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Display table request
A 5'x8' table able to hold the 50 pound experimental apparatus is requested for display

Key Words:
Heat Transfer; Steam Line; Fin; Algorithm; Engineering; FEA Software, CAE Software

Using a Cooling Fin's Temperature Gradient to Detect Water Levels

The project sponsor is Con-Edison's steam distribution division. Flooding from rainwater can submerge the underground steam lines and rapidly cool them. This cooling causes bubble collapse water hammer, which can cause damage and disrupt operations. The current water-level detection for flooding is costly. A proposed, lower cost, solution employs the temperature gradient from multiple sensors on a cooling fin to detect the water level. The goal of this project is to develop an algorithm to detect the water level based on the temperature gradient. Using fundamental engineering relationships for heat transfer and engineering software a gradient was predicted for given water levels. It is anticipated that experimental work will validate these analytical models. An experimental apparatus is being designed to validate the heat transfer coefficients which are needed to accurately and analytically model the system. The test apparatus will use an insulated electrical resistance heater which is connected to the cooling fin. The fin will then be submerged to different water levels while temperature and energy inputs are measured. It is also expected that these results will enable a simple algorithm to be programmed into Con-Edison's operations systems. It is expected that this new system will save several hundred thousand dollars over a five year lifespan and yield very reliable data on flooding. This should further the reliability of the steam system to serve its customers.