Client Reviews

Acoustic Scintillation Flow Meter (ASFM) is getting the recognition it deserves. Please read what our clients have written about it:

May 2004. Hydro Review Edward Fulton. "Monitoring Equipment for Hydro: What's New?"

"Brad Bird, senior hydraulic engineer with the U.S. Army Corps of Engineers, said the device (ASFM) is routinely used for index testing at the Corps' hydro projects on the Columbia and Lower Snake rivers. In its approach, the Corps mounts ASFM Advantage on the turbine intake. It then indirectly, but accurately, measures the flow discharging through the turbine.

During the past seven years, Bird said, the Corps has conducted index testing on seven hydro plants ...

In every case, he said, the testing resulted in engineers adjusting the blades and gates according to flow. On average, he said, the Corps is obtaining 1.5 to 2 percent increases in efficiency, enough to economically justify the cost of the tests.

Bird said results are the key for other Hydro plant owners considering using the device for index testing: efficiency increases pay for the test itself."

Installing equipment on ASFM frame

Jan 2004. Hydro Quebec proposal to CEATI

"Typical savings regarding scintillation method versus current meter method:

Cost reduction during a typical test include the following: I) Instrumentation, installation and testing period. At low head locations where flow measurements are usually conducted in the turbine intake (rectangular), some 10%-20% cost reductions are expected (fewer instrumentation, less calibration, easier installation, portability between units etc.). Thus a minimum $20-25,000 per test. In certain cases, usage of other methods is extremely difficult without having unacceptable high costs. ... Powerhouse owners are very sensitive to unusually long Unit stoppages with ensuing loss of revenue generation particularly if it involves spilling.

With large rectangular intake using the scintillation method versus the current-meter method, two (2) days of generating production is recoverable.

These calculations show substantial potential savings, which should be of prime interest to Utilities if time out for testing means lost generation. In many cases, it does."

continued

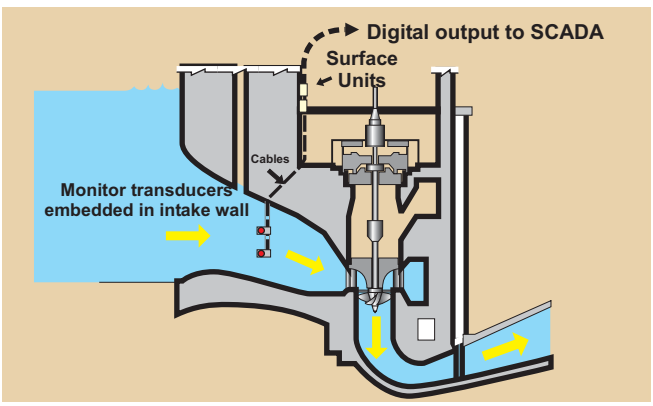
Oct. 2003. US Army Corps of Engineers, Hydroelectric Design Center (HDC) Report."Abbreviated Acoustic Relative Flow Measurement"

"By far, the greatest uncertainty of turbine performance testing involves the measuring of volumetric flow rate. Various methods have been implemented by HDC to measure fluid flow. Most recently, HDC has implemented ASFM testing in an attempt to measure absolute flow through Kaplan turbines. Due to the constantly changing cross sectional shape of Kaplan turbines, traditional flow measurement techniques cannot be economically applied. ASFM is unique in that it does not require a uniform cross section throughout the length of the measuring section. HDC has performed ten to twelve scintillation tests since 1996.

In HDC's experience, scintillation maintains a relatively low precision error ...

The low precision uncertainty of ASFM lends itself well as a method for relative flow testing ...

The time and cost saving involved in using abbreviated ASFM tests, or any other flow measuring method similar to ASFM in application is potentially great, especially when considering Type I optimization where every unit in a given powerhouse would be outfitted with flow sensing equipment."



ASFM monitor schematic diagram

Aug 2003. Hydro Review "Optimizing the Corps' Hydro-electric Generation on the Columbia River: A Multi-faceted Effort"

By Rodney Wittinger, PE, mechanical engineer and turbine expert in the USACE Hydroelectric Design Center in Portland, Oregon.

"More recently, as an applied research project, the Corps applied the acoustic scintillation method of measuring flow by using transducers mounted on a frame in the intake gate slot on five Corps projects.

This measurement system does appear satisfactory in determining relative flow for calibration of the Winter-Kennedy taps in defining the optimum "on cam" curve.

Lowering ASFM frame at U.S. Army Corps of Engineers' John Day dam site

continued

US Army Corps of Engineers®

May 2003. Battelle Report by T.J. Carlson et. Al. : "Review of Application of an Acoustic Scintillation Flow meter for Hydro-turbine Discharge Estimation. Technical Review Team Report of Findings."

"The review panel has concluded that, while measuring Kaplan turbine discharge with acoustic scintillation within a total uncertainty (bias plus random error) of +/- 1% is not feasible at this time, with the present state of the technology, attaining a precision uncertainty (random error) of +/- 1% is feasible, and acoustic scintillation may therefore be acceptable to be used to obtain relative discharge measurements over the operating range of individual turbines, assuming the measurement bias (systematic uncertainty) remains essentially constant with discharge.

In the final analysis, the efficiency gains by applying current state-of-the-art acoustic scintillation may significantly outweigh the losses resulting from continued operation of poorly indexed or adjusted units."

McNary Dam (U.S. Army Corps of Engineers)

INTERNATIONAL Water Power & DAM CONSTRUCTION

December 2002. International Water Power & Dam Construction. "AQFlow flow meter successful in intake tests."

"Douglas County Public Utility District (PUD) of Washington, US, has successfully completed tests using the AQFlow Acoustic scintillation flow meter (ASFM) system to measure flow through a large Kaplan turbine."

"The ASFM technology is a promising technology for measuring large flows through short intakes" said Ken Pflueger of Douglas County PUD. " Preliminary test results show that the technology works well. It also has the advantage that one set of frames can be moved from unit to unit for index tests instead of having to be permanently installed."

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