

USBC bowling ball motion study concludes

04/01/08

USBC Equipment Specifications and Certification

Two-year research project leads to new specification on bowling ball surface roughness



The United States Bowling Congress and bowling ball manufacturing company representatives have worked together during the past two years on a comprehensive **study of bowling ball motion**. Now complete, the cooperative research project's goal was to determine which characteristics have greater effects on the motion of modern, high-tech bowling balls as they roll down a lane.

One of the technical study's main findings is that the major factor in how a bowling ball reacts on a lane is the chemistry of its cover material. Modern bowling balls can be constructed with extremely aggressive, porous chemical materials in the cover, giving the balls potential to easily gain traction and hook hard and sharp into the pins despite heavy amounts of oil on the lane surface. Left unregulated, modern bowling balls could have a disproportionate impact on scoring relative to player skill in the sport of bowling.

With that finding in mind, USBC has created a new manufacturing specification dealing with the porosity and chemistry of bowling ball surfaces. Recently approved and set to be implemented in April 2009, this initial specification sets precise limits for the first time on the gaps between microscopic indentations on the outer surface, or cover stock, of bowling balls. The distance between the tiny gaps has a significant impact on how aggressively a bowling ball can hook on a lane. This component was determined to be the No. 1 factor that affects bowling ball motion.

Currently, the only specification USBC has developed for bowling ball surface measures hardness. The new specification is based on the chemistry of the materials in bowling ball cover stocks and measures how lane oil is absorbed into a ball's surface.

"For the first time in the sport of bowling, USBC has created a method capable of measuring

differences of bowling ball cover stock chemistry by means of porosity and surface roughness," said USBC Vice President - National Governing Body Neil Stremmel. "With this specification and others set in the recent past, USBC is taking a step toward the re-balancing of player skill and success in the sport of bowling."

Bowling balls submitted to USBC for approval after April 2009 must meet the new specification to be permitted in USBC competition.

Goals of study were achieved

As the sport's national governing body, USBC undertook the research working cooperatively with bowling manufacturers. Formed in 2005, the USBC Bowling Ball Specifications Task Force is comprised of USBC research engineers and technical volunteers from several bowling ball manufacturing companies. One impetus for the study is that over the past two decades, bowling's credibility had been compromised in part due to technological advancements that have greatly affected scoring in the sport.

The study, conducted in two phases, measured and ranked how 18 different variables affected overall performance of modern bowling balls. In addition to surface roughness, coefficient of friction and oil absorption were two other variables that the study found to have a significant impact on ball motion. See the full report on bowl.com for definitions of the 18 variables and further details.

USBC's goal with the research was to gather data about the complex dynamics and inner motion characteristics of today's high-tech bowling balls. That and other information obtained in working with ball manufacturers and other industry leaders is being used to set performance-based specifications when needed for bowling balls used in USBC-certified competition.

"Our objective with this study was achieved," Stremmel said. "That goal was to gain a better understanding of bowling ball motion. Now, USBC has scientific data on which to base future research and specifications."

The testing process officially started in the summer of 2006. USBC engineers and technicians performed hundreds of tests to analyze the data. Particle and reactive resin

bowling balls were used for the research study that was conducted in the USBC testing center in Greendale, Wis., which includes eight lanes in a climate-controlled building. USBC's robotic ball thrower - nicknamed "Harry" - was used to roll the test balls. The data was measured using "Super C.A.T.S." (Computer Aided Tracking System) to record the exact location and velocity of bowling balls that Harry rolled down the lane. The Super C.A.T.S. system is made up of 23 small electronic sensors installed down two lanes.

Additional testing for surface roughness and oil absorption is planned using approximately 600 bowling balls. Those tests may lead to an additional set of specifications next year, Stremmel said.

Through that bowling ball research, USBC is committed to maintaining the highest standards for credibility and integrity of bowling. In fulfilling that pledge, USBC is launching a re-evaluation of all components of the System of Bowling, which includes lane surfaces, lane conditions, bowling balls and pins. USBC also has formed task forces to deal with issues and standardization of lane surfaces and lane conditioners/cleaners.

Stremmel will discuss the bowling ball motion study findings in detail during technology presentations at the USBC Convention in Kansas City, Mo., (Wednesday, May 7 and Thursday, May 8 at 10:30 a.m.) and International Bowl Expo in Orlando, Fla., (Monday, June 23 from 2:15-4:15 p.m.).