City Talk

Making the cut in competitive fencing

Hong Kong's Edgar Cheung scores a hit on Italy's Filippo Macchi during their Paris Olympics final and, inset, after winning the gold medal for the men's foil. Below: Hong Kong's Vivian Kong with her gold for the individual epee. SING TAO

The Paris Olympics is now over, and our representatives won honors for Hong Kong with a comparatively bumper harvest – two gold medals for fencing and two bronzes in the swimming pools.

And we narrowly missed out on a bronze for table tennis.

While most people would focus on the abilities of athletes and their lustrous achievements, I, not being a sportsman, am more interested in the technical aspects.

Olympic Games results are often very close.

Relying on judges often leads to objections and appeals when those on the losing end feel they are being unfairly treated.

To ensure fairness, scientific methods are often used to decide the winner through the use of electronic systems.

Take fencing for example.

Essentially, three types of swords are used: the foil, the epee and the sabre.

The foil is the lightest, and its mode of attack is by thrusting but not cutting.

It has a small cross section and is thus light and flexible, often weighing less than half a kilogram for a blade length of just over one meter.

The epee, which is also for thrusts, has a wider blade with a triangular cross-section that makes it much stiffer.

It has a groove cut along the length of the blade to house the signal wire.

Both of these have a metallic button at the tip to activate an electronic signal for scoring.

The saber, for both thrusting and cutting, does not have a button on the tip.

Unlike the lighter swords, which has a spherical bell guard and an orthopedic grip, the saber has a wraparound guard, and a straight handle called a French grip to facilitate the sweeping cutting action, but meanwhile providing effective protection for the hand and fingers.

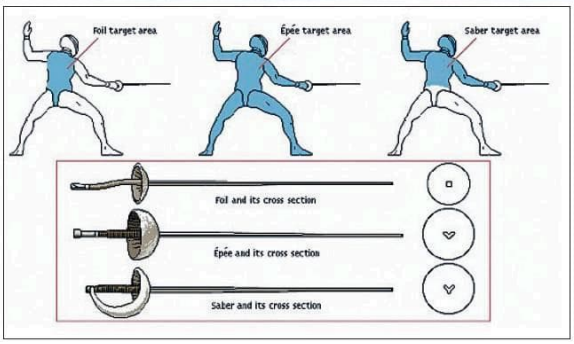
There is a socket behind the hand guard for electrical connectivity.

As for scoring areas, only the torso counts for the foil. For the epee, the whole body, arms and legs are targets, while for the saber it is the body, arms and the head.

Fencing is an extremely fast sport.

To help judges keep a precise count, electronic signals instead of eyes are used as they provide an accurate means of establishing whether the sword has actually touched the opponent, and in some cases, who achieved contact first.

For this to happen, the athlete's outfit must be linked to the sword to form a complete electric circuit with the opponent's sword when touched.



Hence fencing equipment is specially designed.

The full gear includes shoes, socks, breeches, plastron, chest plate, jacket, lamé, glove, mask and body wire.

Fencing shoes are not obligatory, but they should have a slip-resistant tread and offer protection against rolling of the ankles.

The socks, breeches and glove should be robust enough to protect the athlete.

Please note that fencers wear only one glove on the hand weapon-wielding hand.

Chest plates are mandatory for women but optional for men.

The plastron is for body protection and usually made of nylon or Kevlar.

To facilitate accurate scoring, the lamé, worn on top, is an electrically conducting vest that enables an accurate and reliable means of recording sword contact by the opponent.

The mask protects the head and neck and, for bouts with the saber, is also electrically conductive.

The body wire links all the body parts that can receive scoring contacts with the lead wire to the control panel to record and show the scoring signals.

For an athlete to prepare for a bout, the full gear must be correctly worn so that the lamé is on top and ready to receive scoring signals.

The speed of the fencers and their virtual non-stop movements make judgment calls by humans nigh impossible and sometimes result in a lot of unnecessary objections and appeals.

With electronic scoring, there is a scientific method for determining the scoring in a way that eliminates guesswork and ensures fairness.

Like all activities in modern life, engineering plays a vital part to ensure reliability and accuracy.

While spectators enjoy the spectacle, engineers are quietly working behind the scenes to provide a vital backup to enhance the enjoyment and the record of how a bout is going.

Veteran engineer Edmund Leung Kwong-ho casts an expert eye over features of modern life