



Motorcycle Wheels Group





Process





We labeled the spokes using the image to understand the different types of spokes





Cutting the tire off of the wheel





Removing the spokes





Taking apart the Wheel Hub





Making our own tools for removing the bearing retaining ring!





Front wheel axle





Washing...





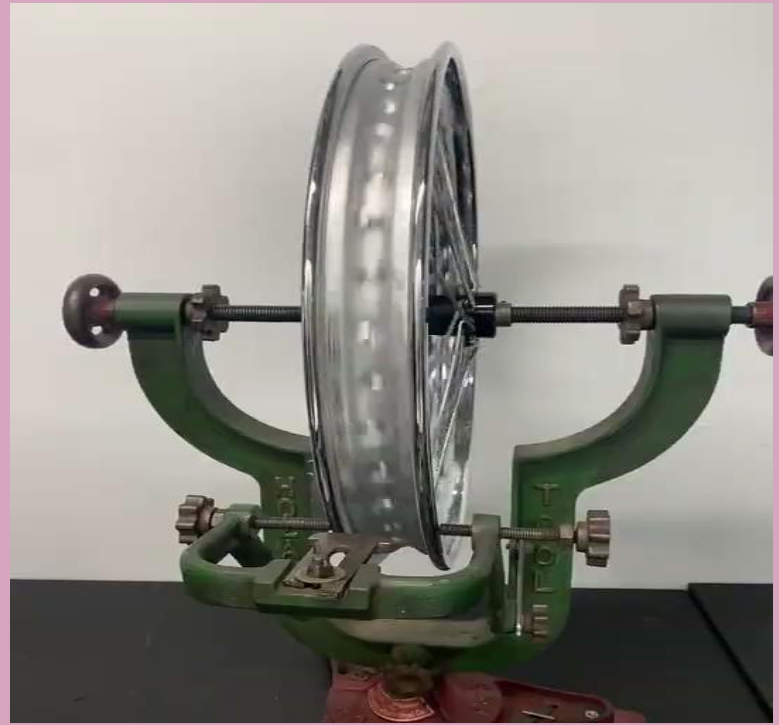
Lacing the Wheel





Lacing the Wheel Cont.





Never perfect due to welding seam

Truing Process





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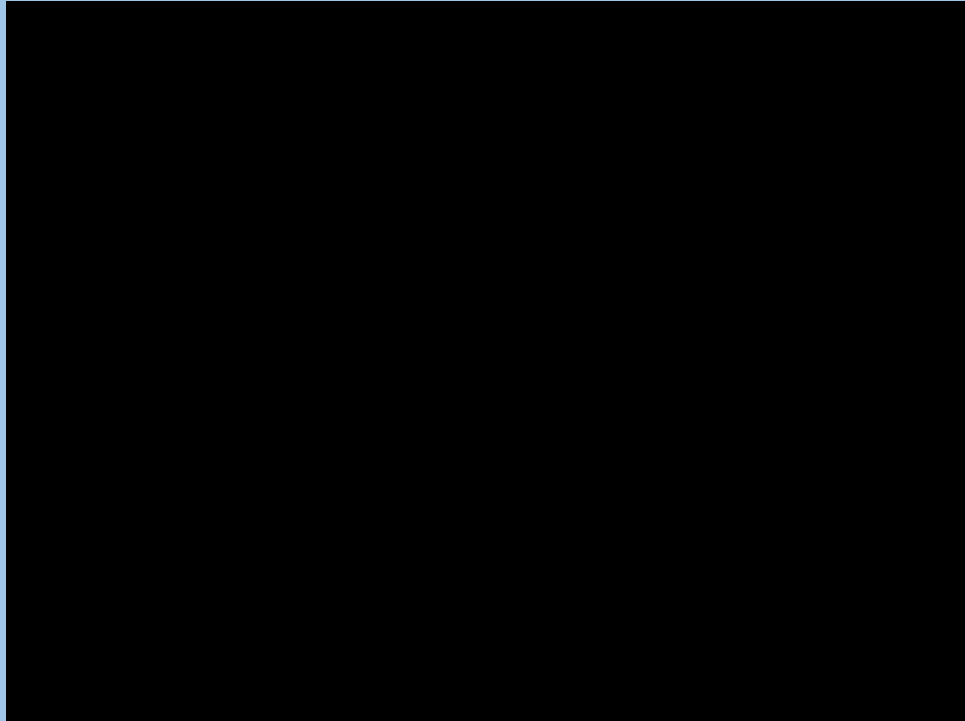


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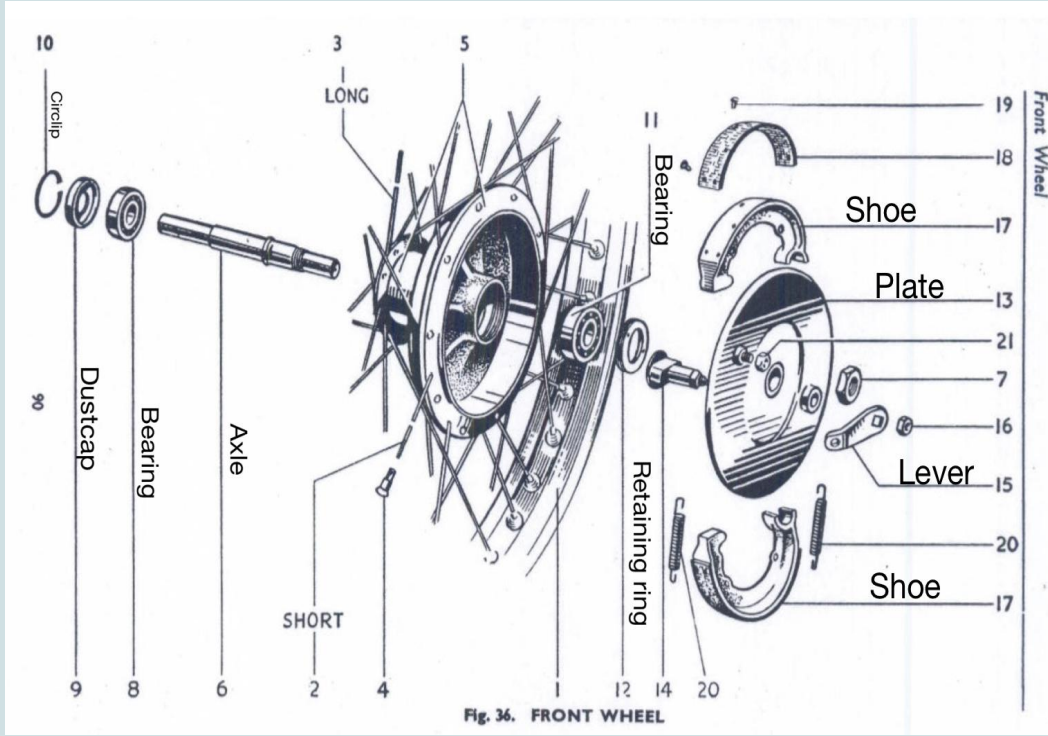
Putting the Tire On





Putting the Tire On





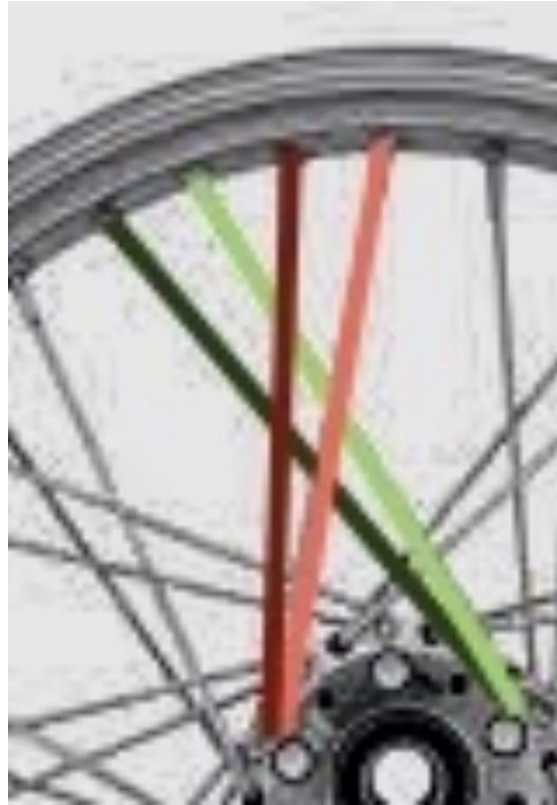
Putting the Wheel Hub Back Together

Front Wheel



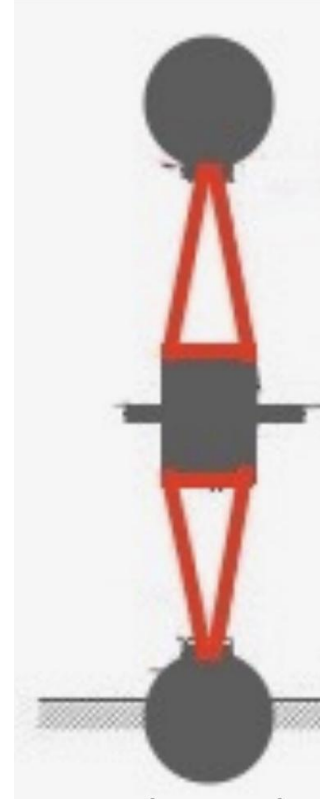
Science

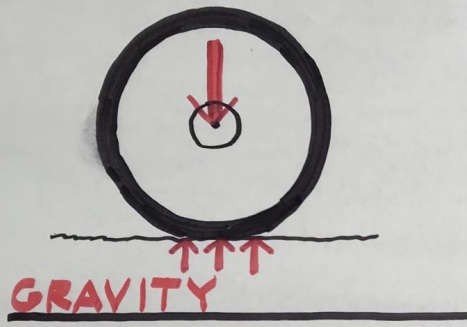
- Spokes (10 groups of 4 spokes) only work in tension
- Red = forward leaning
- Green = backward leaning

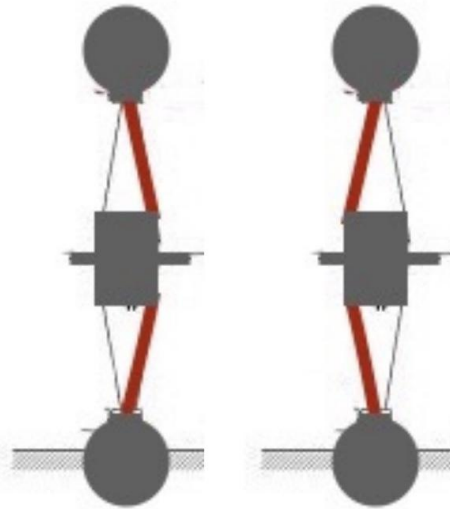
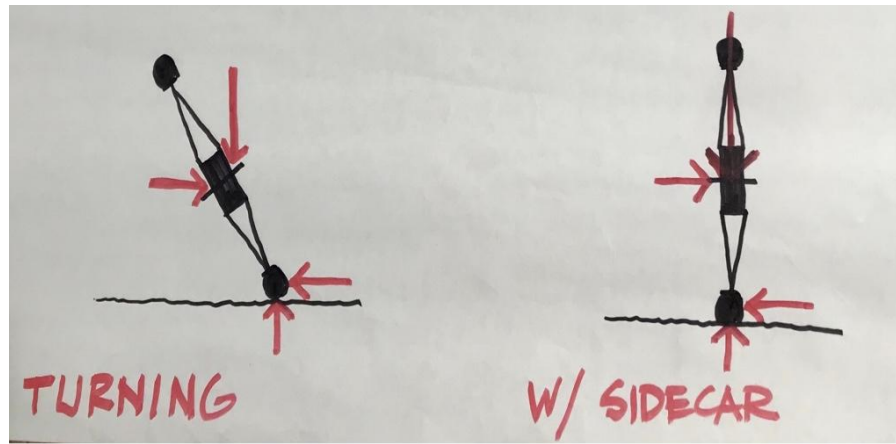


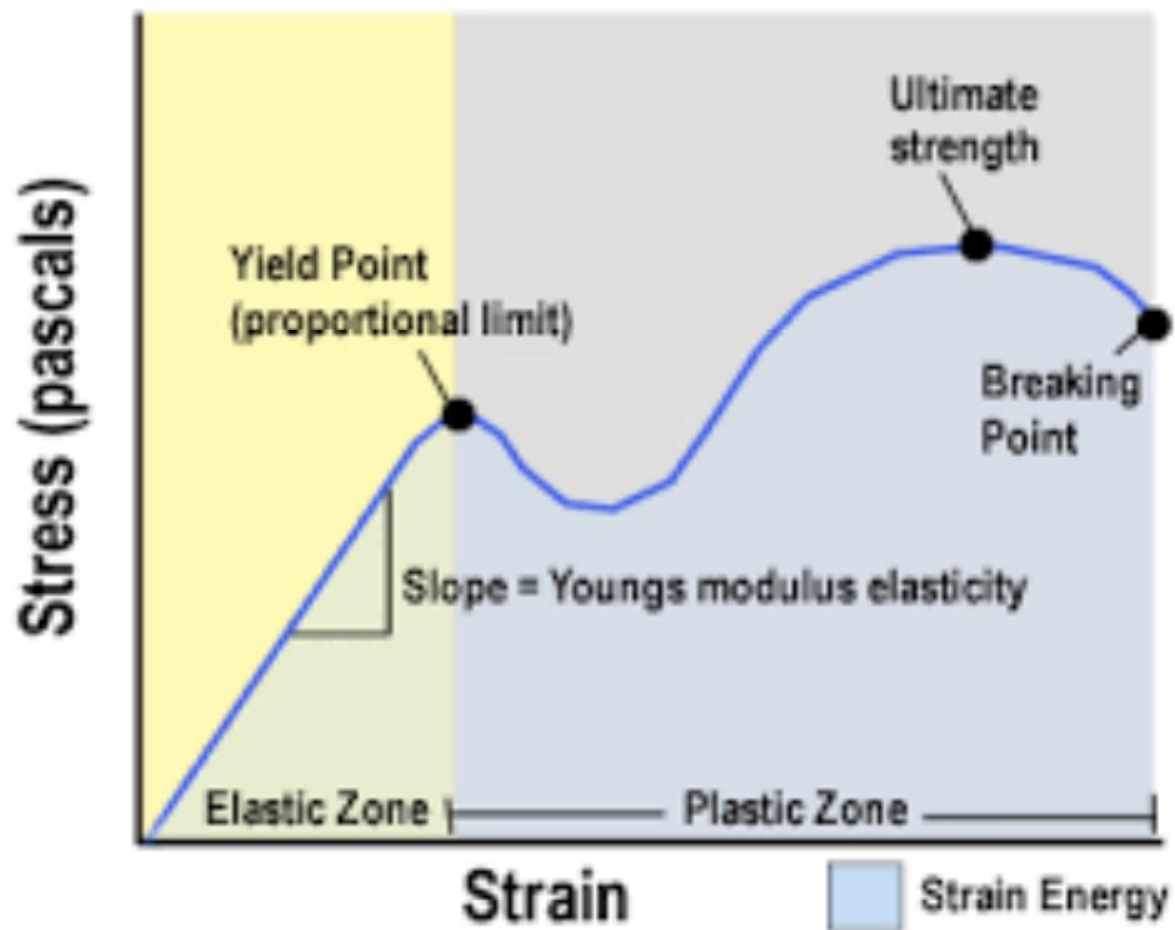
Images from Bill Becker's presentation

Triangulation









How much tension can be applied on a spoke before it snaps?

Maximum working load: 750lbs

Initial tension in spokes: Between 220 and 265 lbsF

Maximum brake force that can be experienced: About $\frac{1}{2}$ the weight of the motorcycle and rider (200lbs).

Assuming that the brake comes only from the front wheel (1.583 ft radius): Torque = $200 \times 1.583 = 316.66 \text{ lbs} \cdot \text{ft}$

Change in tension of the spokes with a with a disc brake with radius $\frac{1}{12}$ foot: $316.66 / (\frac{1}{12}) = 3800 \text{ lbsF}$

Load is distributed evenly among all the spokes: $3800 / 40 = 95 \text{ lbsF}$ -> completely safe

In order to break: A force of around 1050 lbsF (torque)

Work Cited/ People Consulted

-Professor Littman, Bill Becker, Jon Prevost