

Trade Center dust an unhealthy blanket

New study shows makeup and size of particles combine for toxic mix

BY TED SHERMAN
STAR-LEDGER STAFF

Under a powerful microscope, the dust from the devastation at the World Trade Center takes on the appearance of poisoned darts.

In one sample, a thin strand of glass fiber, no more than 15 microns long — far smaller than the width of a human hair — can be seen skewering a piece of some unknown dark material, a loaded dart small enough to be inhaled directly into the lungs.

In a new analysis of the dust and debris plume resulting from the collapse of the Twin Towers on Sept. 11, researchers yesterday detailed a sloppy brew of toxins and other contaminants that could pose long-term health concerns for

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PAUL LLOY, ENVIRONMENTAL SCIENTIST

rescue workers, nearby residents and commuters who were exposed to it in the days following the terrorist attacks.

"These were not clean samples," said environmental scientist Paul Lloy, acting associate director of the Environmental and Occupational Health Sciences Institute. The pulverized debris contains a mix of compounds including asbestos, lead and partially burned or unburned jet fuel, he said.

At the same time, Lloy said the particle size and distribution of the matter — including the microscopic glass fiber darts mixed within the dust — was such that it could track deep into the lungs and lodge there.

"That's what makes this so different. That's why there is so much concern," Lloy said.

The examination by the environmental institute — a research center jointly sponsored by Rutgers University and the University of Medicine and Dentistry of New Jersey-Robert Wood Johnson Medical School — was one of the most

sweeping chemical and physical analyses thus far of the World Trade Center remains. The analysis included 22 different tests for organic materials, inorganic substances, dioxins, hydrocarbons and radionuclides.

Three samples of the pinkish-gray dust and ash that settled in Lower Manhattan were collected from atop abandoned automobiles to the east of Ground Zero, on Cortland Street, Cherry Street and Market Street. Researchers put the fluffy, flour-like material under electron microscopes, as well as intensive chemical and gas analysis.

Most of the material was found to consist of building and construction materials, as well as cement, cellulose from paper and wood, and glass fibers. A wide variety of plastics, furnishings, business machines and computers — along with soot, and leaded and unleaded paint — added toxicity to the mix.

The cement dust gave it a high pH reading, a measurement of acidity, contributing to the lung and upper respiratory irritation and so-called "World Trade Center cough" that many rescue workers have been reporting.

Lloy said there were a number of compounds in the mix that could cause long-term effects, depending on exposure.

Some firefighters are already reporting asthma or diminished lung capacity and are on medical leave.

A number of studies of the dust plume and air quality have been conducted after the terror attacks, reporting many of the same findings. Just this week, University of California scientists said air samples taken in New York in the weeks after Sept. 11 found unprecedented levels of pollutants such as sulfur and silicon.

Researchers at the University of California at Davis' Detection and Evaluation of Long-range Transport of Aerosols group also found elevated levels of titanium from pulverized concrete and vanadium and nickel from the combustion of fuel oil. Lead, believed to have come from the thousands of computers in the trade center, was detected as well.

The U.S. Geological Survey, which did its own study, found some of the dust to be highly caustic. The pH of water is 7. The New Jersey study found pH levels much higher — from 9.2 to 11.5.

Complicating the situation was the light, fine quality of the dust,

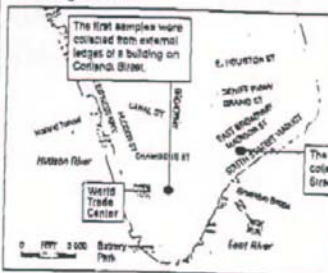
A closer look at the Twin Towers dust samples

A scientific team has analyzed dust from the World Trade Center plume of smoke. A variety of tests were performed on microscopic samples. Generally light and fluffy and of a pinkish-gray color, the dust samples consisted mostly pulverized building materials including cement, cellulose and glass fibers. Toxic materials included asbestos, glass fibers, lead and polycyclic aromatic hydrocarbons. Identifying these components plays an important role in helping people who may have inhaled the smoke during the fire weeks after the attack. Indoor areas that have not been cleaned properly are also at risk for later inhalation.



World Trade Center plume of smoke and dust moving east on Sept. 11, 2001.

Gathering evidence



The first samples were collected from external ledges of a building on Cortland Street.

The second and third samples were collected from the tops of cars at Cherry Street and Market Street.

The results

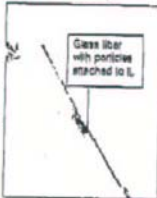
Basic characteristics of WTC settled dust and smoke samples.

	CORTLAND ST.	CHERRY ST.	MARKET ST.
pH (lower)	11.5	9.2	9.5
Non-fiber (carbonaceous)	50.0%	48.2%	87.0%
Glass fiber	40.0%	40.0%	40.0%
Cellulose	0.2%	10.0%	80.0%
Chrysotile	0.8%	0.8%	3.0%

Help with the terms used:

- pH is a unit of measure that describes the degree of acidity or alkalinity of a solution. It is measured on a scale of 0 to 14.
- Cellulose is from paper and textiles.
- Chrysotile are asbestos fibers.

Glass fiber detected in Market Street sample



Source: Univ.-WTC Panel
LARRY TRISLER FOR THE STAR-LEDGER

which made for an extended period of exposure.

"It wasn't just people were inhaling it on day one. A lot of the dust remained suspended in the air because we had hardly any rainfall, so there was a lot of re-suspension

of the material," Lloy said. Dust remained on some outdoor surfaces and rooftops through November.

Lloy said long-term studies will be needed to examine the health implications. But he added that the composition of the material makes it imperative for those who still have remnants of the material in their homes or offices to call in a professional hazardous materials team to clean it up.

"Don't even consider using a vacuum cleaner," he said.

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