Wheels of Tiger Cub 63-2

By Hannah and Eric

Why can't motorcycles stand up on their own?

Because they're too tired

Front Wheel Diagram



Rear Wheel Diagram



Evolution















Physics of the wheel



- The top half of the spokes are in tension when the wheel is moving. To avoid warping the metal, the bottom spokes will become less tense (in other words, compress) when the top spokes are tense.
- In order for the wheel to rotate, torque must be applied--which is a force that causes an object to move around an axis
- Geometry of the wheel --almost every wheel has clusters of four spokes, even though nipples are evenly distributed around the rim. Most wheels have 36 spokes, but for the British, there are 40 spokes because of differential forces between the rim and the hub when accelerating stopping.

Calculations

- Torque is the twisting force produced by the engine which gets split up between the wheels
- Multiple sets of plates in a clutch means multiple torques at which the clutch will slip

Torque calculation

3000rpm= fly wheel speed 420rpm= rear wheel speed 100 foot pounds= torque required to move rear wheel

420/3000= x/100

x= 14 foot pounds (to move flywheel/ get flywheel to slip--a unit of torque equal to the force of 1 lb acting perpendicularly to an axis of rotation at a distance of 1 foot.)

<u>What if our wheel had single</u> <u>spoke - what would the diameter</u> <u>need to be?</u>

150 lbs= weight of bike 150 lbs= weight of rider (child) 300 lbs= total downward force; 150 lbs on each wheel 75,000psi=breaking point of steel Breaking point=force/diameter =75,000=150/A=.002 inches minimum diameter. This can be altered when supplementing with safety mechanisms, ext.

Young's Modulus



Young's modulus is useful in determining materials properties. There is a relationship between stress and strain: At a certain point, the material will break (this point occurs after the working strength limit is reached.). Thus, it is important that each of the materials, particularly the spokes, on the wheels have been carefully chosen.

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