

Research on the Application of New Material Technology in the Field of Competitive Sports

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Keywords: New Materials, Competitive Sports.

Abstract: With the continuous advancement of science and technology, the application of new materials has become an important means to promote the development of sports. This paper uses the method of literature data to study the impact of new materials on the field of competitive sports, finds that new materials play an important role in sports environment, sports equipment, sports equipment and sports protection, Point out that new materials are one of the important conditions for improving the level of competitive sports, moreover, believe that risks should be paid attention to when applying new materials in competitive sports.

1. Introduction

At present, sports competition in the world is largely the competition of science and technology, and advanced and novel new materials are one of the important conditions for improving the level of competitive sports. In order to improve sports performance, countries around the world, especially developed countries, spare no effort to develop new materials and apply them to competitive sports. With the rapid development of China's economy, our country is vigorously developing sports cause; sports can show China's comprehensive national strength and promote indomitable national spirit. Vigorously developing sports can improve the physical fitness of the people. Science and technology, as today's primary productive forces, is undoubtedly an important factor in promoting the development of sports. More and more new materials are applied in the field of competitive sports, which has played an important role in promoting the development of competitive sports.

2. The Emergence of New Technology Materials in the Field of Competitive Sports

With the advancement of science and technology in this century, a large number of new materials have been continuously used in the field of competitive sports, such as carbon fiber composite materials, boron fibers, new ceramic composite materials, amorphous metal fibers, single crystalline silicon carbide fibers, and thermoplastics. In addition, titanium alloys, new carbon fiber reinforced high-performance resin-based composite materials, etc., have shown great advantages in the manufacture of sports equipment, its excellent mechanical, mechanical and physical properties, such as high specific strength and high specific modulus, light weight, high strength, high rigidity, good toughness, low strain, etc., which significantly improve the performance of sports equipment, so it has been widely used.

3. The Role of New Materials in Competitive Sports

2.1 Direct action

The new materials are directly used in the manufacturing of personal products for athletes and sports equipment. With the development of science and technology and technological progress, new materials such as carbon fiber, new ceramic materials, non-metal fiber, boron fiber, etc. have been directly applied to the manufacturing of related sports products. These new materials are directly used in the manufacture of sports equipment, for example: badminton rackets, tennis rackets,

bicycles, high jump poles, sailing boats, rowing boats, skis, clubs and other equipment as well as balls used in various competitions.

2.2 Indirect action

Modern sports are inseparable from related places, equipment and necessary communication instrument support. In production, there will also be various demands for materials, it also make new materials play an important indirect role in the development of sports. A large number of new materials are used in the field of sports; first, they improve the quality and performance of sports products, secondly, they improve the safety of athletes in use, thirdly, with the application of new materials and new technologies, they also directly promote athletes' potential to achieve better sports performance.

4. The Role of New Materials in Promoting the Development of Sports

3.1 New materials improve the sports environment

Before the 1970s, most of the runways were padded with cinder and sand. Later, with the development of polymer chemical synthetic materials and their application in the construction of sports venues, so the flexible plastic track is invented. It is precisely because the plastic field facilities use new materials on the surface; it perfectly combines the biomechanical characteristics of the human body, brings unprecedented comfort to sports, and greatly promotes the improvement of competition performance. Moreover, the bright and beautiful track can inspire athletes' competition spirit and improve the competition level. At present, nanotechnology is applied to the construction of sports venues, and the paved nano-track is more conform to the mechanical characteristics than ordinary plastics, while it is easy to maintain and has a long life. Athletes compete in new sports venues, and the chance of sports injuries is greatly reduced.

In many competitive sports, related sports training and competition equipment also use new materials, while increasing the elasticity and toughness of gymnastic equipment, they not only protects the athletes, but also promotes the athletes to complete difficult movements in the competition. In free exercises competitions, since the use of flexible spring courts, the difficulty of free exercises has increased, athletes often use tandem, bends, and straight somersaults in the competition. The improvement of movement difficulty and objective conditions required by complete the movement have greatly promoted the development of gymnastics skill. Another example is the new coating complex, which is composed of the base layer hardened after coating with 3% voids, by artificial synthesis, the produced floor has good elasticity and softness, and good comfort, which have good cushioning effect during the action, thereby giving better protection to the knee joints, feet and ankles. Moreover, the reduced noise of the game also ensures that the audience enjoys the game.

3.2 New materials enhance the manufacturing level of competitive sports equipment

The new materials improve the manufacturing level of sports equipment which is determined by the characteristics of new materials. For example, glass fiber reinforced materials or carbon fibers are used in the manufacturing of badminton rackets and tennis rackets. The previous rackets are mostly made of wood and metal, they are not only heavy in weight, poor in strength, and not comfortable in hand. Rackets produced by new materials have obvious characteristics of portability, good strength and comfortable feel. In the past, in mountaineering and sailing sports, athletes used hemp rope, which was weak in strength and there were safety risks in sports. Nowadays, sports ropes made of new materials, amorphous nylon or carbon fiber, have strong wear resistance and extremely high safety in use. Sports equipment produced by new materials not only improves the quality and performance of sports equipment, but also makes sports equipment more interesting during use due to its own high technology. For example, the golf ball produced luminescent materials, when the game is held under bad light conditions; the fluorescent layer of the ball itself emits a bright green light to ensure that the game stops normally.

3.3 New materials promote the development of sportswear

3.3.1 Sportswear

Because the quality and style of sportswear have a direct impact on athletes' performance, the development and research of sports apparel has attracted more and more attention from the sports world. In some events, the difference in sportswear worn by athletes not only affects the performance of the competition, but also affects the final score due to the aesthetic differences of the referee's personal sportswear. At present, the commonly used materials for making sportswear are waterproof and moisture-permeable fabrics, moisturizing and sweat-absorbent clothing materials, and clothing materials that reduce resistance. The waterproof and moisture-permeable fabric can not only effectively prevent external moisture or wind from entering the clothes, but also discharge the heat emitted by the human body due to exercise out of the clothes, they are suitable for making mountaineering clothes, ski clothes, kayaking clothes, etc. . By vacuum-evaporating a layer of aluminum that can be melted at high temperatures on a blended fabric of polyester recycled fiber, it not only reflects the infrared rays generated by sunlight, but also effectively regulates the temperature inside the clothes. In winter sports, sportswear must have a strong sweat-absorbing function to reduce the coldness of athletes after a lot of sweating. Therefore, there is a sweat-absorbent fabric that uses the difference in thickness of synthetic fiber monofilaments. The choice of clothing materials for sports clothing has a more obvious impact on swimming performance. "Shark skin" produced by Australia Sporting Goods Company, Scientific experiments have shown that if the resistance during swimming is reduced by 1%, the swimming speed can be increased by 0.3% on the original basis. After testing, athletes wear this swimsuit, they can reduce their resistance in the water by 7.5% in comparison with wearing ordinary swimwear, and their sports performance is improved by 3% on the original basis. At the 2000 Sydney Olympics, athletes wearing this kind of swimsuit broke the world record 14 times before and after the competition, they once again proved the role of high-tech sports products in promoting the development of modern sports.

3.3.2 Sports shoes

Sports running shoes are very important for athletes. The moment the foot hits the ground, the human body will receive the impact from the ground, and the weight of the foot on the ground is 3 times the body weight. Moreover, it has been scientifically verified that for every 100g increase in the weight of running shoes, the athlete's physical energy consumption will increase by 1%, good shock absorption and good stability will have an important impact on sports. Because modern track and field rules do not stipulate the weight of running shoes, how to reduce the weight of running shoes has become the focus of sports shoe manufacturers' research and development and production. For example, in 1991, Mizuno made special running shoes for Lewis, a famous American sprinter, and the total weight was only 115g, the sole is made of special glue, and the studs are made of strong ceramics, which reduces the overall weight of this pair of sports shoes by 20g. At the Tokyo World Championships in Athletics, it helped Lewis win the 100m gold medal and broke the world record.

In addition, according to the characteristics of different projects, the researchers also used a large number of new materials and new techniques in the production of football shoes, basketball shoes and baseball shoes, further optimize the game effect of sports shoes and playing them in their respective competitions, played an important role in their respective competitions. A typical track and field shoe produced by Reebok is only 156g, the sole material is woven from carbon fiber and glass fiber, and a new type material called "shark skin", in order to reduce resistance, the front of the shoe is also covered with a layer of smooth Lycra, which is a lightweight, shock-absorbing, and elastic shoe.

3.4 New materials is conducive to protect the sports body

With the 100-year history of the Olympics, the achievements of competitive sports are getting closer and closer to the limits of the human body. Therefore, from a certain level, the competition of sports has been transformed into a competition of science and technology, the application of new

materials under high-tech research and development provides material guarantee for the improvement of sports performance, moreover, moreover, it has greatly promoted the development of sports science and technology. Today's science and technology has reached a molecular level in the study of human functions, which is not only conducive to the improvement of competitive sports performance, but also conducive to the scientific, humane and individual development of competitive sports. Therefore, the new materials have had an all-round impact on the sports body in competitive sports. For the protection of athletes' bodies, the first choice is new materials in plastics and composites, for example, plastic shell and energy-absorbing foam can be used to make helmets, wear it during practice, and it can protect the heads and eyes of football goalkeepers and baseball players. Similarly, high-elastic foam is used to make heels or insoles, which is also helpful to reduce heel pain during exercise.

5. Applications of New Materials in Competitive Sports

4.1 Produce high-tech sports equipment

Modern competitive sports launch a powerful challenge to the limit of human physical fitness; it requires sports experts to pay attention to the improvement and development of sports equipment while emphasizing scientific training. The application of new material in sports equipment mainly includes: poles, baseball bats, fishing rods, ice skates, ice hockey sticks, snowboards, rowing boats, tennis rackets, badminton rackets, golf balls and poles, bicycle racing, sailing boats, kayaks, surfboard, fencing ring, boxing ring, gymnastics training and competition platform, shooting and archery equipment, high jump equipment and various training and competition balls, etc. Taking pole-vault as an example, the key equipment of pole vault is the pole, the elasticity and length of the pole are the key for athletes to give full play to their ability, so it has become the center of research for researchers. The production of fiberglass poles has made the pole vault performance progress by leaps and bounds. The mechanical and physical properties of glass fiber rods are better than metal rods.

4.2 Produce professional sportswear

The fabric and design principles of sportswear have a greater impact on the improvement of athletes' performance. Therefore, the research and development of new material in sportswear is highly competitive. For example, in swimming sports, the birth and improvement of swimwear represented by "shark skin" has led a series of revolutions in "low resistance swimwear", which is an important aspect of active research by sports scientists. The Dutch have made comparative test on whether swimming with new materials can reduce frictional resistance. Studies have shown that the average resistance of wearing high-tech swimsuit is 9% lower than that of wearing ordinary swimsuit. The reason is that wearing swimsuit can cover the unevenness of the body and make it tend to be streamlined; deformation can also be reduced to a certain extent. With the development of new material technology, the materials of swimsuits are constantly improving. A good swimsuit should have: high tensile strength, so that the swimsuit tightens the whole body and reduces the front area; moreover, the closer the cut is to the streamline, the lower the resistance make the player's limbs to stretch at will; Water will not enter from the surface of the swimsuit, so that the water entering the swimsuit can flow out smoothly. There have been silk swimsuits, nylon swimsuits, woolen swimsuits, and swimsuits made of polyurethane fiber. Today, scientists have developed a swimsuit with the characteristics of fish skin.

6. Conclusion

The application of new materials in competitive sports can effectively improve the overall level of sports. At present, new materials, is applied in all aspects of competitive sports, we should rationally look at the application of new materials in the field of competitive sports, and carry out the research and development of new material technology to better improve the overall level of sports.

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