

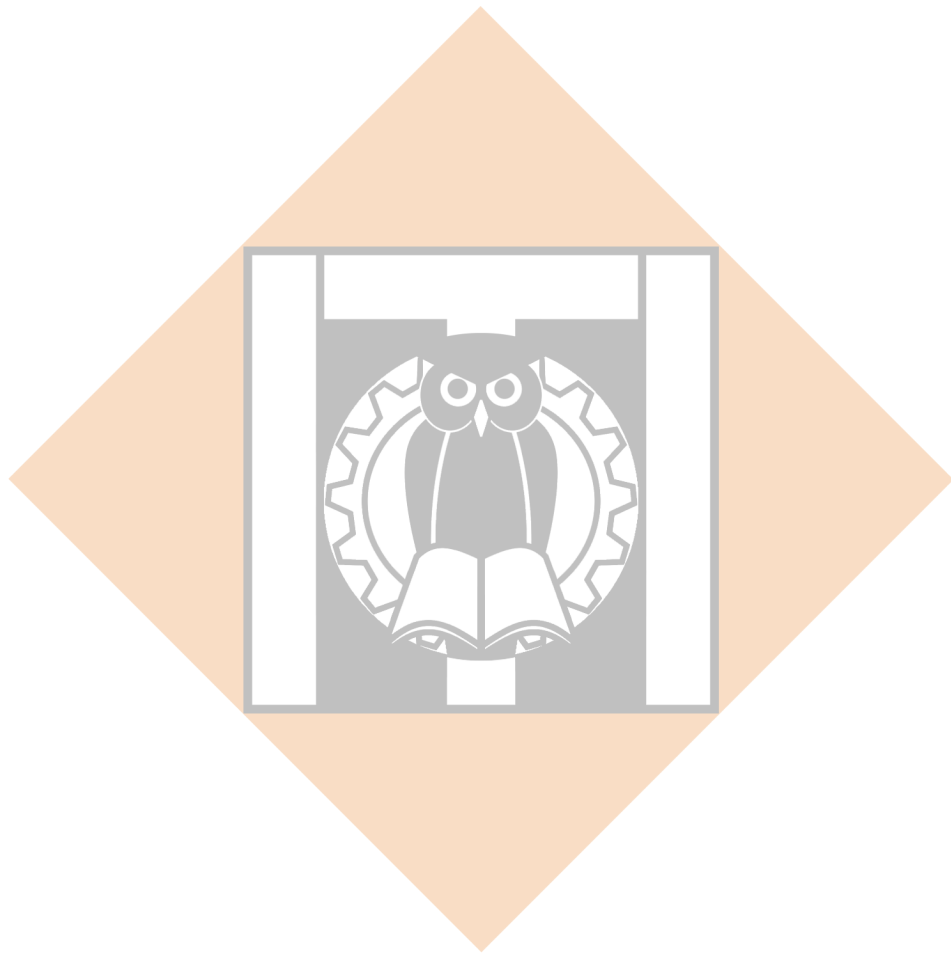
ABSTRAK

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Judul	Pra-Rancangan Pabrik Kopolimer <i>Poly Methyl Methacrylate – Block–Poly Butyl Methacrylate</i> Dengan Kapasitas 5.000 Ton/Tahun

Industri cat (*coating*) di Indonesia terus berkembang sejalan dengan pertumbuhan sektor properti dan perumahan. Salah satu bahan utama dalam cat adalah resin sintesis. Resin sintesis mempunyai peranan penting dalam kualitas cat yang dihasilkan. Dengan memerlukan komposisi monomer, katalis, dan pelarut yang dapat menunjang kualitas polimer yang dihasilkan sehingga dapat meningkatkan kualitas cat. Untuk meningkatkan kualitas cat diperlukan kombinasi monomer-monomer yang digunakan yaitu monomer *Methyl Methacrylate* (MMA) dengan monomer *Butyl Methacrylate* (BMA) secara kopolimerisasi *block* menjadi PMMA-b-PBMA. Melihat masih dilakukannya impor polimer sebagai bahan utama pembuatan cat, maka dapat dijadikan sebagai peluang usaha. Selain itu, kebutuhan cat di Indonesia juga semakin meningkat seiring dengan meningkatnya populasi manusia di Indonesia. Pabrik PMMA-b-PBMA rencananya akan didirikan di daerah Cilegon, Banten dengan kapasitas produksi 5.000 ton pertahun. Metode yang digunakan pada pabrik ini adalah metode polimerisasi emulsi, dimana Monomer MMA direaksikan dengan monomer BMA dengan bantuan inisiator yang terjadi dalam reaktor tangki berpengaduk pada suhu 75°C dan bertekanan 1 atm. Kebutuhan sarana penunjang pada pabrik PMMA-b-PBMA antara lain kebutuhan air pendingin 23.351 kg/jam, air umpan *boiler* 8.707 kg/jam, kebutuhan air domestik 720 kg/jam, kebutuhan bahan bakar solar 1.317 kg/hari, dan kebutuhan listrik 165 kWh. Bentuk badan hukum dari perusahaan ini adalah perseroan terbatas (PT), dimana pimpinan perusahaan dipimpin oleh dewan direksi yang membawahi 120 orang karyawan yang bekerja sesuai jam kerja yang terdiri dari karyawan shift dan karyawan non-shift. Pabrik ini beroperasi selama 330 hari pertahun. Dari analisa ekonomi yang dilakukan terhadap pabrik diperoleh *Fixed Capital Investment* (FCI) sebesar Rp. 108.653.229.631, sedangkan *Working Capital Investment* (WCI) sebesar Rp. 63.827.565.444. Analisa kelayakan diperoleh *Break Even Point* (BEP) di tahun pertama 41,54%,

Net Cash Flow Present Value (NCFPV) di tahun ke-10 sebesar Rp 305.512.025.441, *Internal Rate of Return* (IRR) 38,05%, dan *Minimum Payback Periode* (MPP) 3 Tahun 9 Bulan. Dari hasil Analisa ekonomi di atas, maka pabrik PMMA-b-PBMA dengan kapasitas 5.000 ton pertahun layak (*feasible*) untuk didirikan.

Kata Kunci : *Methyl Methacrylate, Butyl Methacrylate, Kopolimer, Resin, dan Coating*



ABSTRACT

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Judul	Preliminary Plant Design of Poly Methyl Methacrylate –Block– Poly Butyl Methacrylate Copolymers with 5000 Tons/Year Capacity

The paint industry (coating) in Indonesia continues to grow in line with the growth of the property and housing sectors. One of the main ingredients in paint is synthetic resin. Synthetic resin has an important role in the quality of the paint produced. By requiring a composition of monomers, catalysts, and solvents that can support the quality of the polymer produced so as to improve the quality of the paint. To improve the quality of the paint, a combination of monomers are needed, namely Methyl Methacrylate (MMA) monomer and Butyl Methacrylate (BMA) monomer by block copolymerization into PMMA-b-PBMA. Seeing that polymer is still being imported as the main ingredient for paint production, this may be used as a business opportunity. In addition, the demand for paint in Indonesia is also increasing along with the increasing human population in Indonesia. The PMMA-b-PBMA plant is planned to be established in Cilegon, Banten with a production capacity of 5,000 tons per year. The method employed in this plant is the emulsion polymerization method, which the MMA monomer is reacted with the BMA monomer with the help of initiators occurring in a stirred tank reactor at 75 ° C and 1 atm. The needs for supporting facilities at the PMMA-b-PBMA plant includes 23.351 kg/h of cooling water, 8.707 kg/h of boiler feed water, 720 kg/h of domestic water demand, 1.317 kg/day of diesel fuel, and 165 kWh of electricity. The form of the legal entity of this company is a limited liability company (PT), where the company leadership is led by a board of directors who oversees 120 employees and work according to working hours consisting of shift employees and non-shift employees. This plant operates for 330 days per year. The result of economic analysis for PMMA-b-PBMA plant is as follows: Fixed Capital Investment (FCI) was Rp. 108.653.229.631, while the Working Capital Investment (WCI) was Rp. 63.827.565.444. Feasibility analysis obtained Break Even Point (BEP) in the first year of 41,54%, Net Cash Flow Present Value (NCFPV) in the 10th year of IDR 305.512.025.441, Internal

Rate of Return (IRR) 38,05%, and Minimum Payback Period (MPP) 3 Years 9 Months. Based on the results of economic analysis above, it can be concluded that the PMMA-b-PBMA plant with a capacity of 5.000 tons per year is feasible to be established.

Keywords: *Methyl Methacrylate, Butyl Methacrylate, Copolymer, Resin, and Coating*

