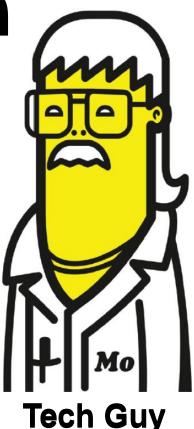


## The Shape of Things to come!

**Effective Ball Motion** 

## withOUT

a h Ole!







## Today's Guide:







## Hey, MO!



E-mail: mopeymagic@gmail.com

Facebook: radicalmop







Modern bowling balls and the higher revolution bowling style require an increasing amount of oil on the lanes, and patterns are changing faster. This trend is NOT sustainable.

USBC conducted extensive research and surveyed all of bowling's stakeholders.

To protect bowling's future:

- USBC is eliminating balance holes
- Setting a new specification for oil absorption
- The overall result will slightly limit hook potential

Noble Intentions!

USBC research shows these changes will:

- Slow oil pattern transition
- Cause bowlers to move less
- Keep the same scoring pace with lower oil volume

Time will tell!

No current USBC approved balls will be deemed illegal. All equipment is grandfathered in, indefinitely. Balance holes need to be plugged by August 1, 2020.

The goal IS to protect the playing environment for the future, NOT lower scoring!



We applaud the USBC for not implementing the current oil absorption rule until *August 1, 2020*. We consider the oil absorption rule to be a work in progress. We feel that time is needed to further analyze the data to reduce the standard deviation in order to *significantly reduce the margin for error* on this test.

The good news is that ALL of the current coverstocks pass this test!



#### **New USBC Ball Approval Procedure**



- Differential radius of gyration for new core designs only
  - i. Eight additional balls must be submitted (specific weight to be determined by USBC) for balls with a measured differential radius of gyration between 0.050" and 0.060".
  - ii. The average differential radius of gyration of all samples of similar weight must be no higher than 0.055" for the ball to be approved without participation in the optional supplemental testing process.
  - iii. If through the supplemental testing process it can be proven that balls are not designed above the maximum specification of 0.060" and have less than 0.6% rate of non-conforming balls, the ball will be approved.

#### SUPPLEMENTAL TESTING

The supplemental testing process requires the manufacturer to test 24 samples from the same model and weight for the specification in question and report the values to USBC. USBC can compare the mean and standard deviations of the supplemental data to the 10 samples tested by USBC using the appropriate statistical tests to assure they come from the same population. If the samples are from the same population, and process capability shows the model can be produced with less than 0.6% defects (6,000 out of 1,000,000 DPMO-Defects Per Million Opportunities), the product will be approved. If the data indicates the 24 belong to a different population than the original 10 samples, the 24 supplemental samples need to be submitted to USBC to be tested. If the data still indicates the 24 supplemental samples belong to a different population, or if testing indicates the model will be produced with more than 0.6% DPMO, the model will not be approved.

WOW! & more new restrictions added!



# Timeline for specification changes



#### Aug. 1, 2018

- For balls over 10 pounds without a weight hole, allowable static weights will be 3 ounces of side, thumb or finger weight
- For balls over 10 pounds with a weight hole, the current specification
  of 1 ounces of side, thumb or finger weight remains
- No-thumb bowlers who choose the increased static weight/no weight hole option would need to mark by scribe, engraver or tool near the intended center of palm with a plus (+) mark

## **USBC** Handout





#### **More Timeline Info**



#### Aug. 1, 2019

- Only a dry towel can be used to clean a bowling ball during competition.

  This rule just means NO LIQUIDS during competition!

  Aug. 1, 2020
  - A bowling ball's oil absorption rate must be more than 2 minutes,
     15 seconds for the ball to be approved

#### Aug. 1, 2020

- Elimination of balance holes; bowlers may have up to five holes for gripping purposes and all must be used on every delivery
- No-thumb bowlers would need to mark by scribe, engraver or tool near the intended center of palm with a plus (+) mark

# Another part of the USBC Handout







# They change the RULES, so

# We have to change the TOOLS!





## Eliminating balance holes will have a profound effect on SUCCESSFUL BALL DRILLING and BOWLING BALL DESIGN.

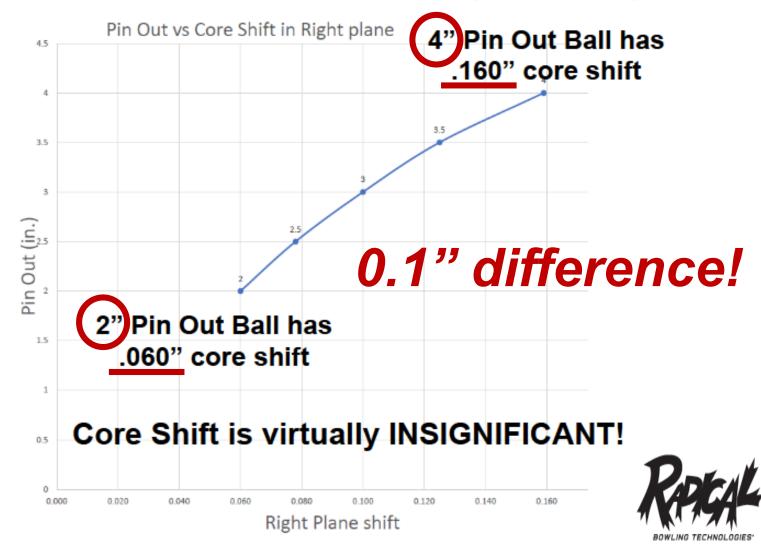




## IMMEDIATE BENEFIT of New Specs. Pin to CG distance NO LONGER matters!



#### Pin Out Distance vs. Core Shift (in Inches)

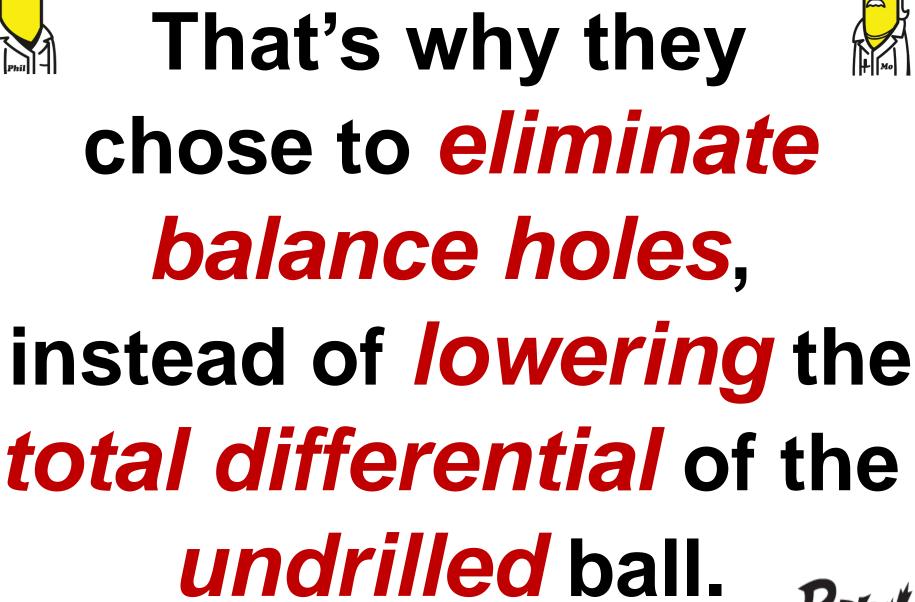






## The USBC understands, as we have preached, that it's the numbers of the DRILLED BALL that really matter.







To understand ball motion accurately, we have to realize that CORE SHAPE DETERMINES MOTION. That motion is, then, modified by the *LAYOUT* chosen, and the COVERSTOCK of the ball. Finally, the surface of the ball is adjusted so the **BREAKPOINT** is the right distance down the lane on a given LANE CONDITION.

The CORE SHAPE of the drilled ball, resulting from the LAYOUT chosen, and the BOWLER'S GRIP drilled into the ball, will determine the shape of the RG CONTOURS of that drilled ball.

Those RG contours will, then, determine the AXIS MIGRATION PATH of the ball as the ball goes down the lane.

This will result in the MOTION of the DRILLED BALL as it travels down the lane.



## Let's study the effect of drilled RG Contours and the PIN to SPIN Line on BALL MOTION.









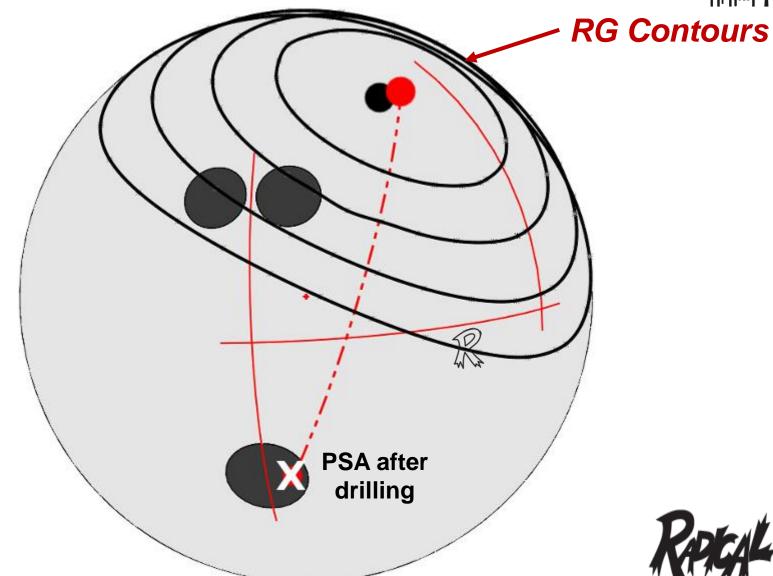
## **Understand that** ALL DRILLED BALLS are at least slightly ASYMMETRICAL.





#### **RG Contours of the drilled RADICAL RIDICULOUS**

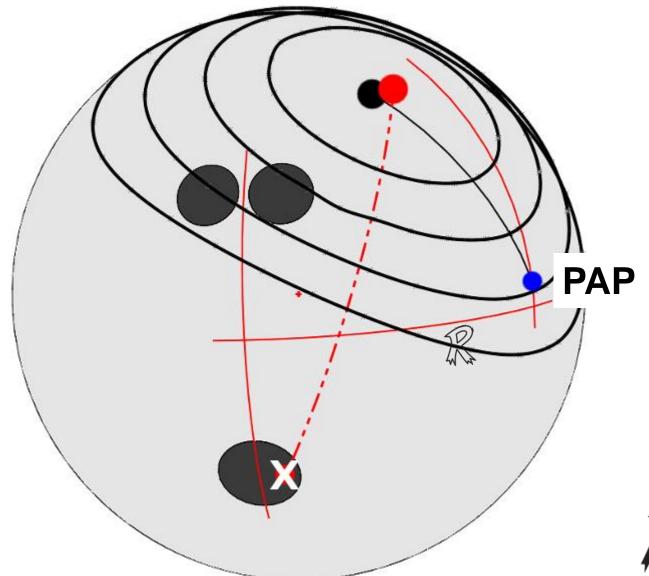






## RG Contours of the drilled RADICAL RIDICULOUS a bowler's PAP added



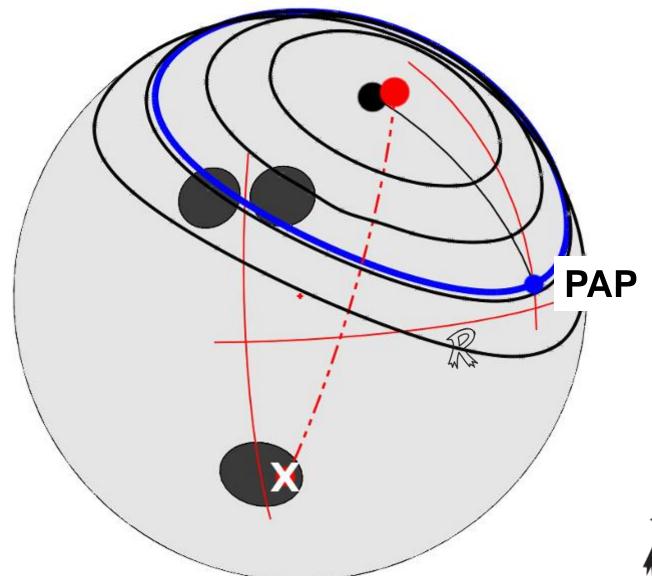






## RG Contours of the drilled RADICAL RIDICULOUS with a bowler's PAP & Axis Migration Path added









#### **Spinning a Drilled Symmetrical Ball**



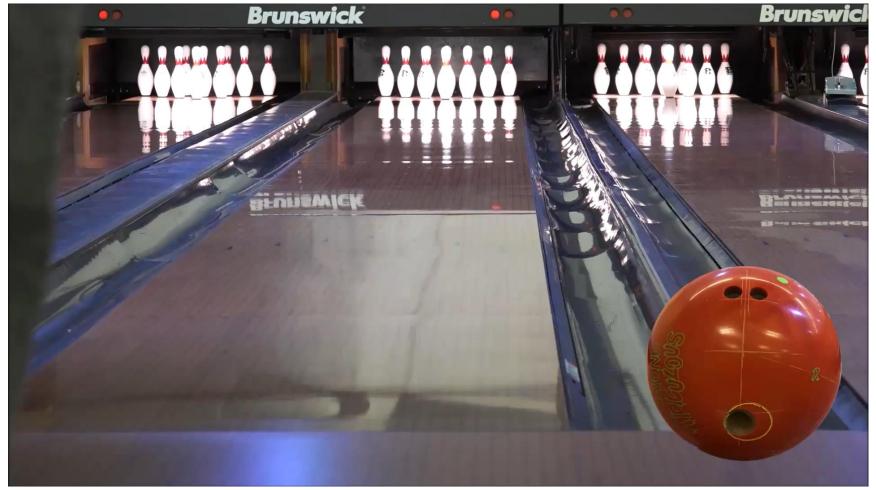






## **BEYOND RIDICULOUS**40 / 3 <sup>3</sup>/<sub>4</sub> / 20









## Spinning a Drilled Symmetrical Ball with a Balance Hole





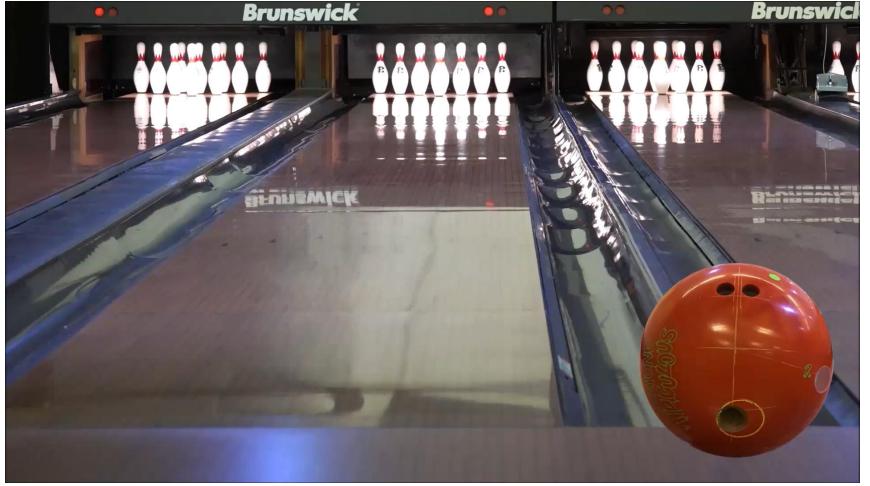
the Balance Hole moved the PSA 2 1/2" RIGHT





## BEYOND RIDICULOUS 40 / 3 3/4 / 20 with a balance hole





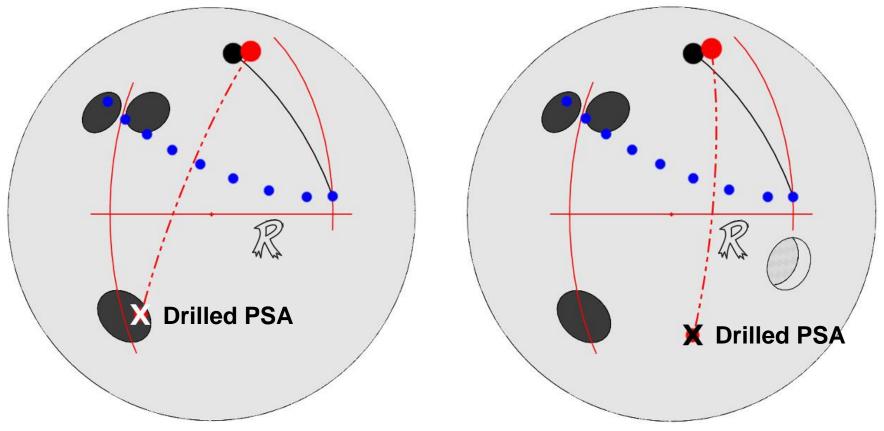
Bowler moved his feet 3 boards left
& sent it right!





## RADICAL RIDICULOUS 40 / 3 <sup>3</sup>/<sub>4</sub> / 20





The PSA moved 2 1/2" right when the 1 1/8" Balance Hole was drilled. This resulted in the ball revving up & reading the lane sooner, creating more overall hook, because the ball revs up when the migrating axis crosses the "Pin to Spin" line.







# That will *NO LONGER* be possible after 8/1/2020 under the *new USBC rules*.







Eliminating the ability of ball drillers to use a balance hole when drilling symmetrical balls will significantly reduce the overall hook and versatility of those drilled symmetrical balls.

Adding additional surface to a symmetrical ball after the balance hole has been plugged will help offset some of the loss of hook of that symmetrical ball, but the hitting power of the plugged symmetrical ball will probably still be negatively affected.





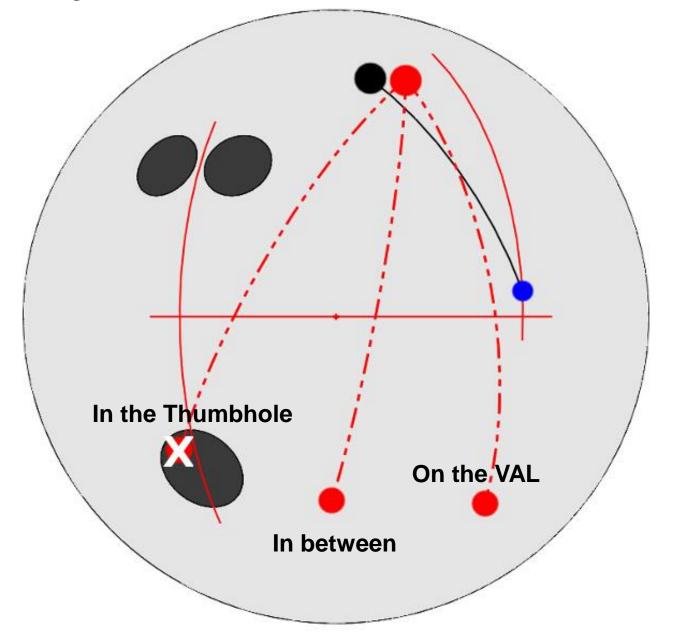
## Understanding the effect of the PSA LOCATION on the MOTION of a DRILLED BALL.





#### **Asymmetrical PSA Positions**



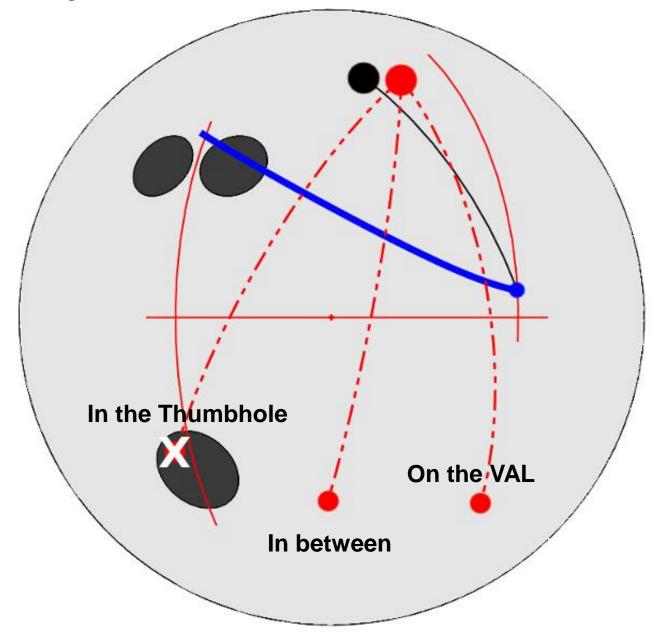






#### **Asymmetrical PSA Positions**











## This is only possible with an ASYMMETRICAL BALL.





## CAUTION:



Without the luxury of being able to adjust the ball reaction for your customer by adding a balance hole,

## YOU HAVE TO GET IT RIGHT THE 1<sup>st</sup> TIME!!!







Make sure you ask your customer on what lane conditions he wants to use the ball.

Competitive and sport lane conditions are still the same, but *ANYTHING GOES* on league lane conditions *NOW!* 





#### RADICAL Ball Development Process

- 1. Set very specific ball performance targets.
- 2. Design cores that will provide the desired numbers after drilling to hit the performance targets.
- 3. Select and test at least three coverstock formulations to hit the performance target and confirm that the ball is effective for multiple bowler styles.
- 4. Test a variety of ball finishes to tune the ball motion for the best "out of the box" performance.





## Most bowlers believe that there are only three "types" of coverstocks **SOLID**, **PEARL**, or **HYBRID**.



However, there are many base reactive systems with a variety of additive package formulations each with the option of *SOLID*, *PEARL*, or *HYBRID*.

We put lots of time and effort into making sure that the CORE/COVERSTOCK COMBINATION provides the best possible BALL MOTION and PIN CARRY.



# Your PROCESS for getting it RIGHT!



- BALL Selection
- LAYOUT Choice
- Surface Adjustment

Then, it's up to the bowler to put their feet in the right place and REPEAT!



# **BALL Selection**



Starting the process properly begins with selecting the ball with the correct motion potential for the bowler for the situation in which it is supposed to be used.

- What are the bowler's delivery specs?
- On what lane condition is it to be used?





# BALL Categories



In order to aid pro shops in choosing ball designs more effectively, we are announcing 2 current ball categories: True Symmetric Moderate Asymmetric



#### True Symmetric Balls



- Longer transition at the breakpoint.
- More continuous motion.
- CG location on the drilled ball does NOT matter.
- Motion controlled by the pin to PAP distance and the VAL angle.
- Use ball surface to move the breakpoint distance on the lane.



## True Symmetric Balls



Balls with INTERMEDIATE
 differentials up to .007".

Balls with TOTAL
 differentials up to .053".





#### **Moderate Asymmetric Balls**



- More drilling versatility.
- More defined breakpoints.
- Moving the *PSA* creates different shapes in ball motion.
- Use pin to PAP distance, VAL angle, and PSA location to create the desired shape for the ball motion.
- Use ball surface to adjust the breakpoint distance on the lane.





### Moderate Asymmetric Balls



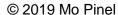
Balls with INTERMEDIATE
 differentials between
 .012 and .022".

Balls with TOTAL
 differentials up to .053".





New categories of ball designs will be added to increase the total versatility of the RADICAL line as the USBC deadline of 8/1/2020 for the elimination of ALL balance holes approaches.





## LAYOUT Choice



The ball layout is used to adapt the bowling ball's DESIGN to the bowler's STYLE and the lane CONDITION.



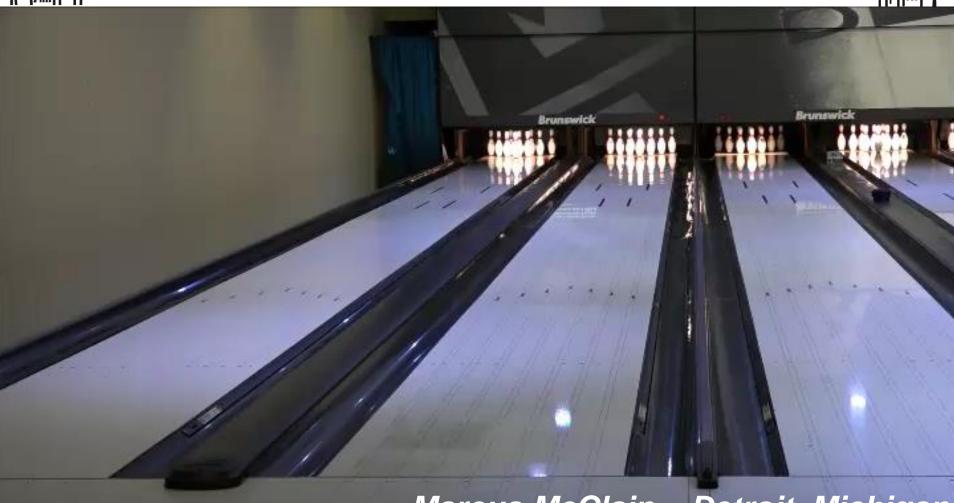


RADICAL has specific recommended layouts in each ball category to MAXIMIZE the ball's **PERFORMANCE** and VERSATILY.



#### MEET our BOWLER





Marcus McClain – Detroit, Michigan Sophomore – Indiana Tech USBC Eagle Winner





	DRILLING CHART (Symmetrical)								
Layout Specs				Int. Diff.	Total Diff.	Performance Differential	RG PAP		
Undrilled									
Α	Maximum Flip	Pin Over 70° x 3 1/2" x 20°							
В	Most Versatile	Pin Over 75° x 4" x 30°							
C	Smoother Motion	Pin Over 80° x 4 1/2" x 40°							
D	Smaller Hook	Pin Beside 90° x 2 1/4" x 45°							

This chart uses a 5" horizontal axis co-ordinate. Adjust the drilling angle for other horizontal co-ordinates. Always use the pin to PAP distance and VAL angle to get the desired ball motion.

Please remember that the drilling angle of a drilled symmetrical ball really DOESN'T matter because the PSA of a drilled symmetrical ball is always by the thumb.

If the bowler has a preference for a CG location, I suggest you use their choice.







#### **SQUATCH SOLID DRILLING CHART (Symmetrical)**

Layout Specs			Low RG	Int. Diff.	Total Diff.	Performance Differential	RG PAP
Undrilled			2.482	0.005	0.054	0.055	
Α	Maximum Flip	Pin Over 70° x 3 1/2" x 20°		0.018	0.064	0.067	2.508
В	Most Versatile	Pin Over 75° x 4" x 30°		0.020	0.063	0.066	2.514
С	Smoother Motion	Pin Over 80° x 4 1/2" x 40°		0.019	0.058	0.061	2.519
D	Smaller Hook	Pin Beside 90° x 2 1/4" x 45°		0.014	0.060	0.062	2.494













MAXIMUM FLIP LAYOUT



© 2019 Mo Pinel













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LAYOUT tape slo





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### True Symmetric









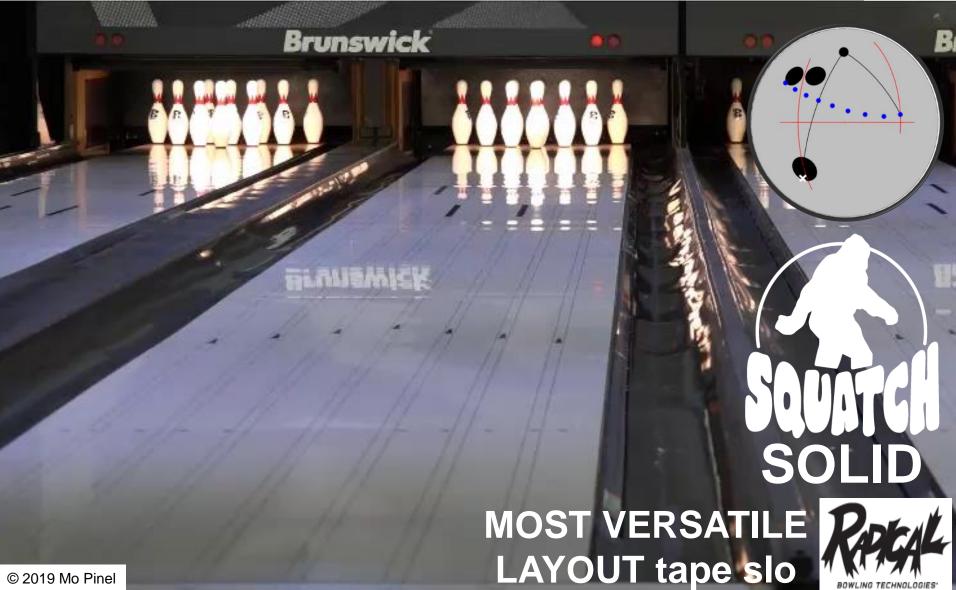


MOST VERSATILE LAYOUT tape















SMOOTHER MOTION LAYOUT









LAYOUT tape

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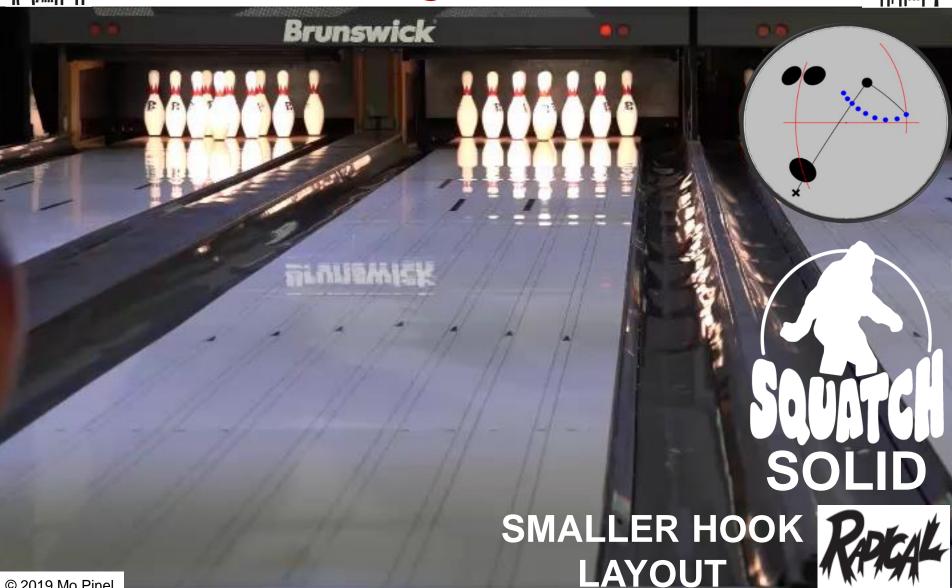


SMOOTHER MOTION LAYOUT tape slo









© 2019 Mo Pinel















#### Both balls *flare less* resulting in *less hook*!

Urethane ball results in much more carrydown.
Urethane ball tends to destroy oil pattern.
Urethane ball will lose hook more quickly.

Short Pin Reactive ball definitely creates less carrydown.

Short Pin Reactive ball will result in pattern lasting longer.

Short Pin Reactive Ball will promote the pattern opening up.

#### YOU DECIDE!







DRILLING CHART (Asymmetrical)								
Layout Specs			Low RG	Int. Diff.	Total Diff.	Performance Differential	RG PAP	
Undrilled								
Α	Maximum Flip	Pin Over 70° x 3 1/2" x 20°						
В	Most Versatile	Pin Over 45° x 4" x 35°						
C	Smoother Motion	Pin Over 20° x 4 1/2" x 40°						
D	Midlane Hook	Pin Under 40° x 4 1/4" x 75°						
н	Smaller Hook	Pin Reside 00° v 2 1/4" v 45°						

This chart uses a 5" horizontal axis co-ordinate. Adjust the drilling angle for other horizontal co-ordinates. Always use the pin to PAP distance and VAL angle to get the desired ball motion.

When doing asymmetrical balls, use the *drilling angle*, the *pin to PAP distance*, and *the VAL angle* to create the desired shape of the ball motion.

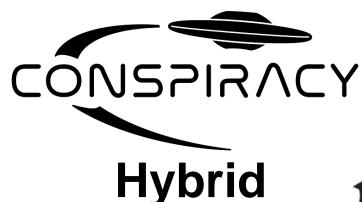




#### **CONSPIRACY DRILLING CHART (Asymmetrical)**

Layout Specs			Low RG	Int. Diff.	Total Diff.	Performance Differential	RG PAP
Undrilled			2.488	0.021	0.056	0.060	
Α	Maximum Flip	Pin Over 70° x 3 1/2" x 20°		0.030	0.060	0.068	2.507
В	Most Versatile	Pin Over 45° x 4" x 35°		0.025	0.054	0,059	2.516
C	Smoother Motion	Pin Over 20° x 4 1/2" x 40°		0.017	0.048	0,051	2.528
D	Midlane Hook	Pin Under 40° x 4 1/4" x 75°		0.020	0.042	0.047	2.520
E	Smaller Hook	Pin Beside 90° x 2 1/4" x 45°		0.012	0.032	0,062	2.496

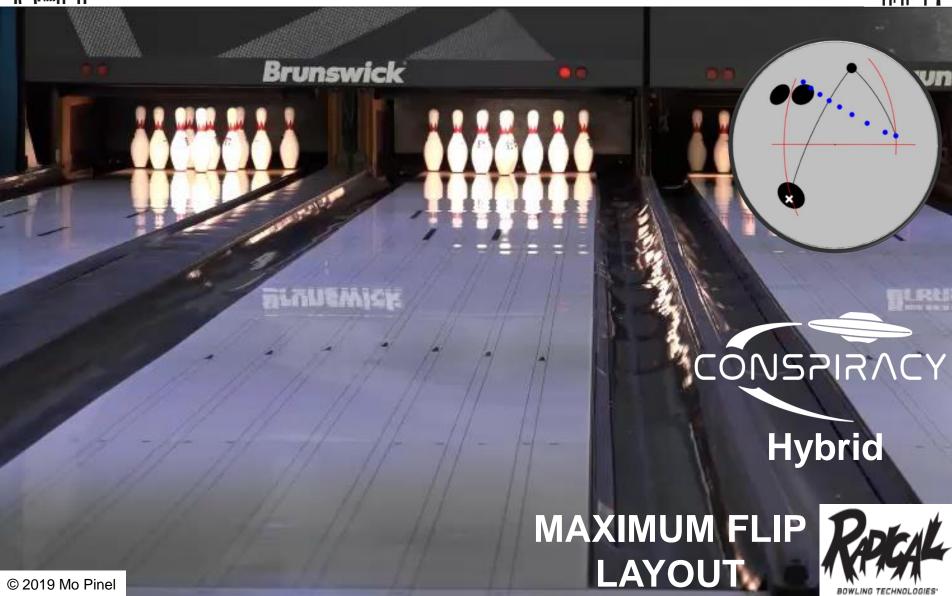






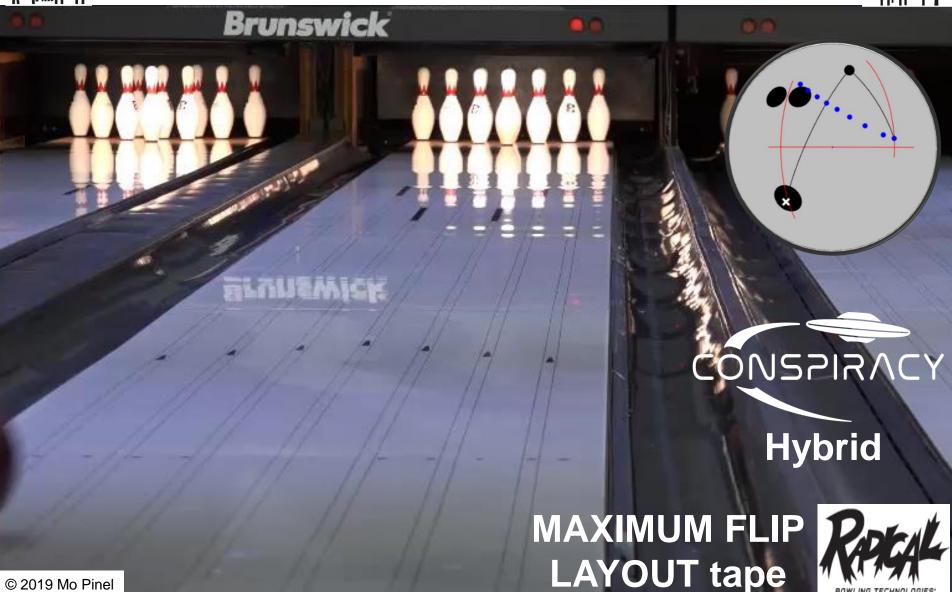
















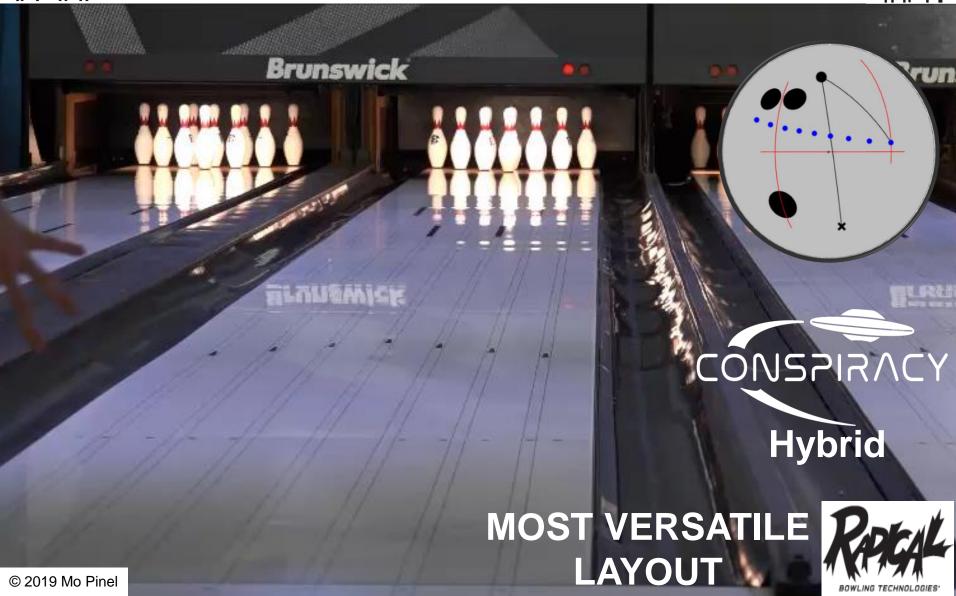


MAXIMUM FLIP LAYOUT tape slo



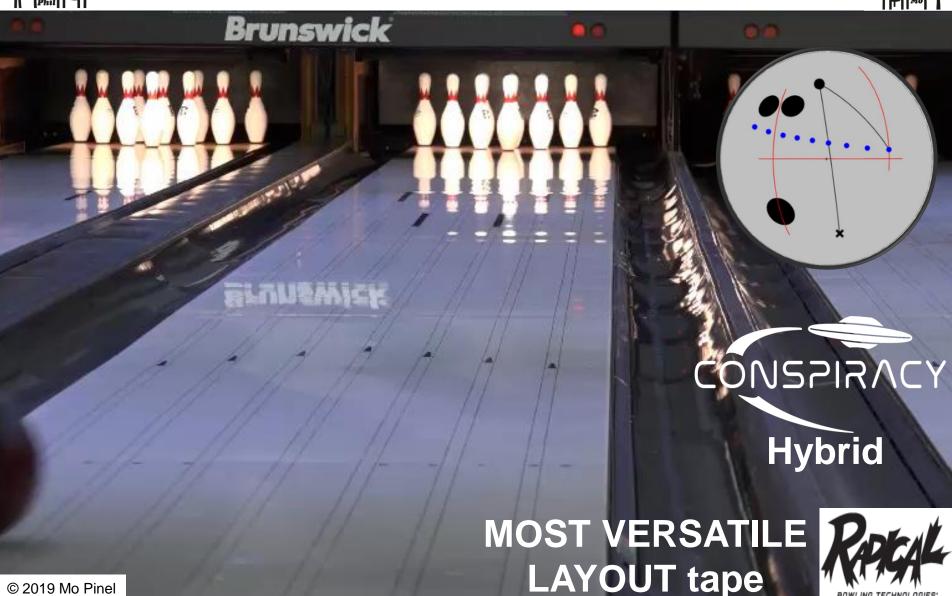








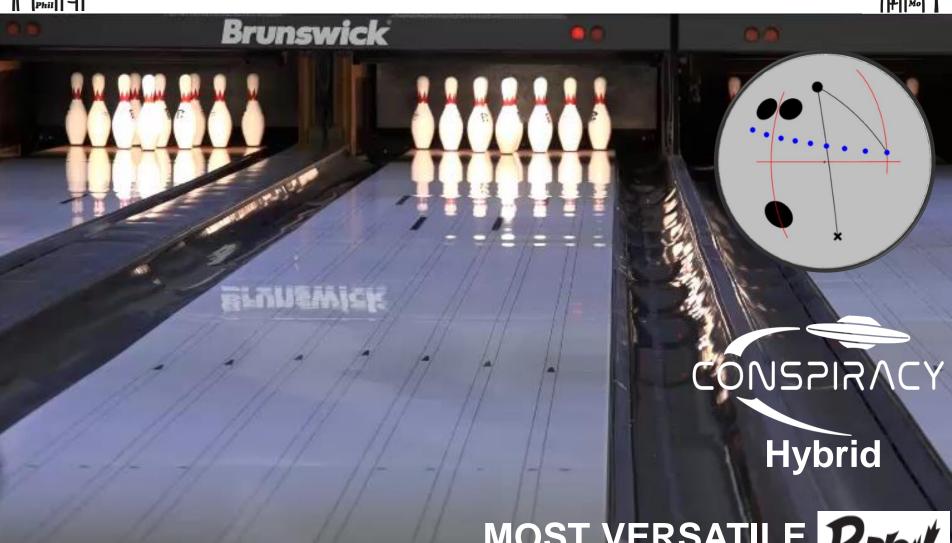




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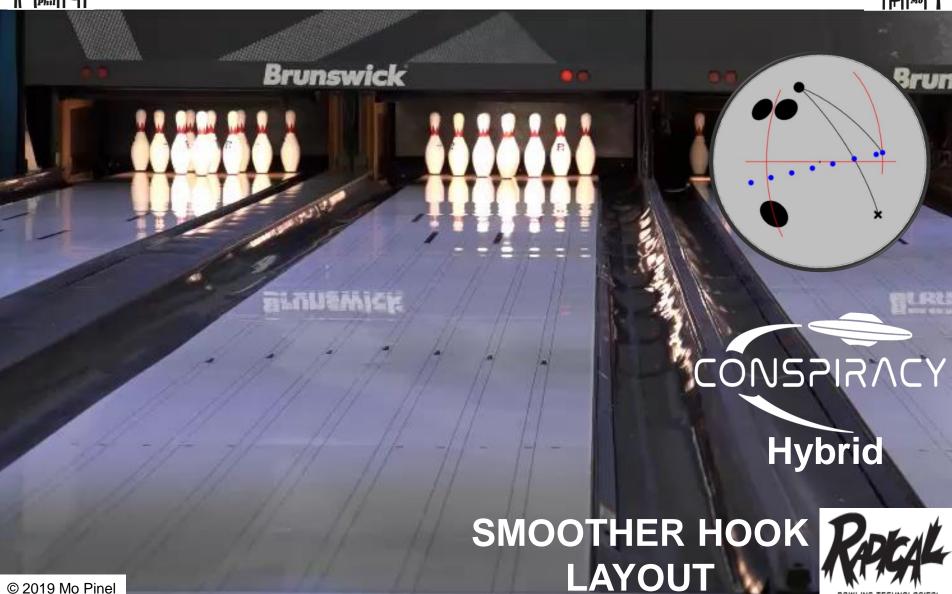


MOST VERSATILE LAYOUT tape slo



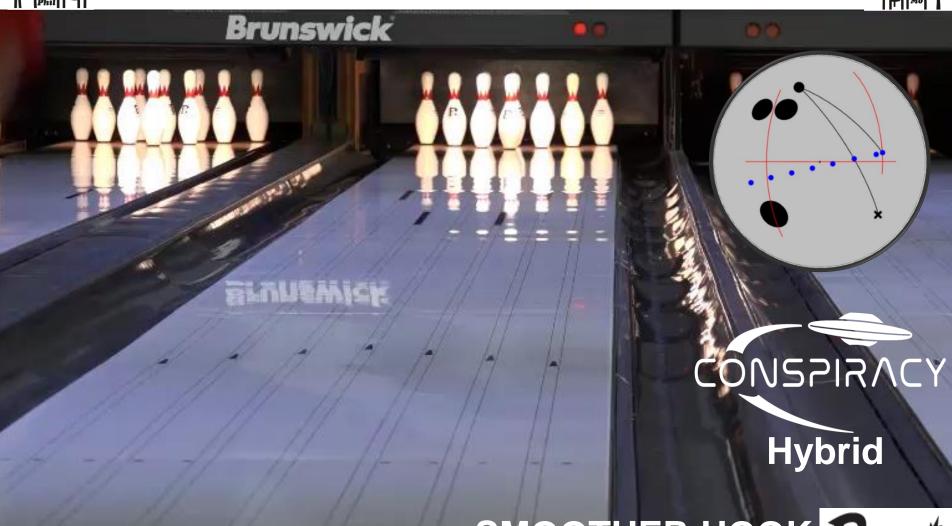










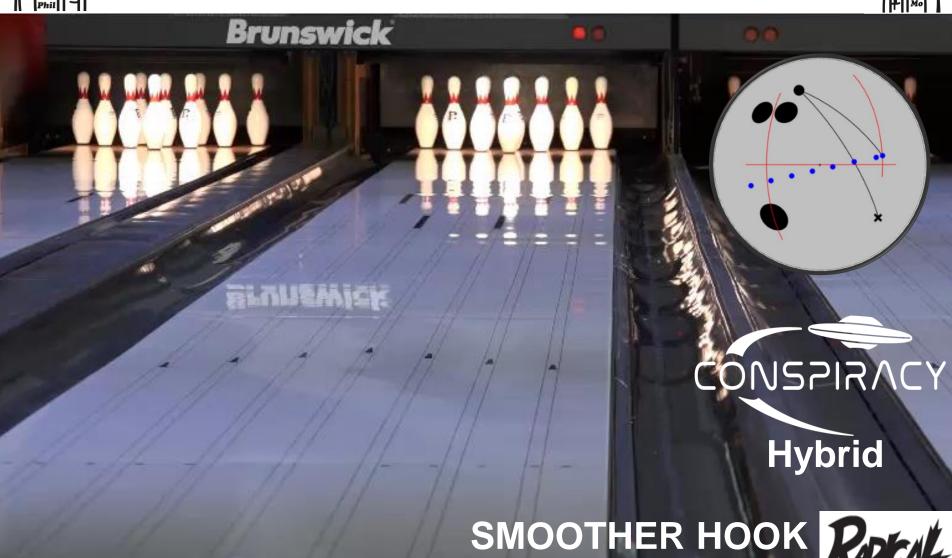


SMOOTHER HOOK LAYOUT tape







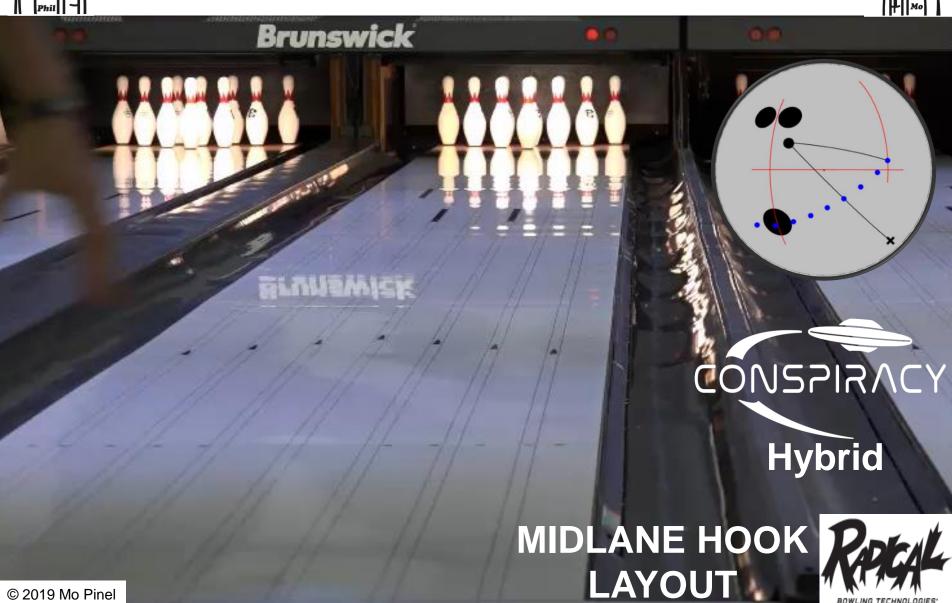


SMOOTHER HOOK LAYOUT tape slo



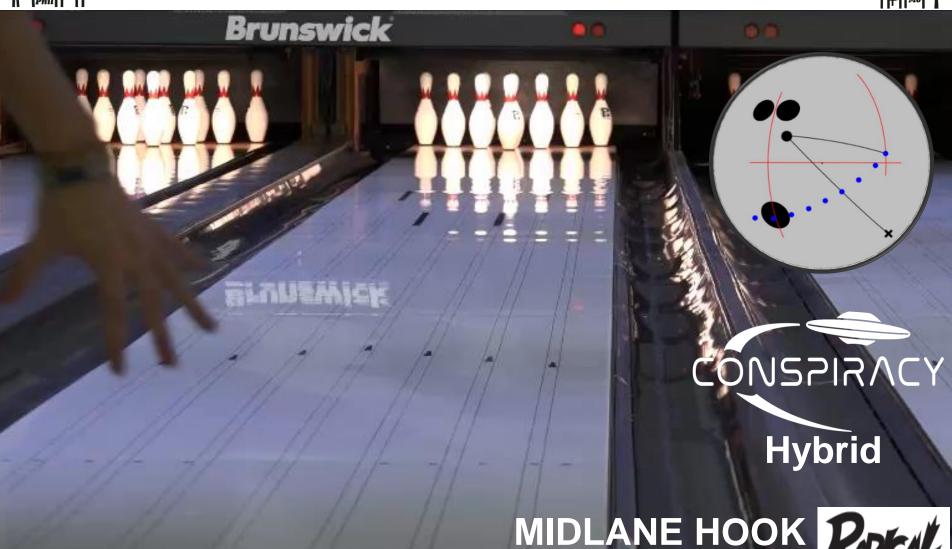








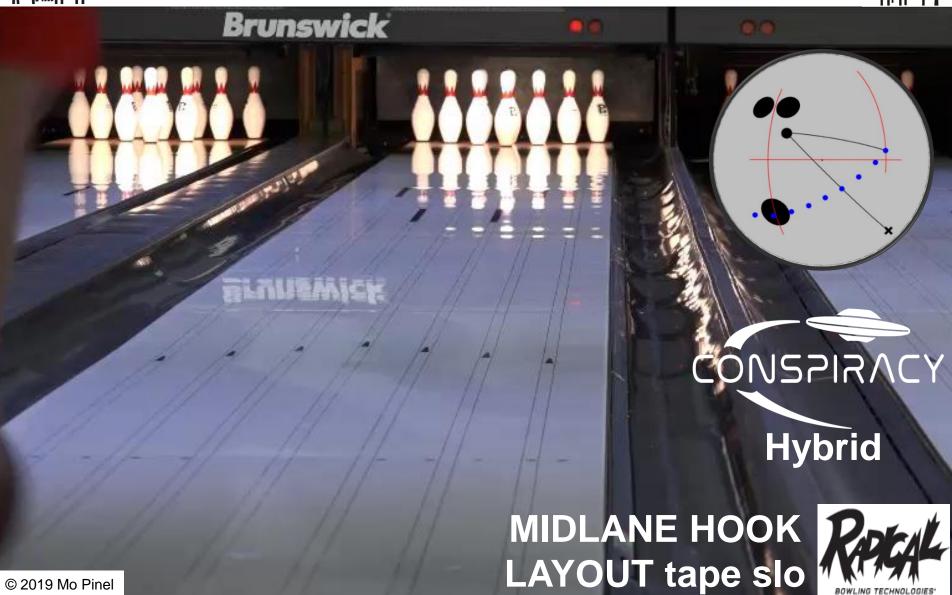




LAYOUT tape

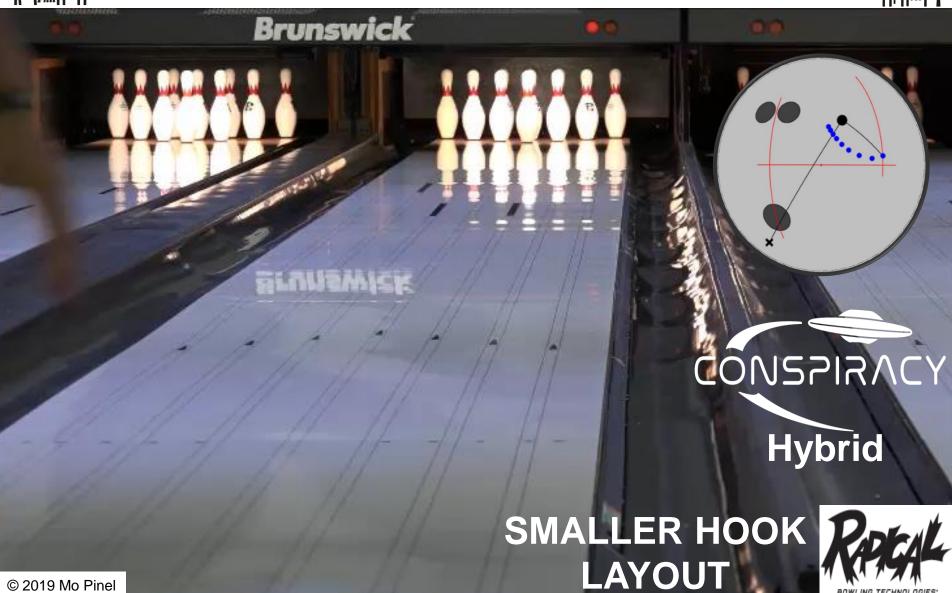






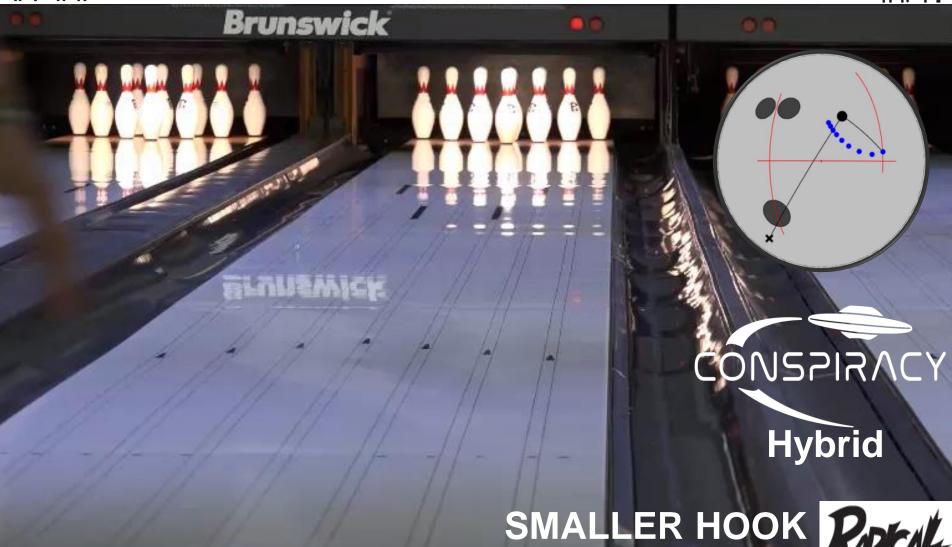








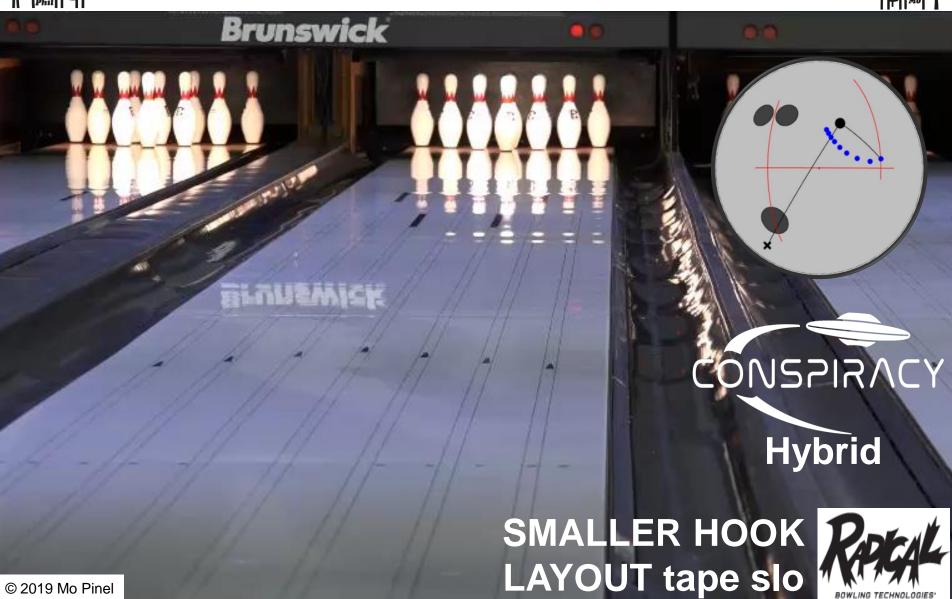




**LAYOUT** tape











# 

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## Surface Adjustment



After choosing the BALL with the right MOTION POTENTIAL, and using the LAYOUT that matches the **BOWLER** to the LANE CONDITION being bowled on, the final step is to adjust the surface to get the ball to SLOW DOWN at the right place as the ball travels down the lane to MAXIMIZE SCORING.





#### For a bowling ball to strike,

#### it must

## SLOW DOWN!



Do not hesitate to *alter* the factory surface to fit the *bowler's game* and the *lane conditions* being bowled on.

Factory surfaces are for display and to set the tone for the ball only.

The most common mistake with ball surface that I see is TOO LITTLE SURFACE!





## **RADICAL** Factory Surfaces



- · 500 / 1500
- · 500 / 3000
- · 500 / 1000 / 2000
- · 500 / 1000 / 3000
- 500 / compound
- 500 / 1000 / compound
- 500 / 1000 / polish
- 500 / compound / polish





## Surface Texture



Wet sanded with 240, 320 or 360 paper or pad Scuffed with a good burgundy pad Sanded with 500 grit paper or pad Sanded with 800 grit paper or pad Scuffed with a grey pad Wet sanded with 1000 grit paper or pad Wet sanded with 1500 grit pad Wet sanded with 2000 grit paper or pad Wet sanded with 3000 grit pad Wet sanded with 4000 grit paper or pad Wet sanded with used 4000 grit pad Polished with compound Polished with ball polish Polished with ball polish containing a slip agent

earliest breakpoint







#### TRUE Surface vs "SKIP Sanding"

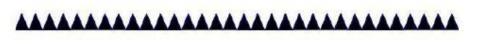




500 GRIT SANDED



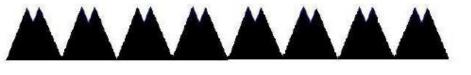
1000 GRIT SANDED



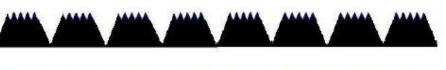
2000 GRIT SANDED



4000 GRIT SANDED



500/2000 "SKIP SANDED"



500/4000 "SKIP SANDED"



500/3000 "SKIP SANDED"







Makes it harder to throw the ball thru the breakpoint!





# Keys to SCORING!



## • Good SHOTmaking!

• Put your *FEET* in the right place.

• Put the right **BALL** in your hand.





## Brunswick RAPIGAL ON

hosted by

#### Pro Shop and Ball Motion Training Class





(formerly the IBPSIA Advanced Hands On training class)

- 4 days and 4 evenings with on lane sessions
- All Attendees will receive 2 new balls (one performance and one plastic)
  - Attendees should bring their best fitting bowling ball and bowling shoes; as bowling is a part of the class.

Learn about drilling for the new USBC specifications and the either/or rule, for the benefit of your customer!

**New Completely Revised Manual!** 

Dates: 11/3/19 - 11/7/19

Cost: \$995 per person

Location:

Innovative Bowling

**Products** 

250 N Main St

Jacobus, PA 17407

Faculty:

John Jameson

CEO of VISE and Innovative Bowling Products

<u>Mo Pinel</u>

Technology Director of Radical BT - USBC Silver Coach

Tom Carter

USBC Silver Coach - 38 years of pro shop experience

Mark Moon

30 years pro shop experience

Todd Porter

USBC Bronze Coach - 17 years pro shop experience

For more information or to register, call Sarah at Innovative 800-226-5891 or email sarah@innovativebowling.com.

Anyone purchasing a Mill Package from INNOVATIVE between 6/1/19 and 11/1/19 can send one attendee for FREE!





# Now, it"s YOUR turn!



## Any QUESTIONS, COMMENTS, or CONCERNS!





