Lateral MU vs Normal Load Scatter Plot For All Rims (Same Tires):

A graph of different colored dots

Description automatically generated with medium confidence

Justification For Using lc10 16x7.5 10x8:

1. **Consistency Across Loads**: The lc10 16x7.5 10x8 tires show a relatively consistent lateral MU across the range of normal loads. This suggests that the tire provides a stable level of lateral grip regardless of load changes, which is advantageous for predictable vehicle handling.
2. **Higher Lateral MU**: At various normal loads, the lc10 16x7.5 10x8 tires maintain a higher lateral MU than some of the other tire options, particularly at higher loads. This higher friction coefficient indicates better lateral grip, translates to better cornering performance and stability.
3. **Load Carrying Capacity**: The data points for lc10 16x7.5 10x8 extend to the highest normal load range among the lc10 options, indicating a good load carrying capacity while still maintaining a high lateral MU.
4. **Comparison with Other Tires**: When compared to the r25b tires, the lc10 16x7.5 10x8 shows competitive or superior lateral MU at similar load levels, suggesting that it's at least on par with, if not better than, the alternative options in terms of grip.

If the criteria for tire selection includes a balance between load capacity and lateral grip performance, the lc10 16x7.5 10x8 tire would be a justified choice. It offers a high lateral friction coefficient across a range of loads, which indicates good performance for applications that require maintaining control and stability under varying load condition.

## Comparing Lateral Force and Self Aligning Moment Against Slip Angle for Different Pressures. Holds Camber, Velocity, and Load Constant by Choosing Most Commonly Used Value

Non- Normalized Lateral Force vs Slip Angle & Self Aligning Moment vs Slip Angle (For Varying Velocities): A graph of a line graph

Description automatically generated with medium confidence

Normalized Lateral Force vs Slip Angle & Self Aligning Moment vs Slip Angle (For Varying Velocities):

A graph of different types of lines

Description automatically generated with medium confidence

Justification:

1. **Lateral Force vs Slip Angle**:
   * The curves for different velocities are closely grouped together, which indicates that velocity has a relatively small impact on lateral force until the slip angle starts to increase substantially.
   * At higher velocities, the peak lateral force is slightly lower, which suggests that at higher speeds, the tire may provide less lateral grip.
2. **Self Aligning Moment vs Slip Angle**:
   * Similar to the lateral force graph, the curves for self-aligning moment are close together for the different velocities, implying a small velocity dependency on the self-aligning moment until a certain point.
   * There's a slight trend that the peak of the self-aligning moment becomes less pronounced as velocity increases, which could mean that the tire provides a less strong self-centering action at higher speeds.

From this analysis, the tire maintains its performance characteristics over a range of velocities quite well, with only a minor decrease in peak lateral force and self-aligning moment at higher velocities. This suggests that the tire is versatile and can perform consistently across different speeds.

It would be justified to operate the vehicle within the tested range of velocities since the tire does not exhibit drastically different behavior that could negatively affect the handling of the vehicle. This could be particularly important in applications where the tire must perform under varying speed conditions, such as in motorsport or high-performance driving scenario

## Comparing Lateral Force and Self Aligning Moment Against Slip Angle for Different Cambers. Holds Pressure, Velocity, and Load Constant by Choosing Most Commonly Used Value

Non- Normalized Lateral Force vs Slip Angle & Self Aligning Moment vs Slip Angle (For Varying Degrees of Camber):

A graph of different colored lines

Description automatically generated

Normalized Lateral Force vs Slip Angle & Self Aligning Moment vs Slip Angle (For Varying Degrees of Camber):

A graph of different angles

Description automatically generated with medium confidence

1. **Lateral Force vs Slip Angle:**
   * The lateral force generated at 2 degrees of camber is strong across a broad range of slip angles, indicating good cornering performance without excessive trade-offs in grip.
   * The peak lateral force at 2 degrees of camber is higher than at 0 degrees, suggesting improved cornering ability, while it does not drop off as sharply as it does at 4 degrees of camber, which could indicate better stability after the peak force is reached.
2. **Self Aligning Moment vs Slip Angle:**
   * At 2 degrees of camber, the self-aligning moment curve is consistent and smooth, with a peak that is comparable to the 0 and 4 degrees curves. This reflects a balance between tire feedback and steering effort, which can be crucial for driver confidence and control.
   * The curve at 2 degrees does not exhibit the extreme peaks and troughs that the 4 degrees curve does, suggesting more predictable handling characteristics. This is particularly important when the tire is pushed to the limits of its grip.

Using 2 degrees of camber seems to offer a good balance between maximizing lateral force and maintaining a stable, predictable self-aligning moment, which can translate to effective tire performance during cornering without compromising vehicle control. It's a compromise between the lower camber angle, which might not exploit the full cornering potential of the tire, and a higher camber angle, which could lead to a more abrupt transition at the grip limit and potentially increased tire wear. Therefore, for activities like track racing where cornering performance is key, 2 degrees of camber could be the optimal choice for maintaining tire contact with the road and improving handling.

## Comparing Lateral Force and Self Aligning Moment Against Slip Angle for Different Pressures. Holds Camber, Velocity, and Load Constant by Choosing Most Commonly Used Value

**Non-Normalized Lateral Force vs Slip Angle & Self Aligning Moment vs Slip Angle (For Varying Tire Pressures):**

A graph of different colors and sizes

Description automatically generated with medium confidence

**Normalized Lateral Force vs Slip Angle & Self Aligning Moment vs Slip Angle (For Varying Tire Pressures):**

A graph of different colors

Description automatically generated with medium confidence

1. **Lateral Force vs Slip Angle:**
   * At 68.9476 kPa, the lateral force curve is smooth and the peak is broad. This suggests that the tire maintains a relatively high lateral force over a wider range of slip angles, which results in more predictable behavior during cornering.
   * The peak lateral force is the greatest when compared with other pressures, but not by a significant margin. While it is not the peak for all slip angles, a benefit of having a more linear response, as a more progressive loss of grip is generally easier for a driver to manage.
2. **Self Aligning Moment vs Slip Angle:**
   * The self-aligning moment curve for 68.9476 kPa shows a peak that is lower than the higher pressures but is also wider. This wider peak translates to a tire that provides more feedback to the driver over a range of conditions, which is beneficial for car control.
   * The drop-off after the peak is less abrupt compared to the curve at 96.52664 kPa. This less abrupt change suggests that as the tire approaches and surpasses its grip limit, the handling characteristics change more gradually, which can be better for driver control.

In summary, 68.9476 kPa ( provides the absolute highest lateral force and not the lowest for self-aligning moment, the smoother and more predictable curves at this pressure can be beneficial for drivers who prioritize control and feedback while still having absolute grip.