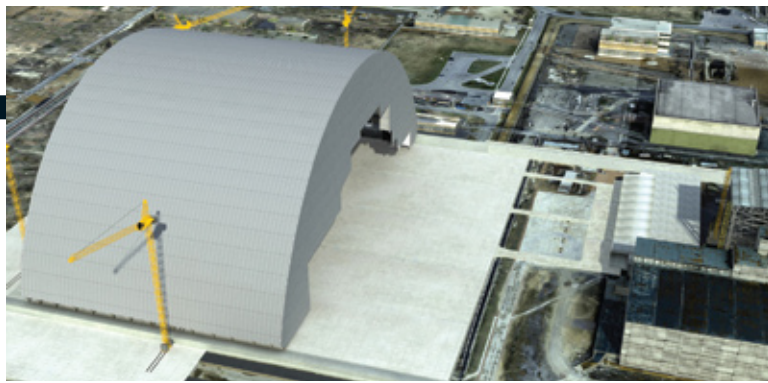


ENVIRONMENTAL ENGINEERING

Steel Rainbow

Twenty-five years after Chernobyl, the world's largest movable structure is set to seal off the failed reactor for good



Imagine a metal arch that, at its highest point, is taller than the Statue of Liberty. Now picture it sliding along the ground for a distance of about three football fields, making it the biggest movable structure ever built. Under this steel rainbow, engineers are planning to entomb the site of the worst nuclear accident in history, at the Chernobyl power plant in the Ukraine, using robotics to dismantle the ruins

and permanently seal the wreckage. After reactor number 4 exploded at the plant on April 26, 1986, sending radioactive dust as far as Japan and the U.S., the Soviet Union put up a structure of steel and concrete, commonly known as the sarcophagus, over the reactor to contain the radioactivity. "It was really quite a remarkable feat, but after 25 years, it's in danger of collapse," explains civil and environmental engi-

neer Eric Schmieman of the Battelle Memorial Institute. The structure, which was put up as quickly as possible to limit worker exposure to radiation, was never meant to last forever. It was designed "like a house of cards," Schmieman says, with pieces of metal leaning against one another and hooked together. "There are no welded joints or bolted joints—it wouldn't take much of a seismic event to knock it down."

French construction company Novarka is working on a replacement, the New Safe Confinement (NSC), which Schmieman helped to design. Because the reactor is still radioactive, architects designed the NSC with worker safety in mind. The arch will not be built over the sarcophagus but will be assembled nearby from prefabricated segments. Workers will use hydraulic jacks to slide the arch about 300 meters along

Teflon bearings until it covers the sarcophagus. Once engineers seal the reactor, they will remotely maneuver three robotic cranes inside the NSC to dismantle the sarcophagus and reactor and to clean up any leftover radioactive dust. Novarka aims to finish fabricating the NSC by the summer of 2014, at a cost of \$2.1 billion from 29 countries. It is expected to last at least 100 years.

—Charles Q. Choi

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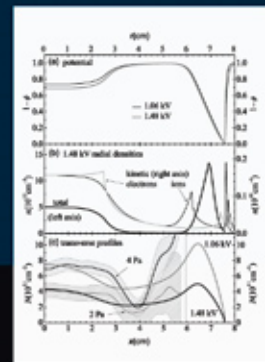
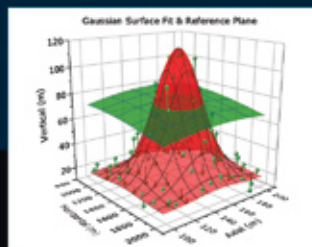
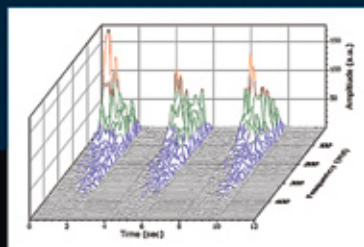
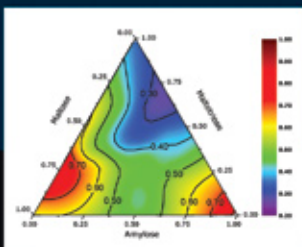
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