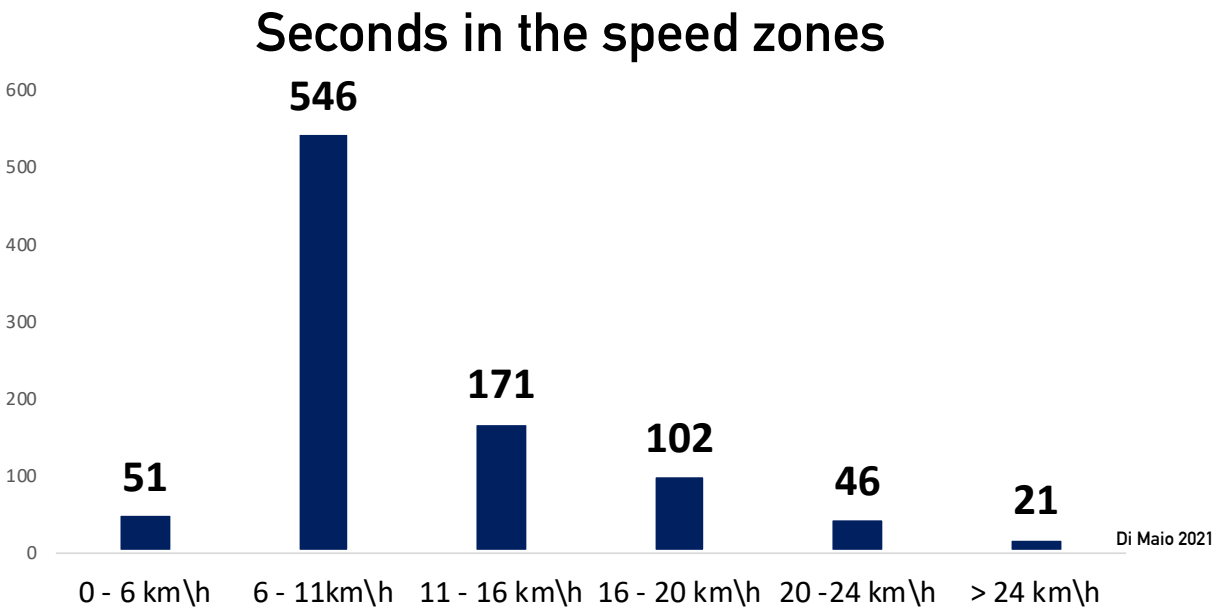
Rugby Sevens

Study of the performance model

Index

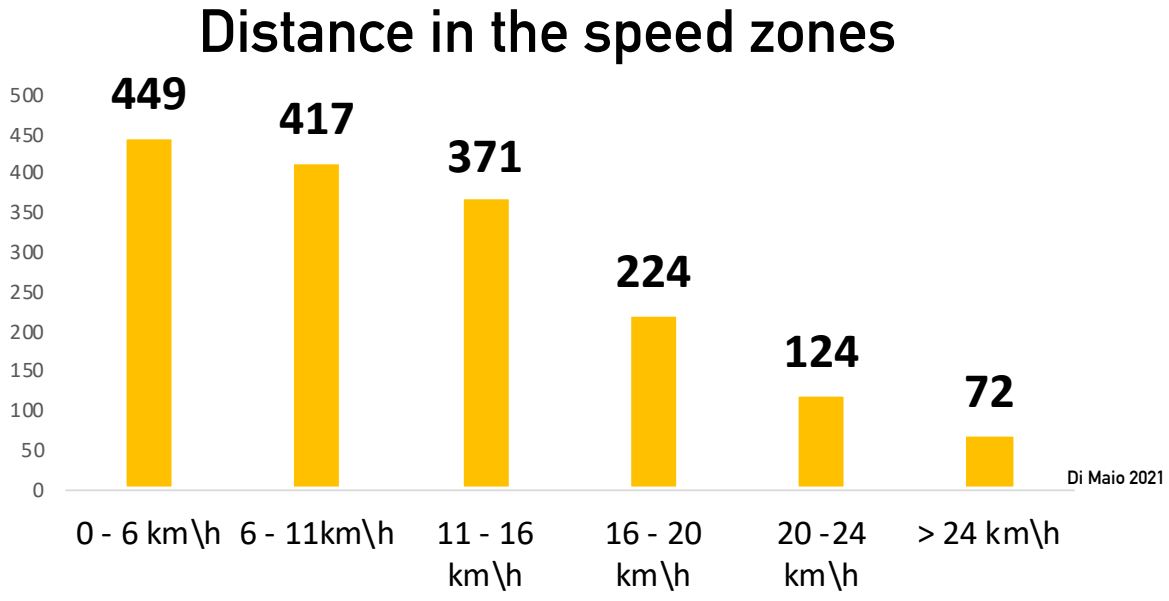
SPEED

Let's start the study on one of the most analyzed parameters not only in Rugby Sevens: speed.
The first data concern the subdivision based on time in the various speed zones.

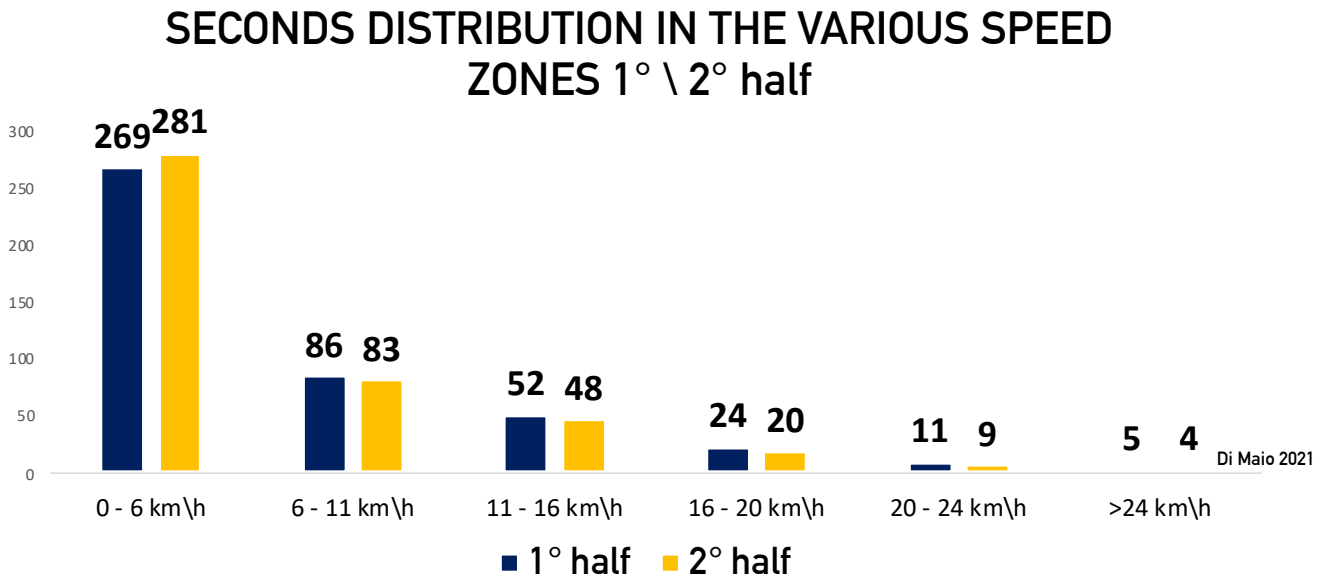


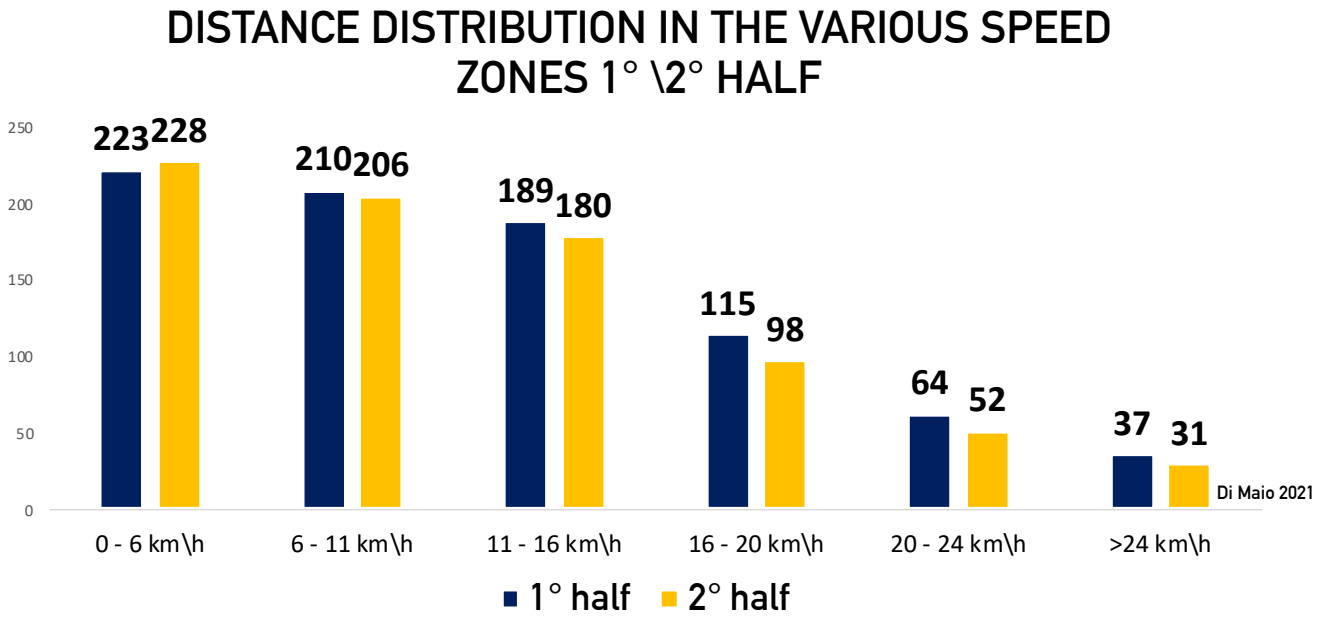
If we take into account not the time but the distance travelled, the relationships clearly change. In fact, in the same fraction of time, more meters are covered at a higher speed.

The

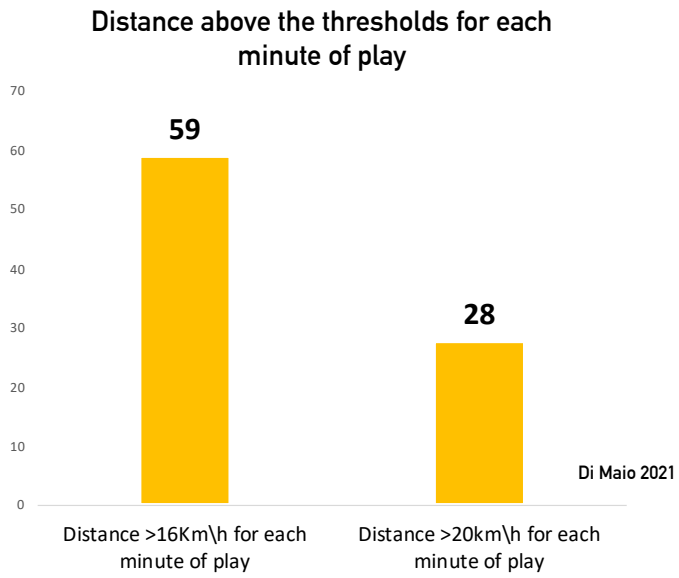


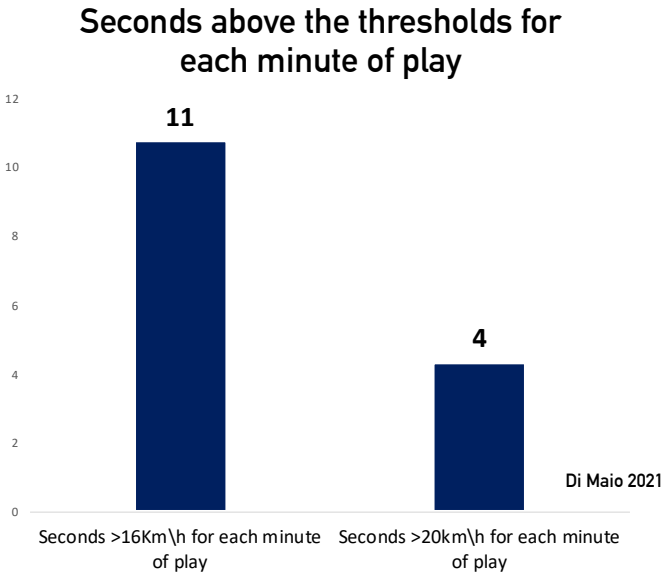
distribution of these two parameters in the two halves of the game is almost the same. In fact, there are no substantial differences between the two parts of the game, except for a slight decrease in the values in the second half at higher speeds (about 5% -10% depending on the speed zone).



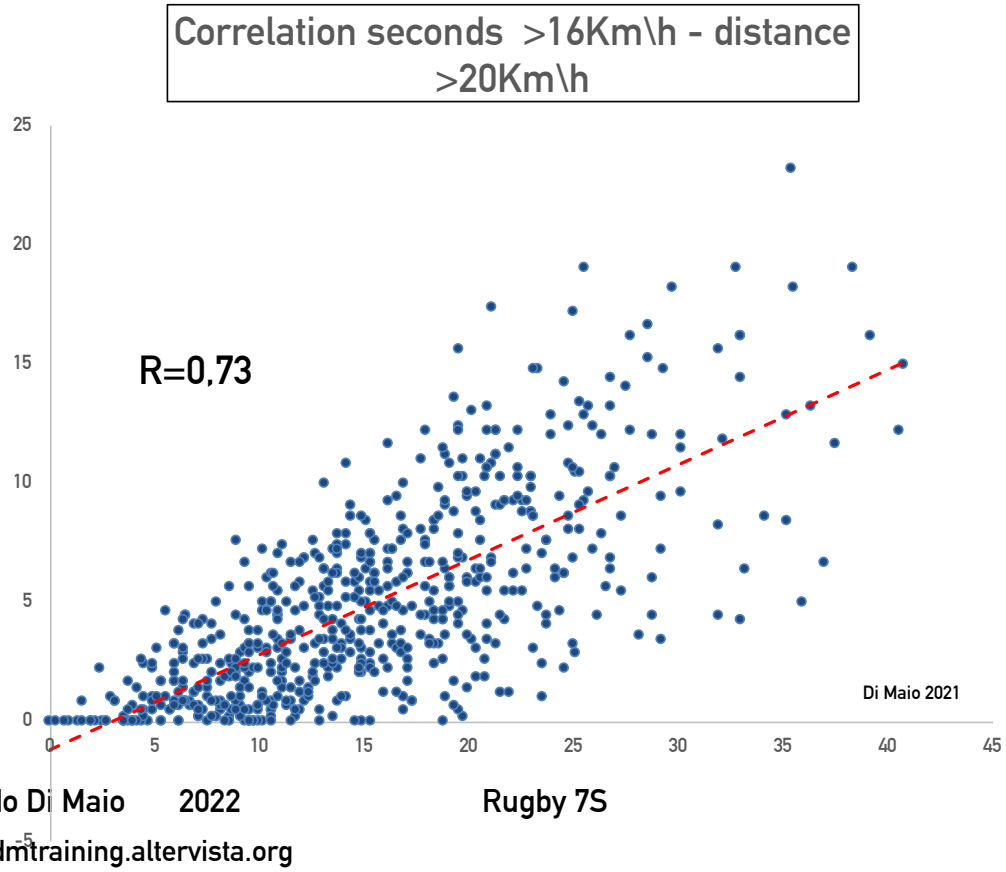


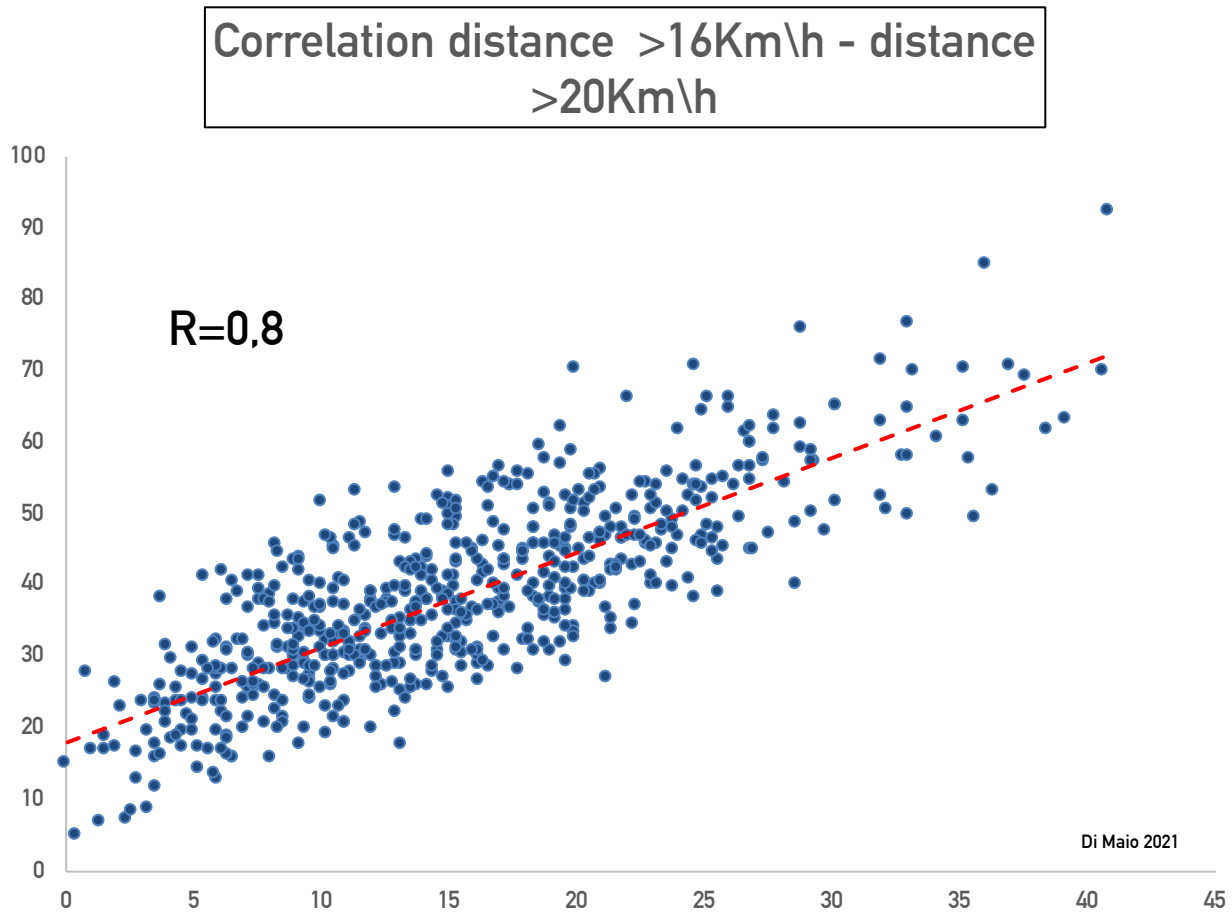
For each minute of game play, players travel an average of 59 meters above the 16Km \ h threshold in 11 seconds of activity. 28 meters instead above 20 Km \ h in 4 seconds.





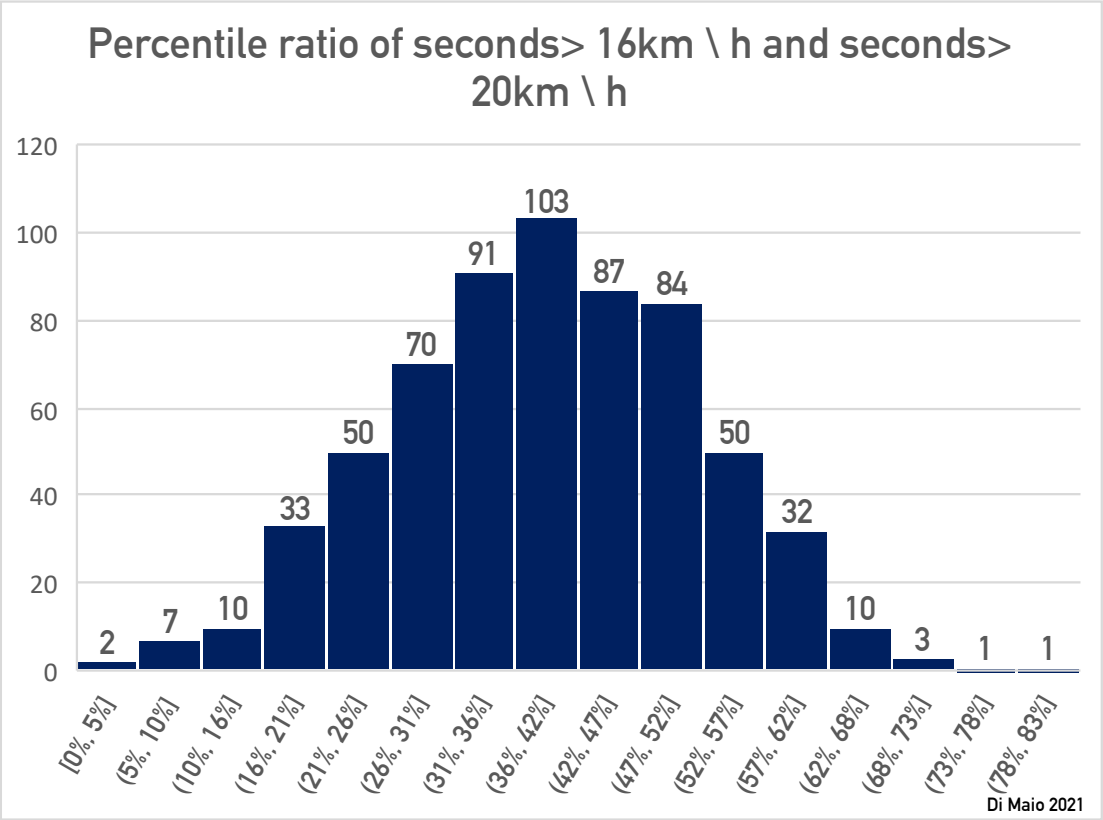
On the other hand, the correlation between distance and time above the thresholds of 16 and 20 Km \ h is quite different.
Unlike intense accelerations, there is an important correlation between the two parameters which defines a close link between these two.



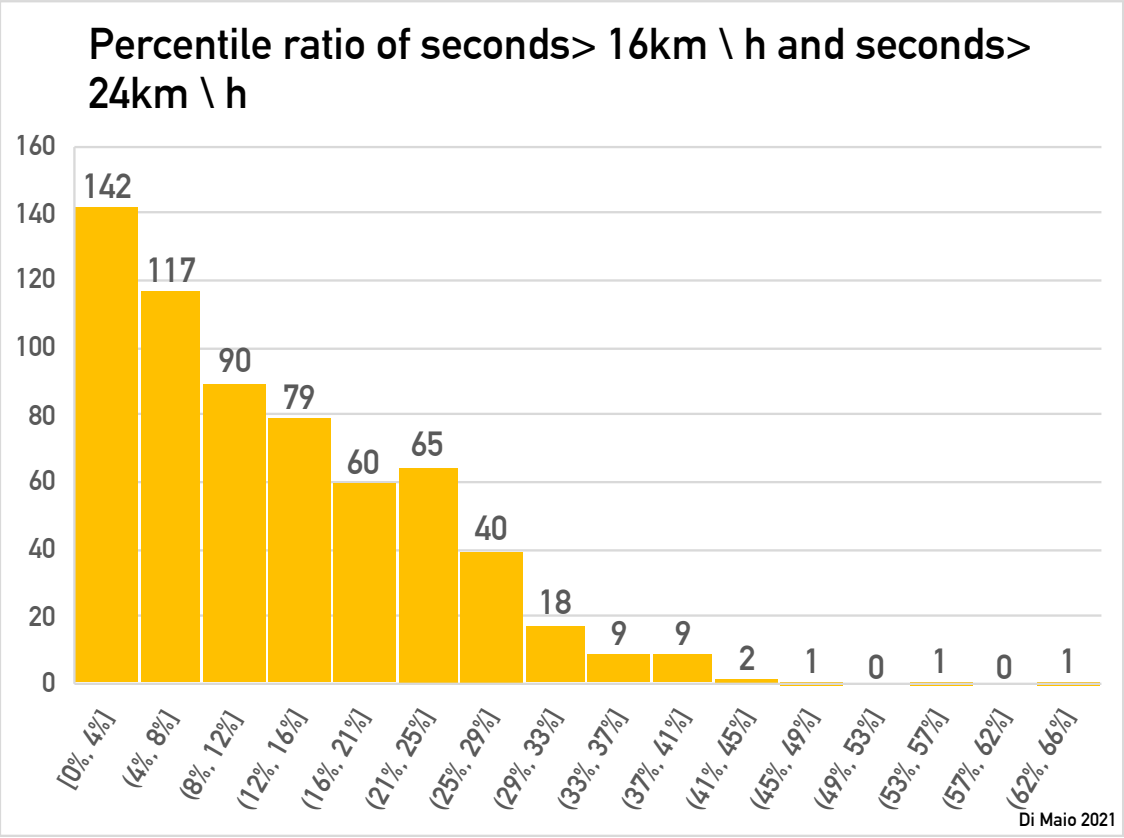


Let us now consider the ratio between the seconds above the 16Km \ h threshold and those above 20Km \ h, this time on an individual level. The distribution of the percentiles shows us what the differences are between the players and what is the most represented type of player/performance.

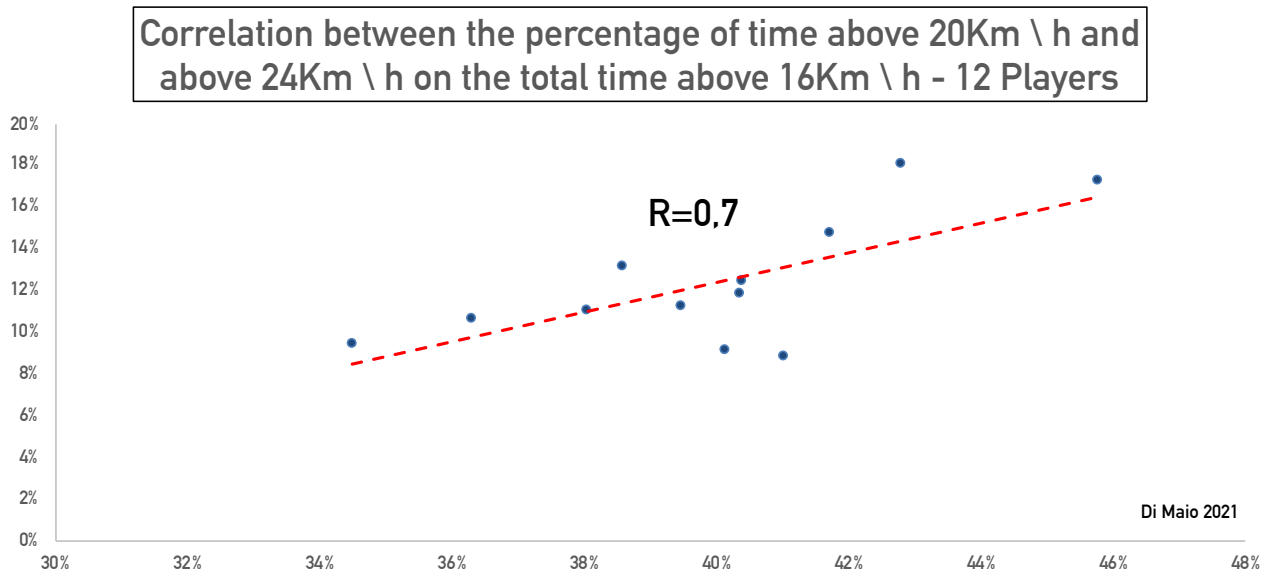
Out of 634 carried out surveys, 44% of the times it was found that players went beyond the 20Km \ h threshold between 31% and 47% of the time they were above 16Km \ h.
It is equally true that we find performances that are not represented in percentage terms, but that they exist and fall within the cases that game situations can create, obviously together with individual skills.



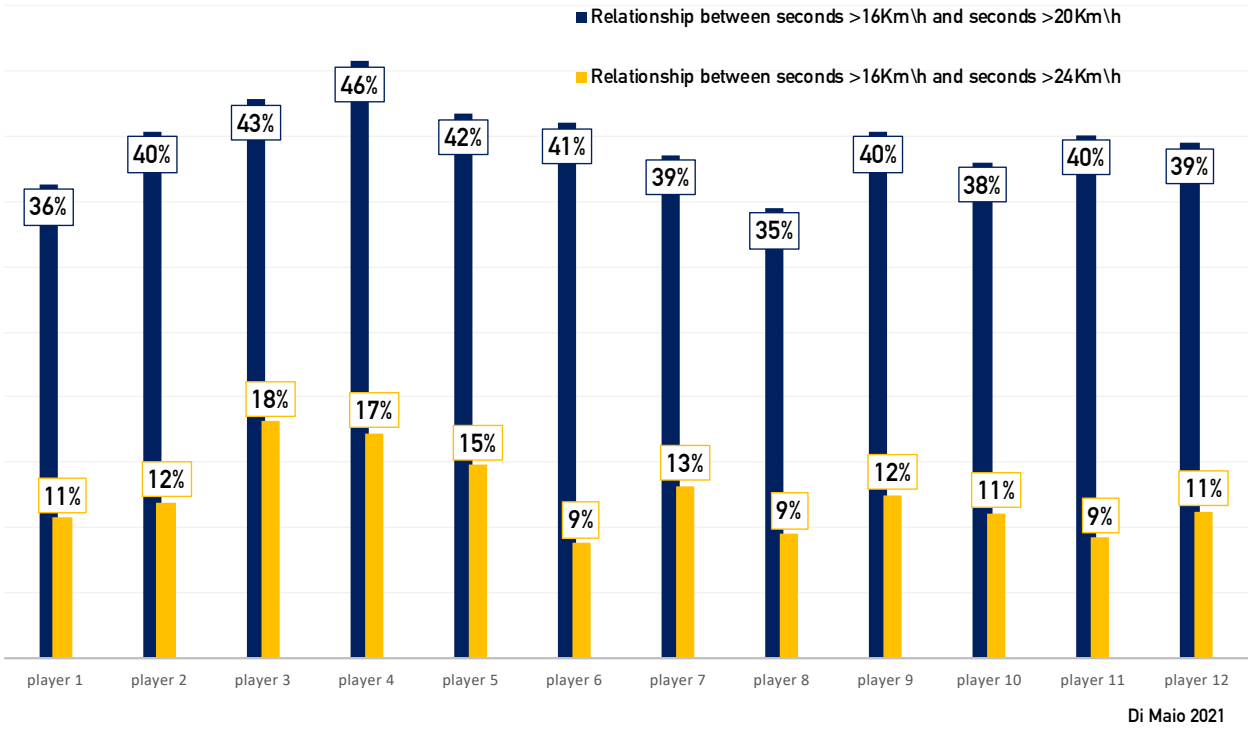
The distribution changes considerably if the second threshold is brought to 24Km\h.
In this case the most represented percentages are from 0% to 12% which alone correspond to 55% of the total of the surveys.



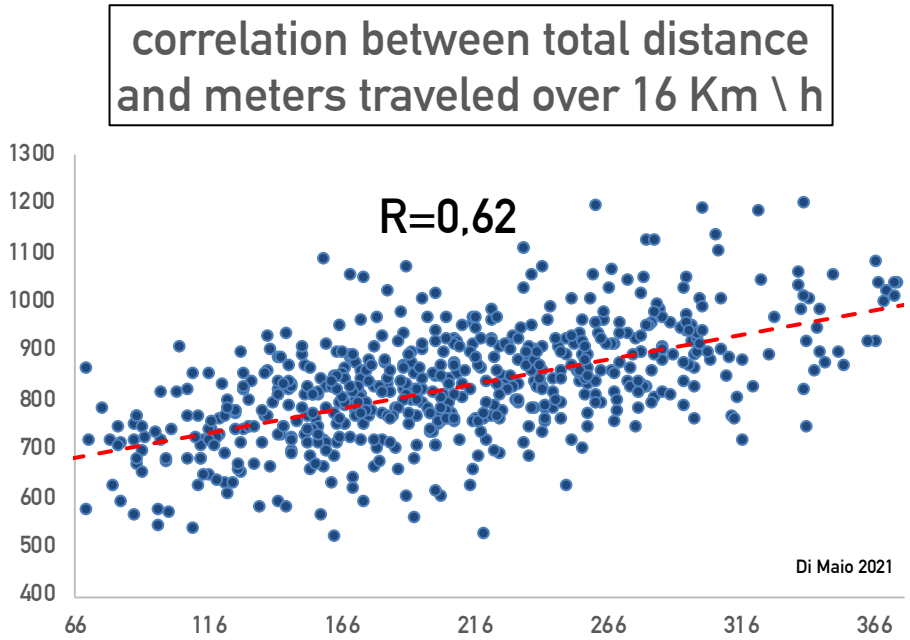
Let us now examine these same parameters but on an individual level.
Data from 12 players with at least 25 recorded playing times was used.
The percentage values of the time spent above 20Km \ h and 24Km \ h on the total time above 16Km \ h were directly correlated.
In this way it is possible to observe the behavior of the players when they exceed the threshold of 16Km \ h and how much time in percentage they manage to go beyond the other two thresholds.

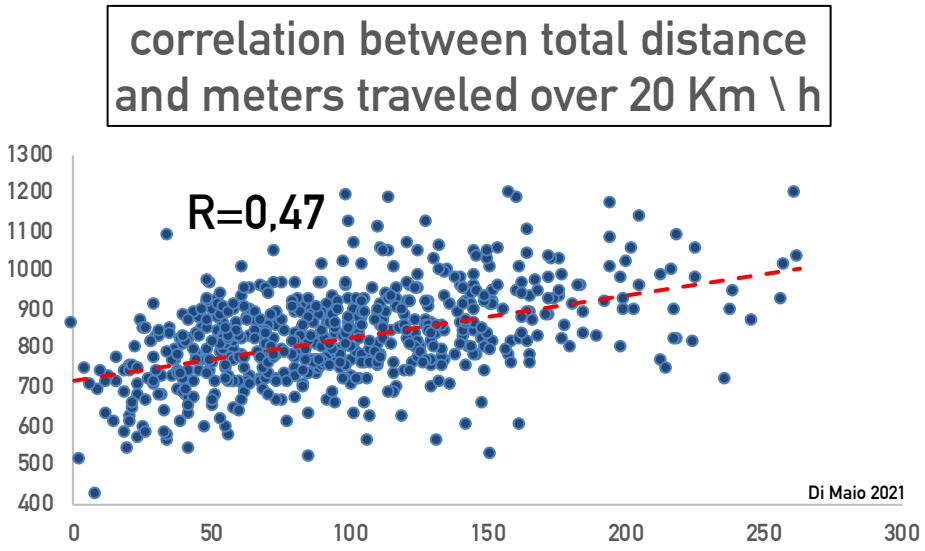


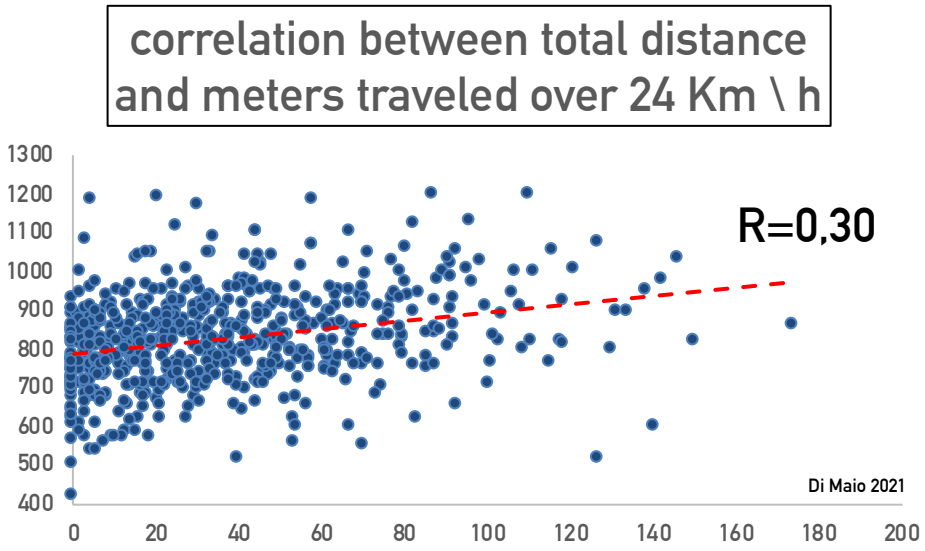
This 12-player study demonstrates that this correlation exists even though there are out-of-average values.
This means that, at least for these players, the percentage of High Speed Running time (over 16Km/h) in which a player is able to exceed even 20Km/h is correlated with the ability to go beyond 24Km/h.
We can therefore say that 20 Km/h turn out to be a very significant threshold even for the highest speeds, much more than 16Km/h.
Individually then we can observe the ratios of the parameters taken into consideration, with the next graph where each player has been associated with their respective values.
In this way it is possible to appreciate the distribution and personal performance and identify each player's type of performance.



Returning to the general data on speed, let's see what relationships exist with the data exposed so far and how the speed interacts with the other parameters. First we relate the distance data beyond the thresholds of 16 Km /h, 20 Km/h and 24 Km/h with the total distance.

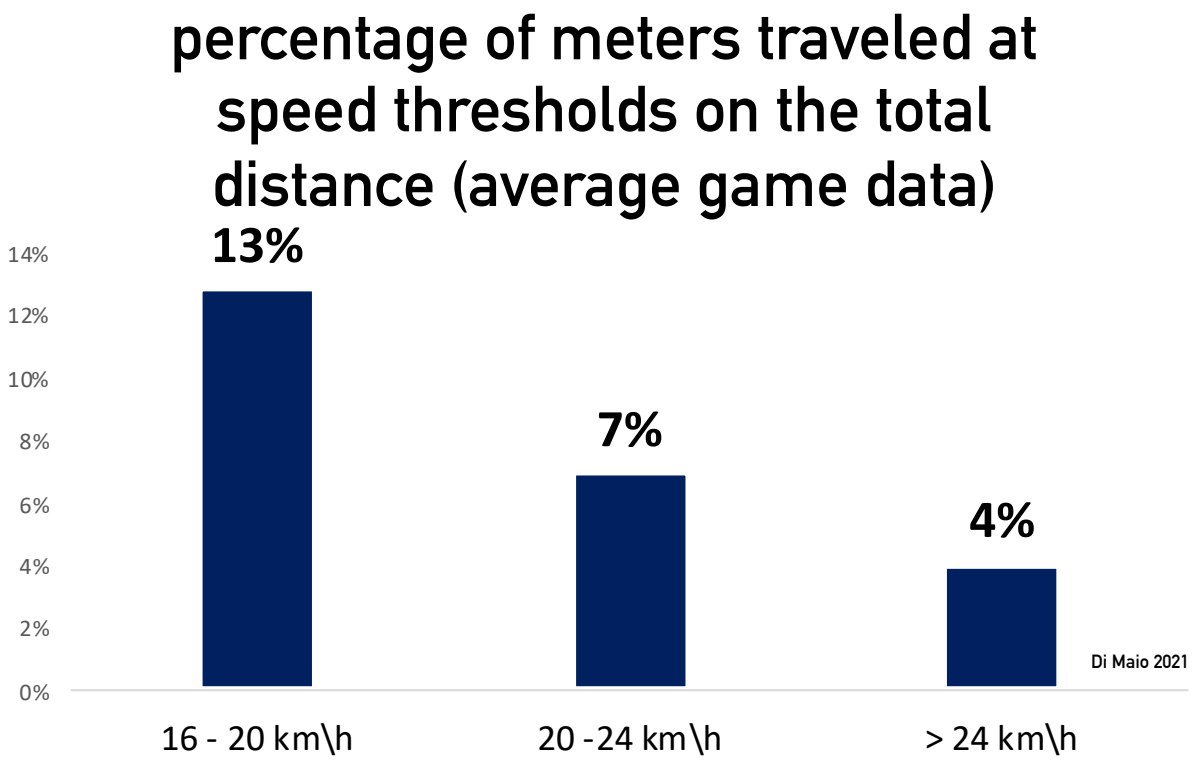




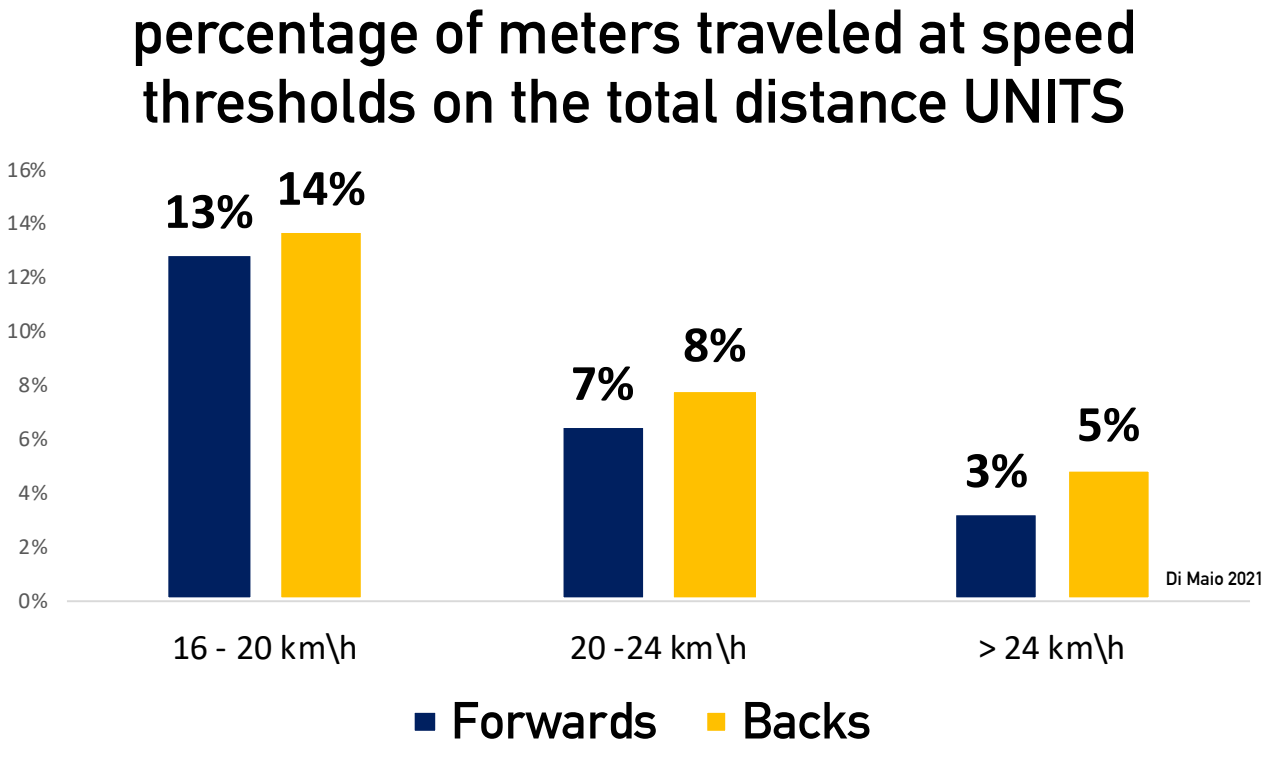


Distance at higher speeds appears to be less correlated with total distance. In fact, an increase in the total distance travelled seems to be more related to an increase in High Speed Running (> 16Km/h) and much less to other speed thresholds.
The same result if you compare the speed data with those of the metabolic power. Compared to the important relationship with the data at the 16 Km/h threshold, equally relevant values are not found when the threshold is moved higher, witnessing a linear decrease of this value up to the 24 Km/h threshold.

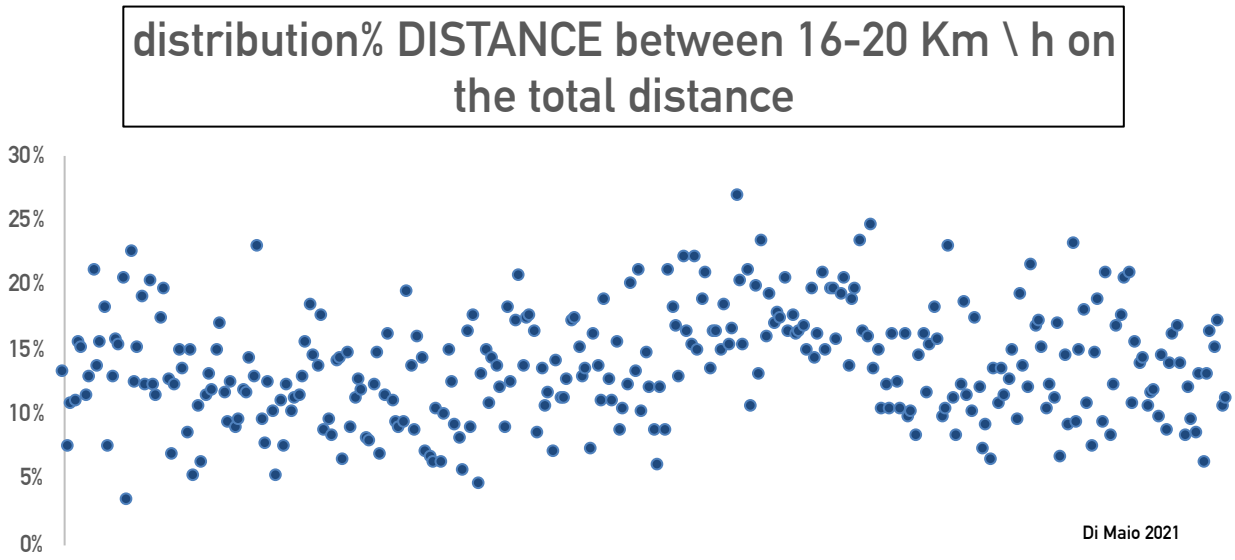
We can also define the percentage of the total distance traveled above the speed thresholds taken into consideration.



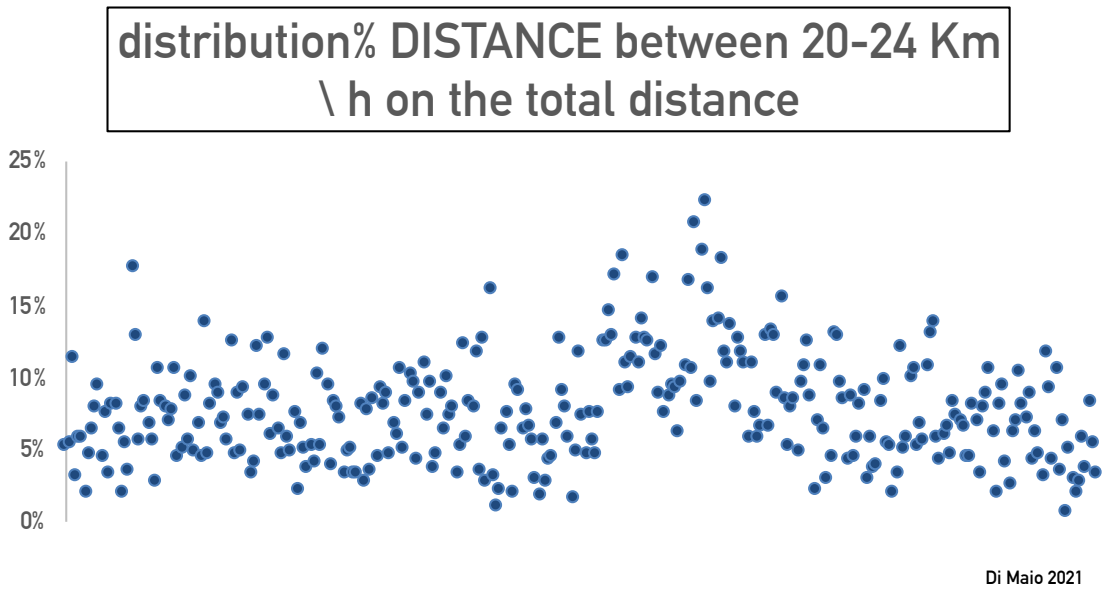
The differences between the roles are more marked, compared to other parameters, in favor of the Backs who have more opportunities to express high speeds.



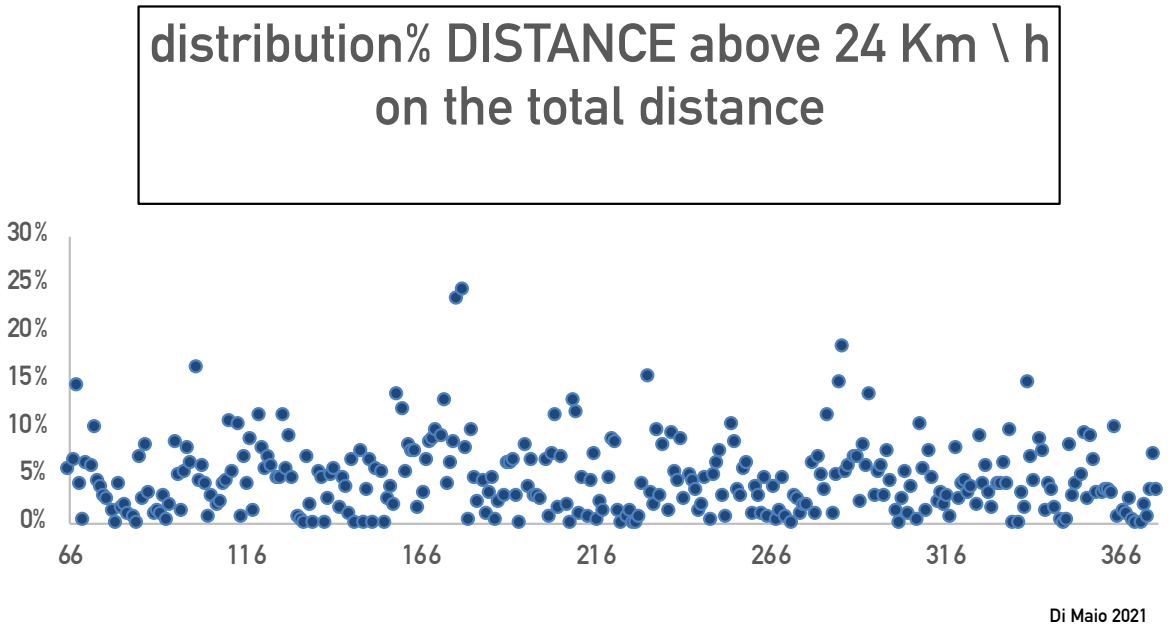
The range within which these data move is restricted as regards the 16-20 Km/h band.
The average of 13% is also the median value, being the most represented value.
The other values are also very close to this average which precisely defines a part of the performance model.



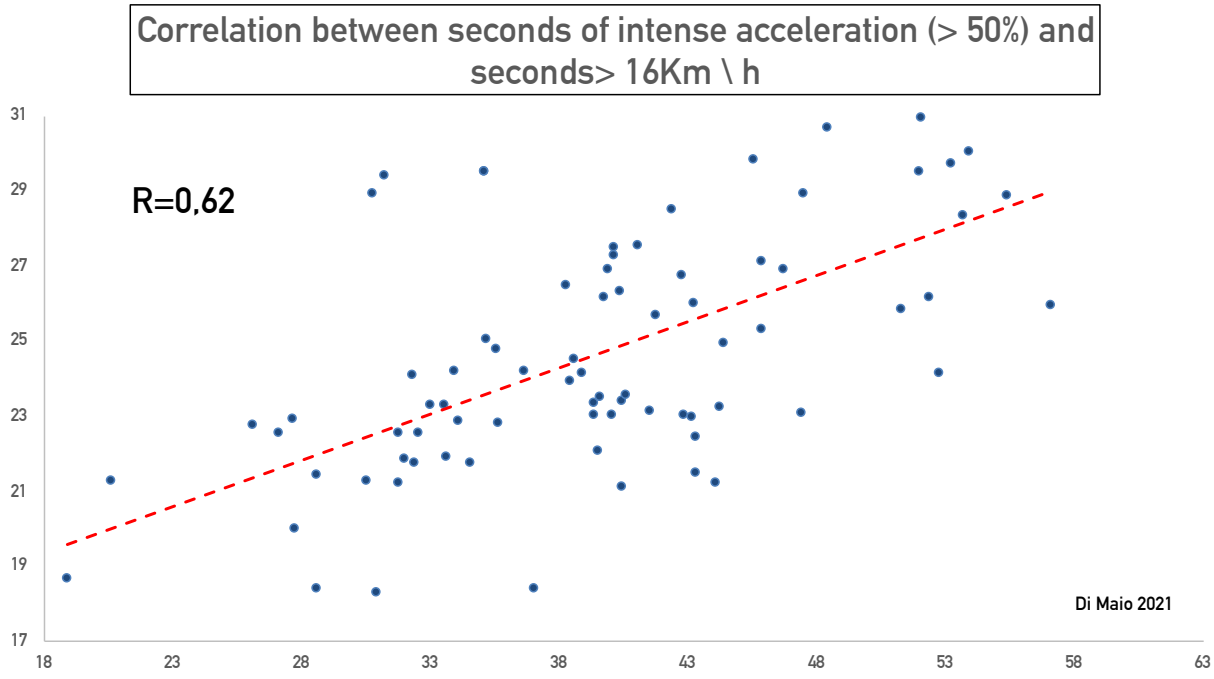
Moving into the 20-24Km/range, the situation changes in favor of a less homogeneous distribution where we find values close to 0 and values over 15%.



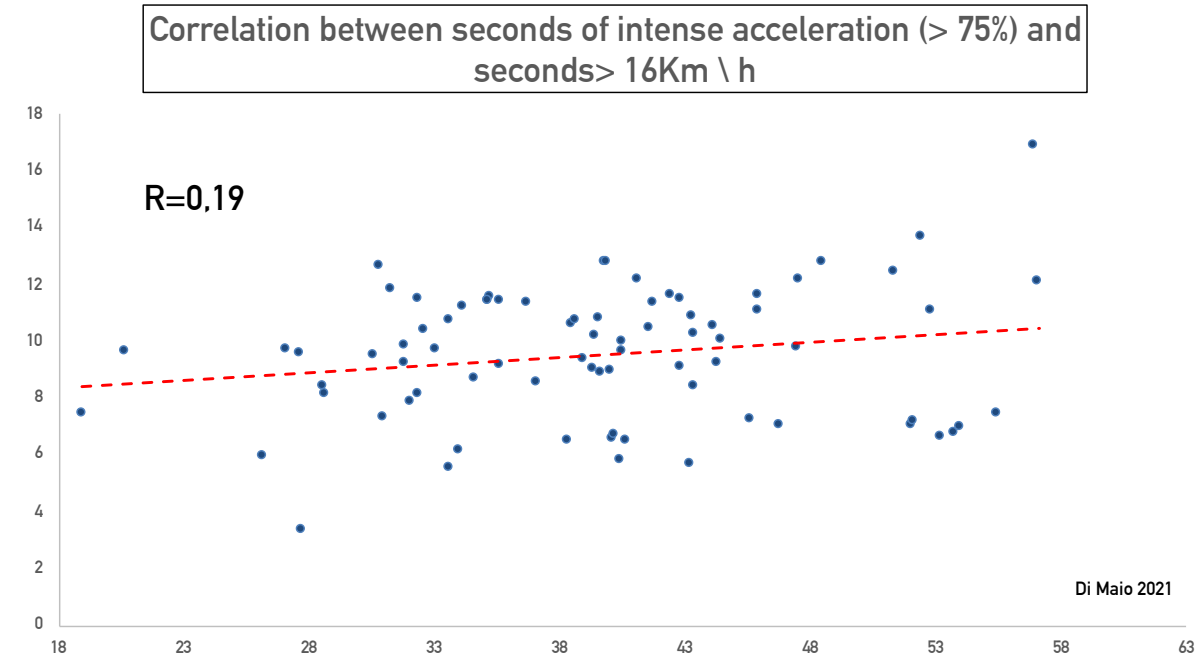
Finally, beyond the threshold of 24 Km/h we find an average of 4% of the total distance but, as can be clearly seen from the graph, this average is absolutely not representative of the individualities and specific situations of the match.
Many values equal to 0 are contrasted with values that reach over 20%.



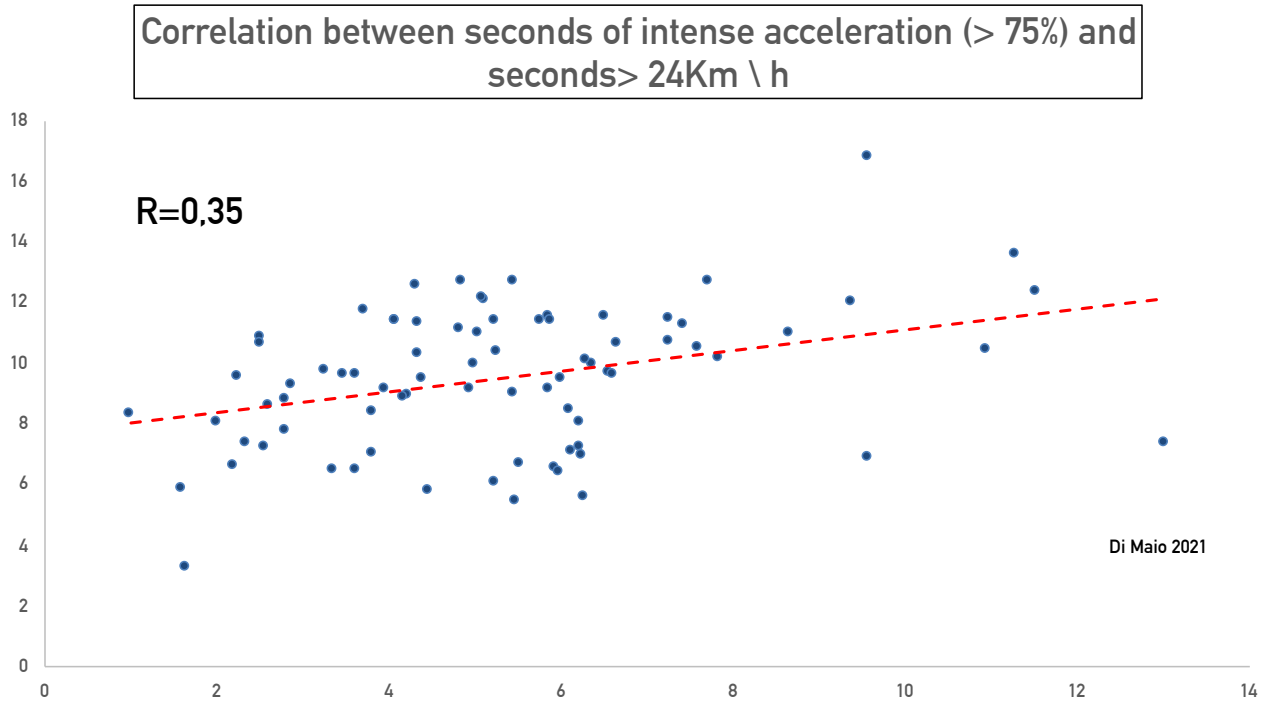
An interesting picture is drawn from the relationship between speeds and accelerations.
There is a good correlation if we take into account the lower thresholds of the two parameters.



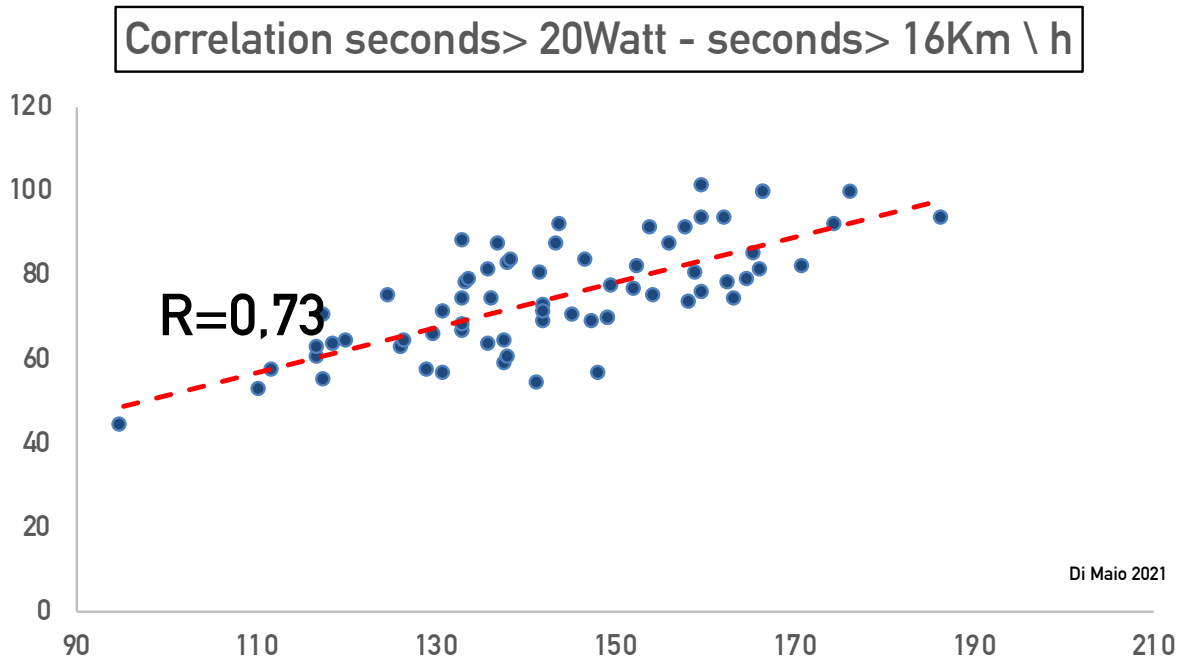
But if you raise either of the two thresholds, the correlation values drop quickly. In the example below the threshold of intense accelerations was brought to 75% of the maximum allowed.

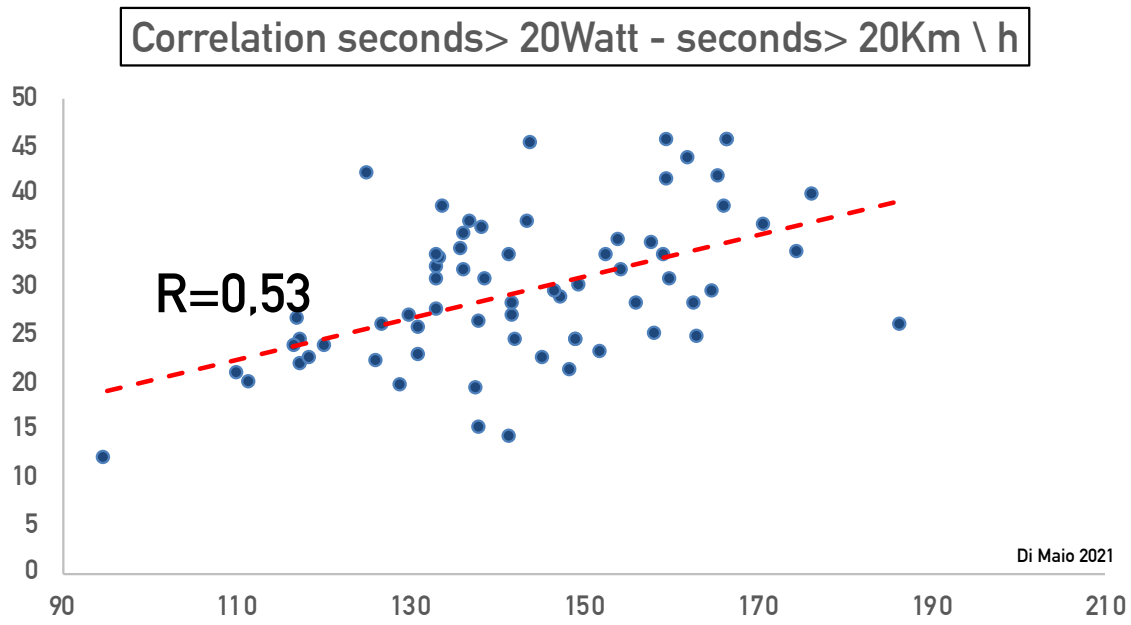


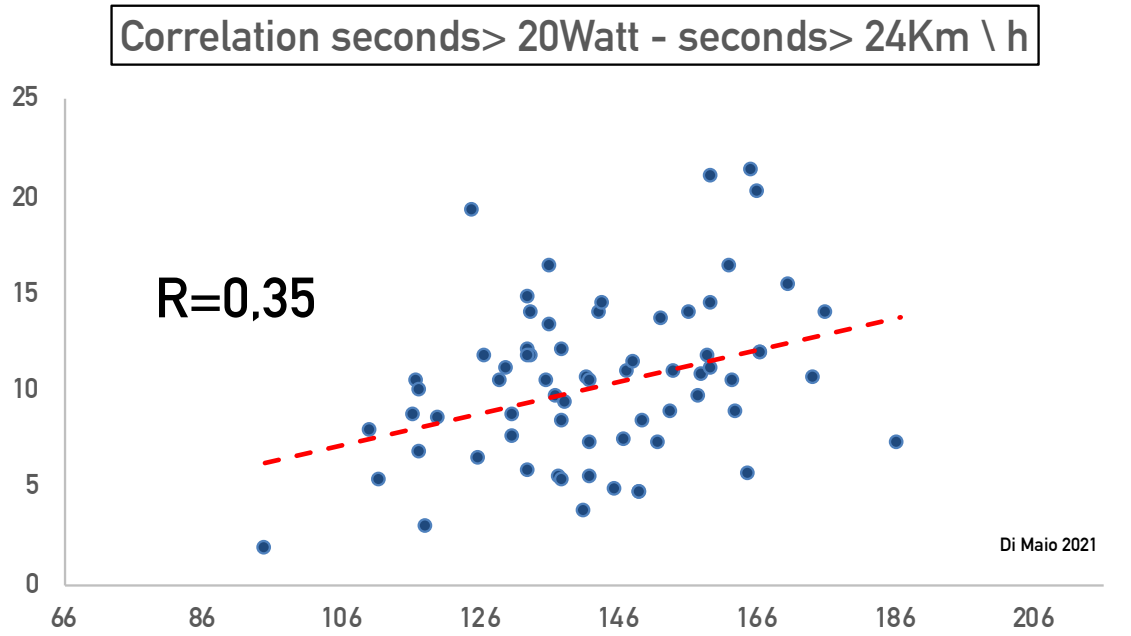
Even using the maximum thresholds (intense accelerations> 75% of the maximum and speed above 24Km/h) the relationship remains low showing a good number of points far from the trend line.



By directly relating Speed to Metabolic Power, the trend does not change. Using low thresholds we find good correlations but increasing the thresholds, also in this case, the linearity between the two data is lost.

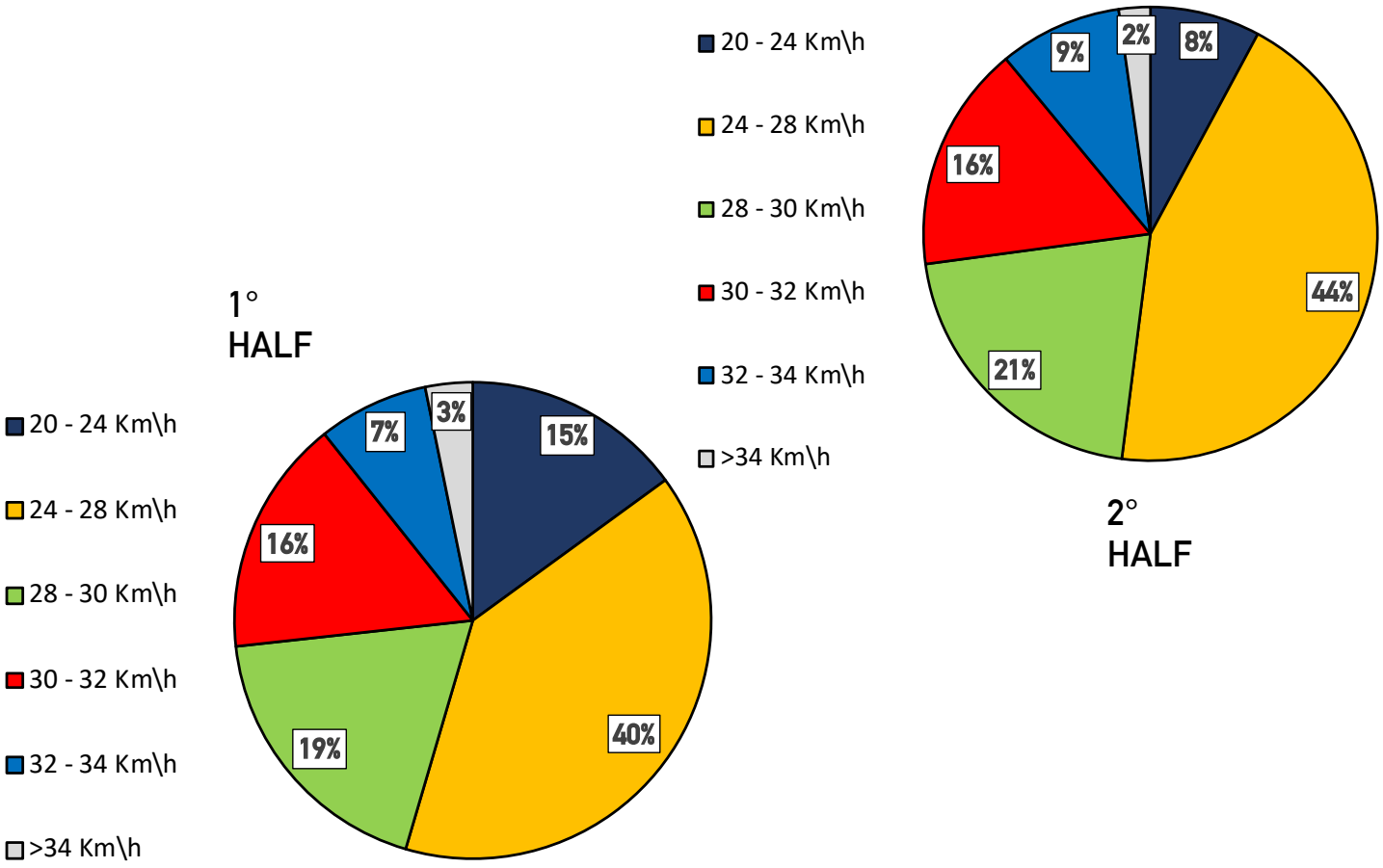


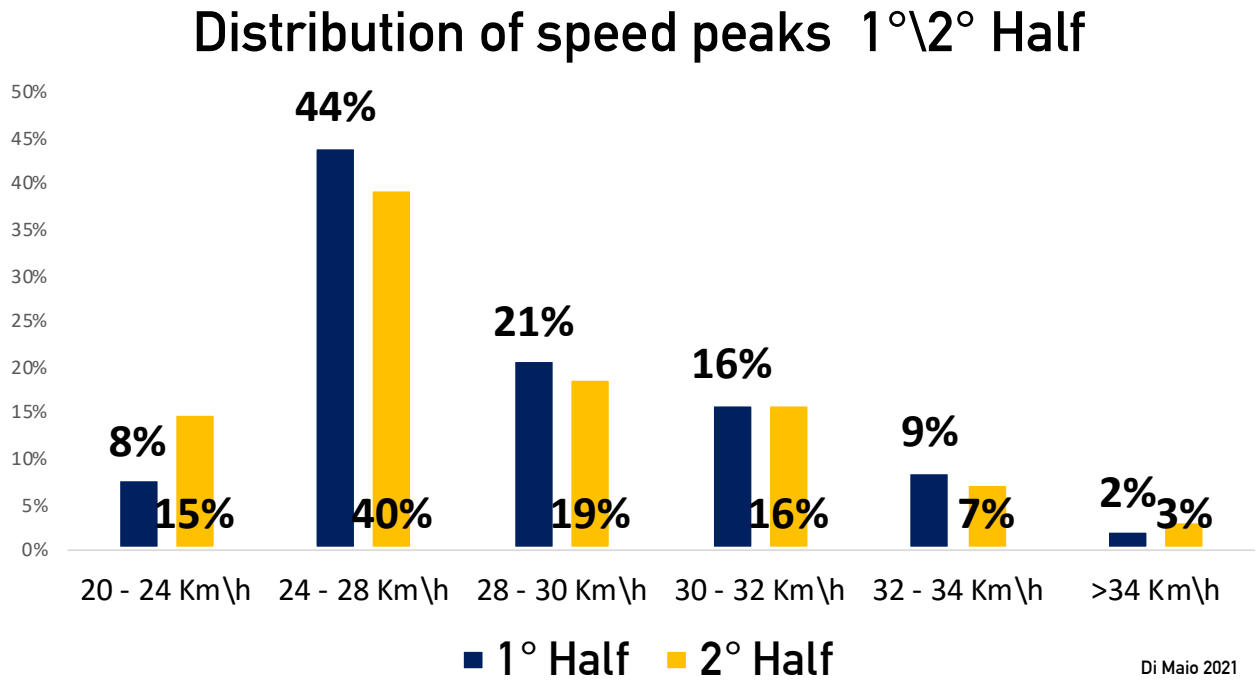




In Sevens there are many situations that lead players to reach important speeds, many more than in Rugby Union, but there are just as many situations in which they are led to perform a considerable number of short and intense accelerations. The relationship between these two parameters shows that it is possible to have a certain linearity as long as the intensity is not too high. In that case, both high speeds and intense accelerations both represent moments of maximum effort that must be considered only partially overlapping.

The latest speed analysis concerns the speed peaks recorded in the match.
The first three graphs show the distribution of the speed peaks in the two halves of the match, with no significant differences in the more demanding bands.





The thresholds of 28 and 30 Km / h are not always exceeded (respectively 46% and 26% of the time).
When this happens, on average, players stay above these thresholds for about 4 seconds.
A relatively short time to think that energy expenditure can be heavily influenced especially by high speeds.
Certainly the moments in which these speeds are expressed are decisive in the game and for this reason they are nevertheless of crucial importance.