

CHAPTER V

CLOSING

5.1 Conclusion

This study was conducted to investigate the effect of composite material combinations on the dynamic characteristics and structural strength of a cantilever beam with several variations: carbon fiber with epoxy resin (CE), carbon fiber with polyester and vinylester resin (CPV), glass fiber with epoxy resin (KE), and glass fiber with polyester and vinylester resin (KPV). Based on tensile test results, it was found that the CPV has the highest tensile strength reaching 70.2 MPa. In addition, a significant rightward shift in the natural frequency indicates increased structural stiffness, which helps prevent damage caused by resonance due to high vibration deflection. In terms of damping, the CE combination showed the highest damping ratio reaching 0.1 based on experimental curve fitting results, indicating that this combination is the most effective at dissipating vibrational energy. Based on these two parameters, it can be concluded that CPV material offers the best stiffness, while CE material provides the highest damping capability. With these characteristics, the combination of CPV and CE materials is highly suitable for application structures, which require high strength, good at vibration damping, and lightweight properties to support performance and efficiency.

5.2 Recommendation

For future work, it is recommended to use a finer mesh during the simulation process to enhance the accuracy of the numerical analysis, especially in areas of the structure that experience high stress concentration. Additionally, material property inputs such as elastic modulus, poisson's ratio, and density should be determined more precisely to ensure the simulation results closely reflect actual conditions. In the experimental stage, data collection should be carried out carefully and repeatedly, ensuring that all measuring instruments are properly calibrated to avoid measurement errors. Furthermore, it is important to minimize external disturbances such as noise during testing, especially during the bump test, so that the data obtained are accurate and representative of the actual conditions.