

Study for Effective Lightning protection System for Floating Roof Tanks in Petroleum Refinery

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Degree of Master of Science

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Sri Lanka

February 2020

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Thesis/Dissertation submitted in partial fulfillment of the requirements for the degree Master of Science in Electrical Installations

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Abstract

Refinery is considered as the foremost division of the Ceylon petroleum corporation which ensures the safety of the operation of process plant as well as for maintaining the required country's demand for petroleum products to enhance the energy sector of the country.

Since the un-interruptible continuous refinery operation is critically important to maintain national requirement of petroleum product and protecting the tanks and process equipment is essential.

In this study, main concern about floating roof large crude oil storage tank facility. The most general method to prevent the possible damage to floating roof crude oil storage tank is using good earthing. The earthing system provides an electrical path to the ground and performance of the earthing system gets better as the earth loop impedance becomes lower.

Since it is among the major concerns currently Refinery engineering staff is struggling with; and a proper method for reducing the sparks due to lightning mainly at critical locations were studied and simulations were done by using the floating roof tank model prepared by using PSCAD software which was validated with the actual model tank tested in the UOM laboratory.

Direct and In-direct surge currents were calculated theoretically for 25 kA, 50 kA, 100 kA and 200 kA surges of 10/350 μ S & 8/20 μ S by applying calculated surge currents to the tank model.

Finally, by analyzing all the results and the protection methods of different types of grounding devices were studied and proposed adjustable grounding conductor (AGC) with suitable locations as the optimum solution.

Acknowledgement

I would like to express my sincere gratitude to my thesis supervisors Prof. J.R. Lucas and Dr. Asanka Rodrigo for having guidance and for their cordial support throughout the research and the thesis. Dr. Asanka's support and motivations were invaluable driving forces for me for the successful accomplishment of this study. It is for me a great pleasure and a great experience to having work under such a friendlier supervisor, who is having a broad scientific knowledge related to lightning protection and Earthing systems.

I am also very grateful to my masters' coordinator Dr. Prasad for his precious advices on thesis writing and for providing me encouragements to complete the thesis in time.

I would like to gratefully thank Refinery Manager Eng. E.A.S. Edirisinghe, Deputy Refinery Manager Eng. L.G.M.R. Perera, Senior Electrical Engineer Eng. D.D.U.S. Jayasundera and my colleagues, staff and the subordinates in the Refinery Electrical Department who helped me to complete this research and thesis successfully.

Furthermore, I would like to thank each individual who has supported me in various ways throughout the entire process.

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