R22-12 Spin reduction modifications to existing irons

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1 Summary

In order to support research into golfer behavior, studies were conducted to identify ways to modify spin for balls hit from the rough. One evaluated the effectiveness of using an epoxy filler to significantly reduce the depth and resulting volume of grooves in existing clubs. The trial golf club was evaluated for spin and durability, with positive results. In addition, as an alternative to replacing golfers' irons with groove-less or modified clubs, trials were conducted to evaluate the effectiveness of applying different types of thin-film tape in significantly reducing the spin from the rough of an existing club face.

2 Method

2.1 Groove filling

A cavity-backed, stainless steel 5-iron was identified for initial evaluation. Paint was removed from grooves, and the face was cleaned with denatured alcohol. The grooves were filled using a commercially available two-part filled epoxy that sets to a tensile strength of 5,000 psi with a dark gray finish.

Figure 1: Golf club having filled grooves as described in text.

The face was scraped smooth using a flat, wooden mixing stick, and was lightly cleaned using acetone and paper towel. The epoxy was allowed to set for 36 hours. The finished product is seen in Figure 1. Groove dimensions were measured after grooves were filled, with the result that the depth had been reduced to 0.003 inch. Repeated measurement after 45 golf ball impacts at 112 ft/s and 35° loft showed that this method of filling was robust.

2.2 Application of thin-film tape

Two types of commonly available tape were tested: transparent packing tape and impact marking tape. Impact experiments were conducted according to the process described in 2.3, with tape applied to the face of the club prior to the placement of wetted newsprint.

2.3 Rough impact spin approximation

The effectiveness of the unmodified and modified club face was determined according to the following procedure:

a. Rigidly fixture the clubhead at a loft of 35°
b. Ensure that the club face is clean and dry
    i. Apply thin-film tape if appropriate
c. Apply a 2 in. × 1.25 in strip of wetted 30 lb. basis weight newsprint to the face
d. Propel a urethane cover multilayer golf ball at the club face at a speed of 112 ± 1 ft/s
e. Record the post-impact spin
f. Repeat until at least 10 impacts are measured
g. Record the average spin

This procedure has been found in previous work to mimic the effects of hitting out of light rough (R&A Rules Ltd., USGA, 2006).

This procedure was applied to an unmodified 2010-conforming clubhead, the same clubhead having tape applied between impacts in step 2.3b(i), and a clubhead having grooves filled with epoxy as in 2.1.

3 Results

Spin measurements were obtained for all wet-spin impacts described above where the impact speed was within +/- 2 MPH and without significant sidespin. A comparison of different results is shown in Figure 2 and Table 1.

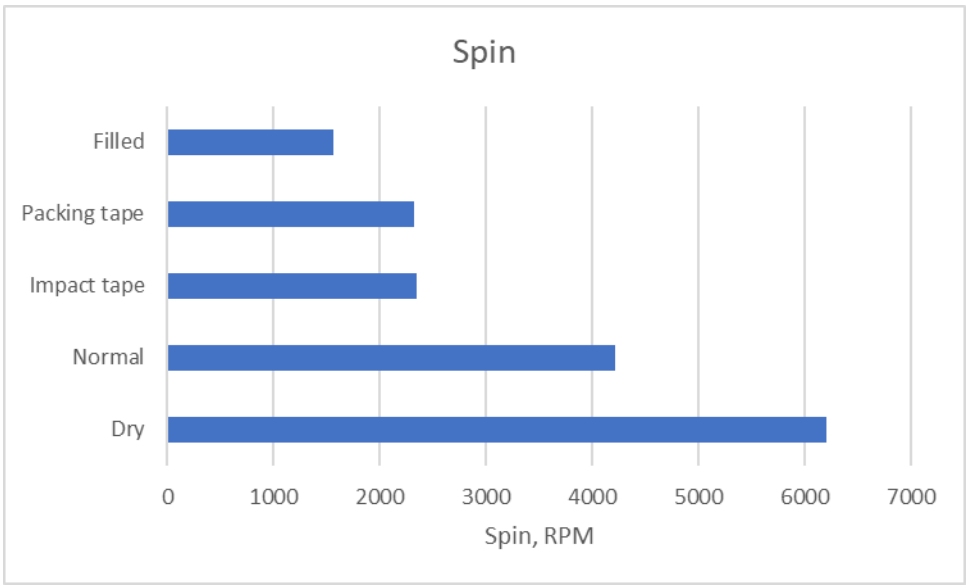

Figure 2: Spin results for oblique impact tests.

Table 1: Resulting spin and spin reduction as a percentage of dry spin.

	Spin, RPM	Spin reduction
Dry	6180	0%
Unmodified	4200	32%
Impact tape	2340	62%
Packing tape	2340	62%
Epoxy Filled	1560	75%

4 Conclusions

Filling with epoxy has shown to be an effective and durable way to produce very low-volume grooves, producing significantly reduced wet spin in stainless steel irons. The use of thin-film tape was slightly less effective in reducing spin, but still lead to significant reductions compared to 2010-conforming grooves.

5 References

R&A Rules Ltd., USGA. (2006). *Interim Report on Study of Spin Generation.* St Andrews, Liberty Corner: R&A Rules Ltd., United States Golf Association.