

## AIR POLLUTION

## Gate Wait for Better Air

Commercial jets may spend as much as 30% of their total flight time taxiing on the tarmac before takeoff.<sup>1</sup> In the United States, this “taxi-out time” translates into 6 million metric tons of carbon dioxide, 45,000 metric tons of carbon monoxide, 8,000 metric tons of nitrogen oxides, and 4,000 metric tons of hydrocarbons emitted into the atmosphere yearly.<sup>1</sup> Holding planes at the gate for fewer than 5 extra minutes may be a simple way to reduce these emissions, according to a pilot study conducted at Boston Logan International Airport by researchers at the Massachusetts Institute of Technology (MIT).<sup>2</sup>

The MIT team studied departure data from Logan and developed models to minimize runway congestion by increasing the amount of time planes spent at the gate. Working with the Federal Aviation Administration (FAA) and air traffic controllers, the MIT team ran eight 4-hour tests in August and September 2010 during Logan’s busiest arrival and departure times.

The average taxi-out time at Logan is about 20 minutes. Holding 247 flights at the gate for an average of 4.3 extra minutes reduced taxiing time by an average of 20%, and fuel consumption dropped by 16–20 gallons per plane. Takeoff times were not delayed, because once planes pushed back they proceeded quickly to takeoff. About 18 hours of taxi-out time were eliminated over the course of the study, resulting in an overall estimated fuel savings of 3,900–4,900 gallons.

This simple strategy offers a potential win-win situation for airports, airlines, and neighboring communities whose air is polluted by airport emissions. Air traffic controllers and aircraft pilots “were very positive and liked the fluid flow of aircraft on the ground instead of long queues,” says study leader Hamsa Balakrishnan. She’s working with the FAA to improve the method and test it at other congested

airports. The team is also working on a model to estimate emissions avoided through the reduction in fuel consumption.

Hazardous air pollutants measured at or near airports include nitrogen dioxide, polycyclic aromatic hydrocarbons, fine particles, carbonyls, and volatile organic compounds.<sup>3,4,5</sup> These pollutants have been generally linked to cancer,<sup>6</sup> heart attack,<sup>7</sup> and type 1 diabetes.<sup>8</sup> In one study, people living within 5 miles of airports were 1.5 times more likely than people living farther away to be admitted to hospitals for a variety of respiratory diseases.<sup>9</sup>

“It’s important that we minimize emissions,” says Lourdes Maurice, executive director for environment and energy at the FAA. Although it remains to be seen whether reduced taxi-out times at other airports will translate into significant fuel savings and emissions reductions, Maurice says, “The initial benefits look very good and we are continuing efforts with MIT.”

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### REFERENCES

- Deonandan I, Balakrishnan H. Evaluation of strategies for reducing taxi-out emissions at airports. In: Proceedings of the AIAA Aviation Technology, Integration, and Operations (ATIO) Conference, Fort Worth, Texas, 13–15 Sept 2010. Available: <http://tinyurl.com/6h6azxd> [accessed 18 May 2011].
- Simaikis H, et al. Demonstration of Reduced Airport Congestion through Pushback Rate Control. Report No. ICAT-2011-2 (January 2011). Cambridge, MA:MIT International Center for Air Transportation, Department of Aeronautics & Astronautics, Massachusetts Institute of Technology. Available: <http://tinyurl.com/64zevaj> [accessed 18 May 2011].
- Adamkiewicz G, et al. Nitrogen dioxide concentrations in neighborhoods adjacent to a commercial airport: a land use regression modeling study. *Environ Health* 9:73 (2010); doi:10.1186/1476-069x-9-73.
- Hsu H, et al. Contributions of airport activities to air pollution levels in surrounding neighborhoods. *Epidemiology* 19(6):S293 (2008); doi:10.1097/01.ede.0000340349.85469.42.
- Jun K-H, et al. Personal, indoor, and outdoor exposure to VOCs in the immediate vicinity of a local airport. *Environ Monit Assess* 173(1–4):555–567 (2011); doi:10.1007/s10661-010-1404-9.
- Crouse DL, et al. Postmenopausal breast cancer is associated with exposure to traffic-related air pollution in Montreal, Canada: a case-control study. *Environ Health Perspect* 118(11):1578–1583 (2010); doi:1289/ehp.1002221.
- Nawrot TS, et al. Public health importance of triggers of myocardial infarction: a comparative risk assessment. *Lancet* 377(9767):732–740 (2011); doi:10.1016/s0140-6736(10)62296-9.
- Pearson JF, et al. Association between fine particulate matter and diabetes prevalence in the U.S. *Diabetes Care* 33(10):2196–2201 (2010); doi:10.2337/dc10-0698.
- Lin S, et al. Residential proximity to large airports and potential health impacts in New York State. *Int Arch Occup Environ Health* 81(7):797–804 (2008); doi:10.1007/s00420-007-0265-1.

## The Beat

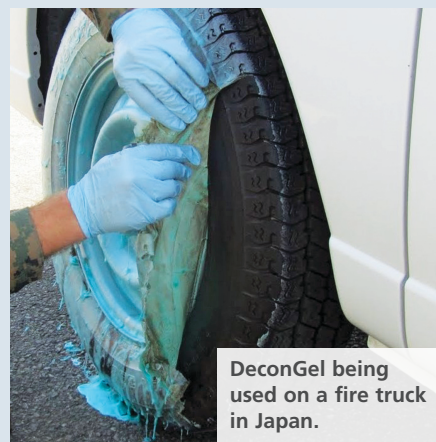
by Erin E. Dooley

### Gel Tackles Tohoku Waste

CNN reports Japanese officials are using a product called DeconGel to clean up areas contaminated by the March 2011 Tohoku earthquake and tsunami.<sup>1</sup> The product is applied as a liquid to surfaces contaminated by hazardous chemicals or radiation and then dries into a gel that

can be peeled off, taking contaminants with it. DeconGel has been used to clean up polychlorinated biphenyls, mercury, chromium, beryllium, and radioactive materials. Although the product can’t neutralize radioactivity—no product can—its developer claims it can reduce labor and disposal costs.<sup>2</sup>

cobalt-tungsten carbides in powder or hard metal form, certain inhalable glass wool fibers, riddelline (a compound found in *Senecio*-based herbal remedies), and the industrial chemicals *o*-nitrotoluene and styrene.



DeconGel being used on a fire truck in Japan.

### 12th Report on Carcinogens Released

In the 12th *Report on Carcinogens*, released in June 2011, the National Toxicology Program adds two substances to the list of known human carcinogens: formaldehyde (formerly listed as reasonably anticipated to be a human carcinogen) and aristolochic acids (botanical chemicals found in some *Aristolochia*- and *Asarum*-based herbal remedies, which are listed for the first time).<sup>3</sup> The new report also adds six entries to the list of substances reasonably anticipated to be human carcinogens: capatafol (a fungicide),

### IARC Classifies Radiofrequency Electromagnetic Fields

In May 2011 the International Agency for Research on Cancer (IARC) classified radiofrequency electromagnetic fields like those emitted by cell phones as possibly carcinogenic to humans.<sup>4</sup> The agency based its decision on limited evidence suggesting an increased risk for glioma (a malignant type of brain cancer) and acoustic neuroma (a benign tumor of the nerve connecting the ear to the brain) associated with cell phone use. The group also concluded there is inadequate evidence to draw conclusions for other types of cancers. The number of cell phone users worldwide is currently estimated at more than 5 billion.<sup>5</sup>