DIFFERENTIAL FOR QUAD RIDER WITH CHAIN AND SPROCKET POWER TRANSMISSION

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ABSTRACT

All Terrain Vehicle (ATV) is so popular vehicle today and had been used widely for recreation activities, domestic usage and even as commercial sport. Quad rider whereby one the ATV group actually had a great potential to be fabricated with modification of available sources in the market. It has greatly potential for recreation purpose for the beginning.

Quad rider has similarity with motorcycle where it use small engine usually below 500 cc and transmit power through chain and sprocket. Quad rider by the way has four wheels so that it also needs few similarities with other vehicle. One of the criteria is an ability to withstand slippage and binding when it takes a corner and this can be achieving with using differential. Quad rider is rear-wheel drive vehicle so that its differential is located at the rear side. Therefore modification is needed with usual car differential either front-wheel drive or rear-wheel drive to match with these requirements.

Differential is working when it give different rotational ratio to both wheels when quad rider take a corner. Engine will transmit power through chain and sprocket where at differential, power is distribute equally or unevenly to the right and left rear wheels. Quad rider is a light vehicle so that suitable differential from any light car should be determine before it can be used at quad rider.

Fabrication of differential is made with using available sources that found in market. First task was to find suitable differential and differential for rear-wheel drive Daihatsu Charade had been chosen for modification. The differential has housing that is removed because it is so heavy and not suitable for the usage of quad rider. The crown gear at differential is replaced with suitable motorcycle sprocket that also found in market.

Additional plate is designed and being an intermediary between sprocket and flange of differential. Through bolt, bolt and nut that found in market is decided to fasten the differential. Differential is subjected to the load, which are shear stress and bending

stress due to power transmission from engine through chain and sprocket. Therefore high tensile through bolt, bolt and nut is selected for the fabrication.

Differential housing is also designed to protect its gears from being exposed to outside element like dust, mud, sand, water and etcetera. Quad rider travel at off-road condition and these outside elements can affect the differential gears.

Drive shaft for differential of quad rider is modified to enable original drive shaft fabricated to drive shaft that has universal joint. One end of original drive shaft that has thread for differential is removed to fabricated with drive shaft with universal joint. Therefore a drive shaft with universal joint is modified to enable it welded to original thread. The Perodua Kancil drive shaft is selected for the modification because it has universal joint.

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