

**ABSTRACT**

**An availability (lost work) analysis of the Methanol Synthesis Process with a view to developing an energy audit system.**

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Lost work analysis is important as it allows one to truly assess the thermodynamic efficiency of the system being evaluated. By trending lost work results the degradation in energy performance of a system can be monitored, solutions to problems evaluated and energy savings quantified.

In this thesis a comprehensive material and energy balance on the Methanol Process is first conducted. Out of this, Second Law Analysis is performed on the various subsystems of the process to identify major sources of inefficiency.

The calculation procedures have been computerized using LOTUS 1-2-3 software, thus making energy audits a routine. The intention is to use this auditing tool as a decision making device in determining the optimum conditions at which the process plant should be operated.