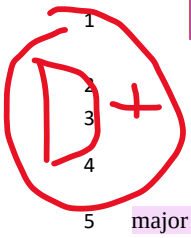
# Takata Airbags: An Ethical Failure for Engineering




Having manufactured airbags since 1988 [1], Takata Corporation became one of the major suppliers of safety equipment for automobiles in the world with about 20% market share [2]. Takata's own mission statement referred to their "responsibilities to society" to produce safe products for a safe world, and for their products to be something "people can rely on" [1]. Prior to the airbag recall discussed here, Takata already had a serious product recall on seatbelts in 1995 [3], which should have served as a warning sign to automakers and a wakeup call to the engineering staff. One of the earliest reports of death due to airbag explosion was in 2003 but was written off as an anomaly [4]. In 2009, after more deaths had been attributed to airbag malfunction, Honda made the first small recall [2]. It was not until 2014 that the National Highway Traffic Safety Administration (NHTSA) issued and order for Takata to recall its airbags [1]. Engineers at Takata had recognized some problems with the inflaters early in the design process but did not release that data until investigations had started. The initial testing was likely not sufficient to find the full extent of the problem since the explosions happened many years after car manufacture and installation. In deposition by Engineer Thomas Sheridan who working at the factories that designed and produced the inflaters, he stated that he attempted to examine failed parts, but they had already been discarded on orders from the vice president of engineering, Al Bernat [5]. Other Engineers who worked at the Moses Lake plant in Washington also made statements about concealing or falsifying information in similar ways. **By concealing this data from both regulatory bodies and vehicle manufacturers, Takata violated tenets 1,2, and 4 of ethics code of the American Institute of Chemical Engineers (AIChE) [6] and**

**Commented [OA(1]:** There is a major issue with your paper. None of your paragraphs start with a topic sentence. Although you have written five paragraphs, they are all short, and don't contain any critical thinking, which is one of the main objectives of writing this paper. I suggest you review the requirements again before writing the next revision. If you are confused or have questions, reach out to me and we can have a zoom meeting to discuss your paper.

**Commented [JDF2R1]:** Sterling. Please contact Anes and make an appointment with him to discuss your paper.

**Commented [OA(3]:** This is hardly enough funneling

**Commented [OA(4]:** There is still problem here, you go from talking about seatbelt to death related to airbags without telling the reader why you are writing about airbags, what is their problem, and how did Takata find itself in this situation.

**Commented [JDF5]:** Funneling. Up to this point (line 21), there is no mention of *engineering ethics*. The opening paragraph must use the writing technique known as *funneling* to provide smooth transitions from (a) background information on the Takata airbag scandal, into (b) the importance of engineering ethics in engineering practice, and (c) the paper's thesis statement (this paper's talking points and its purpose).

The reader should clearly understand that this paper's context is *engineering ethics* before the reader reaches the thesis statement.

**the first, second, and third fundamental canons of the National Society of Professional Engineers's (NSPE) [7] code of ethics in a way that led to multiple deaths and injuries for consumers, and extremely costly recalls for its vehicle manufacturing customers.**

Both engineering associations have first and foremost to "Hold paramount the safety, health, and welfare of the public" [6], [7]. Takata claimed to "dream of a society with zero fatalities from traffic accidents." However, it ignored early warnings in 1999 from then Chief Engineer Mark Lillie that their switch to ammonium nitrate would be dangerous for consumers [8]. The US branch also ran safety tests in which they edited the results to remove most of the failed results, passing this on to Honda [9]. Modifying test results to hide failures was a strategy to sell more parts rather than provide safe parts for those vehicles. While the engineers were not directly responsible for ignoring the warnings, they did not decide to reveal this information to the public or the authorities after it was obviously ignored. The lack of action left the public endangered and auto makers with defective parts in thousands of vehicles.

Both associations require avoiding deception, tenet eleven of the AIChE code [6] and fundamental canon five of the NSPE code [7], and engineering executives were intentionally deceptive with their concealment of potential instabilities in violation of the ethical codes. Documents from as early as 2004 show internal communications about falsified test results and data modification to conceal problems from auto manufacturers [9]. Engineers did not release findings until investigations started, leaving the illusion of safety for the public, and opening the door for corporate partners to be unwitting accomplices in the deceptions. Transparency and honesty are vital for the integrity of the engineering profession, and this case weakens that integrity in the public eye.

**Commented [OA(6]:** So the only issue presented in this thesis statement is concealing data. You need at least two issues, one for each paragraph

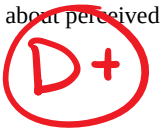
**Commented [OA(7]:** These comments apply to all your paragraphs:
- No topic sentence at the beginning of your paragraph.
- There is no actual critical thinking, just some information about the subject

**Commented [JDF8]:** The body of your report does not conform to the writing requirements for the second draft of this assignment.

**Commented [JDF9]:** Insert a comma and a single space between these references: [6], [7]

A commitment to protecting the environment is part of the first tenet in the AIChE ethics code [6], but public safety should have been paramount in the choice of accelerant. Takata partly chose ammonium nitrate as accelerant for the inflaters partly based on lower emissions when compared with the industry standard tetrazole, also introduced by Takata [10], and less toxic than the older option, sodium azide [11]. While well-meaning, this is a dubious choice considering ammonium nitrate's history of accidental explosions throughout the 1900s. Once the recalls were in full swing, automakers commissioned an outside investigation into the matter from Orbital ATK, which found fault with the design related to known instabilities with ammonium nitrate [12].

Accepting responsibility for actions and heed criticism is listed for both ethics codes as well. The engineering staff may have had undue pressure from company executives to stay quiet about perceived problems with their design.

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[4] E. Beech, B. Klayman. "Takata executive warns about ability to fix deadly air bag flaw." *Reuters*. https://www.reuters.com/article/us-autos-takata/takata-executive-warns-about-ability-to-fix-deadly-air-bag-flaw-idUSKCN0J40CD20141121 (accessed Nov. 8, 2020).

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[6] American Institute of Chemical Engineers. "AIChE Code of Ethics." https://www.aiche.org/about/governance /policies/code-ethics (accessed Nov. 8, 2020).

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[9] U.S. Senate Committee on Commerce, Science, and Transportation, Office of Oversight and Investigation Minority Staff Report. "Total Recall: Internal Documents Detail Takata's Broken Safety Culture and the Need for a More Efficient Recall Process." [Online] Available: https://www.commerce.senate.gov/services/files/04c489c1-36e8-4037-b60b-c50285f3e436 (accessed: Nov 9, 2020).

[10] T. Moran. "Slow Starter: Takata's Non-Azide Airbag Inflator Took a While to Catch On," *Automotive News*. https://www.autonews.com/article/19980223/ANA/802230779/slow-starter-takata-s-non-azide-airbag-inflator-took-a-while-to-catch-on (accessed Nov. 9, 2020).


**Commented [JDF10]:** Per Anes' comment below

**Commented [JDF11]:** IEEE reference style. Each reference should show the reference's publication date. If a publication date is not available, use the year number from the webpage's copyright notice which is usually shown at the bottom of each webpage (or sometimes it's on the website's ABOUT page). See also: http://journals.ieeeauthorcenter.ieee.org/wp-content/uploads/sites/7/IEEE-Reference-Guide_081920.pdf

**Commented [JDF12]:** Your in-text citations are (mostly!) done correctly, so good job with those citations, Sterling.

**Commented [OA(13]:** What is the references section title

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[11] E. Betterton "Environmental Fate of Sodium Azide Derived from Automobile Airbags." *Crit. Rev. in Environ. Sci. and Technol.* Vol. 33, no. 4, pp. 423-458, June, 2010. Accessed: Nov. 9, 2020. doi: 10.1080/10643380390245002. [Online]. Available: https://www.tandfonline.com/doi/pdf/10.1080/10643380390245002.

[12] Orbital ATK. "*Takata Inflator Rupture Root Cause Summary Report*." [Online]. Available: https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/orbital_atk_research_summary.pdf (accessed Nov. 2, 2020).

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