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February 22, 2016

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FILE#: 5922

PO#: NC10247958

Mr. Carroll Williams  
Facilities/Maintenance Manager  
Roanoke Island Festival Park  
One Festival Park  
Manteo, NC 27954

& Mr. Roger Odom  
Natural & Cultural Resources

**RE:** *ELIZABETH II*  
**DOC:** USCG # CG052036  
**HULL#:** NC2007320783  
**TYPE:** 16-CENTURY MERCHANT SHIP REPRODUCTION

### **SURVEY SUMMARY**

Dear Mr. Williams:

This is to certify that on February 1 thru February 3, 2016, at the request of North Carolina's department of Natural & Cultural Resources, the undersigned marine surveyor attended onboard the above captioned vessel, a reproduction of an 16th century merchant ship of wood construction. The vessel was inspected at the DOT Marine Maintenance Facility Mann's Harbor, NC. The vessel was in dry-dock here for her routine maintenance period. The purpose for attending the vessel was to conduct a condition survey of the vessel.

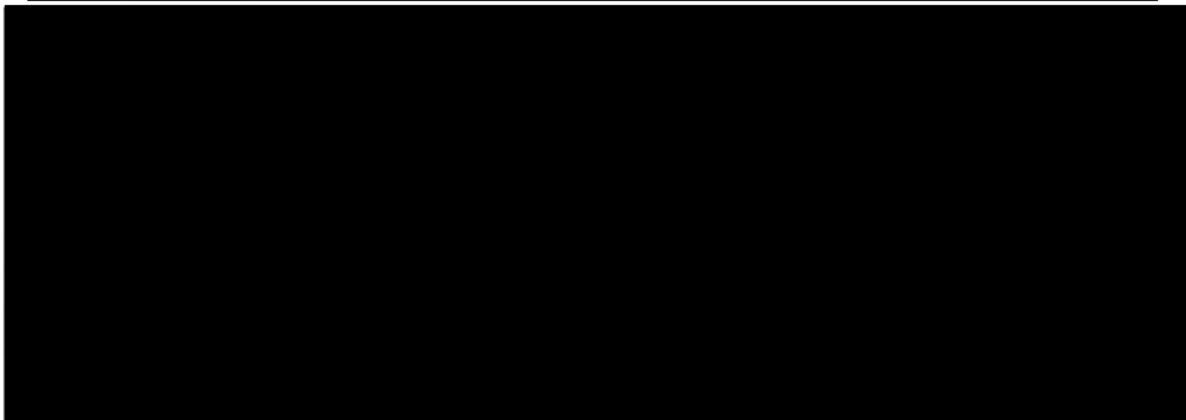
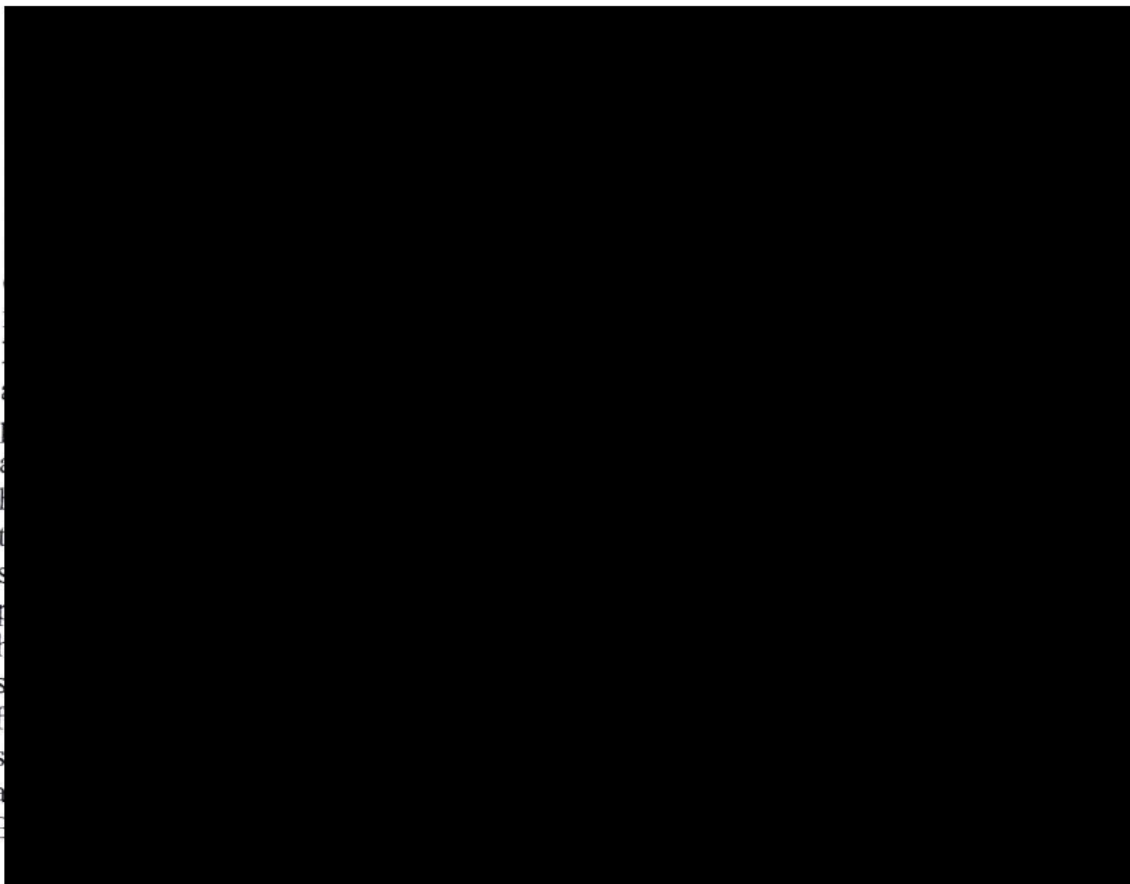
### **DESIGN & CONSTRUCTION**

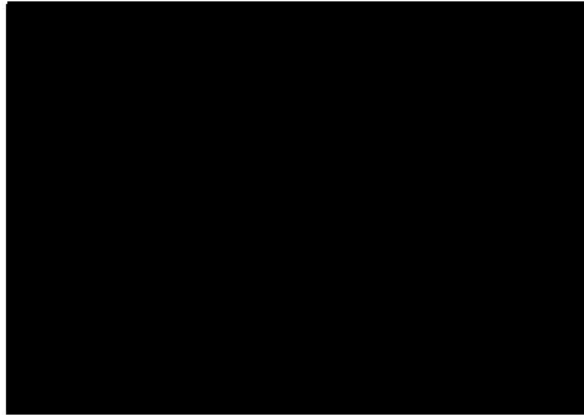
Construction was started on the vessel in July of 1982 and she was launched on November 22, 1983. The lead builder on the project was O. Lie-Nielsen a well-known builder from Maine. She was built in Manteo, NC which is where she is today. *ELIZABETH II* is modeled after a vessel called *ELIZABETH* which was one of the ships that sailed in the 1585 expedition to the New World. It was built as part of the

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Quadricentennial celebration that was planned for 1984 in North Carolina. There were no plans of the original *ELIZABETH*, but it was generally known what a 16-century English Merchant ship would look like and it was with this that they went forward.





Specifications are as reported to the surveyor

### **SCOPE OF SURVEY**

During the survey of the vessel a visual and hammer test inspection was made of the hull underbody, hull topsides including transom, deck and cabin top. Also inspected were the rudder, propellers, shafts and all related equipment. The wood trunnels were viewed from the outside and found to be in good condition, none were pulled; just a visual inspection was done. Pulling the trunnels would be destructive. Destructive testing was not part of the contract. The topsides of the vessel were inspected from a man lift and also the area of the bottom that could not be reached from the ground or from a ladder. The vessel was down rigged with only the lower masts still in place. These spars were inspected from the man lift. The rest of the spars and the rigging were inspected at the parks shop facility where they were stored. The vessel's sails were briefly inspected at the same facility. The vessel was in dry-dock so none of the mechanical systems could be tested. These were visually inspected.

In the interior portion of the survey all loose floorboards were lifted, lockers opened and all these interior spaces inspected. Any and all accessible areas were inspected, except for the purpose of this survey no fixed joiner work or interior ceiling was removed.

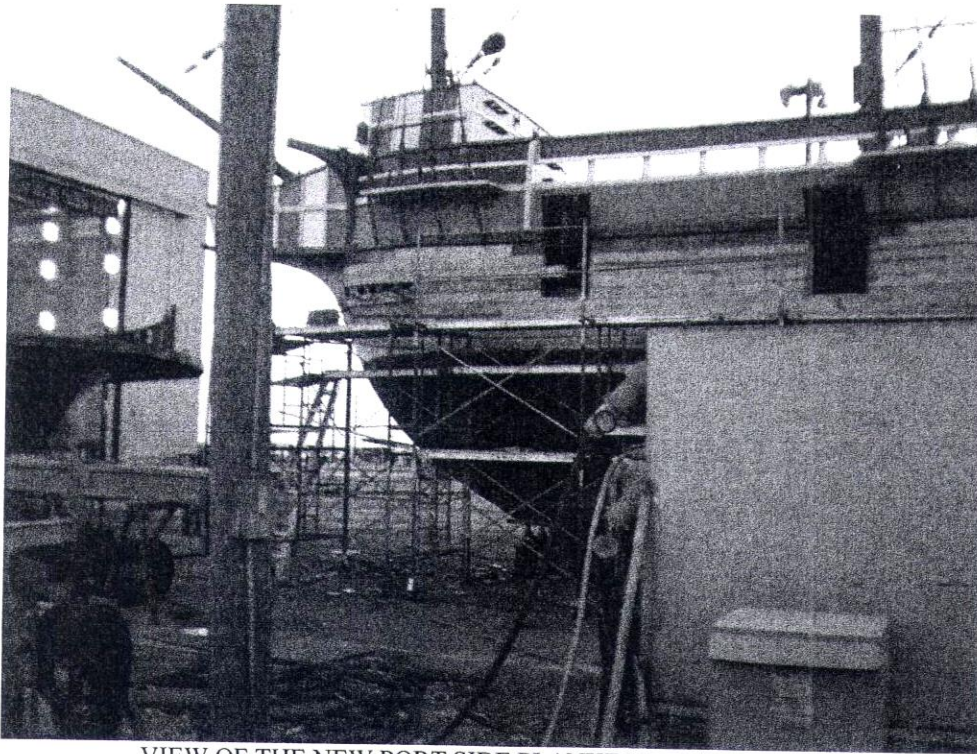
### **COMMENTS**

This office has inspected the vessel in the past with the last inspection being in February of 2011. This recent inspection was at the same facility of the last inspection. The *ELIZABETH II* has had a considerable amount of work since the last survey. Above the water line the port side of the vessel has almost been totally re-planked. On the starboard side a good portion of the planking above the water line has been replaced. It is

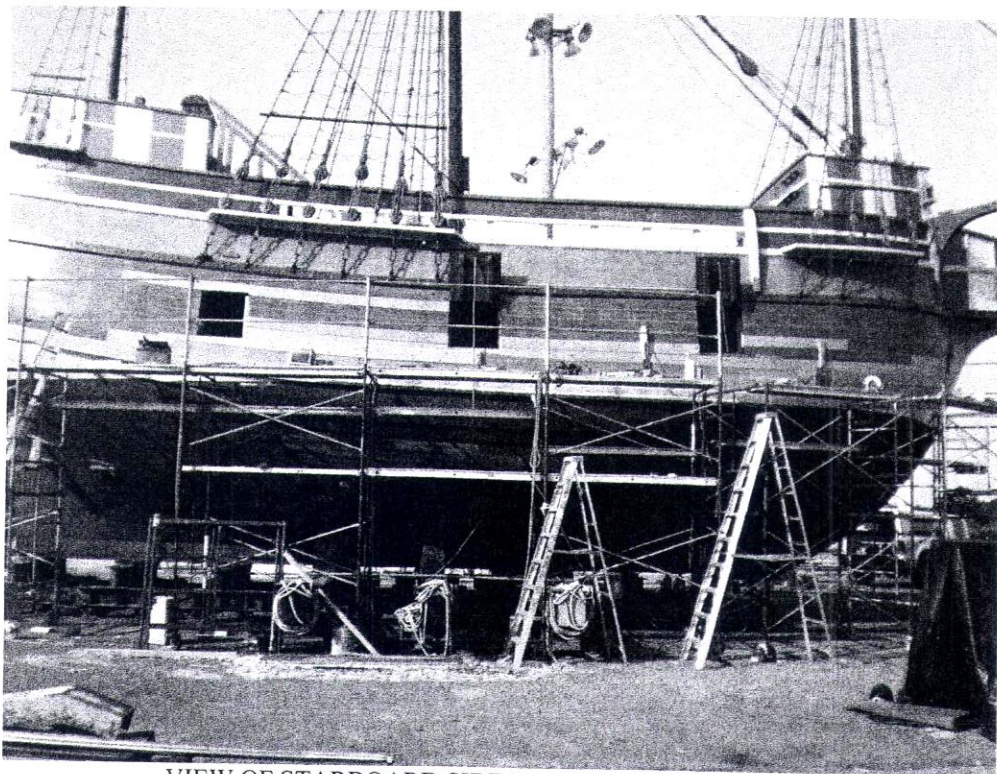


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reported that when the planking was removed the frames were found to be in good condition.

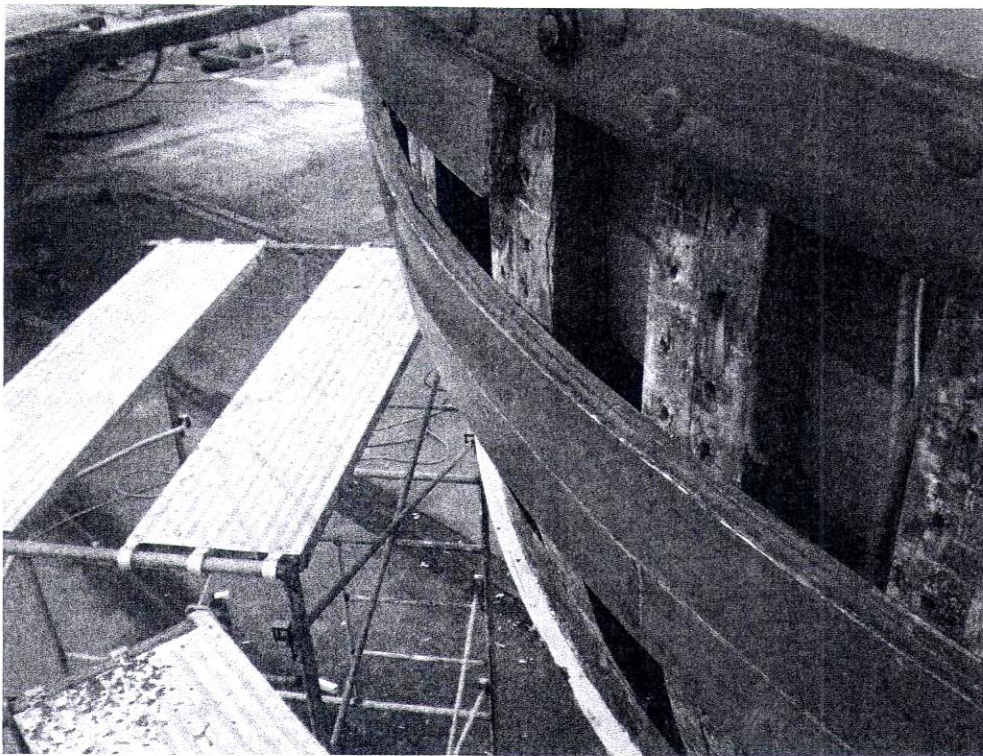


VIEW OF THE NEW PORT SIDE PLANKING – PARK PHOTO

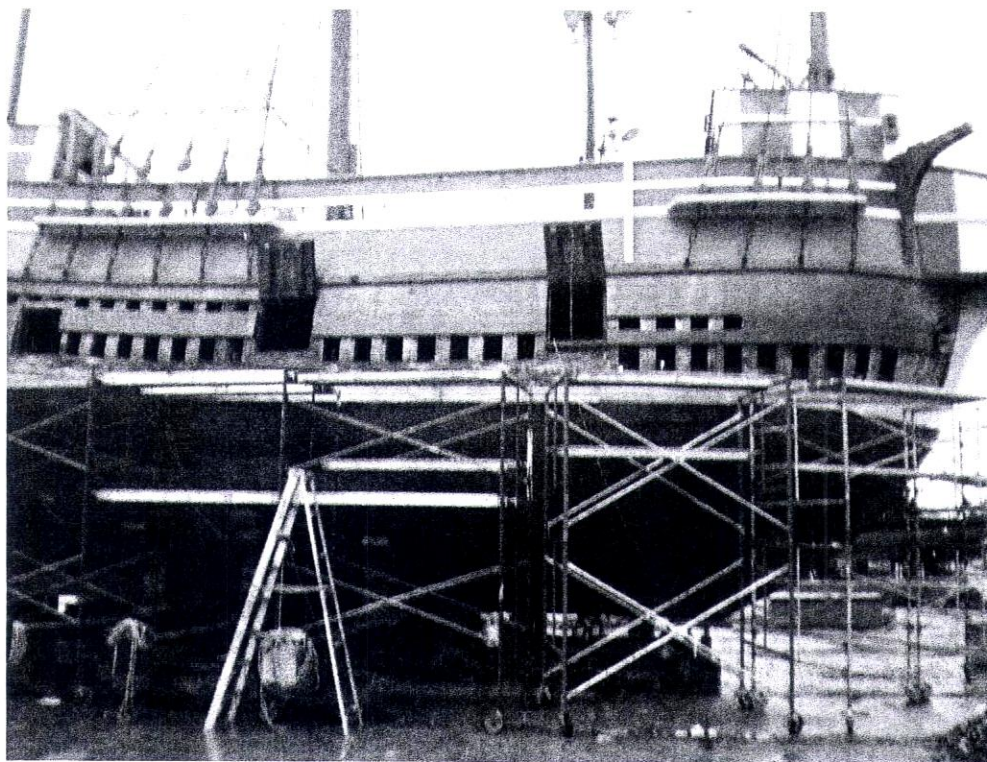


VIEW OF STARBOARD SIDE PLANKING – PARK PHOTO





CLOSE UP OF FRAMES – PARK PHOTO



VIEW OF STARBOARD FRAMES – PARK PHOTO



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In addition to the hull planking noted above the main and quarter deck were replaced. This gave a good look at the vessel's deck beams. With the planking, the new deck and the view that this gave of the structure, the vessel has been significantly upgraded for future service. The next area that will need attention is the bottom. This inspection found issues showing that there has been some deterioration of the planking. It would be recommended that at the next dry-dock the bottom be stripped of paint so a full assessment of the planking needs can be made.

There were some areas that were noted for attention. The recommendations have been divided into priorities for the purpose of maintenance planning. The items should be taken in order of priority with the plan being to have completed all the repairs within three years. The first priority items need to be completed before full operation of the vessel. From the inspection of the vessel the following notes and recommendations are made.

**RECOMMENDATIONS**

**IN ACCORDANCE WITH NFPA-302, ABYC & USCG CODES**

(\* indicates 1<sup>st</sup> priority items)

(+ indicates 2<sup>nd</sup> priority items)

**INTERIOR**

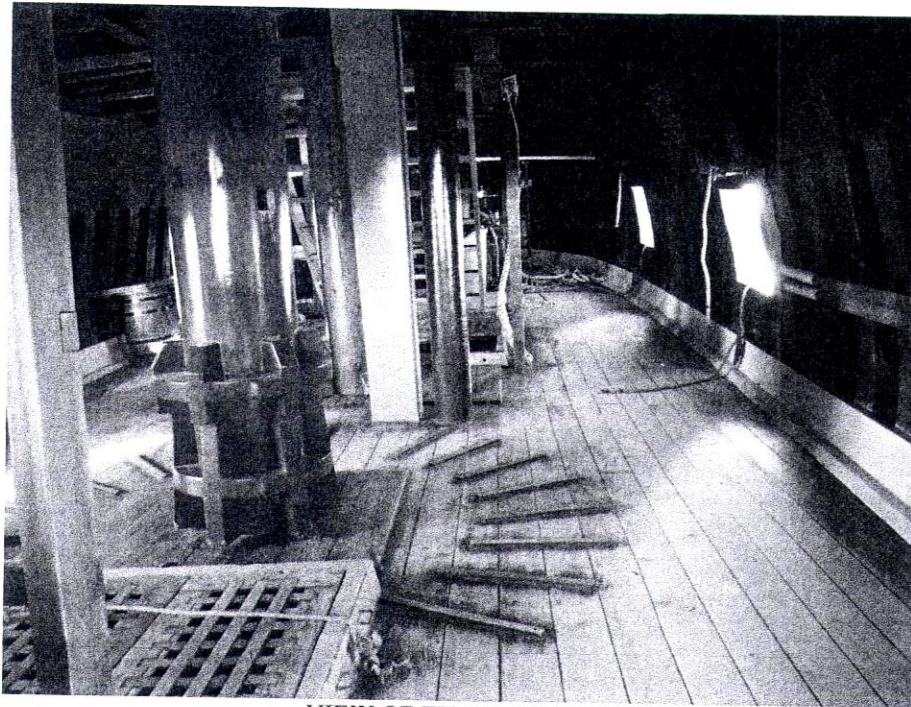
**FORECASTLE**

1. On the aft bulkhead the vertical frames are solid, but have been split out when the nails were hammered in. These can stay the way they are, but should be noted and replaced at some time in the future as time and money allows. In this state they still have the strength needed.
2. On the port side the 1<sup>st</sup> forward vertical bulkhead frame has a long vertical split starting from the top. Not an issue at this time.

**STEERAGE**

3. On the starboard side the 2<sup>nd</sup> starboard frame aft of the locker is split down the center for about 2 ½'. Most likely along the spike line. It still has integrity so for now should be fine. Monitor in the future.
4. On the port side the aft futtock of the aft frame has a significant split starting 1 ½' above the steerage stringer. Monitor this frame for future replacement. No repair at this time.

GUN DECK



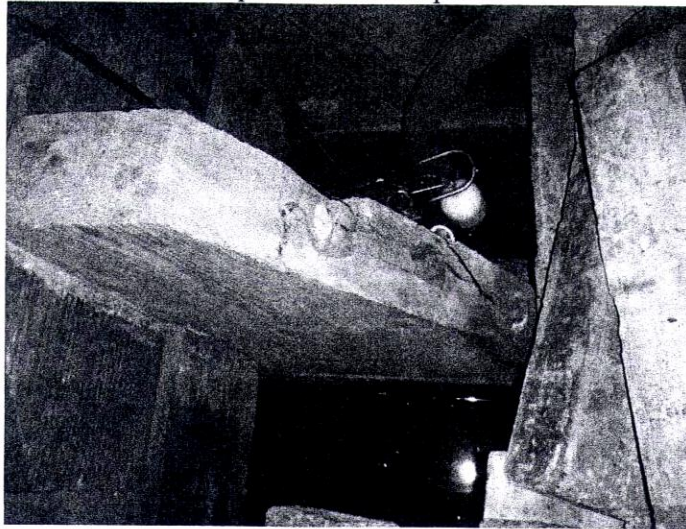
VIEW OF THE GUN DECK

5. There appears to be leaking from above at the aft partition of the forecastle. Seal the deck seam above to prevent the leak.
6. On the port side at the port end of the aft large beam for the forecastle there is some water weeping through here and the margin board where it joins is damp.
7. From some previous leaking the forecastle cabin sole has fuzzy wood on the underside. Clean up and monitor.
8. There is some evidence of wood borers in some of the timbers. It is reported that this is old and there has been not further activity. This should always be monitored.
9. Starboard frame #6 aft futtock has a significant split at the deck lever and above. It still has strength, but should be monitored for any change.
10. The frame aft of the mid port gun port is split at the joint of the upper futtock. Monitor.
11. In the head the lower end of the forward futtock at the forward head partition is split down the center. No repair at this time, monitor.
12. The 3<sup>rd</sup> frame aft of the forward upper futtock has a split out piece in the futtock. No repair at this time, Monitor.
13. The generator was inspected and looked good. The oil was checked and was clean. There was no evidence of any leaks. The sound housing has areas of rust. This should be cleaned up and primed and painted.
14. The starboard transom cheek frame has a split. Continue to monitor.

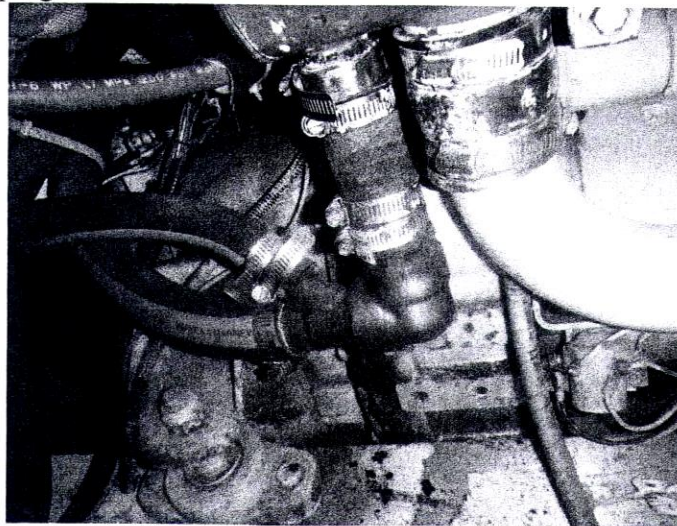


**BILGE DECK**

15. On the port side it looks like there has been leaking from around frame 7 & 8 (has water pump). Not sure if this is past or present. Monitor.
16. The hose connection for the salt water wash down pump should be double clamped. (\*)
17. The actual bilge in this space has a considerable amount of lead ballast. It is recommended that a schedule be made where each dry-dock a section of the bilge is emptied of lead and the bilge cleaned and inspected.
18. The aft starboard main mast step knee is split out at the drift line. It would appear that the iron drifts are expanding pushing the knee apart. This knee should be replaced at some point.



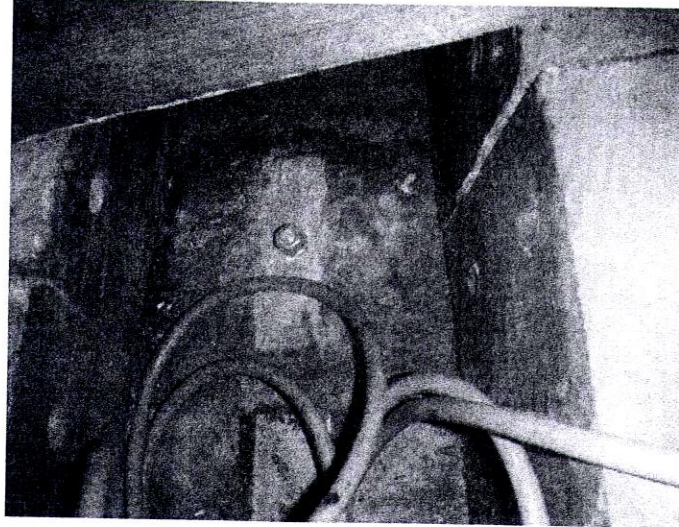
19. On the starboard engine the elbow that runs from the heat exchanger is weeping at the weld.





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20. The port engine intake hose is starting to get ragged at the pump end. Schedule this hose to be replaced.
21. Around the bolts for the starboard aft end of the shaft tube and the strut bolts the planking has been compromised. These planks will need to be replaced at the next dry-dock. To do this the shaft log and the strut will need to be removed. (+)



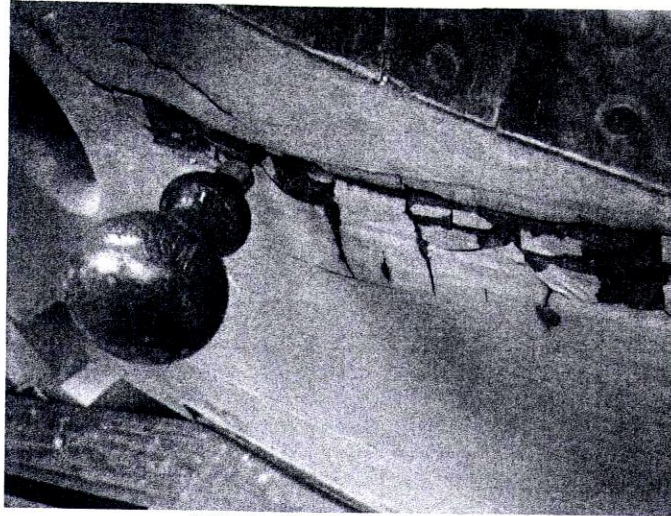
22. The major dip noted in the 2011 report has been taken out of the port vent line, but there is still too much dip and the hose needs to be taken up a bit still.

**EXTERIOR**

**DECK & SUPERSTRUCTURE**

**(BEAKHEAD)**

23. The starboard side of the stem knee is significantly rotted. This needs to be replaced as it cannot be determined the extent of the internal damage. (\*)



VIEW OF ROTT IN KNEE

24. The 2<sup>nd</sup> ladder rail down on the forward face of the forecastle house is split and needs to be replaced. (\*)

#### (FORECASTLE DECK)

25. The forward wood section holding the horns is in very poor condition along the forward edge. Replace.
26. The 3 forward stanchions that the above is fastened to are in poor condition. These should be replaced when the above is replaced.
27. Along the port side the 1<sup>st</sup>, 2<sup>nd</sup>, & 3<sup>rd</sup> stanchions are poor with dampness entering the end grain that is open. These will need to be replaced at some point. When replaced the end grain should be covered to prevent future damage.
28. The aft port corner stanchion is rotted and will need to be replaced.
29. The 2<sup>nd</sup> starboard stanchion aft of the corner is poor with exposed end grain. It will need to be replaced at some point.
30. The other two stanchions are marginal and they have end grain cracks. Monitor at this time.
31. The stanchions across the aft bulwarks are all compromised. They have vertical cracks. These issues continue down into the forecastle. Monitor at this time and replace at some point.

#### (QUARTER DECK)

32. The port bulwark cap rail is marginal from the forward end aft to the scarf. Replace.
33. The starboard cap rail is marginal and has cracks along it. Monitor.
34. The lower aft bulwark aft plank is poor and has been filled with filler. Replace.

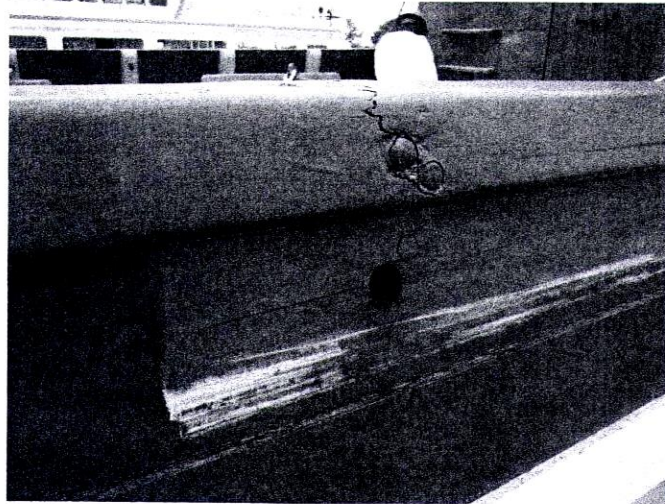


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35. The forward margin board at the ladder way has some cracks. It appears ok. Keep the cracks sealed and monitor.

**(MAIN DECK)**

36. On the starboard side stanchions 9 & 11 are significantly rotted and need to be replaced.
37. On the starboard side there are cracks at the bulwark cap rail at stanchion 4 & 5. This is where the gangway secures. The cap rail will need to be replaced in this area.



**CAP RAIL CRACK**

38. On the port side stanchion 5 has a longitudinal split down the center. This is one of the gate stanchions. Replace the stanchion. The port cap rail is split at stanchion #4. This is where the gangway secures. The above three items all are where the gangway lands. It is recommended that this be re-designed. The gangway should land on the coral whale. The section of bulwark above this can be made removable and installed when the vessel is sailing. The present system puts a lot of stress on the bulwarks and the stanchions.
39. Port stanchion #5 is also cracked just below the kevel cleat further showing the stress of the gangway.
40. The port pin rail at the main shrouds is showing its age. There is some shrinking of the wood etc. Monitor at this time, but it in mind to be replaced.
41. The bulwarks on the main deck are generally poor. These should be considered for replacement before too long.

**TOPSIDES**

**(WHALES)**

42. On the port side from the 3<sup>rd</sup> main chain plate aft to the stern the red whale is poor and needs to be replaced.
43. From the port 4<sup>th</sup> main deck stanchion forward to the Beakhead the red whale is poor and will need to be replaced.
44. The small coral whale on the port side is poor from the large fairlead aft.
45. On the starboard side from the 4<sup>th</sup> main chain plate forward to the Beakhead the red whale is poor and will need to be replaced.
46. The small starboard coral whale is poor from the large fairlead aft of the forechannel aft to the stern.
47. On the starboard side the mid plank above the top sister plank has a full length check in it. At some point this plank should be replaced.
48. The plank above this has a check at the forward end (under the gun port) approximately 2'. Consider for replacement at some point.

**(PORT TOPSIDES)**

49. The 4<sup>th</sup> plank down from the red whale has a slight crack around the top bung aft of the anchor hawse. Monitor.
50. The forward ends of the blue planks where they meet the cat head are marginal. Put on the replacement list.
51. The red whale has several splits and questionable areas under the forward channel. The problem runs aft to the butt aft of the 3<sup>rd</sup> bulwark stanchion. Replace the whale in this area.
52. The red whale should be replaced from the new butt at the new section aft.
53. The 5<sup>th</sup> plank down from the lower red whale has several cracks at frames 6 & 7 aft of the main chain plate. Replace at some point.

**(TRANSOM)**

54. The 2<sup>nd</sup> plank down from the top cap rail is rotted to port – replace.
55. The inboard upper end of the port quarter deck knee sounds questionable. Monitor.
56. On the port side the upper two outboard diagonal planks are poor and need to be on the replacement list.

**(STARBOARD TOPSIDES)**

57. Where the great cabin forward port side meets the red bulwark rail the lower planks are rotted.



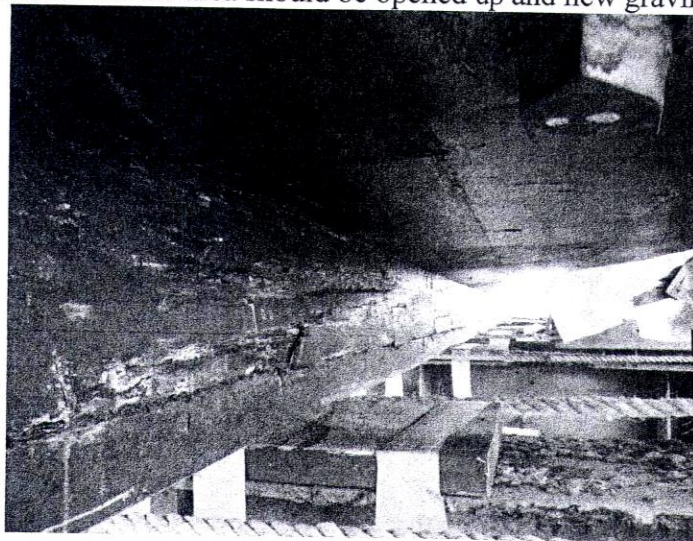
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58. The butt in the varnished plank above the white whale forward of the mizzen chain plate is poor. Put on the replacement list.
59. The large red whale starting two stanchions forward of the main chain plates and running aft of the 3<sup>rd</sup> chain plate is poor – replace.
60. The 2<sup>nd</sup> blue plank above the large red whale where it meets the cat head is poor – replace.
61. Where the varnish planks start at the turn of the bow there are cracks at the fastenings. Monitor at this time.
62. The large red whale under the forward channel is poor between the next to last and the last chain plate. Schedule for replacement.

**BOTTOM (Planks are counted up from the garboard with the garboard as 0)**

**(STARBOARD BOTTOM)**

63. On the keel on the port side there has been a keel repair of various graving pieces. These graving pieces have been pushed out over time. Next haul out the area should be opened up and new graving pieces fit.



64. Aft of this there is another area with a long graving piece above the worm shoe that is old and should be replaced.
65. On the starboard side forward plank #7 has a bad area 41" forward of the forward butt. Replace this plank from the butt forward to the stem.
66. The starboard plank #8 has several poor areas in the plank aft of the forward butt. Replace this plank from the forward butt aft to the next butt.
67. Starboard plank #9 has several poor areas starting 3'-" aft of the forward butt. Replace this plank from the forward butt aft to the next

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butt. This is a long plank and will give a good window into the frames in this area.

68. Forward starboard plank #5 has grain that is starting to open up. Monitor this plank. At some point it will get to a point where it will need to be replaced.
69. Starboard forward plank #4 has hollow sounding 12” aft of the stem. Monitor for any change.
70. On the starboard side plank # 13 & 14, starting where they meet the water line aft and running forward toward the sister planks (plank #14 runs under the sister plank) look questionable. Monitor.
71. Starboard plank #15 has marginal areas just before the water line aft of the sister planks. Monitor.
72. On the starboard side the aft end of the sister plank over planks 14 & 15 feels loose when sounded and has a significant crack in the center. Will need to be replaced at some point.
73. On the starboard side the lower sister plank at planks 13 & 14 sound loose and looks marginal. It starts 60” aft of the forward end. Replace at some point.

**(PORT BOTTOM)**

74. On the port side plank #1 has some poor to marginal areas starting from the aft butt and running forward approximately 6’. This plank should be on the replacement schedule.
75. Port plank #4 has poor areas starting at the 2<sup>nd</sup> butt forward from the stern post. It should be scheduled to be replaced from this butt aft to the last butt.
76. Port plank #5 has poor and marginal areas starting at the butt forward of the stern tube. Replace this plank.
77. On the port side several of the planks that have not been identified for replacement have rust colored spots around the iron fastenings. As time goes on this will spread. In the mean time when these are found, pull the bungs, etch the spike head, treat with Ospho and coat with epoxy. This will slow down the progress.
78. On the port side the forward end of the sister plank below the water line sounds hollow when sounded. Monitor.
79. The port aft plank #9 has some questionable areas above the shaft tube and plank #10 has a couple of questionable areas. Monitor and at some point they will need to be replaced.
80. The after section of planks 7 – 10 are showing their age. These were not part of the stern post replacement. Put on the replacement list.



**NOTES**

- No seatrials were conducted as the vessel was in dry dock.
- All rigging was inspected at the parks work shop.


**CONCLUSION**

The *ELIZABETH II* has had very good maintenance over the years. As noted in this report , in recent years, she has had some significant work. This work has kept her in good condition. It is apparent that her condition is directly related to the good maintenance staff that looks after the vessel and their maintenance of her. There is a good maintenance program in place. Upon the completion of the (\*) items in the recommendations this vessel would be considered a good marine risk. This report is submitted with out prejudice and for the exclusive use of Roanoke Island Festival Park and/or their agents. It cannot be passed on to any others with out the express permission of **Capt. G. W. Full & Associates, Inc.**

This report is submitted in good faith and constitutes a description of the condition as than found. The surveyor assumes no responsibility for any defects and is to be held harmless for conditions subsequently arising. This report does not warrant expressly or implied, or guarantee the condition of the above vessel.

Respectfully Submitted,

**CAPT. G. W. FULL & ASSOCIATES, INC.**

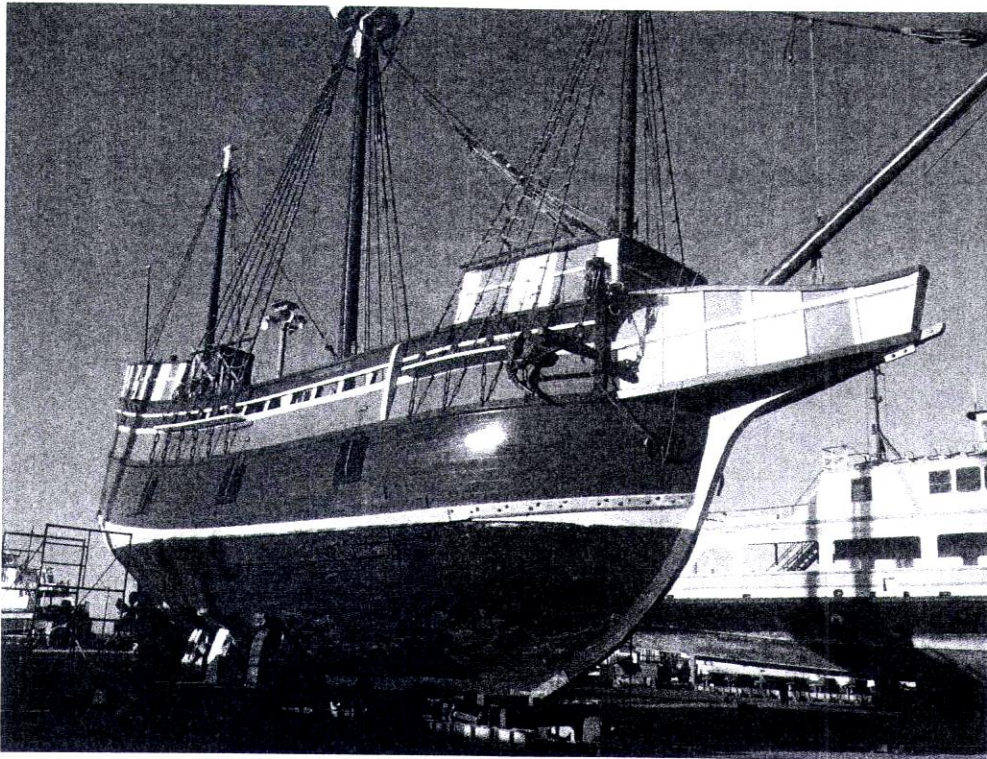


**By:** Capt. Paul C. Haley, NAMS-CMS  
Certified Marine Surveyor

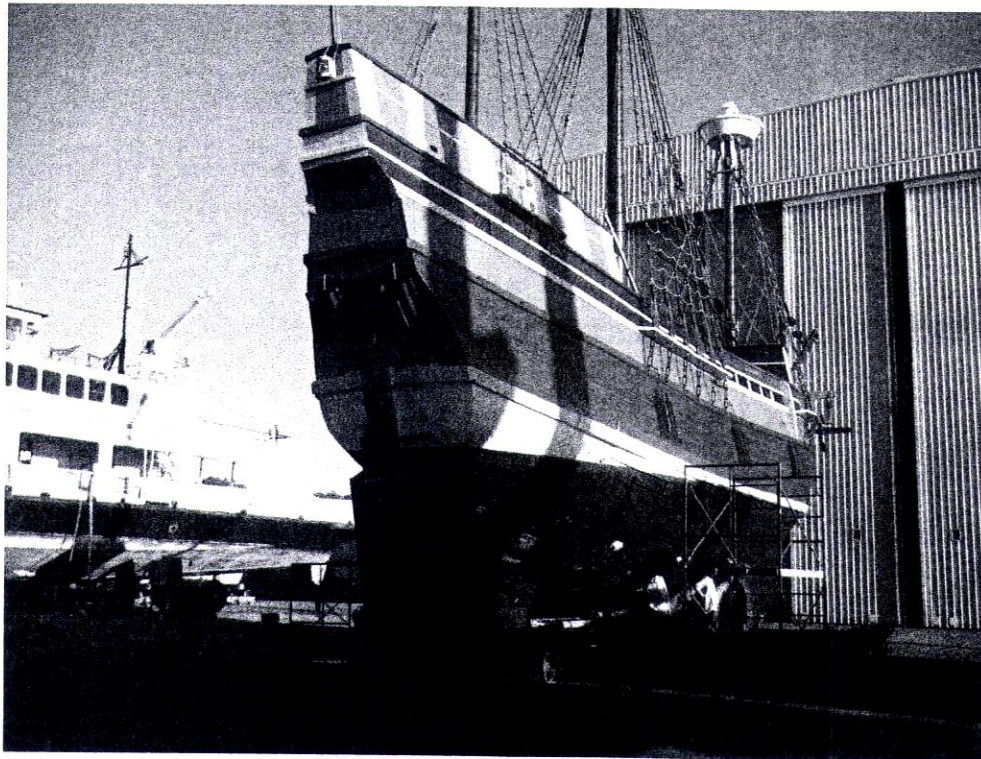




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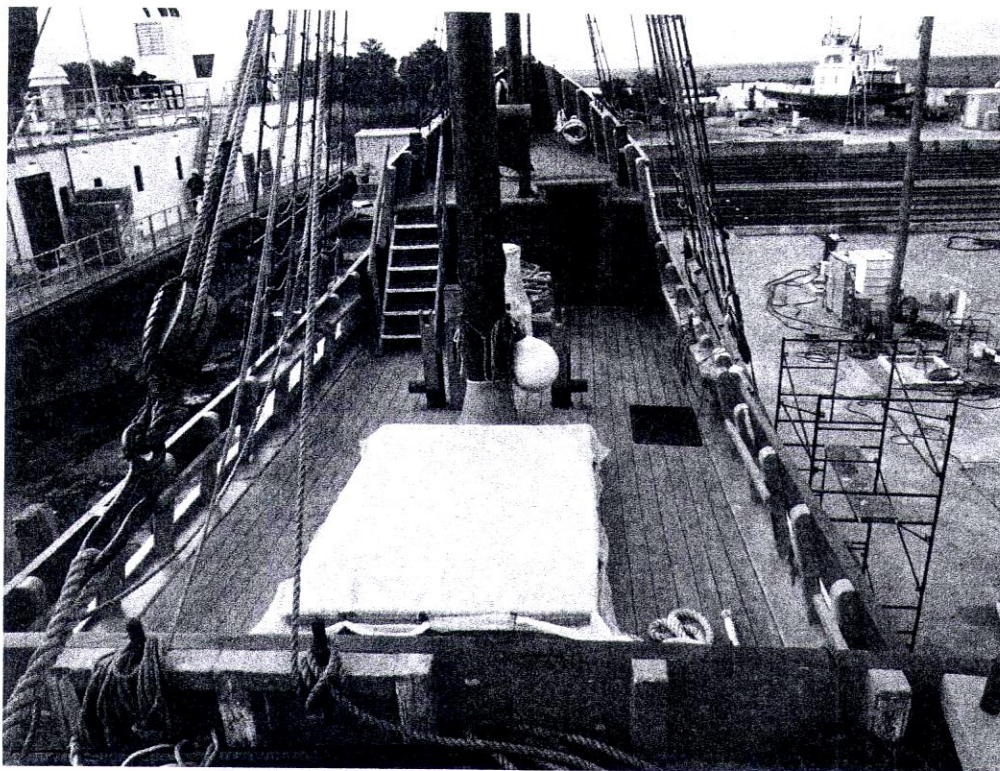
FORWARD VIEW OF THE VESSEL IN DRY DOCK



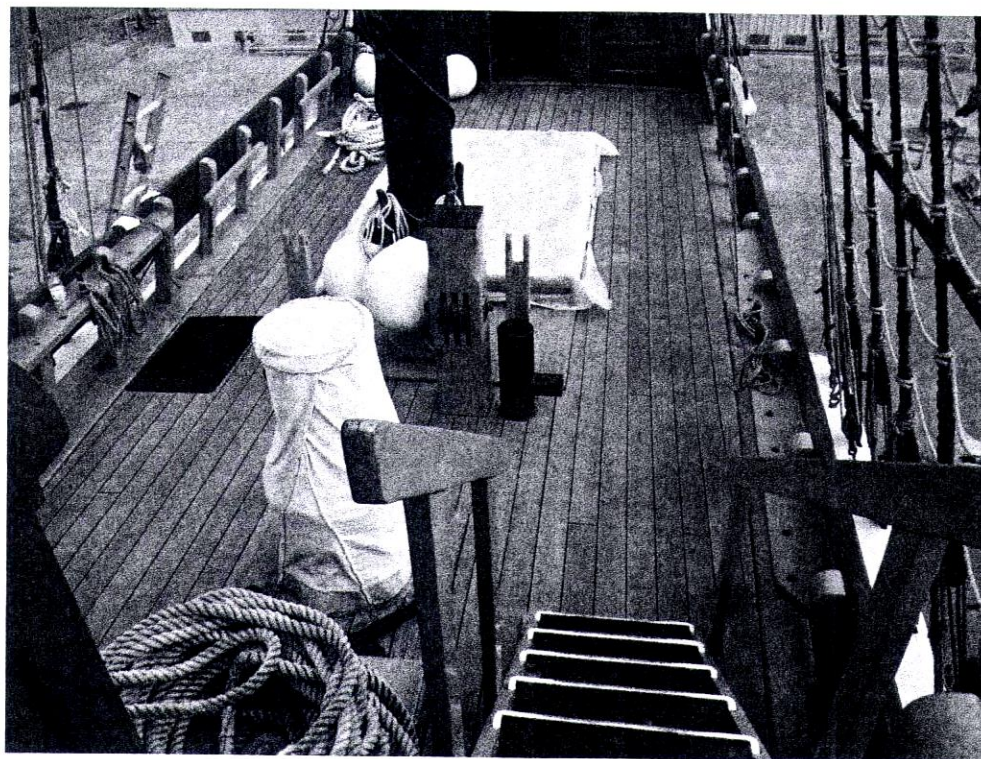
STERN VIEW OF THE VESSEL



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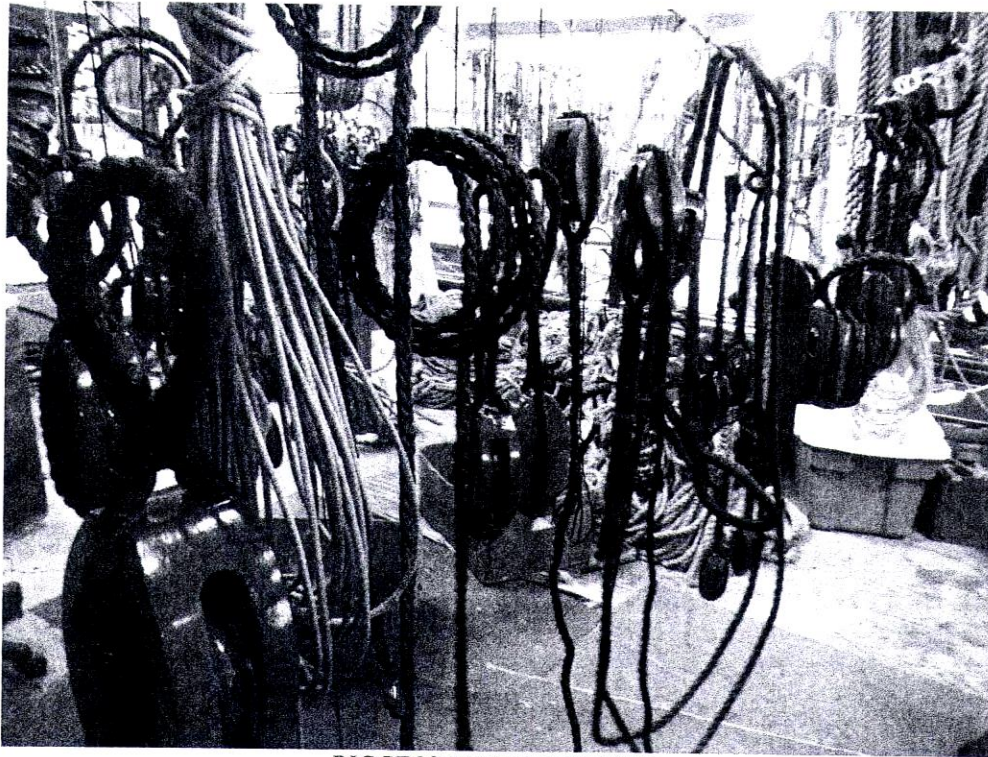


DECK LOOKING AFT – NOTE NEW DECK PLANKS



DECK LOOKING FORWARD





RIGGING BEING SERVICED



MORE RIGGING