

The Crush and Double Tap in or Close to a Hoop

The term “crush” is a shorthand or colloquial way of describing *WCF GC Rule 13(a)(7)*.

“The classic ‘crush’ stroke is more difficult to commit than many referees seem to believe. Professor Stan Hall demonstrated that a ball remains in contact with a mallet end-face for a very short time. The distance that matters is that between the impact points on (a) the ball's circumference and (b) the circumference of the hoop leg. In practice, unless the striker is so incompetent as to drive the striker ball almost straight at the upright (in which case a double tap will occur after the ‘crush’ anyway), this means that the nearest point of the ball must be within 2 mm of the upright before there is any real chance of a crush.”

When a mallet strikes a ball

(By Prof. Stan Hall NSW 1994)

This condensed chart below is derived from the Oxford Croquet web site:

<http://www.oxfordcroquet.com/tech/hall/index.asp>.

Contact times for single ball strokes using Dawson Mark II balls with a normal stroke.

The distance the roqueted ball travelled in metres	Average contact time between balls in milliseconds (one thousandth of a second)	Initial velocity of mallet metres/second	Travel distance during contact in mm (ball and mallet in contact)
24 (hard shot)	0.89	7.3	3.7
12	0.94	5.2	3.0
2.7	1.03	2.2	1.6
0.6 (soft shot)	1.32	1.15	1.19

“If the shaft of the mallet was greatly inclined to the vertical (as in a hammer stroke) the contact time was substantially more because the ground prevented the ball from springing away from the mallet”

Summary

Confusion arises due to:

1. The contact time for a **soft** shot is longer, while the actual contact **distance** is shorter.
2. The contact time for a **hard** shot is shorter, while the actual contact distance is **longer**.

(Condensed by O Edwards 2007)

Additional reading

1. “*When a mallet strikes a Ball*” by Prof Stan Hall, ACA Gazette 1994 (Vol.44 No1 Page 12) which is a quick summary of the full article that appears on <http://www.oxfordcroquet.com/tech/hall/index.asp>.
2. The ACA Golf Croquet Referees Manual (Section GC B9, page 6)
3. The ACA Association Croquet Referees Manual (Section B9 page 4): “Double tap after a Banana (or worm) Cannon”.

The diagram on the following page shows possible ‘crush’ and ‘double tap’ situations. The ball is touching the right leg of the hoop with the larger portion of it on the playing side, so that any movement of the ball through the hoop except **away** from the leg would be a fault. It can be seen

that if the line of the mallet when striking is from F, G or H, a firm forward swing could be a **double tap** of the ball onto the left leg of the hoop.

Therefore there is a high probability that a **double tap** would occur if the line of aim of the mallet, when striking, is along F, G or H, unless a careful stroke is played. This is often accompanied by the sound of two clicks – The first is when the mallet strikes the ball and the second when the ball hits the leg – if it is a triple or multiple or rumble sound it probably is a double tap fault.

If the aim is along A, B or C, an immediate crush occurs.

The only safe aiming area is the narrow band between D and E. This is why a referee ought to be called when *Rules 13(a)(6), (7) or (10)* may be broken.

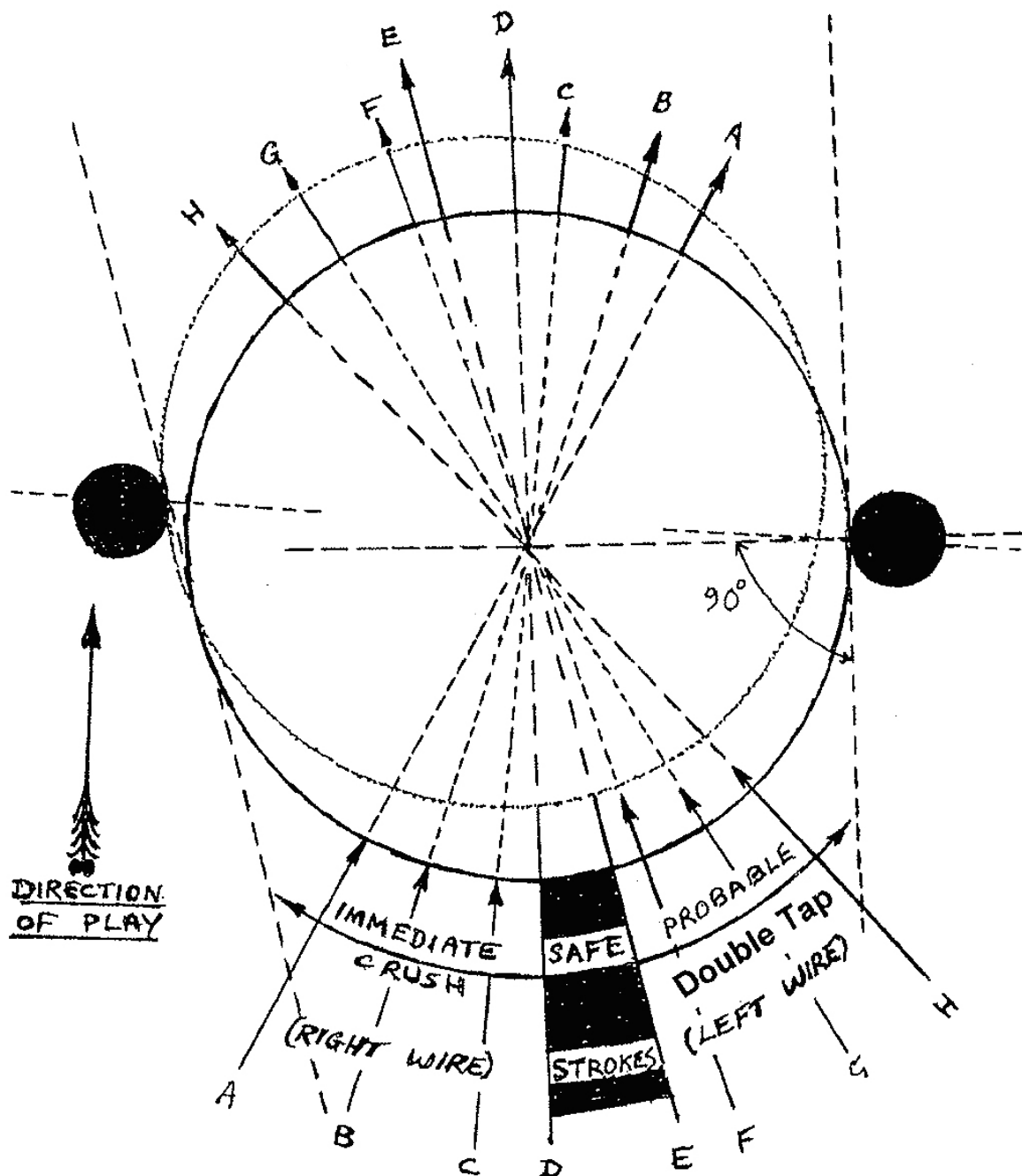


Diagram courtesy VCA

Simplified ACA Statement:

Unless a ball is actually:

- touching a hoop leg, or
- within 2 mm of the hoop leg

then a 'crush' *cannot* occur, however a double-tap might occur.

If a multiple noise occurs as a result of the stroke it probably **will not be a crush** but it probably **will be a double tap fault**.