Maglev burns out in Japan

Tokyo

JAPAN'S ambitious plans to develop a high-speed magnetically levitated (maglev) train went up in smoke — literally — on 3 October, when a test vehicle burnt to the ground during a test run. The accident throws into question the future of maglev trains, a technology that Japan is hoping to develop into its commercial transport system of the future.

The 22-metre maglev train is capable of travelling at more than 400 km an hour when floating on its superconducting magnets, but the accident occurred when the vehicle was only running at low speed on rubber tyres. One of the tires went flat and burst into flames, and confinement of the fire by the concrete walls of the U-shaped trackway resulted in the train being completely gutted.

Although three researchers on the train escaped unhurt, the fire raises serious questions about the safety of the maglev system. From 1993, the Railway Technical Research Institute, which developed the maglev train, plans to start testing it on a new 43-km track that will run through long tunnels in the mountains of Yamanashi Prefecture west of Tokyo. (Until now, the train has been tested only on a 7-km overhead trackway in Japan's southern island of Kyushu where the accident occurred). If a similar fire broke out in a tunnel it could have disastrous consequences.

Fire is not the only problem the maglev train faces. Researchers are having difficulty shielding the inside of the vehicle from the powerful magnetic fields emitted from the superconducting magnets that drive and levitate the train. At present,

people with heart pacemakers cannot travel in the train for fear that the pacemaker might be stopped by the magnetic fields. And the medical effects of long-term exposure to strong magnetic fields are also uncertain.

Another potential danger is 'quenching' of the superconducting magnets, a process (albeit rare) whereby the magnets rapidly lose their superconductivity. The maglev train in such an event would drop onto its rubber tyres, and the present accident suggests that those cannot be relied on.

Despite these problems, Transport Minister Kanezo Muraoka, whose ministry is financing the project, says tests on the new track in Yamanashi Prefecture will go ahead on schedule. The project has the backing of one of Japan's most powerful politicians, Shin Kanemaru, the so-called 'godfather' of the ruling Liberal Democratic Party who is reputed to have the power to select Japan's prime ministers and whose constituency is in Yamanashi Prefecture. Although replacing the burnt-out vehicle will cost about ¥3,000 million (\$23 million), this cost is small compared with the potential financial and political fallout of cancellation.

Property speculators have already moved into the Yamanashi area and driven up the prices of land near the test track, and too much is now at stake politically for the project to be called off. But ambitious plans by proponents of the maglev train to extend the Yamanashi trackway into a commercial line linking Tokyo and Osaka must now be very much in question because of the numerous technical hurdles in the way.

David Swinbanks

This train is bound for the scrap yard.

Radio wars

WHEN television crews visit California's Mount Wilson observatory, their cameras sometimes fail inexplicably. The facility's own electronic equipment often behaves erratically. And radios are often plagued with interference. An encounter with alien radiation? Hardly.

The problem is right on the next mountain peak. There, a cluster of radio and television antennas pump out a total of over 10 million watts of broadcast programmes to the Los Angeles area — and subject any piece of unshielded electronic equipment in close range to the incidental indignities of electromagnetic disturbance. Researchers who use Mount Wilson's 100-inch reflecting telescope have been forced to become shielding experts as they swaddle their sensitive light-receiving equipment with enough metal to keep them working in a bath of radiation of the nearby antennas. Yet, despite their efforts, radiation from the antennas has essentially rendered large portions of the western sky off-limits.

Things could, however, be even worse. In 1989, the Sigma Communications Corporation proposed to set up another antenna farm on a second peak less than a mile away, this time to the south. With a potential output of another 10 million watts, the new facility threatened to shut down the observatory entirely, says director Robert Jastrow. After unsuccessful appeals to local authorities and the company itself, closing seemed a real possibility.

Then an observatory official happened to mention the problem to an attorney from the Los Angeles-based law firm Sheppard, Mullin, Richter & Hampton which agreed to take the case *pro bono*.

Now, after more than a year's negotiations, Sigma has given in. In an agreement completed this summer, the company agreed to restrict total electromagnetic in the direction of Mount Wilson to no more than current levels, to limit the height of the antennas, and to shield all lights at the antenna facility so that none are visible from the observatory.

The victory is only the latest for US observatories, which are becoming increasingly skillful in dealing with local governments and organizations to keep the skies free of radio and light interference. Palomar Observatory astronomers, plagued by radiation from a growing number of nearby low-power transmitters, have successfully lobbied the San Diego Board of Supervisors to change the zoning laws to include emission limits. And the University of California Lick observatory recently persuaded the nearby San Jose City Council to change most of the city's street lamps to low-pressure sodium designs that emit light only in the human visual range, where it can be more easily filtered out of observations. Christopher Anderson