

COMPARISON OF ADHESION BEHAVIOR ANALYSIS BETWEEN GFRP RODS AND CONCRETE WITH STEEL REINFORCEMENT AND CONCRETE

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ABSTRACT

Reinforced concrete is susceptible to corrosion in aggressive environments. GFRP as an alternative reinforcement offers corrosion resistance and light weight. This study aims to compare the bond strength of concrete to steel reinforcement and GFRP to support the use of GFRP in coastal areas such as Bengkalis Island. The testing was conducted using two methods: bending (referring to ACI 440.1R-06) and tensile (referring to SNI 8972:2021), using variations in embedment length of 5 db, 10 db, and 15 db. The observed parameters include maximum load, slip, deflection, and failure patterns. The bond stress of steel is generally higher than that of GFRP. The difference reaches 21.45% at an embedment length of 10 db and 13.05% at 15 db. However, at 5 db, GFRP outperforms steel by 15.22%. Stress decreases with increasing embedment length. Pull-out failure is dominant at 5 db, while 10 db and 15 db show concrete splitting failure. Steel bond strength to concrete is stronger and more stable than GFRP. However, beam deflection in GFRP reinforcement is always greater than steel, indicating GFRP's more flexible nature.

Keywords : *GFRP (Glass Fiber Reinforced Polymer), Embedment Length, Bond Strength, Bond Failure*