

wheels

By hasan, ella, celia, and ryan

history of the wheel



- Origins in mesopotamia, around the year 3500 B.C.E
- Its first major use was seen in chariots and carts for trading, but they eventually found their way into the construction sector when they were used to assist in the making of the pyramids.
- The middle ages saw wheels being used to generate rotational energy with the use of the windmill and to mill grain
- The industrial revolution saw wheels being used in locomotives for transportation
- The legacy continues in other means of transportation such as cars and MOTORCYCLES.

rim

Materials—in our motorcycle rim:

*Mild steel sheet—rolled into correct profile, welded,
plated with copper, nickel and chromium*

- Strength
- Rigidity
- Hardness
- Workability—machinable, malleable (reshape by compression), ductile (reshape by stretching)
- Resistance to corrosion
- Cost
- Availability

RIM — Compression ring that supports the tire



spokes

Materials—in our motorcycle spokes:
Mild steel wire—drawn into correct profile, bent, threaded, plated with copper, nickel and chromium for Strength and Hardness.

- Workability—machinable, malleable (reshape by compression), ductile (reshape by stretching)
- Resistance to corrosion
- Cost
- Availability

SPOKES—Tension member that supports the rim



hub

Materials—in our motorcycle hub:
Aluminum, cast, machined, polished

- Light weight
- Workability—formed by casting, easily machinable
- Natural resistance to corrosion
- Conducts heat
- Cost
- Availability

HUB—Tension member that supports the spokes. Also connects the wheel assembly to the motorcycle



physics.

forces

Dead load

Live load

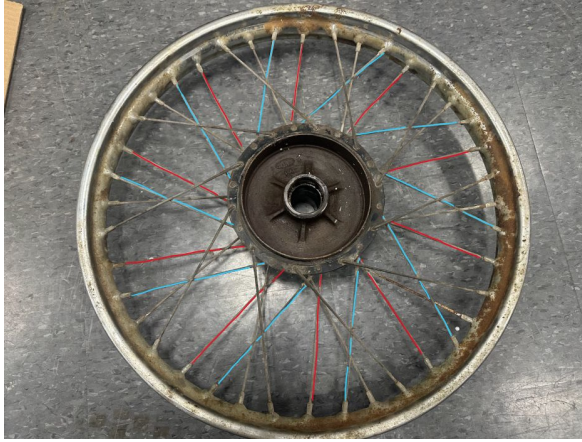
Static load

Dynamic load

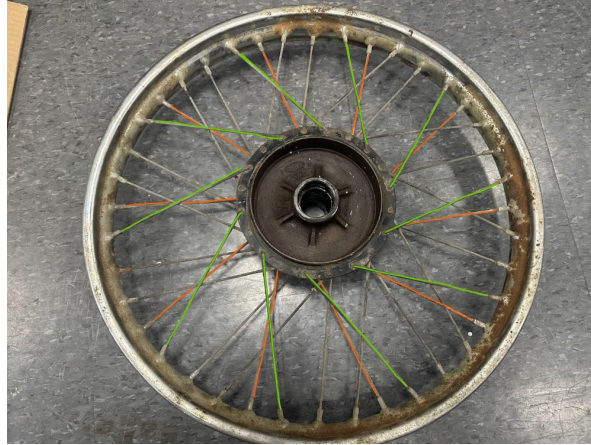
Groups of
4 Spokes



under load



deceleration



acceleration



gravity

process





- January, 29, 2024
- 1959 Tiger Cub

removal

- Wheels were rusted
- Saw was used to take the wheel off, metal wiring inside made it difficult to do so
- Hubs and spokes were then disconnected from one another and then cleaned
- The hub was preserved, but new spokes and rim were ordered



cleaning parts



- Wire Brush - scrub away dirt, rust, and other debris
- Washing Station - water supply and sanitizing supplies

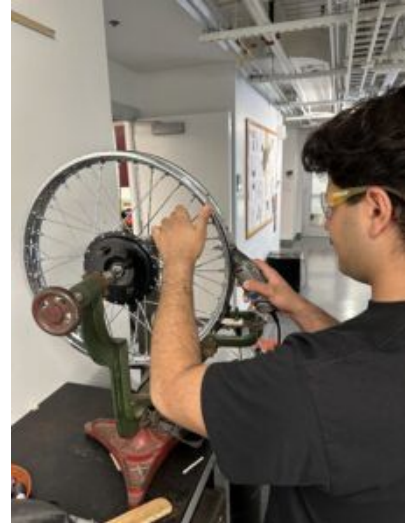
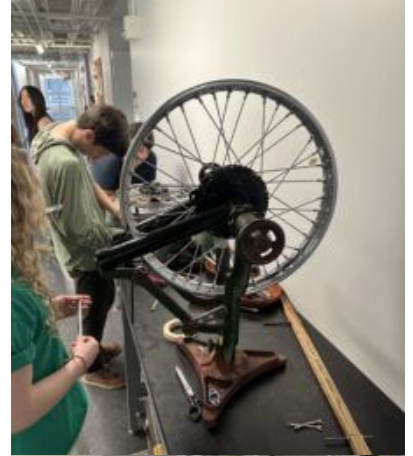
paint coated



- Some parts were unnecessarily coated
- Had to sand hubs to get paint off of the inside

reconstruction

- The rim was aligned with the hub and the spokes were attached
 - The spokes were attached in a crossed fashion
- The rim was then placed onto the truing stand and the spokes were adjusted to match the offset of the wheel.
- The ends of the spokes poking out of the rim were then grinded off using a grinder
 - This was done in order to ensure that the spokes did not puncture the tubing inside
- The wheel was then placed onto the rim with one side around the wheel and then the tube was placed inside
- The rest of the wheel was attached by nudging the tiring into the rim using tire irons.



truing the wheel



- **Mount the Wheel:** Secure the wheel in the truing stand, ensuring it spins freely without wobbling.
- **Check for Runout:** Spin the wheel and check for side-to-side and up-and-down movement (radial and lateral runout).
- **Measure Hub Offset:** Measure the distance of the hub to each end up the rim, opting for the hub to be as centralized as possible. Note the amount of offset (side-to-side movement).
- **Loosen Spokes:** Use a spoke wrench to loosen the spokes on the side opposite the offset to allow the wheel to move towards that side.
- **Tighten Spokes:** Tighten the spokes on the side with the offset to pull the wheel back towards the center.
- **Repeat:** Continue to spin the wheel, measure offset, and adjust spokes until the offset is minimized and the wheel runs true.



THANK YOU

