

# Shaken, not stirred

*When creating new procedures and practices, never stop asking yourself, 'But what if...?'*

**M**any years ago I worked for an organization with a medium-sized utility plant that had four 50-mw, steam-driven turbo-generators operating continuously for about 15 years with the same oil. Over time the oil started to develop a measurable amount of foam in the tanks, to a point where some action was warranted. The oil volume in each of the tanks was a little more than 6,000 liters, and oil changes would have been a fairly significant expense.

Since I am a firm believer in avoiding “quick-fix” additive treatment products, I chose instead to take a much more systematic and due diligence approach. At least that was the plan!

The first task was obtaining samples from each of the four tanks and testing them against the ASTM D892 Foaming Tendency method to verify if the foaming was due to a decrease in the oil's antifoaming characteristics. The results indicated a fairly significant decrease from the new oil reference, so I went back to our long-term oil supplier and asked them to provide me with some of the antifoam additive used in the original formulation. Graciously, the oil supplier provided me with a small can of the antifoam additive, along with the recommended dosage rate.



I think the additive was probably about 10,000 cSt at room temperature (the proverbial molasses in January). The other point of note is that this additive is finely dispersed in the base oil as opposed to dissolved. So how does one go about getting a very small amount of this molasses finely and equally dispersed into a 6,000-plus liter tank of oil?

I went to the warehouse and obtained a bunch of empty (new) paint cans. I took some of the oil from the oil reservoirs, added a small amount of the additive, sealed the paint cans and then had them shaken on a standard paint shaker. I further diluted this mixture into another can of oil from the reservoir, shook again and ended up with what I believed to be a well-dispersed mixture.

Off I went back to the turbine units, with an accomplice and a video camera, to document the task at hand. (Tip: Make sure you are the one holding the camera and your accomplice is the one seen in the videotape.) The accomplice very slowly added the additive mixture to the oil tank and, over a period of only a few minutes, the foam almost completely disappeared. We repeated the act on all four turbine tanks and headed home with the satisfied feeling of another job well done.

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Sometime during the next 2-3 days one of the turbines came to somewhat of a crashing halt. During the disassembly we discovered that the thrust bearing on the main shaft-driven oil pump was completely wiped. Luckily the damage was limited to only the main oil pump and the bearing itself. A day or two later a second turbine suffered the same sudden and catastrophic failure.

A thorough root cause analysis was done that, in the end, still left us a little perplexed—was the additive treatment directly related to the failures? The other two units never had an issue, and the two failed units were returned to service with the treated oil as it was. My job was saved not because someone else's face was in the video but rather due to the solid due diligence path and procedures I had followed.

The lesson I learned here was that even though you think you are taking the appropriate steps, you can never stop asking yourself, "but what if...?" I did my homework and analysis to identify the problem, developed a solution and a good execution plan, and documented the actions taken. However, I missed the step of evaluating the risks before taking action. **TLT**



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**Editor's Note:** If you have a unique story or personal experience that you would like to share, you can e-mail your submissions to TLT editor Evan Zabawski at [evan@fluidlife.com](mailto:evan@fluidlife.com).

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