F1 STRATEGIES THAT WIN!

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Abstract

This analysis of Formula 1 race strategies reveals the critical influence of tire selection, pit stop management, and adaptability to track conditions on race performance and outcomes. Key findings indicate that drivers starting on **Medium or Intermediate tires** generally achieve better final classifications due to the optimal balance of grip and durability. Conversely, while **Soft tires** offer initial speed, their high degradation often necessitates more frequent pit stops, negatively impacting overall performance. The data suggests a strong correlation between the number of pit stops and final positions, with drivers employing conservative strategies—limiting stops to five or fewer—often securing higher placements. Successful drivers like Max Verstappen and Lando Norris exemplify effective strategy execution, showcasing the importance of consistent lap times and adaptability in changing conditions. Recommendations for achieving consistent podium finishes include optimal tire selection, conservative pit strategies, maximizing stint lengths, and real-time adaptability to race conditions. These insights emphasize that success in Formula 1 relies not only on speed but also on strategic foresight and the ability to navigate complex racing scenarios effectively.

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Introduction

Formula 1 is widely regarded as the pinnacle of motorsport, where teams and drivers push the boundaries of speed, precision, and technical prowess. What sets F1 apart from other racing series is not just the sheer speed of the cars, but the intricate level of technicality involved in every aspect of the race. From the aerodynamics of the vehicles to the data-driven decisions made in real-time, success in Formula 1 often hinges on the finest of margins. A half-second, or even a millisecond, can be the difference between securing a win or slipping down the leaderboard. It is these technical challenges that force teams to employ sophisticated strategies to gain even the slightest competitive advantage.

This analysis will delve into the strategies utilized by various teams throughout the 2024 Formula 1 season, focusing on decisions related to pit stops, tire usage, and overall race management. Teams like Mercedes, Red Bull Racing, Ferrari, and McLaren, each bring their unique approaches to race strategy, leveraging data to make critical decisions under immense pressure. Using detailed lap-by-lap race data, we will break down how these teams execute their strategies and adapt to dynamic race conditions.

Ultimately, the goal of this analysis is to uncover which combinations of strategies provide teams with the best chance of success, particularly in securing podium finishes. By understanding how pit stop timings, tire choices, and stint lengths influence race outcomes, we aim to provide a clearer picture of the competitive edge that drives success in Formula 1.

Background

Formula 1 (F1) traces its origins to the early 20th century, with the first official World Championship race held in 1950 at Silverstone, England. Born from European Grand Prix motor racing, F1 quickly became the premier global stage for motorsport, drawing the finest drivers and engineers from around the world. Over the decades, the sport has undergone significant evolution, from advancements in-car technology to the introduction of safety regulations and the globalization of the race calendar. What began as a European-dominated competition is now a worldwide spectacle, with races held across nearly every continent. The rapid pace of technological innovation in F1 has kept it at the cutting edge of both motorsport and automotive engineering, making it a showcase for the latest developments in speed, aerodynamics, and data analysis.

In Formula 1, a win is much more than a driver crossing the finish line first. For drivers, it represents personal triumph, skill, and the ability to outmaneuver their rivals on the track. For car makers and engineers, a victory signifies that their technical expertise and innovation have resulted in a machine capable of dominating at the highest level. Teams like Mercedes, Red Bull, and Ferrari invest millions of dollars and thousands of hours into perfecting the design, aerodynamics, and performance of their cars. Each win, therefore, is a testament to the combined effort of the driver, engineers, mechanics, and strategic planners.

To win in Formula 1, teams must not only be fast, but they must also follow the extensive rulebook governed by the Fédération Internationale de l'Automobile (FIA). The FIA enforces both sporting and technical regulations, ensuring fairness and safety in the competition. **Sporting rules** include regulations on how the race is conducted, such as the number of laps, qualifying procedures, and

driver conduct on the track. Teams must also follow strict **technical rules** that dictate everything from engine specifications to car dimensions. These rules evolve yearly as the FIA seeks to improve safety, reduce costs, and encourage innovation.

Some of the most critical rules in F1 revolve around **pit stop timing**, **tire choices**, and **stint lengths**. Pit stops are essential in every race, where teams must change tires and sometimes make adjustments to the car. Timing is crucial—pit stops that are too early or too late can disrupt race strategy. Similarly, tire choices are strategic decisions teams make throughout the race, selecting from soft, medium, and hard compounds. Each compound offers different trade-offs in terms of speed and durability, and choosing the right tire for the right conditions can significantly influence performance. Stint lengths—the time spent on the track between pit stops—are carefully managed to maximize performance while minimizing tire degradation.

A typical Formula 1 season consists of 20-23 races, known as Grand Prix events, held on different tracks around the world. The season usually spans from March to December, with races taking place on a variety of circuits, from street tracks like Monaco to purpose-built courses like Silverstone. Each Grand Prix weekend features three practice sessions, a qualifying session to determine grid positions, and the main race, which typically lasts around two hours. Race lengths are predetermined by either the number of laps or a maximum time limit of two hours. Points are awarded to the top ten finishers in each race, with the driver and team accumulating the most points by the end of the season and being crowned World Champion.

Objectives

Total Number of Pit Stops: This analysis will examine the number of pit stops made by each driver and team across all races, identifying trends in pit stop frequency and comparing strategies used throughout the season.

Tire Compounds Used During the Race: The study will analyze the tire compounds each driver used in different races, highlighting strategic variations in tire choices between teams and how these influenced performance.

Number of Laps Completed on Each Tire Compound: We will explore how many laps drivers completed on each tire compound and visualize the relationship between tire choice, stint length, and race strategy.

Average Lap Time per Stint and Delta Time per Tire Compound: This objective focuses on calculating average lap times for each stint and assessing how performance changed across tire compounds over time, using visual data to track these changes.

Time Spent in Pits: The total time each driver spent in the pits will be measured to analyze how pit times affected race outcomes, with comparisons made across teams and drivers.

Tire Compound Choice vs Lap Time: We will investigate how different tire compounds impact lap times, identifying which compounds provided the fastest performance during various race phases.

Starting Tire Type vs Final Classification: This point analyzes the influence of starting tire choices on final race positions, determining if certain initial tire decisions contribute to better race outcomes.

Number of Laps on a Compound vs Delta Time: We will study how tire performance deteriorates with use by examining the correlation between the number of laps on a compound and the change in lap times.

Number of Stops vs Final Position: The relationship between the number of pit stops and final race standings will be assessed to see if fewer or more stops lead to better race results.

Race Length vs Strategy: This analysis will explore how the length of a race affects pit stop strategies and tire choices, helping to understand how race duration influences team decisions.

Dataset

The data provided by Ocean Protocol covers a comprehensive range of information that can help achieve the outlined objectives in the analysis of F1 pit stop strategies and race performance. The data is spread across nine different files, each containing key details about various aspects of the races.

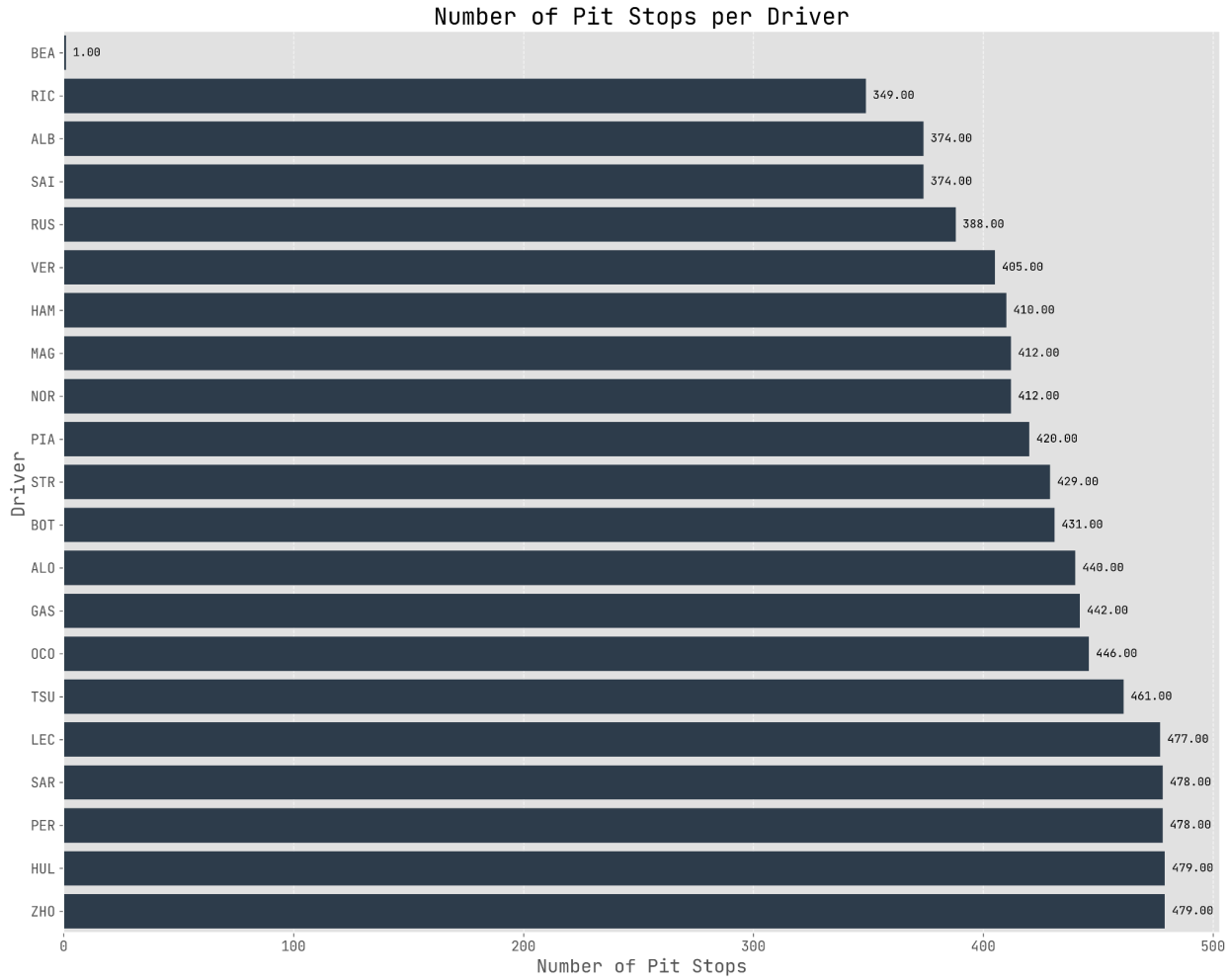
- ***Car Data*** includes time-stamped metrics like RPM, speed, gear, throttle, and DRS usage, which can be used to analyze the overall performance of drivers across different laps and races. This data will be useful in understanding how race strategy and tire choice impact performance over time.
- ***Circuit Data*** provides the geographical coordinates and other attributes of track markers, enabling the examination of the track layout and how it influences pit stop decisions and tire performance, especially in corner-heavy or high-speed sections.
- ***Lap Data*** contains detailed information about lap times, sectors, stint length, pit times, and tire compounds. This is crucial for analyzing the number of laps completed on different tire compounds and the effect of those compounds on lap time and strategy. It also helps link tire choice and lap time variations.

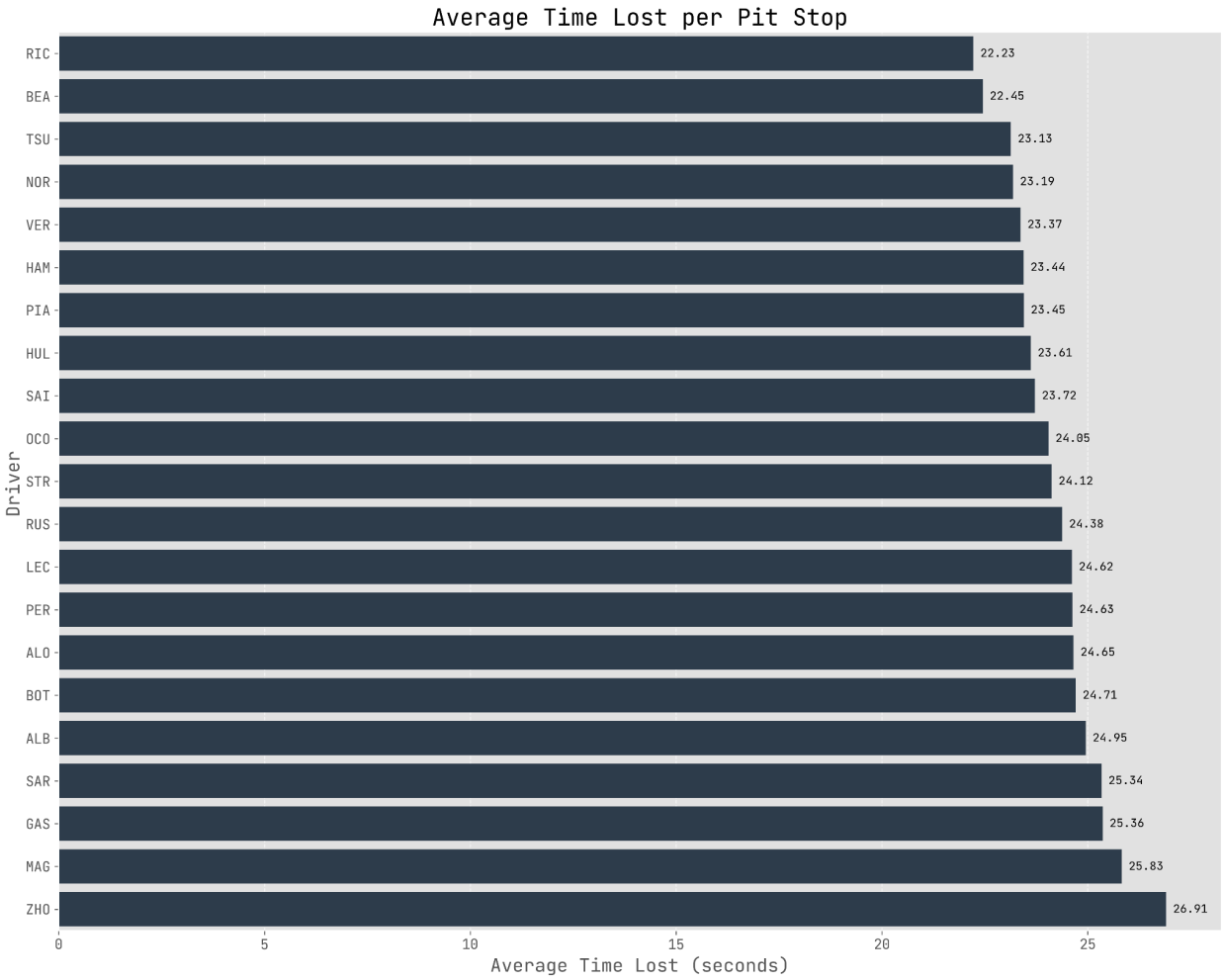
- ***Position Data*** tracks the real-time positions of drivers, which will be valuable in exploring how pit stops and tire strategies affect race positions throughout the event.
- ***Result Data*** shows the final race positions, classified positions, and grid starting points for each driver. This will help in assessing the influence of starting tire type and number of pit stops on final race standings.
- ***Control Message and Track Status Data*** capture events like flags, DRS status, and track conditions, which are useful for determining external factors that may affect pit stop decisions and tire performance during different race phases.
- ***Weather Data*** provides track and air temperatures, humidity, and wind speeds, allowing for a deeper understanding of how environmental factors influence tire performance and pit stop strategies.

Key Findings

Pit Stop Frequency & Timing

Across the **Formula 1 grid**, there is **significant variation** in pit stop frequency, with drivers ranging from as few as **one pit stop** (Felipe Drugovich [BEA]) to as many as **479 stops** (**Guanyu Zhou [ZHO]**). The **average pit stop time** per driver spans from just over **22 seconds** to nearly **27 seconds**, underscoring the impact of **team efficiency** and **pit crew performance** on race outcomes.





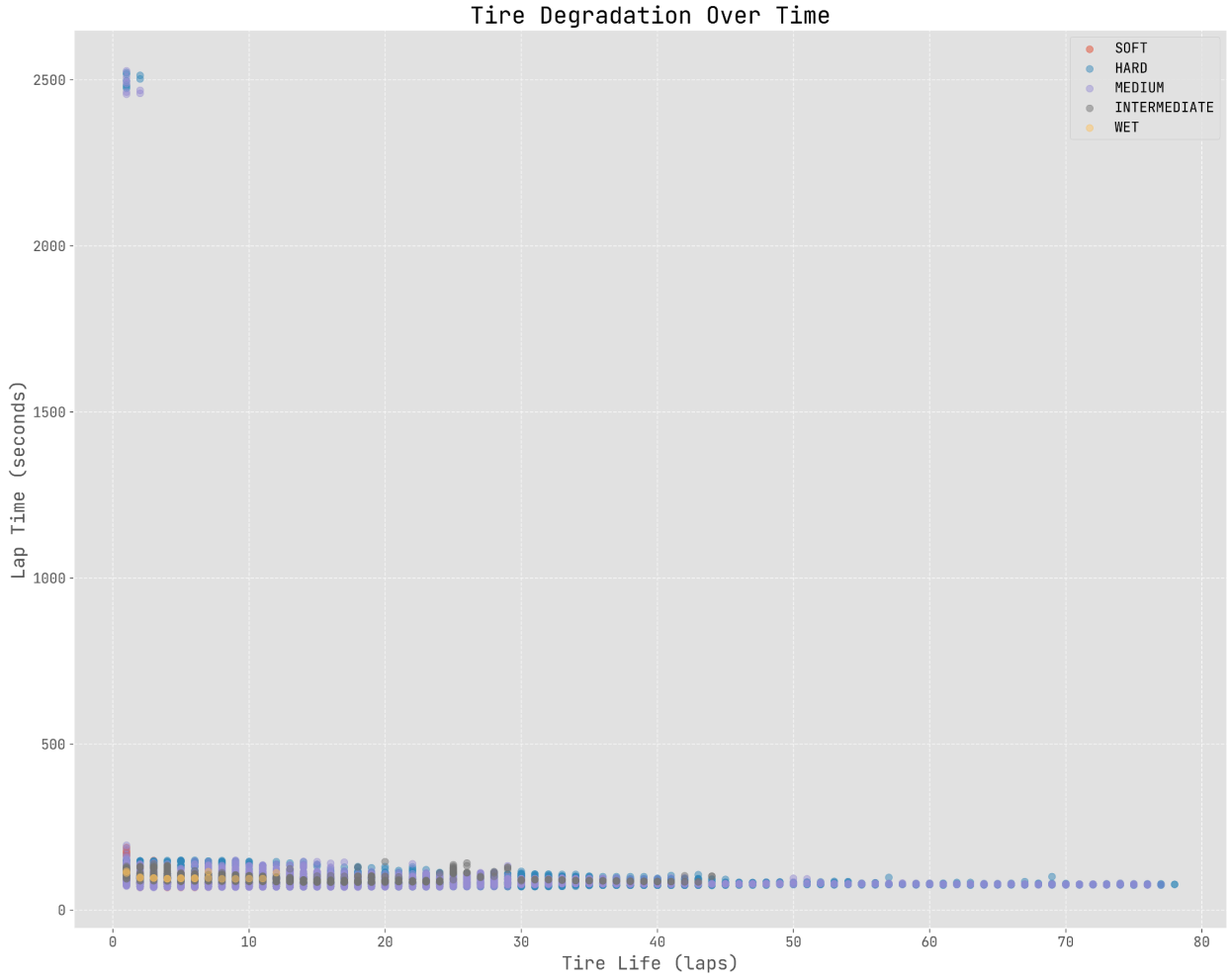
On an individual driver level, the data reveals interesting performance differences. For example, **Pierre Gasly [GAS]** had one of the **highest average pit stop times** at **25.36 seconds**, but relatively **fewer total pit stops** (442). This resulted in a **lower total pit time** (329.71 seconds) compared to drivers with more frequent stops. In contrast, **Sergio Pérez [PER]** and **Guanyu Zhou [ZHO]** had **nearly identical pit stop frequencies**, but their **total pit times** differed significantly due to **Zhou's** longer average pit stop duration.

Among the most efficient drivers, **Daniel Ricciardo [RIC]** and **Yuki Tsunoda [TSU]** stand out with **average pit times** of **22.22 seconds** and

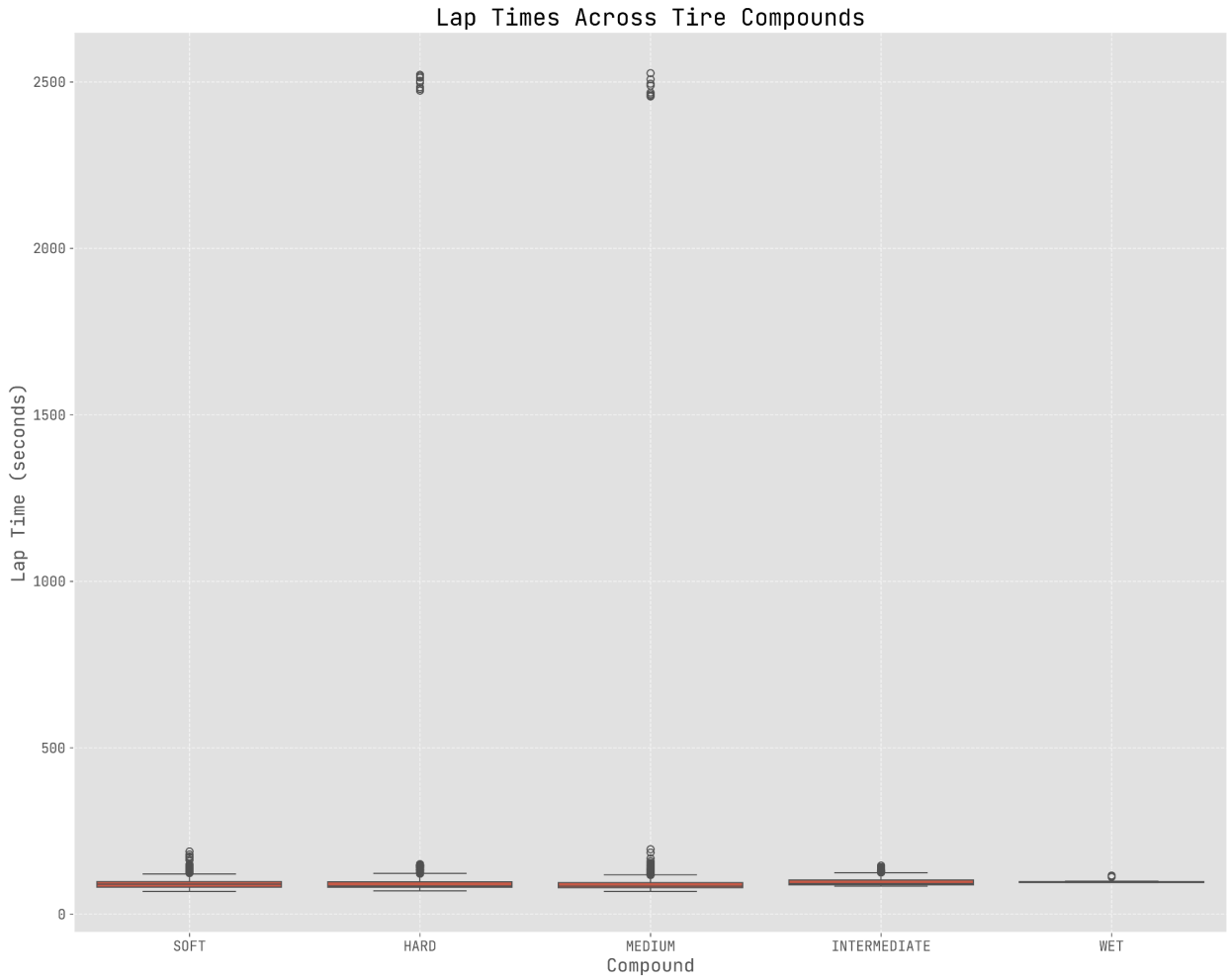
23.13 seconds, respectively. Despite a **high number of pit stops**, their efficiency contributed to **competitive total pit times.**

Tire Strategy & Race Performance

Tire strategy is one of the most **critical components** of race performance in **Formula 1**, as **tire compounds** play a key role in determining a car's **lap time** and **handling** under different track conditions. Across the grid, there are significant differences in **average lap times** based on tire compound choices. The **soft tire** generally provides the **fastest laps** but with **limited durability**, whereas **harder compounds** offer **greater longevity** at the cost of speed.



Drivers consistently posted their **fastest laps** on **soft tires**, with average lap times typically around **84-88 seconds** for top performers. In contrast, **hard compounds**, which prioritize durability over grip, resulted in lap times averaging around **87-96 seconds**. The **intermediate** and **wet compounds**, designed for **rainy conditions**, led to the **slowest lap times**, typically in the **mid-90s or higher**, highlighting the challenges of racing in wet weather.



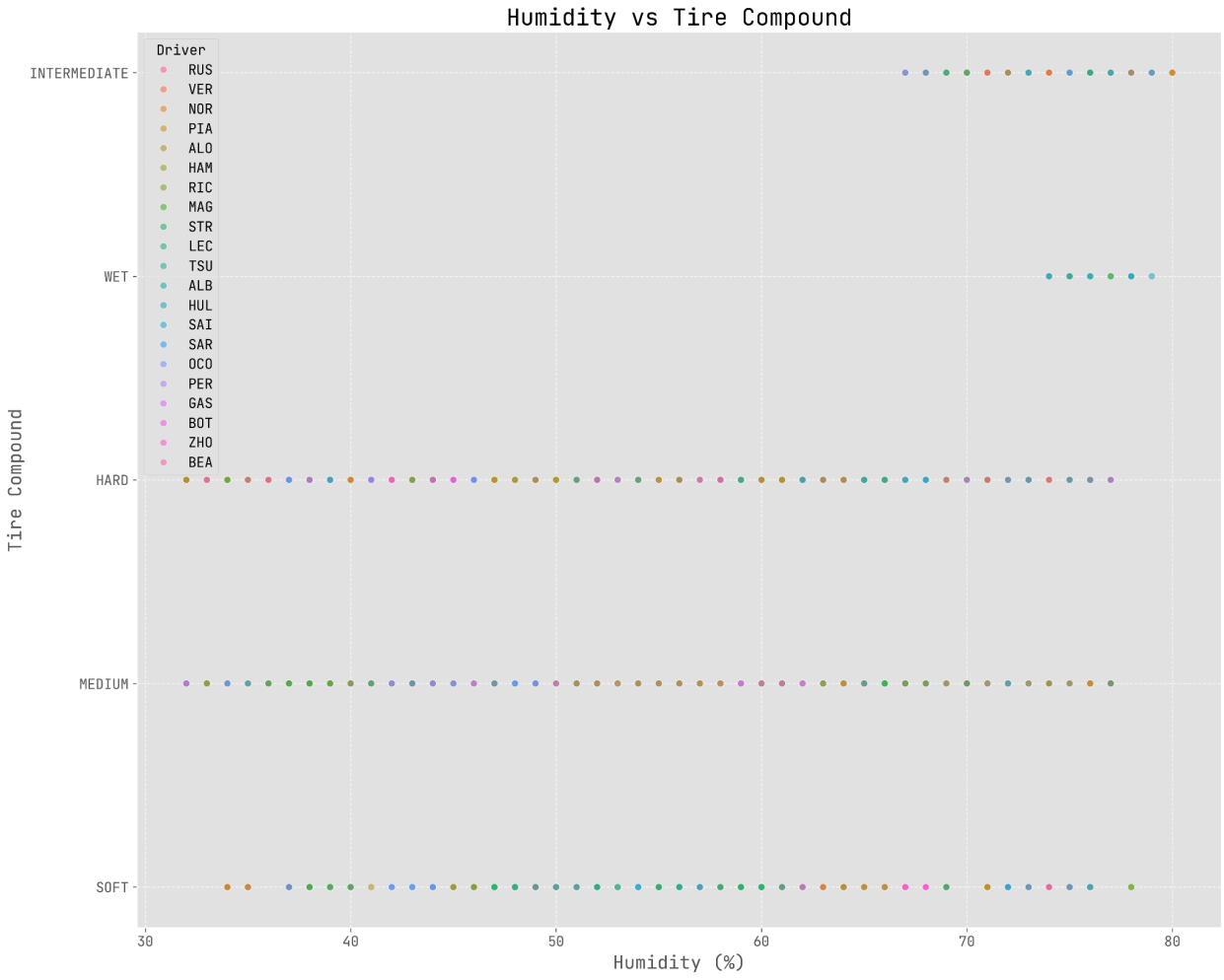
Individual drivers displayed unique **tire preferences** and **performance characteristics**. For instance, **George Russell [RUS]** was exceptionally fast on **soft tires**, with an **average lap time** of **83.13 seconds** over 44 laps—one of the fastest among all drivers. **Guanyu Zhou [ZHO]** also showed strong performance on soft tires, averaging **86.88 seconds**, but his times on **medium** and **intermediate tires** were significantly slower, perhaps indicating a **less optimal setup** for those compounds.

Daniel Ricciardo [RIC] stood out for his performance on **hard tires**, with an impressive **average lap time** of **85.01 seconds** over 481 laps, demonstrating a **strong race pace** on harder compounds. On the other hand, drivers like **Pierre Gasly [GAS]** and **Lance Stroll [STR]** experienced slower lap times on harder tires, suggesting either **less efficiency** with that compound or a **team strategy** focused on different race dynamics.

Finally, drivers like **Yuki Tsunoda [TSU]** and **Carlos Sainz [SAI]** remained competitive across all compounds, maintaining **consistently fast lap times** on both hard and soft tires, showcasing their **versatility** in managing tire strategies throughout the race. In contrast, **Guanyu Zhou [ZHO]** and **Max Verstappen [VER]** posted **slower lap times** on **intermediate** and **wet compounds**, suggesting potential **challenges in wet conditions**.

Impact of Weather on Tire Choice

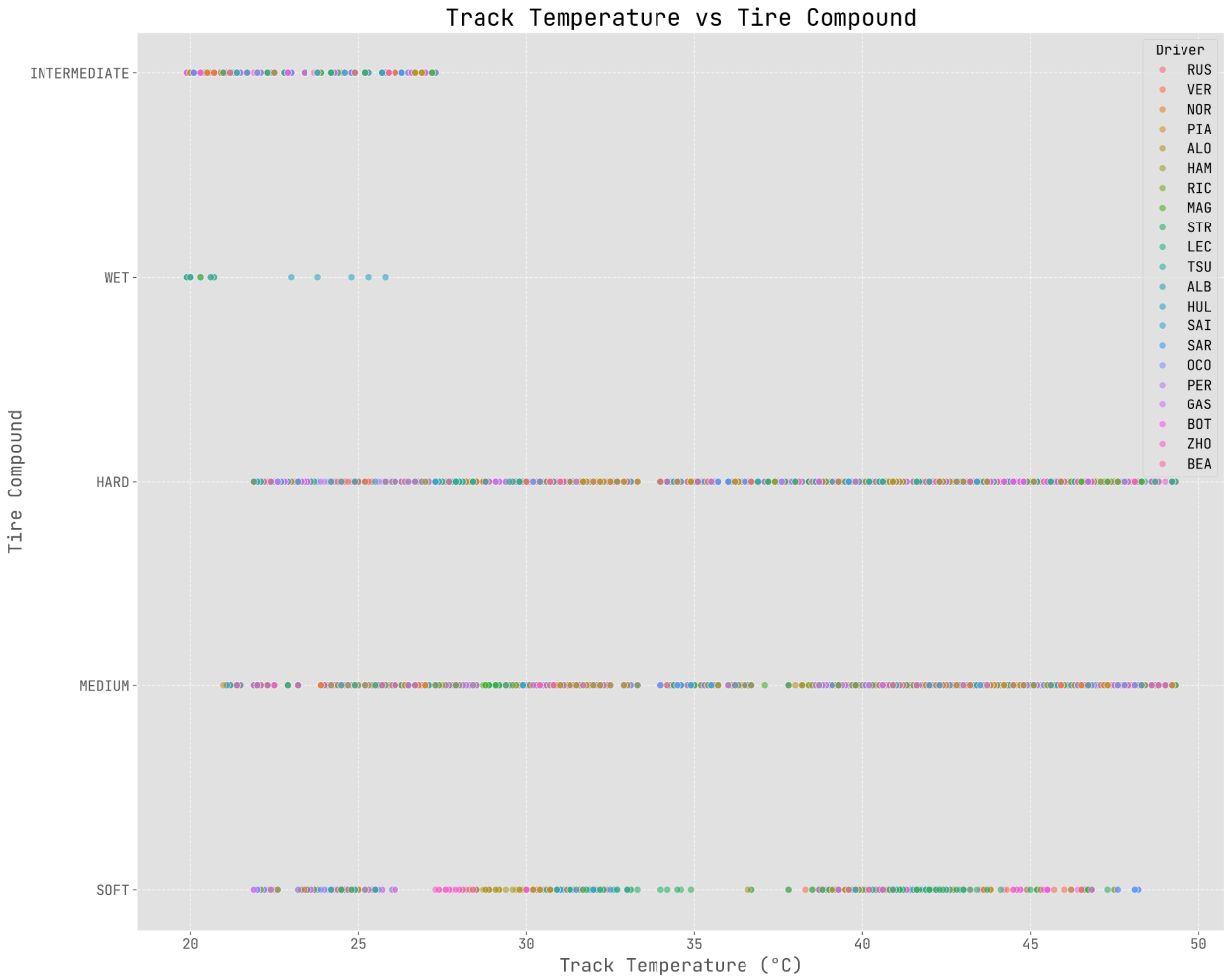
Across **Formula 1 races**, the data reveals a clear **correlation between weather conditions** and **tire compound selection**. **Intermediate** and **Wet tires** are predominantly chosen during **rainfall**, aligning with **lower air and track temperatures** as well as **higher humidity levels**. These tires provide **better grip** and **stability** in wet conditions, which is crucial for maintaining **speed** and **safety**.



Conversely, **Hard**, **Medium**, and **Soft tires** are favored in **dry weather**, where higher track temperatures allow the tires to reach **optimal performance.** Drivers generally select **harder compounds** in **warmer, dry conditions** for their **longevity**, while **softer tires** are chosen in **cooler, dry conditions** for their superior **grip.**

During the **Canadian Grand Prix**, drivers like **George Russell [RUS]**, **Max Verstappen [VER]**, and **Lando Norris [NOR]** were among the quickest to adapt to **wet weather**, switching to **Intermediate tires** as **temperatures dropped**, **rainfall began**, and **humidity spiked.** Their **lap times** reflected successful **tire management**, demonstrating their adaptability in wet conditions.

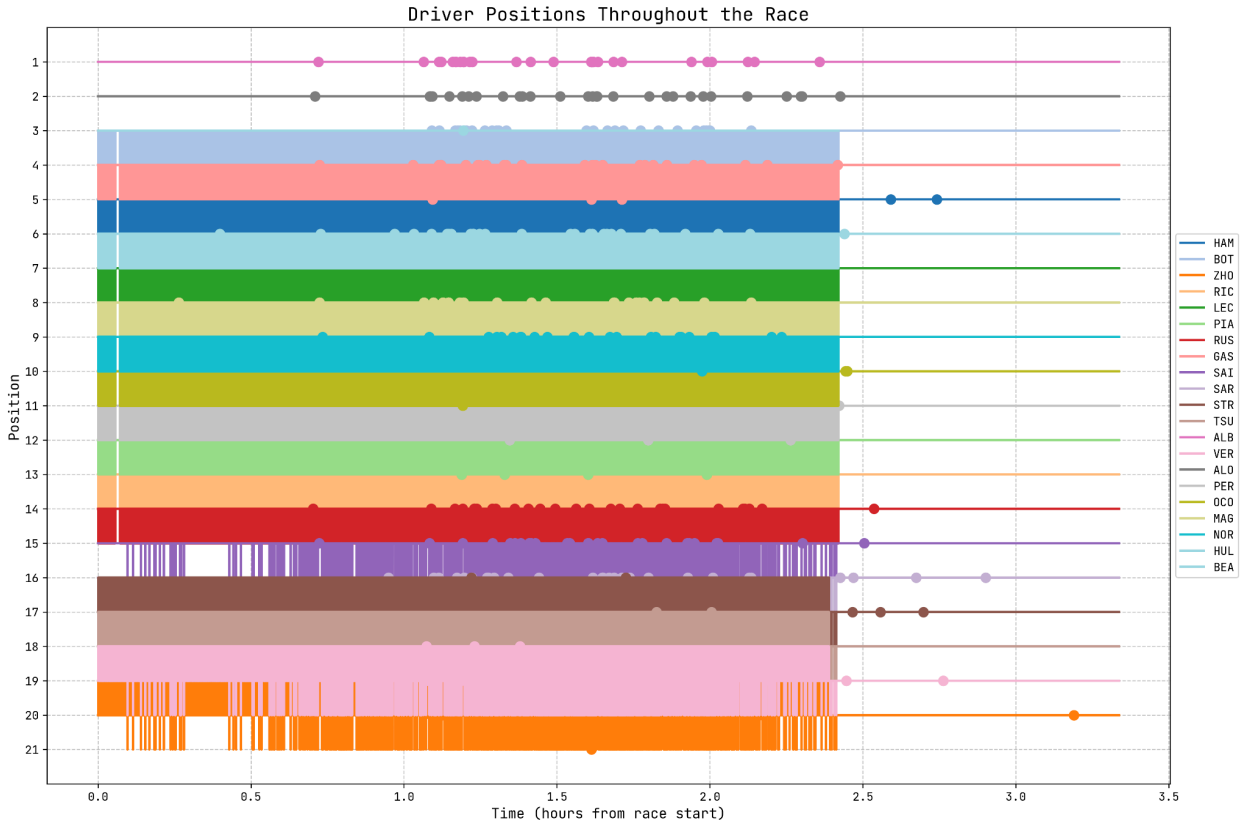
Fernando Alonso [ALO] and **Oscar Piastri [PIA]** also opted for **Intermediate tires**, but their lap times were **slightly slower** than others, potentially due to differences in **car setup** or **driving style** in the rain.



In **dry conditions**, drivers like **Alex Albon [ALB]** and **Charles Leclerc [LEC]** favored **Soft** and **Medium tires**, particularly in races with **higher air temperatures**, indicating a focus on **maximizing speed** under **optimal weather conditions.**

Position Changes Due to Pit Stops

One **crucial aspect of race strategy** in **Formula 1** is the **timing of pit stops**, where drivers change tires, refuel, and receive mechanical adjustments. The **timing** and **duration** of these stops can significantly impact a driver's **position on the track**, with well-timed stops often leading to **significant position gains** or losses. Let’s examine the role of pit stops in F1, considering both their **overall impact on race strategy** and the **individual performance** of drivers.



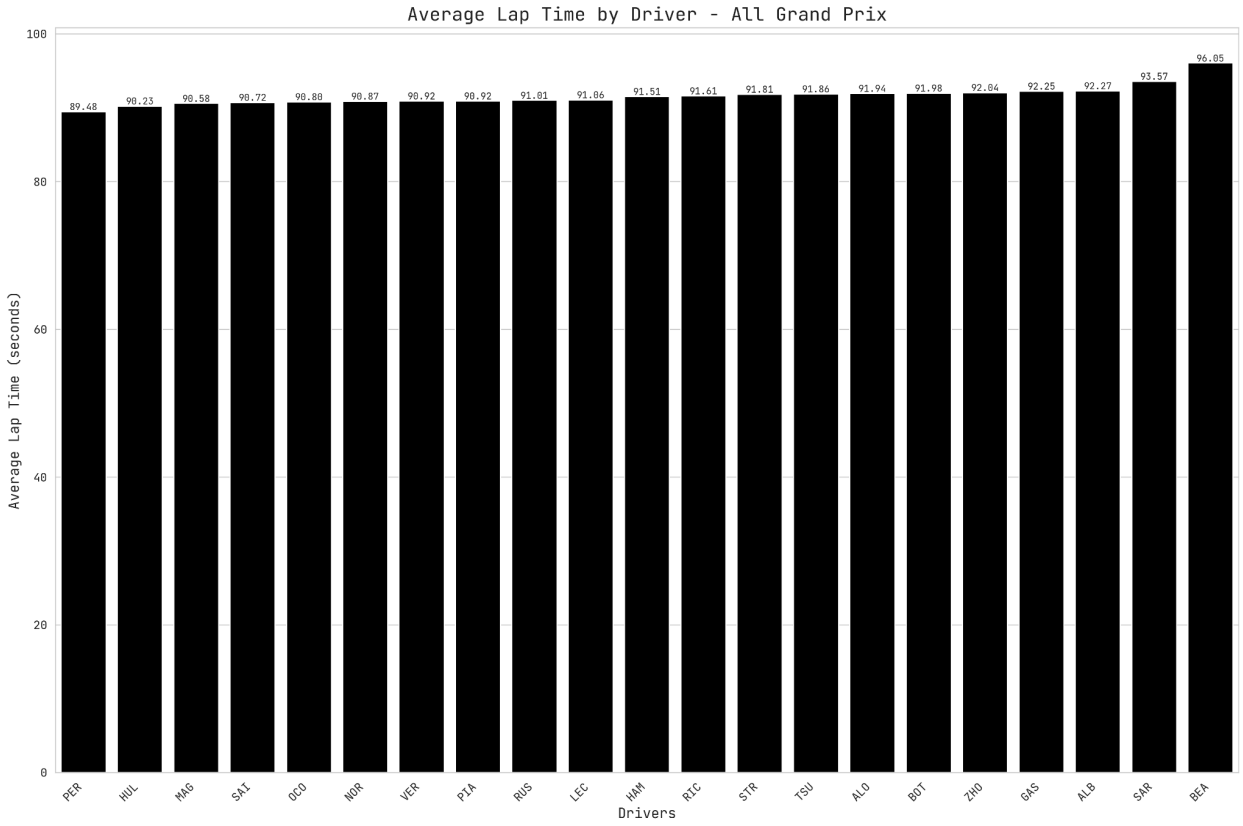
The data shows that some drivers, like **Lewis Hamilton [HAM]**, exhibit **consistency** in their pit stop performance, maintaining their position or experiencing only **minor fluctuations**. In contrast, drivers like **Lando Norris [NOR]** and **Charles Leclerc [LEC]** see more **significant**

position changes, suggesting potential areas for **strategic improvements** in their pit stop management.

Pit stops play a **critical role** in **Formula 1 races**, with their **strategic timing** and **execution** often altering the outcome of a race. Teams must balance the need for **speed**, **tire wear**, and **fuel efficiency**, optimizing their pit stop strategy to maximize their chances of **victory**.

Lap by Lap Performance

The fastest drivers consistently post **average lap times** under **91 seconds**, highlighting their **dominance** in both **race pace** and **strategy**. However, drivers at the lower end of this spectrum exhibit a noticeable decline in lap performance, which may indicate challenges related to **car setups**, **tire management**, or **strategic execution** during races.



Sergio Pérez [PER] stands out with the **fastest average lap time** of **89.48 seconds**, showcasing his ability to maintain **high speed** consistently across various race conditions. Following closely are **Nico Hülkenberg [HUL]** and **Kevin Magnussen [MAG]**, whose lap times hover just above **90 seconds**. These drivers exhibit an **elite level of performance**, with slight variations likely attributable to **car differences**, **tire choices**, or **team strategies**.

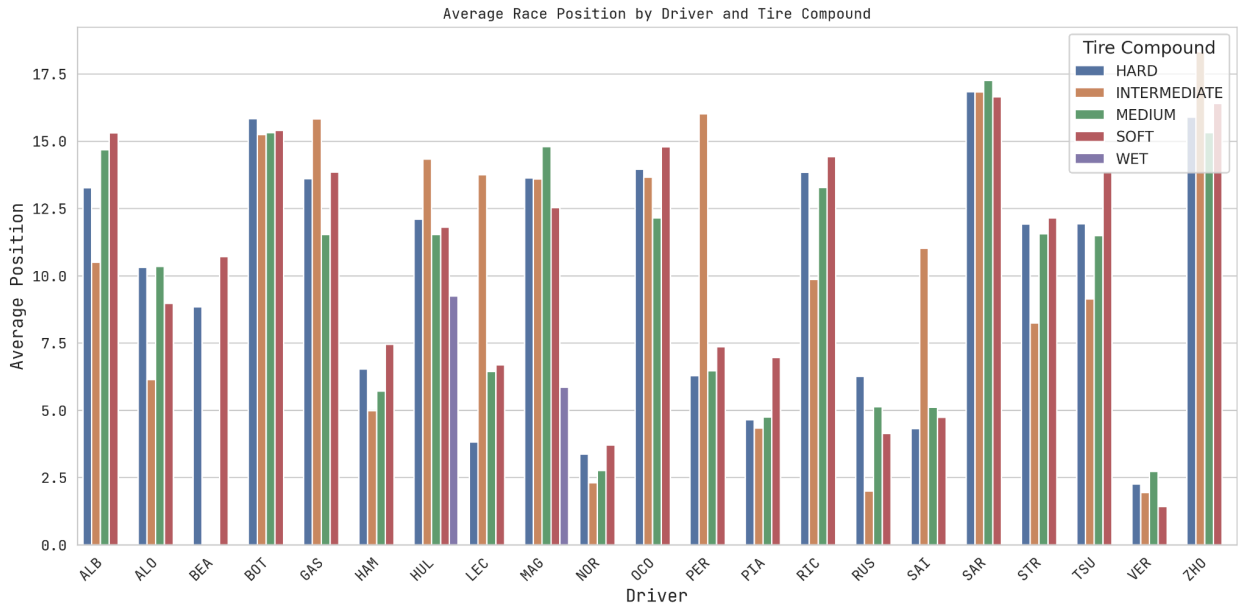
Max Verstappen [VER], often regarded as one of the frontrunners, records an **average lap time** of **90.92 seconds**, placing him in the **mid-upper tier** of drivers. His consistency is evident, yet the gap between him and **Pérez** indicates potential for **optimization** in **race management** or **mechanical setups**.

Tire Compound vs. Positioning

When examining the impact of different **tire compounds** on drivers' **average positions**, it becomes evident that the choice of tire plays a **crucial role** in **race strategy** and **performance**. Generally, **intermediate** and **soft compounds** are associated with better average positions across the grid, indicating that teams utilize these tires in situations that maximize **performance** or capitalize on favorable track conditions. In contrast, **hard** and **medium compounds**, while durable, often lead to more conservative race strategies, resulting in slightly lower average positions for most drivers.

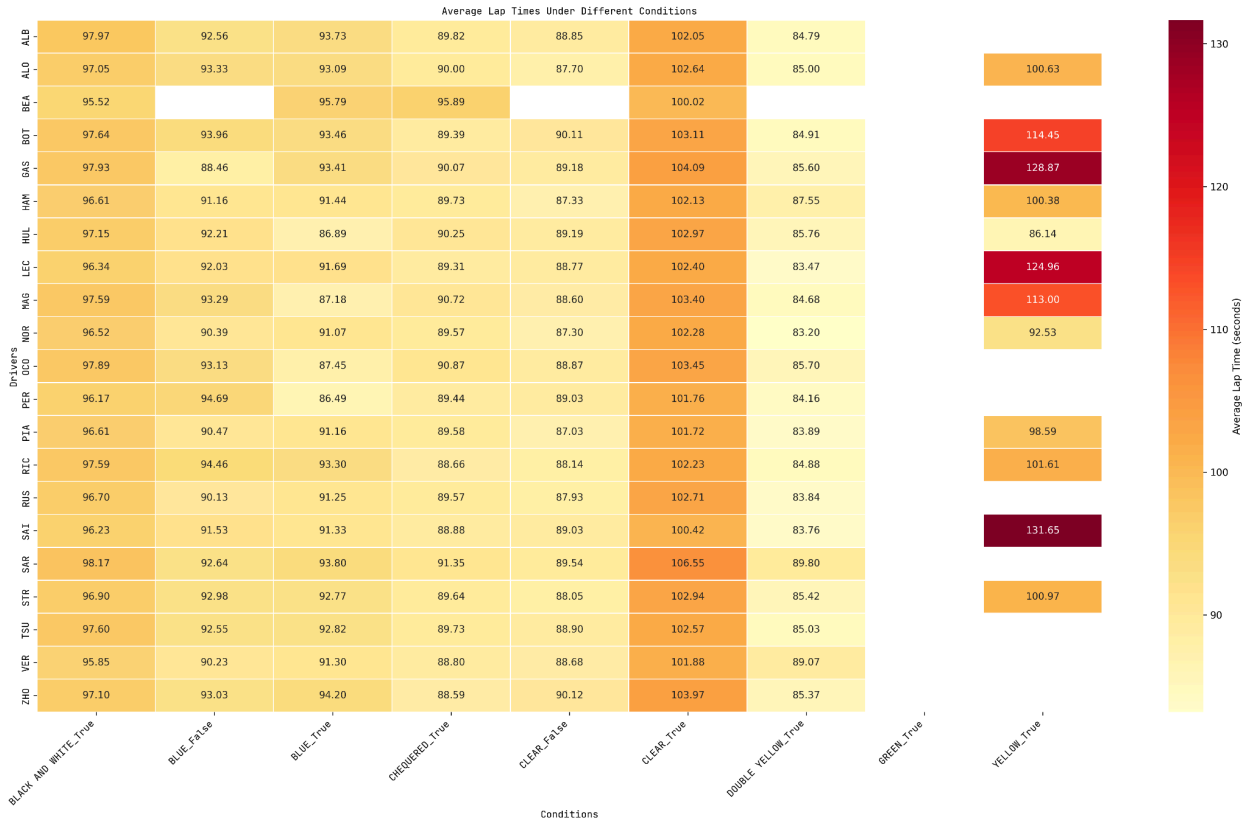
Max Verstappen [VER] consistently ranks as one of the **top performers**, maintaining an average position near the front across all tire compounds. Notably, he excels on **soft tires**, achieving an average position of **1.42**, which showcases his team's ability to leverage the tire’s **grip advantage** during critical race phases. Similarly, **Lando Norris [NOR]** and **George Russell [RUS]** also demonstrate strong

performances, with Norris achieving an average position of **2.31** on **intermediate tires**, while Russell dominates with an average position of **2.0**, reflecting their **excellent adaptability** during changing weather conditions.



Impact of External Events (Flags, DRS, Track Conditions)

The impact of **external events** on lap times in **Formula 1** racing is significant, with various flags and track conditions influencing overall performance. The data indicates that certain events, such as **double yellow flags** and **black and white flags**, generally lead to **slower lap times** across all drivers, likely due to the necessity for **caution**. In contrast, laps completed under **green flag conditions** tend to be faster, reflecting the absence of disruptions. Specifically, **black and white flags** (used for disciplinary warnings) correlate with noticeably slower average lap times, while laps under **double yellow flags** result in some of the slowest average speeds, as drivers must reduce their pace due to potential hazards.

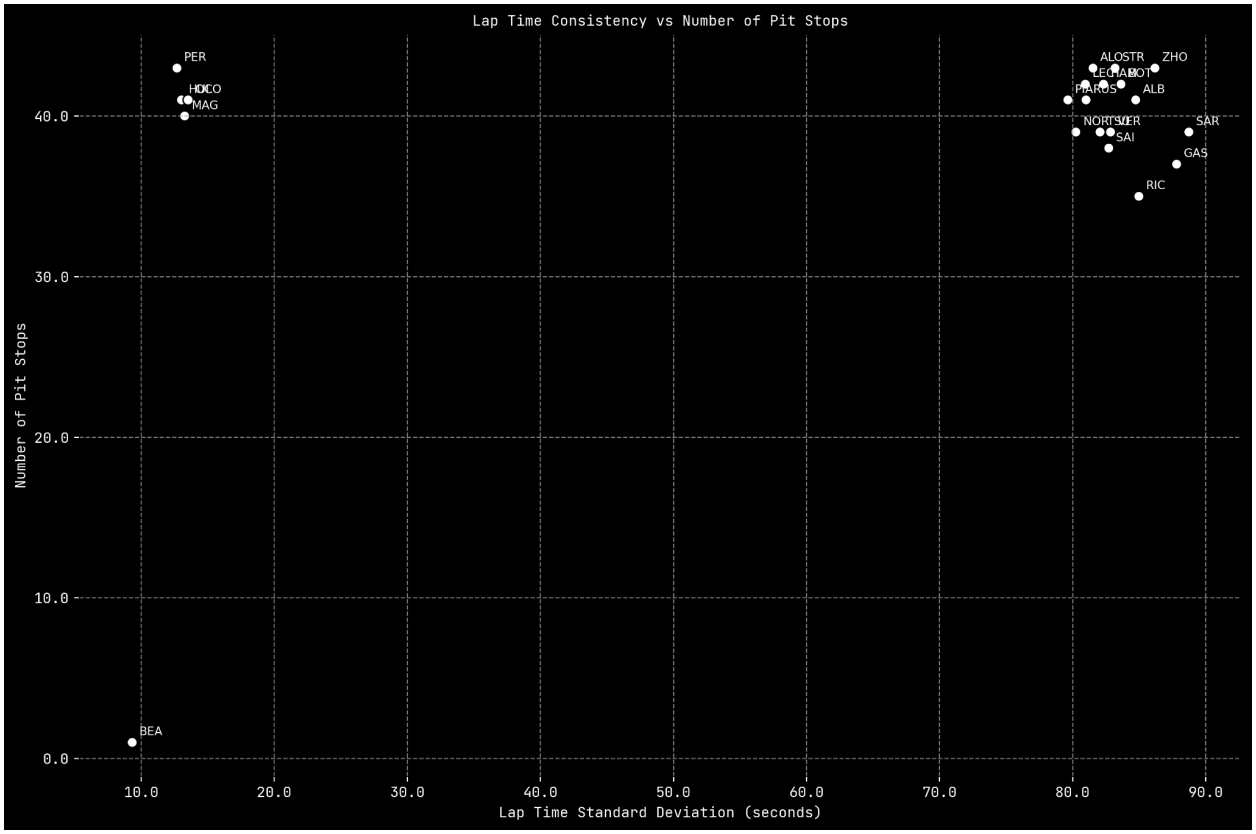


Max Verstappen [VER] consistently records faster lap times across multiple conditions, including **green flag periods**, where he averaged **88.79 seconds** per lap, showcasing his ability to maintain **pace** in clear conditions. Similarly, **Charles Leclerc [LEC]** excelled under green flag conditions with an average lap time of **89.30 seconds**, indicating a **strong pace** during uninterrupted racing.

Drivers like **Lando Norris [NOR]** and **Lewis Hamilton [HAM]** also demonstrate competitive times across various flags. Norris averaged **89.57 seconds** under **chequered flag conditions**, while Hamilton recorded an average of **89.72 seconds**, reflecting their capability to maintain high speeds toward the end of races. However, Hamilton's average lap time of **96.61 seconds** under **black and white flag conditions** suggests a **significant impact** from such external factors, more so than for some other drivers.

In contrast, drivers like **Logan Sargeant [SAR]** and **Valtteri Bottas [BOT]** struggled under **yellow** and **double yellow flags**, with lap times noticeably increasing, demonstrating how these conditions disrupt their rhythm. Bottas had one of the slowest laps under double yellow flags, averaging **114.45 seconds**, indicating a **significant drop in pace**.

Driver Consistency vs. Pit Stop Strategy



Generally, a **higher number of pit stops** correlates with greater fluctuations in lap times, as interruptions in rhythm due to **tire changes** or **race strategies** can significantly affect lap performance. Conversely, drivers with fewer pit stops tend to exhibit more **consistent lap times**, as evidenced by lower lap time variability

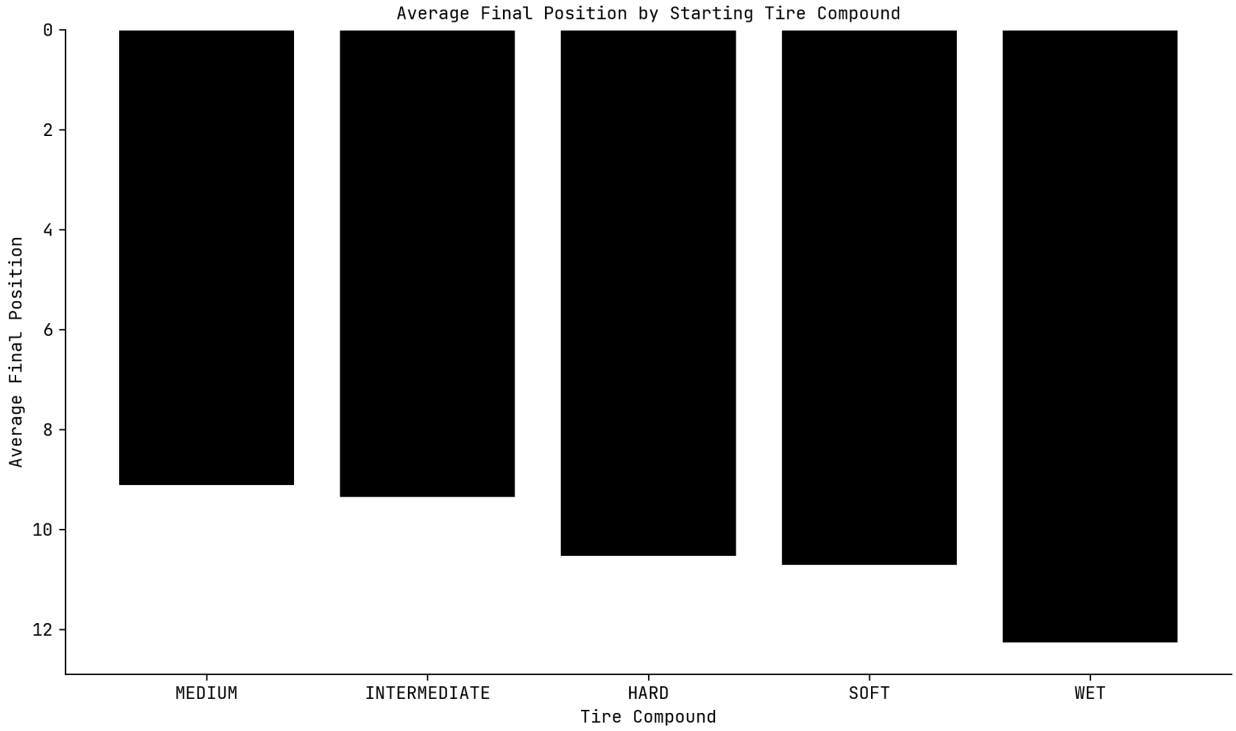
(standard deviation). However, the **length of stints** between pit stops also plays a crucial role in maintaining consistent performance.

Lando Norris [NOR] demonstrates exceptional consistency, recording the **lowest lap time standard deviation** of **80.25** among drivers who completed the most laps (**903**). Despite having **39 pit stops**, his longer average stint length of **22.58 laps** suggests fewer interruptions in his rhythm, contributing to his strong consistency.

In-depth Analysis

Starting Tire Type vs Final Classification

Drivers who started on **Medium tires** tended to perform the best, with an average final classification of **9.13**. This suggests that the Medium compound strikes a favorable balance between performance and durability, allowing drivers to maintain competitive lap times while minimizing tire degradation.



Starting on **Intermediate tires** also yielded strong results, with an average classification of **9.37**. Intermediate tires are typically used in mixed weather conditions, so this performance suggests that drivers who managed changing weather conditions well were able to secure good positions.

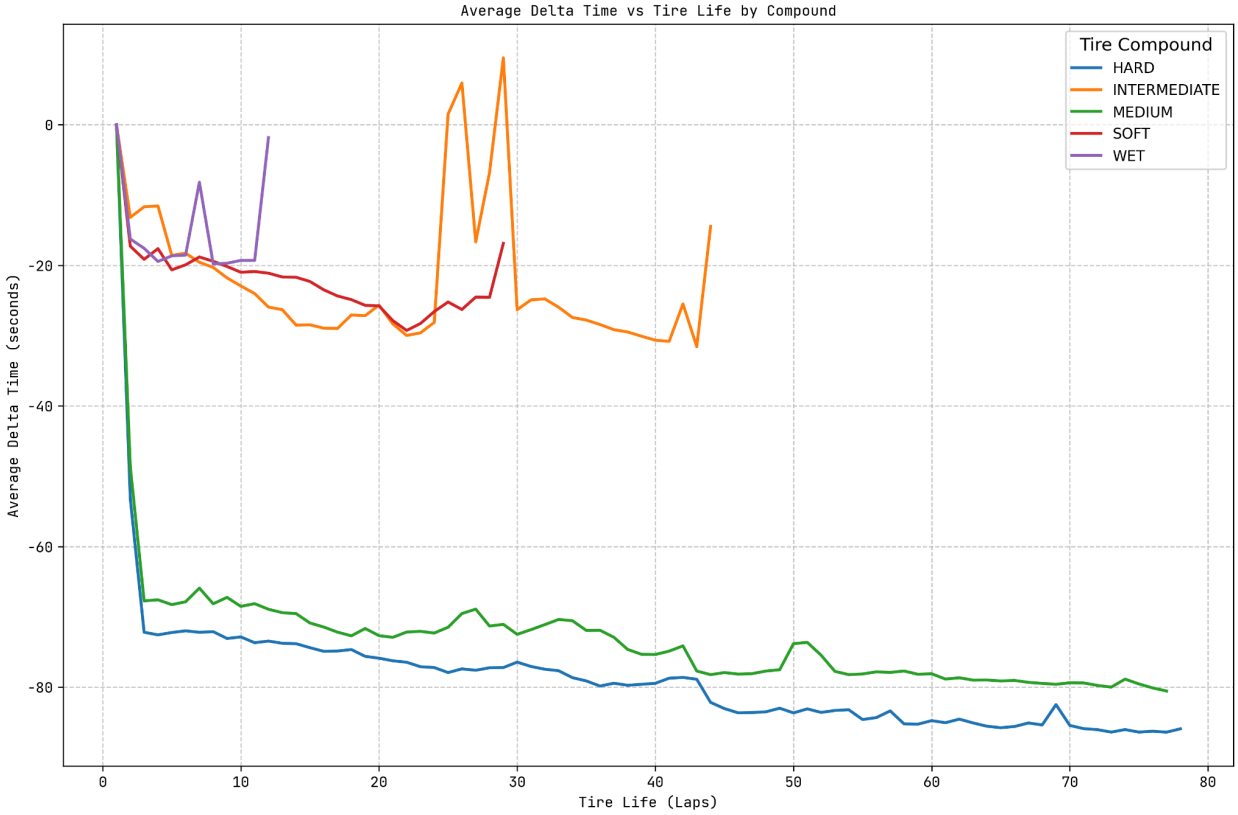
Conversely, drivers who started on **Hard tires** finished with an average classification of **10.55**. The Hard compound, while durable, may not

have provided enough initial grip to keep up with competitors on softer compounds, impacting race positions.

The **Soft tires** saw a slightly worse average final classification of **10.73**, suggesting that while they may offer better early race performance, the high degradation rate may have forced drivers into more pit stops or slower lap times as the race progressed.

Finally, drivers starting on **Wet tires** had the lowest average final classification at **12.29**. This reflects the challenging conditions typically associated with wet races, where factors beyond tire performance, such as weather and driver skill in wet conditions, play a major role in determining race outcomes.

Number of Laps on a Compound vs Delta Time



Drivers using the **Hard compound** experienced the most consistent performance, with an average delta time of **-78.67 seconds** over **78 laps**. This suggests that Hard tires, known for durability, maintain stable performance over long stints without a significant degradation in lap times.

The **Medium compound** shows a slightly higher average delta time of **-73.10 seconds** over **77 laps**, indicating that it also provides good longevity while still offering better initial grip than Hard tires. The minimal difference in delta times between Hard and Medium compounds suggests both are viable for longer stints, though Medium tires may offer a slight edge in terms of lap performance.

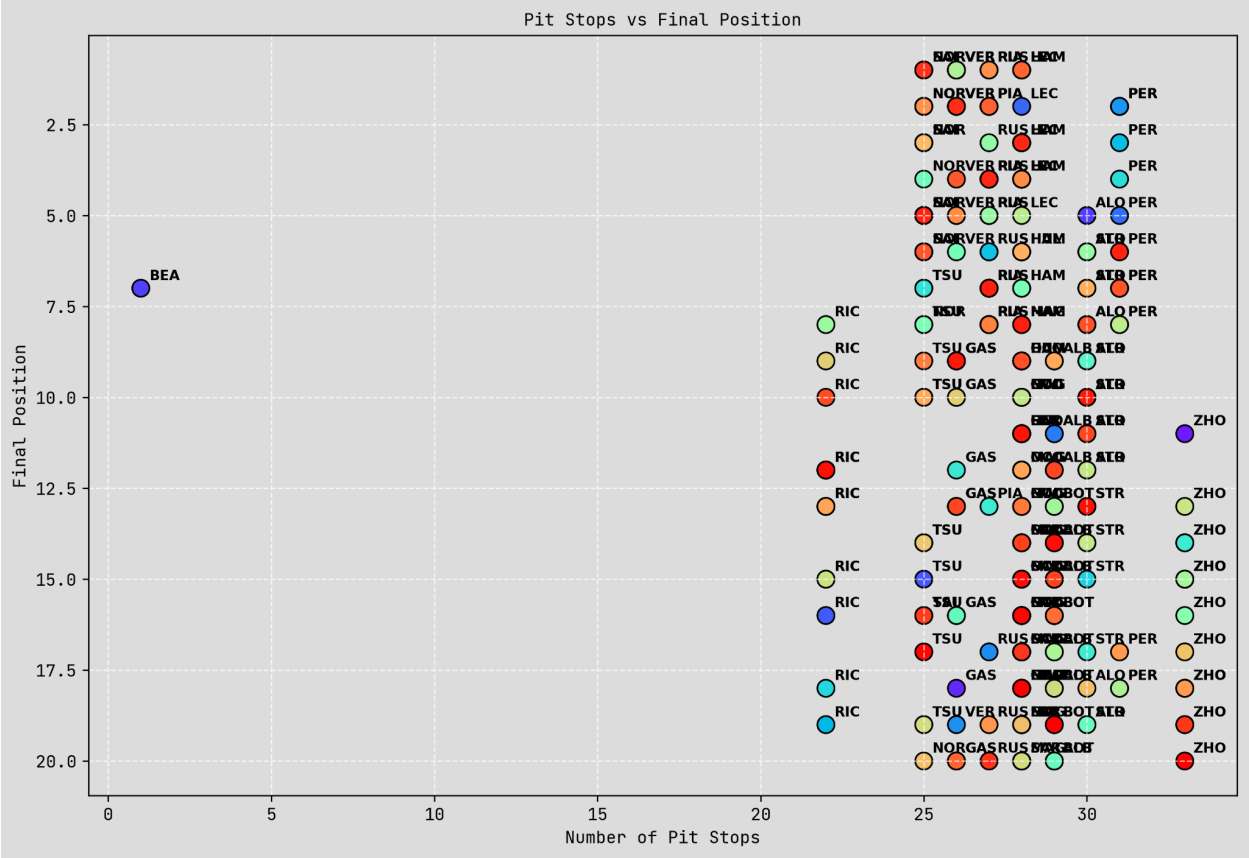
On the other hand, the **Intermediate** and **Soft compounds** both exhibit much smaller average delta times, **-21.80** and **-21.92 seconds**, respectively. This reflects that while these tires offer better short-term grip, their performance deteriorates faster, especially over shorter stints. The **Soft compound** is often used for aggressive strategies but requires more frequent pit stops due to higher degradation.

Finally, the **Wet compound** has the smallest average delta time of **-14.89 seconds** over only **12 laps**, highlighting the challenges of managing performance in wet conditions. Wet tires degrade more quickly, and their delta times fluctuate due to unpredictable weather factors, making them less reliable for extended stints.

In summary, while **Hard** and **Medium tires** excel in maintaining performance over longer stints, **Soft** and **Intermediate tires** show significant wear over fewer laps, and **Wet tires** have the lowest performance consistency, largely dependent on weather conditions.

Number of Pit Stops vs. Final Position

At first glance, there appears to be a **loose correlation** between the number of pit stops and the final position. Drivers who made **fewer pit stops** (e.g., 5 or fewer) generally finished in **better positions** (closer to the top of the field). For instance, BEA, who only made **one pit stop**, finished in **7th place**, suggesting that a more conservative pit strategy can yield competitive results.

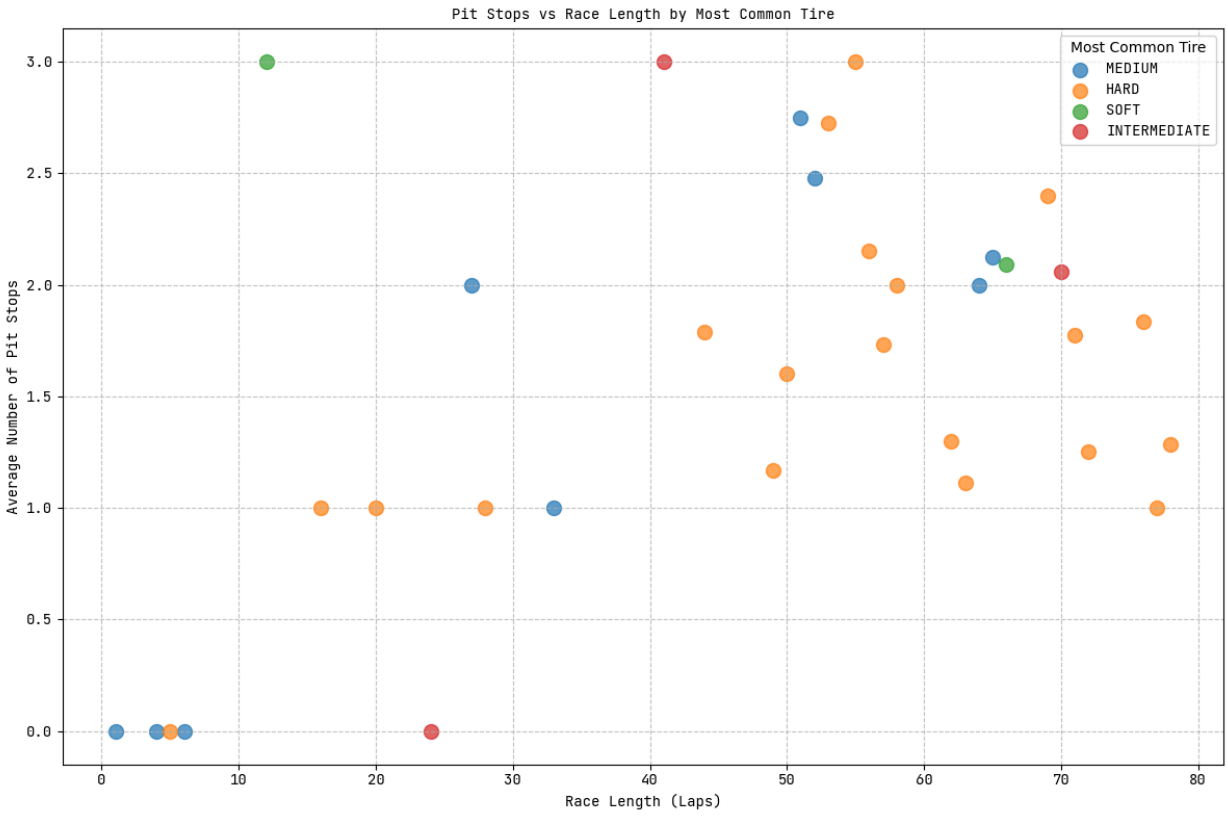


As the number of pit stops increases, we observe a spread of results. Drivers like **RIC**, who made **multiple pit stops** (10 or more), tended to finish in lower positions, typically ranging between **10th and 20th**

place. This suggests that making frequent pit stops, particularly beyond 10 stops, is detrimental to a driver's final standing.

However, drivers who made **a moderate number of stops** (between **5 and 15**) show a more varied outcome, with some managing to secure better positions despite a higher stop count. This indicates that strategy, timing, and tire management play critical roles alongside the raw number of stops.

Race Length vs. Strategy



For **short races** (up to around 12 laps), drivers tend to make **zero pit stops** and opt for **softer tires**, such as the **Medium** or **Soft compounds**, which offer better grip and speed over shorter distances without requiring multiple tire changes. For instance, in a 12-lap race,

drivers averaged **3 pit stops** using the **Soft tire**, indicating an aggressive approach focused on maintaining speed.

As the **race length increases**, drivers generally adopt more **conservative strategies**. In races between **16 and 33 laps**, the most common tire tends to be the **Hard compound**, which is more durable and can last longer, thus minimizing the need for frequent stops. For example, in a 33-lap race, the average number of pit stops was **1**, with the **Medium tire** being the most common.

For **longer races** (above **50 laps**), the **Hard tire** continues to dominate, likely due to its endurance, while the number of pit stops increases slightly but remains manageable, usually between **1 and 3 stops**. In a **55-lap race**, the average was **3 stops**, with drivers mostly selecting the **Hard tire** to balance performance and tire wear.

Conclusion

The analysis of Formula 1 strategies highlights several key factors that significantly influence race performance and outcomes. A central takeaway is the critical role of tire choice in shaping race strategies. Drivers who start on **Medium tires** tend to perform the best, balancing grip and durability effectively. Intermediate tires also show strong results, especially in variable weather conditions, while Hard tires, though durable, often lead to lower final classifications due to their slower initial pace. In contrast, Soft tires, while offering speed, require more frequent pit stops and may hinder long-term performance.

The correlation between pit stops and final positions underscores the importance of strategic decision-making. Drivers who adopt a conservative pit strategy—making **five or fewer stops**—generally secure better finishing positions, demonstrating that maintaining race rhythm can be more beneficial than aggressive tire management. Conversely, drivers with excessive pit stops tend to finish lower in the standings, indicating that consistency is key.

Winning drivers like Max Verstappen and Lando Norris exemplify the successful employment of these strategies. They consistently demonstrate adaptability to race conditions, utilizing tires that maximize their car’s performance while minimizing disruptions. These drivers maintain high lap times, particularly under green flag conditions, where they can capitalize on their tire choices without external interruptions.

Recommendations for Consistent Podium Finishes

To enhance their chances of achieving consistent podium finishes, drivers should consider the following strategies:

1. **Optimal Tire Selection**: Prioritize starting on **Medium or Intermediate tires** to leverage their balance of performance and durability. Understanding track conditions and weather changes is essential to optimize tire use throughout the race.
2. **Conservative Pit Strategies**: Limit pit stops to **five or fewer** to maintain rhythm and avoid unnecessary disruptions. Planning pit stops around tire wear and race conditions can help drivers sustain performance while minimizing time lost.
3. **Maximize Stint Length**: Focus on longer stint lengths, especially when utilizing Hard tires, to capitalize on their durability and maintain consistent lap times. This approach can reduce the frequency of pit stops and allow drivers to build momentum throughout the race.
4. **Adaptability to Conditions**: Be prepared to adjust strategies based on real-time race conditions. For example, using Soft tires aggressively during short races or managing Intermediate tires effectively during mixed conditions can provide strategic advantages.

By employing these strategies, drivers can enhance their performance, navigate the complexities of race conditions, and improve their chances of achieving a podium finish consistently. Ultimately, success in Formula 1 hinges not only on raw speed but also on strategic acumen and the ability to adapt to ever-changing circumstances on the track.

Appendix

Code, Dataset, and Charts:
https://github.com/polymawutor/f1-2024-strategies