

Cybersecurity, Compliance, and the Titanic Walk Into a Bar: Ethics Could Have Averted that Collision

by

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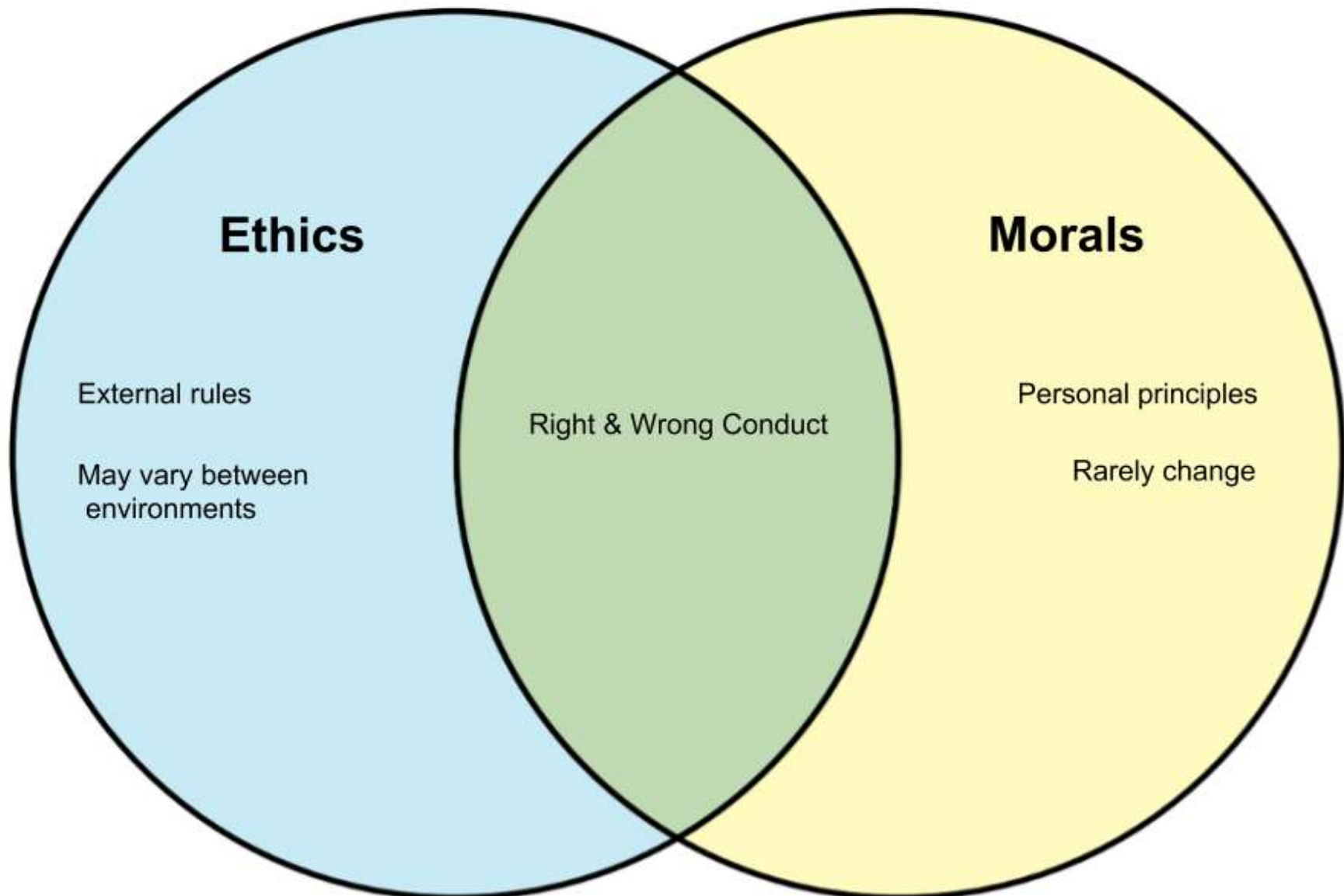
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A bit about me...

- Karla Carter
- Associate Professor of Cybersecurity at Bellevue University
- Teaching Information Technology Ethics since 2007
- ACM Committee on Professional Ethics (COPE) member
- IEEE Nebraska Section Member-At-Large & Student Activities Chair
- Curious, intense, and irreverent

“SAME fully supports and expects strict compliance by every member with all applicable laws and regulations in the conduct of business and professions.”



Ethics

External rules

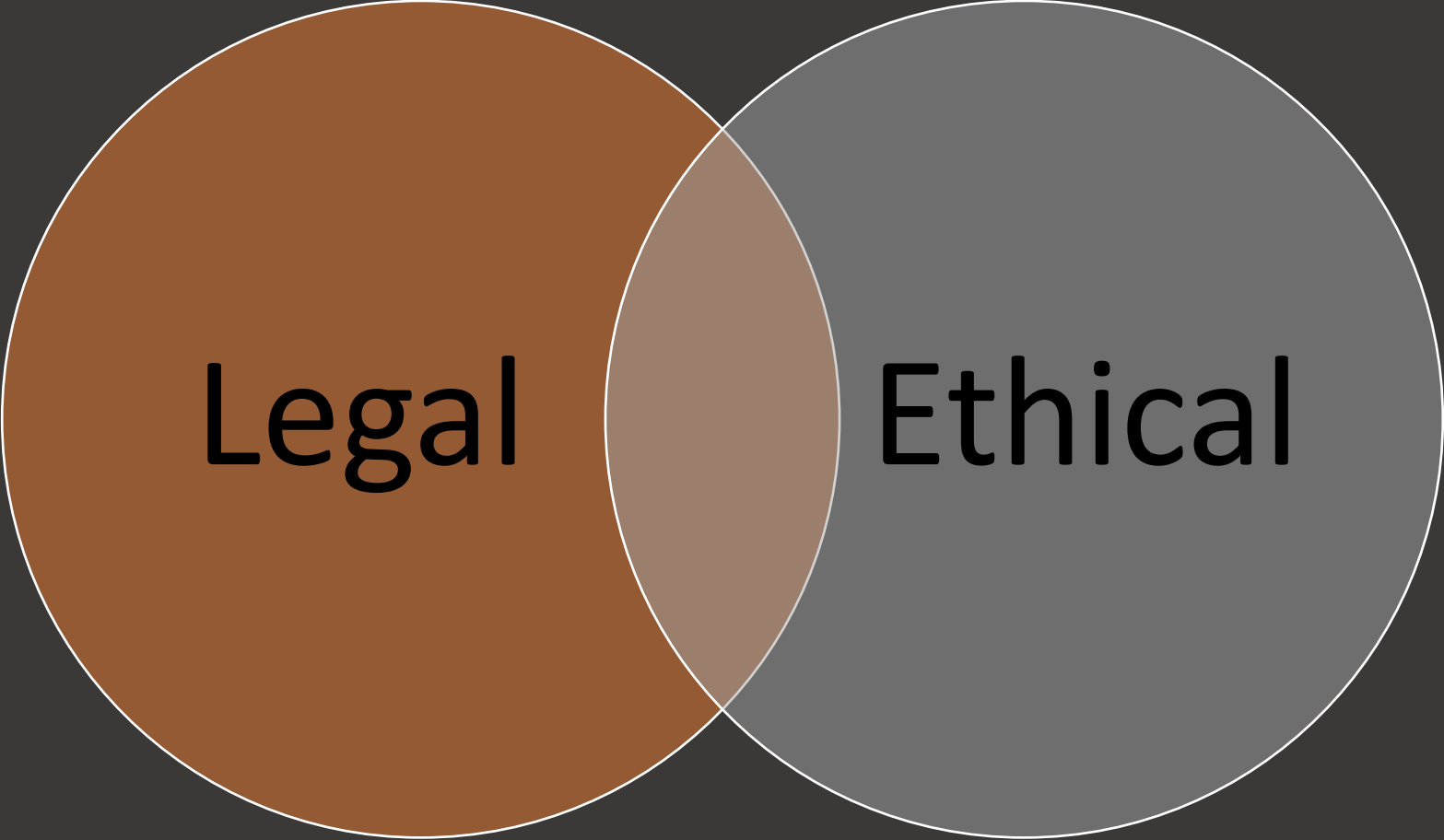
May vary between environments

Morals

Personal principles

Rarely change

Right & Wrong Conduct



Legal

Ethical

It's ethical to be in compliance

But mere compliance may not be ethical

And, now, some jokes...

Q. What do you get if you cross a dog with a vegetable?

A. Broc-collie





Q. What do you get if you cross a sea monster with a duck?

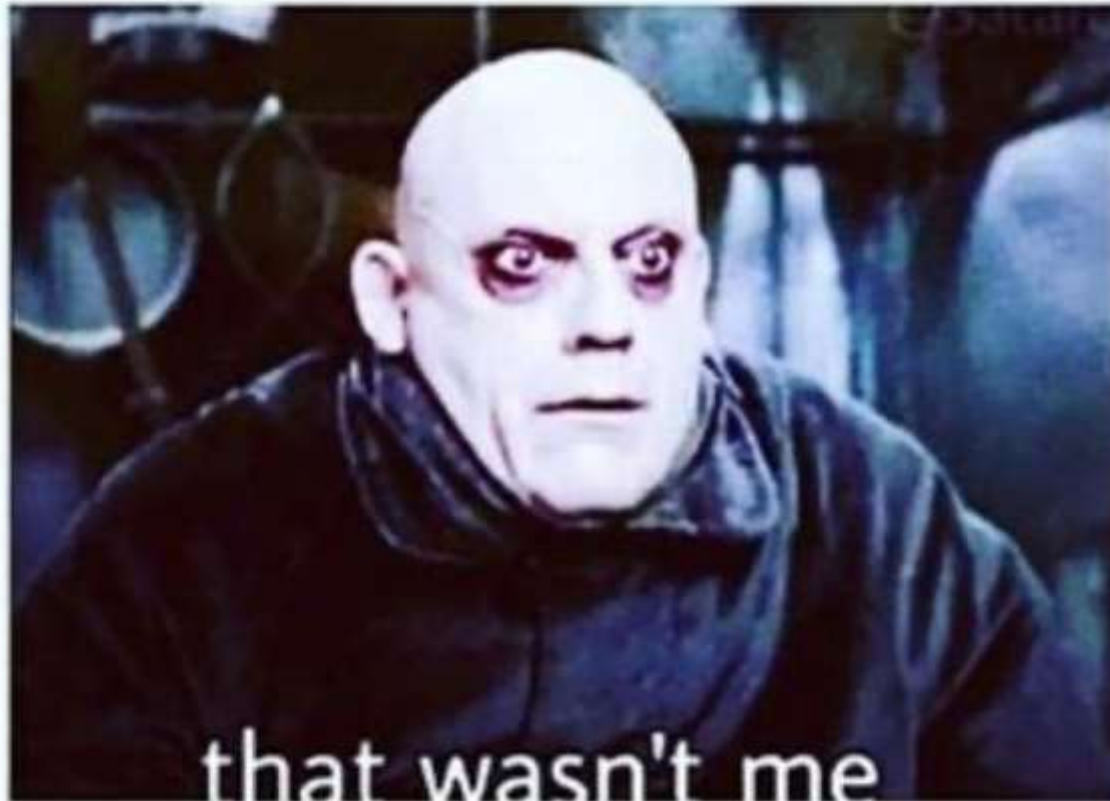
A. Quacken



Q. What do you get when you cross the Atlantic Ocean with the *Titanic*?

A. Halfway

When your dark humor
accidentally slips in front
of new people



that wasn't me

Conventional wisdom states people died
because *Titanic's* owners chose to have
fewer lifeboats
...but was that true?

A Night to Remember (1958)



"I don't think the Board of Trade regulations visualized this situation, do you?"

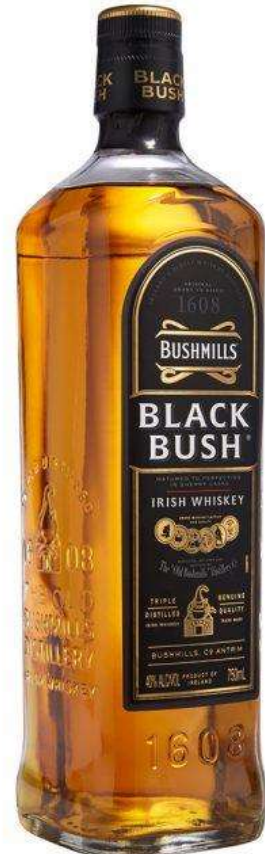
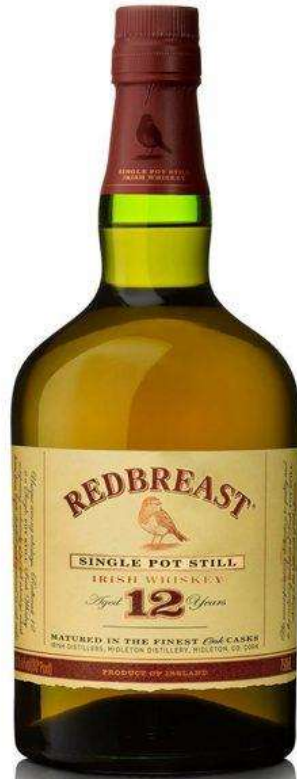
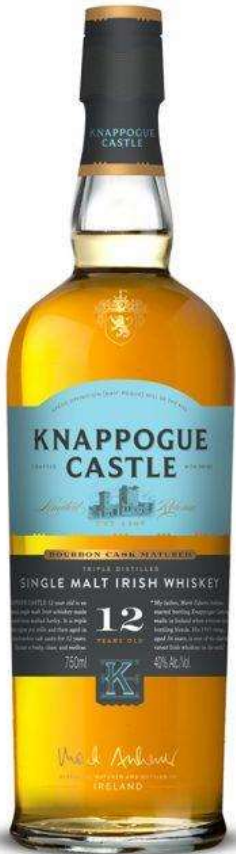
– Captain Edward Smith to Thomas Andrews

Titanic was actually in regulatory compliance with the lifeboat regulations of the day.



The lifeboat **capacity** of the Titanic was 64 vessels, meaning that the ship, had it filled all available space, could have saved over 4,000 passengers given that the average boat held 65 people. However, laws for lifeboat requirements for passenger ships had last been updated in 1896, sixteen years before the Titanic set sail. The twenty lifeboats actually on board at the time of the voyage could hold only 1,178 people out of 2,223 aboard. This was **compliant** with the law of the time in 1912. The given requirements that Titanic would have had to follow assigned the number of life boats based on the weight of the ship, not the number of passengers. The law specified that any passenger ship up to 10,000 gross registered tons was required to carry 16 lifeboats. As the law was outdated, ships were much larger than when it was first written. **Titanic weighed 46,329 gross registered tons, over four times what the law stipulated. Yet, it still only had to have 16 lifeboats. The ship designer even went beyond the law and added 20 lifeboats rather than 16.**





- “Harbor regulations are written in blood”
– quoted by a retired US Navy officer
- /writteninblood “A subreddit for historical events so negligent, bizarre, or catastrophic that they directly created new regulations and norms.”



International Convention for the Safety of Life at Sea (SOLAS) passed in 1914 and mandated enough lifeboats for those aboard, along with mandatory drills.

SO WHAT
REMODELING
WORK ARE
YOU DOING
BACK HOME?

WE'RE PAVING THE
MAIN ROAD WITH THIS
SPECIAL ASPHALT MADE
BY THOMAS GOOD AND
THE CHIN BROTHERS.



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WHO
ARE
THEY?

GOOD'S AN ASPHALT SPECIALIST
AND THE CHINS ARE THESE TEN
BROTHERS...TOGETHER THEY DE-
SIGN A SPECIAL ASPHALT THEY
NAMED AFTER THEMSELVES.



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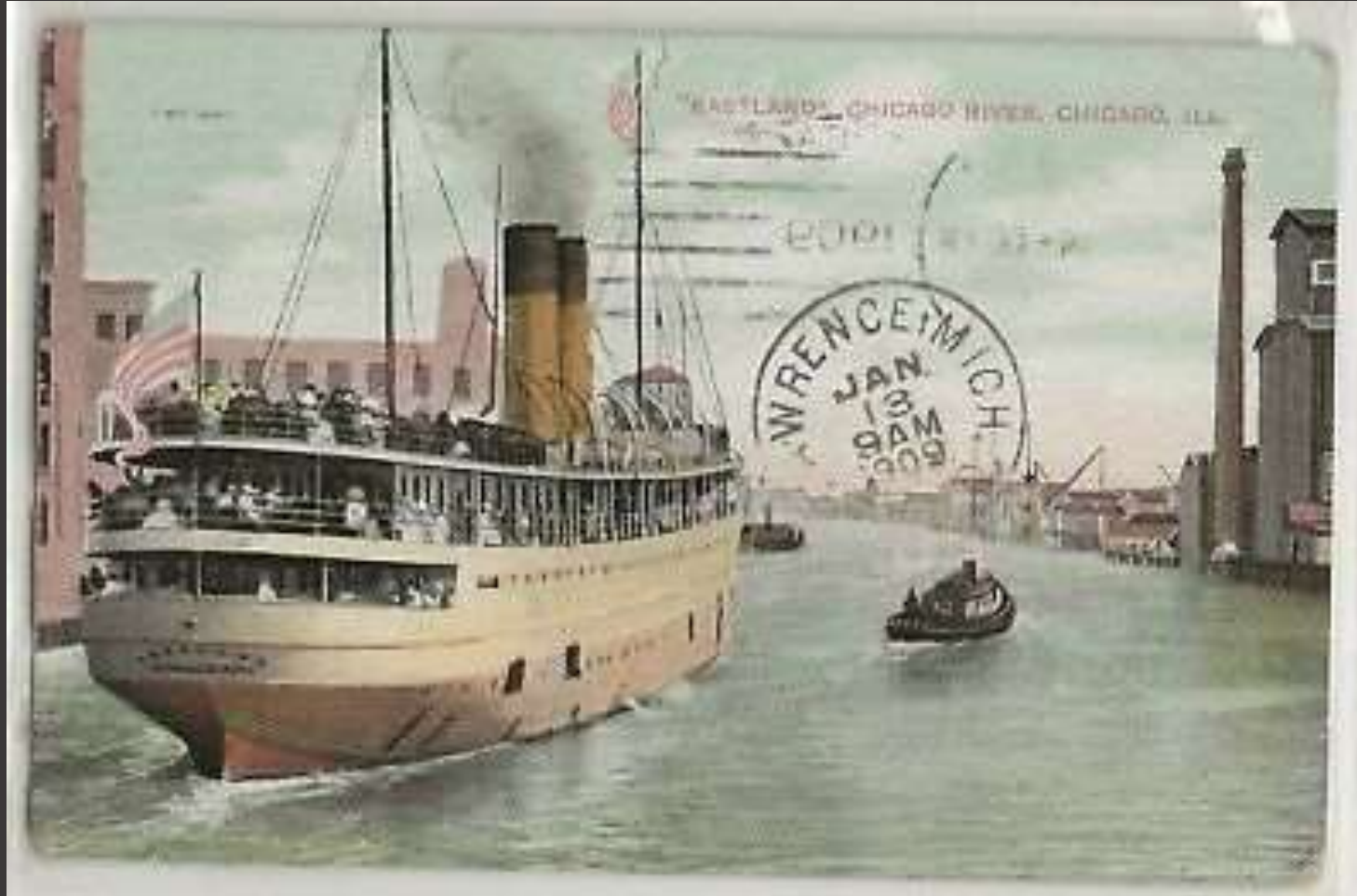
SO THE ROAD
TO HELL IS
PAVED WITH...

...GOOD AND
TEN
CHIN'S.

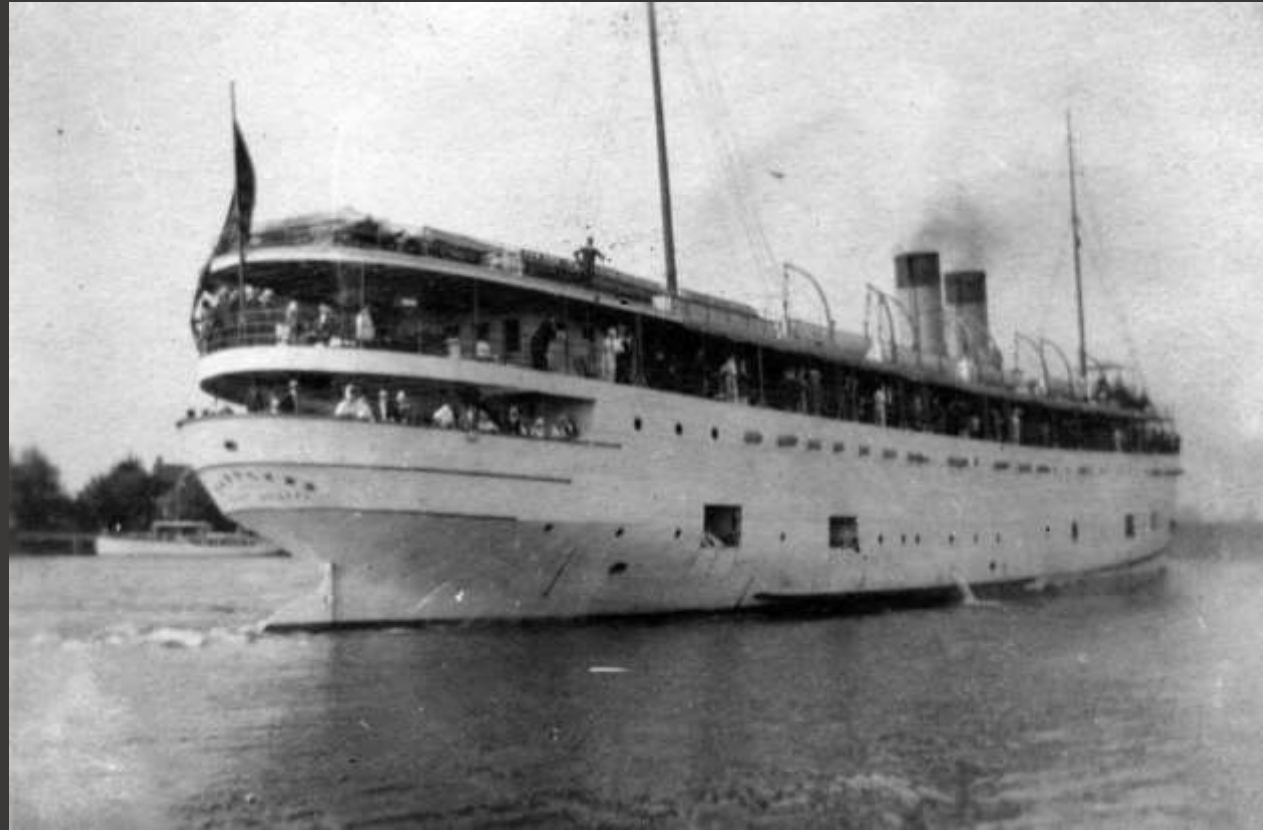


La Follette Seaman's Act
(1915)

SS Eastland (1909)



SS Eastland (1915)



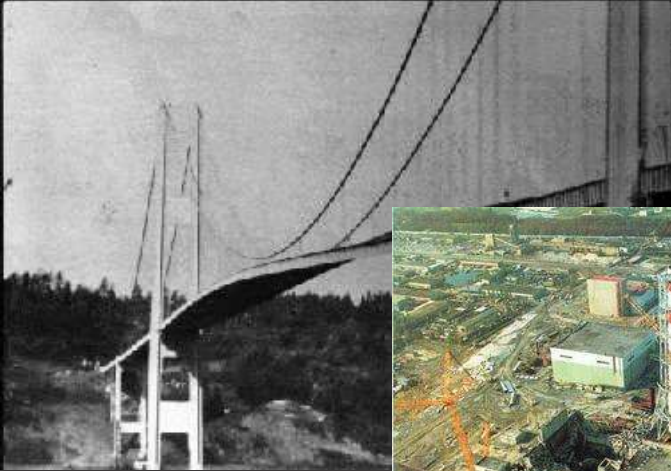




(Make sure the fixes don't create their own unintended bad consequences)



Engineering Failures



And now
for something
completely different...



ChatGPT



YT: GERMAN SOUND TV +



what are some military engineering failures that came about due to a reliance on compliance alone?



While it's hard to pinpoint failures specifically attributed to a reliance on compliance alone, there have been several military engineering failures in history that could be partly due to too much emphasis on following the rules or protocols without considering practical implications, feasibility, or ground realities.



Here are a few examples:

1. **The Maginot Line (France, 1930s):** This line of fortifications was built by France in the 1930s to deter German invasions. While it was a marvel of military engineering, it relied heavily on assumptions and specifications that proved flawed. The Germans bypassed it via Belgium during World War II, making the Maginot Line an expensive and ineffective solution.
2. **The F-35 Joint Strike Fighter Program (USA, Ongoing):** The F-35 program has been beset by numerous delays, cost overruns, and performance issues. One major criticism is that the program tried to meet too many different requirements from different branches of the military, leading to a "jack of all trades, master of none" scenario. This could be seen as a failure to challenge compliance with diverse requirements, at the expense of practical effectiveness.
3. **The Mark 14 Torpedo (USA, World War II):** Early in World War II, the US Navy's primary submarine torpedo was the Mark 14. However, the torpedo was fraught with issues, many of which were not discovered until after the start of the war due to inadequate testing and insistence on following design specifications. This is a case where blind compliance with design requirements led to a product that failed under actual war conditions.
4. **Sherman Tanks (USA, World War II):** The American M4 Sherman tank was criticized for being under-armored and under-gunned compared to its German counterparts, leading to high casualty rates among Sherman crews. Despite evidence from the field, American war planners stuck to their original specifications for the tank for far too long before starting to produce up-gunned and up-armored versions.

It's important to note that these failures are due to a combination of factors, not solely "reliance on compliance alone." Military planning and engineering is a complex process, where various factors including strategy, resources, and technology all play roles. Nevertheless, these examples show that strict adherence to rules or protocols, without questioning their applicability or effectiveness, can lead to costly failures.

Bard
(Google)



what are some military engineering failures that came about due to a reliance on compliance alone?



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There are many military engineering failures that have come about due to a reliance on compliance alone. Some examples include:

- The collapse of the Morandi Bridge in Genoa, Italy in 2018. The bridge was designed and built to comply with all applicable regulations, but it failed due to a combination of factors, including poor design and construction, and inadequate maintenance.
- The sinking of the MV Sewol ferry in South Korea in 2014. The ferry was overloaded and poorly maintained, and it capsized after hitting a rock. The disaster killed over 300 people, many of whom were students.
- The failure of the levees in New Orleans during Hurricane Katrina in 2005. The levees were designed to withstand a Category 3 hurricane, but they were breached by Katrina, which was a Category 5 hurricane. The flooding caused by the levee failures caused widespread damage and loss of life.

These are just a few examples of military engineering failures that have come about due to a reliance on compliance alone. It is important to remember that compliance is not enough to ensure safety and reliability. Engineers must also use their judgment and experience to design and build structures that are safe and reliable in all conditions.

Here are some of the reasons why compliance alone is not enough to ensure safety and reliability:

- Regulations are often based on historical data and experience. As conditions change, regulations may not keep up.
- Regulations can be complex and difficult to interpret. Engineers may misinterpret regulations, leading to unsafe designs.
- Regulations can be outdated or obsolete. New technologies and materials may not be covered by existing regulations.
- Regulations can be ignored or circumvented. Engineers may be tempted to cut corners or take shortcuts in order to save time or money.

It is important for engineers to be aware of the limitations of compliance and to use their judgment and experience to design and build structures that are safe and reliable.



how does ethics play a role in these failures?



Ethics plays a critical role in engineering, and military engineering is no exception. Ethical considerations involve issues of honesty, integrity, responsibility, respect for people's rights, concern for public safety, and sustainable development. In the context of military engineering, here's how ethics could be implicated in the cases mentioned:




1. **The Maginot Line:** Ethical implications here might include the question of whether it was responsible and honest to invest heavily in a defensive measure that relied on assumptions that were not adequately tested or that ignored possible alternatives (like a German attack through Belgium). Additionally, there's the matter of whether such spending was in the best interest of the French public, considering the dire consequences when the line failed.
2. **The F-35 Joint Strike Fighter Program:** This case involves ethical issues of transparency, public trust, and fiscal responsibility. Ongoing problems with the program, despite massive financial investment, raises questions about the proper stewardship of public funds, accurate reporting of progress and problems, and the responsibility to provide the military with functional equipment.
3. **The Mark 14 Torpedo and Sherman Tanks:** In these examples, ethics come into play with regard to the responsibility to provide reliable, safe, and effective equipment to military personnel. The failure to adequately test the Mark 14 torpedo and to react to the evident deficiencies of the Sherman tank may represent an ethical lapse in this duty of care. Further, there is an obligation to be honest and transparent about these issues once they become apparent, so that they can be rectified.

In general, the ethical dimensions of these cases could be seen in terms of responsibilities to military personnel, the public, and even to opponents in war (under the principles of just war theory, which includes avoiding unnecessary harm). Adherence to high ethical standards could help to avoid such failures, as it promotes rigorous testing, transparent reporting, responsible use of resources, and due attention to the potential human cost of military actions.



how does ethics play a role in these failures?



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Ethics plays a role in military engineering failures in a number of ways. First, ethics can help engineers to make decisions that are in the best interests of society. For example, engineers may be faced with a decision about whether to design a weapon that is more powerful or more destructive. An ethical engineer would consider the potential consequences of their decision, both for the people who would use the weapon and for the people who would be affected by its use.

Second, ethics can help engineers to avoid making decisions that are motivated by self-interest or greed. For example, an engineer may be offered a bribe to design a weapon that is less safe or less effective. An ethical engineer would refuse the bribe, even if it meant losing their job.

Third, ethics can help engineers to communicate effectively with each other. For example, engineers may be working on a project that involves a number of different stakeholders, each with their own interests and concerns. An ethical engineer would take the time to listen to all of the stakeholders and to try to find a solution that is acceptable to everyone.

In conclusion, ethics can play a vital role in preventing military engineering failures. By following ethical principles, engineers can make decisions that are in the best interests of society and that avoid putting people at risk.

Here are some of the ethical principles that can help engineers to prevent military engineering failures:

- **Do no harm:** Engineers should always strive to design and build structures that are safe and reliable. They should never put people at risk, even if it means sacrificing their own interests or career.
- **Be honest and transparent:** Engineers should always be honest with their clients and with the public about the risks and benefits of their designs. They should not make false promises or hide information that could be important to decision-making.
- **Be accountable:** Engineers should be held accountable for their actions. If they make a mistake, they should be willing to admit it and to take steps to correct it.

By following these ethical principles, engineers can help to ensure that military engineering projects are conducted safely and ethically.



Can you go deeper into the ethical implications of the Maginot Line?



Absolutely. The Maginot Line, a vast network of fortifications along the French-German border, has often been used as an example of a military engineering failure due to its ineffectiveness in preventing a German invasion during World War II. This case carries several ethical implications, particularly around the values of honesty, responsibility, and respect for the public's welfare.



1. **Honesty and Transparency:** The Maginot Line was built based on the belief that it would deter a direct German attack, a belief grounded in the experiences of the First World War. If the military and political leaders knew about the limitations of the Line but chose to undercommunicate them or downplay them to the public, there would be a breach of honesty. It's also possible that these leaders genuinely believed in the Line's effectiveness, in which case the ethical issue might lie in a failure of self-scrutiny and open discussion of the assumptions underlying their strategy.
2. **Responsibility and Diligence:** Building the Maginot Line was a massive investment of public funds. If decision-makers didn't adequately consider or prepare for possible alternatives to a direct attack (such as the eventual German strategy of invading through Belgium), this could be seen as a failure of due diligence in the stewardship of public resources. Moreover, they had a responsibility to adapt their defensive strategies as new information and technology became available, and their failure to do so could be seen as an ethical lapse.
3. **Respect for Public Welfare and Safety:** The ultimate purpose of the Maginot Line was to protect the French public from the horrors of another war. However, the overreliance on this fortification system may have actually put the public at greater risk, as it proved inadequate in the face of Germany's innovative military strategies. This raises questions about whether the French leadership properly prioritized the safety and wellbeing of their citizens.
4. **Prudent Risk Management:** If the French military and political leadership did not properly consider or plan for the possibility that their assumptions about the effectiveness of the Line could be wrong, this could be seen as a lack of prudent risk management. This might be seen as an ethical issue insofar as it involved a failure to consider the potential human cost of their decision.

In summary, the Maginot Line's failure raises several ethical issues, particularly around the values of honesty, responsibility, and respect for the public's welfare. These issues underline the importance of ethical considerations in military engineering and strategic planning.



ChatGPT brought up the Maginot Line as a failure of military engineering ethics. What are your thoughts on that?



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✦ The Maginot Line was a system of fortifications built by France along its border with Germany in the 1920s and 1930s. The line was designed to deter a German invasion, but it ultimately failed to do so. In 1940, Germany invaded France through Belgium, bypassing the Maginot Line altogether.

The Maginot Line has been criticized as a failure of military engineering ethics for a number of reasons. First, it was built on the assumption that Germany would attack France head-on, which was not the case. Second, it was built without considering the possibility of Germany using new technologies, such as tanks and airplanes, which ultimately made the line obsolete. Third, it was built at a great cost, which could have been better spent on other military projects.

The Maginot Line is a reminder that military engineering is not just about building fortifications. It is also about understanding the enemy's strategy and tactics, and about using new technologies to your advantage. Engineers who fail to consider these factors are putting their countries at risk.

In addition to the ethical concerns raised by ChatGPT, the Maginot Line also had a number of practical problems. For example, it was very expensive to build and maintain. It also required a large number of troops to defend, which could have been used elsewhere. Additionally, the line was not very flexible, and it could not be easily adapted to changes in the battlefield.

Overall, the Maginot Line was a failure of military engineering. It was expensive, inflexible, and ultimately ineffective. It is a reminder that engineers must always consider the ethical and practical implications of their designs before they build them.



I'm giving a talk on ethics to military engineers - what do they need to know to future-proof their jobs given advances in AI technologies?




The advent of AI and other advanced technologies in military engineering presents both exciting opportunities and challenging ethical questions. Here are some considerations military engineers should be aware of to future-proof their roles:



1. **Understanding AI:** A fundamental understanding of AI, machine learning, and data analytics is crucial. Even if an engineer isn't directly working on AI, it's important to understand how these systems work, how they can be applied in a military context, and what their limitations are.
2. **Bias in AI:** AI systems are only as good as the data they are trained on. If the training data contains biases, the AI system will likely perpetuate those biases, leading to unfair or even harmful outcomes. Military engineers need to be aware of this and work to minimize bias in the AI systems they develop or deploy.
3. **AI Transparency and Explainability:** As AI systems become more complex, it's becoming increasingly difficult to understand why they make the decisions they do. This is a significant issue in a military context, where understanding decision-making processes is often crucial. Military engineers should strive to prioritize transparency and explainability in the AI systems they work with.
4. **Accountability and Responsibility:** With AI systems potentially making life or death decisions in a military context, determining who is accountable for these decisions becomes complex. Engineers need to be mindful of this issue and work within frameworks that ensure proper human oversight and accountability.
5. **Security and Robustness:** AI systems in the military must be robust against adversarial attacks and cyber threats. Engineers should prioritize building and maintaining secure systems to protect against these risks.
6. **Ethics and Laws of War:** AI in warfare must abide by international humanitarian law, including principles of distinction (differentiating between combatants and civilians), proportionality (avoiding excessive force), and necessity (using only the force necessary to achieve a military objective). Engineers should be versed in these principles and how they apply to AI.
7. **Continual Learning and Adaptation:** The field of AI is rapidly evolving, and engineers will need to continue learning to stay relevant. This includes staying abreast of technical developments, but also legal and ethical discussions surrounding AI use in the military.
8. **Interdisciplinary Collaboration:** Engineers should actively seek input from ethicists, legal experts, and other relevant stakeholders when developing or deploying AI systems. This can help to ensure that ethical considerations are taken into account throughout the process.

By paying careful attention to these areas, military engineers can play a crucial role in ensuring that AI is used responsibly and effectively in a military context. They can help to shape a future where AI not only enhances military capabilities, but also upholds the highest ethical standards.



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Here are some things that military engineers need to know to future-proof their jobs given advances in AI technologies:

- **AI is changing the way wars are fought.** AI is being used to develop new weapons and technologies that are more powerful and more destructive than ever before. This means that military engineers need to be prepared to design and build systems that can withstand these new threats.
- **AI is also being used to automate tasks that were once done by humans.** This means that military engineers need to be prepared to adapt to new ways of working and to find new ways to add value to their organizations.
- **AI is raising new ethical concerns.** As AI becomes more powerful, it is important to consider the ethical implications of its use. Military engineers need to be aware of these concerns and to make sure that they are using AI in a responsible way.

Here are some specific tips for military engineers who want to future-proof their jobs:

- **Stay up-to-date on the latest AI technologies.** The field of AI is constantly evolving, so it is important for military engineers to stay up-to-date on the latest developments. This can be done by reading industry publications, attending conferences, and taking online courses.
- **Develop skills in data science and machine learning.** AI is based on data science and machine learning, so military engineers who want to future-proof their jobs need to develop skills in these areas. This can be done by taking courses, reading books, and working on projects that involve data science and machine learning.
- **Become an expert in a particular area of AI.** There are many different areas of AI, such as natural language processing, computer vision, and robotics. Military engineers who want to future-proof their jobs should become an expert in a particular area of AI. This will make them more valuable to their organizations and will give them a better chance of finding a job in the future.
- **Become a leader in the field of AI.** Military engineers who want to future-proof their jobs should become a leader in the field of AI. This can be done by publishing papers, giving talks, and starting a company. By becoming a leader in the field, military engineers will be able to shape the future of AI and ensure that their skills are in demand.



Absolutely, let's look at the overlaps and how they align with the points I made:



1. **AI in warfare:** Both points underscore that AI is drastically changing warfare. It's being used to develop more powerful weapons and technologies, and it can also automate tasks that humans once performed. This corresponds with my emphasis on understanding AI, its possibilities, and its limitations in the military context.
2. **New Ethical Concerns:** Both inputs stress the emergence of new ethical issues due to AI's increased capabilities. These issues relate to the design, development, and use of AI in warfare and the importance of using AI responsibly, which is in line with my points about bias in AI, transparency and explainability, accountability, and adhering to the ethics and laws of war.
3. **Staying Updated:** The importance of staying up-to-date with the latest developments in AI is a common theme. This can be achieved through reading industry publications, attending conferences, and taking relevant courses, which aligns with my point about continual learning and adaptation.
4. **Developing Skills in Data Science and Machine Learning:** AI's foundations lie in data science and machine learning, making it crucial for military engineers to develop these skills to remain relevant, matching my advice on understanding AI and data analytics.
5. **Becoming an AI Expert:** Specializing in a specific area of AI, such as natural language processing, computer vision, or robotics, is suggested for job security and value addition, which aligns with my point about understanding AI and its various aspects and applications.
6. **Leadership in AI:** Aspiring to become a leader in the field of AI, through means such as publishing papers and giving talks, ensures skills are in demand, aligning with my points on leadership, interdisciplinary collaboration, and contributing to shaping the future of AI in a responsible and ethical manner.
7. **Security:** Both inputs highlight the importance of creating AI systems robust enough to withstand new threats and adversarial attacks.

By combining these areas of overlap, military engineers can ensure they are well-prepared for the future impact of AI on their profession.



One last thing....

“I can do that. I’ll just need it in writing.”

Questions?
Comments?