

MASS TRANSIT

9/11-Damaged Rail Is Reborn Temporarily

Rebuilt line and stations between New Jersey and World Trade Center signal area's rebirth

The Nov. 23 resumption of train service from New Jersey into New York City's former World Trade Center site after a \$566-million overhaul of stations and track damaged on Sept. 11, 2001, marks a crucial milestone in lower Manhattan's renaissance. The project's centerpiece is a \$323-million "temporary"

station for the Port Authority Trans-Hudson (PATH) line in New York City that will serve as a no-frills stand-in for the \$2-billion downtown transportation megacentral to come by the end of the decade.

The station opened a month early and

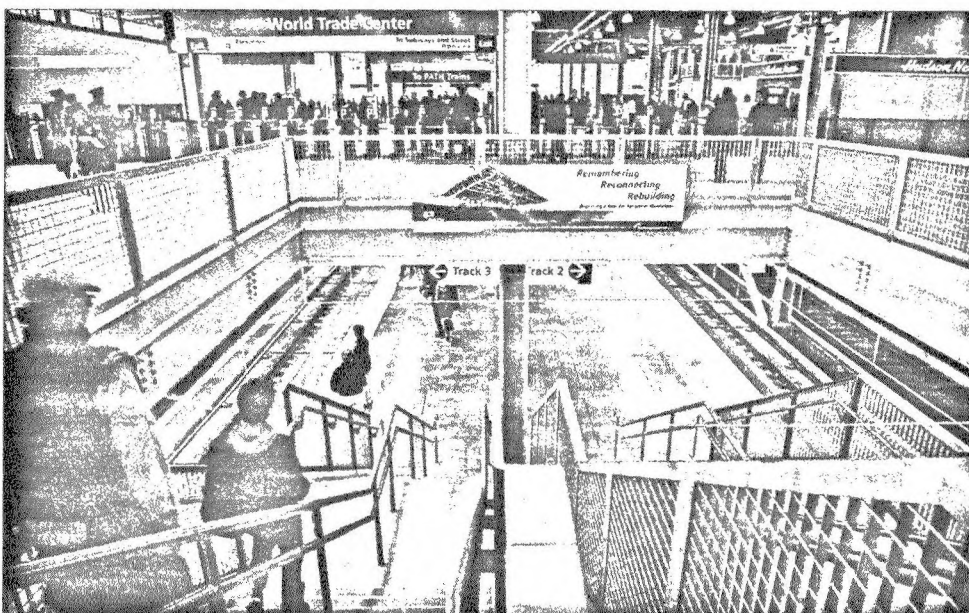
debuted five months after the reopening of the Exchange Place station across the Hudson River in Jersey City, N.J. That station underwent \$137 million of work, including the 110-ft extension of platforms to accommodate 10-car trains.

That modification was considered more than 20 years ago but ruled out because of the cost and required service lapse, say officials of the Port Authority of New York and New Jersey, which runs PATH. The reconstruction was funded by the Federal Emergency Management Agency, Port Authority and insurance.

The Port Authority spent \$106 million restoring 1-mile-long tunnels below the river that suffered major flood damage after the 9/11 terror attacks. "Tunnels were flooded up to roof height," says Lou Menno, a manager of the Port Authority's priority capital program. Water from seepage and firefighting also destroyed many of the 150 cables and 4,400 wires inside.

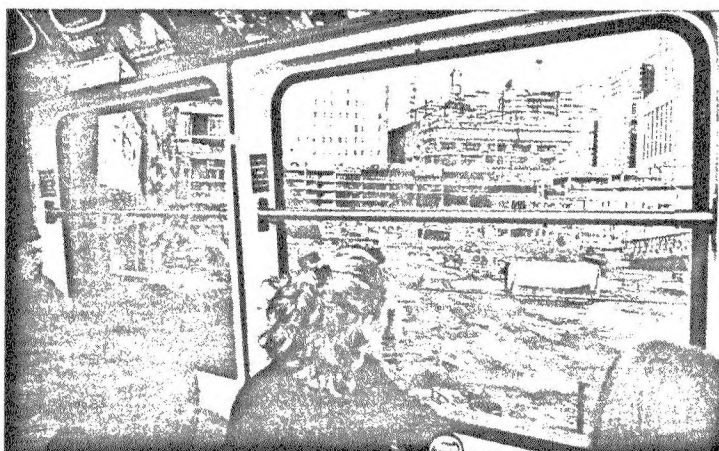
The PATH system consists of five tunnel extensions of varying elevations shaped like a hand. It needed major work to repair tunnel linings and to accommodate trains that were rerouted from Exchange Place to another Manhattan PATH station. Track, electrical equipment and ducts were replaced and the Port Authority spent more than \$16 million on new track signals and \$2 million on a new computer-run switching center that replaces the old relay system.

It took weeks after 9/11 to pump out the water, says Tom



▲ **Rebirth.** Temporary PATH station at World Trade Center was opened after \$323-million reconstruction.

Groark, Port Authority assistant chief engineer. Officials say the reconstruction required contractors to work "double and triple shifts." Construction was managed by a joint venture of Tully Construction Co., Flushing, N.Y.; A.J. Pegno Construction Corp., College Point, N.Y.; and Yonkers Contracting, Yonkers, N.Y. The team is set to



▲ **More To Come.** Train service kicks off new activity at former Ground Zero.

receive a \$5-million early completion bonus, sources say.

The 16.6-ft-dia, iron-lined tunnels now have a new track system of direct-fixed neoprene fasteners instead of the old ties and ballast. Duct banks now feature fiberglass reinforcement. The cast-

iron lining of compressed air tunnels built in 1905 "is as good as the day it was put up," Groark says.

Reconfiguring tunnel extensions to allow trains to turn around and switch tracks required nearly 11,000 cu yd of excavation. Drill-and-blast operations

were challenging because of the risk of damage to buildings above, says Groark.

Engineers decided to use Austrian roadheader machines to excavate the soft mica encountered, says Raymond Sandiford, the Port Authority's chief technical engineer. But the machines were high-maintenance and sometimes went down "for days and weeks," he says.

Next spring, architect Santiago Calatrava will present designs for the permanent

transportation hub that will link PATH with subway lines, says a Port Authority spokesman. Five bidders have been short-listed for the construction management contract (see story, p. 7). The entire hub is set for a 2009 opening. ■

By Aileen Cho and Debra K. Rubin

BLACKOUTS

Reliability Standards Could Have Prevented Aug. 14 Failure

A preliminary government report into the causes of the Aug. 14 blackout across several Midwestern and Eastern states and part of Canada found that human error, poor communications and inadequate training were to blame for what one senior U.S. official calls a "preventable" incident. The report, released Nov. 19 by the U.S.-

Those recommendations could take on new importance with Congress' failure to enact omnibus energy legislation this year (see story, p. 9). Government officials say that the lack of mandatory reliability standards were a contributing factor to the power failure. "Reliability standards likely would have prevented this," Energy Secretary Spencer Abraham said. The bill

three high-voltage transmission lines until the problem escalated out of control. When those lines short-circuited because they came into contact with trees, the control room alarm system failed to react. Because FirstEnergy's monitoring system was not providing current information about problems, the control room operators took no action.

Task force officials now begin to conduct a series of public forums on the initial findings.

required those standards.

Canada Power System Outage Task Force, faults Akron, Ohio-based FirstEnergy Corp. for not stepping in soon enough to stop the outage from "cascading out of control."

Task force officials now begin the second phase of the inquiry, a series of public forums in the affected areas to hear comments on the initial findings and solicit specific recommendations to be included in a final report.

The lack of an enforceable standard also leaves open the question of how to discipline FirstEnergy. "If we had an enforceable reliability standard, the answer would be clear-cut," says Abraham. He added that it is "premature" to discuss any enforcement measures until the final report is issued. Abraham also declined to speculate on possible action by state regulators.

The report says FirstEnergy employees were not aware of problems with

This set off a chain reaction because neighboring utilities and reliability coordinators, who could have addressed the growing problem, were not informed. The report also found that the Midwest Independent System Operator, which coordinates power transmission in the region, also was performing ineffectively.

"We remain convinced that the outage cannot be explained by events on any one utility system," FirstEnergy President Anthony J. Alexander says. The report does not adequately address underlying causes of the outage, he adds. ■

By Sherie Winston