

An Analysis of the Layout of Water Pipes on *Titanic's* Tank Room Roof and Third Funnel Aft Face

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Introduction

The evidence for the accurate layout of water pipes on *Titanic's* tank room roof is relatively sparse. The evidence for the arrangement of the water pipes on the aft face of the third funnel is somewhat better but still is limited. Many modelers and researchers have attempted to interpret the complex layout of the water pipes but no explanation has ever been given how these modelers and researchers arrived at their particular interpretations of their layouts. For that reason, I decided to undertake a detailed analysis of the configurations of these water pipes. I will show the evidence which led to my conclusions. Determining the layout of the water pipes in these areas is like assembling a jigsaw puzzle. The pipes must conform to numerous pieces of evidence and the constraints they impose. One by one, we will examine the various parameters within which the water pipes must be arranged.

The Photos

Photos are usually at the top of the evidence hierarchy. This investigation is no exception. There are three photos which will be used. Two are a port and starboard view of the tank room roof and the aft face of the third funnel which were taken by a Cork Examiner photographer while *Titanic* was in Queenstown. The third is a candid photo of Charles Whilems and companions taken while the ship was in Southampton. These photos are shown in Figures 1, 2, and 3.

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Figure 1

Port side boat deck of *Titanic*



Figure 2

Starboard side boat deck of *Titanic*

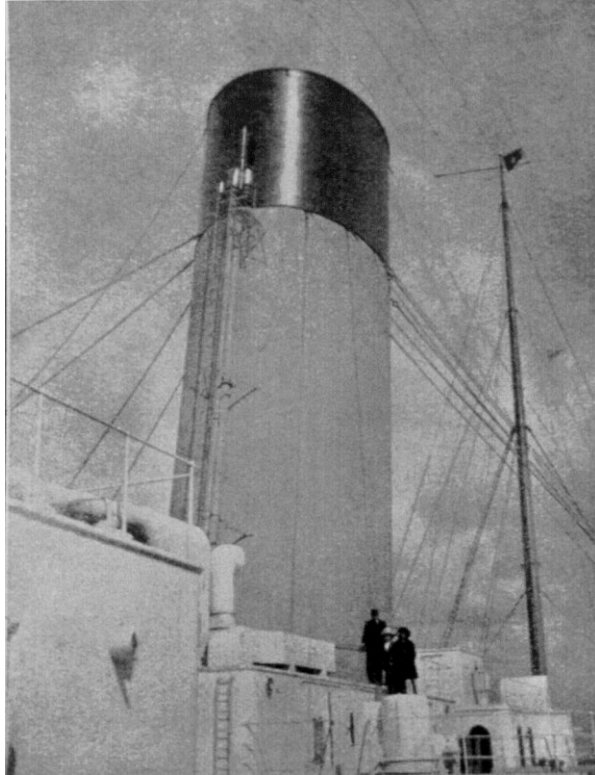


Figure 3

View aft towards *Titanic's* fourth funnel

Pertinent areas will be cropped and enlarged later.

The Plans

Two particular specialized plans will be used in this analysis. The first is the “S.S. *Olympic* Pumping Arrangement Pipe Plan” as seen in Figure 4 and the “S.S. *Titanic* Pumping Arrangement Pipe Plan” seen in Figure 5. Like the photos, the pertinent sections of these plans will be cropped and enlarged.

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Figure 4

“S.S. Olympic Pumping Arrangement Pipe Plan”

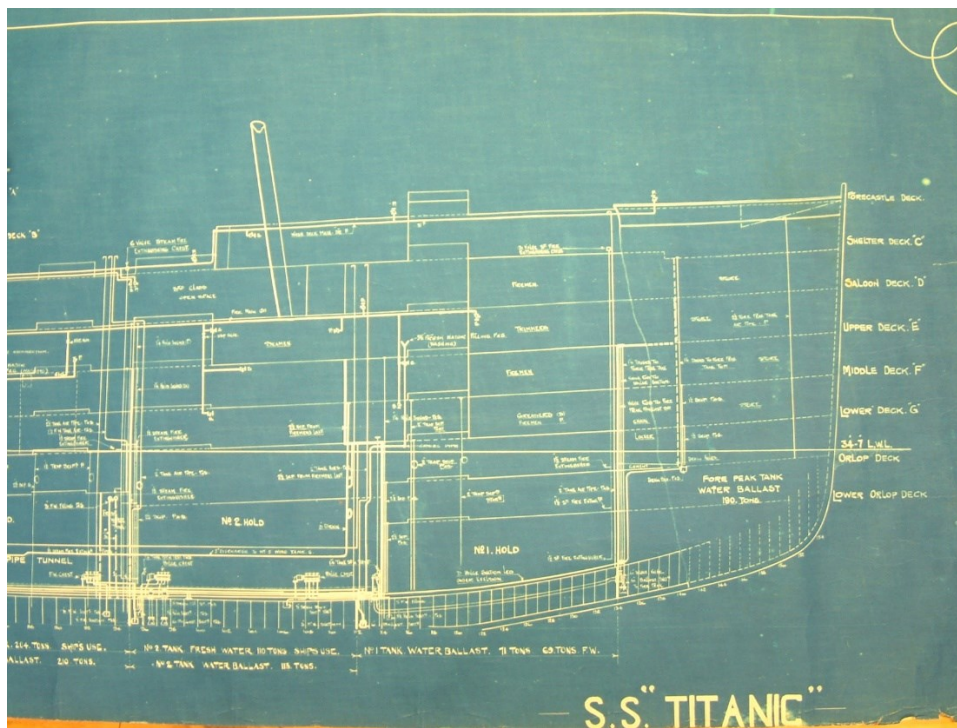


Figure 5

“SS. Titanic Pumping Arrangement and Pipe Plan”

Pipe Sizes

I will be working backward in this article by presenting images of the pipe configurations I am proposing then presenting the various pieces of evidence which I believe confirm this arrangement. Figure 6 shows the proposed pipe configuration on the aft aspect of funnel #3. Figure 7 shows the proposed pipe configuration on the roof of the tank room.

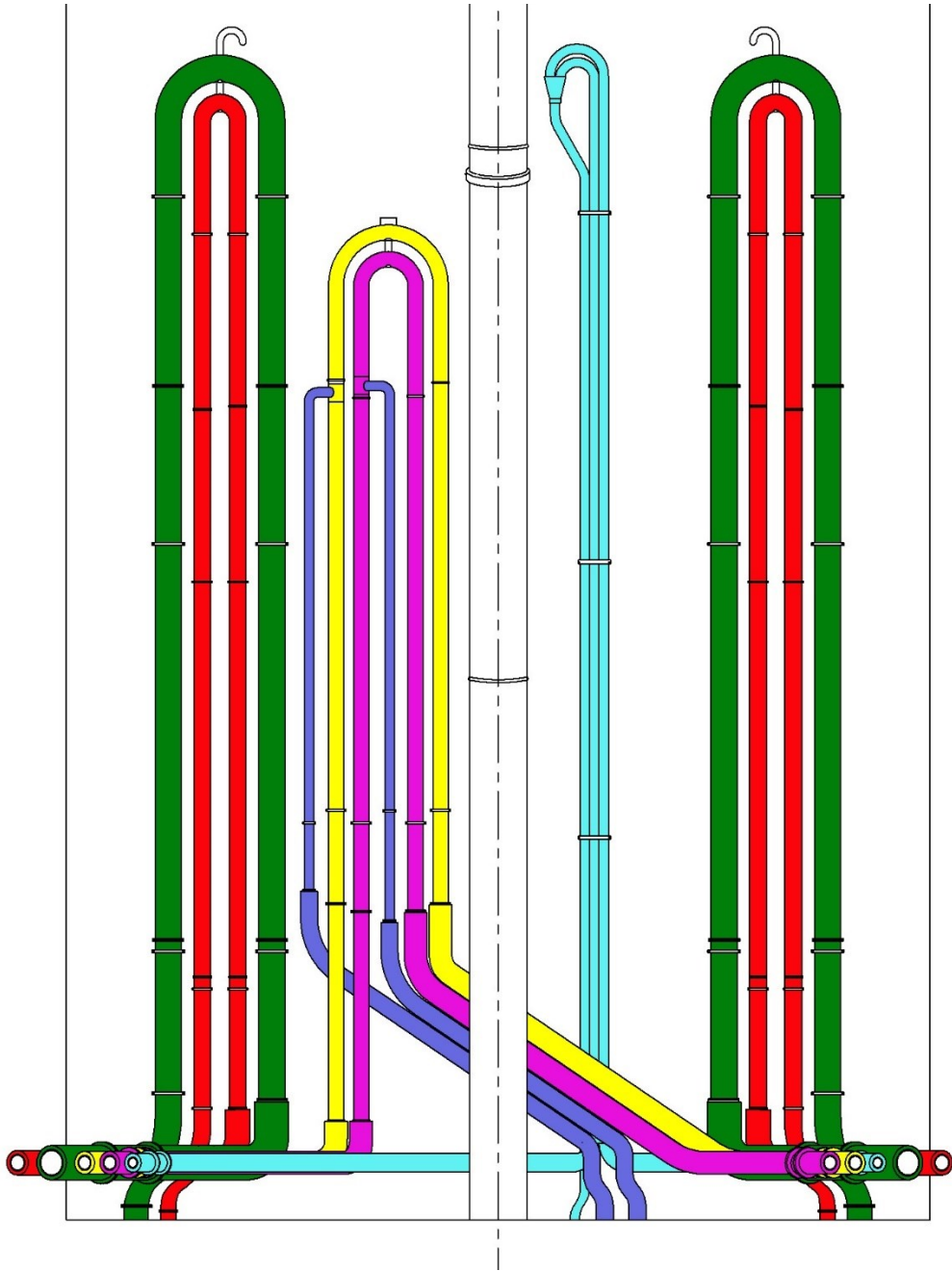


Figure 6

Proposed pipe configuration on aft face of funnel #3

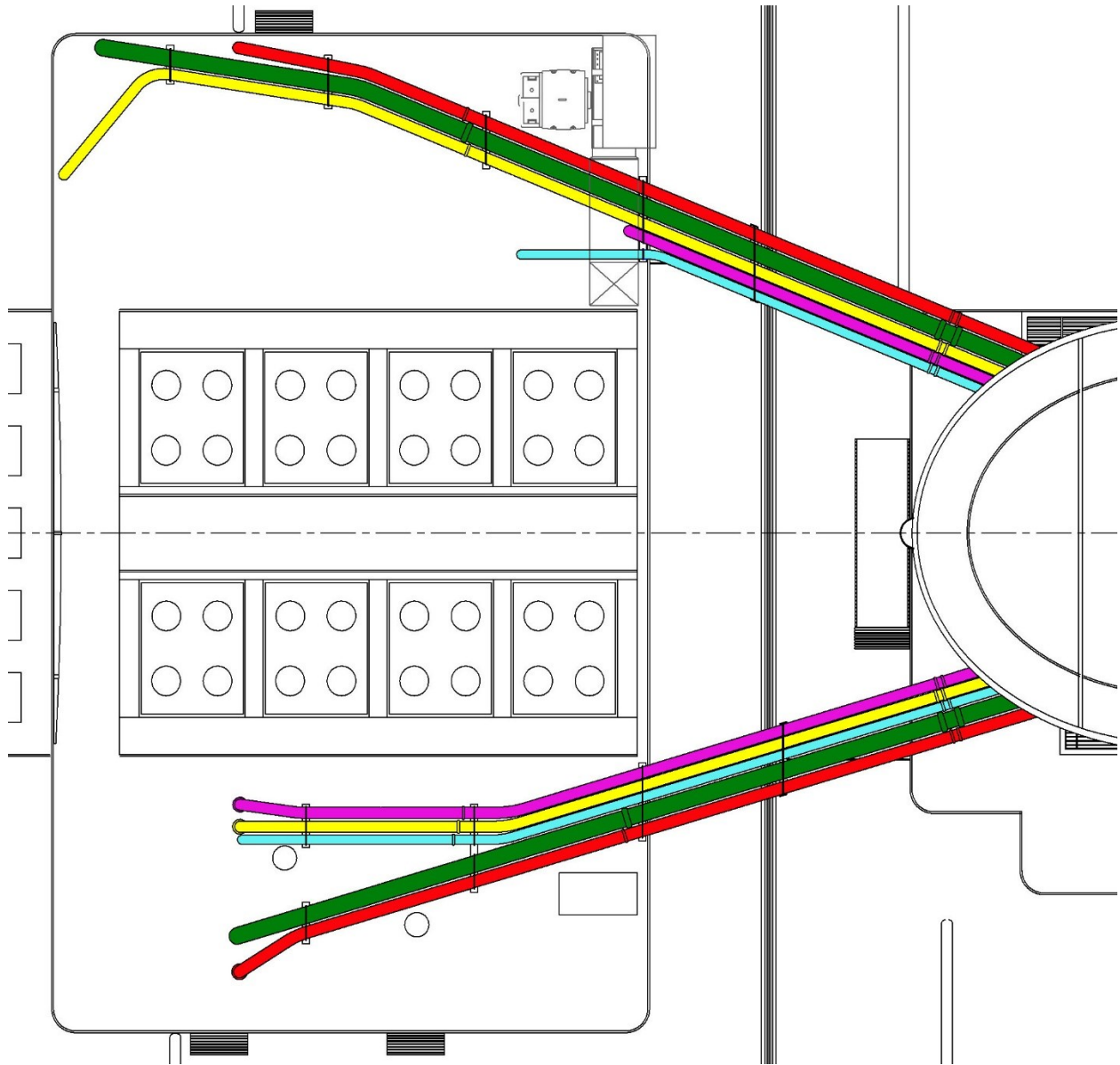


Figure 7

Proposed pipe configuration on tank room roof

Figures 6 & 7 are color-coded to show the different sizes of pipes. Figure 8 is a legend which correlates the colors to the various pipe sizes.

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	I.D. (inside diameter)	O.D. (outside diameter)	lagging (insulation) diameter
	2 inches	2-1/2 inches	4-1/2 inches
	2-1/2 inches	3 inches	5 inches
	3-1/2 inches	4 inches	6 inches
	3-1/2 inches	4 inches	6 inches
	4 inches	4-1/2 inches	6-1/2 inches
	6-1/2 inches	7 inches	9 inches

Figure 8

Color-coded legend for pipe sizes in Figures #6 & #7

The thicknesses of the pipe walls and the lagging (insulation) are estimates. I have estimated a pipe wall thickness of ¼ inch. The lagging is estimated from photos to be 1 inch thick.

The evidence which supports the identification of the pipe sizes is found in the *Olympic* and *Titanic* "Pumping Arrangement Pipe Plan".

The outboard pipe loop pairs (p & s) are identified on the *Olympic* pipe plan. Figure 9 shows a segment of this plan which identifies the sizes of these pipes.

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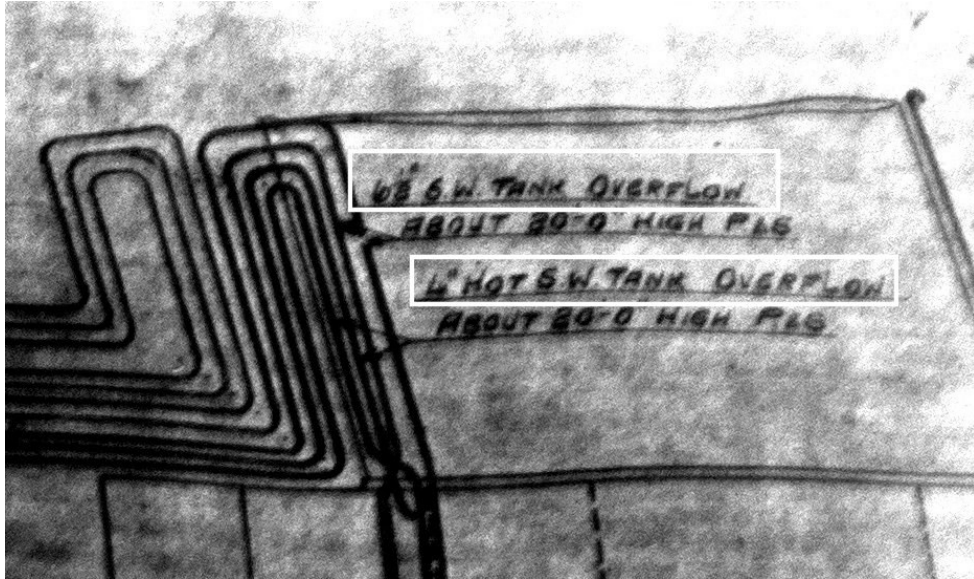


Figure 9

Plan showing sizes of outboard pipe loop pairs (p & s)

The layout of the pipes is not like it is on the ship. The plan's purpose was to provide a working schematic of the pipes much like an electrical circuit diagram. These pipe loop pairs are the largest pipes shown in green and red in Figures 6 & 7. **The pipe sizes in inches are the inside diameters of the pipes.**

The next pipe loop group is between the outer pipe loop pair and the central steam escape pipe. It is seen on the *Titanic* pipe plan in Figure 10.

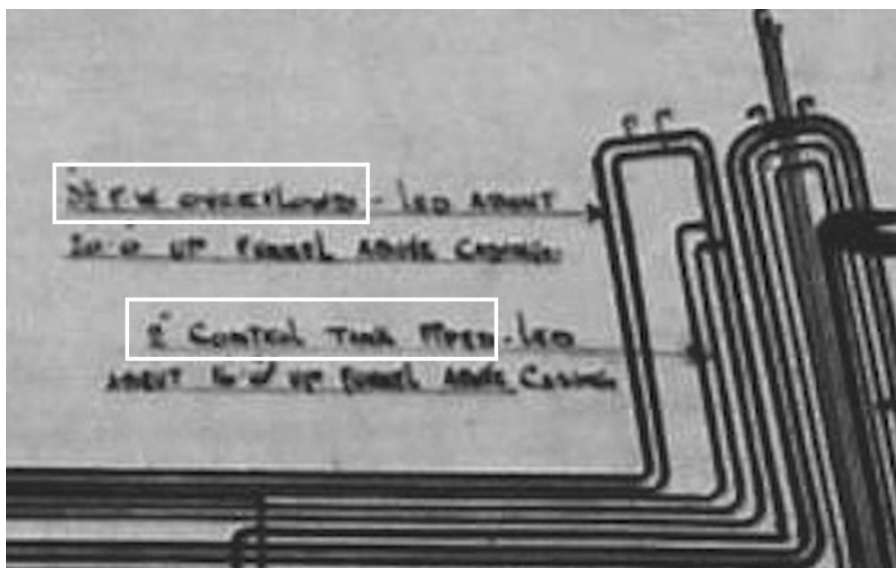


Figure 10

Port inboard pipe loop group

The next group of pipes is somewhat more difficult to identify on the pipe plan with regard to sizes. One has to carefully follow the pipes down to the lower parts of the ship to identify the sizes. This pipe group is the inboard group on the starboard side. It consists of two “J” loop pipe overflows which empty in to a cup-and-drain pipe. The overflow pipes are expansion pipes for hot water systems. This type of pipe arrangement is found on all the other funnels and serves the same purpose. Therefore, we can confirm the size by following the pipes on the other funnels to where the size notation is given. Figure 11 shows this type of expansion pipe and drain configuration.



Figure 11

Expansion pipe loop group

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To confirm the size of these expansion loop pipes, three (Figures #12, #13, & #14), examples will be shown on the pipe plan from the third funnel and two other funnels where these same expansion loops are located.

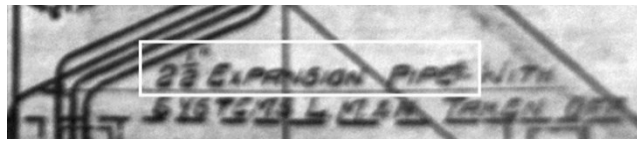


Figure 12

Expansion pipe size notation



Figure 13

Expansion pipe size notation



Figure 14

Expansion pipe size notation

The identification of the pipe sizes will aid in the identification of the pipe locations in some of the photos.

Ventilator Boundaries

There are a number of structures which establish parameters for the locations of the various pipes on the roof of the tank room. On the port roof of the tank room one of these is 30-inch electric fan sirocco ventilator. This ventilator is a specially configured 30-inch sirocco ventilator. For a long time, this ventilator was misidentified as a 35-inch sirocco ventilator as is seen in many other locations on *Titanic's* weather decks and deck house roofs. This ventilator is shown in Figure 15.

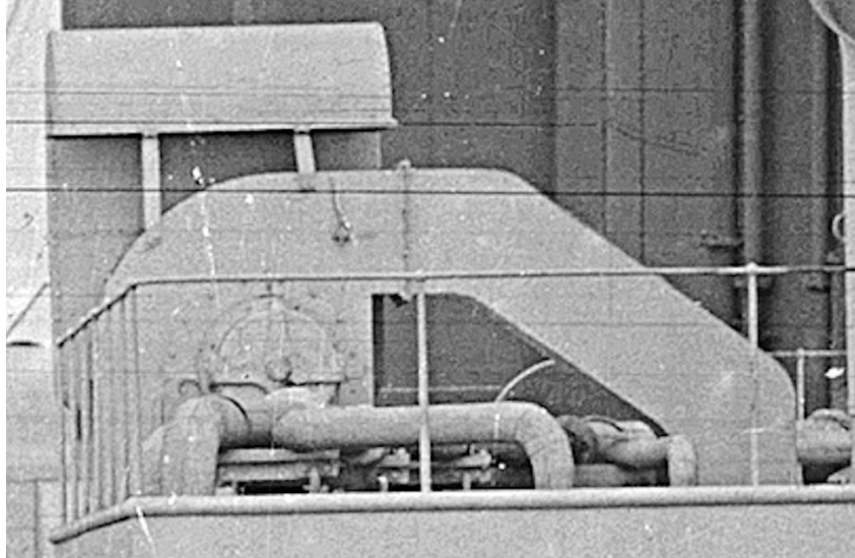


Figure 15

30-inch sirocco ventilator on port tank room roof

It can be seen that the pipes which travel between the funnel and the port tank room roof must pass between the body of the ventilator and where the output duct pierces the tank room roof. The “window” through which the pipes passed was approximately 60 inches. This dimension can be seen in Figure 16.

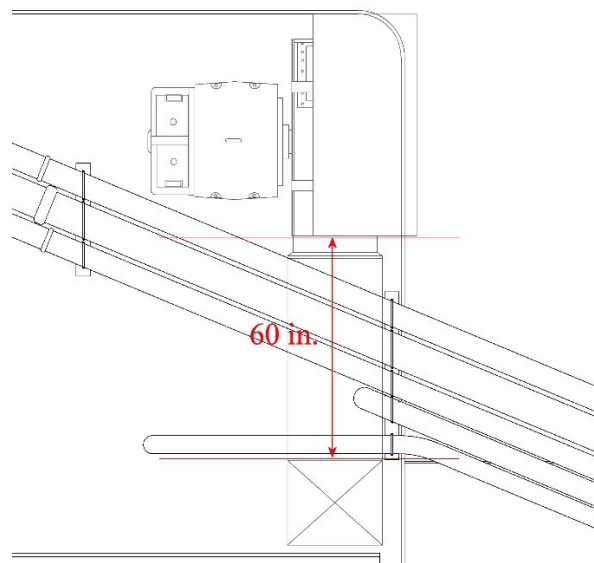


Figure 16

Width of window through which pipes pass under 30 in. ventilator

On the starboard tank room there are three natural draft (non-powered) ventilators. The two aft mushroom ventilators were probably installed after the pipes were installed. They had to be centered between roof beams but their athwartship position was not crucial and could be altered to accommodate the pipes. The duct-type ventilator forward needed to be centered athwartship. It was still clear from interfering with the pipes. These three ventilators can be seen in Figure 17.

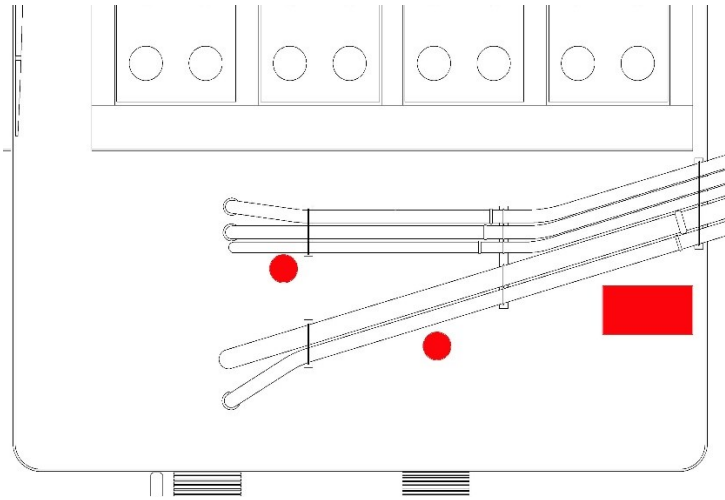


Figure 17

Natural draft ventilators on starboard tank room roof

Stanchion Boundaries

One of the difficulties in determining the fore and aft positions of the pipes on the port side of the tank room roof is that the best photo of this area is taken from almost directly aft. Fortunately, the Whilems *Titanic* photo shown in Figure 3 shows the fore and aft positions of the outboard two pipes on the port side of the tank room roof. The photo is fairly washed out in this area but it is possible to see where the pipes curve down to pierce the roof as can be seen in Figure 18.

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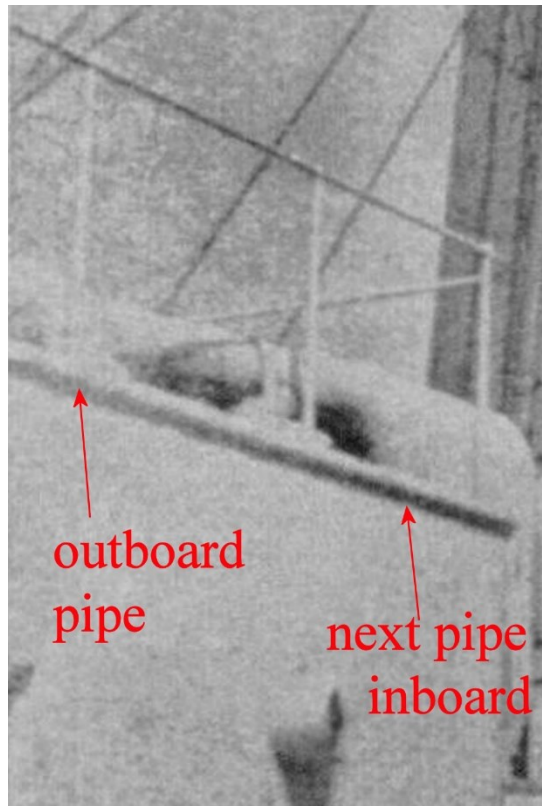


Figure 18

Outboard two pipes on port tank room roof in relation to stanchions

To try to be more precise in locating where the two outboard pipes entered the port tank room roof, the known locations of the port tank room roof railing stanchions are used. There are 7 stanchions on the port side roof as shown in Figure 19.

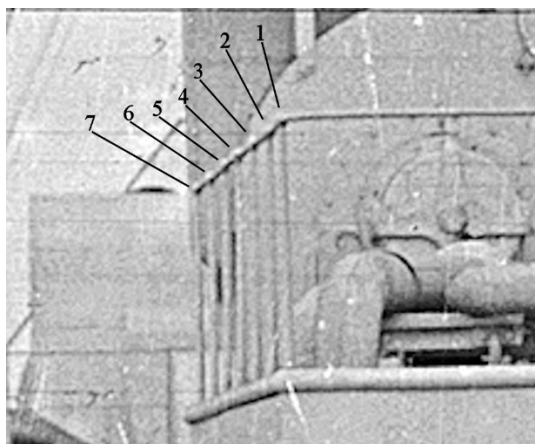


Figure 19

Port railing stanchions on the tank room roof

The relationship of the apparent location of the two outboard pipes to the stanchions is also related to the underlying framing of the roof beams as we will see in the next section. Figure 20 shows the location of the two outboard pipes with relation to the tank room roof railing stanchions (in green).

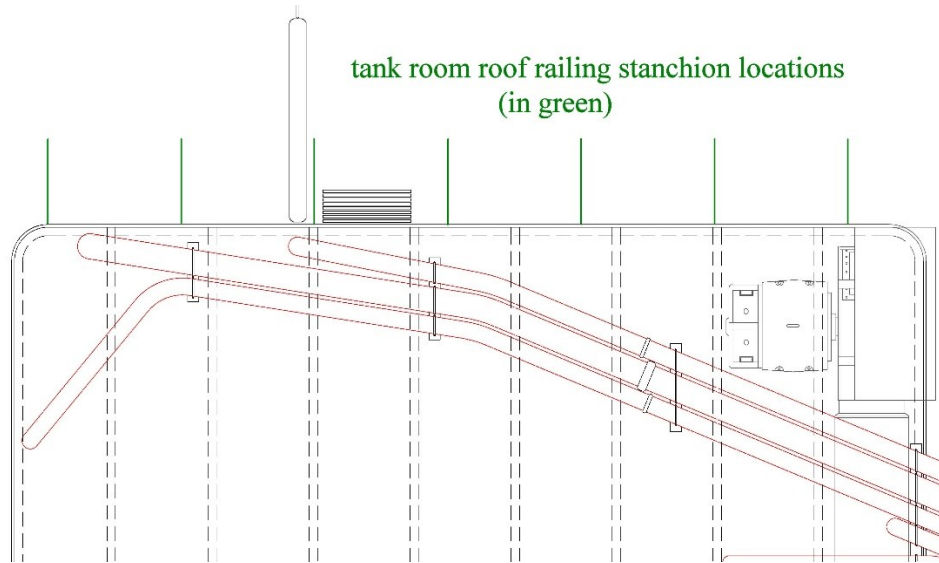


Figure 20

Port side tank room roof railing stanchions (in green)

Tank Room Roof Framing

In examining the positions of where the pipes on the tank room roof pass through the roof, it appears that they enter next to roof beams so that the pipes could be securely anchored to them. Figure 21 shows a drawing of the roof of port side the tank room with the underlying beams (dashed). Figure 22 shows the starboard tank room roof with underlying beams (dashed).

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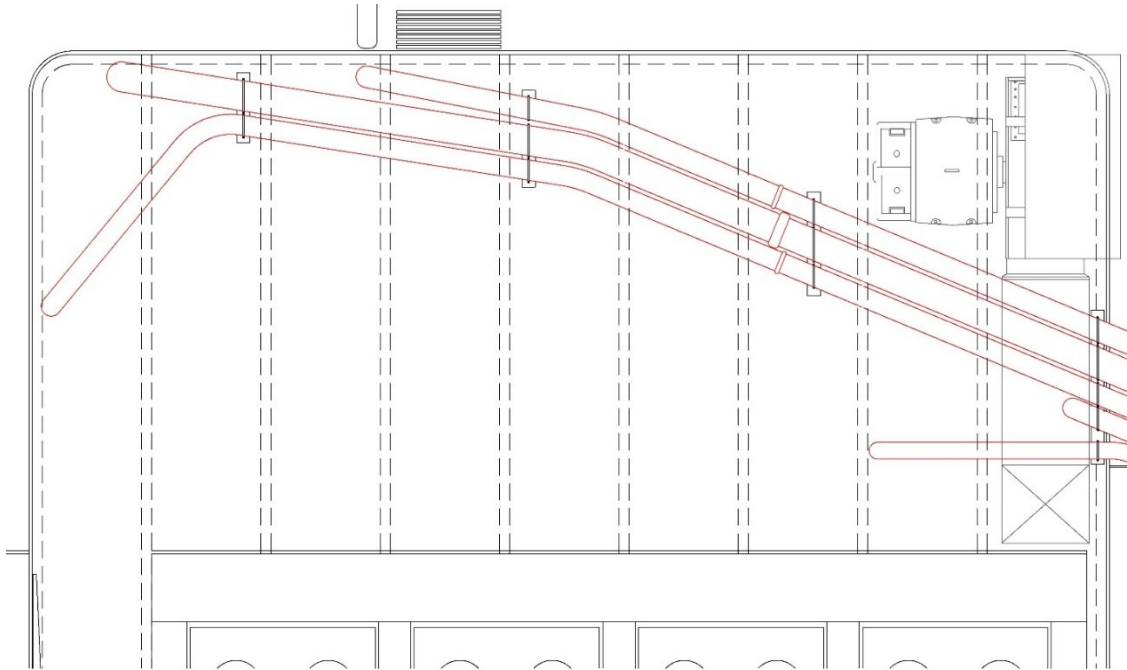


Figure 21

Port side tank room roof showing underlying roof beams (dashed)

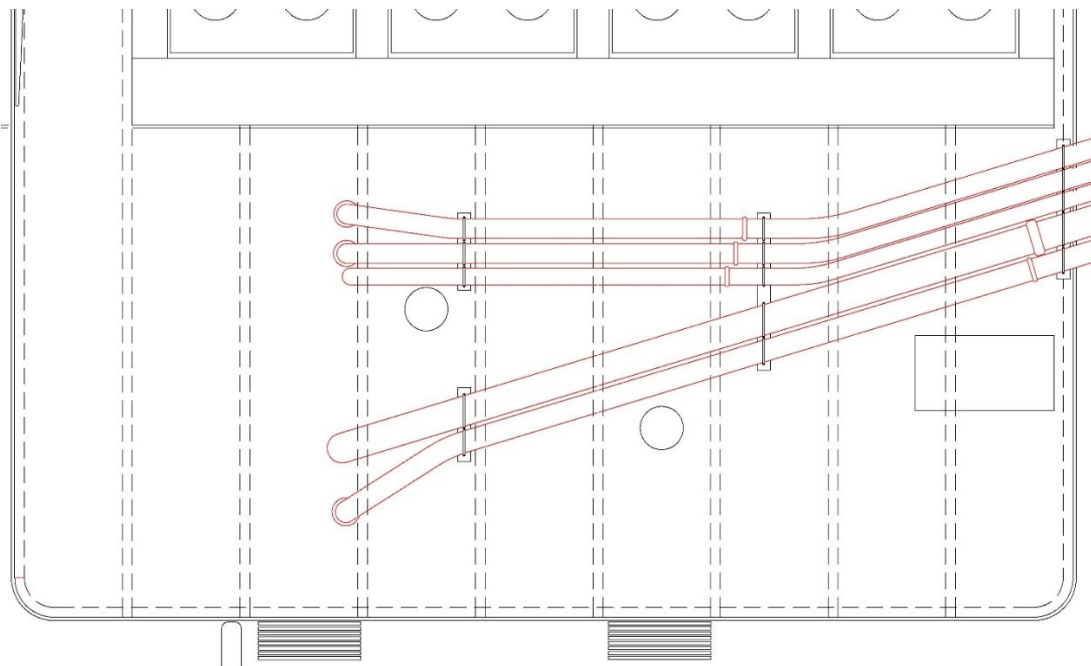


Figure 22

Starboard side roof showing underlying roof beams (dashed)

Line-of-Sight Photo Analysis

In order to determine the fore and aft positions of the inboard three water pipes on the port tank room roof, the photo shown in Figure 1 must be analyzed by line-of-sight analysis to determine where the end of the pipes pierce the tank room roof. In order to perform this analysis, the location of the camera in the photo must be determined to be able to draw sight lines. So as not to belabor that process, the location of the camera in Figure 1 is shown in Figure 23.

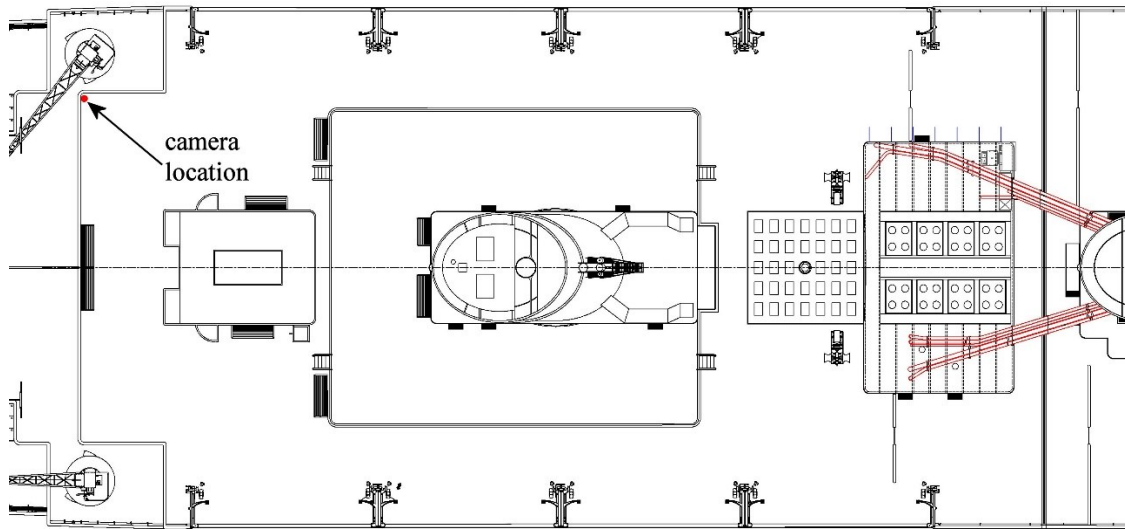


Figure 23

Camera location in Figure 1

The inboard three pipes will be numbered from inboard to outboard. There are two sight lines which help us to determine the location of the ends of these three pipes. The end of pipe #1 lines up with the inboard aspect of the ventilator duct where it pierces the roof. The ends of pipes #2 and #3 are on the same sight line. Consequently, the end of pipe #3 obscures the end of pipe #2. Figure 24 show a photo view of the lines of sight through the ends of the three inboard pipes.

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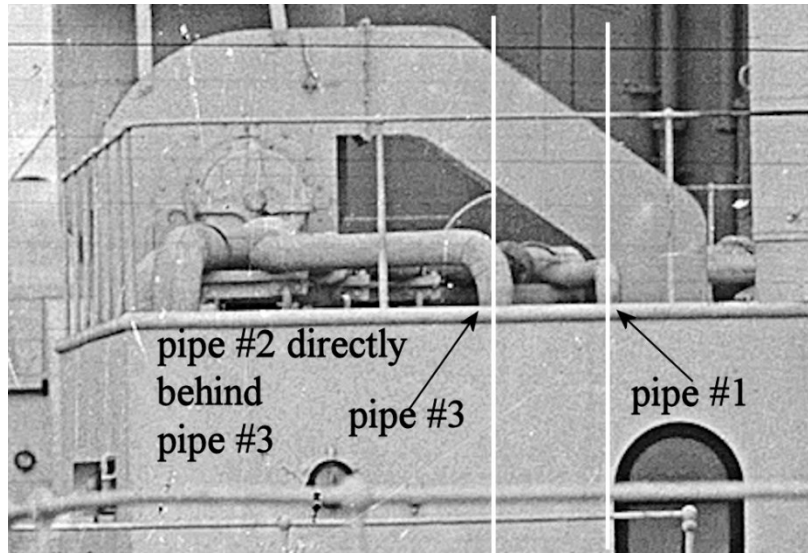


Figure 24

Inboard three port pipes with lines-of-sight

Figure 25 is a plan view drawing of the pipes on the port tank room roof with lines of sight drawn through the inboard three pipe ends.

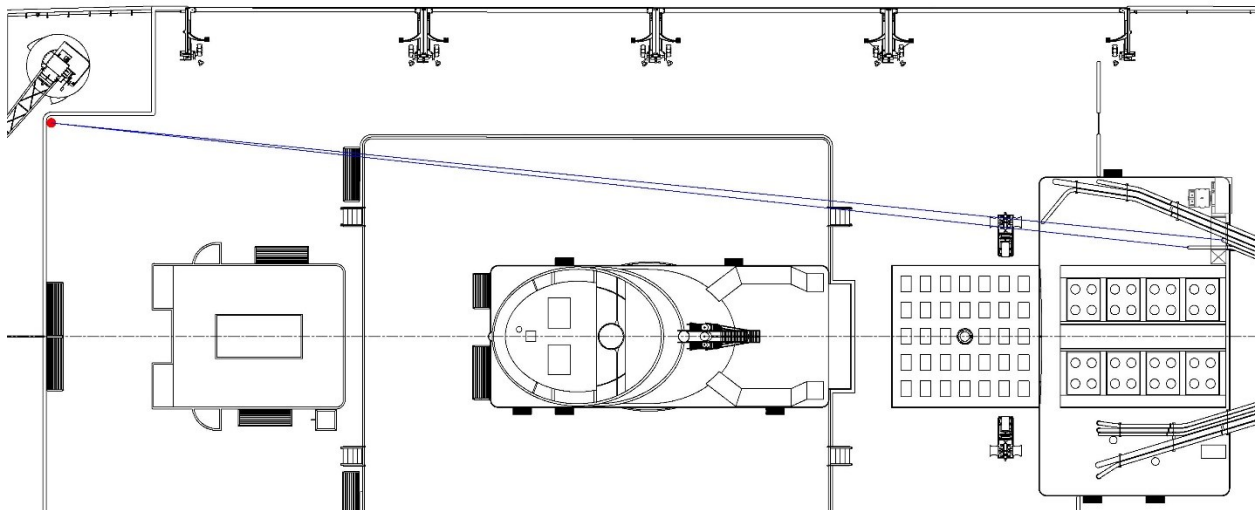


Figure 25

Plan view of lines of sight through port inboard three pipe ends

The pipes on the starboard roof of the tank room all end just aft of the junction of the engineers smoke room and the tank room.

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Figure 26 is a closer view of the lines of sight through the inboard three port tank room pipes.

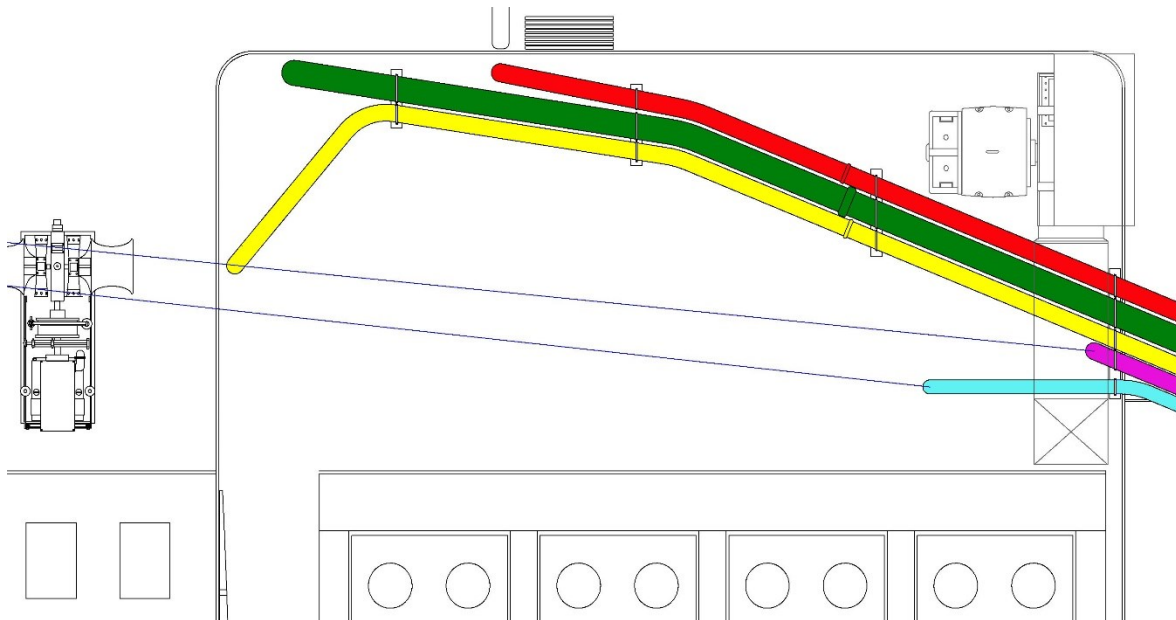


Figure 26

Plan view of lines of sight through port inboard three pipe ends

Pipe Joint Flanges and Pipe Clamps

One aspect that is highly speculative as to their locations is that of the pipe joint flanges and clamps. Since there is insufficient photo evidence to locate all the pipe joint flanges and clamps, I have studied the pipes to see if there is any kind of rule for their placement. I tried to determine whether the pipe joint flanges were added because of a limitation on pipe length or if their placement was related to bends in the pipes. I have come to the conclusion that the pipe joint flanges were placed to accommodate pipe bends. It appears that as a general rule the pipe joints were made so that pipe bends occurred at the terminal end of a pipe segment. There are a few pipe segments between joints where the bend occurs between joints and both ends are straight. Given these general rules which I am not asserting are ironclad, the next drawings will illustrate where I believe pipe joints and pipe clamps were placed.

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Figure 27 shows the horizontal pipe joint flanges in blue and pipe clamps in red. The groups of flanges atop the third funnel deckhouse are expansion joints.

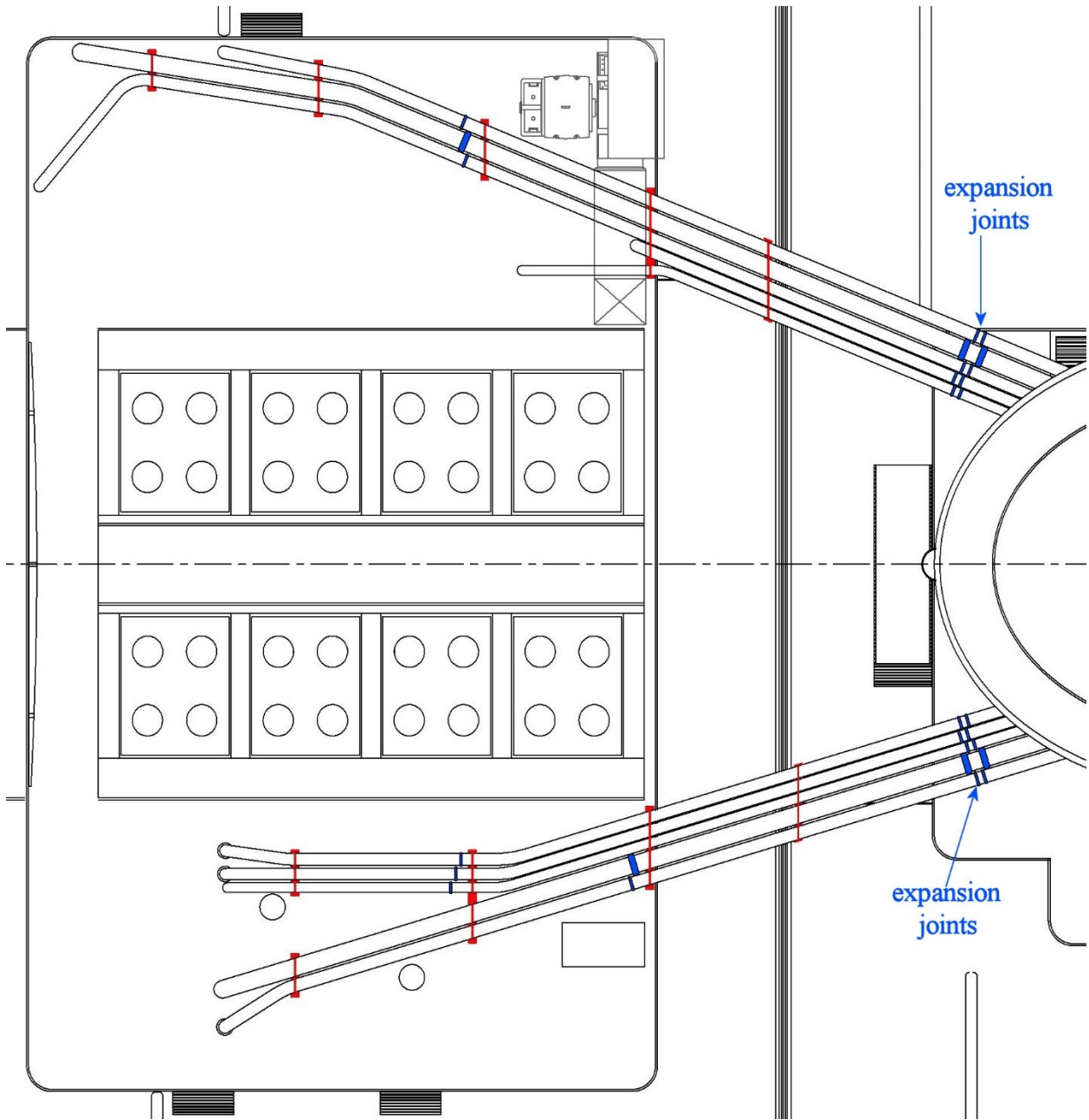


Figure 27

Horizontal pipe joint flanges (in blue) and pipe clamps (in red)

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Figure 28 shows the pipe flange joints (in blue) and pipe clamps (in red) on the vertical water pipes on the aft face of funnel #3 (in red).

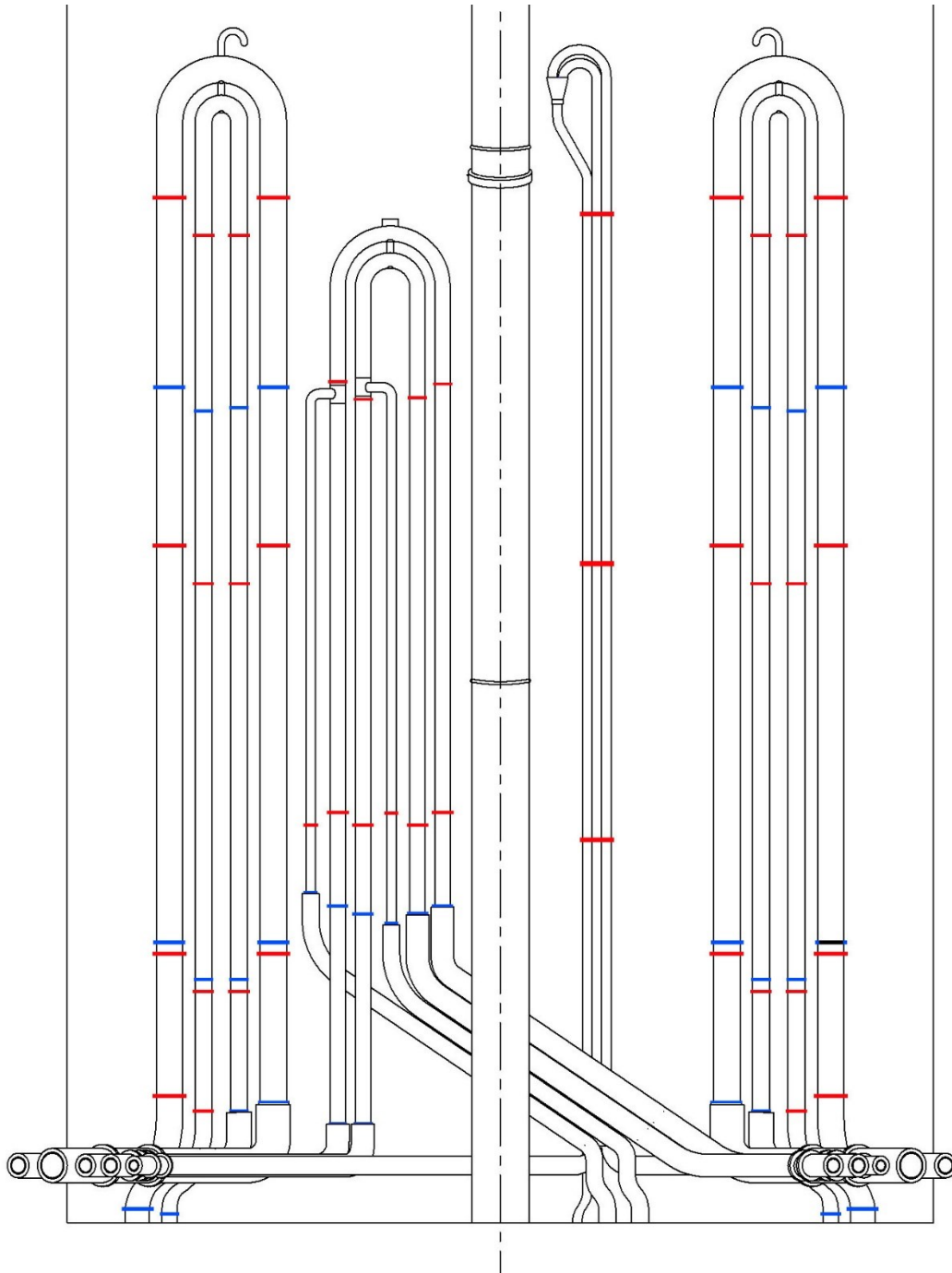


Figure 29

Vertical pipe joint flanges (in blue) and pipe clamps (in red)

Painting

The vertical pipes on the aft face of the third funnel were painted the same White Star Buff as the funnel. The horizontal aspect is a little more difficult. There are very few aspects of the painting of the exterior of *Titanic* which changed between when the ship was presented to her owners on April 2, 1912 until the last photo of her was taken on April 11, 1912. The painting of these third funnel water pipes appears to be an exception. We have photos taken in Belfast which leads one to believe that the buff color proceeded aft to and including the pipe expansion joints of all the pipes. Then we have photos of *Titanic* after she started her voyage which indicate that the separation line between the buff and the white was nearer to the funnel. After much analysis, it appears that *Titanic's* funnels got a fresh coat of paint in Southampton. During this painting it appears that the separation line between buff and white was moved closer to the funnel on both port and starboard sides. Figure 30 show the final position.

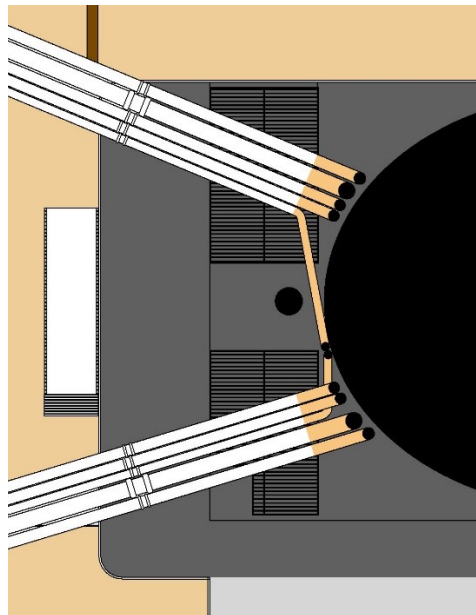


Figure 30

Paint separation line location on 3rd funnel water pipes

Conclusion

Previously, I and others have made interpretations of the configuration of the water pipes on *Titanic's* aft funnel face and tank room roof without any explanation about how we arrived at these configurations. In this article I have sought to give more detailed explanations for the various components of the water pipe system in this area. Information for this task has been limited where *Titanic* concerned. That is why *Olympic* evidence was used to supplement the

analysis. I do not claim that this analysis is flawless but at least it provides a starting point for further analysis.