



Suspension Group

Spring 2023

Timothy Tymecki
Bakari Edwards

What Does a Suspension Do?

Generally, there are 3 primary functions of a suspension:

- Provide comfort for the rider
- Control the dynamics of the motion of the bike
- Guarantee grip, or wheel-to-surface contact



Lab Summary

- During this semester, we took apart the front and rear suspension and spent a great deal of our time using the parts cleaner to clean the grease, oil, etc. from the parts.
- We also used the sandblaster to knock off the rust from the front fork.
- Lastly, we used the diagrams from the manual to piece together the parts assemble the front and rear suspension.



Front Fork

- x Our motorcycle uses a Triple Tree fork design
- x The front fork controls the movement of the front wheel and controls the springs that absorb shock.
- x When the front fork dives (meaning the springs are allowed to compress), such as when a motorcycle brakes, this is called compression
- x Coming back up, this force is called rebound



Spring for Front Suspension

To calculate the forces on a compressed spring
, we use this formula below:

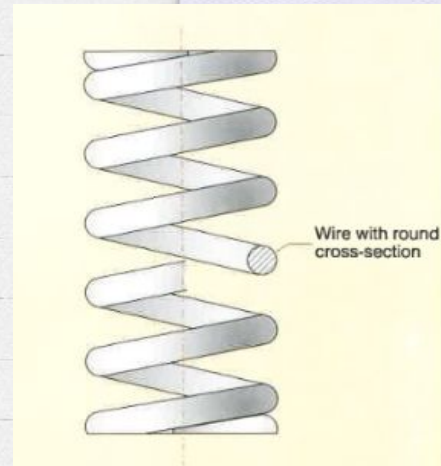
Equation 13.1

$$\mathbf{F = k \cdot x}$$

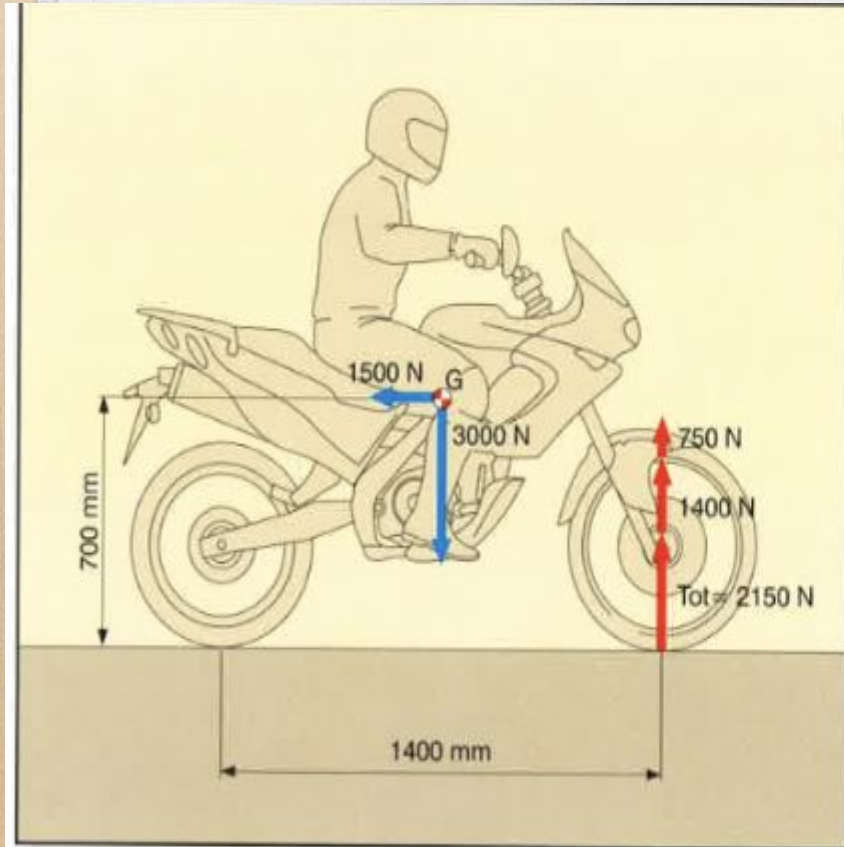
where:

k = spring stiffness;

x = working range of the spring.



Front Fork Force P.2



The situation described by our calculations is:
braking force applied to the wheel:

$$m \cdot t = (0.5 \cdot 3000) = 1500N$$

Speedometer

- To determine the “speed”, better noted as velocity, the bike needs to note two pieces of data
 - 1– How many complete revolutions the (back) wheel makes
 - 2– The change in time
- Using this information, the speedometer can estimate the velocity.



$$\bar{v} = \frac{\Delta x}{\Delta t}$$

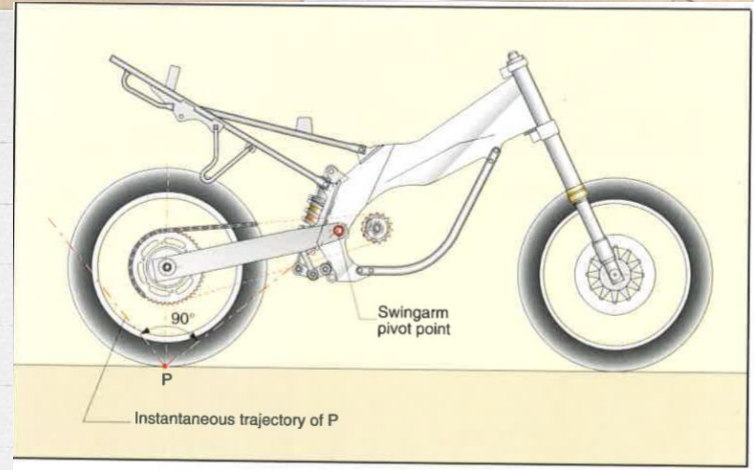
\bar{v} = average velocity

Δx = displacement

Δt = change in time

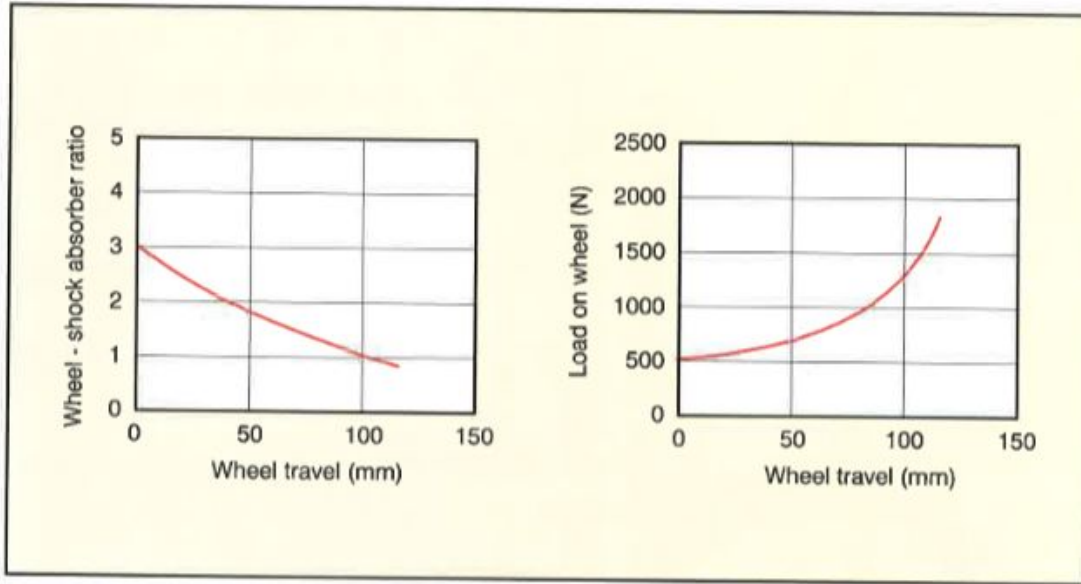
Rear Suspension

- x The rear suspension, in simple terms, controls the upward and downward motion of the back wheel.
- x Also absorbs a lot of the shock that the motorcycle takes
- x Almost universally in motorcycles, the design used is the swinging arm rear fork with shock absorbers.
- x Our motorcycle uses a plunger-type suspension, however.



Progressive Rate

Fig. 15.5: progressive rate suspension.



Our motorcycle
uses linear rate,
however

Ending Slide

Thanks for your
time!