

The Grounding of Titanic

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Explores the hypothesis that that Titanic grounded on an underwater shelf of the iceberg.

Presented for consideration by the

1.0 Purpose - The purpose of the paper is to set forth the argument that *Titanic* grounded on an underwater shelf of the iceberg, compromising her double bottom structure. The combination of direct impact damage suffered along the ship's bottom and subsequent racking damage which parted plates along her starboard side allowed enough water into the hull so that the internal subdivision was overwhelmed.

The definitions for nautical terminology of relevance to this discussion can be found in Appendix I.

1.1 Assumptions - For purposes of this discussion, it is assumed that *Titanic* was turning *towards* the iceberg at the time of collision and that her reciprocating engines were stopped. The rationale for this assumption is detailed in Appendix II.

1.2 Descriptions - A reference for Titanic's structure and internal subdivision can be found in Appendix III. A physical description of the iceberg is detailed in Appendix IV.

2.0 Collision

The most significant aspect of *Titanic's* iceberg encounter was that most people on the ship did not realize anything particularly unusual or important had happened. The majority of passengers slept through the most fateful seconds of their lives. Aside from those located deep within the forward portion of the ship, no one felt a great impact, or heard a deafening roar. There was only a slight tremble or a distant noise:

"It is best described as a jar and a grinding sound. There was a slight jar followed by this grinding sound....then thinking it over it was a feeling as if she may have hit something with her propellers....There was a slight jar followed by the grinding--a slight bumping...naturally, I thought it was from forward...[the grinding noise] lasted a matter of a couple of seconds..."

C.H. Lightoller, Second Officer, Officer's Quarters

"Well, I did not feel any direct impact, but it seemed as if the ship shook in the same manner as if the engines had been suddenly reversed to full speed astern, just the same sort of vibration, enough to wake anybody up if they were asleep...Not as if she hit anything straight on - just a trembling of the ship."

Able Seaman Joseph Scarrott, Forecastle Head

"At the time of the collision I was awake and heard the engines stop, but felt no jar. My husband was asleep."

Emily Bosie Ryerson, Passenger, Cabin B-63

C.E. Henry Stengel, Passenger, Cabin C-116

"There was just a small motion, but nothing to speak of..."

Pantryman A. Pearcey, 3rd Class Pantry, F Deck

Anecdotal evidence of this nature is normally treated with deserved circumspection by forensic accident examiners. However, in this instance, we have more than a single random observation. Many of the eyewitness descriptions of the impact contain common key elements: the event lasted only a few seconds, there was no strong jolt, a faint noise (sometimes described as a grinding of metal) emanated from the bottom of the ship. Equally significant are the details that are universally lacking from eyewitness descriptions. There were no tales of people being flung from the upper bunks by the force of the crash. No first-class passengers were pitched headlong down the famous Grand Staircase. Tables remained upright and drinks did not spill in the smoking rooms. Overwhelming agreement of survivors was that the meeting of *Titanic's* 53,000 tons (displacement) of steel with probably hundreds of thousands of tons of ice was a soft event.

Ship collisions with icebergs are usually not soft events. Three days prior to *Titanic's* fatal accident, another ship ran into the same field of ice. The French passenger liner *Niagara* ran headlong into an iceberg on the evening of Thursday, April 11, 1912. That accident occurred while passengers were enjoying dinner. The result was devastating, if press accounts, such as the following from the *New York Herald*, can be believed:

Passengers were hurled headlong from their chairs and broken dishes and glass were scattered throughout the dining saloons. The next instant there was a panic among the passengers and they raced screaming and shouting to the decks..."I thought we were doomed," said Captain Juham yesterday. "At first I feared we had been in collision with another vessel as I hurried to the bridge. But when I saw it was an iceberg and that we were surrounded by ice as far as we could see through the fog, my fears for the safety of the passengers and the vessel grew....I am sure Captain Smith had a similar experience in practically the same locality when the Titanic went down."

New York Herald

April 17, 1912

Despite their hair-raising experience, all passengers aboard the French liner survived, and the ship made its way to port. Perhaps because of *Niagara's* survival, it has become fashionable to blame First Officer Murdoch for not hitting the berg squarely on the bow. This, of course, is not a practical solution for a deck officer, no matter the imagined benefits. The discussion about a head-on collision, though, brought out an interesting point about the effect of a collision against the bow of a large ship, such as *Titanic*. Edward Wilding, the senior Naval Architect under Thomas Andrews at Harland & Wolff, testified during the British Board of Trade (BOT) Enquiry that in the case of a head-on collision, the bow of *Titanic* would have deformed much like the "crumple zone" of a modern automobile. This crumpling would have dissipated much of the force of the blow by spreading it out over several seconds. According to Wilding, telescoping of the ship in this manner would have reduced injuries among passengers and crew who were lucky enough not to have been trapped in the compacted sections of the bow.

While less dramatic than a head-on impact, the more-often invoked "glancing blow" at 22.25 knots would have created its own kind of havoc. At impact, the deck would have jumped sideways relative to anything not riveted to it. This "rebound effect" would have been as disruptive to people in the forward third of the ship as a major earthquake is in a large hotel ashore: sleeping third-class passengers in the bow would have been tossed out of their bunks; personal items would have been sent flying; people walking in the corridors would have been thrown to the deck. Either type of impact - head-on or glancing - would have been an unforgettable experience. None of the more than seven hundred survivors recalled such a dramatic event. Except for the men in the stokeholds, the

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