

Every Gram Counts Above the Clouds



Scales are used to determine the weight of an aircraft. But that is not all. Bertrand Piccard's solar-powered aircraft and a 270-ton Airbus have something in common: they both need scales to achieve stable, balanced flight.

The first pilots in aviation history more than 100 years ago were visionaries with the goal of defying gravity in their "heavier than air" machines. Bertrand Piccard and Andre Borschberg could be called the spiritual heirs of these pioneers.

Solar Impulse an investment in the future

Piccard is the initiator and president, while Borschberg is CEO of the Solar Impulse enterprise. Their goal? To circumnavigate the Earth without any fuel, using only the power of the sun. To achieve this goal, their 70-man team constructed the Solar Impulse, a solar-powered aircraft with the wingspan of an Airbus A 340 and a weight of 1,600 kg. Around 12,000 photovoltaic cells spread out over a wing area of 200 m² almost twice the area of an Airbus A 320 transfer solar energy to four electric motors. Each of these motors generates around 8 hp, which should be enough power to keep the Solar Impulse airborne during the night.

Three scales to determine the center of gravity

Their weight also plays a key part here. Every modification to the carbon fiber fuselage of the solar-powered aircraft also alters its weight, which is why the engineers regularly weigh the aircraft. During every weighing process, they determine the aircraft's unladen weight and its center of gravity. Without precise knowledge of this center of gravity, an aircraft is uncontrollable. If the center of gravity is too far behind the main wing, the aircraft's path will resemble that of a rollercoaster. If it is too far forward, the aircraft will simply crash. The Solar Impulse is positioned on three scales to determine its unladen weight and center of gravity. The main scale is positioned beneath the nose gear, with another scale positioned beneath the tailwheel unit and one beneath the main wing. The scales used are the WMH weighing platforms from METTLER TOLEDO.

As supplier to the project, the precision instrument manufacturer shares the vision of the Solar Impulse circumnavigating the world without any fuel - a project that will surely also help raise awareness for the immense potential of renewable energies.

Industrial scales at Airbus

The Airbus example serves to underline importance of scales, not just for lightweight solar-powered aircraft, but also for commercial airliners. There are three reasons why a 270-ton passenger aircraft needs to be weighed. Firstly, airline operators purchase aircraft on the basis of a specific weight, which is contractually fixed. The weighing process therefore serves to confirm this contractually agreed weight. Secondly, the weight is critical for measuring fuel consumption. To this end, an aircraft is weighed with maximum payload and full fuel tanks prior to a test flight. Once the test flight is completed, the aircraft is weighed again to confirm the kerosene consumption recorded by the measuring instruments. The third reason why aircraft are weighed just like the Solar Impulse is to determine their center of gravity. This information is absolutely vital for all airlines, as this is the only way for passengers and freight to be evenly distributed within the aircraft and thereby enable stable flight.

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