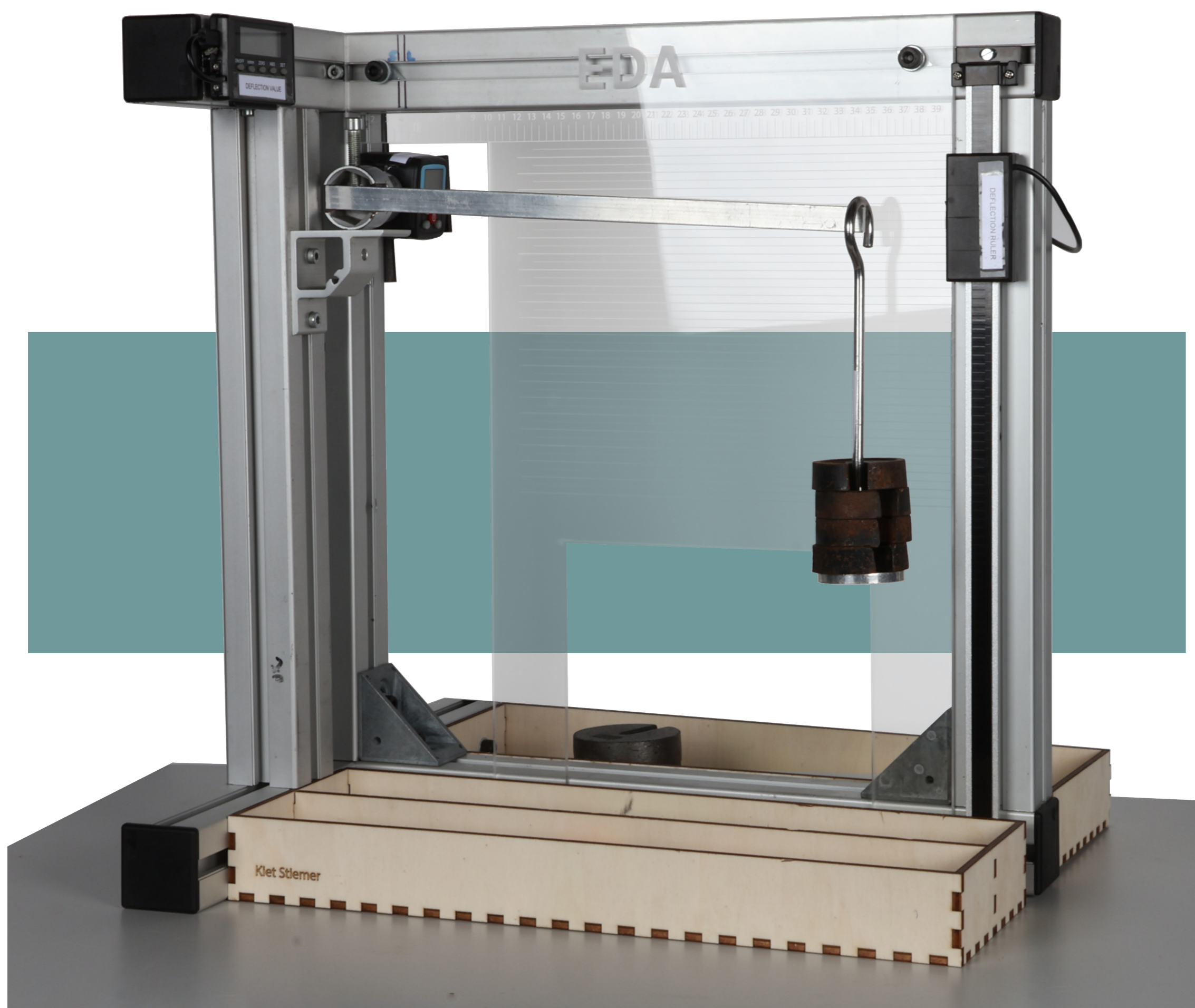


Educational Deflection Analyser

Improving mechanics education with an experiential machine



During the course **Understanding Product Engineering** at the IDE faculty, basic engineering principles are thought, however **time is limited**. Moreover, these skills and knowledge are **little applied** in student design projects.

The EDA is an **experiential machine** with the aim to address the lack of practical, hands-on learning experiences in early engineering education. Its purpose is to offer first year IDE bachelor students a way of experimenting with **statics and beam deflection**.

By applying load on a fixed beam sample, we are mimicking the cantilever beam, a typical situation in statics exercises.

A reaction moment occurs in the fixed support, something that is experienced as an abstract principle by students. The EDA has a moment sensor in the support to be able to play around with this. The prototype allows the user to measure the deflection caused by the load, and compare this to theoretical values calculated with common deflection formulas.

The common formula for the cantilever beam is shown below and lends itself well to learn relevant influences in product design.

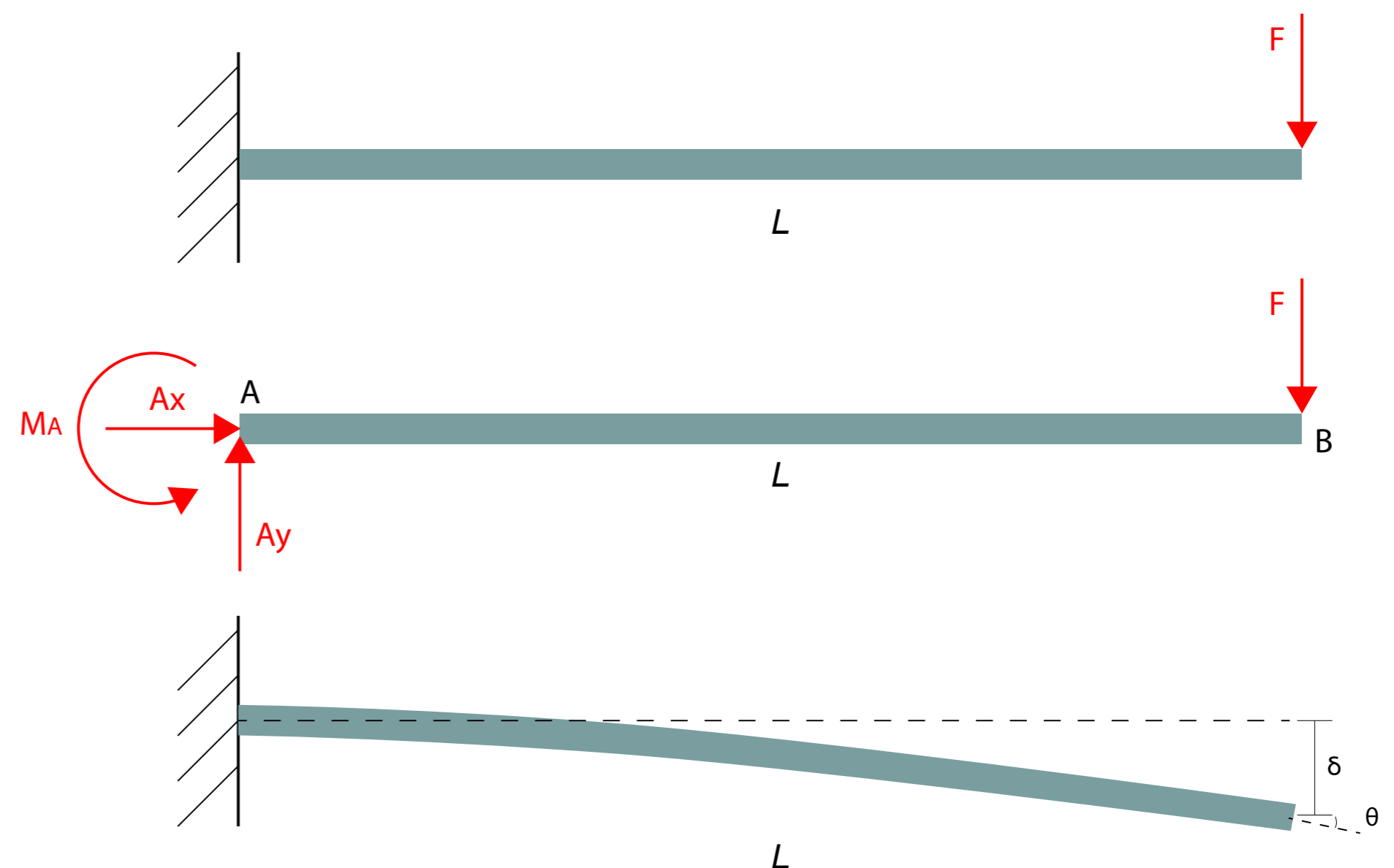
Force: external loads

Length: dimensions

$$\delta = \frac{FL^3}{3EI}$$

Stiffness: material

Inertia: geometry



Guided by the Productive Failure learning approach, the EDA is part of a workshop assignment. This is evaluated with the end user and leads to the conclusion that with continued development, the EDA holds the potential to become an effective learning tool in the future to make engineering education enjoyable and see the application reflected in design projects.

