Reliability of Copvs Accounting for Margin of Safety on Design Burst

By Pappu L. N. Murthy

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 22 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.In this paper, the stress rupture reliability of CarbonEpoxy Composite Overwrapped Pressure Vessels (COPVs) is examined utilizing the classic Phoenix model and accounting for the differences between the design and the actual burst pressure, and the liner contribution effects. Stress rupture life primarily depends upon the fiber stress ratio which is defined as the ratio of stress in fibers at the maximum expected operating pressure to actual delivered fiber strength. The actual delivered fiber strength is calculated using the actual burst pressures of vessels established through burst tests. However, during the design phase the actual burst pressure is generally not known and to estimate the reliability of the vessels calculations are usually performed based upon the design burst pressure only. Since the design burst is lower than the actual burst, this process yields a much higher value for the stress ratio and consequently a conservative estimate for the reliability. Other complications arise due to the fact that the actual burst pressure and the liner contributions have inherent variability and therefore must be treated as random variables in order to compute the...

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