

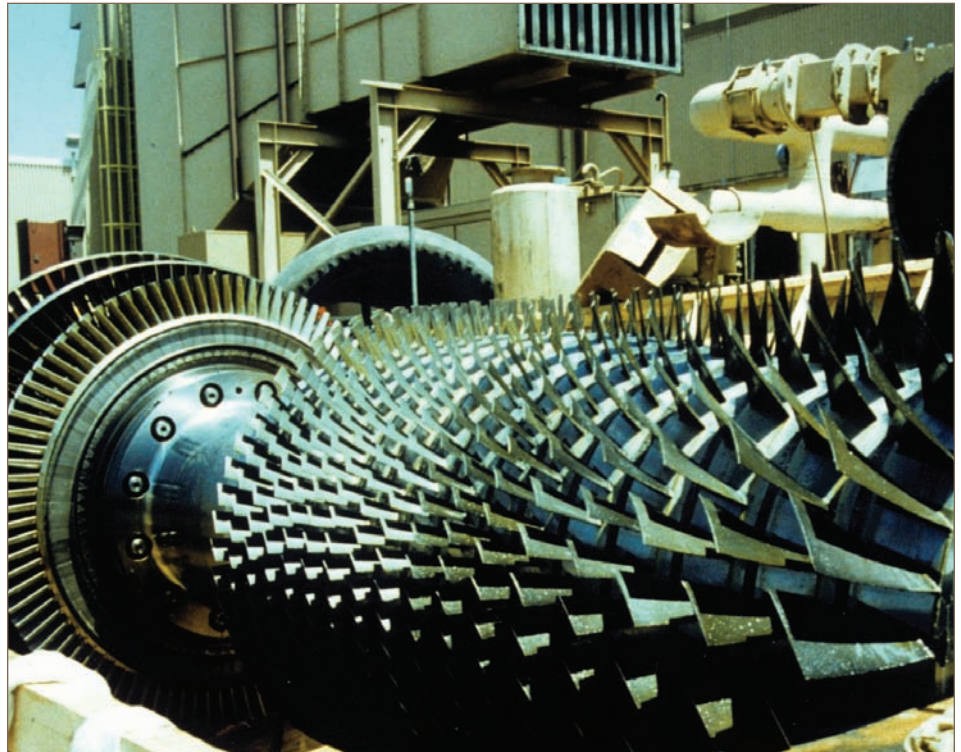
The quest for answers

How the flow of information passes through FM Global to study and prevent loss

It was 18th-century French author and philosopher Francois Marie Arouet de Voltaire who said, “No problem can stand the assault of sustained thinking.” Here at FM Global, “sustained thinking” translates into a culture of questioning that begins with on-site engineers who discover problems or hear about them from clients—to scientists and researchers who investigate the concerns and test new approaches—to client service team members who share what’s learned back with clients so they can make confident, well-informed decisions.

“This steady flow of information among FM Global clients, field engineers and research staff is crucial,” said Louis Gritzko, vice president and manager of research. “Not only are immediate research needs identified based on client and FM Global engineering input, but also this back and forth keeps FM Global at the forefront of emerging property loss prevention puzzles for us to solve. This flow of ideas also often stimulates new approaches to loss prevention and assists researchers in gathering actual client data, which plays a vital role in their research.”

William Doerr, assistant vice president and research area director, says requests for assistance from FM Global come from all directions. “We hear from our



Client inquiry led FM Global to take the lead in understanding the hazards behind turbines.

own on-site engineers or client service team members who are working with clients to address a concern that’s been identified. We hear from clients’ own researchers who have been working on a problem and want our advice. We even hear from upper management—our clients’ and our own. It’s not unheard of to have a president or a chief executive officer who is aware of a problem at his or her company contact our senior management directly and say, ‘How can FM Global help us here?’ That request flows to us and we’re on it.”

Questions that get answered range from the unusual (“Why are we experiencing spontaneous static fires in our production?”) to the more common (“Why is my fire protection system corroding?”). Doerr says every question posed or situation identified is critical to loss prevention and taken seriously.

Rick Morgan, assistant vice president, principal engineer, forest products, said when information was recently received about a serious static fire hazard at a wood products plant, a team of five FM Global experts was

FM Global takes the lead on addressing safe turbine shutdown methods

assembled and sent to the site. “As the client’s principal engineer, I was part of the team, along with the field engineer, a materials chemist, and a research director,” Morgan explained. “We met with the site’s plant manager, toured the facility and spoke at length with the client’s research department. Our consultation and calculations confirmed some of what they suspected. Working with the client, recommendations were developed and implemented and the problem was controlled.”

It’s FM Global’s culture of questioning and insatiable need to know how loss can be prevented, along with its succinct and open lines of communication internally and with clients, that enable the company to study and prevent loss with such effectiveness, says Morgan.

And clients are critical to achieving that effectiveness. “We need information to flow back to us from clients because it not only helps us build our knowledge base, but also develop solutions based on their actual needs,” added Gritz. “Without that input, conducting our research would be like building a car without ever talking to the person who was going to be driving it. Our clients are the ‘drivers’ here. Our pursuit of answers to loss prevention questions is about giving them the best engineering-driven risk management solutions we can.”

Fire protection deficiencies for lube-oil systems were a major factor in damage and outage times for turbines in 17 large turbine building fires during a recent 15-year period. The property damage from these incidents totaled more than US\$400 million (indexed to 2003 dollars). Lost generating capacity was in excess of 20 million MWh (assuming a base-loaded station with a capacity factor of 86 percent). This capacity is roughly equivalent to that of a mid-size investor-owned utility in the United States. The average loss was more than US\$24 million. The average outage was more than 24 weeks.

“This hazard of turbine-generator oil fire in electric power generation has been of concern for many years,” said Terry Cooper, assistant vice president and senior engineering technical specialist, who, since 2004, has been spearheading a group effort to develop design, construction and operational guidelines that can be used by the power generation industry to mitigate the costs associated with fire protection for turbine and generator oil systems. “Some may argue that it’s a low-frequency hazard, but that suggests turbine operators are not prepared for it. And we all know what happens when we’re not prepared.”

According to Brian King, senior engineering technical specialist and manager of the equipment hazards group, when oil is released from the systems as a result of rupture in an oil pipe or separation of a mechanical joint, valve or pipe connection, oil can spray and may be

ignited by adjacent hot surfaces. “The ideal solution to stop the fire is to cut off the fire’s fuel,” said King. “However, such an action can cause severe mechanical damage to turbine and generator rotating and stationary components.” Past occurrences of loss of lube oil to a turbine generator at operating speed (3,600 revolutions per minute) have resulted in the rotating elements of both the turbine and generator exiting the respective machines and containment buildings causing not only extensive damage to the units, but also severe damage to the surrounding equipment and buildings.

Safe shutdown of turbines in the event of fire is possible, stresses King.

“An emergency procedure to secure the turbine and shut off oil systems or shift the oil systems to lower operating pressure so the fire can be controlled by manual firefighting while the turbine is slowing down can be determined and implemented when necessary.”

Cooper and King are working with clients and the power industry to gather the facts, the distinctions and equipment-specific issues and the concerns to develop mitigation strategies that will be embraced, accepted and implemented. “Our goal continues to be identifying the fire hazards in turbine oil systems including different possible fire scenarios and developing design and operational strategies to reduce their likelihood, mitigate their consequences and lead to safe shutdown of the turbine,” said Cooper.