

ABSTRACT

Transmission tower is a vital component so that a good prediction of tower's damage is important in order to anticipate a fatal damage. Earlier facts showed that tower had a local damage or buckling in some part of the stems that in fact the tower is still intact and standing upright. PT . PLN initiated to provide emergency reinforcement in anticipation of a fatal damage . Other facts indicated that the specific location of tower located on the hill, at outskirts of river slope, and tower's foundation used a local foundation without tie beam. The hypothesis is differential settlement caused buckling. It is supported by observational data such as photos and measurement data of 3D existing tower's geometry. There are some researches conducted to prove the hypothesis such as statically indeterminate structural analysis, elastic linear structural analysis, and elastic nonlinear structural analysis (DAM) which refer to technical data and the implementation of shop drawing with program SAP 2000 v.14.0. Evaluation of tower's strength is refer to AISC-LRFD 2010. The results showed that first, tower is statically indeterminate structure thus differential settlement affects the whole structure's behavior. Second, differential settlement affects a significant changes of bracing's axial force that indicated of buckling when compared with others external loads either due to constant load, wind load, and under broken wire load. Third, differential settlement affects some of tower's stems are in unstable and critical condition. Therefore, the provision of emergency was appropriate retrofitting and the foundation' integrity with tie beam can not be underestimated.

Key words: differential settlement, foundation, stability, buckling, tower transmission