

PHILLIP BUTTERFIELD, PhD CIVIL & ENVIRONMENTAL ENGINEERING

Finding Solutions for Aircraft Drinking Water

Have you ever stepped into a riverbed with bare feet and wondered about the slippery stuff on the rocks? It's biofilm, a substance that forms when bacteria meet surfaces in wet environments. This slimy film allows the bacteria to become anchored to all sorts of materials, with both negative and positive results.

Now consider that biofilm grows on the drinking water storage tanks aboard commercial aircraft and that this growth cannot be prevented. Until now, researchers have not probed into the issue of aircraft drinking water, which is stored in tanks lined with materials (ABS and PETG plastics) uncommon in municipal water systems.

Enter Phillip Butterfield, a research professor at WSU Spokane, who is asking clearly important questions as he tackles this problem. What kinds of microbes form in these tanks and make their way into water glasses? How effectively do current disinfection methods work? What potential does biofilm have to harbor harmful bacteria?

Butterfield approaches these questions through sophisticated laboratory work that simulates the tank environment. Using a programmable controller, the contents of CDC biofilm reactors are replaced with fresh tap water by controlling valves, feed pumps, and reactor mixers. One reactor receives water amended with calcium to increase the water's hardness; another is amended with carbon compounds to increase the biodegradable carbon in the water. A third reactor receives un-amended tap water. After two months, Butterfield's lab samples the reactors for biofilm and evaluates the success of the disinfection regimen.

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