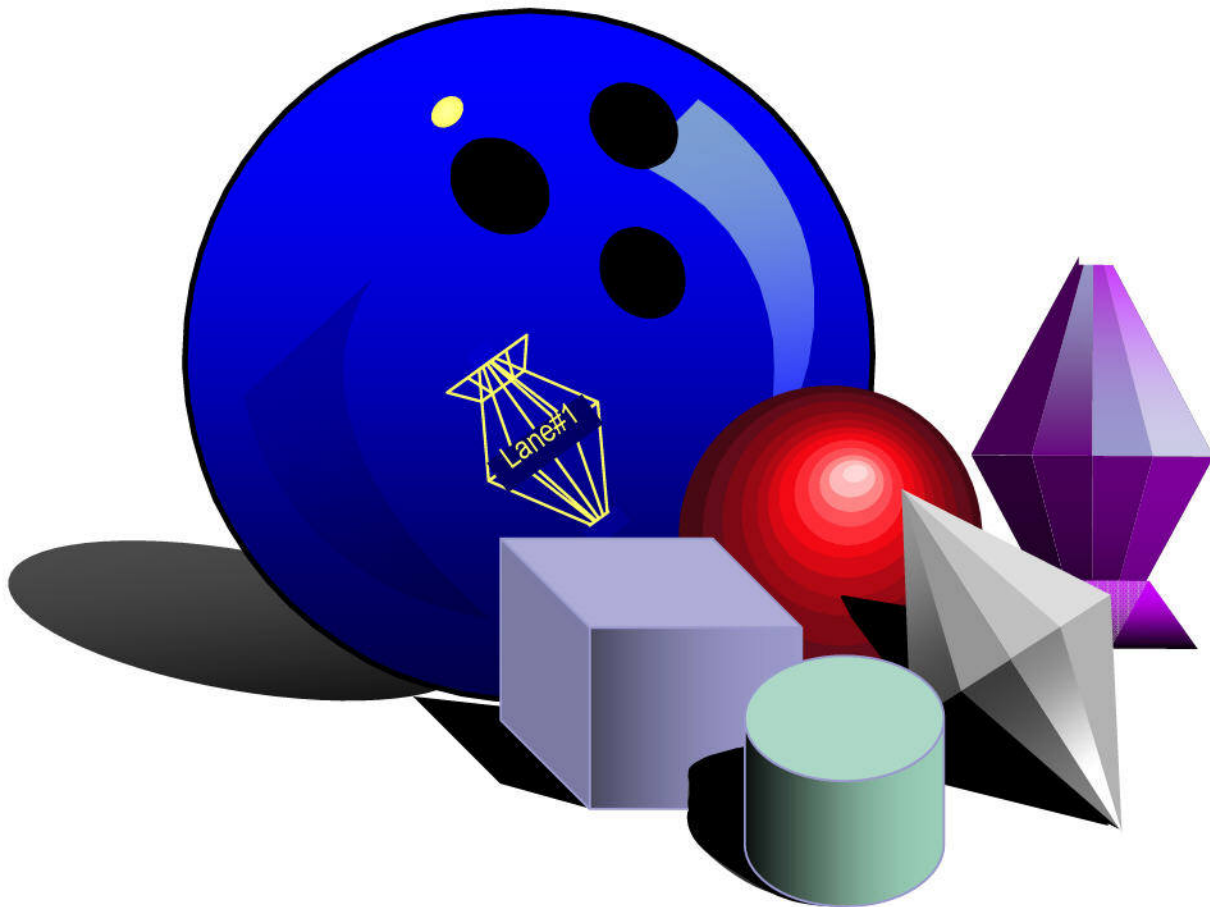


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THE CORE CONCLUSION



What is the Core Conclusion?

You might be overwhelmed by all the information this applied physics research report contains. So, now my challenge as a scientist is to summarize all this experimental and theoretical work into an easily understandable conclusion. I will attempt to wrap up this work on the core design comparisons by answering the questions that a bowler might be wondering about if they have read the entire report or if they have simply skipped to the ending conclusions to see what has been proposed.



1. Do the shapes of the cores in a bowling ball really matter?

Yes, the shape of a bowling ball core will create differences in the motional dynamics of bowling ball traveling down the lane. The core shape can affect the path shape (hook pattern), the roll, spin, flare, and overall qualities of the motion of the bowling ball. These influenced factors will also affect the overall pin carry effectiveness.

2. Do the core shapes influence the energy available to carry the pins and strike?

Yes, the core shape helps determine the overall distribution of stored energies in the ball that are transferred to the pins during the ball's collision with the pins. For example, two balls traveling and spinning down the lane at the same speed can have different amounts of total motional energy stored just because of the different weight blocks within the balls. This will surprise some bowlers because it seems counterintuitive.

3. What core shape is the best?

Remember, this report compares the Lane #1 Diamond Core (modeled as double base facing cones) to the basic shapes of cylinders, spheres, and cubes that are often the basis of bowling ball core designs – this scientific exploration was all about highlighting the differences that the shape of a core will produce. This research report shows advantages in the motional energies available for pin carry over those of the basic core shapes. We have confirmed that a diamond core will have more rotational kinetic energy than the basic core designs studied with equivalent measurements and motional conditions.

The percent increase in rotational energy of the cores was produced in this report and is summarized in Table 1. The table shows that cores of equivalent mass and size rotating about an axis at the same rotational velocity will have differing rotational energy based solely on the distribution of mass about the rotational axis. You can clearly see from the numbers that the diamond core shape has a rotational advantage over the other shapes as each calculation shows an increased percentage of the diamond core versus the basic shapes. You will notice a cube core is vastly different in its rotational dynamics.

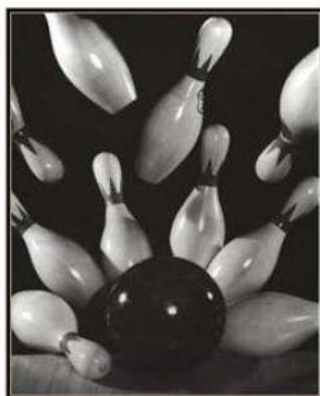
Table 1: Core Shape Comparison Summary

Core in Comparison	Rotational Energy % Increase Range ¹
Diamond Core vs. Sphere Core	25% - 50%
Diamond Core vs. Cylinder Core	20% - 50%
Diamond Core vs. Cubical Core	200% - 260%

¹ % Increase based on equivalent core size, mass, and rotational velocity. The range indicates the cores having various possible rotational axes.

4. In simplest terms, what does all this mean?

All things being equal in terms of core design except for the core shape, then it would theoretically appear that a diamond core (double-right-cone shape) would have a mechanical energy advantage once rotating. Most of this extra energy is stored in the rotational aspect of the core since the moment of inertia for a spinning diamond core shape is greater than that of the other basic core shapes.



Now, the reported results are what drives ball manufacturers to design cores of different shapes, densities, and masses. Ball designers are trying to find and use different aspects of energy distribution among the various engineering aspects (cores, covers, etc) of the ball design in hopes of finding the magic combination to enhance the performance of a bowling ball. A theoretical difference in core design in regards to ball performance makes sense. Manufacturers have discovered that the core shape, size, and mass can affect the ball roll and spin. Thus, there is a rush in trying many different styles of core designs.

5. What can be concluded about the Lane #1 Diamond Core?

Performance & scoring is all about the energy that a bowler can impart and give to a bowling ball as it hooks and travels down the lane and releases as it collides with the bowling pins. If you are looking for a bowling ball to use for a wide variety of conditions then Lane#1's designed diamond shaped weight blocks are a valuable tool for many bowling styles because the unique diamond shape effectively and efficiently takes dynamic advantage of the many physical laws that govern the performance of a bowling ball.

