BATTELLE'S REVOLUTIONARY FATIGUE PREDICTION TOOL ADOPTED BY ASME'S 2007 BOILER AND PRESSURE VESSEL CODE

Columbus, OH—When the American Society of Mechanical Engineers (ASME) publishes the latest version of the ASME Boiler and Pressure Vessel Codes it will signify a monumental breakthrough in how industry addresses weld fatigue. It also marks a crowning achievement for Battelle scientist Dr. Pingsha Dong. Section VIII, Division 2 of the Code will now include Battelle's Mesh-Insensitive Structural Stress method as an alternative means for predicting fatigue and fatigue life. The method is also known as the master S-N curve method signifying its ability to correlate a massive amount of actual fatigue test data into a single S-N curve. The Verity® method is available in fe-Safe™ — a leading fatigue software package distributed by UK-based Safe Technology Ltd.

Because Dong's mesh-insensitive structural stress method provides a level of predictability never before seen and can be easily applied, it was originally viewed as too good to be true. After years of rigorous testing through a Joint Industry Project that has applied Verity in a series of complex scenarios, Verity was proven to be a more reliable method of predicting the point at which a weld would fail than any previous technology.

"There are two aspects of Battelle's method that make it such a monumental achievement for industry," said David Osage, President and CEO of The Equity Engineering Group Inc and lead consultant in the re-write of Section VIII, Division 2 Code. "First, we have never been able to achieve the consistent and accurate results that this method provides and secondly, and maybe equally as important, is that it is very easy to apply and can be incorporated seamlessly into current codes and standards."

"For the past 20 or 30 years, experts in the field have been trying to address the inadequacies in stress analysis for the fatigue design of welded structures so that companies would not have to compensate for poorly correlated test data," Dong said. "Eventually, industry and academia gave up, concluding that the significant variability inherent in existing empirical-based stress analysis approaches, such as various surface-extrapolation-based hot spot stress methods, is a fact of life. We did not give up."

The ASME Boiler and Pressure Vessel Code establishes construction rules for new boilers and pressure vessels as well as nuclear power plant components. This code is required for use by most regulatory bodies in North America, but is also broadly used internationally.

Osage noted that Verity has been included in a fitness-for-service standard produced jointly by the American Petroleum Institute and ASME entitled API 579-1/ASME FFS-1 *Fitness-For-Service*,

which is used for the remaining life evaluation of in-service pressurized equipment. The use of Verity in this standard illustrates the flexibility of the method; i.e., it can be used for the design of new equipment as well as the evaluation of existing equipment.

Any breakthrough of this magnitude is sure to raise eyebrows, and the path to adopt Dong's method into the codes was not easy. Since there had been little advancement in fatigue prediction, and Dong's methodology produced results that were previously thought to be impossible, many industry veterans questioned that such a solution could exist. Years of validating data and presentations to ASME's constituency were required to turn skeptics into believers. It was this battle, and the support Dong received not only from Battelle, but also from members of the ASME, that makes this achievement so special, he said.

Additionally, Pingsha noted that the mesh-insensitive structural stress method is directly applicable for fatigue design and life prediction of steel bridge structures, as well as remaining life assessment for aging bridges. "Recently published full scale fatigue data for steel bridges and signal masts, funded by the DOT and various States DOTs, has been predicted by our method as stipulated in the 2007 ASME Code".

About ASME

Originating in 1914, the ASME Boiler and Pressure Vessel Code has been adopted in part or in its entirety by 49 states and numerous municipalities and territories of the United States and all the provinces of Canada. It is kept current by the Boiler and Pressure Committee, a volunteer group of more then 950 engineers that meets regularly to consider requests for interpretations, revision, and to develop new rules. In the formulation of its rules and in the establishment of maximum design and operating pressures, the Committee considers technological advances including materials, construction, methods of fabrication, inspection, certification, and overpressure protection.

About American Petroleum Institute (API)

API is the only national trade association that represents all aspects of America's oil and natural gas industry. Its 400 corporate members, from the largest major oil company to the smallest of independents, come from all segments of the industry. They are producers, refiners, suppliers, pipeline operators, and marine transporters, as well as service and supply companies that support all segments of the industry.

About Battelle:

Battelle provides solutions to some of the world's most important challenges through its three global businesses: National Security, Energy Science and Technology, and Health and Life Sciences. Battelle is the world's largest independent research and development organization with technology contributions that find their way into hundreds of commercial products each year. Conducting $3.8 billion in global R&D annually, Battelle oversees 20,000 employees in more than 120 locations worldwide, including five national laboratories Battelle manages or co-manages for the U.S. Department of Energy. Headquartered in Columbus , Ohio, and established in 1929 as a non-profit charitable trust, Battelle focuses on societal and economic impact and actively supports and promotes science and math education.

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