DESIGN ANALYSIS OF 35 MT CONCENTRIC PASSIVE HEAVE COMPENSATOR

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CANDIDATE DECLARATION

I hereby declare that this thesis is based on my original work except for the quotations and citations, which have been acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UiTM or other institutions. Therefore, I, admit that have been provided with the Academic Rules and Regulations for Under Graduate, Universiti Teknologi MARA, adaptable with the manner of my research study.

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ABSTRACT

This paper provides the findings of the design analysis of a 35 Metric Tonne (MT) Concentric Passive Heave Motion Compensator component. This design is proposed to substitute the existing Passive Heave Compensator (PHC) design and reduce the material usage whilst maintaining its function as for the study is done to proposed a new and improved design from the existing design of PHC. This research makes sure the performance of the component is safe along with the proper material selection and detail design. The main objective of this research is to design the main component of the compensator and comply the analysis accordance with Det Norske Veritas (DNV) standards. This research will provide the mathematical model for the performance analyses, the detail designs and the simulations of the design. The method of obtaining the performance analyses of the concentric PHC is outlined by employing software to complete the performance calculation, 3-dimensional (3D) design drawing, and finite element analysis (FEA) simulation. Through the calculation, the properties of the component's performance are gained thus, the data parameters are illustrated in the form of 3D drawing and the analyses can be done by FEA. The result of the FEA presents the simulation of the component towards its boundary conditions such as fixed constraints and selected surfaces. This simulation shows results on the effect of the pressure, force and the stiffness of the component towards the load applied. The data gained from these analyses are the force magnitude, Von Mises Stress, displacement (x, y and z-axes), stresses and strains (xx, xy, xz, yy, yz, and zz-axes). As the

conclusion, this research recommended the substitution of the component design will lead to new design approach and it will be one of the success methods of obtaining design analysis of concentric passive heave compensator.