

ABSTRACT

Pembangkit Listrik Tenaga Panas Bumi (PLTP) Unit 1 Kamojang merupakan salah satu supply listrik untuk kebutuhan masyarakat kabupaten Bandung. PLTP Unit 1 mengalami peristiwa insiden kebakaran pada struktur penyokong mesin *Turbine-Generator*, pada tahun 2014. Struktur penyokong mesin *Turbine-Generator* mengalami kerusakan pada kolom dan balok yang mengakibatkan terjadinya retak (*crack*), dengan kategori kerusakan ringan, sedang dan berat.

Peyusunan tugas akhir ini bertujuan untuk menganalisis keandalan struktur pasca kebakaran serta rencana penambahan beban pada mesin *Turbine-Generator*. Selain itu juga untuk menghitung berapa kekuatan struktur pasca kebakaran. Pengambilan data meliputi pemeriksaan visual, pengujian *core drill*, pengujian *rebound hammer*, pengujian UPV (*ultrasonic pulse velocity*) dan *rebar scanning*. Setelah dilakukan analisis pada struktur penyokong mesin *Turbine-Generator* terjadi kerusakan yang cukup signifikan pada balok dan kolom sehingga perlu dilakukan perbaikan, selain itu juga perlu dilakukan perkuatan pada balok dan kolom akibat penambahan beban baru. Pemilihan perkuatan menggunakan metode *concrete jacketing* lebih efektif karena sifat dari beton itu sendiri tahan terhadap panas yang ditimbulkan oleh mesin *Turbine-Generator* saat beroperasi dari pada metode *steel jacketing* yang sifat mekanisme baja tidak tahan terhadap panas.

Berdasarkan hasil pengamatan menunjukkan bahwa, pada lantai *Basement* didapat mutu beton ($f'c$) yang diperoleh yaitu, untuk Balok = 21.10 N/mm², Kolom = 23.75 N/mm² dan *Shear wall* = 25.21 N/mm², pada lantai *Groud floor* dan *Mezzanine* didapat mutu beton ($f'c$) yang diperoleh yaitu, untuk Kolom = 14.43 N/mm² dan Pelat lantai = 14.69 N/mm², pada lantai *Operating* didapat mutu beton ($f'c$) yang diperoleh yaitu, untuk Balok = 21.10 N/mm². Hasil perhitungan perkuatan struktur balok (*concrete jacketing*) didapatkan hasil penambahan tulangan Tarik 5 D25 dan tulangan geser D13-50 Dan perhitungan perkuatan struktur kolom (*concrete jacketing*) didapatkan hasil penambahan tulangan longitudinal kolom 20 D25 dan tulangan geser D13-150. Kesimpulan yang dapat diambil dari perbaikan struktur penyokong mesin *Turbine-Generator* dengan menggunakan metode *concrete jacketing* menunjukkan bahwa struktur tersebut masih layak, kuat dan kaku.

Kata kunci: *Concrete jacketing*, Struktur pasca kebakaran, Perbaikan struktur, Penambahan beban mesin, Struktur penyokong mesin

ABSTRACT

Geothermal Power Plant (Pembangkit Listrik Tenaga Panas Bumi/PLTP) Unit 1 Kamojang is one of the plant that supplies the electricity needs for the citizen of Bandung district. PLTP Unit 1 once had a fire incident on the structure which supported the Turbine-Generator machine back in 2014. The structure which supported the Turbine-Generator machine suffered damages on the column and beam and these damages leads to cracks within the category of light, moderate and severe.

This final assignment was developed to analyze a structure reliability after it was caught on fire and the plan to add more weight to the Turbine-Generator machine. And also to calculate the strength of the structure after a fire incident. The data collection includes visual observation, core drill testing, rebound hammer testing, UPV (ultrasonic pulse velocity) testing and rebar scanning. After an analysis was performed on the structure which supported the Turbine-Generator machine it was discovered that there were significant damages on the beam and column which needed reparation, and reinforcement for the beam and column was also needed due to the newly added weight. The chosen reinforcement method is the concrete jacketing because it is more effective considering the nature of concrete itself which can endure the heat that is generated by the Turbine-Generator machine when it is operated rather than the steel jacketing method and the mechanism nature of steel that is not heat retardant.

Based on the observation it was found that, the Basement floor has a concrete quality ($f'c$) of, for the Beam = 21.10 N/mm², Column = 23.75 N/mm² and the Shear wall = 25.21 N/mm², the Groud floor and Mezzanine has a concrete quality ($f'c$) of, for the Column = 14.43 N/mm² and the Floor Plate = 14.69 N/mm², the Operating floor has a concrete quality ($f'c$) of, for the Beam = 21.10 N/mm². The calculation of the concrete jacketing reinforcement on the beam structure result is additional reinforcement Pull (Tarik) 5 D25 and slide reinforcement D13-50, and the calculation of the concrete jacketing reinforcement on the column structure result is additional reinforcement on the longitudinal column of 20 D25 and the slide reinforcement D13-150. The conclusion from the structure reinforcement on the Turbine-Generator machine that uses the method of concrete jacketing is that the structure is found to be decent, strong and rigid.

Key words: Concrete jacketing, post fire Structure, structure Reparation, weight addition on the machine, Structure that supports the machin