



Tech triumphs

By Anne Ryman, The Republic|azcentral.com

Posted 7/22/2012 04:10:15 AM

Olympic records have been falling steadily for more than a century, largely because of improvements in physical fitness and training.

Do changes work?

In 2009, an English sports engineer and university professor, Steve Haake, analyzed four men's sports -- the 100-meter sprint, pole vault, javelin and cycling -- and measured the effects of technology dating from 1894. He found big differences:

100-meter sprint: Athletes' performance improved 24 percent over time, but only 4 percent was attributable to tighter aerodynamic clothing. The other 20 percent was because of improvements in physiology, nutrition, coaching, better running tracks and other factors.

Cycling: Technology was the biggest factor in improvements; 101 percentage points of the 220 percent in improvement in the one-hour cycling record was because of developments in bike aerodynamics.

Pole vault: Poles went from wood to bamboo and then to metal before switching to carbon or glass fiber; 27 percent of the 86 percent improvement in records was because of changes in materials.

Javelin: The sport's governing body changed the javelin's center of gravity in the mid-1980s because the design made it difficult to identify where the tip landed. The change resulted in shorter throwing distances. Until then, javelin performance had increased 95 percent. Afterward, other changes to the javelin, including drilling holes in the tail and roughing the surface, caused a steep rise in world-record throws. The governing body then mandated the javelin be smooth, and the pace of new Olympic and world records has leveled off.

The London Games, however, are putting a new focus on another factor pushing Olympic achievement to new heights: better technology.

More athletes in more sports are turning to high-tech devices, clothing, testing and research to gain an edge against the competition. In some cases, advances in a sport's basic equipment, such as a soccer ball, are elevating the performance of all competitors.

The Summer Games, which begin with opening ceremonies Friday, will be a showcase of sorts for "sports engineering," as it is called. And not all of the innovations being employed are publicly known yet.

"There will be a great deal of new technology used in the upcoming Games," said Philippa Oldham, head of manufacturing at the Institution of Mechanical Engineers, a London-based organization that recently published a report on trends in the field. "Sports engineering is notoriously secretive, so many advances won't be revealed until the events begin."

Still, Oldham and other sports experts know enough about what's going on behind the scenes to provide a look at the latest trends. This summer's high-tech clothing includes aerodynamic track suits made of recycled materials, super-light running shoes and garments that compress the muscles for better control and performance. Innovations that aren't visible include high-tech sensors that analyze a swimmer's kick during training and egg-shaped pods that athletes sit in to help them process oxygen more efficiently.

Advances in training

Much of the sports technology will never be seen because the high-tech approaches are used during training for the Games. "Everyone around the globe has been scurrying around basically making the training environment for the athlete high-tech," said David James, a sports engineer and senior lecturer at Sheffield Hallam University in England, which runs the Centre for Sports Engineering Research.

Sensors are popular training devices in Olympic swimming and boxing.

They are attached to parts of the body and collect data on performance that can be downloaded for analysis to a coach's iPhone or iPad.

In recent years, sensors have become more portable and barely noticeable, enabling athletes to use the devices during routine training rather than in a lab, James said.

Besides sensors, some U.S. swimmers and volleyball players use an egg-shaped chamber known as a CVAC pod. Inside the pod, changes in barometric pressure, temperature and air density create changes in the body similar to adaptations caused by high-intensity exercise.

California-based CVAC Systems Inc. says athletes who use the CVAC process report greater endurance and more energy. The pod's popularity got a boost recently when Serbian tennis player Novak Djokovic reportedly used the device. A study of athletes at the University of Hawaii in 2009 found that the process significantly improved their blood's oxygen-carrying capacity.

CVAC officials won't reveal which Olympic athletes use the chambers or the price tag of the equipment. Athletes usually rent time on the pods at sports facilities. "We found athletes don't like to let their competitors in on what they're doing," said Mary Steinman, the company's director of marketing.

Read the full article at:

http://usatoday30.usatoday.com/USCP/PNI/Front%20Page/2012-07-22-pni0722met-olympic-devicesPNIBrd_ST_U.htm