

THIS WEEK 28 March 1998

Something in the air – Aircraft ground crews may face an unsuspected danger

By Harvey Black

THE health of people who service jet aircraft could be harmed by aerosols of the fuel. At a meeting next week in San Antonio, Texas, researchers will describe animal studies suggesting that these aerosols damage the lungs and have subtle neurological effects.

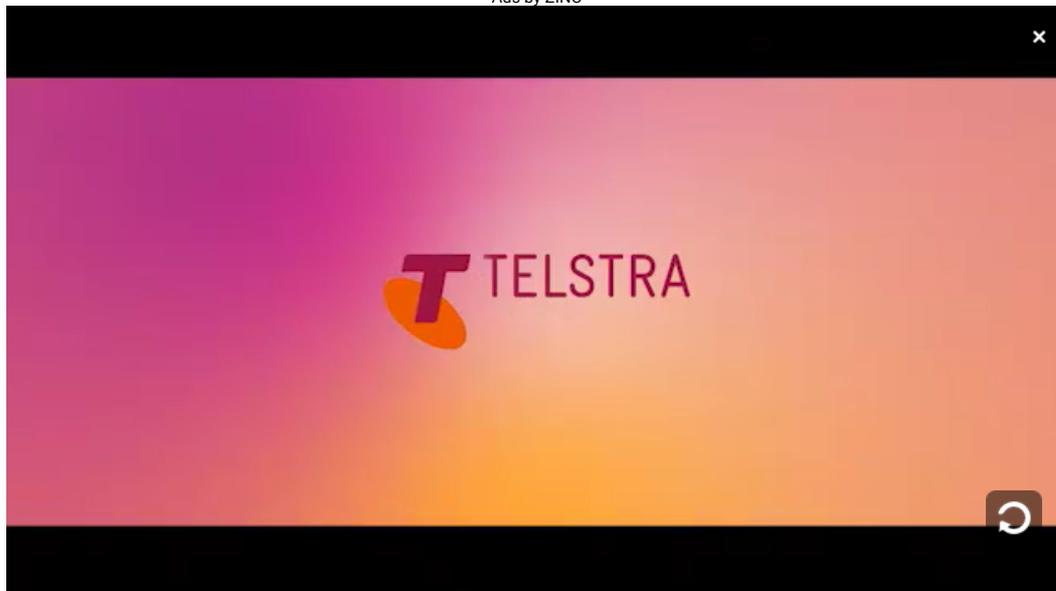
Most military and commercial jets use a kerosene-rich fuel called JP-8 or Jet A, which has always been considered safe. But scientists are now starting to investigate the risks of breathing the aerosols of unburnt fuel that shoot into the air when an aircraft starts its engines.

Mark Witten, a respiratory physiologist at the University of Arizona in Tucson, has exposed rodents to aerosols of JP-8 containing droplets between 1.5 and 1.8 micrometres across—similar to those created by jet engines.

Even a single, hour-long exposure to an aerosol containing 50 milligrams of JP-8 per cubic metre increased lung permeability in mice and caused the loss of cilia, the hair-like projections that waft dirt out of bronchial tubes. “This will allow dust, pollen and other stuff in the lungs to set up a chronic inflammatory state,” says Witten.

Other researchers are studying the effects of repeated exposure to JP-8. Carol Baldwin of the University of Arizona exposed five rats to aerosols containing 1000 milligrams of JP-8 per cubic metre over five weeks. Each week, they breathed the aerosol for an hour a day on five separate days. Finally, for an hour a day on three further days they breathed an aerosol containing 2500 milligrams of fuel per cubic metre. The rats became hyperactive. In trials lasting three minutes, they reared onto their hind legs an average of 17 times—more than twice as often as animals that had not breathed JP-8.

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The animals had previously learnt the location of a platform submerged in a tank of water. After exposure to JP-8, they had forgotten where to find it. But they could learn new tasks, which suggests that the fuel had specific effects on memory—perhaps by interfering with a brain region called the hippocampus.

Meanwhile, Steven Kornguth of the University of Wisconsin, Madison, has exposed mice to aerosols containing 1000 or 2500 milligrams of JP-8 per cubic

metre for an hour a day over one week. Compared to control animals, their retinas and cerebellums contained up to five times as much glutathione

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sense of where one's body is in space.

The exposures studied by Baldwin and Kornguth may be higher than those experienced by aircraft ground crews. But until detailed studies on ground crews are carried out, no one knows for sure.

David Leith, an environmental engineer at the University of North Carolina School of Public Health in Chapel Hill, is now developing instruments to measure the density of JP-8 aerosols. In a trial in Alaska, the plume created by a jet exceeded 200 milligrams per cubic metre of JP-8—the maximum his device could register.

So far, most evidence of the health effects of JP-8 on ground crews is anecdotal. "I talked to crew chiefs, and they said they seem to have more colds, more bronchitis, more chronic coughs than the people not exposed to jet fuel," says Witten.

At next week's meeting, sponsored by the US Air Force, the Environmental Protection Agency and the National Institute of Occupational Safety and Health, officials hope to lay down a plan for future epidemiological studies.

"What we're trying to do is develop exposure standards for anyone who works around an aircraft," says Major Les Smith of the Brooks Air Force Base in San Antonio, who chairs an Air Force committee looking at the health and environmental effects of JP-8.

Magazine issue 2127, published 28 March 1998

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