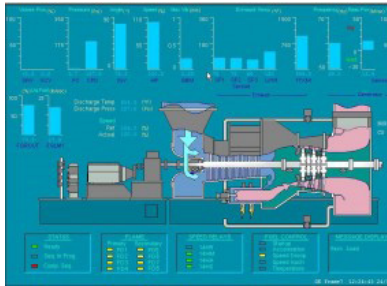


# Thinking about gas-turbine M&D? Don't overlook Chromalloy's Tiger

November 12, 2013



One of the featured presentations at CTOTF's™ Generator, High-Voltage, and I&C Roundtable was "Techniques for Effective Monitoring and Diagnostics of Gas Turbines," by Dr Charlie Nicol, diagnostic systems manager for Turbine Services Ltd, a wholly owned subsidiary of Chromalloy. The presentation extended the underlying theme of the user group's 2013 Fall Conference — diagnostics and predictive analytics—through the final day of the meeting.

Nicol has been the chief architect for the Tiger turbine monitoring and diagnostic system since its birth more than 20 years ago. Background: Tiger began as a European funded project, involving a multinational consortium taking leading-edge research and applying it to the monitoring and diagnosis of GTs. The commercial product, developed by Intelligent Applications, was acquired by Sermatech and subsequently by Chromalloy.

Tiger is installed on 90 turbines today—including several models of gas-turbine frames and aeros, as well as steam turbines. The product generally has an excellent reputation among long-term users, but one has to wonder why there aren't many more plants using this diagnostic system. Perhaps it was the prolonged period of development and too many participants in that process; it took 17 years to go from a prototype to 60 installations two years ago.

After listening to the presentations on the first day of the fall meeting, including one by the manager of GE's Industrial Performance and Reliability Center, it may be that SmartSignal and others have passed Tiger by—at least in the US. Aggregating data from many like machines improves the predictive models and an aggressive OEM certainly has a leg up in this regard. Engines current Tiger users are operating include GE Frames 5 (two shaft), 6B, and 7EA; GE aeros LM2500 and LM6000; P&W FT4; 501F; GE steam turbine.

Nicol's presentation began with the ABCs—the reasons for monitoring and diagnostics, the skill sets required by those interpreting and using the information collected from your engine, how an incident profile benefits the engine owner/operator (such as planning corrective action), etc. He then dissected the software and explained its structure and functionality, and how the company's M&D center in Glasgow works.

Nicol noted that Tiger classifies diagnostics according to severity, turbine area, relevance to the main conclusion, and number of occurrences. It enables the user, he said, to easily replay the data, graph the information, access turbine manuals, link to user-specific notes, etc. Nicol then gave some examples of Tiger's "finds," such as sticking fuel and bleed valves, faulty controller cards, improperly operating speed ratio valve, faulty vibration sensor, etc. Digging into the details, he used bearings to illustrate how Tiger uses diagnostics (vibration data in this case) to detect bearing unbalance, misalignment, oil whip, oil whirl, rubs, and/or blade damage.

There were a few dozen more slides illustrating information displays in chart and table form, how to track startups and shutdowns and use aggregated data to guide future starts and stops, how different variables are displayed on-screen, etc. You can access Nicol's presentation in the CTOTF Presentations Library.

The Generator, High-Voltage, and I&C Roundtable traditionally runs the entire last day of every CTOTF™ meeting. Session Chair Moh Saleh, engineering manager for SRP's Desert Basin Generating Station, who doubles as the high-voltage vice chair, is supported by Vice Chair-Generators Craig Courter, maintenance manager for Guadalupe Power Partners, operated by NAES Corp, and Vice Chair-I&C John-Erik Nelson, principal mechanical engineer for Braintree Electric Light Dept.