Technical English
Unit 6
professional English
Dimensions of circles

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A. Key dimensions of circles

- ❖An engineer is giving a training course to a group of technical sales staff who work for a tyre manufacturer. During the talk, she mentions a number of dimensions relating to circles.

- ❖Obviously, the outside edge of a tyre forms a circle, as you can see in this simple diagram.

circumference of outside of tyre

radius

diameter of wheel

diameter of tyre
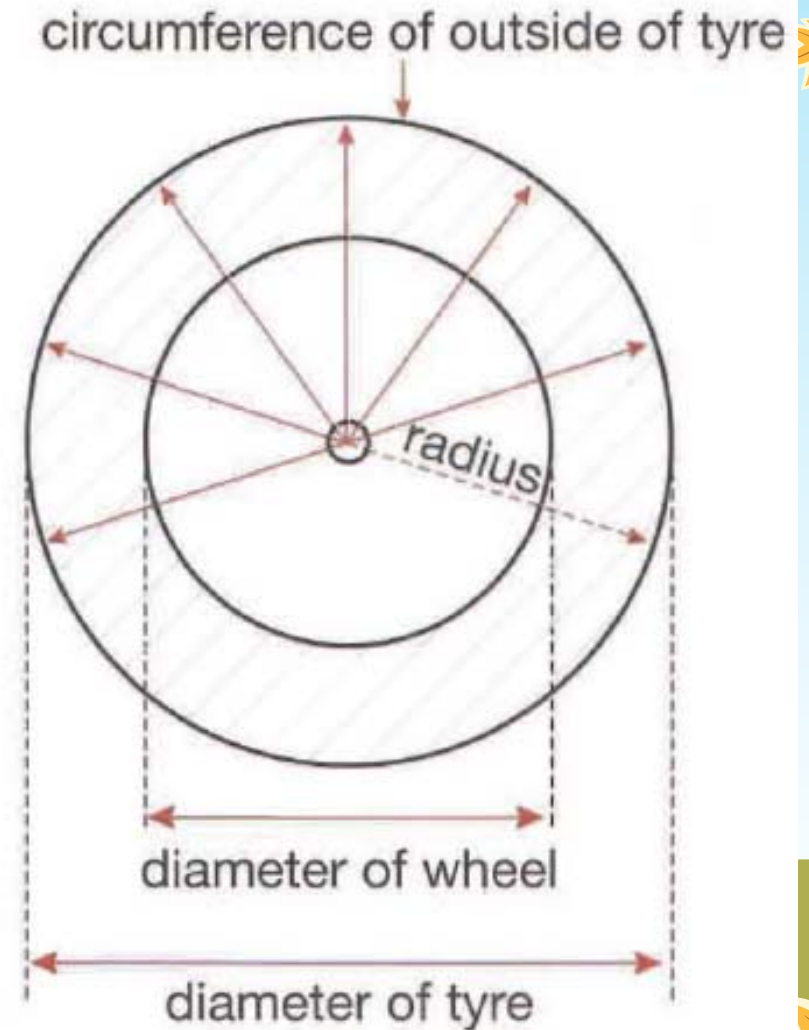
A. Key dimensions of circles

❖ The outer circle in the diagram is the outside of the tyre, and the inner circle - the circle with the smaller diameter - represents both the inside of the tyre and the outside of the wheel.

❖ And, clearly, the inner circle is right in the middle of the outer circle - it's exactly in the centre. So because it's central, that means the inside and outside of the tyre form concentric circles. And as the tyre is circular, simple geometry tells us that measurements of the radius, taken from the centre of the circle to different points on its edge - points on the circumference- are equal. All the radii are the same. In other words, the tyre has a constant radius.'

A. Key dimensions of circles

❖ But when a tyre is fitted to a vehicle, it's compressed against the road surface. That means its geometry changes.

❖ So while the wheel - the inner circle - obviously remains **round**, the circumference of the tyre - the outer circle - changes shape. It **deforms**.
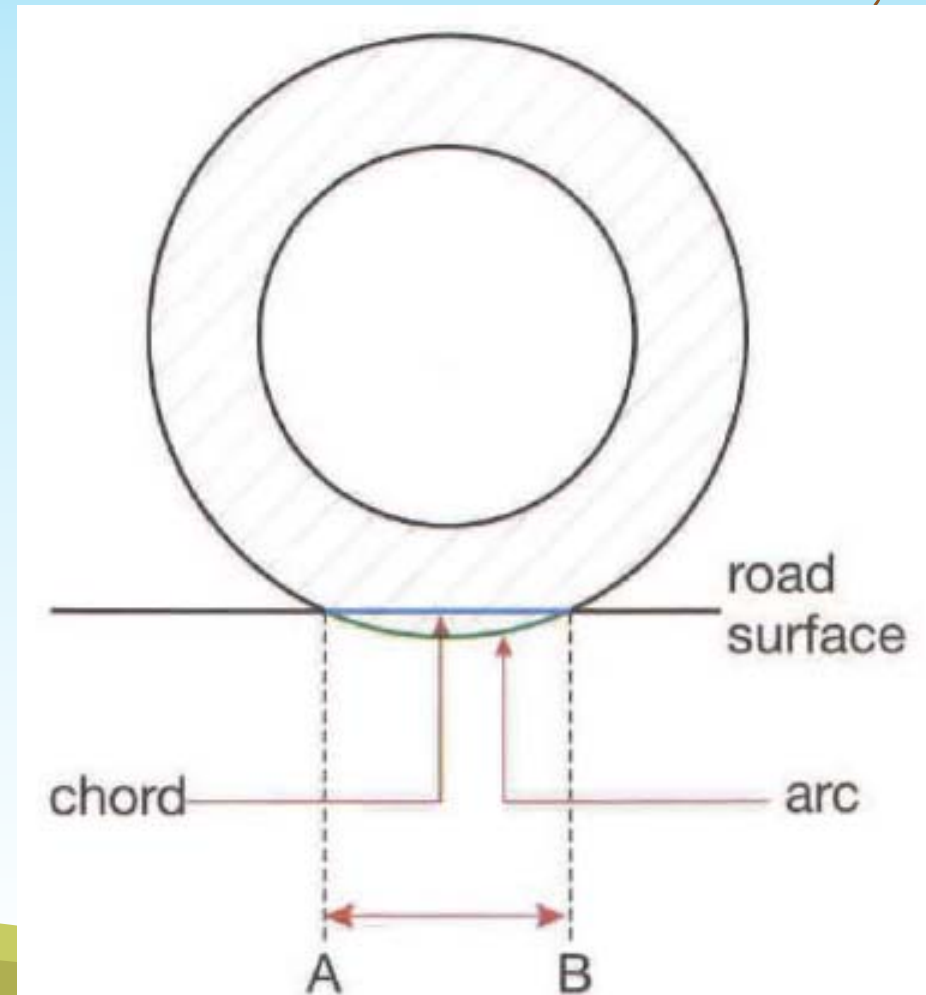
A. Key dimensions of circles

❖ Before **deformation**, this part of the tyre forms an arc of the circle, between points A and B. So, as you can see in this diagram, it's not a straight line - it's a **curved** line. But after deformation, it's no longer a curve. The tyre becomes deformed between points A and B. It becomes a **chord** of the same circle, forming a straight line between A and B.

❖ However, the length of a chord and the length of an arc, between the same two points on a circle, are different. So the design of the tyre has to allow for this change in shape- from a rounded edge to a straight edge.

B. Types of views used on drawings

- Technicians are discussing different views shown on drawings (looking at components from above, from the side, etc.), as they search for the information they require.

- In non-technical, everyday English, engineering drawings are often called plans.

- Section is the short form of cross-section, and is commonly used in technical contexts.

- Two-dimensional and three-dimensional are often shortned to 2D and 3D.

B. Pipe dimensions

- Specific terms are used to describe the circular dimensions of pipes. The width of the inside of a pipe is called the inside **diameter (ID)**. It can also be called the **bore**. The outside width is called the **outside diameter (OD)**. When pipes are laid horizontally, the top of the outside of the pipe is called the **crown**, and the bottom of the inside of the pipe is called the **invert**.
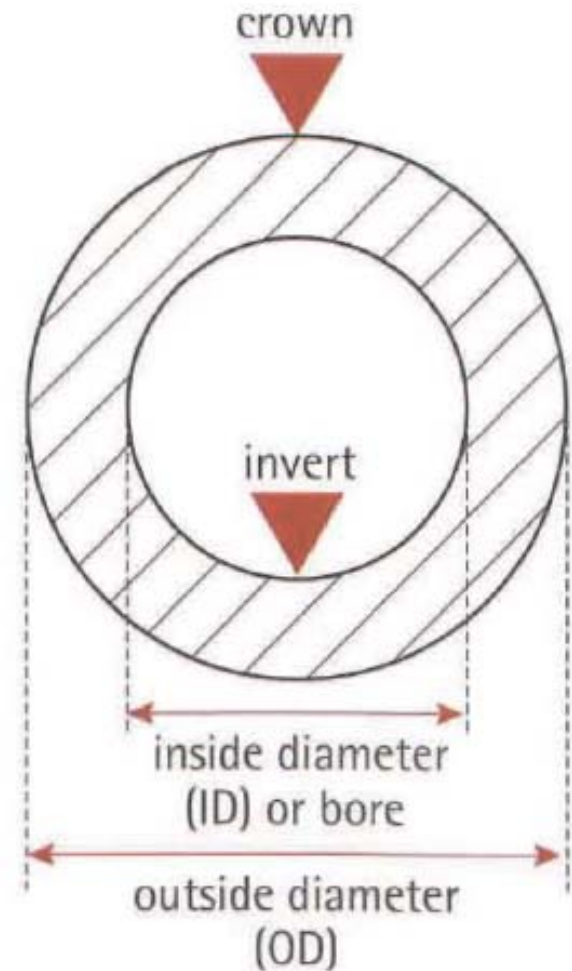
6.1 Complete the notes, made by a salesperson attending the engineer's talk, using the words in the box.

Arc, chord, circular, circumference, constant, curved, deformed, diameter, radius

Before tyres are fitted to vehicle:

— shape is round — outside edge is perfectly (1) ....

— di ...

— to ...

— all ...

1 circular	4 circumference	7 deformed
2 radius	5 constant	8 curved
3 diameter	6 arc	9 chord

are equal – tyre has (5) .... radius

— bottom of tyre is (6) .... of a circle

When fitted to vehicle, bottom of tyre is compressed and (7) ....
changes from (8) .... line to straight line. Straight line is
(9) .... of a circle.

6.2 Find words and expressions with the following meanings. One question has two possible answers.

1. the highest point of a horizontal pipe

2. the lowest point of the inside of a horizontal pipe

3. the maximum overall external width of a pipe

4. the maximum internal width between the pipe walls

1 the crown
2 the invert

3 the outside diameter
4 the inside diameter / the bore

6.3 Change one word in each of the sentences below to correct them

1. The distance travelled by the vehicle each time its wheels turn completely is equal to the radius of one of its tyres.

2. The diameter of the tyre is measured from the centre of the wheel to the outside edge of the tyre.

3. The radius of the curve in the motorway is constant, so the edges of the road follow chords of a circle.

6.3 Change one word in each of the sentences below to correct them

4. The curve in the motorway has a constant radius, so the inside and outside edges of the road are arcs of two deformed circles that have the same centre.

5. The invert is on the circumference of the external face of the pipe, and therefore cannot be in contact with the liquid flowing inside the pipe.

6. The thickness of the wall at the bottom of the pipe, plus the distance between the invert and the crown of the pipe, is equal to the inside diameter of the pipe.

Solution 6.3

1. The distance travelled by the vehicle each time its wheels turn completely is equal to the **circumference** of one of its tyres.

2. The **radius** of the tyre is measured from the centre of the wheel to the outside edge of the tyre.

3. The radius of the curve in the motorway is constant, so the edges of the road follow **arcs** of a circle.

4. The curve in the motorway has a constant radius, so the inside and outside edges of the road are arcs of two **concentric** circles that have the same centre.

5. The **crown** is on the circumference of the external face of the pipe, and therefore cannot be in contact with the liquid flowing inside the pipe.

6. The thickness of the wall at the bottom of the pipe, plus the distance between the invert and the crown of the pipe, is equal to the **outside** diameter of the pipe.