

TOPOGRAPHY . . . WHAT DOES IT MEAN?

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From the Cornerstone Newsletter, Summer 1998, the article discusses lane topography, important knowledge for all bowlers. Used with permission....

TOPOGRAPHY . . . WHAT DOES IT MEAN? The Cornerstone Volume 1 The Foundation Newsletter Summer 1998(*
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Topography- the science of representing the features of a surface.

Lane topography is one of the most influential factors in ball reaction. The topography of a surface consists of three different types of measurements: Crosswise Tilt, Crowns & Depressions, and Lengthwise Level. Topography affects the ball reaction characteristics of each lane and is mostly responsible for "Mystery lanes."

Crosswise Tilt

The American Bowling Congress and Women's International Bowling Congress make the rules covering lane specifications. One such specification is the crosswise tilt, or the measurement from gutter to gutter which shows if one side of the lane is higher than the other side. The specification is plus or minus 40 thousandths (0.040) of an inch. This is just a hair over 1/32 of an inch.

The ABC/ WIBC provide special lane levels used in measuring and certifying bowling lanes. For crosswise tilt the level is laid across the lane, and the bubble of the level will move to the side that is high. Feeler gauges (ranging between 0.005 to 0.040 of an inch thick) are then placed under the low end of the lane level until the bubble is once again centered. The thickness of the gauges needed equals the amount of tilt on the lane.

All lanes have some amount of tilt. While there may not be consistent tilt readings across all lanes in a particular center, there is often a degree of consistency on each lane. The amount the crosswise tilt affects the entire lane can be averaged between each arrow. Example: 0.040 thousandths tilt has an average value of 0.005 thousandths for every five board area.

The crosswise tilt only becomes a real factor when the lane is tilted to one side for a certain length of the lane. The ball is more affected by the crosswise tilt from thirty feet to the pin deck. It can have some impact in the front of the lane, but the tilt needs to be pretty large. In simpler terms if a round object is placed on a flat, level surface, then one side is raised, the object rolls to the low side.

Remember this is only one of the pieces of the surfaces characteristics.

Example of 0.040 inch Crosswise tilt

Crowns and Depressions

The crowns and depressions show the actual shape of the surface from gutter to gutter.

A crown is an increase in height from a given zero point. The peak of the crown, of course, is the highest point. The peak, however, is not necessarily the center of the lane. It can peak at any point across the lane. A crown, unlike crosswise tilt, is measured by the amount of change across each five-board area. This is also measured using the lane level with an attachment called the Dial Indicator. The indicator glides across the level reading the amount of rise or drop of the surface in thousandths of an inch.

A crown can give the bowler a sense of hold but also takes away swing area. Like crosswise tilt, crowns have more influence when they remain consistent across a certain length of the lane. Crowns have a tendency to benefit players that do not cross a lot of boards. Two units of oil can feel like five units when the lane is crowned. The amount of pressure that the ball has against the lane is less when going away from the pocket but greater when more direct. It is like riding over a hill.

Example of a 0.020 inch Crown

A depression is the opposite of a crown.

The shape is measured by the amount of decrease from the zero point. This concave shape allows bowlers to feel that

there is more swing area but less hold. It can make the gutter more open. Five units of oil can react like two units. A depression can force players to cross boards. The pressure the ball feels on a depression is greater when crossing boards, but a ball thrown on a direct trajectory will have trouble reaching its break point. A depressed lane is very much like a banked turn on a road. When a vehicle hits the bank it becomes easier to turn and also slows with more ease. The momentum of the vehicle is now compressed into the embankment.

Example of a 0.02 .inch Depression

The ABC/WIBC specifications for crowns and depressions are the same as crosswise tilt (plus or minus 0.040 of an inch).

Lengthwise Level

The lengthwise level of the lane is the final piece in the topography puzzle. This can also have dramatic effects on ball reaction. This allows us to see how many hills and valleys the ball sees rolling down the lane. Like driving, the vehicle maintains or even increases speed when moving down a hill. It slows quite a bit when moving uphill. A lane that runs uphill or downhill from 30 feet to the pindeck, will become more sensitive to speed changes. This is caused by the amount of surface pressure that the ball has against the lane. A lane going downhill can play tighter and an uphill lane can promote more hook.

There is no specification for the lengthwise level of a lane. Most lanes are installed using a carpenters string or a laser. One problem with a carpenters string is it will tend to show the lane is lower in the center than at the foul line and pin deck. In our data collection process we collect the lengthwise measurements every five feet, with a laser.

Three-in-One

When all three factors (crosswise tilt, crowns and depressions, and lengthwise level) are added together, many different things can happen. Each lane has some differences whether it is one or all of the three factors. Certain combinations of the three can have somewhat similar characteristics as a lane that has a different topography. Inequity can be seen in a surface and the level of a lane can give a certain style or side an advantage. The patterns run for the PBA allow the topography to stand out. The patterns do not provide much in swing or hold, so we know what the reaction should look like and when we see something different we can make an accurate conclusion on the topography.

Wood lanes tend to be the most consistent across a given center. The reason is the sanding equipment does not allow for easy changes from lane to lane. Most machines have a fixed pattern for making cuts. But keep in mind there can still be mystery lanes.

Synthetic lanes, on the other hand, can be vastly different from lane to lane across a house. There are many reasons for this:

Reason #1: The Environment

Centers located in areas of the world that can experience large temperature and humidity changes from season to season, see the most changes in topography (both wood and synthetic). See, even though the lanes are synthetic, they are still made of wood in one form or another. Substructures are made of a pressed board, and pressed fiberboard's (wood fibers). The actual surface is made up of sheets of pressed paper with a melamine layer that the ball touches. So the surface can absorb moisture from the air and it can dry out when the air is dry. All wood does this!

Reason #2: The Installation

How synthetic lanes are installed is very important. They may initially be consistent across the house. Eventually the lane takes abuse and gets exposed to environmental factors, explained above. Remember that a wood lane is one solid piece while the synthetics are separate pieces screwed together. An installer may tighten screws tight enough to dimple the surface and cause the areas not screwed down to "bubble" up.