness to mechanical alignment and effective lubrication of all moving parts, water cleanliness (water chemistry) and seals (to keep the precious and expensive steam in the engine). Interestingly, much of the lube oil was captured, filtered and reused, while all exhausted and unused engine steam was used to pre-heat boiler water—*effici ency at its best!*

As it was in the days of steam engines, much of today's equipment is still predominantly mechan-ical, i.e., using seals, aligned driver/driven components and lubricated bearings. Thus, when we know that misalignment robs energy and causes premature failure, that a rolling element bearing can still fail in over 50 different ways and that we can predict and prevent virtually all mechanical failures, why have we become so lax about maintenance and reliability fundamentals?

We really don't have any excuse. If we want true reliability, availability, throughput and quality, we have to recognize what equipment still needs: That's to be "Run like a Religion!" Good luck.
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