*International Journal of Engineering Science Invention*
*ISSN (Online): 2319 – 6734, ISSN (Print): 2319 – 6726*
*www.ijesi.org Volume 2 Issue 4 ǁ April. 2013 ǁ PP.48-51*

# How Vehicle Can Move Faster On The Road With Less Consumption Of Fuel?

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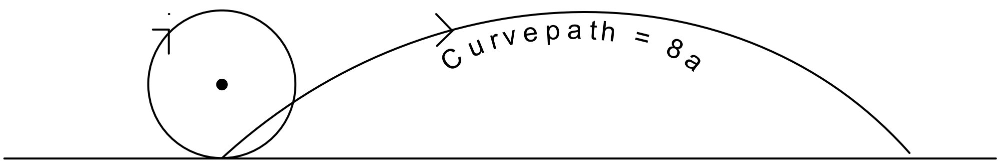
A bird flies making curves in air by its wings. A fish swims making curves in water by its fins. Similarly a vehicle moves on the road making curves by its wheels. This implies that everybody moves from one place to another by making curves on any medium of path.

When a wheel rolls on the road, a point on the wheel, which touches the road moves vertically on a curved path to cover horizontally a straight line path in one rotation. The curved path is a cycloide, whose length is calculated, by the length formula of calculus as 8a. A wheel covers $2\pi$a distance on a horizontal path in its every rotation, where 'a' is the radius of the wheel, which generates the cycloide. The cycloide is an arc of a circular path, whose radius is 'r'. A wheel moves on the road by making curve in its every rotation. This implies that a point on the wheel which touches the road moves on it by making curve in its every rotation.

From the above fact a theory can be derived as follows:

**CURVE THEORY:** *Every Body Moves Vertically More Distance On A Curved Path To Cover Horizontally Less Distance On A Straight Line Path.*




**Straight line path = $2\pi$a**

The law of motion on the road is applicable to the motion in air and the motion in water.

A vehicle can not move on a curved path without a centripetal force. The centripetal force acts along the radius and towards the centre of the curved path. The natural tendency of a body is to move uniformly along a straight line. While moving along a curve, the body has a constant tendency to regain its natural straight line path. This tendency gives rise to a force called centrifugal force, which makes the body to move along a straight line. This force acts along the radius and away from the centre of the curved path. The centripetal force $\frac{mv^2}{r}$ takes the point of the wheel, which touches the road vertically, to a distance 8a in the curve, but in the same time the centrifugal force $\frac{mv^2}{r}$ the same point horizontally to a distanced of $2\pi$a. The centripetal force and centrifugal force are equal in magnitude and opposite in directions. So each one of the two forces should move equal distance, but the curve length is greater than the straight line length. 8a>$2\pi$a and 8a-$2\pi$a =

$$(8-2\times\frac{22}{7})a=\left(\frac{56-44}{7}\right)a=\frac{12}{7}a.$$

This implies that some amount of centrifugal force could not be used for which $\frac{12}{7}a$ distance could not be covered by this force horizontally on a straight line. As the magnitudes of the two forces are equal;

So 8a distance should be covered by the centrifugal force $\frac{mv^2}{r}$.

1 unit of distance will be covered by $\frac{mv^2}{8ar}$ Centrifugal force

$\frac{12a}{7}$ unit of distance will be covered horizontally by $\frac{mv^2}{8ar} \times \frac{12a}{7} = \frac{3}{14}\frac{mv^2}{r}$ Centrifugal force = $\frac{3}{14r} \times 2 \times \left(\frac{1}{2}mv^2\right) = \frac{3}{7r}$ Kinetic Energy, where ½ $mv^2$ = KE

Hence $\frac{3}{14}\frac{mv^2}{r}$ centrifugal force is obtained from $\frac{3}{7r}$ Kinetic Energy.

So in every rotation of a wheel $\frac{3}{7r}$ Kinetic Energy is conserved with it to take the vehicle to a distance of $\left(\frac{12}{7}a\right)$ in the next rotation of it. The conserved kinetic energy $\frac{3}{7r}$, which takes the wheel to $\left(\frac{12}{7}a\right)$ distance is called the inertia of motion. Hence a body which moves 8a distance in a curved path to cover 2πa distance on a straight line path haves the inertia of motion. The ratio of the curved path length to the straight line path length = 8a:2πa=8:2π = $8:2\times\frac{22}{7} = \frac{8x7}{7}:\frac{44}{7} = 56:44 = 14:11 =$ The ratio of the topside length of a body to the bottom side length of the body. When a wheel moves on the road ,it makes cycloid curve in its every rotation. The curve length is more than the straightline length of the cycloid. The wheel moves opposite to the direction of air motion.

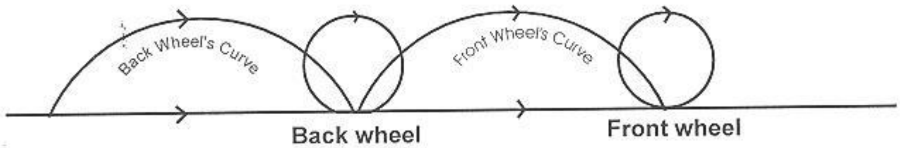
The air moves more distance on the curved side than the straightline side distance in the same time. The velocity of air is inversely proportional to the pressure of the air. So,the velocity of air on the curved side is more than the velocity of air in the straightline side. That is why the pressure of air is less on the curved side & the pressure of air is more on the straightline side. As a result the direction of resultant pressure is from the road to the vehicle. For this reason the vehicle becomes lighter when moves on the road.

There are three cases of inertia of motion of a vehicle. The inertia of motion depends on the distance between the front wheel and the back wheel of a vehicle. The three cases are $d=2\pi a$, $d > 2\pi a$ and $d < 2\pi a$ where d = the distance between the front wheel and back wheel of the vehicle, a = radius of the wheel, $2\pi a$ = circumference of the wheel= horizontal distance covered by one rotation of the wheel

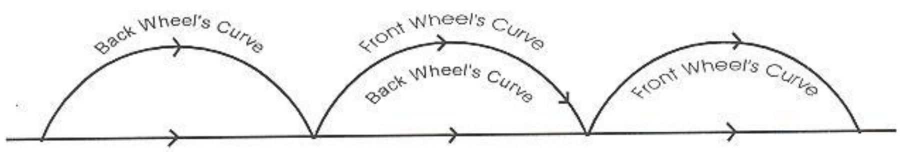
**Case - I : $d = 2\pi a$**

If the distance between the front wheel and the back wheel of a vehicle will be $2\pi a$ then the end of the $2\pi a$ distance of the back wheel will touch the begining of the $2\pi a$ distance of the front wheel as a result of which the back wheel's vertical curve will coincide the front wheel's vertical curve in the motion.

So there will be no interruption between the vertical curve of the back and front wheel as a result the inertia of motion of the back wheel will be received by the front wheel. So the vehicle moves faster with less consuption of fuel. In this case the curves of the wheel are connected to one another like the waves of the water.



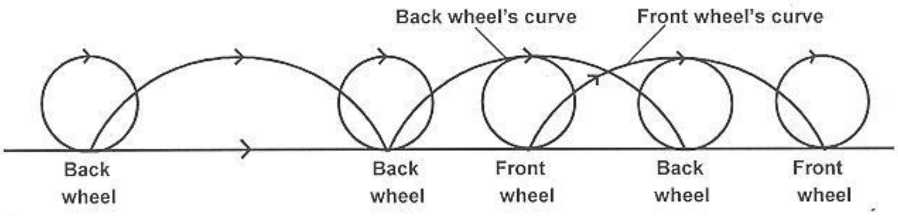

Here distance between the two wheels is equal to the circumference of the wheel.

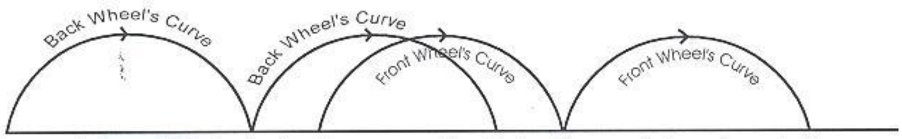



In the middle back wheel's curve and front wheel's curve coincide each other.

**Case -II : $d > 2\pi a$**

If the distance between the back wheel and front wheel is more than $2\pi a$ of a vehicle, then the inertia of motion of the back wheel can not be received by the front wheel, as a rsult of which the vehicle can not move well, because the back wheel's curve and the front wheel's curve interrupt each other in the motion.

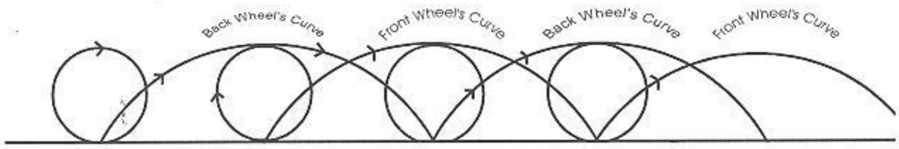


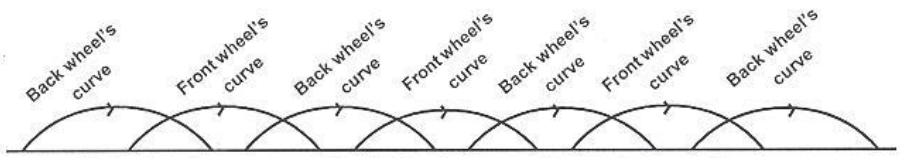




In the middle back wheel's curve and front wheel's curve interrupt each other.

**Case III : d < 2πa**

If the distance between the back wheel and the front wheel of a vehicle is less than $2\pi a$, then there will be interruption between the back wheel's curve and front wheel's curve. So inertia of motion of the back wheel will be interrupted by the inertia of motion of the front wheel, as a result of which the vehicle can not move well.




Back wheel's curves and front wheel's curves interrupt one another.

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