

Name of research project:	Study of Electrostatic Discharge Hazards Related to Flammable Liquid Transfer Operations in Intermediate Bulk Containers (IBCs)
Background/Rationale	<p>Flammable liquid transfer operation is a common activity in the chemical, pharmaceutical and hazardous waste management industries in Singapore. Examples of such operations include transfers from storage tanks to intermediate bulk containers (IBCs), ISO tankers to IBCs, drums to IBCs, etc.</p> <p>These operations, depending on the degree of isolation/earthing of the storage vessels and interconnecting piping, could lead to an accumulation of electrostatic charges and result in an electrostatic discharge that might ignite a flammable atmosphere, if present.</p>
Study Objectives and Design	<p>The study aims to better understand the hazards associated with flammable liquid transfers to and from IBCs in Singapore. The study will specifically look at the likelihood that these transfer activities/processes could result in fires and explosions by studying the accumulation of electrostatic charges on IBC surfaces and piping. In doing so, the quantifiable parameters to evaluate such hazards could be developed for the industry. This would be in addition to the development of a semi-quantitative or qualitative assessment method.</p> <p>In addition, the study will also explore ready-made solutions (if any) to control such electrostatic hazards and evaluate whether such solutions are implementable/affordable in Singapore's context, especially for the SMEs.</p> <p>This study will adopt a large-scale laboratory experimental approach to allow for the careful control and variation of different parameters affecting electrostatic discharges. In general, the experimental rig needed for this study will involve two IBCs (one storage and one test) that are connected via piping and an intrinsically safe variable flow pump.</p> <p>Electrostatic charge measurement sensors will be placed externally along the piping and around the test IBC to gather the necessary data. Measurement of charges in-situ, within the flammable liquid will also be taken.</p>
Interim findings/reports:	Nil
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