

The most common wheel diameter sizes for both road bicycles and MTB are 27.5" (aka. 650c) and 29" (aka. 700c). The 27.5" and 29" refer to the diameter of the rim in inches, where the 650c and 700c refer to the typical diameter with a tyre on in mm. The dimension that is relevant to the design of a bicycle training platform is the diameter with the wheel on, and will thus commonly range between 650 mm and 700 mm. (Montague Bikes)

2.6 Eddy Current Brake

Working Principle

An Eddy Current Brake (ECB) is a contactless braking device that consists of a stationary magnetic flux source and a moving conductor. The magnetic flux source can be from either permanent magnets or electromagnets, and the conductor typically takes the form of a rail, drum or disk. As the conductor moves through the stationary magnetic flux, it experiences a time-varying magnetic flux density. According to Lenz's law (Equation 2.3), this time-varying magnetic flux density $\frac{\delta \vec{B}}{\delta t}$ results in an electric field \vec{E} .

$$\nabla \times \vec{E} = \frac{\delta \vec{B}}{\delta t} \quad (2.3)$$

According to Ohm's Law (Equation 2.4), this electric field results in circulating currents \vec{J} within the conductor with conductance σ .

$$\vec{J} = \sigma \cdot \vec{E} \quad (2.4)$$

These circulating currents are called "Eddy-currents", and the interaction of these eddy-currents with the flux density results in a force \vec{F} that opposes the motion: (Gay, 2005)

$$\vec{F} = \vec{J} \times \vec{B} \quad (2.5)$$