ABSTRACT

STRESS ANALYSIS AT THE INTERSECTION OF NON RADIAL NOZZLE AND TOROIDAL TANK

By

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Kerosene to gas conversion policy done by the Indonesian government, causing the use of LPG tank is more required. Previous study shows that toroidal tank can withstand stress better than the current PERTAMINA 3kg LPG tank. Hence, the study was extended to determine the position of non radial cylindrical nozzle that gives the highest limit pressure. Toroidal tank having the same volume as PERTAMINA LPG 3kg of 7.3 Liter and radius ratio of 4 were used in this study. Cylindrical nozzle of 25 mm diameter and 10 mm height was attached perpendicular to the toroidal plane. The position of nozzle was made various along a major radius of toroid, from intrados to extrados and changed every 5mm, from 155 to 210 mm. The maximum applied internal pressure was 1,5 times pressure to yield. The study used ANSYS Software and it was found that the best nozzle position, indicated by the highest limit pressure, is located between crown and the extrados and closer to the extrados. This result conforms to the membrane theory that the highest stress occurs at the intrados and nozzle shall not be located next to that location.

Keywords: pressurized toroidal tank, limit pressure, finite elemen analysis