# From Possum to Performance: The Elusive Out of Box Reaction

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The evolution of cover stock technology has dramatically changed the sport of bowling since the first introduction of urethane and the consequential additive technologies (reactive urethane) that followed shortly thereafter. Since then, the sport of bowling has eagerly waited for the unveiling of the newest and greatest reactive cover stock. However, with this eager excitement also follows a taboo phrase that is commonly associated with the newest and great technology.

This taboo phrase, of course, is "ball death."

All too commonly, whispers or even outright war cries echo through the community that the newest technology works great, but dies after only a few months, weeks, or even games. The striking ball that shot 790 last week fails to kick out the ten pin the following week. The claims are always the same: the lanes haven't changed; the pattern is the same; nothing is different. Therefore, the conclusion is that the ball is "dead." Worse yet, when the pro shop attempts to resurface the ball back to the factory finish, the ball rolls straighter than it did before it was fixed.

So the question had to be posed: what can be done to stop ball death, or what can be done to restore a dead ball? The general rule of thumb has always been to de-oil the ball, and then refinish the ball back to the factory finish. However, in so many instances, the results are always the same. The ball looks great, but now its performance is less than expected. Luckily, we know a few given facts that help us isolate the problem. We know that the weight block hasn't changed, the bowler's release hasn't changed, and the oil pattern hasn't changed. Through this process of elimination, we know that the only variable left is the cover stock.

Fortunately, the time and research spent on ball death came into fruition as we began to discover the underlying cause of ball death. However, before we can examine the final performance of a ball, we must first examine its beginning when it is still an infant as a core, cradled in a plastic mold, not yet wrapped in urethane. After the weight block and core have been created, the reactive urethane is poured around the core and allowed to harden. Once it sets, it is removed from the mold and allowed to sit for several hours to finish curing and hardening. Only then is this sphere of urethane lathed into the uniform round sphere we know as a bowling ball. And so therein lies the first key to the out-of-box performance.

The process of rounding a ball is simply a matter of lathing the urethane into a uniform sphere. This is achieved by rotating the ball rapidly on a lathe while a very sharp and precisely calibrated blade cuts the ball into a uniform shape; the cut is relatively smooth and has perfectly rounded the ball to a few thousandths of an inch. Next, the ball is resurfaced for a few minutes with a rough grit to remove any lathe marks, and then finished with the appropriate grit.

To the naked eye, all is well; the ball is round, the surface is smooth, and the reaction is great. However, on a microscopic level only viewable in millionths of an inch, this smooth surface more closely resembles the jagged and ridged structure of a mountain range.

In truth, the surface of the ball is very porous with steep valleys, ridges, peaks, and craters that have been created by the chemical nature of the reactive urethane as it cures. The effect is multiplied by the lathe and finishing process. This surface is like the treads on a tire: the greater the topography or deviations of the cover, the greater the ball's ability is to generate friction in oil. Similarly, when these surface deviations wear, the ball acts like bald tires on water. Rather than displacing oil, allowing the ball to read the pattern, it hydroplanes, creating less traction in the oil. At this point, the ball is now "dead" since it no longer has the ability to navigate the pattern or generate the same amount of friction it once did in the back-ends.

Luckily, the odds are this ball is not actually dead, but rather playing possum, waiting for the right opportunity to spring back to life. This can be achieved through simple resurfacing, but not through conventional methods. For example, if the ball has an out-of-box finish of 4000-grit Abralon®, the normal routine used for restoring the factory finish is as follows: 360-grit to cut the surface; 500-grit to remove the 360-grit cut marks; 1000-grit to remove the 500-grit cut marks; and so on, until the ball is shiny, bright, and perfectly smooth with a “4000” finish. This ball looks great now, but in truth, with each sequentially higher grit used, we remove and lessen the deep valleys, ridges, peaks, and craters that once gave the ball life. Now, this freshly resurfaced ball is more cosmetically appealing, but it is still not the same as it was from the factory.

So what is the trick to resurfacing the ball so that it works as it was originally intended? The trick is simple, but it runs counter to accepted woodworking and carpentry practices. Rather than going through each grit sequentially from lowest to highest, we need to skip the intermediate steps. For example, a factory finish of 4000-grit Abralon® can be achieved by using 500-grit Abralon® to deeply cut the surface of the ball, exposing fresh cover stock, removing lane damage and recreating the same topography originally made during the manufacturing process. Next, skip the 1000-grit and 2000-grit processes and go directly to 4000-grit. This has the effect of creating a strong surface topography with numerous peaks and valleys that generate friction on the back-ends. However, the 4000-grit finish rounds the sharp edges and points that can cause the ball to read the lane too early; this allows the ball to skid in the heaviest oil (the heads), still read the buff and lighter volume (the mid-lanes) but still generate massive amounts of friction in the dry (back-ends). Hence, the ball now has the perfect amount of skid, hook, and roll to generate the right amount of movement in the right places.

Now that we know the trick is skipping some of the intermediate grits, we should be able to restore the reaction from the original out-of-box finish and revive a once thought to be dead ball. Also, it’s important to keep in mind that this finish method can be used to change the reaction of any ball.

## Here are a few useful combinations:

**500-grit** This reaction causes the ball to read extremely early. This usually on works well on extremely heavy patterns or very direct angles by speed dominate players.

**360, 1000-grit** This reaction gives the ball more length than 500 alone, but still has a significant ability to generate friction in heavier oil. This works well on heavy patterns with fresh back-ends.

**500, 2000-grit** This reaction is a very good benchmark reaction as the ball has enough topography to still generate friction in medium to light oil, but not enough to cause the ball to read too early in most cases. This finish delays the hook transition, allowing for a strong entry angle.

**500, 4000-grit** This reaction works extremely well on multiple patterns, giving the ball easy length through the heads, a subtle but noticeable mid-lane reaction, and an enormous amount of friction at the end of the pattern. This finish can generate some of the strongest entry angles possible on fresh patterns, but may start to skid too far as the pattern carries downlane.

Of course, there are multiple methods, resurfacing mediums, and grits available on the market, all of which will yield slightly different results causing a ball to read earlier or later, with more or less on the back-ends.

As a final recommendation, whenever making surface adjustments, our research has shown that the lowest grit should be applied with more pressure, but for a shorter duration. The higher grits should be applied with less pressure, but for a longer time. This will have the desired effect of creating strong surface deviations to displace oil, but will also round the edges, peaks, and valleys enough to get the desired amount of skid.