

Lady Liberty Gets An Oil Change

Soybean oil isn't just for cooking anymore. Agricultural Research Service (ARS) scientists have figured out how to turn soy oil into a new kind of hydraulic fluid to help run elevators.

ARS chemist Sevim Erhan's lab created the soy-oil-based elevator fluid at the request of Jeff Marrazzo. He's the building and utilities foreman for the National Park Service on Liberty Island in New York Harbor.

The Park Service had been running the Statue of Liberty's only elevator with a petroleum-based hydraulic fluid. Marrazzo was concerned about pollution from accidental spills and leaks, so he asked Erhan whether a vegetable oil-based fluid could work just as well.

Marrazzo knew that in case of a spill or leak, plant-based products can be broken down by hungry microbes already in the soil, so there's less worry about pollution. But vegetable oil by itself isn't a suitable hydraulic fluid, says Erhan, at ARS' National Center for Agricultural Utilization Research in Peoria, Illinois.

To tackle the problem, Erhan's team studied how petroleum-based elevator fluids are "built" chemically and how they actually work—for example, how they transfer heat from moving parts. Using this information, they came up with ways to make changes in soy oil so that it would work in the same way.

Many crops, including sunflowers and corn, produce oil that's good enough to eat. Erhan chose soybean oil because it doesn't cost much, it has very high quality, and there's plenty of it—it's a "home-grown" resource because you can always plant more soybeans!

Erhan's unit teamed up with AgriLube, Inc., of Defiance, Ohio, to make the soy-based elevator fluid and to test its safety and performance. Results from those tests show the soy-based fluids work as well as, or better than, the petroleum-based ones. One advantage of the soy-based fluid is that it's slower to catch fire when exposed to a flame—a phenomenon called "flash point."

Marrazzo says the Statue of Liberty's elevator has been successfully running on a 1,000-gallon batch of the soy-based fluid since November 14, 2002.

AgriLube, meanwhile, has asked ARS for licensing rights to commercially make the soy-based elevator fluid.

- By [Jan Suszkiw](#), [Agricultural Research Service](#), Information Staff