

Nakkarin Sainyamsatit 2008: Design of Human Machine Interface for Chemical Process Safety of Continuous Biodiesel Production. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Thongchai Srinophakun, Ph.D. 135 pages.

Integration of human machine interface with a Hazard and Operability (HAZOP) analysis was proposed in this work. This concept potentially leads to the identification of some unexpected deviations and radically decreases the time necessary for the hazard identification process.

Continuous biodiesel production was simulated by ASPEN PLUS version 2006.5. It can be divided into six cases covering three conventional and three reactive distillation cases. In each case, soy bean oil compositions (trioleic, trilinoleic and tripalmitic oils) were varied in order to convert 1000 kg/hr feed to 99 wt % purity of biodiesel. Human machine interface (HMI) was designed to improve these processes by applying the automatic HAZOP analysis. With this approach, users can have sufficient information from simulation to analyze the optimum operation and safety. Severity level has also provided to classify the action in the process. Severity level 1 and 2 concerned to optimum conditions which are 58-64 °C, 50-200 KPa. If the analysis shows severity level 3, the safety instrument system (SIS) will automatically manage the operation in order to reduce/restrain the quantity of damage in this level. This proposed system could minimize the damage and also improve the overall quality of the process.

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Thesis Advisor's signature

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