

ABSTRAK

Pra rancangan pabrik polistiren dari monomer stiren dengan kapasitas 250.000 ton/tahun akan direncanakan dibangun di Kota Cilegon, Provinsi Banten. Pabrik ini direncanakan akan beroperasi selama 330 hari dalam satu tahun dengan jumlah pekerja 147 orang. Polistiren dibuat dengan melakukan polimerisasi polistiren dengan bantuan inisiator benzoil peroksida pada fase cair. Reaksi yang berlangsung bersifat isothermal, pada suhu 90°C dan tekanan 1 Atm pada reaktor alir tangki berpengaduk (RATB). Bahan baku yang diperlukan adalah monomer stiren sebesar 34.933 Kg/jam, Etilen benzene sebagai pelarut sebesar 23.288 Kg/jam dan benzoil peroksida sebagai inisiator sebesar 2.531 Kg/jam. Kebutuhan utilitas air sebesar 544.106 Kg/jam, kebutuhan listrik sebesar 2.244,4064 kW, bahan bakar boiler berupa *fuel oil* sebesar 2.985 Kg/jam dan solar sebagai bahan bakar untuk sumber listrik cadangan sebesar 344,139 Kg/jam. Hasil analisa ekonomi dari pabrik ini menunjukkan jumlah *Fixed Capital Investment* (FCI) sebesar Rp. 1.713.322.106.760,- dan *Working Capital* (WC) sebesar Rp. 3.993.197.355.237,-. Keuntungan sebelum pajak (50%) sebesar Rp. 402.966.154.728,-. *Return On Investment* (ROI) sebelum pajak sebesar 23,52 % dan *Return On Investment* (ROI) setelah pajak sebesar 11,76%. *Pay Out Time* (POT) sebelum pajak 3,2 tahun dan *Pay Out Time* (POT) 5,1 tahun. *Break Event Point* (BEP) pada 48,28 % dan *Shut Down Point* (SDP) pada 26,29 %. berdasarkan analisa ekonomi tersebut dapat disimpulkan bahwa pabrik polistiren dari monomer stiren ini layak untuk didirikan.

Kata-kata Kunci : Monomer Stiren, Benzoil Peroksida, Etilen Benzene, Polistiren

ABSTRACT

Preliminary design of polystyrene plant from styrene monomer with capacity 250.000 ton/years was planned to be built in the city of Cilegon, Banten Province. This chemical plant will be operated for 330 day/year with 147 employees. The polymer is made by polymerizing polystyrene with the initiator of benzoyl peroxide in the liquid phase. The reaction is isothermal, the reactor operates at 90° C temperature and 1 atm pressure with continuous stirred tank reactor (CSTR). Raw material needed was styrene monomer 34.933 Kg/hour, ethylene benzene as a solvent 23.288 Kg/hour, benzoyl peroxide as an initiator 2.531 Kg/hour. Utilities needs include water as much as 544.106 Kg/hour, electricity requirements amounted to 2.244,4064 kW, fuel oil as much as 2.985 Kg/hour, and 344,139 Kg/hour of solar. An economic analysis shows that's this chemical plant need to be covered by Fix Capital Investment of about Rp. 1.713.322.106.760,-. Working Capital of about Rp. 3.993.197.355.237,-. Profit before tax (50%) is Rp. 402.966.154.728,-. Percentage of return on investment (ROI) before tax was 23,52 % while after tax was 11,76% . Pay out time (POT) before tax was 3,2 years while after tax was 5,1 years. The value of break even point (BEP) and shut down point (SDP) was 48,28 % and 26,29 % . Respectively based on the economic analisis, it was conclude that plant design of with polystyrene plant from styrene monomer capacity 250.000 ton/years was visible to build.

Keywords : Styrene Monomer, Benzoyl Peroxide, Ethylene Benzene, Polystyren