

Paper title: Sacrificing Safety in the Name of Innovation: The OceanGate Titan Disaster

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Author: Danny Marchant

Secondary author: Elisabeth Arnold Weiss (research advisor)

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## Sacrificing Safety in the Name of Innovation: The OceanGate Titan Disaster

In 2023, the OceanGate Titan submersible embarked on a mission to visit the Titanic, ending in a catastrophic implosion and the loss of all five souls on board. Despite successful missions descending to the Titanic before, OceanGate and founder Stockton Rush repeatedly ignored warnings, had an insufficient pressure depth testing plan, oversimplified the submersible's design, and sacrificed safety in the name of innovation. Design choices such as a carbon fiber hull and oversimplified controls were chosen and made the company appear to be on the cutting edge of new maritime technology. However, these critical choices would end up being detrimental to the Titan's final voyage. While accident reports remain ongoing, early reports have shown that the most likely outcome of the Titan was the cracking of its hull, which had previously experienced problems and had not undergone a rigorous amount of testing, as should be required for an ocean floor expedition submarine. Final accident reports will likely further characterize how the lack of proper equipment and testing had decreased the Titan's chance of success.

Regardless of the true catastrophic failure the Titan experienced, the company's ambitions to conquer the frontier of deep-sea exploration resulted in poor ethical standards. The Titan also serves as a modern parallel to the ship it was intent on exploring; the Titanic notoriously sank due to an iceberg, as the ship had been poorly tested in rough conditions. In the growing age of extreme adventures, OceanGate's lack of proper testing and overconfidence in its engineering resulted in a culture that was socially responsive to meet demand but lacking in social responsibility. Ethical standards must be established and enforced for start-ups who push the envelope in extreme environments to foster a spirit that emphasizes discovery while prioritizing safety. Additionally, countries must collaborate to ensure basic, proper regulations can be enforced in international spaces, such as the mid-Atlantic, to prevent more disasters at sea.

The OceanGate disaster can be used as a valuable lesson to educate the future leaders of engineering. Cultural vitality and social responsiveness must come from the design of the technology itself rather than the dreams and ideas of one person. This shift encourages a collaborative engineering community during design and development to provide a diverse range of perspectives. Emerging leaders in technology must serve as role models for those who endeavor new technology and must demonstrate responsible and ethical engineering while still striving for innovation. Additionally, sound engineering choices benefit society as a whole. Had OceanGate not sunk, the American and Canadian coast guards would not have spent millions attempting to locate the submarine on the ocean floor. Another key influence the Titan sinking has had is the new perception of danger among the public about deep sea exploration, which has generally changed the public opinion to become opposed to important private company missions that could serve as a great benefit to science in the future. By learning from the OceanGate

disaster, future society can benefit by producing and maintaining an ethical, educational, and inventive exploration industry, both at sea and beyond.