Out of the night, a new runway

By Otto Pohl

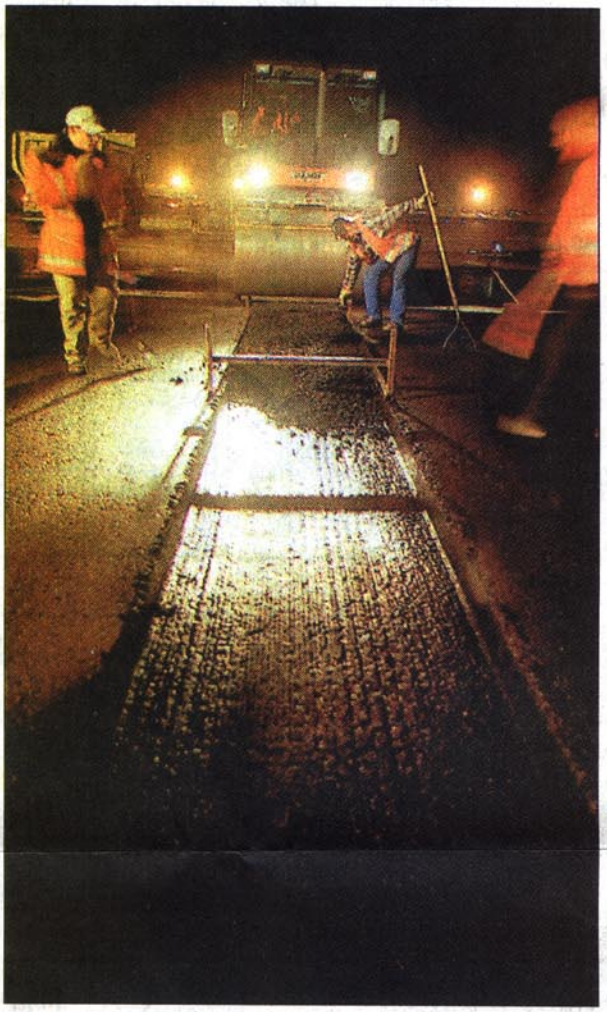
FRANKFURT

There is a nightly lull in take-offs and landings at the airport here, but the quiet is misleading. By 10:30 p.m. Frankfurt time, there are already dozens of flights streaming in from Asia and the Americas to make dawn arrivals here.

So it might not seem prudent to use the night's brief quiet to jackhammer the runway apart. But since the airport cannot afford to close the aging runway that it must replace, it has decided to schedule all of the work in a seven-and-a-half hour nighttime window.

Over 300 nights, as planes from such destinations as Kuala Lumpur, Rio de Janeiro and Washington draw ever closer, workers remove a 15-meter section of the main runway, about 50 feet, and replace it with something that must be, by dawn, hard enough to hold a Boeing 747 and cool enough not to explode its tires.

"It's like a Formula 1 pit stop," says Gregor Rajewski, the project's manager. While airports have long done much of their repair work at night, industry experts say this is the first time an airport is attempting to replace an entire runway at night without affecting daytime traffic. And as the global transport network becomes more heavily used and increasingly interdependent, this project is seen as a likely template for other airport renovations.



A new section of asphalt is smoothed out and readied for lights.

To describe the absolute need for the work to be completed correctly and on time each night, Rajewski reaches for another metaphor. "Think of it as open-heart surgery," he says. "I need a plan B for every contingency."

Those contingencies include finding bombs under the tarmac. During World War II, the Frankfurt airport was a primary target of Allied bombing. Hasty postwar reconstruction simply paved over the detritus of war. On this runway replacement job so far, bomb squads have removed two live bombs from under the runway, which is used for 200,000 take-offs and landings a year.

So far, workers have replaced about half of the four-kilometer runway. The work is scheduled to be completed in spring 2005 at a cost of €38 million.

Airports once had enough excess runway capacity to temporarily close one for repair. That is no longer the case, and shutting down a runway can create enormous ripple effects for all the passenger and cargo traffic flowing in and out of hub airports like Frankfurt.

"More than ever, the logistics supply chain won't wait," says Paul Behnke, director of economics and security at Airports Council International, an association that represents airports. "That will drive innovative engineering and technology for putting up the infrastructure that the supply chain requires."

The runway being replaced here was built 35 years ago. The airport has carried out maintenance and expansions since then, but airport officials say it has reached the end of its useful life.

Other airports are watching the Frankfurt experiment closely. The Zurich airport also needs to replace a runway in the next few years, said Martin Pola, the airport's chief construction manager. His initial doubts about the concept have evaporated, he said, since visiting the Frankfurt site and seeing work progressing smoothly. "I was deeply impressed," he said. "Their success proves the concept."

There have been a few difficult moments. One night, the police shut down the highways around the airport in a surprise drug raid, Rajewski said. With all of their asphalt trucks stuck in the resulting traffic jams, and the morning flights approaching, Rajewski ordered construction crews to refill the hole with a temporary gravel filling, covered only by a thin layer of asphalt. The next night they were able to replace that section.

Hans-Jürgen Keller, a bomb removal expert, says the bombs under the runway do not pose any significant threat. The two he has found so far were a 50-kilogram, or 110-pound, American bomb and a 70-kilogram German bomb. The American bomb was dropped on the airport and but didn't explode, while the German one apparently never got off the ground.

As far as the airport goes, two bombs represent a fairly meager harvest. Keller has found dozens of bombs over 12 years of working on the airport grounds, he says, along with 13 engines from Luftwaffe planes, and an entire jeep in the American sector of the airport. He finds so many unexploded bullets and so much anti-aircraft ammunition that he doesn't bother keeping track of it all. "Some day they'll be done," clearing the airport, Keller said. "But I probably won't live to see it."

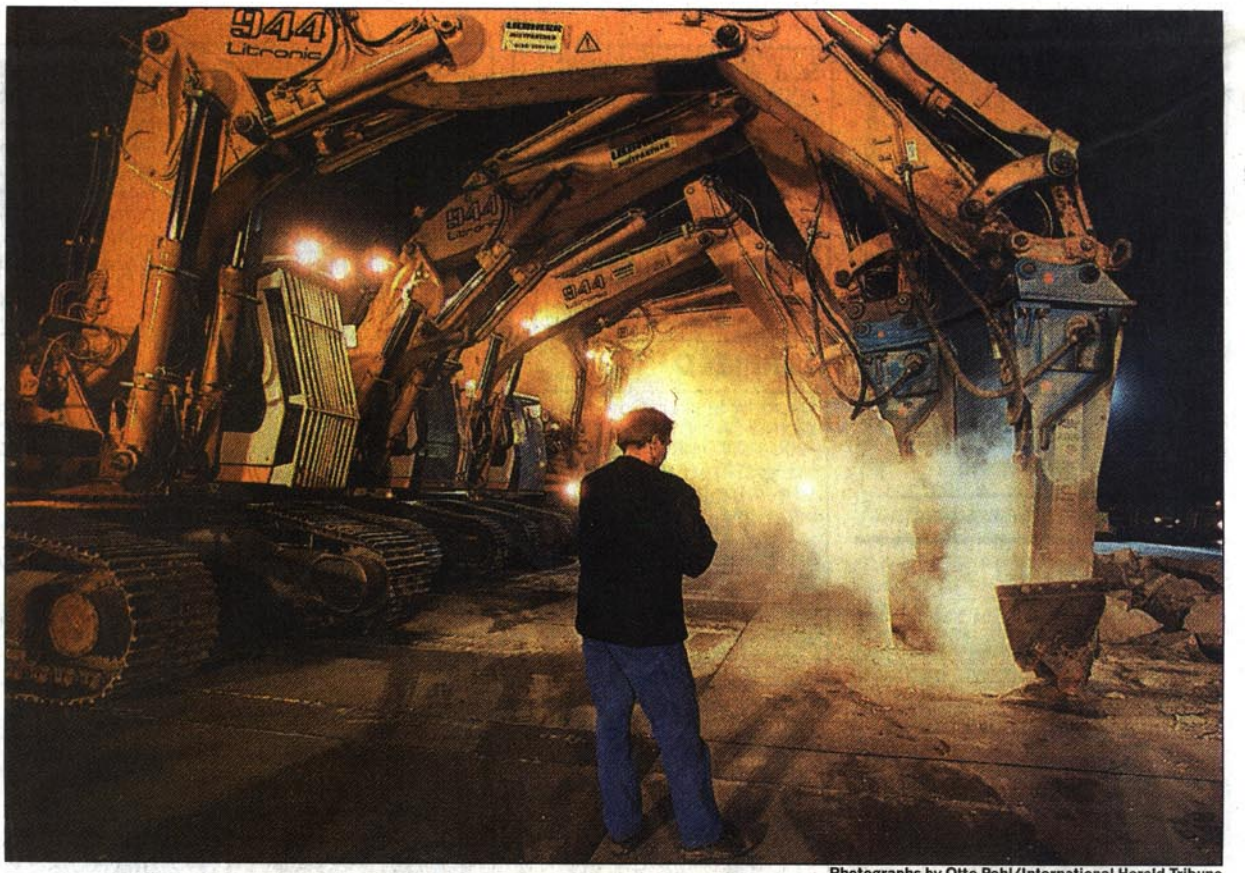
The work of the bomb squad is only one part of a tightly choreographed routine. Each nighttime shift begins the same way: As soon as they get the word from the traffic control tower, four backhoes outfitted with jackhammers line up in the middle of the airport's primary runway and begin reducing 15 meters of the 60-centimeter-thick, 60-meter-wide concrete runway to rubble.

Backhoes scoop the concrete into waiting trucks. After the bomb squad has completed its search, the earth is smoothed, a bed of dirt and gravel is added, and three layers of asphalt are poured. After that, markings are painted and landing lights are installed.

In total, 1,400 tons of concrete are removed and replaced with a similar amount of asphalt. After each larger section of runway is completed, workers shave off the top four centimeters of asphalt and lay down a final coat for a smoother finish.

Work continues five days a week, but stops during the middle of summer and winter, when the weather conditions are either too hot or cold for the asphalt.

There was much debate about the choice between concrete and asphalt, Rajewski said. Concrete was the traditional choice of runways, he said, but they couldn't find a concrete that would



Photographs by Otto Pohl/International Herald Tribune

Fifteen meters of the main runway at Frankfurt airport are reduced to rubble. The section must be replaced and usable by 6 a.m.

harden quickly enough. The asphalt they chose not only hardens quickly enough to handle an Airbus A340-600, currently the plane with the heaviest weight per wheel, but can be poured at a low enough temperature that it will be no warmer than 85 degrees centigrade when the first planes touch down.

So does this new technique herald a time when all infrastructure, like highways, will be replaced at night? Rajewski doubts it. "At airports, time is money," he says. "Roads are owned by governments. They don't care if you're stuck in a traffic jam or not."

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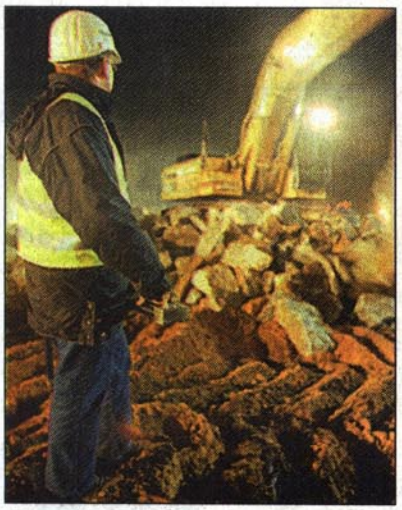

Hans-Jürgen Keller, the bomb hunter, watching the backhoes go to work.