

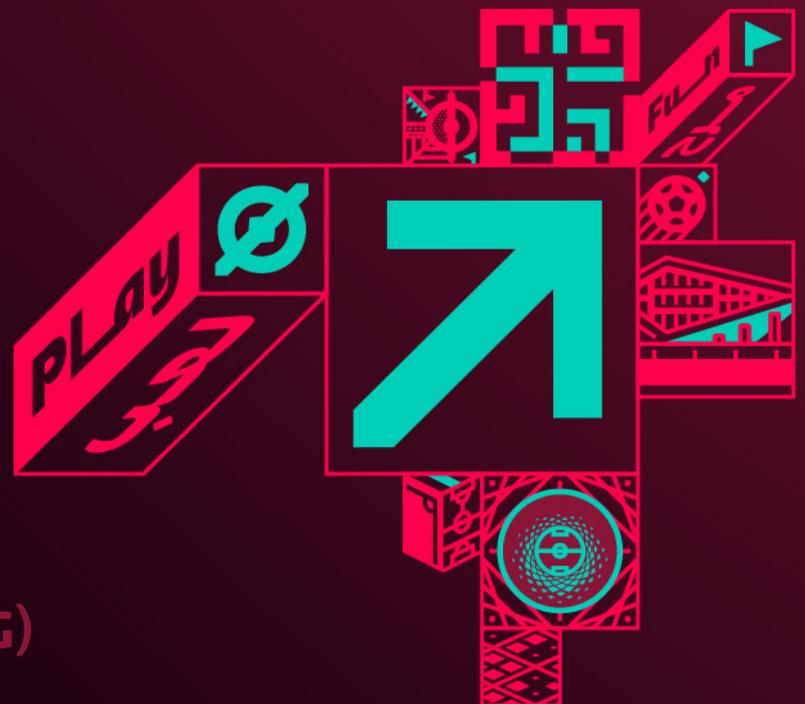


**FIFA WORLD CUP**  
**Qatar2022**

# Enhanced Football Intelligence

## Explanation Document

11.10.2022 v1.0



**High Performance (TSG)**

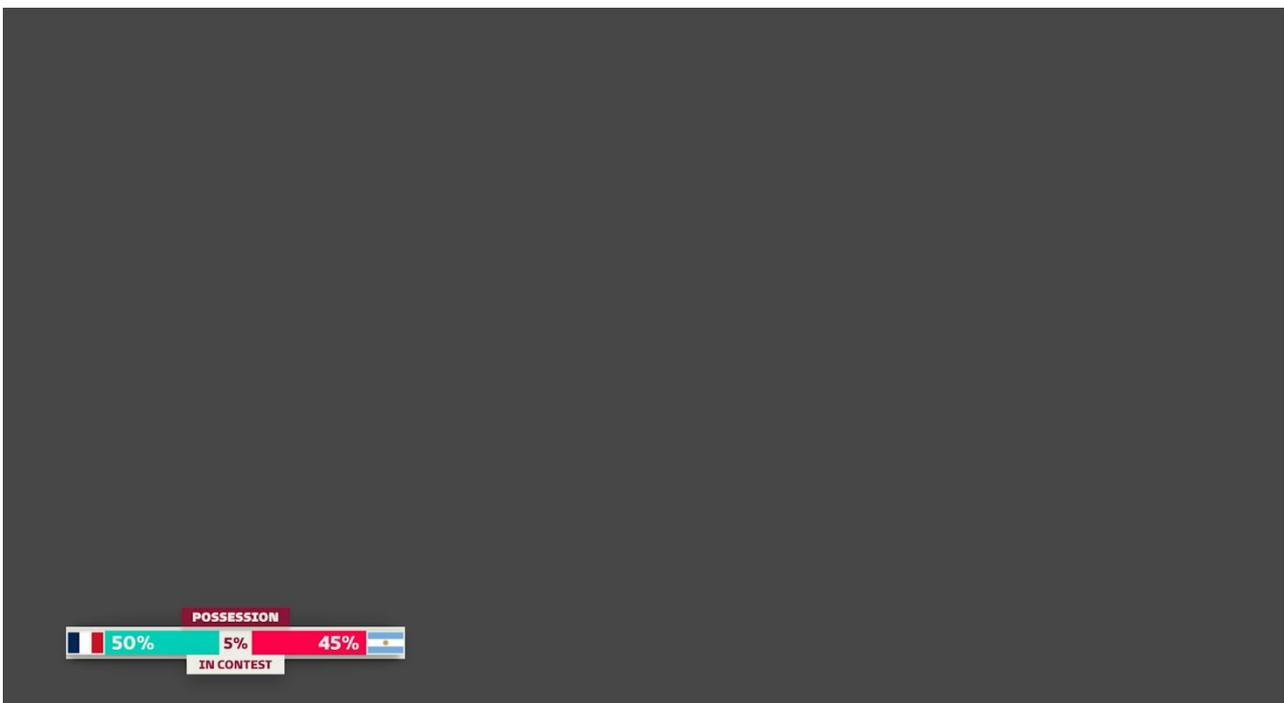
Football Performance Analysis & Insights

## Possession control

**Football description:** This metric highlights the breakdown of ball possession over the course of a match. Separated into three categories, “possession state” measures the ball possession divided by team, as well as the percentage of time “in contest”, i.e. the moments during the match when neither team are in controlled possession of the ball. Any output will generate three possession values: Team A (%), In Contest (%), Team B (%).

We want to enhance the Possession (%) traditionally seen on TV screens by introducing a third category, “In Contest”. The possession state “In Contest” is an accumulation of moments during the match when neither team are in controlled possession of the ball. This state is triggered by certain events that occur during the match. For example: two players compete for the ball in the air during an aerial duel, and contact on the ball by a player during this contest will initiate a loose ball state, therefore “In Contest”. Alternatively, a defender performs a defensive action, blocking a pass from reaching its intended target, and as the defender contacts the ball during the block, the ball enters a loose ball state, again initiating “In Contest”. These actions, along with several other events during a match, initiate the “In Contest” possession state.

**Calculation description:** Measures the % and total time that ball possession is in each of four states: 1. Possession by Team A; 2. Possession by Team B; 3. In Contest – so in play but with neither team in controlled possession; 4. Out of Play. These possession states are calculated based on the sequence of events performed by the players on the pitch.



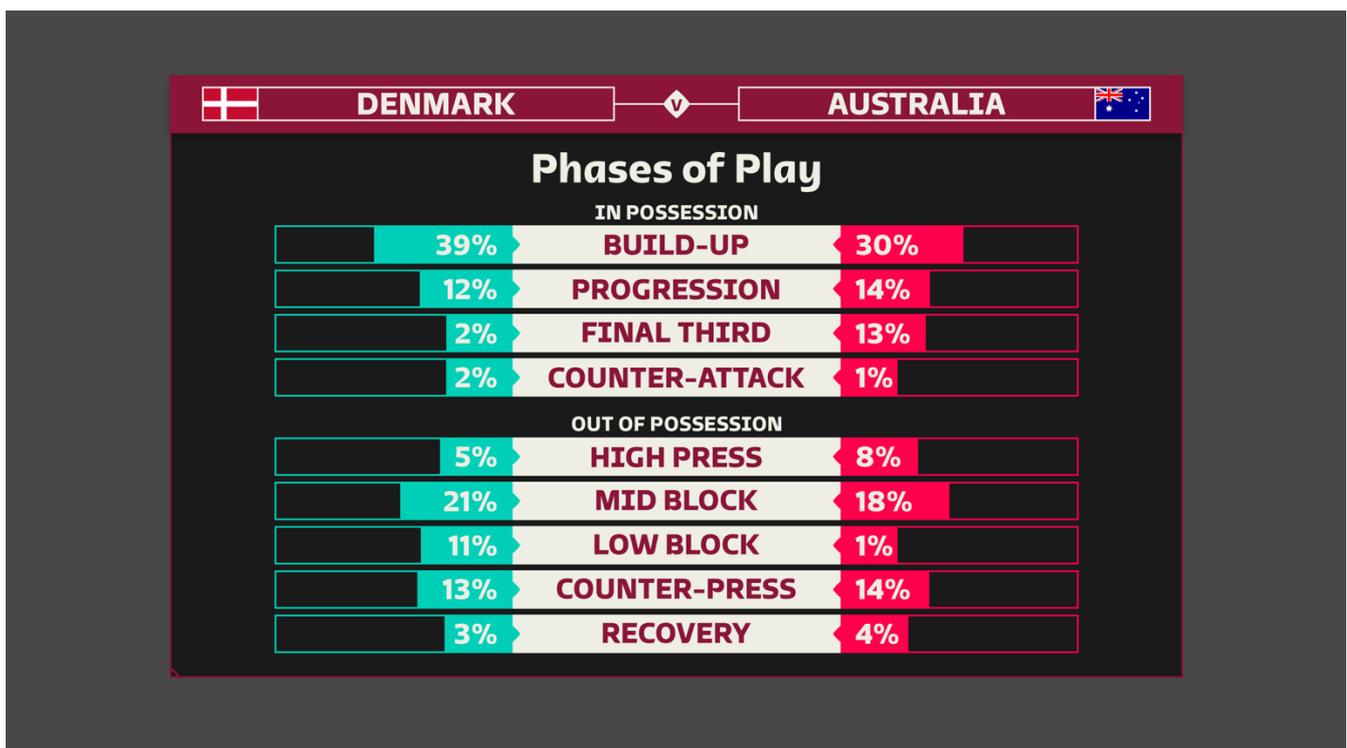
## Phases of play

**Football description:** Phases of play is a metric that accumulates the percentage of ball-in-play time and allows us to understand the types of strategies and tactical behaviours adopted by each team during a match. Breaking down the phases of play into in-possession and out-of-possession categories allows us to analyse each individual team’s style of play, as well as the pattern of a match across 90 minutes. For example, if Team A spends a high % of time in the final third and Team B records an equally high % of time in a low block, this gives us an indication that Team A were in control of the ball and attacking their opponents’ goal, whereas Team B spent a larger proportion of the match in a low block phase, indicating their preference to defend in their defensive third.

This metric differentiates between nine out-of-possession phases (High press/block; Mid press/block; Low press/block; Counterpress; Recovery; Defensive transition), seven in-possession phases (Build up opposed/unopposed; Progression; Long ball; Final third; Counter-attack; Attacking transition) and four set-play phases (Corner; Free kick; Throw-in; Penalty).

**Calculation description:** The algorithm calculates various in-possession and out-of-possession phases based on tracking data. To identify the phases on a frame level, it uses various spatial and physical features, e.g. the locations of the players and the ball on the pitch, the distance between players and the ball, the movement speeds of players and the ball, and the movement directions. Having the same phase identified for a sufficiently large number of consecutive frames results in temporal sequences that are classified as the corresponding frames. These sequences are aggregated and subsequently transformed into a fraction of in-possession time or out-of-possession time, respectively.

Presentation example:



## The following phases are to be shown live on TV.

### In possession

**Build up:** This is how teams initiate their attacking play, performing a combination of short passes between team-mates, mostly from side to side, with the aim of progressing the ball forward through the thirds and up the pitch. Typically, build up is associated with playing out from the back with the defenders, but it will involve more players in attacking positions when a team's build up gets closer to the opponents' goal. Build up can be opposed or unopposed. "Unopposed" indicates that the in-possession team were allowed to begin their attack under minimal pressure from the opponents. "Opposed" indicates that the opponents looked to engage with the in-possession team, applying pressure to the players on the ball with defensive pressure or defensive actions. Typically, this can be associated with teams that build up their attacks against opponents who look to press and win the ball back high up the pitch.

**Progression:** The aim of this attacking phase is to advance the ball into the final third. Typically, this is achieved by vertical passes that break the opponents' lines, or by a player carrying the ball forward with a ball progression (this looks similar to a carry/dribble by an individual player).

**Final third:** When teams are in possession of the ball in the attacking third of the pitch, where the aim is to finish the attack by scoring a goal.

**Counter-attack:** A counter-attack is when a team regains possession and immediately attacks the opposition with speed and intensity. It is all about being direct and exploiting the spaces between and behind the opposition defensive lines.

### Out of possession

**High press:** The defensive team engages the opposition high up the pitch and attempts to aggressively apply defensive pressure against the attacking team. This can typically be seen when the attacking players of the defensive team attempt to close down the space of opposition defenders during the attacking team's build up play.

**Mid block:** The defensive team adopts an organised defensive shape in the middle third of the pitch. Typically, teams will look to stay compact and narrow, with the majority of the defensive players connected to each other very closely.

**Low block:** The defensive team adopts an organised defensive shape in their defensive third. Typically, teams will look to stay compact and narrow, with the majority of the defensive players connected to each other very closely as they attempt to defend their goal and prevent the opponents from penetrating their penalty area.

**Counter-press:** Following a loss of possession of the ball, the out-of-possession team immediately aims to regain the ball through aggressive pressure on the opponent. Typically, this is most often seen when the attacking team lose the ball in the final third and want to quickly regain possession. This phase can happen anywhere on the pitch.

**Recovery:** Following loss of the ball, the defensive team quickly runs towards their own goal. This is typically seen when the attacking team are counter-attacking and the defensive team must recover quickly to defend their goal.

## Ball recovery time

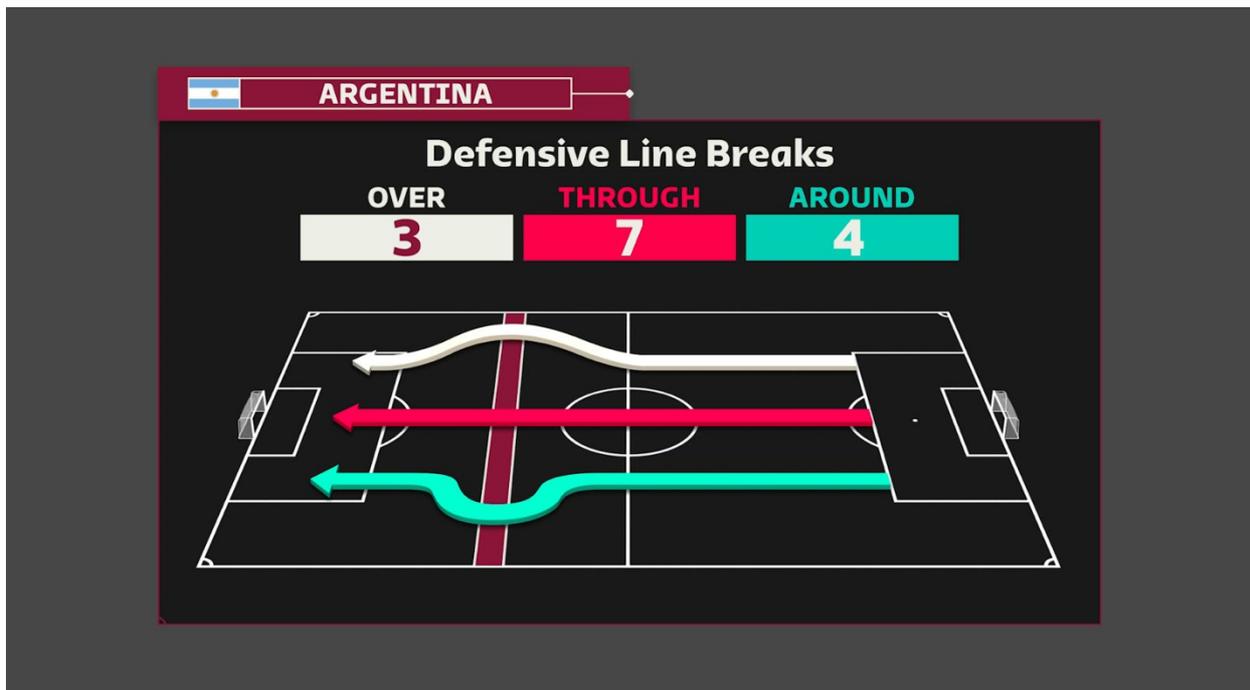
**Football description:** The time it takes for a team to regain possession of the ball after losing possession. For example, Team A are attacking their opponent's goal and are dispossessed, and the time it takes for Team A to fully regain possession from Team B is the resultant ball recovery time for Team A.

**Calculation description:** The ball recovery time is the time difference between the last ball control event of a team in its possession sequence and the first ball control event in the following possession sequence. In between these possession sequences, there can be possession sequence by the opponent team and/or a ball in contest state.

## Line breaks

**Football description:** An opposition line is broken when the attacking team play the ball beyond the deepest player in that line. The most valuable line breaks are defensive line breaks as they place the attacking team behind the opposition defence and this increases their chance of creating scoring opportunities.

**Calculation description:** Line breaks is a metric that counts how many and which *units* of the opponent team have been bypassed by a pass/cross or whilst a player is in possession of the ball. *Units* are groups of players that act in similar roles at the moment of the pass, cross or ball progression, e.g., defenders typically form the defensive unit, midfielders form the midfield unit, and attackers form the attacking unit. In addition to counting the attempted and completed line breaks, the metric also includes information regarding how the units have been bypassed: how many units in total were available, the deepest unit broken, the total number of units that were broken and in which direction the distribution was performed: a line break can go through, around or over a unit. Furthermore, the metric also contains information on whether line-breaking passes, crosses or ball progressions have been received inside or outside the opponent's team shape.



## Receptions behind midfield and defensive lines

**Football description:** This identifies the location on the pitch where players are receiving the ball, in relation to the opposition team shape. Receiving the ball behind the opponents' midfield line creates the opportunity to disrupt the opponents' defensive structure and advance into key attacking areas. For example, midfield players such as Kevin de Bruyne or David Silva will attempt to find and exploit the spaces between the midfield and defensive lines, whereas attackers such as Kylian Mbappé or Romelu Lukaku will aim to exploit the space and receive the ball behind the opponents' defensive line. Receiving the ball behind the opponents' defensive line increases the chances of scoring a goal as this reduces the number of defending players between the position of reception and the goal.

**Calculation description:** This metric counts how often the ball has been received behind the opponents' midfield or defensive line, either inside or outside the opponents' team shape, as receptions in those areas typically lead to dangerous goalscoring opportunities.

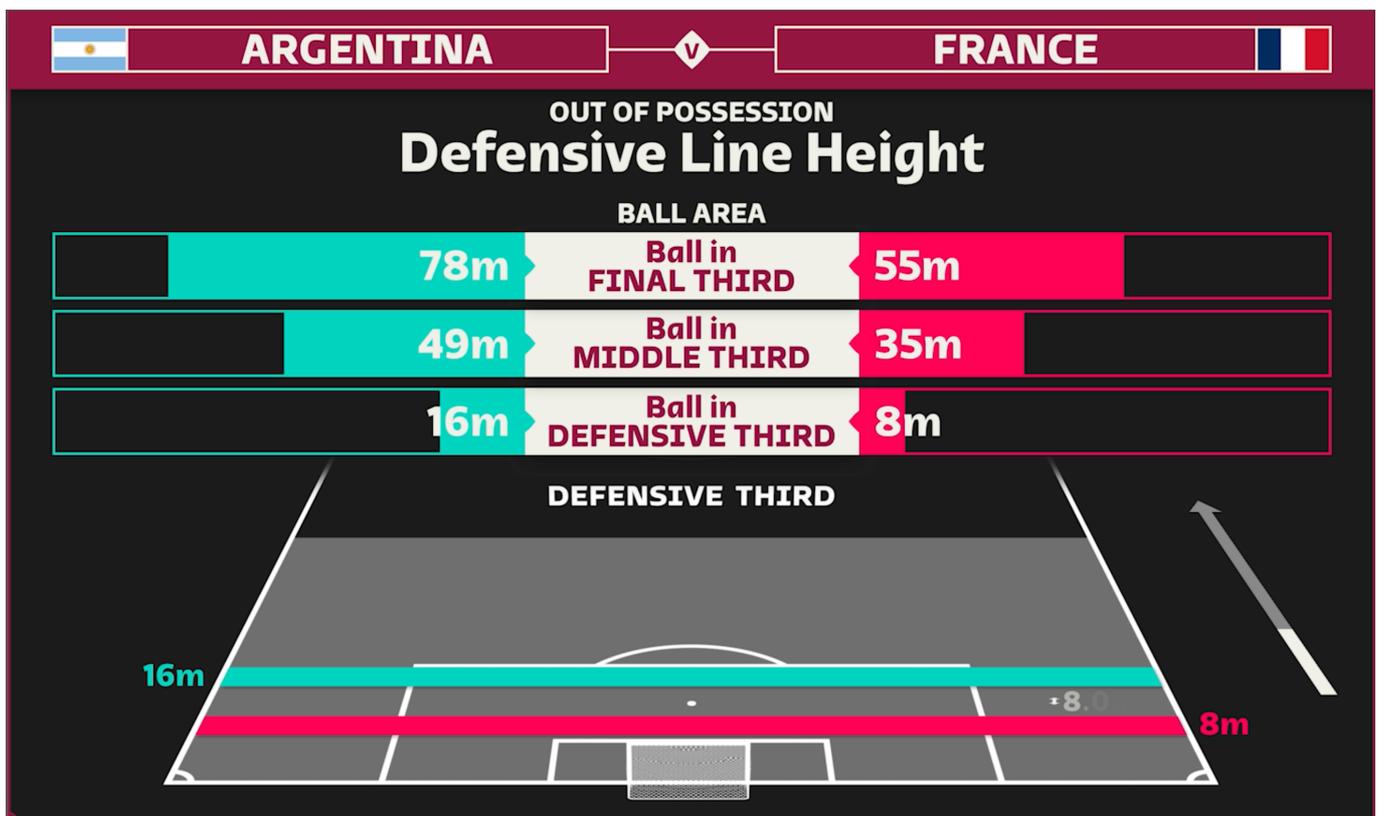
## Defensive line height and team length

**Football description:** Defensive line height is a metric that averages the height of the deepest line closest to the goalkeeper during in-possession and out-of-possession phases over a certain period of time. The distance is measured from the deepest defensive player to their own goal line. The metric serves as an indicator of how close a team is to their own goal whilst out of possession, or how high the defensive unit is able to position itself during in-possession phases.

Team length is the distance between a team’s deepest and highest players, excluding the goalkeeper. For example, whilst Team A are in possession of the ball with a centre back (who is also the deepest player in the team), the team length in this instance would be measured between that centre back and the highest attacking player in the same team.

**Calculation description:** The algorithm groups the outfield players of a team into three categories, i.e., defenders, midfielders, and strikers, and subsequently determines the line height of each group by using the height of the deepest player per group. The resulting line heights, as well as the height of the goalkeeper, are aggregated over time with the aggregations being reported for different situations depending on whether the team has been in-possession or out-of-possession, and in which third the ball has been, i.e., defensive, middle or final third. Team length is the average vertical distance between the deepest and the highest outfield players over time. The reported aggregates differentiate between in-possession and out-of-possession situations and are broken down depending on the area that the ball has been in (own third, mid third, or final third).

Presentation example:



## Team shape

**Football description:** Team shape allows us to better understand the positional structures adopted by teams, as well as the individual responsibilities of players, in relation to the time their team spends in and out of possession. Typically, teams are listed on our screens as playing in certain structures/formations, when the reality is that this is only the case for a very short period of time across a match, and in actual fact team structures are very fluid and flexible. “Team shape” will identify and demonstrate the different shapes that teams actually adopt across a 90-minute period.

This metric allows us to add further context to the “real” team structures during a match, both in and out of possession. For example, we often see teams listed as 4-3-3 or 4-4-2, but the reality is this rarely is the case, especially when a team are in possession of the ball. Full backs may play high and wide, and wingers may position themselves narrow and centrally inside the pitch. A team such as Manchester City may attack with five attackers in their last (highest line). Team shape captures these situations and represents the true shape of a team across the course of a match, both with and without the ball.

**Calculation description:** The algorithm assigns to each player a functional role based on their location relative to the location of their team-mates. The aggregation of these roles into groups results in a team shape. These aggregations are done using the players’ locations over a particular period of time.

## Final third entries

**Football description:** Measuring the number and location of final third entries means we can begin to understand the attacking strategies that teams adopt as they approach the opponents' goal. Analysing final third entries can provide insights into how teams utilise their own attacking strengths or expose the potential weaknesses of their opponents' defensive structure. The metric counts the number of final third entries performed by the attacking team against their opponents as well as the location of those entries, split across five different entry zones: left channel, left inside channel, central channel, right inside channel, and right channel. A final third entry is registered when the attacking team successfully receives possession inside the final third. For example, the image below represents a right-side heavy attacking strategy adopted by France, with 12 right channel entries as opposed to 2 left channel entries.

**Calculation description:** The algorithm calculates final third entries for both teams, with final third entries being credited to a team if the ball is successfully distributed or carried into the final third. Final third entries are counted in correspondence to the vertical pitch channels in which they happened. The vertical pitch channels include left channel, left inside channel, central channel, right inside channel, and right channel.

**Presentation example:**



## Forced turnovers

**Football description:** Forced turnovers is a defensive metric awarded to the defending team. This metric captures the moments when the attacking team lose position of the ball due to pressure being applied by the defending team. The higher the quality, intensity and number of player pressures, the higher the chance of the team in possession losing the ball. Teams and players will often be seen pressing or applying pressure in the opponents' defensive third in order to force a turnover in possession close to the opponents' goal, thereby increasing the opportunity of creating a goalscoring opportunity.

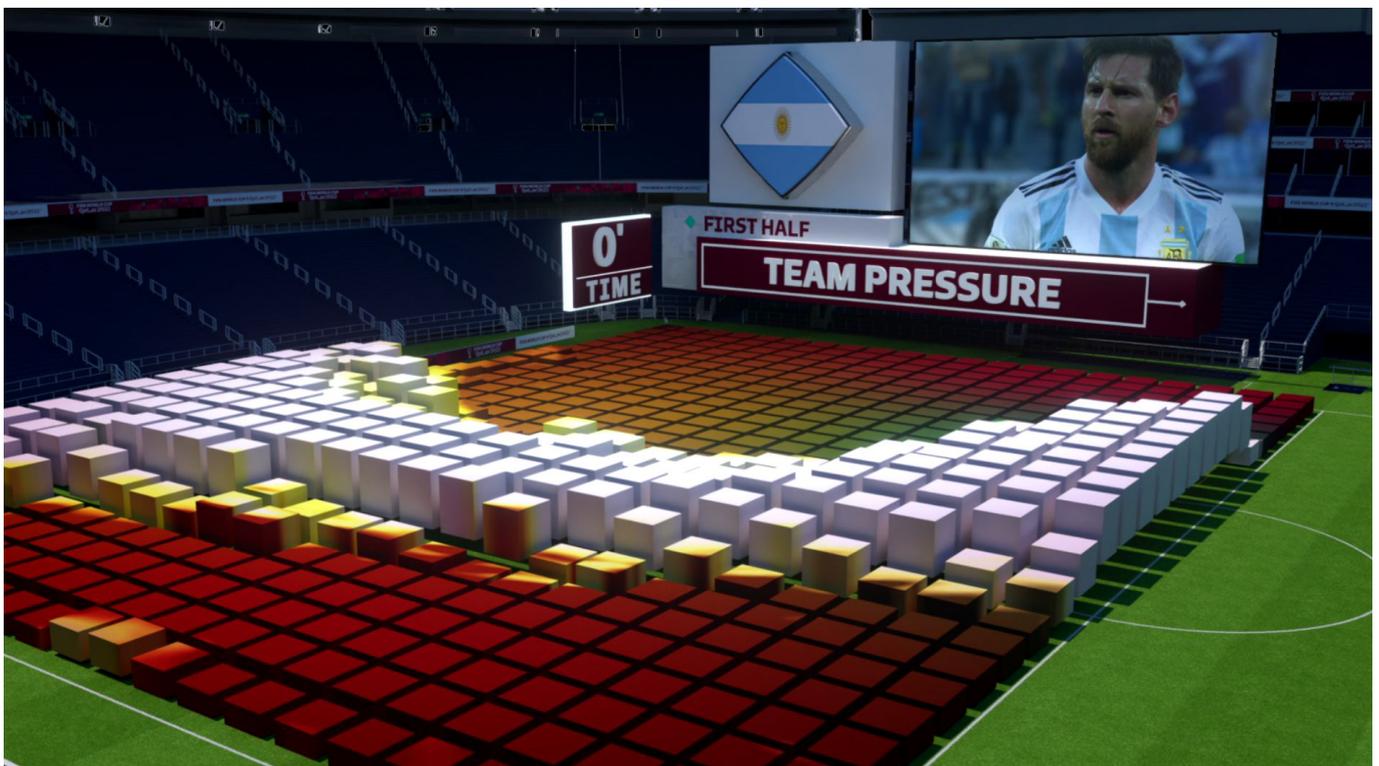
**Calculation description:** A player/team will be credited with a forced turnover if they exert pressure on the ball and their team then gains possession of the ball on the next touch through a misplaced/intercepted pass, a successful tackle or a lost dribble/ball carry. Multiple defensive players can be credited with the same forced turnover, although this will count as just one forced turnover at the team level.

## Pressure on the ball

**Football description:** Pressure on the ball is when a defensive player closes down the space between themselves and the player on the ball. Closing down the space limits the time and options for the player on the ball. Pressure on the ball is measured from a defensive perspective, as the more defensive pressure a defender applies on the opponent, the higher the pressure on the ball. For example, an attacker is attempting to cross the ball and is approached by a defender. The defender gets close enough to the attacker to be able to tackle / challenge / physically contest the cross, so this would register as heavy pressure and a score to reflect that scenario. By way of another example, an attacking player carries the ball forward and performs a pass whilst being pressed by an opponent. The opponent was not close enough to physically complete and challenge for the ball before the pass was performed. Pressure was still applied on the attacker at the moment of the pass, so this would register as a moderate pressure rating.

**Calculation description:** Pressure on the ball is a measure of the defensive pressure applied towards an attacker in possession of the ball. Information such as the defender's distance to the ball, the angles of the defender to the ball carrier (if a defender is in front of the ball carrier, the pressure applied score is greater than if the defender were behind the ball carrier) and the proximity of defenders towards the ball carrier are considered. Pressure can be moderate or heavy. If a player is pressed, the pressure received is an accumulation of all pressures applied at that moment.

**Presentation example:**



## Expected goals

**Football description:** Expected goals (or xG) measures the quality of a chance on goal by calculating the likelihood that a goal will be scored from that location on the pitch during a particular phase of play. The value produced is linked to several factors from before the attempt at goal was taken. For example, the location of the attempt on goal, the body part used, the position of the players on the pitch and the preceding action prior to the attempt. xG is measured on a scale of between 0 and 1, and the lower the score, the less probability of a chance being scored. A score of 1 represents a chance that a player would be expected to score every single time. For example, a penalty typically registers a score of around 0.7xG, indicating that on 7/10 occasions a penalty will be converted. Now take the same principle and apply it to other attempts at goal, the scores generated indicate that when looking at thousands of attempts at goal with near identical scenarios, a score is created to reflect what the probability of scoring in that situation is.

**Calculation description:** xG represents the probability of scoring from a given attempt at goal, based on a statistical model developed over a historical database of shots and their scoring rates. Key factors impacting scoring probability include: distance; angle; number of players obstructing the goalmouth; pressure on the shooter; whether the attempt on goal is with the head, foot or body; the goalkeeper position at the time of the attempt on goal. The model does not include any variables around an individual player's finishing skill or an individual goalkeeper's ability.

**Presentation example:**

