

The cricket ball is a weather cock!

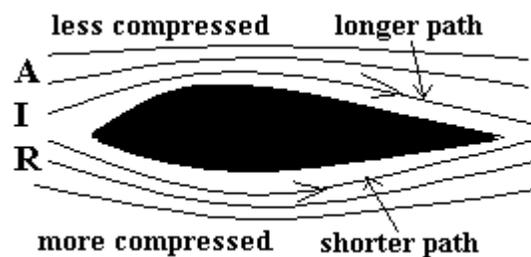
In the world cup series just over, we heard of the night play having helped pace bowlers. How could that be, asks S.Ananthanarayanan.

It is because a cricket ball can be like an aeroplane wing and a skilled bowler can work like the pilot.

Aeroplane wing has a special shape

The shape of the aeroplane wing helps it experience ‘lift’ when it cuts through the air during flight. This happens because the cross section of an airplane wing, like we can see in the picture, is slightly longer around at the upper surface than the lower surface.

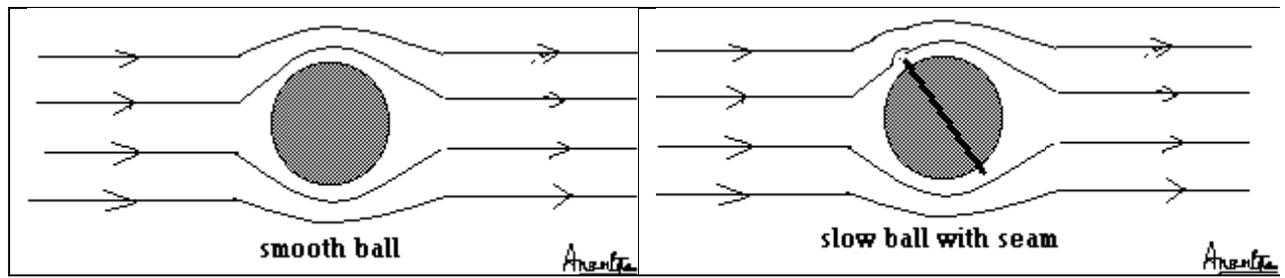
When the wing moves through the air, the air above the wing needs to rush past a little faster than the air below the wing. The result is that the air above is ‘stretched out’ and at a lower pressure than the air below – which gives rise to an upward ‘lift’.



Aero plane wing

And the cricket ball?

As the cricket ball is shaped the same on all sides, exactly the same thing as with the aeroplane wing is not possible with the cricket ball. Nevertheless, something akin is achieved with the help of the ‘seam’ of the cricket ball. As we can see in the picture, the air would move smoothly, and at the same speed, all around a smooth round ball in flight. Even when there is a slight deformity on one side, which is because of the seam being against the direction of motion of air at that side, the air would just smoothly clear the deformity and there would be no ‘aeroplane wing’ effect.



But if the ball is thrown really fast, then, the flow past the deformity is not smooth and the air breaks into eddies and ‘roughness’, known as ‘turbulence’. This is something like the spiraling ‘whirlpools’ and froth that we see when we draw a stick quickly through water.

<p>When this happens, there is a difference between the flow of air on the smooth side and the ‘seam’ side, and a difference in pressure. The lower pressure is on the seam side and the ball ‘swings’ towards that side.</p>	
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	<p>The fast bowlers’ skill</p> <p>As this effect starts only when the ball is moving pretty fast, swinging the ball in the air is usually the domain of the fast bowler. One problem in this is that when a ball is just thrown, even if it is fast enough, the seam would not just align itself in the desired direction. To make this happen, the bowler needs to throw the ball with the seam held just right and also to impart some spin, to the seam itself, so that the orientation of the ball stays stable. This is something like the spinning wheel of a bicycle keeps the bicycle steady by turning, to right itself, in case the bicycle tilts! The ball stays steady, like a gyroscope.</p>
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But what of the night-time play?

The exact speed at which the flow around the seam becomes turbulent is sensitive to the temperature and the humidity of the air. Fast bowlers are known to be able to work many wonders when playing near the sea and in moist weather. As the ball loses speed in the course of its flight, a skilled bowler can time the moment during its flight when the swing begins and make the ball cut in late in the flight and take the batsman by surprise. During night play in the World Cup, in South Africa, temperature drops and the weather becomes damp. Playing pacers may prove tricky!