LET'S TALK A LOT OF BALLS

or: everything you didn't want to know about footballs

So what will be kicked at this World Cup?

The ball to be used at this World Cup is called the *Trionda* which is manufactured by Adidas (for the 15th consecutive World Cup – not that we are suggesting that there is anything dodgy about the way they win the contract from FIFA to supply equipment).

After reading the publicity put out by the German company about the ball, one doesn't know whether to laugh or cry.

For example, the ball was "*Intentionally designed to pay homage to the World Cup's three host nations*". Adidas says that "*it took more than 3.5 years to design*". "*The ball is the brand's most technically advanced ball ever*". And if anyone can explain what the phrase: *"Making it work better and making it really express the cultural opportunity for football in the market also made it a very complex and interesting project"* actually means then they shall win a prize (*ed: a Trionda ball?)*. Admittedly, it most be a boring job having to write press releases about footballs, but this is just a 'word salad': random words tossed together.

The "trionda" features a brand new four-panel ball construction with "*intentionally deep seams and strategically placed debossed lines.*" This, Adidas says, creates "*optimal in-flight stability by allowing sufficient and evenly distributed drag as it travels through the air"*. Bear that in mind when your favourite player misses horribly from 2m out.

This official match ball also carries the newest version of Adidas' Connected Ball Technology with a new mounted chip system. It features a 500Hz inertial measurement unit (IMU) motion sensor chip that sits inside a specifically created layer in one of the ball's four panels.

The chip is designed to send precise ball data to the Video Assistant Referee (VAR) system in real time, which can help quicken the pace of a match by providing referees with more information to help make faster decisions for calls like offsides. So, the VAR referee can make the wrong decision more speedily – remember this fact when they are spending five minutes on a VAR review.....

Personally, I think the entire German nation can be proud of the fact that hundreds of their finest minds are continually working not on a cure for cancer or how to prevent global warming but ensuring that every two years football tournaments have ever better footballs.

But how did we come to the *Trionda*? If you thought that a ball was simply a round thing that rolls, then read on....

A History of balls

We'll skip all the stuff about how medieval people used to blow up pig's bladders and kick them around *(ed: they still do in Newcastle)* and jump to when the first rules on football came into operation, which required footballs to be of a standard size and weight.

The Size of one's balls

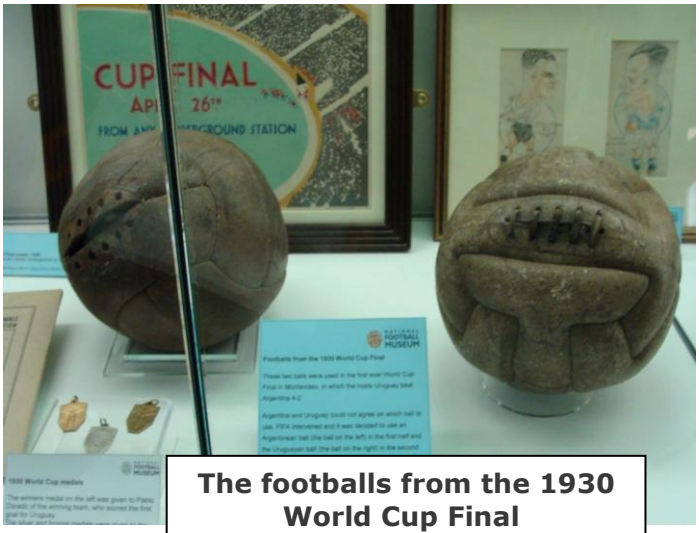
The Football Association in England was the first governing body to apply rules relating to the shape and dimensions of footballs. These regulations remain in place to this day. They decided that a ball needed to be a perfect sphere and have a circumference of between 27 and 28 inches (that converts to 685mm-710mm). In 1872 the weight of a regulation football was set at 14 to 16 ounces (=400g – 450g). Over the years, these dimensions have remained with only the materials and construction methods of balls changing. *(Ed: This is, in itself, interesting since today's footballs seem to be lighter than those I played with 50 years ago, yet cannot be.)*

After the English Football League was created in 1888, both Mitre and Thomlinson's of Glasgow started to mass-produce footballs. The combination of strengthened leather and quality stitching means that the footballs retained their shape better than they ever had before.

There were still some differences in the quality of balls all of which came down to the materials being used. The finest balls used leather from the rump of a cow and cheaper balls were made out of leather from the shoulder. Even so, the whole process had improved footballs and, as a consequence, improved the game for players and fans.

A Need for uniformity

Despite the introduction of the FA's ball regulations, there was still no uniformity between the design of footballs used around the world. Different countries tended to play with different sized balls, which often caused problems for international matches.



The footballs from the 1930 World Cup Final

The most famous case being the 1930 World Cup final between Argentina and Uruguay. Neither country could decide which design of ball to use, so they used a different one for each half. The first half saw the Argentinian ball on the pitch but it was swapped for the Uruguayan one in the second. Argentina ended the first half being 2-1 up before Uruguay came back in the second to win 4-2.

The question of how much the ball change affected the outcome of the match remains open to debate but it is reasonable to assume that it did. Despite this, it wasn't until 1996 (!) that FIFA introduced a Quality Control Programme for Footballs.

20th Century Balls

At the start of the 20th century, most of the balls in circulation used rubber bladders. An inner tube covered in leather was used as it improved the bounce and ball physics. Balls at this time were usually produced using brown leather and were made up of 18 sections arranged in 6 panels.

The manufacturing process had come on a long way but there were still major problems. The stitching and leather's water-retention properties meant that heading the balls was painful and sometimes dangerous. If you were playing in the rain, the ball would get heavier and heavier as the match went on.

Manufacturers attempted to resolve this problem by damp proofing their footballs. During the 1940s, a carcass made of cloths was added between the bladder and the outer leather. This added strength and a layer of damp proofing. Paints and other non-porous materials were also added during the 1950s and 60s to reduce water absorption. This was the time when white and orange balls started to be introduced as they would be more visible to spectators during night matches.

Balls can be bad for your health

A large number of footballers suffered long-term brain damage after repeatedly heading one of the heavy balls. Stan Cullis of Wolves was knocked unconscious in a game against Everton during the 1938-39 season. He suffered a severe concussion and required intensive medical treatment. He was told that another concussion of that severity would kill him. It didn't stop him from playing and, a couple of years later, he was hit in the face with a football. He suffered another severe concussion and was in a critical condition for 5 days. He was told that even heading a heavy leather football could prove fatal, so Cullis, who at that point was England Captain, decided to retire.

Hexagonal Design

It wasn't until the 1960s that the first synthetic, completely waterproof ball was created. It then took until the 1980s for them to be universally used around the world. This was the era of the first "Buckminster" balls, a ball was developed by Richard Buckminster Fuller. The design consisted of 20 hexagonal and 12 pentagonal pieces, sewn together. This design created the most spherical design that had ever been seen and offered an accurate response in the air. This new ball was officially used for the first time at the 1970 World Cup in Mexico. It was also the first ball to feature alternating black and white panels. The 1983 World Cup in Spain used footballs with rubber inlaid over the seams to prevent water from getting inside. Four years later, polyurethane balls were used for the first time.

Modern Balls

The next major shift in the design of footballs came in 2006 when Adidas introduced the *Teamgeist*, which had 14 panels instead of the traditional 32. This (allegedly) gave the player more control and meant that the ball was closer to being spherical than ever before. The panels weren't stitched together but were moulded instead. This prompted a new shift in the design of footballs and one that has continued to this day.

How are modern footballs made?

Here is a fascinating official video from Adidas showing balls being made.

https://youtu.be/rzvFBcIGurM

One sees that the process is a combination of high-tech machines cutting, painting and glueing, combined with extremely boring manual jobs feeding these machines. (And, despite the Adidas official video showing white workers we can be pretty sure that most of the balls are made in Asia).

ALMOST 60 YEARS OF ADIDAS BALLS AT TOURNAMENTS

Here is a resume of every design of ball seen at World Cups since 1966. Don't be surprised if you become nostalgic when you see the design of ball that you kicked around in the street as a kid!

World Cup 1966 – the Challenge 4 star ball

"Challenge 4 star" was the name of the official match ball of the 1966 World Cup in England.

It was the last ball for a finals not made by Adidas. It also had no markings or brandings to identify that it was made by the British company Slazenger – better known for manufacturing tennis balls. The ball was made with 25 rectangular leather panels.

After an English ball won the World Cup, Germany vowed never again to allow a non-German ball in a World Cup final…….

1970 World Cup – the Telstar ball

The iconic 32-panel football design using 20 hexagonal and 12 pentagonal patches was developed by Dane Eigil Nielsen in 1962. He had been a professional goalkeeper who boosted his income by working in the leather industry. Adidas acquired the design and used it for the 1968 Euros, their first tournament ball. The ball was leather, but not waterproofed!

For the 1970 World Cup Adidas simply re-used the design, but named it the Telstar ball after the Telstar communications satellite, which played a key role in transmitting the tv signals from the World Cup in Mexico. The black and

white design was felt to be optimal for black-and-white tv viewing. For the World Cup itself only 20 balls were made – but an incredible 600 000 replicas were sold worldwide.

The leather ball was still not waterproofed, though this was not an issue for a tournament in Mexico!

1974 World Cup – the Telstar Durlast ball

For the 1974 World Cup (and the 1972 EUROs) a revised model of the Telstar ball was used. Called the Telstar Durlast it had a waterproof coating – important, since the 1972 Euros were held in Belgium!

WC 1978 – the Tango Durlast ball

Used for the first time at the World Cup 1978 in Argentina the Tango Durlast was the first of a series of Tango balls used for the next decade.

The design used 20 triads, creating an optical impression of 12 identical circles. The Tango had greater lamination compared to previous designs making it more resistant to water intake.

WC 1982 – the Tango Espana Ball

Tango Espana was the name of the match ball for the World Cup 1982 in Spain.

It was the first ball which made from a mixture of leather and synthetic materials. The ball had improved waterproof qualities through its rubberized seams However, the seams weren't very tough and resulted in the ball having to be changed many times in some games.

WC 1986 – the Azteca Ball

For World Cup 1986 in Mexico the ball was named the Azteca. It was the first ball at a World Cup that was made of fully synthetic material (though it still comprised of 32 hand sewn panels). The triad shapes used in the design of the ball were painted like Aztecs frescoes (*ed: I wonder if the Aztec nation got paid any royalties?)*.

WC 1990 – the Etrusco Unico

For the World Cup 1990 in Italy the ball was called the Etrusco Unico. The name and design of the ball were chosen in honour of the history of ancient Italy and fine art of the Etruscans. Three Etruscan lion heads decorate each of the 20 triads, used in design of ball. Compared with its predecessors Etrusco had an improved water resistance, durability and rebound. It was the first ball with an internal layer of black polyurethane foam (whatever that means).

WC 1994 – the Questra ball

Adidas Questra was the name of the official match ball of the World Cup 1994 in USA. The name came from the ancient world for the pursuit to the stars (the quest for the stars).

Adidas aimed to create a more responsive and light ball (with negative comments in the tournament). By manufacturing the new ball from five different materials and enveloping it in polystyrene foam, Adidas made the Questra more waterproof and allowed for greater acceleration when kicked. The tango pattern contained the outline of stars.

WC 1998 – the Tricolore ball

The Tricolore ball – used at the 1998 World Cup in France - was the first coloured ball used at a world championship. The ball's markings featured the colours of the French flag and a rooster tail.

The Adidas Tricolore had a synthetic foam layer with a regular array of durable micro-cells filled with gas. This structure provided durability and good tactile contact with the ball. Produced in Morocco, it was the first time since 1970 when the World Cup ball was made not in Europe.

WC 2002 – the Fevernova ball

The official match ball of the 2002 World Cup in Japan and South Korea was, apparently, the result of three years of work to improve the previous Tricolore ball at Adidas' research centre.

This ball featured a refined syntactic foam layer, to give the ball superior performance characteristics, and a three-layer knitted chassis, allowing for a more precise and predictable flight path.

WC 2006 – the Teamgeist ("team spirit") ball

For the World Cup in Germany Adidas came up with the Teamgeist ball.

It was made with 14 external panels, resulting in 60% fewer joints. The design claimed to improve accuracy of pass and improve ball control. It looked weird!

WC 2010 – the Jabulani ball

The World Cup 2010 ball was made in South African style (??) and named after the Zulu word for "celebrate". The Jabulani ball comprised eight external structural panels interconnected by a heat seal technology, that increased shot accuracy (*ed: not for England*).

As this was the 11th model of ball created by Adidas for World Cups, 11 different colours were used. The colours also represented the 11 players in every team, the 11 different languages of South Africa and the 11 tribes of South Africa.

WC 2014 – the Brazuca ball

The name of the 2014 World Cup ball was selected in an open vote, in which more than 1 million Brazilians participated. Brazuca is, apparently, the Brazilian word for bollocks.

The internal construction of the Adidas Brazuca ball was a chamber of natural rubber, then a multi-layer filler made of fabric and synthetic foam.

The Brazuca official match ball had only 6 flat parts, 12 seams and 8 joint points - but the seams followed a complex curve. This provided aerodynamics and an unrivalled circular shape to the ball (*ed: does this mean that previous balls were not circular, or even spherical?!!*).

The Brazuca 2014 ball was decorated with ribbons of three colours, symbolizing the so-called bracelets desires in Brazil. According to legend, bangles should be wrapped around the wrist and tied with 3 knots making a wish on each of them. *(ed: who wrote this rubbish for Adidas??!!)*

2018 WC – the Telstar 18

Adidas Telstar 18 was the name of official match ball of FIFA World Cup 2018 in Russia.

The World Cup 2018 ball had a white base with a set of black and grey colours placed on its upper. It was supposed to be a modern interpretation of the iconic look of the original Telstar 1970 ball with its 32 black and white panels.

Like its predecessor Adidas Brazuca ball, the Telstar 18 official match ball had just six panels, with a very elaborate and innovative shape. They were fastened to a seamless construction and presented a distinct 3D textured upper for control and grip.

The World Cup 2018 ball also had a built-in NFC chip that allowed you to interact with the ball through your smartphone(!!). When the Adidas Telstar 18 ball was connected to the smartphone, the user was sent to a website that had been organized for football fans in the eve of the World Cup 2018 (and presumably tried to sell them more stuff from Adidas).

2022 World Cup - the Al Rihla ball

The Adidas Al Rihla World Cup ball 2022 had a shape of the 20 panels which is inspired by sand dunes. The inspiration of the colour scheme of the Adidas Al Rihla official match ball was the "colours of the Qatari flag and traditionally white Arab clothes".

One of the main innovations of the World Cup 2022 ball was Speedshell technology, aimed to increase the speed of flight and rotation of the Al Rihla ball to achieve excellent aerodynamics and a perfect shot – again, not that it helped England.

And how much does a football cost?

Adidas and co are, understandably, somewhat reticent to discuss how much it actually costs to make sporting equipment but it is likely that the top-quality thermally bonded balls cost around €30 to manufacture. A hand-stitched ball made in a Far-East sweatshop probably costs €5 to make.

So, how much will a Trionda ball cost you? Well, if you want to buy the match-quality version then it costs a whopping €150 on the official Adidas website (though shipping is free, assuming that the Belgian Post are bothered to deliver parcels). Meanwhile Trionda 'training' balls (ie cheap balls just painted to look like the official ball – the ones you will buy your kids) are available from €16.

Conclusion

After spending far too much time looking at footballs one has to conclude that whilst today's footballs are much better than those used fifty years ago, an obscene amount of time and money seems to have been spent on creating new balls for every tournament. Only on a couple of occasions has the same design been used – yet, to use the old adage "if it's not broke then don't fix it"! And I wonder how many kids rush out to buy replica footballs at the ridiculous top prices because they have seen them in a tournament? I would bet that 99% just buy the cheapest footballs they (or their parents) find.