

The Knees to the Outboard Bulwarks and the Aft Bulkhead of *Titanic's* Forward Well Deck

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Introduction

This article will take a fresh look at the steel “knees” between the outboard bulwarks and the aft bulkhead of *Titanic's* forward well deck. Originally it was widely thought that these knees were merely plates to anchor the backstays to the foremast. Recent analysis of a photo taken while *Olympic* was at the breakers in 1935 shows details which have not been evident in other photos of *Titanic* or *Olympic* while they were in service. This photo will be analyzed to try to determine both the structure and function of the structures seen in this photo. This article will be relatively brief but the information will be valuable for the modeler.

The Photos

Figure 1 is a photo of *Olympic*. In the photo a white painted horizontal plate can be seen on the starboard side.

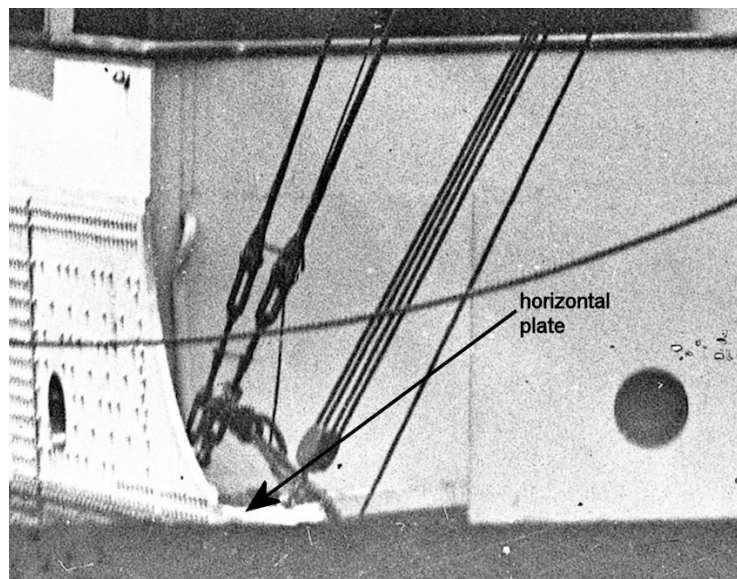


Figure 1

Horizontal plate at aft outboard corner of forward well deck

In the photo, a two of the foremast backstays can be seen. The lower attachment points of these backstays cannot be seen. It was long assumed that they were anchored to this horizontal plate and that was its sole purpose.

Figure 2 shows a photo of *Olympic* at the breakers in 1935.



Figure 2

Port aft corner of forward well deck of *Olympic* at breakers in 1935

This cropped photo shows previously unknown details of the area of the aft outboard corners of the forward well deck. In the photo we can see that this is more than a simple plate. There are support structures below the horizontal plate structure. This photo reveals more information than any other previous photo. Consequently, we will be referring to it throughout the article.

Knees

Rather than being an anchor plate for backstays it appears that the plates in question served another purpose. I believe that they were structural reinforcing “knees”. Knees reinforce, strengthen, and stiffen the junction between two structures which are at roughly ninety degrees to each other. Figure 3 shows a wooden knee between vertical and horizontal timbers.



Figure 3

Knee

Figure 4 shows a steel knee between a fore and aft bulkhead and an athwartship bulkhead on *Olympic*.



Figure 4

Woman seated on a steel knee

Figure 5 shows a steel knee at the junction of two deckhouses on *Olympic*.

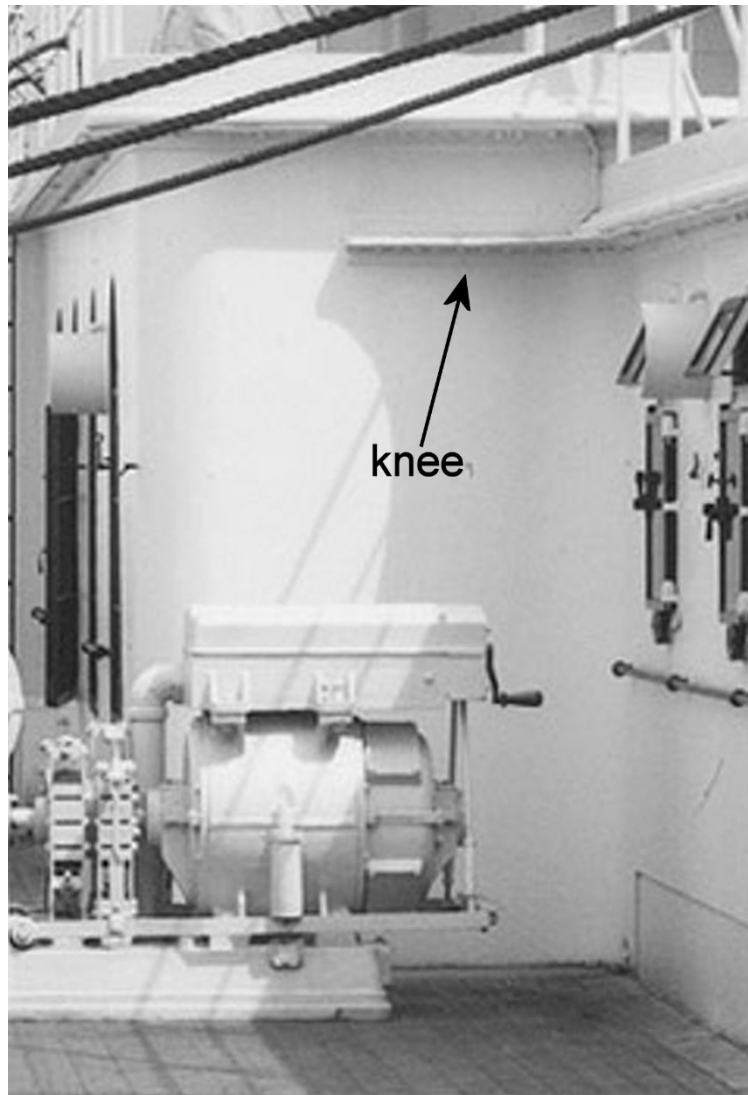


Figure 6

Steel knee at the corner of two deckhouses on *Olympic*

The outboard bulwarks of Titanic's well deck didn't have extensions of the hull frames to which plating would be attached. To give support to these bulwarks, steel stiffener brackets were riveted to the inboard side of the bulwarks. Steel stays were attached to these stiffeners and to the waterway inboard of the bulwark. The forward part of the ship was subject to more force against it due to the force of the sea as the ship traveled through it. In order to strengthen areas which were subject to excessive force which might compromise structural integrity, knees were used to strengthen these joints. It appears that the joint between the aft bulkhead of the forward well deck and the bulwark was one such joint. The knee plate in Figure 2 was attached to both the bulwark and the aft bulkhead by steel angles. In order to further stiffen the corner,

steel web supports were riveted to the bulwark, the knee, and the deck. These took the place of simple stays which only provided support for the bulwark. This knee was larger than most others in that its fore and aft length was from the aft bulkhead of the forward well deck to where the aft aspect of the aft bulwark gangway met the bulwark.

Belaying for Backstays

Since it appears that the knee was primarily for structural strength, the question becomes was it used to anchor the backstays? We don't have a definitive photo which answers the question one way or another. We do know that all other shrouds and backstays for both masts were anchored to the shell plating. Because of this fact, I believe that the foremast backstays were also anchored to the shell plating rather than this knee. There was one eye visible in the forward end of the knee for attaching rigging which can be seen in Figure 1. This rigging was only used during cargo operations.

Drawings

Figure 7 shows both plan and elevation views of the forward well deck knee. The knee is shown in red. The bulwark web supports are shown in green.

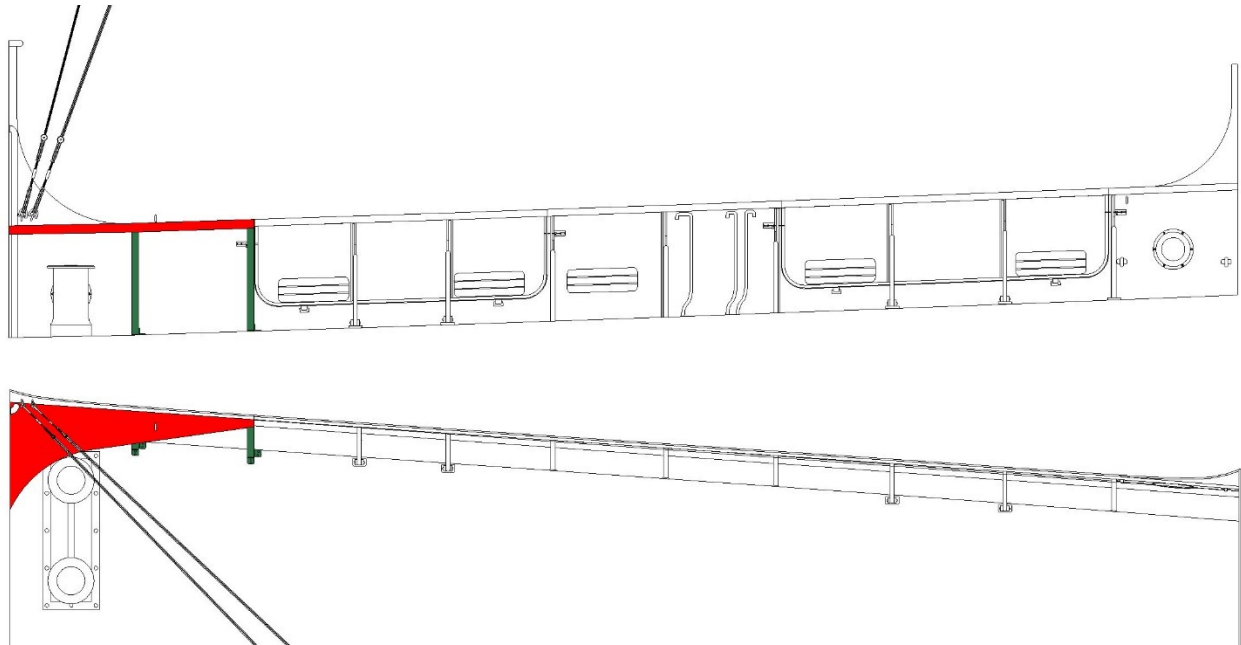


Figure 7

Plan and elevation views of the forward well deck knee

Conclusion

This article has provided evidence to describe the structure and function of the forward well deck knees on *Titanic*.