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Hot Spot Technique in Cricket

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Abstract: Hot spot technique has very important role in cricket. Hot spot technique is very beneficial for batsman, bowler, or umpire. The rate of hot spot technique is 90-95%. Hot spot technology even though claimed to be extremely accurate, it is not uses in many matches. The main reason for this is its expense $6000 per day use of two cameras and $10000 for the use of four cameras.

Keywords: Cricket, Hot spot, Umpire, Snickometer.

INTRODUCTION

The Umpire Decision Review System is a technology-based system used in the sport of cricket. The system was first introduced in Test cricket, for the sole purpose of reviewing controversial decisions made by the on-field umpires in the case of whether or not a batsman had been dismissed. The system was first tested in an India v Sri Lanka game in 2008. The system was officially launched by the International Cricket Council on 24 November 2009 during the first Test match between New Zealand and Pakistan at the University Oval in Dunedin. It was first used in One Day Internationals in January 2011, during England's tour of Australia. The ICC initially made the UDRS mandatory in all international matches, but later made its use optional, whereby the system would only be used if both teams agree. The ICC has agreed to continue to work on the technology and will try to incorporate its use into all ICC events. On 29 October 2012, the International Cricket Council made amendments on LBW protocols, increasing the margin of uncertainty when the ball hits the batsman's pad. On 18 September 2013, the International Cricket Council announced that for a trial period starting in October 2013, a team's referrals would be reset to zero after 80 over's in an innings in Test matches.

Previously each team had a maximum of two unsuccessful reviews in an innings. Hot Spot is an infra-red imaging system used in to determine whether the ball has struck the batsman, bat or pad. Hot Spot requires two infra-red cameras on opposite sides of the ground above the field of play that are continuously recording an image. Any suspected snick or bat/pad event can be verified by examining the infrared image, which usually shows a bright spot where contact friction from the ball has elevated the local temperature. Where referrals to an off-field third umpire are permitted, the technology is used to enhance the on-field umpire's decision-making accuracy. Where referrals are not permitted, the technology is used primarily as an analysis aid for televised coverage. Hot spot's success rate is found to be 90–95%. New cameras were used in Border-Gavaskar series in 2011–12 for viewers, which were vastly superior to those that had been part of the DRS in the past.

CRICKET

Cricket is a bat-and-ball game played between two teams of 11 players each on a field at the centre of which is a rectangular 22-yard long pitch. Each team takes its turn to bat, attempting to score runs, while the other team fields. Each turn is known as an innings. The bowler delivers the ball to the batsman who attempts to hit the ball with his bat away from the fielders so he can run to the other end of the pitch and score a run. Each batsman continues batting until he is out. The batting team continues batting until ten batsmen are out, or a specified number of over's of six balls have been bowled, at which point the teams switch roles and the fielding team comes in to bat. In professional cricket the length of a game ranges from 20 over's per side to Test cricket played over five days. The Laws of Cricket are maintained by the International Cricket Council (ICC) and the Marylebone Cricket Club (MCC) with additional Standard Playing Conditions for Test matches and One Day Internationals. Cricket was first played in southern England in the 16th century. By the end of the 18th century, it had developed to be the national sport of England. The expansion of the British Empire led to cricket being played overseas and by the mid-19th century the first international match was held. ICC, the game's governing body, has 10 full members. The game is most popular in Australasia, England, the Indian subcontinent, the West Indies and Southern Africa.

UMPIRE

In cricket, an umpire role is very important for both teams as well as foe the game. An umpire is a person who has the authority to make judgments on the cricket field, according to the laws of cricket. Besides making decisions about legality of delivery, appeals for wickets and general conduct of the game in a legal manner, the umpire also keeps a record of the deliveries and announces the completion of an over. A cricket umpire is not to be confused with the referee who usually presides only over international matches and makes no decisions affecting the outcome of the game. Traditionally, cricket matches have two umpires on the field, one standing at the end where the bowler delivers the ball (Bowler's end), and one directly opposite the facing batsman (usually, but not always, at square leg). In ODI matches third umpire role is also very important. However, in the modern game, there may be more than two umpires; for example Test Matches have four: two on-field umpires, a third umpire who has access to video replays, and a fourth umpire who looks after the match balls, takes out the drinks for the on-field umpires, and also arranges travel and meals for all of the umpires. When a ball is being bowled, one umpire (the bowler's end umpire) stands behind the stumps at the non-striker's end (that is, the end from which the ball is being bowled), which gives him a view straight down the pitch. The second takes the position that he feels gives him the best view of the play.

Through long tradition, this is usually square leg – in line with the popping crease and a few yards to the batsman's leg side – hence he is sometimes known as the square leg umpire. However, if a fielder takes up position at square leg or somewhere so as to block his view, or if there is an injured batsman with a runner, then the umpire must move somewhere else – typically either a short distance or to point on the opposite side of the batsman. If the square-leg umpire elects to stand at point, he is required to inform both the batsmen, the captain of the fielding team, and his colleague. He may also move to the point position later in the afternoon if the setting sun prevents a clear view of the popping crease at his end. It is up to the umpires to keep out of the way of both the ball and the players. In particular, if the ball is hit and the players attempt a run, then the umpire behind the stumps will generally retreat to the side, in case the fielding side attempts a run out at that end. At the end of each over, the two umpires will exchange roles. Because the bowlers end alternates between over's, this means they only move a short distance. For certain decisions during a match, the on-field umpire may refer to the Third Umpire if there is one appointed, who has access to television replays. The Third Umpire is most often used in the case of run-outs, where the action is too fast for the naked eye but can be also used to decide the cases of disputed boundaries and catches, when the umpires cannot decide if the ball has struck the ground before being caught (but not to decide whether or not the ball in fact struck the bat or gloves of a batsman).

SNICKOMETER

A Snickometer, commonly known as Snicko, is used in televising cricket to graphically analyze sound and video, and show whether a fine noise, or snick, occurs as ball passes bat. It was invented by English computer scientist Allan Plaskett in the mid-1990s. The snickometer was introduced by Channel 4 in the UK, who also introduced the Hawk-Eye and the Red Zone, in 1999. The snickometer is composed of a very sensitive microphone located in one of the stumps, connected to an oscilloscope that measures sound waves. When the ball nicks the bat, the oscilloscope trace will pick up the sounds. At the same time, a high speed camera records the ball passing the bat. The oscilloscope trace is then shown alongside slow motion video of the ball passing the bat, and by the shape of the sound wave you can determine whether of not the noise picked up by the microphone coincides with the ball passing the bat, and whether the sound seems to come from the bat hitting the ball or from some other object. This technology is used in televised cricket matches to graphically show the video of the ball passing the bat at the same time the audio of any sounds at the time. It is only used to give the television audience more information and to show if the ball did or did not actually hit the bat. The umpire does not get the benefit of seeing 'snicko'. As the ball passes the bat, there can be other noises that can be confused with the ball on bat noises. The bat often hits the pads on the way through, making a sound at the same time the ball passes the bat. The sound/sound wave is purportedly different for bat-pad and bat-ball, but this is not always clear. The shape of the recorded sound wave is the key - a short sharp sound is associated with bat on ball. The bat hitting the pads or the ground produces a flatter sound wave. Note that the umpire does not have the benefit of the snickometer, and must instead rely on his senses of sight and hearing, as well as his own personal judgment.

MECHANISM OF HOTSPOT

Hot Spot uses two infra-red cameras positioned at either end of the ground. These cameras sense and measure heat from friction generated by a collision, such as ball on pad, ball on bat, ball on ground or ball on glove. Using a subtraction technique a series of black-and-white negative frames is generated into a computer, precisely localizing the ball's point of contact.

HISTORY OF HOT SPOT

Hot Spot uses technology developed in the military for tank and jet fighter tracking. The technology was founded by French scientist Nicholas Bion, before being worked upon by many companies in Paris and being bought and adopted by the Australian Nine Network. The technology was adapted for television by BBG Sports, the Australian company responsible for the Snick meter, in conjunction with Sky Sports. The technology was first used during the first Test match of the 2006-07 Ashes at The Gabba, on 23 November 2006. The ICC announced that Hot Spot images would be available for use as part of its ongoing technology trial during the second and third Tests (March 2009) in South Africa. The system was to be available to the third umpire in the event of a player referral. For the 2012 season BBG Sport introduced a new generation of HOT Spot using the very high performance SLX-Hawk thermal imaging cameras provided by UK based SELEX Galileo. These cameras provided sharper images with improved sensitivity and much less motion blur than earlier HOT Spot technologies. As a result, the latest HOT Spot system is able to detect much finer edge nicks than in previous seasons, essentially ending all earlier doubts about the capability of the technology. Following the success of this updated HOT Spot system, BBG Sport and SELEX Galileo signed an exclusivity agreement for the supply of SLX-Hawk cameras for HOT Spot in cricket and other sports.

COMPARISON

Hot Spot has two main advantages over its competing technology, the Snick meter, which is a sound-detection based system. Snickometer often produces inconclusive results indicating contact (potentially any combination of bat, pad and ball) only, whereas the Hot Spot clearly shows exactly what the ball strikes. Precise synchronization of the Snick meter sound with associated pictures takes time, making it currently not suitable for use in the umpire decision review system. Hot Spot technology, even though claimed to be extremely accurate, is not used in many matches. The main reason for this is its expense: $6000 per day for the use of two cameras and $10000 for the use of four cameras. Warren Brennan, the owner of BBG Sports, said the unwillingness of the International Cricket Council or national cricket boards to pay to use the expensive technology had restricted its use: "We won't be supplying Hot Spot to the World Cup next year, even for the semis or finals, if the cricket boards want a feed of that for adjudication purposes, they should contribute to the costs.

USE OF HOT SPOT

Its principal application in cricket is in deciding whether the ball has struck the batsman's bat or pad — this determination being critical in determining if a batsman is dismissed or not on appeal for LBW or caught. In considering whether a batsman is out when the ball strikes bat then caught by a member of the fielding team or caught in front of the stumps when ball hits pad, one of the most difficult decisions is whether the ball struck the pad only, or the bat only, or (if it struck both) whether the pad or the bat was struck first. If the ball strikes the bat only, or strikes the bat followed by the pad, then the batsman could be out caught but not LBW. If the ball strikes the pad in front of the stumps or in line with stumps, then the batsman could be out LBW but not caught. If the ball strikes the pad followed by the bat, then the batsman could be out LBW or out caught if a fielder catches the ball. The batsman's bat and pad are often close together, and it can be very hard to determine by eye which was struck first, whereas the hotspot technology can often resolve the question. Hot-spot imagery is also used to show which part of the cricket bat hit the ball, as ideally the batsmen try to "middle" the ball i.e. hit it where the sweet spot lies. Hot spot camera provides some valuable information while analyzing the strokes played by a batsman.

CONCLUSION

Hot Spot has two main advantages over its competing technology, the Snickometer, which is a sound-detection based system. Snickometer often produces inconclusive results indicating contact (potentially any combination of bat, pad and ball) only, whereas the Hot Spot clearly shows exactly what the ball strikes. Hot Spot technology, even though claimed to be extremely accurate, is not used in many matches. The main reason for this is its expense: $6000 per day for the use of two cameras and $10000 for the use of four cameras. There is no doubt that this technique is very beneficial for players and umpires. If the technique is affordable it will be beneficial for cricket.

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