

# Excavating 2020 style

Code-named the "SfinX Project," Volvo Construction Equipment (CE) has come up with a glimpse of how excavators may evolve over the next two decades. The result is more revolution than evolution.

Naturalist Charles Darwin first came up with the idea that species evolved slowly over millions of years, and that only the fittest survived. If a team of designers from Volvo Construction Equipment and Perspectives Design are to be believed, evolution itself has evolved, with "super machines" produced in as little as 20 years. Such is the result of the SfinX Project: to design the excavator of the 2020s. Although the shape is recognizably prehistoric, the total package is space-age hybrid, incorporating the latest research and inventing some of its own.

"Productive, smart, and hungry to dig" is the way I describe the futuristic SfinX excavator. Like the guardian of the Great Pyramid at Giza itself, the SfinX is purposeful and a little mean-looking—although it remains a Volvo and needs to be environmentally friendly.

While still recognizable as an excavator, almost every component has been radically altered. The engine is no longer diesel but a small fuel cell that produces electricity and emits only heat and water vapor. This design frees up space in the superstructure and allows the engine to perform as an active counterweight, which moves in and out to compensate for the forces on the boom.

The use of electrical power is not restricted to the engine. Hydraulics are largely replaced in the SfinX excavator, removing the need for piping fluid around the machine, and reducing the need for hydraulic rams. Instead, electric motors drive the four tracks and the main boom. The boom features a lattice design that is low in mass and allows the operator to see through it, thus reducing the

blind spots caused by solid booms. The four tracks allow the excavator to keep a much higher contact area with the ground than is possible with traditional twin tracks. Each of the tracks has independent suspension and can brake, turn, and accelerate, delivering greater comfort, maneuverability, and control.

Among the SfinX's many innovative ideas that the current generation of excavator operators will have to wait for is a main swing bearing (between the undercarriage and the superstructure) that uses an electromagnetic field. A bearing with this technology would have zero friction and make braking extremely smooth while allowing high-speed turning of the superstructure.

Perhaps most interestingly, the cab can be moved up and/or outwards to allow a good view of the work area, or be left on the ground when working in dangerous locations or even underwater. With the cab being the operator's workplace, we put no limits on our imagination. New concepts are continuously under investigation and taken to the extreme—the cab could come down to the ground in the morning to greet the operator.

Some of the technology needed to actually build the SfinX excavator is close to being reality today, while others may never happen. But what the designers have proven is that the process of evolution is alive and well at Volvo CE and that the latest thinking will help to maintain the survival of the fittest in construction equipment. The actual machines available in 2020 may look radically different to the SfinX design study. But SfinX is our concept lab. That's where we test ideas. We don't know how much of what we have imagined will end up in future machines, but what we do know is that we need to stimulate our vision of the future to develop genuinely new concepts. **OHE**



by **Lorenzo Terreno**, Vice President Product Portfolio and Advanced Engineering at Volvo Construction Equipment



Volvo CE concept excavator



Electric motors drive the tracks