The Science Behind Swing Bowling

Long Form / Horizontal Format:

It’s time for pace bowlers to set the stage ablaze!

And what better way to enthrall the crowd than with swing bowling?

So what exactly is swing bowling and how does it work?

In swing bowling, the bowler controls the ball's trajectory by utilizing the influence of airflow…

…to essentially “swing” the ball.

So as soon as the ball pitches, it either swings in towards the batter or away from the batter.

When the ball swings in towards the batter, the bowler is said to have bowled an in-swinger.

And when the ball swings away from the batter, the bowler is said to have bowled an out-swinger.

For amazing swing deliveries, bowlers depend on the texture of the ball.

Have you noticed that pace bowlers usually rub the ball against their clothing every now and then?

That’s to polish one side of the ball, so that it remains shiny on one side and the other side stays rough.

So then, how do bowlers manage to actually swing the ball?

The trick behind it is explained by science!

Let’s say a right-handed batter is facing a right-arm swing bowler.

The bowler aligns the ball like this…

…with the shiny side of the ball on the right, the rough surface of the ball on the left, and the seam slightly angled away from the batter.

The ball, as it moves through the medium of air, is enclosed in a pocket of air.

The ball splits the airflow into two streams at the seam —

one stream going down the shiny surface and the other going down the rough surface.

The air that flows down the shiny side has a smooth or a laminar flow.

Laminar flow is when a fluid like water or air flows in nice, neat layers without mixing up.

But the air that flows down the rough side has a turbulent flow.

Turbulent flow is where a fluid like air mixes up and flows in a rough, haphazard manner.

So due to the differences in airflow, the air on the shiny side is smoother and faster compared to the air on the rough side.

And as air flows faster on the shiny side, it separates early from the ball,

compared to the separation that occurs on the rough side.

Because airflow separates faster on the shiny side, it exerts a side force…

…making the ball swing towards the rough side.

So for a right-handed batter, this ball will be an out-swinger.

Similarly, if the bowler aligns the ball with the rough surface on the right, the shiny surface on the left, and the seam slightly angled into the batter like this…

…the ball will likely be an inswinger for the right-handed batter…

…as the air flow being smoother on the left and separating faster from the ball, exerts a force that swings the ball towards the rough side on the right.

Apart from the in-swinger and the out-swinger, there's yet another very skilled swing technique known as the reverse swing.

The reverse swing is possible when the ball is quite worn out, typically after 35 to 40 overs.

At this time, one surface of the ball is rough…

but the other surface is super rough.

As the ball travels through the air, the super rough side creates an even more intense airflow turbulence compared to the rough side.

With the turbulence being that high, airflow cannot hold on to the ball and separates quickly,

even before separation can occur on the less rough side.

This causes the ball to swing towards the super rough side as against swinging towards the less rough side in conventional swing…

…leading to a reverse swing.

The batter may be expecting an in-swinger but might instead be delivered an outswinger in the fraction of a second that the ball moves through the air.

So there's incredible science working behind the technique of swing bowling.

And as the texture of the ball is important in swing bowling, other factors also impact the swing of the ball.

Certain conditions of the pitch can aid in maintaining the texture of the ball.

If the pitch is grassy, the ball can grip the surface of the pitch better…

…leading to more roughness on one side.

Now you know the secret of swing bowling.

Do you know what kind of swing it is when the ball turns in towards the batter?

Make sure to tell us in the comments below!