**Motivation**

The goal of this research is to determine how inflation pressure effects the performance characteristics of a mountain bike tire. Thoughts on inflation pressures vary widely throughout the bike community and cyclists that are just getting into the sport have a difficult time finding a setup that works best for them. This process can be very time consuming and dangerous due to how inflation pressure effects the stability and handling of the bike. This research can be used as a guideline for riders of all skill levels to help determine the proper inflation pressure for their tires.

**Approach**

The test subject was a Maxxis Minion 29x2.3” mountain bike tire mounted on a Cross29 rim with a width of 0.810”. The pressures used were: 35psi, 50psi and 60psi. At each pressure, the tire was tested under three vertical loading conditions: 44lb, 69lb, and 94lb. For each of the nine total tests, the slip angle was continuously varied to ±5° and the camber angle was continuously varied to 15° and -20°. The resulting forces and moments were collected to then extract the stiffness coefficient.

**Results**

![Figure 1: Testing Device](image1)

![Figure 2: Side view of contact patch and laser measurement at zero slip and camber angle](image2)

![Figure 3: Data after being processed using MATLAB](image3)

**Conclusions**

- Cornering Stiffness decreased with added vertical load and decreased with higher inflation pressures
- Camber stiffness increased with added vertical load and decreased higher inflation pressures
- The effects of different inflation pressures were much more pronounced in cornering stiffness