

ACOUSTICS2008/3338
**Data fusion technique applied to steam wastage estimation and
fault detection in an industrial process heating application**

Sivaram Nishal Ramadas

Institute of Sound and Vibration Research, University of Southampton, University Road, Highfield, S017
1BJ Southampton, UK

Data fusion, the process of combining information obtained together from many heterogeneous sensors to form a single composite picture of the environment, is used widely in many applications. Modern steam heating systems consist of mechanical devices known as 'traps', which are robust and reliable but inevitably over time can wear and fail, with the possibility of leaking steam. To diagnose such faulty steam traps and the level of leakage under operating conditions in a closed system is difficult. This paper presents the preliminary work carried out to integrate together data recorded from commercial sensors (such as piezoelectric acoustic emission devices, pressure transmitters, and thermocouples) to estimate steam wastage and fault detection in a steam system. Experimental data were acquired from a purpose built steam wastage test rig (built similar to the method outlined in the British Standard for determination of steam loss from traps), capable of simulating varying condensate loads by injecting preheated water into a steam test line. The captured composite data is then used to develop a signal processing algorithm to diagnose effective trap operation and quantify the rate of steam loss in the system and the results are discussed.