

SENSE & SERENDIPITY: SOME REFLECTIONS ON MIXING

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ABSTRACT

Serendipity¹ is, in simple terms, the art of making happy discoveries by accident, or alternatively, of being in the right place at the right time. An academic scientist locked in a laboratory may find something new within a detailed area of research. Likewise a plant engineer may work out a beneficial change to some process or design. In each case the person is using the wisdom, the *sense*, of their discipline drawn from knowledge and experience. But seldom would such discoveries be serendipitous. Truly serendipitous discoveries are more likely to originate from the plant engineer and the academic scientist having a drink together after playing golf. Why? Because their blinkers have been left in the office. From such encounters can stem not only an idea, but also the outline of a research and development program from which new products, processes or services may be born. In particular, the value of interactions between informed people with differing agendas, drawn from diverse backgrounds, is highlighted by outlining how such interactions have led to a useful, efficient family of combustors of which each member has a lower than normal impact on the environment and increases bottom line profit for its owner. It is postulated that the effect of jet precession, which is at the heart of the new family of combustors, is to change dramatically the mode of mixing between the fuel and the combustion air. The postulate calls into question the accepted wisdom that good combustion requires "good" mixing which requires intense vortex stretching and generation of fine scale turbulence. The development of a new family of low noise nozzles for, and a simple sheet metal addition to, previously inefficient and noisy induction air conditioning units provides another recent example of the role of serendipity in the evolution of science and engineering. En route, the reasons why governments attempt to stimulate "Research and Development" activity, and how they often undermine their own good intentions, are visited briefly.

¹ From a fairy-tale, 'The Three Princes of Serendip', each of whom had the faculty of making happy discoveries by being in the right place at the right time. Serendip is a former name for Sri Lanka. Horace Walpole is credited with coining the word in 1754.