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Takata's Switch to Cheaper Airbag Propellant Is at Center of Crisis

By **HIROKO TABUCHI** NOV. 19, 2014

The new airbag propellant was supposed to be the next big thing for Takata in 1998. An engineer for the company, Paresh Khandhadia, declared it “the new technological edge” in an interview with a trade magazine then.

Based on a compound called tetrazole, it was seen as a reliable and effective compound for inflating airbags. Yet despite the fanfare, by 2001 Takata had switched to an alternative formula, ammonium nitrate, and started sending the airbags to automakers, including Honda.

That compound, according to experts, is highly sensitive to temperature changes and moisture, and it breaks down over time. And when it breaks down, it can combust violently, experts say.

“It shouldn’t be used in airbags,” said Paul Worsey, an expert in explosives engineering at the Missouri University of Science and Technology. The compound, he said, is more suitable for large demolitions in mining and construction. “But it’s cheap, unbelievably cheap,” he added.

More than a decade later, that compound is at the center of a safety crisis involving Takata and its airbags. More than 14 million vehicles with the Takata-made airbags have been recalled worldwide over concern that they can

Takata's struggle with propellant stretches back to 1991, when the Tokyo-based supplier first started to manufacture airbag inflators in the United States.

Like other airbag manufacturers at the time, Takata based its airbag propellant on a toxic compound called sodium azide. But that compound is volatile and could release toxic fumes into the car, causing chemical burns or breathing problems when the airbags deployed.

Takata then turned to tetrazole, which it promoted to automakers at the time as a safer, more environmentally friendly alternative. Takata introduced the propellant, marketed as "Envirosure," to automakers in the mid-1990s for inclusion on 1998-model vehicles.

"I said, 'Wow! This is the break!'" Mr. Khandhadia, Takata's lead propellant engineer, told the industry publication *Automotive News* at the time, describing the moment tests showed the new propellant worked.

But tetrazole, which is produced in limited quantities and can be expensive, started to squeeze margins at Takata, especially as the airbag market became more competitive, Mr. Lillie said.

By 1999, Takata researchers in Michigan, pressured by executives, developed a propellant based on ammonium nitrate, he said.

But the engineering team in the Moses Lake plant raised objections to basing a propellant on such a risky compound. To bolster its case, the team pointed to explosives manuals warning that the compound "tended to disintegrate on storage under widely varying temperature conditions" with "irregular ballistic" consequences, Mr. Lillie said.

Ammonium nitrate cycles through five solid states. As the vehicle goes from receiving the heat of sunshine to the cold overnight, the temperature swing is large enough for the ammonium nitrate to change from one phase to

ammonium nitrate in its replacement airbags.

In addition to the Senate hearing, Takata is facing mounting legal challenges. Takata said this month that it had received a subpoena for documents related to the defects from a federal grand jury in the Southern District of New York. The company confirmed that it hired Andrew Levander, a well-known defense lawyer based in New York, as it prepares for a criminal investigation.

Rachel Abrams contributed reporting, and Kitty Bennett contributed research.

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