

# Flawed research props up industry

On the defensive over toxic flame retardants,  
the chemical industry turns to the questionable  
conclusions of a friendly scientist

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**BY SAM ROE**

Under attack since May for relying on flawed studies to justify the use of toxic flame retardants in furniture and household products, the chemical industry has turned to a familiar tactic: It has begun pointing to a new scientific paper.

Industry representatives have touted the paper in news releases, before lawmakers and in a video shown to policymakers. They have also shared the paper with two U.S. senators, who cited it during congressional hearings.

But the new paper reaches unsupported conclusions and misleads the public, much like previous studies embraced by industry, a Tribune investigation shows. The paper's author is Matthew Blais, a scientist and chemical industry adviser who had never previously written a paper about flame retardants.

Blais' major finding is that the retardants in typical residential furniture provide a substantial safety benefit, but a Tribune examination of the paper's underlying test results found flawed data and questionable claims.

For instance, his paper relies heavily on a test result that Blais' own colleagues had rejected as invalid.

Of the 79 pieces of furniture that his colleagues tested for an earlier arson study, only one was identified as taking unusually long to burn. The scientists concluded the result for the slow-burning piece of furniture was an outlier and tossed it out.

But Blais highlighted it in his paper as the main evidence that flame retardants slow fires.

Blais also states that scientists at his lab tested a fabric "common in furniture items" and found that the flame retardants in the material dramatically slowed fires, giving families 10 extra minutes to seek safety.

Yet the fabric his colleagues tested isn't used in furniture; it's used in theatrical curtains that are designed to self-extinguish in case of fire. The scientists got the fabric from a North Hollywood, Calif., store serving the film industry.

Blais' paper was not published in a peer-reviewed journal. One leading fire scientist who has examined the work is Vytenis Babrauskas. When informed of the Tribune's findings, he called Blais' paper "exceedingly misleading."

In his opinion, Babrauskas said, "the truth has gone out the window."

Blais, the director of fire technology at the Southwest Research Institute in San Antonio, one of the nation's largest nonprofit laboratories, defended his paper. "I think the data is accurate and the conclusions are correct," he said.

To understand Blais' methodology, the Tribune analyzed the data, charts and codes from more than a hundred lab tests conducted at the institute, then questioned Blais over the phone and in emails more than a dozen times.

He acknowledged he was unsure whether the theatrical curtain fabric his colleagues tested is used in furniture as his paper stated. He also gave varying explanations as to why he used a key test result that his colleagues concluded was invalid,

saying he has conducted additional testing that shows the result was not an outlier.

Blais has been an adviser to the American Chemistry Council, the industry's chief trade group, since 2011. The organization said it pays him a small honorarium to attend occasional meetings. Blais said he doesn't keep the money; it goes directly to his institute.

Blais' paper is based on data from an institute study that was aimed at aiding arson investigators and did not focus on the effectiveness of flame retardants. Blais said that no one paid him to write his paper, but that the trade group produced the video based on the report and paid his travel expenses to two conferences to present his conclusions.

When asked why he did not disclose his ties to industry in his paper, in the video or at a recent conference, he said he didn't think it was relevant. "I am not advocating any particular flame retardant or company," he said.



Matthew Blais has been a science adviser to the chemical industry.

In a written response to questions, the American Chemistry Council said that Blais was "a noted and respected scientist," and that "flame retardants help products meet fire safety standards."

"Dr. Blais' study provides us with some helpful information, and we would like to see it go through the next steps of being peer-reviewed and published," the group wrote.

Blais' paper is important because it has emerged as the industry's main defense against moves by regulators to halt the use of flame retardants found in most couches, love seats and upholstered chairs.

These chemicals — some of which have been linked to cancer, neurological deficits and impaired fertility — migrate from furniture and settle in dust.

Government research shows the amount of flame retardants added to furniture foam to meet flammability rules provides no meaningful protection from fires, and so some health experts argue that the chemicals do more harm than good. Makers of flame retardants say their products are effective and save lives.

## On the defensive

In May, the Tribune investigative series "Playing With Fire" documented how industry has misrepresented the effectiveness of flame retardants for years.

Industry officials frequently pointed to a government study from the 1980s that they claimed showed flame retardants in common household items gave people a fifteenfold increase in time to escape fires.

But Babrauskas, the study's lead author, told the Tribune that industry officials "grossly distorted" his findings and that flame retardants in home furnishings offered little to no fire protection.

Chemical-makers then highlighted a series of industry-financed studies that concluded flame retardants prevented deadly fires, reduced pollutants and saved society millions of dollars.

But the Tribune showed that a major foundation for these studies was a report documenting eight television fires in and around Stockholm. That report had nothing to do with flame retardants and was so obscure it was available only in Swedish.

Lawmakers and health advocates began calling for reforms. U.S. senators held two hearings, advocates marched at the U.S. Capitol, and California announced plans to scrap the rule that made flame retardants common in American furniture.

Industry pushed back: In June, a lobbyist for the chemical-makers handed California lawmakers copies of a slide presentation about Blais' new paper and read from the conclusions, which included that the use of flame retardants in furniture "increases the escape time for a family, saving lives, and increases the available response time for fire services."

The findings of the new study caught some health experts and scientists off guard, as did the paper's supposed sponsor. The chemical lobbyist said Blais' paper was funded by an arm of the U.S. Justice Department, an association that lent the work credibility. This claim would be often repeated by industry officials.

But only the arson study upon which Blais based his paper was funded by the government, not his report.

A month later, in July, an industry consultant showed a five-minute video about Blais' paper to California policymakers studying reform measures.

As the video shows mock-up chairs engulfed in flames, Blais tells viewers that without fire retardants, upholstered furniture is going to burn "very, very quickly" and flames will spread throughout the room.

"Your curtains catch on fire, your rug is on fire — anything else that's flammable in the room will catch on fire," he says.

The next day, Blais' paper came up at a U.S. Senate hearing on the health risks of flame retardants.

One chemical executive testified that the paper showed flame retardants provided families greater safety, while Oklahoma Republican Sen. James Inhofe cited the research and asked that it be entered into the hearing's record.

## **A theater curtain**

The Tribune found several fundamental flaws in Blais' paper, including one that came to light after a telephone call to a Hollywood-area fabric supplier.

Blais writes that testing at his lab for the arson study showed that using a flame-retardant fabric on upholstered furniture dramatically improves fire protection compared with using an untreated cotton covering.

A chair with the untreated covering, his paper states, catches fire easily, and the blaze spreads throughout the room in about three minutes. With the retardant fabric, the fire doesn't spread until 13 minutes.

"By then, your fire alarm hopefully has gone off in your house, and you're awake enough to get out the door," Blais said at an industry conference in May, according to the audio of his presentation.

But what Blais did not disclose — in his paper, in the video or in his presentation to industry — was that the chemically treated fabric his lab tested was not a material typically found in homes.

Both his paper and the arson study identify it as a black Milano fabric bought from Dazian, a North Hollywood firm serving the film and entertainment industries. When the Tribune called Dazian, a representative said the black Milano was a velvet material used almost exclusively for theater drapes and not intended for furniture.

The fabric also meets a strict flammability test that some communities have adopted for drapes and curtains in public places, such as theaters and school auditoriums.

That test, called NFPA 701, was developed by the National Fire Protection Association. Tracy Vecchiarelli, an NFPA associate fire protection engineer and expert on fire codes, said she has never heard of a fabric meeting the drapery requirement being used on furniture. Such material, she said, is designed to essentially self-extinguish.

Asked about the fabric, Blais said both his paper and the arson study made a mistake: The fabric tested at his lab wasn't black Milano, but rather Supercote Heavy-weight Duvetyne, also bought from the North Hollywood supplier.

But that fabric, also known as "Commando Cloth," is used for theatrical curtains and set designs. It, too, meets the strict NFPA 701 standard and is designed to self-extinguish.

Blais' paper explicitly states that the fabric tested in his lab was "common in furniture items that are currently on the market."

Now Blais says he is not certain about that. He told the Tribune the goal was to

show the effect of a fabric that was clearly flame retardant — “not to say that this is a couch you can buy.”

## An ‘outlier’

What about couches and chairs that are not wrapped in theater fabric but more closely resemble furniture found in people’s homes? Blais’ staff tested plenty of those, and he says the results showed items that contained flame retardants in the cushions performed better in burn tests than those that did not.

To assess that claim, the Tribune examined the study upon which his paper is based — his staff’s 207-page arson report — and analyzed its underlying data.

The arson study wasn’t focused on whether flame retardants worked. The researchers largely wanted to know how different ignition sources, such as a match-like flame or gas burner, and different ignition locations, such as a chair’s seat or back, affected fire behavior.

Such data, they thought, might help arson investigators determine how fires started.

Blais’ staff built 79 mock-up pieces of furniture, mostly chairs and three-seat couches. Six kinds of cushions were used, four containing flame retardants. The scientists ignited each item and took a variety of measurements.

For each test, the researchers assigned a nine-character code to represent the nine variables in the experiment, such as where the item was ignited and whether it contained flame retardants.

Of the 79 pieces of furniture ignited, researchers identified only one that took an oddly long time to catch fire — a “very extreme” result, according to the study. The researchers determined that the result was an “outlier” and eliminated it from their analysis.

According to a footnote in the researchers’ final report, the outlier result was from test SRM131BB2 — indicating, in part, a chair with flame retardants in the cushions.

The Tribune compared this test code with the codes of experiments that Blais had cited in his paper. The codes matched. Blais had cited the same test — the one that his staff concluded produced the outlier — as his main evidence that flame retardants in residential furniture provided considerable safety benefit.

He did not describe the result as an outlier in his paper. Instead, he compared it with a result from a chair without flame retardants, concluding that fire spread twice as fast on the untreated item.

When asked why he highlighted a test result that his own staff had thrown out, Blais gave varying answers.

His staff threw out the test result only in terms of “ignition delay,” a measurement from the time a piece of furniture is lit to when the fire is self-sustaining. He said the focus of his paper was different. He highlighted another measurement: the time from ignition to the blaze’s peak intensity.

The Tribune noted that these were very similar measurements, both of which basically measured the time it took for an item to burn.

Blais then said it can be difficult to determine outliers, “and it is the judgment of the scientist making the call.”

But Blais oversaw the arson study and signed off on it. Did he disagree with that conclusion?

He responded, “We have since generated more data showing that it’s not really an outlier.”

The arson study’s lead author, Marc Janssens, a senior engineer at Southwest Research Institute, did not return messages seeking comment. An institute spokesman declined to make Janssens available for an interview, saying only Blais would answer questions.

Janssens' arson study reported only one main conclusion about flame retardants: Chairs with the chemicals produced a lower "peak heat release rate," or a less severe fire, than untreated chairs. But when the three-seat couches were tested, researchers saw little difference.

The data were far from perfect: In most key tests, researchers isolated more than one variable, making it difficult to draw precise conclusions.

The Tribune found just seven examples in which researchers isolated the kind of flame retardant foam common in U.S. furniture as the sole variable. That allowed direct comparisons to be made between the treated and untreated foam. The results were mixed. In four of the seven cases, fire actually spread more quickly in the foam treated with flame retardants.

In terms of the peak amount of heat released, the chemically treated foam generally produced less severe fires, but that might be because most of the untreated foam was twice as dense. Fire scientists say denser foam produces more severe fires simply because there is more material to burn.

In all, the arson study's data offer little evidence that flame retardants in typical furniture are effective.

Blais acknowledged that the arson study data provided limited direct comparisons to precisely assess the effectiveness of flame retardants. But he said he thought there was "a clear indication" that the chemicals worked well.

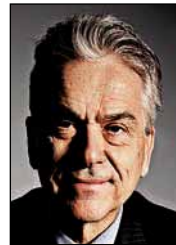
More measurements are needed, he said, to "make an ironclad conclusion," and he has been conducting new experiments to help fill the gaps.

He said he hoped to have his new paper written soon.

## PREVIOUS STUDIES

### Government test results

For years, industry officials pointed to a government study from the 1980s to



support their claim that flame retardants in household items gave people a fifteenfold increase in time to escape fires. But the study's lead author, **Vytenis Babrauskas**, said the industry was being "flat-out deceptive" about his findings and that retardants in typical home furnishings offered little to no fire protection.

### Obscure Swedish report

Industry often stated flame retardants prevented fires, reduced pollutants and saved society millions of dollars. But it turned out that a major foundation of these claims was a report documenting eight television fires in and around Stockholm. That report had nothing to do with flame retardants and was so obscure it was available only in Swedish.



# A new study, but flawed again

In May, a Tribune investigation revealed how the chemical industry distorted various scientific studies to justify the use of flame retardants in furniture. Since then, the industry has pointed to a new scientific paper as evidence that the chemicals are effective. But this new paper misleads the public much like the old ones.

## NEWLY CITED PAPER

Matthew Blais, a scientist at the Southwest Research Institute in Texas and an industry adviser, wrote a paper this year concluding that the flame retardants used in typical furniture provide valuable time to escape fires. His paper is an analysis of data that his lab staff collected for a separate arson study. For that study, his staff built and burned furniture mock-ups.

### CLAIM 1

When a chair without flame retardants is lit, it burns quickly, and the fire spreads throughout the room in about 3 minutes ...

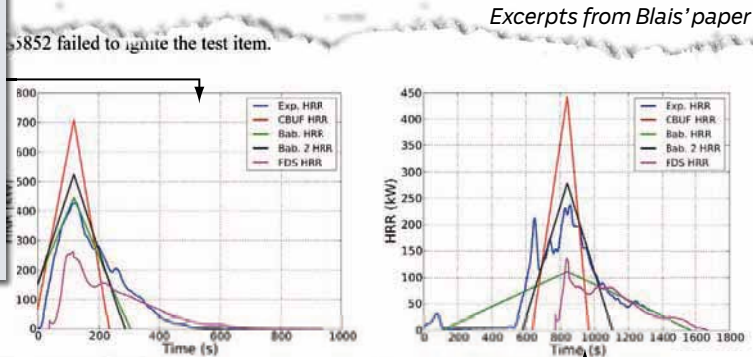


Figure 7: SOM121CS4

Figure 8: SOM221CS1

... but when an identical chair is covered in a fabric containing flame retardants, the fire doesn't spread until 13 minutes – giving people an extra 10 minutes to flee.

### FACT CHECK

Blais does not disclose that the flame-retardant fabric tested is not used in furniture but rather in theatrical curtains designed to self-extinguish. His staff bought it from a North Hollywood, Calif., fabric shop serving the film industry.

### RESPONSE

Although Blais' paper states that the fabrics used in the experiments were "common in furniture items that are currently on the market," he now says he is unsure.

### CLAIM 2

Flames spread more slowly on a chair with retardants in the cushion foam than on one with no flame retardants. Blais concludes that the chemically treated foam — the kind used in homes across America — "slows the onset of free-burning fire by more than doubling the time from ignition" to peak intensity.

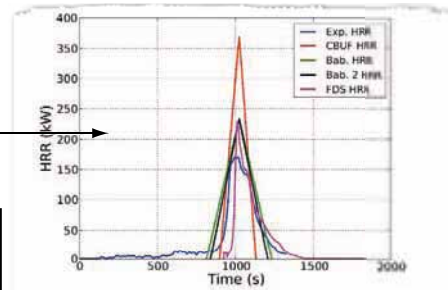


Figure 5: SRM131BB2 - CA TB 117 Urethane Foam

### FACT CHECK

Of the 79 mock-ups Blais' staff tested, only one was identified as taking an unusually long time to burn. The scientists determined the result was an outlier and removed it from their analysis. Even though his colleagues rejected the result as invalid, Blais highlighted it as his main evidence that the flame retardants in typical furniture slow fires.

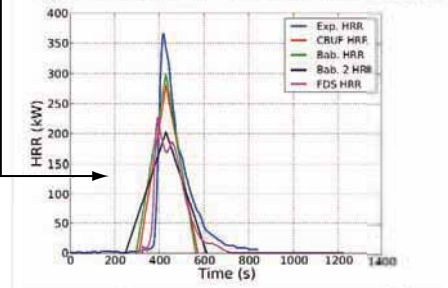


Figure 6: SRM111BS1 - Low density Urethane Foam

### RESPONSE

Blais gave varying explanations for highlighting the outlier result, including that "we have since generated more data showing that it's not really an outlier."