



TIPS TO MAKE YOU TOPS.

If we assume a bowler throws a semi-roll which is close to the thumb and approximately three to four inches away from the fingers we can make some general statements about the reaction of the ball as it relates to the resultant weights in the quadrants.

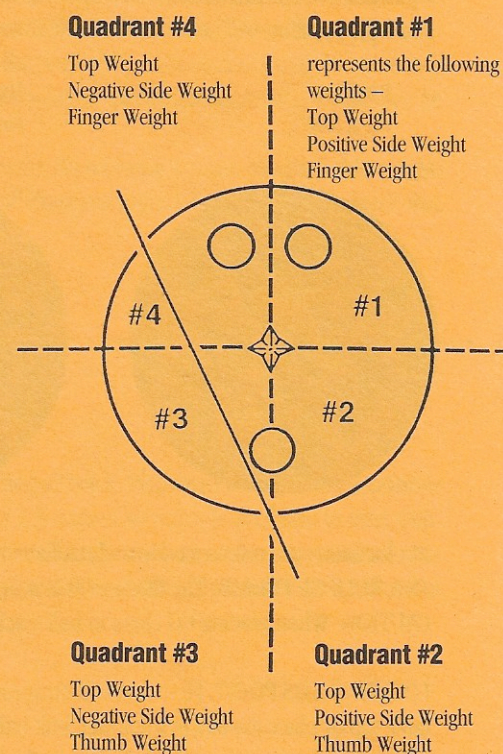
Quadrant #1 Initial skid, late roll – good tendency for strong finish.

Quadrant #2 Early roll – tendency for ball to set.

Quadrant #3 Long roll – very susceptible to speed. Strong finish if lanes are dry at the back ends.

Quadrant #4 Lots of skid – very late roll – bowler will have difficulty getting ball to finish.

The picture to the right represents a bowling ball drilled for a right hand bowler. The ball is divided into four (4) equal parts. For left hand bowlers – the above example is reversed, i.e. – Quadrant 4 becomes Quadrant 1, etc.



The **ROTO GRENADE** is made of the finest 100% urethane material. The unique weight block is similar in shape to a grenade. In other words, it is cylindrical in shape passing through the center of the ball. Top weight is created by positioning the weight block closer to the top of the ball. The ball is PINNED FROM THE TOP. The shape of the weight block creates an over-under weight block. The center of gravity (CG) is located at the four (4) pointed star. The pin placement is identified by a dot (•) which will vary from the CG to 3 inches away from the CG.

There are many drilling techniques. This informational material will deal with two (2) basic techniques. The first method is "label shift" and the other is "pin shift".

• **NOTE** • All instructions with sideweight are shown for righthanders, reverse for lefthanders.

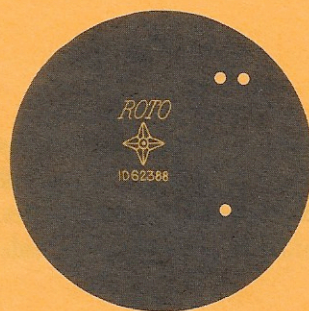
LABEL SHIFT – is defined as moving the grip away from the 4 pointed star.

Positive shift



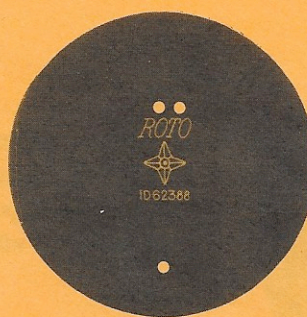
Moving the grip to the left of the 4 pointed star creates positive side weight. This will cause the ball to hook more when it makes its inward move to the pocket.

Negative shift



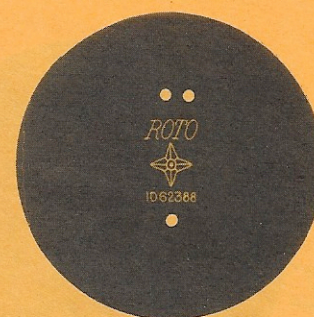
Moving the grip to the right of the 4 pointed star creates negative side weight. This will cause the ball to hook less when it makes its inward move to the pocket.

Finger weight



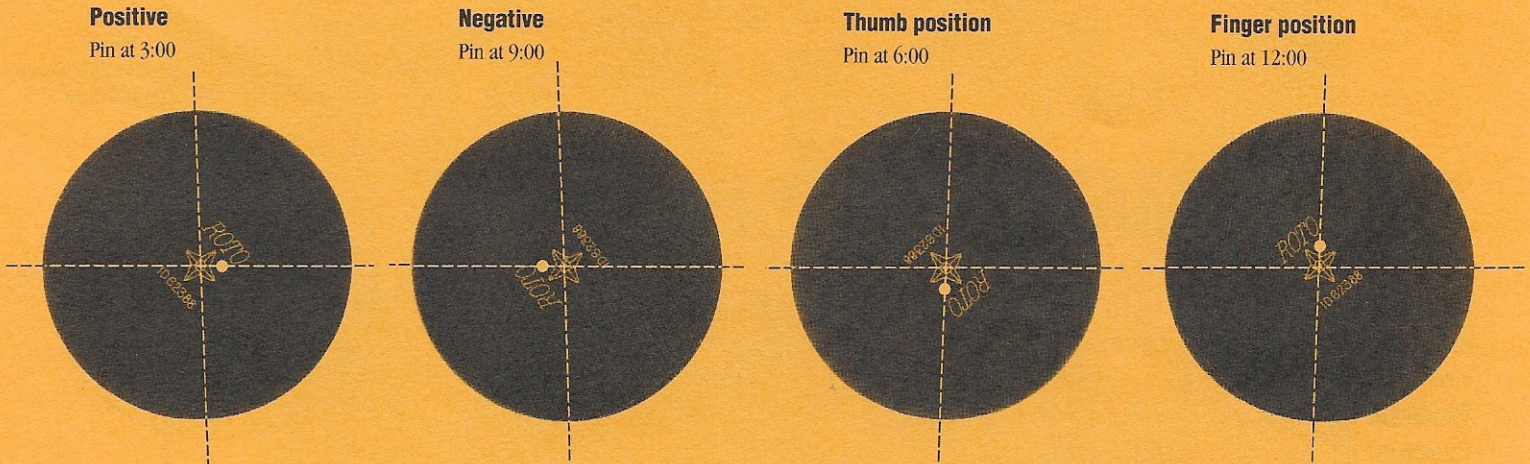
Moving the finger holes closer to the 4 pointed star creates finger weight. This will cause the ball to skid longer before hooking provided the ball track is farther from fingers than thumb.

Thumb weight



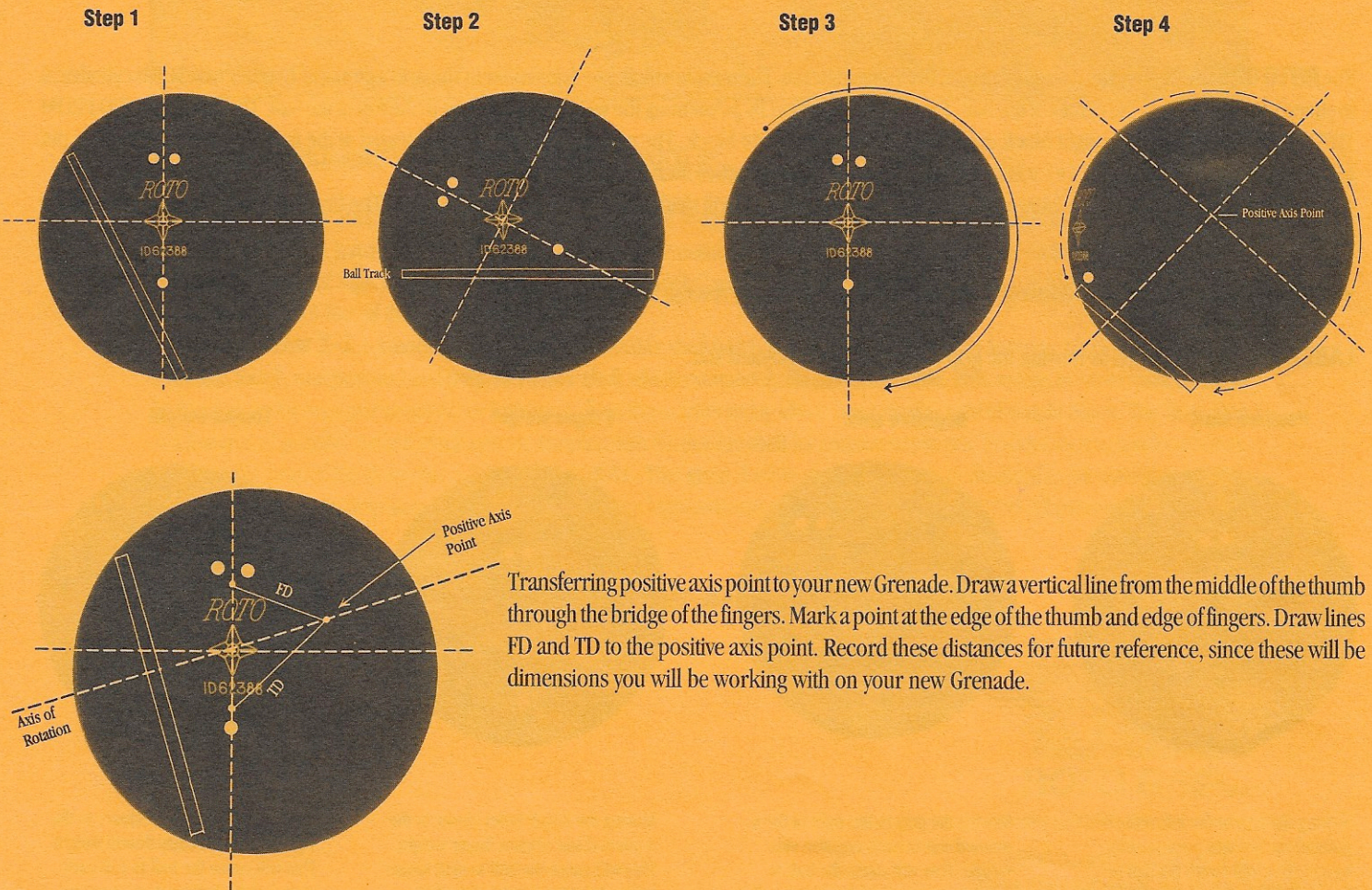
Moving the thumb hole closer to the 4 pointed star creates thumb weight. This will cause the ball to roll early provided the ball track is closer to thumb than fingers.

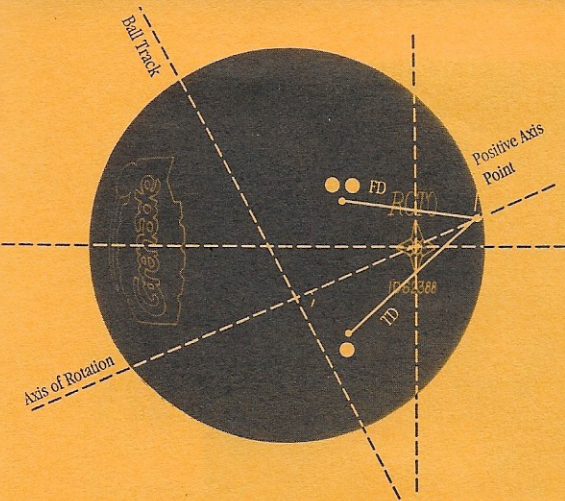
PIN SHIFT – The major difference between label shift and pin shift is in the rotation of the weight block. Pin shift will cause a different ball reaction. In some cases the reaction will be more dramatic than label shift.



Pin locations are referenced to a clock face. Using pin shift with CG shift will increase the hooking characteristics, in some cases very dramatically. AS A RULE OF THUMB: The farther CG is away from the ball track the longer the skid pattern, provided the CG is not located on the axis of rotation. CAUTION: When placing CG close to ball track it may cause the ball to roll up towards the fingers.

LOCATING AXIS POINT: First start with customer's existing ball. Trace the ball track with a yellow marking pencil. Place the ball track so it is parallel to a table top or place the ball in a spinner with ball track parallel to spinner cup. Place a quarter scale on the ball perpendicular to the BALL TRACK and draw a line completely around the ball. Rotate the ball 90 degrees and repeat. Where the lines intersect is the positive axis point as shown below.



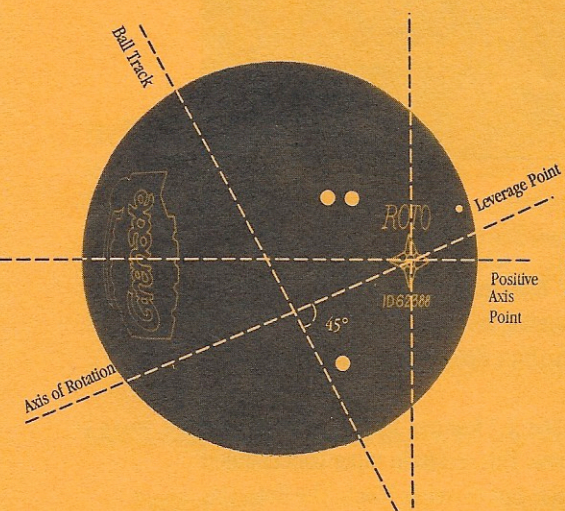


DRILLING AXIS WEIGHT — Select a Grenade with Top weight of 2.5 ounces or less. Make the pin the positive axis point. Measure the “FD” distance and “TD” distance from the positive axis point to the finger mark and thumb mark respectively. After the finger holes are drilled it may be necessary to drill a weight hole to conform to ABC/WIBC weight balance specifications. A weight hole may be drilled directly into the positive axis point.

Axis weight provides the most even rolling pattern. To increase the arc, increase side weight. While axis weight has an even rolling pattern, the ball does not impact the pins with the force that leverage weight does.

LEVERAGE WEIGHT — Is the positioning of the weight block halfway between the positive axis point and the ball track. Picture a clock face. If the positive axis point is at 2:30, with relationship to the finger holes, leverage point would be at 1:15. A top weight of 2.5 ounces or more is desirable to start with.

Leverage weight makes the ball go long. Back end reaction is much more dramatic than axis weight. In fact, in most cases leverage produces the greatest impact. A weight hole may be necessary to bring the static balance within ABC/WIBC specifications. Locating a weight hole at the positive axis point may be desirable, since it will not decrease the effective leverage weight.



BLOCK WEIGHT — Is the positioning of the weight block halfway between the positive axis point and the leverage point. Again, picture the face of a clock. Positive axis point at 2:30, leverage point at 1:15. The block weight pin position will be halfway between the two (2) points.

There are many other interesting ways to drill Roto Grenades. Experimenting is very often the best teacher. Don't neglect the 3 piece or 4 piece ball, such as the Roto-Star X-3. There are very interesting drilling variations that can be accomplished with these balls.



Roto-Grip Manufactures other fine products, such as:

ROTO-GRIP (Blue Roto) – soft polyester bowling ball. A longtime favorite. The Blue Roto features the highest quality soft polyester, (77-78D) hardness, with a special additive in the outer shell that prevents chipping and cracking. The inside of the Blue Roto is made of high density core material with a “puddle” weight block system. The Blue Roto is ideal for dry back ends or when the last 15 feet of the lane breaks down.

Roto-Star X-3 is America's only four piece double shell bowling ball. The Roto-Star X-3 features 100% urethane outer shell and tough, non porous hard polyester inner shell which completely eliminates wobble. This results in super concentrated hitting power, far superior to any other bowling ball on the market today which has a similar type of weight block. The Roto-Star X-3 features a “puddle” weight block system, coupled with the double shell for consistency in roll. Besides the tremendous hitting power, a big plus of the Roto-Star X-3 is its TRUE ROLL. This great double shell ball excels in medium to oil conditions.

That's the Roto-Grip story. We have been designing high-performance bowling balls since 1959. All products are designed by a bowler for bowlers.

ALL ROTO-GRIP BOWLING BALLS CARRY A LIFETIME WARRANTY.



Originators of High Performance Bowling Balls

6250 North Military Trail
West Palm Beach, Florida 33407
(407) 881-9220
(800) 431-1537

407-881-9223