

ABSTRAK

Pabrik Benzena merupakan salah satu pabrik kimia yang mampu memberikan prospek yang sangat baik, mengingat kebutuhan Benzena di Indonesia semakin meningkat. Lokasi pabrik Benzena direncanakan didirikan di kawasan industri Banten dilahan seluas 60.000 m² dengan kapasitas produksi 160.000 ton/tahun. Pabrik kimia ini akan dioperasikan selama 330 hari dengan total 295 karyawan. Benzena dibuat melalui reaksi hidrolealkilasi Toluena dengan Hidrogen. Proses produksi Benzena dilakukan dalam *Fixed Bed Multitube Reactor* pada suhu 600 °C dan tekanan 25 atm. Reaksi memiliki konversi sebesar 85%. Pabrik Benzena membutuhkan bahan baku Toluena sebanyak 23.687 kg/jam dan Hidrogen sebanyak 517 kg/jam. Utilitas yang dibutuhkan untuk setiap tahunnya antara lain 2 m³/jam air secara keseluruhan, 383.462 kg/jam pendingin *dowtherm A*, 552.089 watt/jam listrik dan 26.696,3875 liter/hari bahan bakar. Dari hasil analisis ekonomi diperoleh hasil keuntungan sebelum pajak sebesar Rp. 16.425.500.000.000, keuntungan setelah pajak sebesar Rp. 9.618.990.000.000, *Break Even Point* (BEP) sebesar 30.833%, *Minimum Payback Period* (MPP) selama 3 tahun 8 bulan, *Internal Rate of Return* (IRR) sebesar 44% dan *Net Cash Flow Present Value* (NCFV) sebesar Rp. 50.996.700.000.000. Berdasarkan analisa ekonomi diatas, maka pabrik Benzena dari Toluena dan Hidrogen dengan kapasitas 160.000 ton/tahun layak untuk didirikan.

Kata-Kata Kunci : Benzena, Toluena, Hidrogen, Hidrolealkilasi, *Fixed Bed Multitube Reactor*

ABSTRACT

The Benzene Plant is one of the chemical plants that are able to provide excellent prospects, given the increasing Benzene requirements in Indonesia. The location of the Benzene plant is planned to be established in the industrial area Banten on an area of 60.000 m² with a production capacity of 160.000 tons/year. This chemical plant will be operated for 330 days with a total of 295 employees. Benzene is made hydrodealcilation reaction with Toluen and Hydrogen. Benzene production process is carried out in a Fixed Bed Multitube Reactor at a temperature of 600 °C and a pressure of 25 atm. The reaction has a conversion of 85 %. The Benzene plant requires 23.687 kg/hour Toluene and 517 kg/hour Hydrogen. Utilities needed for each year include 2 m³/hour of total water, 383.462 kg/hour dowtherm A, 552.089 watt/hour of electricity and 26.969.3875 liter/day of fuel gas. From the results of the economic analysis, the results of the pre-tax profit were Rp. 16.425.500.000.000 and the profit after tax were Rp. 9.618.990.000.000. Break Even Point (BEP) was 30,833%, Minimum Payback Period (MPP) was 3 years 8 months, Internal Rate of Return (IRR) was 44% dan Net Cash Flow Present Value (NCFV) was Rp. 50.996.700.000.000. Based on the above economic analysis, the Benzene plant from Toluene and Hydrogen with a capacity of 160..000 tons/year is suitable for establishment.

Keywords : Benzene, Toluene, Hydrogen, Fixed Bed Multitube Reactor