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Extended inherent safety index: Inclusion of biological inherent safety index

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With the increase in global population, more wastes are generated requiring new waste management strategies to be introduced in order to support conventional waste treatment facilities. These strategies rely on the diversification of waste treatment technologies which are no longer deployed exclusively as centralized facilities of large capacity, but can be integrated in decentralized manner. One of the key concerns with selection of waste treatment methods is safety. This is critical for different waste treatment plants: Large capacity plants outside of cities can generate risk of important release of contaminant, such as dioxins, while decentralized small capacity plants can introduce risks through their proximity to urban community. However, limited number of tools includes safety assessment in the conceptual design stage of waste management system helping to tackle potential safety issue at minimum cost. In addition, no tool is able to assess both inherent safety of chemical and biological processes profile of the treatment options, and hence, unable to provide a fair comparison across different waste-treatment technologies. Indeed, currently available tools are designed for a single type of process and involve different evaluation parameters and scoring procedures. This motivates the development of the Extended Inherent Safety Index (EISI) for a comprehensive safety assessment of chemical and biological processes involved in waste-treatment. The proposed tool applicability to assess safety profile of both chemical and biological process is tested with case studies, comprising of food waste treatment technologies in Singapore. It helps to identify safety hotspots within each processes leading to improvements recommendations.

Biography

Alvin Ee Wei Lianga is a Research Engineer with the National University of Singapore, Singapore. His research interest is in the area of safety, health and environment. He has received Process Safety Award in 2016 from Institute of Chemical Engineering, Singapore.

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