

## Increasing refiner plates efficiency with SPC techniques in a fiberboard manufacturing plants

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**Abstract:** In the medium density fiberboard (MDF) product market, Asian countries, especially China, Indonesia, where labor costs and energy and raw material costs are low, provide a significant competitive advantage. Turkey and many developed European countries can only compete with more efficient and effective production processes. In this case, it is vital to use existing resources more efficiently, to reduce costs by constantly monitoring production processes that generate high costs. With this study, it was aimed to increase for working life of the refiner plates and the efficiency of the system by monitoring the energy consumption in the refinery unit. The working life of the refiner plates is of significance to the fiber board manufacturing plant. It may affect refining quality, productivity, and power consumption. In the analyzed process of production considered; although the target life for refiner plates use was 21 days, when historical data were examined the average was determined 11.7 (s=6.34) days. This indicates that an average of 55% of refiner plates life time can be used. The reason why the refiner plates are out of use in a short time is the presence of hard particles such as stone and iron in the dimensions smaller than the wood chips, which can not be detected by scanning in the process with the wood fiber. Extracting these materials before entering the production process requires expensive investments, but in many cases it is impossible. In this study, energy consumption in the refinery unit was monitored every hour and daily distributions in energy consumption were analyzed using regression control chart which are SPC techniques. As known, control charts are used extensively to detect and control various sources of variation in manufacturing environment. Control charts provide signals for the quality and consistency of the system's performance. For example; If for some reasons, the defibrator is more energy consumption in the same conditions, then sample information about energy consumption collected to monitor the process may point out to unexpected performances and states and therefore attract special attention. Thus, the presence of the common (also called random or chance) or special (also called assignable) causes affecting the system can be monitored, and when a signal out of the control limits is detected, it is interfered to the system. Eventually, the refiner plates are avoid from prematurely blunted over the foreseen use period..

**Keywords:** Medium density fiberboard (MDF), Refinery efficiency, Statistical process control (SPC), Regression control chart, Energy consumption