Vehicle Transmission Inertia Test Protocol

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ABSTRACT

A high accuracy and low cost test protocol for the determination of the inertial characteristics of a high performance vehicle transmission is discussed. In particular, a range of NASCAR Sprint Cup race car transmission gear packages are tested and compared. The test results compare the inertial characteristics from the new CR2C transmission as developed by C&R Racing to the current standard four speed manual version. The test protocol evaluates the inertial properties by suspending the input, output, and secondary shafts from a light weight hollow ∅1/4” x 16.58’ long (∅6.35 mm x 5.05m) vertical torsion spring tube. An initial offset twist results in rotational cycling of the components at an easily measurable natural oscillatory period. The equations are developed for the application of the natural frequency measurements to the component inertia results. To provide an easily understood comparison, a full race car power train acceleration analysis is then done to assess the inertial differences in terms of gained ‘effective’ horsepower.