

Abstract

The swingarm of a motorcycle is an important component of its suspension. In order to test the durability of swingarms, a dedicated test rig was designed and realized. The test rig was designed to load the swingarm in the same way the swingarm is loaded on the test track. The research report structure is as follows: relevant literature related to automotive component testing, current swingarm test rig models and composite swingarms were outlined. The Leyni bench, a rig specifically developed by Ducati to test swingarm reliability was shown to be effective but lacked the ability to apply variable loads. The objective of this research was to design and experimentally validate a swingarm test rig to evaluate swingarm performance at different loads. The methodology, the components of the test rig and the instrumentation required to achieve the objectives of the research were presented. The elastic modulus of the carbon fibre swingarm material was calculated using classical laminate theory. The strains and stresses within a swingarm during testing were analysed. The test rig was shown to be versatile, accurate and efficient, with potential for future application. This research has shown the benefit of test rigs for testing motorcycle components.