

ABSTRAK

ANALISIS PERBANDINGAN PERENCANAAN PERKUATAN TOWER *BTS* (*BASE TRANSCIVER STATION*) BERDASARKAN ATURAN TIA/EIA-222-F DAN TIA/EIA-222-G

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Perkembangan teknologi sekarang ini begitu pesat sekali sehingga tidak bisa dipisahkan antara teknologi informasi dengan teknologi telekomunikasi. Salah satu diantara infrastruktur tersebut adalah Base Transceiver Station (BTS) atau Radio Base Station (RBS) yaitu tower/menara telekomunikasi Pemancar yang biasa disebut Tower BTS. Adanya penambahan antenna akan menambah beban pada tower/menara tersebut. Hal ini perlu dievaluasi apakah penambahan beban pada tower tersebut aman atau tidak. Keamanan struktur pada tower bts ini ditinjau dari nilai twist (sudut puntir), sway (rotasi angular), displacement (lendutan) dan stress ratio (perbandingan antara beban terfaktor dengan kapasitas penampang). Dimana nilai stress ratio ini harus dibawah 1 (< 1).

Perhitungan struktur menara telekomunikasi yang ada di Indonesia sampai sekarang ini sebagian besar masih mengacu pada peraturan Telecommunication Industry Association dan Electronic Industries Association atau lebih dikenal dengan TIA/EIA-222-F yang resmi dikeluarkan pada tahun 1996 yang sesuai dengan standar America Institute of Steel Construction (AISC) dan masih menggunakan metode Allowable Stress Design (ASD). Kemudian pada Januari tahun 2006 TIA/EIA mengeluarkan standar baru yaitu TIA/EIA-222-G yang menggunakan metode Load Resistance and Factor Design (LRFD). Analisis dilakukan menggunakan MS Tower.

Hasil analisis berdasarkan peraturan TIA/EIA-222-F-1996 didapatkan nilai stress ratio > 1 dengan nilai 1,568 dan nilai sway $> 0,5$ senilai 0,5036 maka diperlukan perkuatan untuk tower tersebut. Perlu dilakukan penambahan batang perkuatan di kaki atau di Leg dan di batang Horizontal yang bertujuan untuk memperluas batang struktur sehingga menghasilkan nilai stress ratio < 1 dan sudah memenuhi syarat. Hasil perhitungan MS Tower untuk tonase perkuatan sebesar 372,65 Kg atau bertambah sebesar 3%. Analisis berdasarkan peraturan TIA/EIA-222-G-2006 didapatkan nilai stress ratio < 1 dengan nilai 0,771 dan nilai sway $< 0,5$ yaitu senilai 0,2656 maka tidak diperlukan perkuatan untuk tower tersebut.

Kata Kunci: TIA/EIA-222-F, TIA/EIA-222-G, perkuatan, MS Tower, Stress Ratio

ABSTRACT

COMPARISON ANALYSIS OF STRENGTHENING PLANNING OF BTS TOWER (BASE TRANSCIVER STATION) BASED ON TIA/EIA-222-F AND TIA/EIA-222-G RULES

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Technology is developing so rapidly that it cannot be separated between information technology and telecommunications technology. One of these infrastructures is the Base Transceiver Station (BTS) or Radio Base Station (RBS), namely Transmitter telecommunication towers which are commonly called BTS Towers. The addition of an antenna will add to the load on the tower/tower. This needs to be evaluated whether the additional load on the tower is safe or not. The structural safety of the BTS tower is viewed from the value of twist (twist angle), sway (angular rotation), displacement (deflection) and stress ratio (comparison between factored load and cross-sectional capacity). Where the value of this stress ratio must be below 1 (< 1).

The calculation of the structure of telecommunications towers in Indonesia until now mostly still refers to the regulations of the Telecommunication Industry Association and the Electronic Industries Association, or better known as TIA/EIA-222-F which was officially issued in 1996 according to the standards of the America Institute of Steel Construction. (AISC) and still uses the Allowable Stress Design (ASD) method to determine the strength of the structure. Then in January 2006 TIA/EIA issued a new standard, namely TIA/EIA-222-G which uses the Load Resistance and Factor Design (LRFD) method. Analysis was performed using MS Tower.

The results of the analysis obtained based on the TIA/EIA-222-F-1996 regulations obtained a stress ratio value of > 1 with a value of 1.568 and a sway value of > 0.5 with a value of 0.5036, so reinforcement is needed for the tower. It is necessary to add reinforcement rods to the legs or legs and horizontal rods which aim to expand the structural members to produce a stress ratio < 1 and meet the requirements. MS Tower calculation results for strengthening tonnage of 372.65 kg or an increase of 3%.

The results of the analysis obtained based on TIA/EIA-222-G-2006 regulations obtained a stress ratio value of < 1 with a value of 0.771 and a sway value of < 0.5 , which is worth 0.2656, so no strengthening is needed for the tower.

Keywords: TIA/EIA-222-F, TIA/EIA-222-G, strengthening, MS Tower, Stress Ratio



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