



Assignment Topic: Ethics in Engineering Case 01: The Intel Pentium® Chip

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1. Was this case simply a customer-relations and PR problem, or are there ethical issues to be considered as well? If so, what are they?

Ans: This matter was more complicated than merely a client-relations and public-relations problem. There are some ethical issues to consider as well. This is due to the fact that ITP continued to advertise its defective products after discovering a problem with their microprocessor immediately after selling a few of its chips. Secondly, they ignored the customers who could not locate the product's flaw and only changed the chips of those customers who came forward and requested it. This demonstrates the business's immoral attitude toward its customers and the services it renders to them. However, when it turned out that a different version of ITP's chip was experiencing the same problems, the company quickly acknowledged it and replaced all of the customers' chips. As a result, ITP adopted an ethical strategy this time and upheld strong client and public relations.

2. Use the IEEE Code of Ethics to analyze this case and identify all violations (identifying number is ok). Note: pay attention to issues of accurate representation of engineered products and to safety issues.

Ans: The preceding situation violates the first three principles of the IEEE Code of Ethics. They're as follows:

- 1. To accept responsibility in making decisions consistent with the safety, health, and welfare of the public, and to promptly disclose factors that might endanger the public or the environment.**

This rule was broken in this instance because the Pentium CPU flaws constituted a risk to user safety. One of the safety issues is that the computation results were incorrectly interpreted, which complicated ministry or ground

construction. The likelihood of casualties is therefore very high, which raises the probability of damage.

II. To avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist.

The engineers were aware of the problem, but they chose to keep it a secret. This demonstrated Intel's contempt for customers in order to maximize gains and violate the rule.

III. To be honest and realistic in stating claims or estimates based on available data.

However, Intel initially denied that there was a fault with the chip before asserting that the flaw was minimal.

3. Should you reveal defects in a product to a consumer?

Ans: Yes, from my point of view, I should reveal the defects in a product to a consumer.

a) Is the answer to this question different if the defect is a safety issue rather than simply a flaw?

Ans: No, the response would be the same whether the Pentium processor failure was a security issue or merely a flaw. This is due to the fact that most customers use computers to do complex computations that are impossible to resolve in the real world. In this situation, scientists or researchers utilizing computers with Intel Pentium chips may measure the data incorrectly. As a result, it was impossible to conduct an accurate bridge design and study. The bridges could therefore collapse, putting people in danger and causing accidents. This poses a serious safety concern for workers building the bridge digitally. It would be risky for the corporation to conduct its assessment entirely using this system due to the flaw in the floating-point unit that could lead to erroneous calculations.

b) Is the answer to this question different if the customer is a bank that uses the computer to calculate interest paid, loan payments, etc., or a hospital that uses the computer to control critical patient care equipment?

Ans: No. Because a defect in the floating-point unit, which led to errors throughout the process, is the fundamental problem with Pentium chips. This has effects on research as well as the financial industry, where computations are crucial. The software used to calculate interest paid or loan installments on Pentium CPUs was found to have one of the most serious issues. Banks struggle to determine how much money to lend to customers at what interest rate, so even the smallest error could jeopardize the entire financial system. Since the amount of money that banks should retain may differ from the estimated amount, a small miscalculation could lead to significant pressure. Because of this, it's possible that clients won't receive the correct loan payments, which will cost them in business.

4. Should you replace defective projects even if customers won't recognize the defect?

Ans: Regardless of when a customer purchases a product, the seller has a moral and professional duty to disclose any defects to the purchaser.

In this situation, I would replace the defective goods even if customers are not aware of the problem. This is so that I may fulfill both my professional and ethical obligations to replace any defective goods and to inform customers of any flaws or problems in the things they are buying.

The issue must be made known to the customer before he purchases the product. However, I would make every effort to avoid selling any defective goods, and even if I did by mistake, I would call the customer and inform him of the problem in addition to replacing the products in order to win the trust of the customers. In addition, it will boost customer confidence, which will help my business grow.

5. Is it ever possible to say that no defect exists in a product or structure? How thorough should testing be? (Note: use IEEE Code of Ethics as a guide to your answer)

Ans: Yes, it is possible to assert that there is no problem in the product or structure if the producer has completed all testing procedures and tested the product under all extreme situations and performance levels.

Testing is the measurement of a product's characteristics, levels of performance, and standards. Testing is done to make sure the product can carry out the tasks and produce the effects specified in its marketing and specifications. A product should go through extensive and exhaustive testing to ensure that it will work successfully even under the most demanding conditions. Product testing is important because it reveals the performance and capabilities of a product, which must be communicated to customers. This testing is essential for safety reasons as well, as it's important for consumers to understand the dos and don'ts of a product as well as how safe it is for them to use.

6. Do flaws that Intel found in earlier generation chips have any bearing on these questions? In other words, if Intel got away with selling flawed chips before without informing consumers, does that fact have any bearing on this case? Why or why not?

Ans: The flaws discovered by ITP in its microprocessor chip models have a bearing on how items are tested, replaced when they are broken, and examined for safety problems, among other things. This is because the defects in ITP's product were not obvious when it was first released to the market, but after a small number of units were sold, the company received complaints and criticism, to which it rapidly responded by replacing the problematic chips with new, repaired chips. Even after becoming aware of the fault or weakness in the chip, ITP continued to sell the product until the stock was depleted. This exemplifies ITP's unethical and illegal behavior. Despite this, ITP was able to sell defective chips to consumers without disclosing the flaw until the stock of the flawed chip was depleted.

7. G. Richard Thoman, an IBM senior vice president, was quoted as saying, "Nobody should have to worry about the integrity of data calculated on an IBM machine." How does this statement by a major Intel customer change the answers to the previous question?

Ans: According to Mr. G. Richard Thoman, an IBM senior vice president, customers shouldn't be concerned about the accuracy of data computed on an IBM system. This statement from such a well-known person considerably improves the bad perception of ITP. This is because IBM is a large ITP customer, and if IBM declared that its ITP system was error-free and completely functional, it would be a significant boost for ITP. It is a huge relief for ITP and its reputation in the market that all the unfavorable comments that it had to deal with have been reduced because of this IBM announcement.

8. Just prior to when this problem surfaced, Intel had begun a major advertising campaign to make Intel a household name. They had gotten computer manufacturers to place "Intel Inside" labels on their computers and had spent money on television advertising seeking to increase the public demand for computers with Intel processors, with the unstated message that Intel chips were of significantly higher quality than other manufacturers' chips. How might this campaign affect what happened in this case?

Ans: This business, ITP, had begun an extensive advertising and marketing campaign to make Intel a household name prior to the release of microprocessor chips with flaws. The corporation utilized every chance to sell its goods, which contributed to the underlying perception that ITP's goods are of greater quality than comparable products on the market. The public was persuaded by ITP to believe that the company and its goods are superior to those of its rivals thanks to the beginning of this kind of campaign. The firm was condemned for its faulty chips not long after starting this campaign, which had a big impact on the substantial advertising ITP had run before this issue was discovered. This is because when a

company widely advertises its products, consumers build favorable impressions of both the product and the company doing the advertising. The same thing happened to ITP; the bad news spread like wildfire or rendered all the company's advertising efforts worthless, leaving consumers even more suspicious of its products.

9. What responsibilities did the engineers who were aware of the flaw have before the chip was sold? (Again, check in with the IEEE Code of Ethics for your response)

a) After the chips began to be sold?

b) After the flaw became apparent?

Ans: The engineers might need to investigate the chip's standard before the chip was sold. As stated in section II.1 of IEEE Code, "Engineers shall hold paramount the safety, health, and welfare of the public." Engineers should only approve engineering documents that meet the required requirements.

- a)** After the chip was sold to the public, as stated in the section's III.1 of IEEE code, "Engineers should be guided in all their relations by the highest standards of honesty and integrity." Engineers are required to warn clients or employers when they believe a project won't be successful or has problems.
- b)** After the flaw became apparent, as stated in the sections II.3 of IEEE code, "Engineers should issue public statements only in an objective and truthful manner." Engineers must be objective and truthful while providing professional reports, remarks, or testimony.