NUMBER 295 • FALL 2015

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THE MAGAZINE OF ENGINE-POWERED VESSELS FROM THE STEAMSHIP HISTORICAL SOCIETY OF AMERICA

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Night Boat

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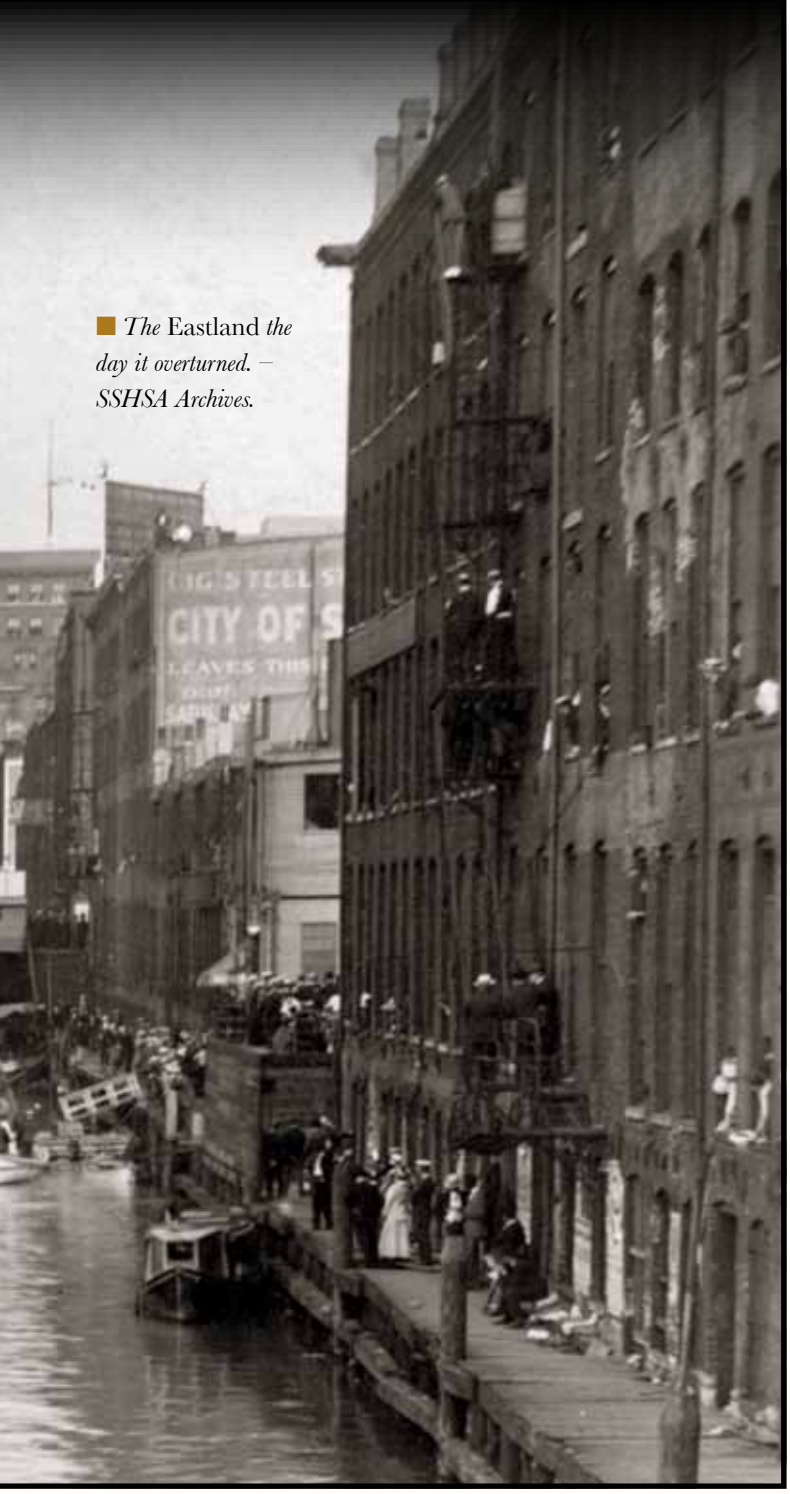
STEAMSHIP HISTORICAL SOCIETY OF AMERICA 80th ANNIVERSARY

Remembering The EASTLAND:

A LASTING LEGACY

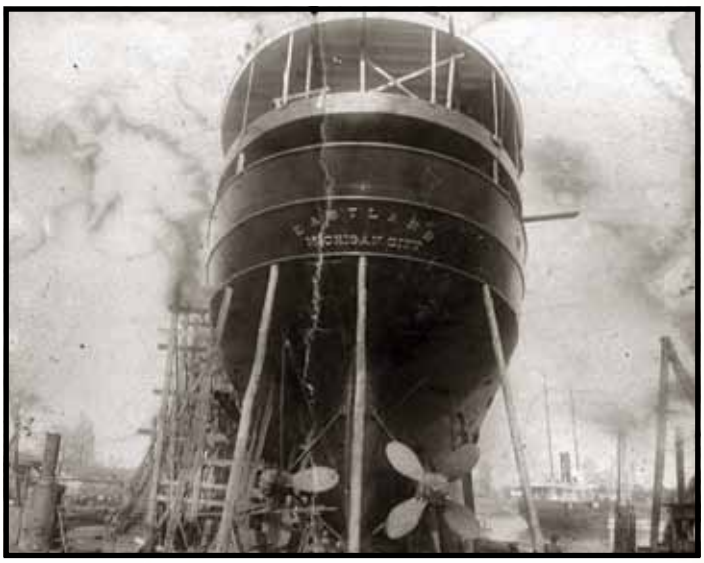


■ *The* Eastland *the day it overturned. – SSHSA Archives.*

by CAPT Eric Christensen, USCG (Ret)

July 24, 2015, marked 100 years since the capsizing of the passenger steamer *Eastland*. With the loss of 844 souls – 841 passengers and three crew – the *Eastland* disaster ranks as one of the greatest losses of life in U.S. maritime history, surpassed only by the fires onboard the *Sultana* in 1865 and the *General Slocum* in 1904. The *Eastland* wasn't lost because of fire, and it didn't sink in the open ocean without enough lifeboats like the *Titanic* three years earlier. The *Eastland* capsized at the dock in the Chicago River as a result of being in an unstable condition. The *Eastland*'s initial construction and significant modifications, all done without regard for stability, made the casualty inevitable. Changes in regulations, made after the disaster, remain today and serve as an enduring tribute to the men, women and children who perished that day.

A Cranky Vessel



■ Eastland *under construction in 1903. – Photo courtesy of the Eastland Disaster Historical Society.*

The *Eastland* was designed and built by the Jenks Shipbuilding Company of Port Huron, Michigan, in 1903. She was the first and only passenger vessel built by Jenks, a yard known for building Great Lakes freighters. Sidney Grant Jenks, the designer of the *Eastland*, consulted his naval architecture professor from Cornell University, George McDermott, on the initial design. The vessel would need to carry 2,000 passengers with 500 overnight passengers in cabins. She would also carry a cargo of fruit on the main deck across Lake Michigan. Her twin screws coupled to two triple expansion steam engines were designed to give her

redundancy and a predicted speed of 20 knots. The vessel had to be fast and it also had to have a reduced draft in order to make it into shallow ports such as South Haven, Michigan.

The resulting long, narrow and shallow design had a short metacentric height, which was preferred on passenger vessels because it had a longer roll period, and was more comfortable for the passengers and crew. After the metacentric height was calculated for the *Eastland*'s design, the shipyard apparently changed the design by reducing the length 60 feet and adding an additional deck for passengers.[1] No inclining tests were conducted by the builders, owner or inspectors after the changes to determine the new metacentric height. Vessel safety regulations of the time, administered by the Steamboat Inspection Service, did not call for such tests.

Because of her shallow draft the *Eastland* was designed with water ballast tanks, which could be filled once the vessel cleared shallow water ports and sandbars, for transit across the lakes. The ballast system consisted of 10 double-bottom ballast tanks, five port and five starboard. The manifold design did not allow for pumping water from one side of the vessel to the other, or for taking water in on one side while discharging from the other. There were no meters or gauges to determine how much water was in the tanks. The engineers estimated how much water was in the tanks by how long the pumps had been running. Dip sticks were used in the vent lines as a rudimentary way to measure the water level in the tanks.

■ Eastland *under construction in 1903. – Photo courtesy of the Eastland Disaster Historical Society.*

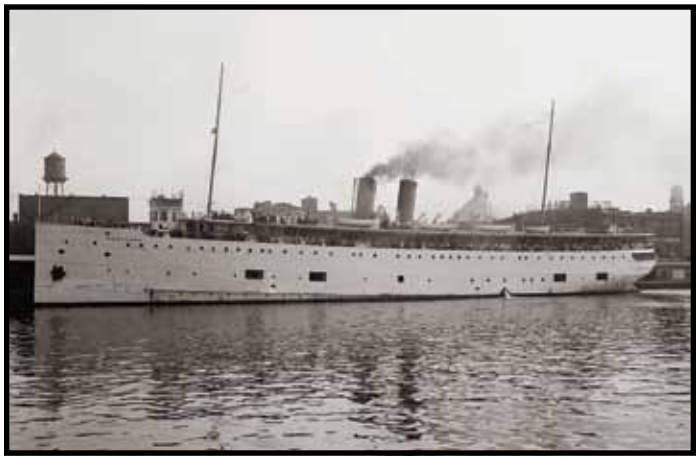
■ *The* Eastland *docked in 1906. – Photo courtesy of the Eastland Disaster Historical Society.*

The *Eastland,* completed in July 1903, was 265 feet long, 38 feet wide and drew 14 feet of water. Her initial capacity was 2,800 passengers. Passenger capacity was determined solely by the Steamboat Inspection Service's Local Board of Inspectors. Local inspectors used their experience and took vessel type and local operating conditions into consideration when determining passenger capacity. This led to inconsistent passenger limits on vessels.

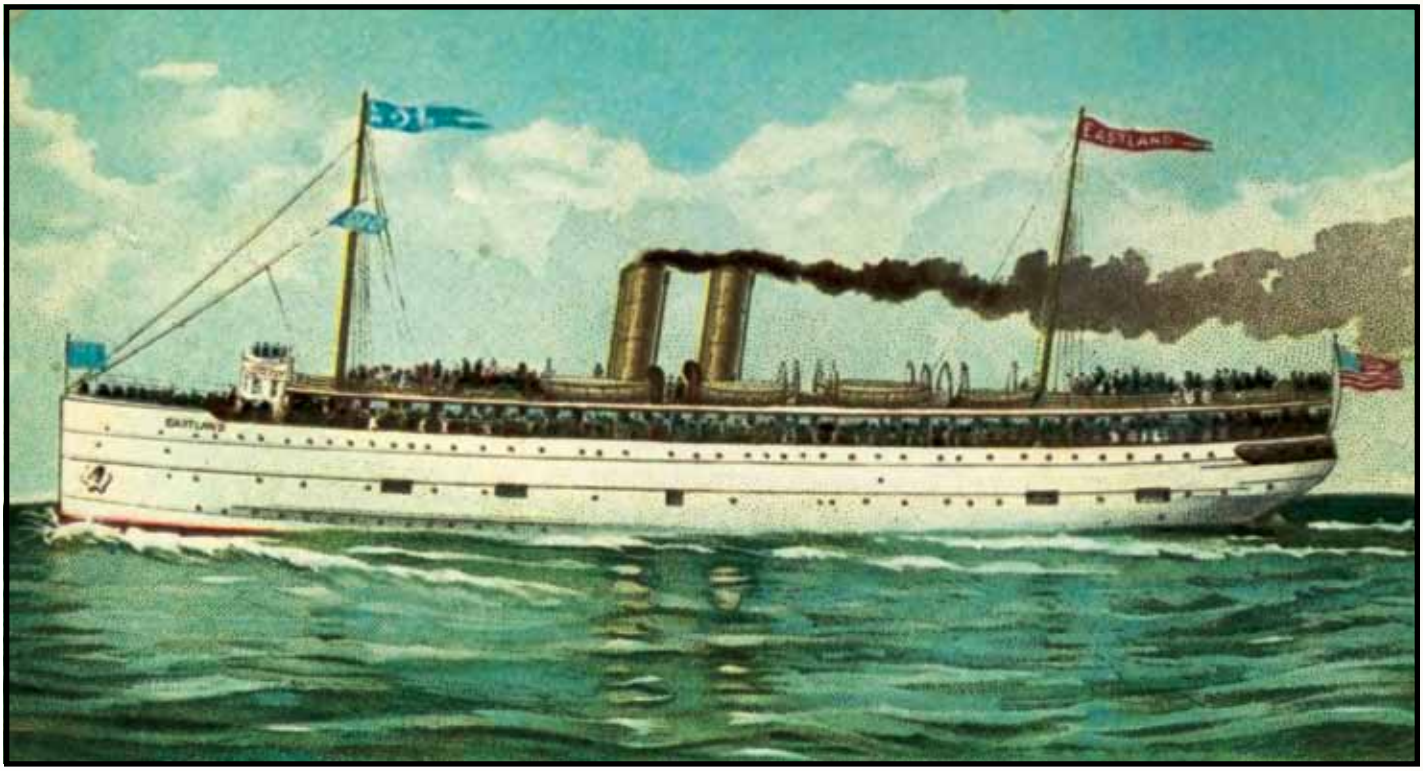
Although touted as the Greyhound or Speed Queen of the Great Lakes, the *Eastland* had a history of stability issues, especially after June 1904, when her capacity was increased to 3,300 passengers. A month later, when the vessel was returning to Chicago from South Haven, the boat listed so much to both sides that she nearly capsized. The licensed capacity of the *Eastland* was then cut back to 2,800 passengers, but over the next six years incidents of listing and instability, first in Lake Michigan and then in Lake Erie, cemented the vessel's reputation for instability. Concern over her reputation prompted the owners at the time, The Eastland Navigation Company, to run half-page ads in the Cleveland Plain Dealer and Cleveland Leader newspapers offering a reward to anyone who could substantiate that the *Eastland* was not seaworthy. There were no takers.

Initial Modifications

The *Eastland* was indeed fast but not as fast as the owners had specified. She was able to make only 19 knots, as opposed to the 20 she was designed and contracted for. In the spring of 1904 an Ellis and Eaves induced draft system was retrofitted to improve the efficiency of the steam plant. A McCreery air conditioning system was installed at the same time to provide cooler, dryer air into the interior of the vessel. The installation of both these systems added significant weight to the vessel, which caused her to squat and touch bottom across the sand bars off South Haven. Twenty-eight propeller blades were replaced in 1904. In September 1904 the *Eastland* was drydocked and extensive modifications were made to the location of propulsion components and auxiliaries in an attempt to improve the trim of the vessel.



■ Eastland *in 1911. – SSHSA Archives.*



■ *Image from an advertising postcard touting the* Eastland *as the "fleetest, high class steamer on the Great Lakes" with safe "all steel and strictly fireproof" construction. – SSHSA Archives.*

In June 1905, 49 overnight cabins were removed on the promenade deck aft of the funnels and the area was reconfigured as a passenger social space. Two additional lifeboats were added to the hurricane deck. Again, no stability calculations were done to account for the additional weight and reallocation of weight within the vessel.

Titanic Additions

Additional modifications were made to the vessel between 1905 and 1912, including the removal of the remaining overnight cabins in 1909 and the reduction of funnel height in 1911. Other changes occurred in the wake of the *Titanic* disaster. In April 1912 a circular issued by the Supervising Inspector General of the Steamboat Inspection Service changed the criteria for determining lifeboat space from vessel gross tonnage to passenger capacity. In addition, local inspectors were reminded that overloading was a concern on excursion steamers, and they would be held personally responsible in the event of an accident related to vessel stability.[2] This caused a reduction in the number of passengers carried on the *Eastland* from 2200 to 2000 for the 1913 season because of the vessel's lifeboat and life-raft capacity.

Congress took up the issue of lifeboat capacity in the form of Robert M. La Follette's Seamen's Act, which, among other provisions, required additional lifeboats and life-rafts on passenger ships. In an interesting case of foreshadowing, in December 1913 A. A. Schantz, vice president of Detroit and Cleveland Navigation Company, advised the Senate Commerce Committee that approval of the Seamen's Act would make ships top-heavy and unstable and would likely cause a Great

Lakes ship to capsize. Despite that dire prediction the act passed the U.S. House and Senate and was signed into law in March 1915. The law itself was not scheduled to go into effect until November 1915, but the owners of the *Eastland* were concerned that the new requirements would further limit the passenger capacity of the vessel. So they added more lifeboats and life-rafts for the 1915 season, thus increasing the passenger capacity of the vessel in advance of any reductions the following year.

■ *Passengers abandon the* Eastland. – *Photo courtesy of the Eastland Disaster Historical Society.*

In the spring of 1915 tons of concrete (estimates range from 30 to nearly 60 tons,[3] were laid on the 'tween and main decks to strengthen the rotting wood on the decks. The additional weight undoubtedly had a negative impact on the stability of the *Eastland*, but no calculations were made to assess the impact.

In early July 1915 three lifeboats and six life-rafts, estimated at 10 to 14 tons, were added as a prerequisite to increasing the capacity of the *Eastland* to 2,570 – 2,500 passengers plus 70 crew. To get a full appreciation of the impact of the sinking of the *Titanic*, one needs to consider that when it was built the *Eastland* was fitted with six lifeboats at a capacity of 120 persons for 2,800 passengers, and now was carrying 11 lifeboats and 37 life-rafts rated at 776 persons for 2,500 passengers. All of that additional weight was carried on the hurricane deck. Over the Fourth of July weekend, steamboat inspector Robert Reid inspected the *Eastland* and issued an amended certificate of inspection at the new capacity of 2,570.

The Disaster

Early on the morning of Saturday, July 24, 1915, with a light rain falling and the air filled with much anticipation and excitement, thousands were gathering along the Chicago River for Western Electric's fifth annual employee picnic in Michigan City, Indiana. Five vessels had been chartered for the picnic, and the *Eastland* was the first to be loaded for a 7:30

■ *The capsized* Eastland *seen from a fire tug as rescue efforts continue. – SSHSA Archives.*

Recovery of bodies from within the overturned vessel photographed from the Wells Street Bridge. – SSHSA Archives.

Advertisement placed in two newspapers offering a reward to anyone who could substantiate that the Eastland *was not safe. – Courtesy of the Ohio Historical Society.*

a.m. departure. At just after 7:00 a.m., with her new full load of 2500 passengers on board, the vessel began to list to port. The chief engineer attempted to counter-ballast the vessel, and twice in a 20-minute period the vessel righted itself from 10- to 15-degree port lists. The third time, however, the *Eastland* continued to list, and once she reached a 30-degree list water began to down-flood through main deck hatches and open port lights. The crew attempted to get passengers to move to the starboard side, but that soon became impossible against the list. At a 45-degree port list the *Eastland* was lost, and she gently rolled on her side, barely making a splash. Within moments twenty-two families were wiped out.

A comprehensive description of the *Eastland* disaster and the response effort can be found in the summer 1965 edition of *Steamboat Bill*. The author, Rev. Edward J. Dowling, was nine years old and living in Chicago at the time of the accident, and he tells the story of the *Eastland* from her service on the lakes through the accident, salvage and eventually the conversion of the vessel to the naval training ship *Wilmette*.

Investigations & Immediate Actions

In the aftermath of the disaster no fewer than seven inquiries into the disaster were announced. They included the coroner, the Harbor and Wharfs Commission of the City of Chicago, the States Attorney of Illinois, the Secretary of Commerce, the Supervising Inspector General of the Steamboat Inspection Service, the Chicago City Council and the Illinois Public Utilities Commission. Many of these inquiries sought to place criminal blame and responsibility for the disaster. In the end the scrap value of the vessel was used to compensate victims, and no one was held accountable for the loss of 844 lives.

Immediately following the disaster President Woodrow Wilson dispatched the Secretary of Commerce, William Redfield, who commissioned a Board of Inquiry from the Steamboat Inspection Service to investigate the cause of the accident.

Stability had been a concern prior to this disaster, but the Steamboat Inspection Service lacked the authority to mandate stability tests on commercial vessels. Secretary Redfield drove that point home in his line of questioning to Captain Nils B. Nelson, the District Supervising Inspector in Cleveland, Ohio, during one of the board hearings:

Secretary Redfield – *Could you, if you were ordered by the government, calculate the metacentric height of vessels in your district with your present force?*

Captain Nelson – *No, we could not.*

Secretary Redfield – *Has it ever been suggested to you that this should be a part of the government's inspection functions?*

Captain Nelson – *Yes, and I think it should be.*

The Board of Inquiry delivered its preliminary report to Secretary Redfield on August 5, 1915. A final report on cause and responsible persons for the disaster could not be completed because of the restrictions placed on the board by the grand jury criminal investigation. From the preliminary report recommendations were made to increase the safety of passenger vessels. These recommendations included:

Establishing a board of competent naval architects within the Department of Commerce responsible for the review and approval of construction plans and stability calculations for steam merchant vessels greater than 100 gross tons. In addition, no vessel would receive a license for service (Certificate of Inspection) until the plans were approved and the vessel's safety, seaworthiness and stability were demonstrated to the satisfaction of the board.

Requiring any alterations to a vessel subsequent to construction be approved by the board of naval architects.

Requiring that increases of passenger capacities be approved by the Supervising Inspector of the District where the vessel operates.

Providing for the appeal of the findings (decisions) of the local Board of Inspectors.

Pending enactment of these recommendations into law by Congress, the Board of Inquiry recommended that no passenger-capacity increases be granted until a personal inspection of the vessel was conducted and a written record of the inspection was completed. Another provisional recommendation was that passenger vessel owners be required to conduct inclining tests under the supervision of a naval architect if there was any reason to question the stability of a vessel.

Within two weeks of the *Eastland* disaster, the city of Chicago mandated stability tests for big Great Lakes passenger steamers. The first test was conducted on the whaleback steamer *Christopher Columbus* on August 5, 1915, in what the *New York Times* said was "…an unusual inclining test in an effort to tip it over."[4] The test, supervised by U.S. Naval Constructor James Ackerson, consisted of loading 7500 sand bags weighing 100 pounds each onto the top decks of the vessel. The vessel then transited to the inner harbor

■ *Testing the stability of the* Christopher Columbus. – *Photo courtesy of ship-wrecks.net.*

■ *One of a team of divers enters the river during recovery and salvage operations on the* Eastland. – *SSHSA Archives.*

basin opposite Grant Park, where the bags were transferred to one side of the vessel. The moment created by the shifting weight resulted in a heel angle of 12 degrees, which was considered a success by the experts on board the vessel. As a modern frame of reference, Coast Guard requirements call for an angle of heel no more than 14 degrees when conducting a simplified stability test.

A Lasting Regulatory Legacy

The first of the recommendations to become law concerned the determination of passenger capacity on steam passenger vessels. The Act of February 14, 1917, required more supervision over the work of local inspectors and gave needed authority to the District Supervisory Inspector to reduce passenger capacities as deemed necessary and to be the approving authority for increases in passenger capacity. The ability to appeal the decision of the local inspectors followed on June 10, 1918.

Legislative change to establish a board of naval architects, within the Department of Commerce, to approve vessel hull and machinery construction proved to be elusive for a number of years. In annual reports following the *Eastland* disaster, the Supervising Inspector General continued to promote the advantages of having such a board. First, it would allow the department to employ experts more familiar with construction than the local inspectors, and second, it would provide uniformity in the application of standards. By 1922 Section 9 of the General Rules and Regulations, prescribed by the Board of Supervisory Inspectors, incorporated the use of American Bureau of Shipping rules for hull, boiler and machinery construction as an accepted standard used by local inspectors.

Eventually all of the recommendations made it into federal law and regulation. Today the U.S. Coast Guard carries out the marine safety mission started by the Steamboat Inspection Service. The Coast Guard's Marine Safety Center is a group of engineers and architects charged with approving vessel plans for U.S.-flagged commercial vessels.

Conclusion

In the October 1915 issue of *Popular Mechanics* there was an article on the engineering behind the righting and salvage of the *Eastland*. In the Comment and Review section of the magazine there was an editorial, titled "Safety First," on the best way to remember the *Eastland* disaster. The last sentence of that editorial by H. H. Windsor concludes "…the best memorial would be that which will make repetition impossible, and safeguard the public for all time to come."

In the 100 years since the *Eastland* disaster there have been significant improvements to shipbuilding technology, crew competence and the regulations governing inspection and certification of U.S. passenger vessels. The result of these efforts is that the United States has not experienced such a horrific loss of life on a passenger vessel since that fateful day in July 1915. A fitting memorial indeed.

Endnotes:

1. *Hilton, George, 1997. Eastland: Legacy of the Titanic. Redwood City: Stanford University Press, p. 29.*
2. *Annual Report of the Supervising Inspector General for the fiscal year ended June 30, 1912.*
3. *Hilton, George, 1997. Eastland: Legacy of the Titanic. Redwood City: Stanford University Press, p. 72.*
4. *Redfield Halts Eastland Inquiry, New York Times, August 6, 1915.*

I would like to thank the Eastland Disaster Historical Society for its assistance in writing this article. For more information about the *Eastland* disaster and its impact on the City of Chicago, check out the society's website at www.eastlanddisaster.org. ⚓

About the Author

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