

ABSTRACT

Dye manufacture produced high amount of dye wastewater from cleaning equipments and house keeping after each batch operation. The wastewater characteristic can be highly variable from day to day depending on the type and colour of dye. In general, dye wastewater contains toxic organic residue out from synthesis or chemistry process, that why dye wastewater disposal has to be controlled precisely in order to ensure that disposal waste will not create environmental problem.

Finishing department PT. DyStar Colours Indonesia Gabus Plant (DCI – GP) is producing semi-finished product to become finished product with physical treatment, which is basically no chemical reaction, this means dye wastewater generation out from Finishing plant is containing dyestuff and dispersing agent, thus the dye wastewater generated by Finishing process is possible to be re-used or recycled.

In the first semester 2009, Finishing department DCI – GP generated in average 145 m³ dyes wastewater / day, thus the wastewater treatment cost is USD 3,159 / day from evaporation process, spray drying, and disposal the solid waste to landfill.

Six Sigma is one of excellent and comprehensive system for achieving, sustaining and maximizing business success. Six Sigma is uniquely driven by close understanding of customer needs, disciplined use of facts, data and statistical analysis, and diligent attention to managing, improving and retaining business processes.

Six Sigma with DMAIC system confirmed that by Defining and Measuring process the dyes wastewater generation can be reduced from 145 m³ / day to become 70.3 m³ / day after 3 months. By Analysis and Improvement process, dye wastewater generation can be reduced up to 20 m³ / day, and furthermore can be recycled or re-used to become finished product which can be sold locally with reasonable price.

Total investment to implement this research / project is approx. USD 29,500 for purchasing and installing 40 units flow meter, 6 units water gun, 2 units floor scrubber, etc. with potential cost reduction Mio USD 1.15 per annum from reducing and recycling dyes wastewater generation in Finishing Plant.

Sigma value in the first quarter 2010 after DMAIC system was successfully implemented is 3.2 sigma, and there is still room for improvement. Efforts which can be used to maintain and improve sigma value such as : create cleaning targets for every single equipment cleaning, install automatic cleaning system / CIP (Cleaning In Place) for production machines, streamlining dye wastewater generation based on color pattern in order to simplify recycle process of dye by-product.