

Hycrete

A late bloomer finds a market for his grandfather's waterproof concrete

U.S. It wasn't until his grandfather Michael Rhodes died in 2002, at age 82, that David Rosenberg gave up his career as a competitive fencer and put his M.B.A. to work turning the scientist's invention into a bona fide business. "I wanted to carry on his legacy," says Rosenberg, 35.

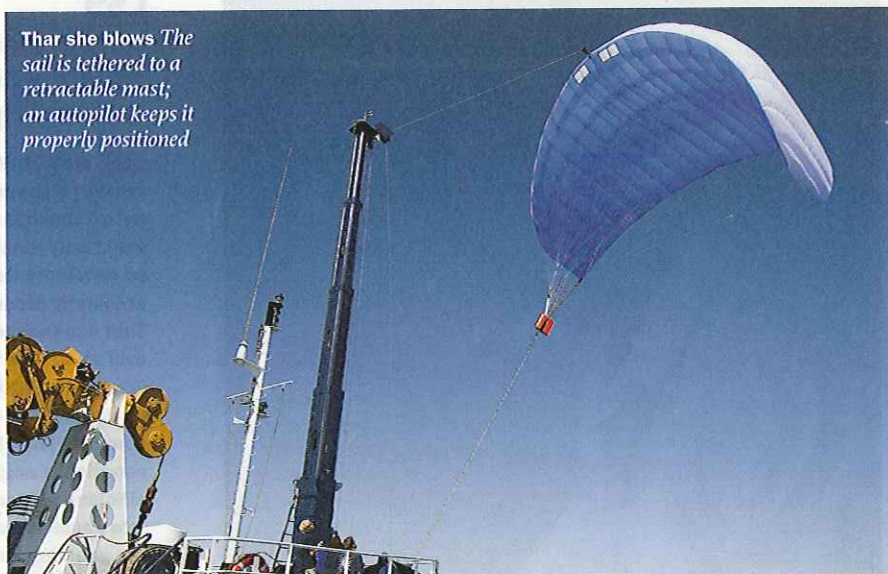
Rhodes, who was a chemist by training, had devised a water-based liquid in 1994 that makes concrete waterproof. Called Hycrete, short for hydrophobic concrete, the substance is added to concrete before it dries. Hycrete is a modified water molecule that, once it dries, takes on the properties of oil in order to repel water.

Conventional waterproofing involves wrapping dry concrete in a layer of plastic or tarlike material; mixing in Hycrete takes just a few minutes. Not only does this speed construction, but it's also more eco-friendly. "Twelve percent of landfill is concrete," says Rosenberg, because regular waterproofing makes it difficult to recycle.

Hycrete-infused concrete can be broken down and reused as raw material (along with cement, water and sand) to make more concrete. The product has been used in everything from a birdbath at the Bronx Zoo to a fountain in the Seattle Olympic Sculpture Park. Although Rosenberg's fencing career was foiled, he admits that Grandpa would have been "extremely excited" to see his work come to fruition.

—By Anita Hamilton

That she blows The sail is tethered to a retractable mast; an autopilot keeps it properly positioned



SkySails

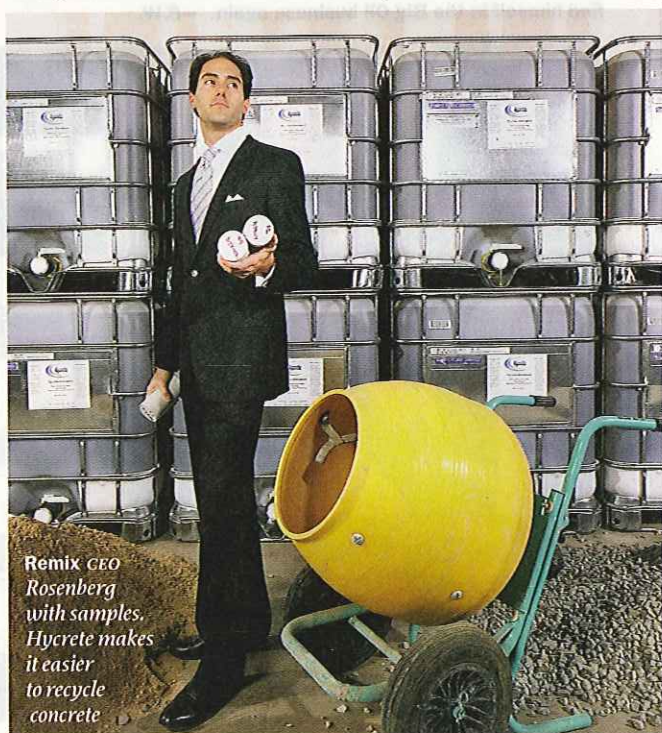
A new twist on an ancient—and green—technology can improve fuel efficiency for ships

GERMANY Love your yacht but worried about your carbon footprint? Do you fancy a nonstop trip from the Mediterranean to the Caribbean without troublesome refueling?

It might be time to upgrade. Way up. SkySails has devised a solution that allows you to glide across the oceans while saving up to 35% in fuel costs. A giant kite floating high above the boat provides the propulsion, if the winds are favorable, to keep it moving. Designed for cargo ships, the SkySails technology combines the attributes of sail- and motorboats. The parachute-like sail produces about four times as much energy as that on a regular sailing ship and, with winds of 8 m.p.h. (7 knots) or more, can be used to relieve the main engine. Crossing under bridges isn't a problem either, since the SkySails sail, unlike the regular kind, has no fixed mast and can be retracted quickly. There is also a safety advantage, since the uplifting force of the kite prevents the ship from listing too much.

Like Benjamin Franklin, SkySails inventor Stephan Wrage had his epiphany while flying a kite. "I started sailing at an early age, and I also liked to build kites," he says. "At some point—I must have been 14 or 15—I thought to myself, there must be a way to put the enormous energy of a kite into a boat." One of the biggest challenges was the problem of how to get the kite into the air and keep it there. This was solved with the help of a telescoping mast at the ship's prow, which lifts the kite into the air. There, with the wind streaming in, the kite unfolds like a huge accordion. An autopilot calculates wind force and direction, ship route and speed and makes sure the sail is optimally positioned.

The first cargo ship with a SkySails kite is scheduled to be launched on Dec. 15. Wrage's long-term goal is to install kites measuring 2,500 to 5,000 sq m on cargo ships more than 300 m in length. Ship traffic produces up to 800 million metric tons of CO₂ annually worldwide. The company figures that retrofitting all suitable ships could save about 18% of that, or an estimated 144 million metric tons of CO₂ a year. —By Stephanie Kirchner



Remix CEO Rosenberg with samples. Hycrete makes it easier to recycle concrete

FROM TOP: SKYSAILS; CHRIS MUELLER—REUTERS/GETTY IMAGES