

# The Application of Modern Science and Technology in Football

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## Abstract

**The wide application of modern science and technology in the field of football promotes the rapid development of football. The innovation of the game ball, the improvement of stadium facilities, the innovation of players and referee equipment, the upgrade of stadium security, the development of event information and communication, etc. are all shining with the light of science and technology. The development and progress of science and technology are bringing revolutionary changes to the sport of football.**

## Keywords

**Science and Technology; Football; Application.**

## 1. Introduction

With the development of the times, modern science and technology have led to the further development of football. Modern science and technology have penetrated into all aspects of football. The process of continuous integration of football with high technology has made football matches more and more exciting. Today, what is displayed on the green field is not only a contest of skills and tactics, but also a display and contest of high-tech football products to a certain extent. It can be said that modern technology has penetrated into the football world like oxygen, which provides a continuous impetus for the development of football. The widespread application of science and technology in the football field heralds the advent of the "technological football era", which will have a major and far-reaching impact on the development of football. In particular, the successful holding of the recent World Cup football matches can clearly reflect the perfect combination of technology and football. In terms of game balls, stadium facilities, equipment for players and referees, stadium security, event information communications, etc., they all reflect the extraordinary charm that technology brings to the sport of football.

## 2. Application of modern technology in football

### 2.1 Innovation of game balls

The traditional leather football is heavy, hard, and sticky. The leather football is just a shot. The previous artificial leather football is harder, more painful to kick, and it is difficult to control. With the development of high technology, football has become more and more waterproof, more elastic, faster, softer, more rounded and seamless, allowing players to control the ball well, the speed of kicking, and the passing and receiving of the ball. The accuracy of the game is better, the pace of the game is faster, the chance of free kicks is higher, the threat of the set kick is greater, and all kinds of balls with strange lines can be kicked.

### 2.2 Improvement of stadium facilities

Football matches are fierce competition on the green field. The development of high technology has made many new types of football fields "come into being". The electronic temperature control system of the "Electronic Temperature Control Football Field" solves the problem of overwintering. The Pontiac football field in Detroit, USA is covered with a huge and peculiar roof covering an area of 4 hectares. A double-layer air film made of glass fiber coated with Teflon covers the air. There is no one in the field. Pillars and any metal skeletons. American scientists and technicians have also developed a novel "indoor lawn". The grass seeds of the lawn are first grown in full sunlight, and the grass boxes are transported indoors before the game and laid into a football field. According to

experiments, this kind of grass box will not wilt within 40 days. After more than ten consecutive games on it, the lawn is still intact.

Since Monsanto in the United States invented the nylon turf court in the 1960s, a wide variety of artificial turf has become more and more comfortable and soft. Nowadays, polyethylene "grass" with a height of 5 cm is far better than sandy soil and rubber pellets; even compared with natural turf, the proportion of ligament strain accidents during the game is greatly reduced, so the demand for this aspect is increasing. Increase rapidly. Therefore, we have reason to believe that with the advancement and development of technology, there will be more high-tech applications in stadium facilities, and the stadium will become more comfortable, safe and durable.

### **2.3 Innovation of players and referee equipment**

#### **2.3.1 Application of technology in player competition and training**

Equipment Jersey of new materials. Each team has its own traditional jerseys, high-tech "join", so that each new jersey constitutes a beautiful landscape on the green field. The "new power layer concept World Cup jersey" produced by Adidas in Germany uses the raw material of the power layer. The team members wear this kind of clothing and do not need to wear sweat-absorbing T-shirts. The material of the clothing is impregnated, breathable, ventilated, and perspirable. The latest high-tech products with unique effects in terms of heat dissipation, fatigue resistance, and reduction of sports injuries. In addition, the close-fitting design can make the jersey adapt to the player's muscle contraction, so that the athlete can feel comfortable while improving the physiological function. Sports shorts and sports socks also use advanced synthetic elastic fiber, which can relieve the vibration of the player's muscles and make the player feel more comfortable in the game.

Humanized design sneakers. The humanized design makes the football shoes have a higher technological content. The design of football shoes by major sporting goods companies stems from their ability to design with modern technology and their sensitivity to new scientific research results. The technological content of football shoes is far Higher than sportswear. The designers of the new sneakers developed in the United Kingdom include soil science experts, computers and biomechanics experts. The sole is made of elastic rubber. There are 6 prominent oblique knots on the sole instead of 6 studs. The heel part There is a cross knot. The football shoes produced by Adidas embodies the comprehensive effect of multiple technologies. The wearer does not have to worry about the direction in which the toe touches the ball, and can kick the ball in any direction or position desired, which can make the ball more rotating when shooting. Nike is not far behind in the development of new sneakers. Their newly developed sneakers are designed according to ergonomic principles. The front and rear soles of the shoes are equipped with fast-reaction air cushions, which can greatly reduce the impact of studs on the soles of the feet. Pressure, and the asymmetric laces on the upper make the shoes closer to the shape of the athlete's foot, providing the player with an excellent touch.

Protective gear with high safety factor. High-tech game protective gear improves the safety factor of the game. Parker Sporting Goods Company of North Carolina, USA has developed a tibial protection device, which is a kind of material used in hospitals to make easy-to-dry, strong, and fit molds. "Ortho-siloxane" has a good effect on preventing fractures. The goalkeeper gloves are impeccable in performance. The Supportframe gloves launched by Uh1sport feature revolutionary palm and back processing, which reduces seams, adapts to the natural movement of the hand, and cooperates with the bone structure to give the hand stronger Support, stability and protection. The 12° bending structure is more in line with the victory structure of the wrist, and the glove finger shape designed according to the hand bone structure increases the area of the ball.

#### **2.3.2 The application of technology to improve the fair and accurate enforcement of football referees.**

Chip football. In this kind of football, a global positioning chip is installed in the football, which plays a very beneficial role in judging whether the ball enters the goal frame. Corresponding systems are also installed on the goal line and frame of the goal. With the help of these electronic eyes, the referee can quickly confirm whether the ball has crossed the goal line.

Headset. At the 2006 World Cup in Germany, we saw that the referee had an extra headset so that he could get in touch with the central control room anytime and anywhere. When there is a dispute or a vague penalty in the game, the central control room will record video from different angles and tell the referee on the field the fair penalty within a few seconds.

Watch. Referees wear special watches with high-tech content during the game. There are two stopwatches on the dial of this watch. When the game is interrupted, the upper stopwatch stops timing, and the lower stopwatch continues to run. The referee can estimate the stoppage time based on the time difference between the upper and lower stopwatches.

Sensing side flag. This kind of side flag is equipped with a push button and is connected to the chief referee's watch by radio. As long as the assistant referee raises the side flag, the chief referee's watch will vibrate.

Free kick distance tester. With it, the referee can be used to test whether the distance between the wall and the ball when a free kick is 9.15 meters.

Electronic card. The player wears an electronic card on his chest, which can accurately determine the position of the player based on the radio waves it emits, which is very useful for the referee to judge whether he is offside.

#### **2.4 Upgrade of stadium security**

High technology is the "protector" for the safety of the stadium. In any sports competition, security work is a major event. In order to ensure the smooth progress of the event, the host country will spend hundreds of millions of dollars to add modern security facilities to the stadium, especially after the "9.11" terrorist incident in the United States, security issues have become a top priority. For example, during the 2006 World Cup in Germany, the German government adopted radio frequency identification technology (RFID). Over 3.5 million tickets for a total of 64 World Cup games are sold with RFID chips with identification information embedded, which enables fans to quickly access their information in the database when passing through the entrances of all 12 hosting stadiums. detected. During the World Cup in Germany, there were more than 30,000 police officers on duty, and some of them were also equipped with "quick identification" mobile fingerprint devices. After the police obtain the fingerprint information of the suspicious person, the central database of the German Federal Ministry of Intelligence will immediately match and identify the fingerprint information, so that the suspect can be quickly identified, the occurrence of accidents can be effectively suppressed, and the smoothness of the game get on.

#### **2.5 Development of event information communication**

Football matches are not only a contest of skills and sportsmanship, but also a test of new information and communication technologies. For example, in the 2002 World Cup in Korea and Japan, a variety of technologies that have never been used before were used for the first time: IP voice communication, wireless local area network (WLAN), converged voice and data, IP software phone, and IP "hardware" phone supported by Ethernet connection, etc. . IP communication technology has been widely used in this World Cup football match. News reporters, stadium staff, volunteers, the World Cup organizing committee, and even referees and players use the latest mobile office technology to obtain information from any location and through any device.

With the development of modern technology to this day, there have been many forms of watching football matches. You can use your computer, mobile phone, etc. to learn about the latest situation anytime, anywhere. The information technology revolution has given modern fans more ways to appreciate football. Fans can abandon sofas and TV sets and use digital radio equipment, mobile phones, laptops and desktop computers to remotely track the game. Mobile video applications also set off a boom during the World Cup. Intel teamed up with mobile TV operators, content providers, software developers, and mobile terminal manufacturers based on IntelXScale processors to launch the "Playing with mobile phones to watch the World Cup" activity. Fans can watch the World Cup directly on their mobile phones. In short, with the development of society, football matches will

become a stage where cutting-edge technology gathers, and the most advanced broadcast of matches will also make football matches more exciting.

### 3. Concluding remarks

Science and technology are primary productive forces. This is the conclusion reached by Comrade Deng Xiaoping through his scientific understanding of the law of the development of contemporary social productive forces and an accurate grasp of the characteristics of the times. Modern science and technology have also played an increasingly important role in football. From the application of modern science and technology in game balls, equipment for players and referees, stadium facilities, stadium security, event information and communications, it has increasingly demonstrated its power in promoting the development of football. Practice has proved that the development of high technology promotes the development of football, and the development of football also promotes the wide application of science and technology. It is foreseeable that with the rapid development of modern science and technology, there will be more and more applications of high technology in the sport of football, and we will also see brand-new, more attractive and exciting games.

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