INTISARI

Limbah lumpur (*sludge*) industri minyak berpotensi mencemari lingkungan. Bentuk fisik lumpur yang berupa campuran padatan dan cairan dapat dimanfaatkan dengan mengambil minyak dan padatan mineralnya. Pengolahan limbah bertujuan untuk mengubah limbah menjadi suatu produk yang dapat digunakan kembali.

Penelitian limbah lumpur Kilang Minyak Balongan, dimulai dengan cara lumpur minyak didistilasi-pirolisis untuk dapat mengambil minyak yang dapat terambil. Residu yang didapat kemudian dibakar dengan tujuan menghilangkan unsur karbon yang masih ada. Residu yang didapat 48,77% dari berat mula-mula lumpur. Penelitian dilakukan dengan cara mendesain campuran mortar, dimana bahan tambahan ini digunakan dengan konsentrasi 5 – 20% dari berat semen yang diperlukan. Pengujian kuat tekan dilakukan pada 3, 7 dan 28 hari. Lembaran asbes semen dibuat dengan perbandingan antara semen dan serat asbes yaitu 4 : 1. 3 : 2, 2 : 3, dan 1 : 4. Pengujian sifat fisis berupa porositas, densitas, ketahanan bakar dan modulus patah, berdasarkan SII Lembaran Asbes Semen dari Departemen Perindustrian RI.

Kuat tekan 0% sebagai pembanding didapatkan hasil 28 hari 366,223 kg/cm^2. Konsentrasi 5% didapatkan 28 hari 452,300 kg/cm^2. Konsentrasi 10% didapatkan 28 hari 428,150 kg/cm^2. Konsentrasi 15% didapatkan 28 hari 380,750 kg/cm^2. Untuk konsentrasi 20% didapatkan 28 hari 262,363 kg/cm^2. Dari uji kuat tekan konsentrasi antara 5 – 15% memiliki kuat tekan lebih tinggi, sehingga bahan ini dapat digunakan sebagai bahan tambahan untuk mengurangi penggunaan semen.

Porositas rata-rata lembaran asbes semen dengan perbandingan antara bahan isian dan asbes 4 : 1 = 17,872%, 3 : 2 = 20,795%, 2 : 3 = 20,165% dan 1 : 4 = 26, 020%. Densitas lembaran asbes semen dengan perbandingan antara bahan isian dan asbes 4 : 1 = 2,05 gr/cm^3, 3 : 2 = 2,12 gr/cm^3, 2 : 3 = 2,24 gr/cm^3 dan 1 : 4 = 2,23 gr/cm^3. Pengujian ketahanan bakar didapatkan untuk lembaran asbes semen perbandingan bahan isian dan asbes untuk 4 : 1, 3 : 2 dan 2 : 3 masih memenuhi standard, sedangkan perbandingan 1 : 4 tidak memenuhi standard. Modulus patah rata-rata lembaran asbes semen dengan perbandingan antara bahan isian dan asbes 4 : 1 = 120,613 kg/cm^2, 3 : 2 = 112,870 kg/cm^2, 2 : 3 = 137,053 kg/cm^2 dan 1 : 4 = 118,987 kg/cm^2. Berdasarkan standard maka lembaran asbes semen masuk dalam mutu "100" dengan minimum rata-rata 100 kg/cm^2. Bahan isian pada pembuatan lembaran asbes semen dapat dipakai dengan perbandingan antara bahan isian dan asbes 4 : 1 dan 2 : 3 berdasarkan sifat-sifat fisis porositas, densitas, ketahanan bakar dan modulus patah.

Kata Kunci : Lumpur Minyak; Bahan Isian; Mortar; Lembaran Asbes Semen

ABSTRACT

Sludge of oil refinery has potency to pollute environments. Its physical phase is a mixture of solid and liquid. According to this feature, it can be utilized by collect its oil and mineral solid. The aim of waste treatment is to change wastes to be useful products.

The research as to sludge of Balongan Oil Refinery was started by distillating and pyrolizing the sludge to collect its recoverable oil. The recoverable residue was then burned in order to eliminate its Carbon content. The final residue had 48.77% of the initial sludge weight. The research was performed by designing mortar mixture. In this case, this additional substance was used in 5-20% concentration of needed cement weight. Test of pressure strength was performed in 3, 7 and 28 days. The cement asbestos sheet was made in proportion between cement and asbestos fiber of 4 : 1, 3 : 2, 2 : 3, and 1 : 4. Test of physical features was based on SII Cement Asbestos Sheets from Department Industrial of RI; porosity, density, burn strength and modulus failure.

The pressure of 0% composition as a comparison was achieved 28 days 366.223 kg/cm^2. The 5% concentration was achieved 28 days 452.300 kg/cm^2. The 10% concentration was achieved 28 days 428.150 kg/cm^2. The 15% concentration was achieved 28 days 380.750 kg/cm^2. The 20% concentration was achieved 28 days 262.363 kg/cm^2. According to pressure strength test, the concentration between 5-15% had a high pressure strength than mortar without filler, the substance could be utilized as additional substances to reduce cement uses.

The average porosity of cement asbestos sheet in proportion between filling substance and asbestos of 4 : 1 was 17.872%, 3 : 2 was 20.795%, 2 : 3 was 20.165% and 1 : 4 was 26.020%. The density of cement asbestos sheet in proportion between filling substance and asbestos of 4 : 1 was 2.05 gr/cm^3, 3 : 2 was 2.12 gr/cm^3, 2 : 3 was 2.24 gr/cm^3 and 1 : 4 was 2.23 gr/cm^3. Test of burn strength of cement asbestos sheet in proportion between filling substance and asbestos of 4 : 1, 3 : 2 and 2 : 3 complied the standard, whereas that for proportion of 1 : 4 did not. The average modulus failure of cement asbestos sheet in proportion between filling substance and asbestos of 4 : 1 was 120.613 kg/cm^2, 3 : 2 was 112.870 kg/cm^2, 2 : 3 was 137.053 kg/cm^2 and 1 : 4 was 118.987 kg/cm^2. According to standard, the cement asbestos sheet was ranked in the "100" quality with minimum average of 100 kg/cm^2. The filling substance to produce cement asbestos sheets could be used in proportion between filling substance and asbestos of 4 : 1 and 2 : 3 based on porosity, density, burn strength and modulus failure.

Key Words : Oil Sludge; Filling Substance; Mortar; Cement Asbestos Sheet.