

Solving your ball reaction problems

"My ball hooks too much!"

"My ball hooks too little!"

"My ball hooks too late!"

"My ball hooks too early!"

Four different problems, but the solution to all of them starts in the same place. Repeat after me: *Surface...Surface...Surface.*

You have just stated the single most important factor in bowling today, especially if you are using urethane equipment. If you have one of the above problems, the place to start to solving it is the texture of the surface of your bowling ball.

The other important factors that control ball reaction are:

- Method of release, including *centrifugal force* and *kinetic energy/torque*.
- Size of the top weight block in the bowling ball.
- Position of that weight block—i.e., *potential energy*.

Let's take a look at the "big four" one at a time so that we can understand how to solve your ball reaction problem.

The texture of the surface of a bowling ball dictates how much friction will be caused between the ball and the lane surface, and friction, my friends, is what gives a bowling ball its hooking and hitting power.

Urethane bowling balls cause upwards

of 1,250 degrees of coefficient of friction when rolled on a normal lane surface (i.e., with some oil on it) while rubber bowling balls cause only 250 degrees of surface friction and plastic balls approximately 500 degrees.

With the other three of the "big four" being equal, nothing will out-hook a urethane bowling ball, nor will any other substance hit harder. The ability to grab the lane so hard before it strikes the pins is what makes urethane bowling balls so dynamic.

Surface is the single most important factor in bowling today.

I compare it with trying to throw a punch while standing on ice (bowling with rubber or plastic), upon which you can only do so much damage to your target versus throwing that same punch while your feet are firmly planted on dry pavement (bowling with urethane). Being able to control all of that power (friction) is the key to high scores.

Very simply put, if you want more hook and hitting power, you need a ball that will cause as much friction as possible, you want a dull, porous urethane ball. If you desire less hook or later hook with the same hitting power, then you want a shiny, less porous urethane ball.

There Bo, I said it: *dull ball, shiny ball.*

Even though the surface is the most important factor, we must also have the rest of the pieces to achieve optimum ball reaction. So let's take a look at No. 2: method of release.

There are two major variables in the method we use to release the bowling ball:

- The speed with which we roll the ball (centrifugal force).
- The amount of rotation in the hand at the release point (kinetic energy/torque).

If you roll the ball very fast with little hand rotation, the resulting ball reaction will be relatively straight and late.

On the other hand, if you roll the ball very slowly with a lot of hand action, the

result will normally be early, dramatic hook. Thus, we need to choose a ball surface that will fit our method of release.

If your tendency is to throw the ball hard, you may need a very dull, porous shell. If you're a soft roller, you will need a shiny, non-porous shell. Pick the surface that best complements your own individual style.

Now we can safely say that surface and method of release go hand-in-hand. After we have matched the ball we need to complement our style, we then move on to the last two of the "big four": size and position of the top weight block in the bowling ball.

Top weights in bowling balls differ in size and density. Some balls may start with as much as six ounces of top weight (legal limit is three ounces after drilling), others with as little as one ounce.

As a general rule of thumb, balls with large weight blocks will help a ball go further down the lane (delay friction), while balls with smaller, less dense weight blocks are easier to hook sooner.

On the other side of the coin, though the larger weight blocks will flip more violently (hook sharper) when kinetic energy takes over the shot, the smaller blocks will arc more gradually and not hook quite as sharply.

Now we must decide what size weight block will help solve our ball reaction problem. If our reaction is happening too late or too sharply, we would need a ball with a smaller weight block. If our reaction is too early, we would benefit from a larger weight block.

Once we decide what size weight block we need, we then need to know what position to put it in. I'm not going to get into off-label "exotic" drillings or two-piece or multi-block bowling balls. We will just look at the positioning of the block in three-piece bowling balls (which cover approximately 90 percent of all bowling balls made) drilled over the label.

- The closer we position the weight block to the track, the more influence that block has on the ball as it travels from the foul line to the pindeck.
- The further away we position that same weight block from the track on which the ball rotates, the greater the influence of that block on the ball traveling from side to side.

• For added length to the shot, we want the weight block positioned as close as possible to the track.

• For more potential hooking power, we would want the weight block further from the track. (This is the most technical of the four factors and should be treated as such. For more information on position-

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Terms to know

Centrifugal force — the component of apparent force on a body in curvilinear motion, as observed from that body that is directed away from the center of curvature or axis of rotation

Kinetic energy — energy associated with motion, equal for a body in a pure translational motion at non-relativistic speeds to one-half the product of its mass and the square of its speed

Potential energy — the energy of a particle or system of particles from position, rather than motion, with respect to a specified datum (break point) in a field of force

Torque — the force that acts to produce rotation

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ing of the weight block, see your professional ball driller for his expert advice.)

So, solve your ball reaction problems by matching the surface of the ball with the centrifugal force and kinetic energy of your release and the potential energy of the weight block. It's much more complicated than the solutions we have all heard in the past—"Add a little side weight."... "Add some more finger weight."—but the results are a lot better, too!

Discuss these problems with your favorite pro shop operator. Together, you can find the "big four" that will give you the optimum ball reaction for your game.

Jerry Francomano, one of the area's top bowlers for many years, operates the Sports Plus/Carmen Don Pro Shop in Alexandria. He will happily answer any pro shop- or equipment-related questions sent to BOWL Magazine, 4700 Auth Place, Suite 501, Camp Springs, Maryland 20746-4202.