

## Abstrak

Pabrik benzonitril ini dirancang dengan kapasitas 50.000 ton/tahun yang akan didirikan di Kawasan Industri Cilegon, Provinsi Banten, dengan luas tanah 30.000 m<sup>2</sup>. Pabrik ini akan beroperasi selama 330 hari atau 24 jam per hari dengan tenaga kerja sebanyak 150 orang.

Benzonitril dibuat dengan mereaksikan antara gas ammonia dan toluen di dalam reaktor *fixed bed catalytic* dengan katalis Vanadium-Titanium-oxide pada suhu 310-340 °C dan tekanan 3 atm. Untuk memenuhi kebutuhan tersebut digunakan bahan baku toluen sebanyak 52.422,34 ton/tahun, ammonia 11.734,75 ton/tahun dan 93,78 kg/jam katalis. Bahan baku tersebut diperoleh dari PT. Styrimo Mono Indonesia yang memproduksi toluen dan PT. Pupuk Kujang yang memproduksi ammonia. Utilitas yang diperlukan terdiri dari air sebanyak 85.642 kg/jam, 195 kg/jam bahan bakar dan listrik sebesar 1.454,56 Kw. Hasil evaluasi ekonomi menunjukkan Modal Tetap (*Fixed Capital*) yang diperlukan sebesar Rp 346.484.194.548, Modal Kerja (*Working Capital*) sebesar Rp. 643.018.672.7547, *Percent return of Investment (ROI) before tax* 54,78 %, *Percent return of Investment (ROI) after tax* 41,09 %, *Pay Out Time (POT) before Tax* sebesar 1,6 years, *Pay Out Time (POT) after Tax* sebesar 2 years, *Break Event Point (BEP)* sebesar 40,05 %, *Shut Down Point (SDP)* 29,11 %, *Discounted Cash Flow (DCF)* yang diperoleh sebesar 6,38 %. Ditinjau dari segi ekonomi, pabrik benzonitril dari toluene dan amoniak dengan kapasitas 50.000 ton/tahun ini cukup menarik bila didirikan di Indonesia.

Kata kunci : benzonitril, toluen, amonia

## Abstrack

*Preliminary plant design of Benzotrile with capacity 50.000 tons/year is planned to be built in Kawasan Industri Cilegon, the province of Banten, in the area of land of 30,000 m<sup>2</sup>. This chemical plant will be operated for 330 days or 24 hours a day with total 150 employees.*

*Benzotrile made by reacting Ammonia and Toluene gas in Vanadium-Titanium-Oxide catalyst bed at temperature 310-340 °C and pressure of 3 atm. In order to fulfill the demands 52,422.34 ton/year of toluene, 11,734.75 ton/year of ammonia and 93,78 kg/year catalyst are needed. The raw materials came from PT. Styrimo Mono Indonesia that provides toluene and PT. Pupuk Kujang that provides ammonia. Utility needed to extend the process system consist of 85,642 kg/h water, 195 kg/h of fuel and 1,454.56 Kw of electricity. An economic analysis shows that this chemical plant need to be covered by Fixed Capital needed is Rp 346.484.194.548, Working Capital of Rp 643.018.672.754, Percent return of Investment (ROI) before tax is 54.78 %, Percent return of Investment (ROI) after tax is 41.09 %, Pay Out Time (POT) before Tax is 1,6 years, Pay Out Time (POT) after Tax is 2 years, Break Event Point (BEP) is 40.05 %, Shut Down Point (SDP) is 29.11 %, Discounted Cash Flow (DCF) is 6.38 %. Based on the above factors, it can be concluded that preliminary plant design of Benzotrile with capacity 50.000 tons/year is visible to be built.*

*Key word : benzotrile, toluene, ammonia*