

D-126
File: Cape
Hatteras

RECOMMENDATIONS ON REPAIR OF HATTERAS LIGHTHOUSE

IN
STORAGE

To

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From

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ON MICROFILM

B&W Scans
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The report of July 14, 1977 described the conditions noted at various points in the metal structure of the Hatteras Lighthouse. This report, plus the inspection of July 15, 1977, together with discussions between Dr. W. W. Austin and Dr. C. R. Manning, have led to the following recommendations for repair of the Hatteras Lighthouse.

The lighthouse was divided into various areas, and the repairs will be listed by area:

#1 Parapet Walls (Cast Iron) from floor decking to area where light is mounted, completely around the circumference of the lighthouse.

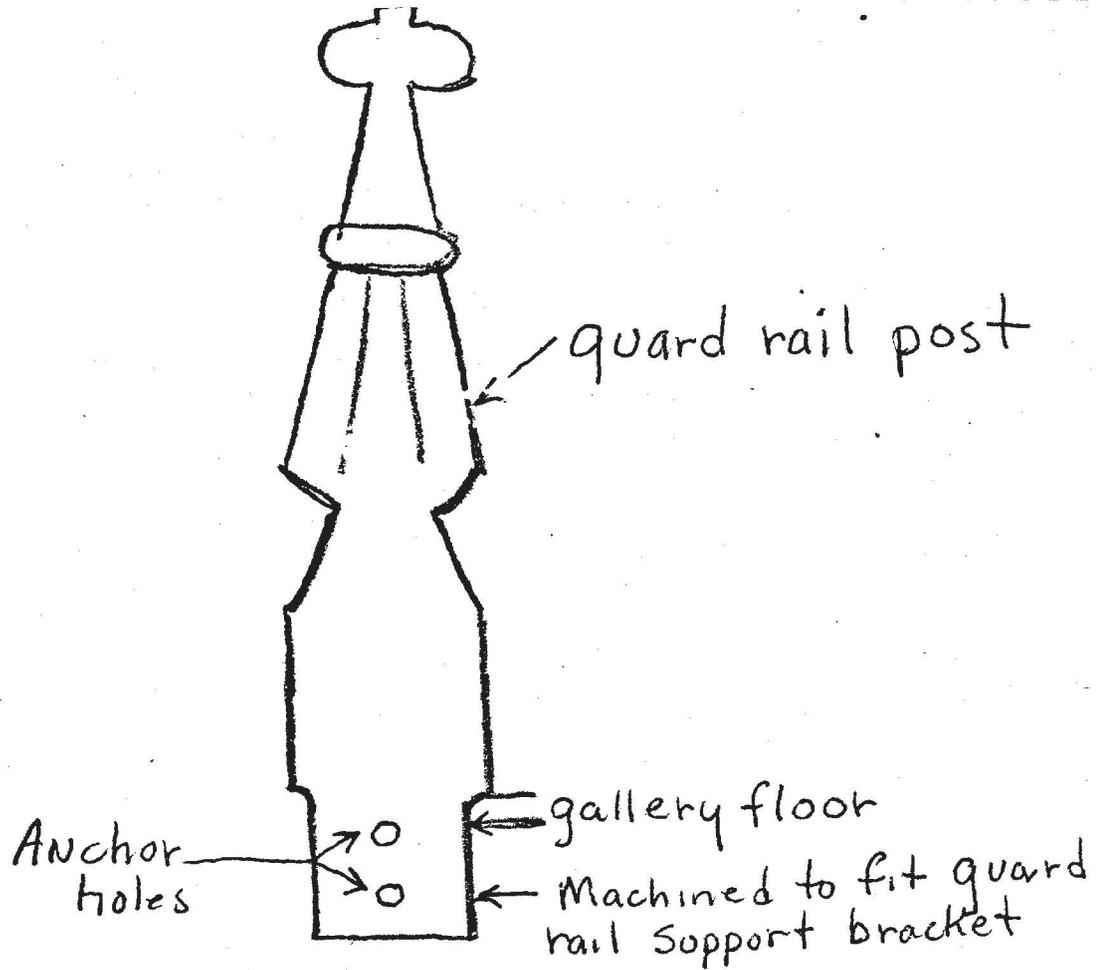
There are a number of cracks running from near the deck floor upward and around circumferentially on the parapet walls. These cracks should be stop-drilled at their ends and then filled by brazing or braze-welding.

#2 Guard Rail - 16 sections - 80 lbs/section = 1280 lbs.
(made of wrought iron)

Replace all sixteen sections. Remake sections slightly heavier (100 lbs/section). Can be remade from wrought iron or K-Monel. We recommend K-Monel for corrosion resistance.

#3 Guard Rail Posts - 16 posts - made of cast iron.

Replace all sixteen guard rail posts. Make posts heavier (150 lbs.). Can be cast from cast iron similar composition to present. Modify posts somewhat. Instead of making bottom flat, we will cast a protrusion on the bottom which can be machined to a close dimension to fit snugly into the guard rail support on the brackets.



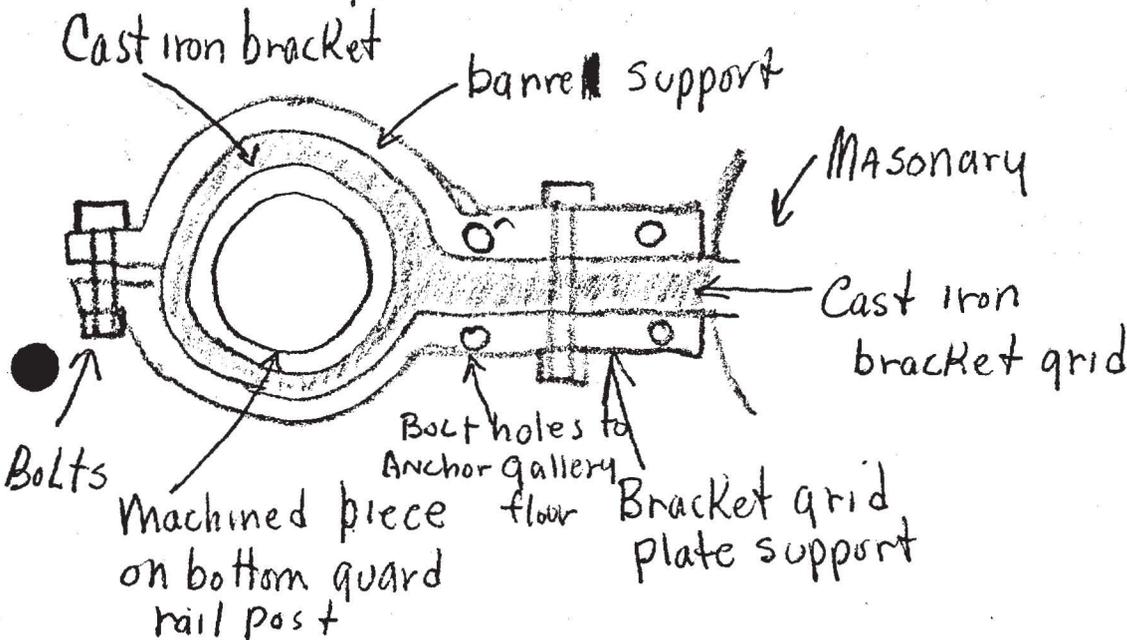
#4 Guard Rail Support and Bracket Grid

The area on the brackets below the guard rail posts (where the gallery floor plate is supported on the bracket grid lattice) must be repaired. The guard rail support is cracked on many brackets and has large pieces missing. The bracket grid is heavily corroded and eroded on many brackets. There is a general overall need to stiffen these areas.

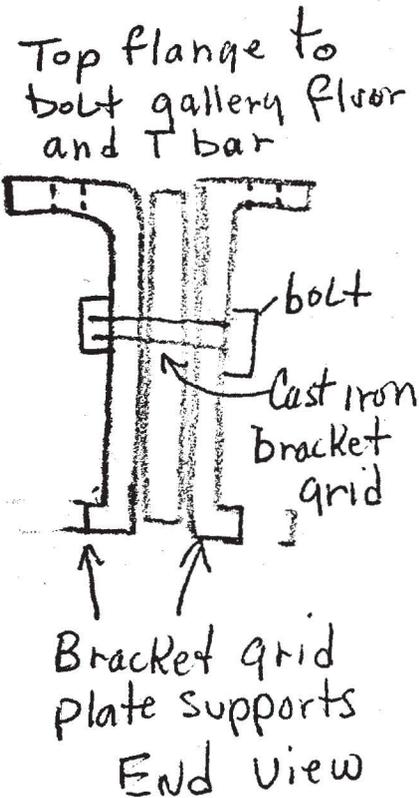
We suggest making a structural barrel, produced in two half sections, with a plate attached to each half section. The plate will fit against the bracket grid. Each will have a heavy flange on top and bottom. The two half sections will be assembled from each side and bolted securely together. The bolts will be removed from the gallery floor and the holes drilled through the flanges; then new bolts

will be inserted and tightened. The barrel will be clamped tightly around the upper part of the guard rail support. This barrel will hold the guard rail post in place. Two horizontally-drilled holes will be made through the barrel and guard rail post protrusion, and bolts inserted. This will stiffen the gallery floor and anchor the guard rail.

Top View

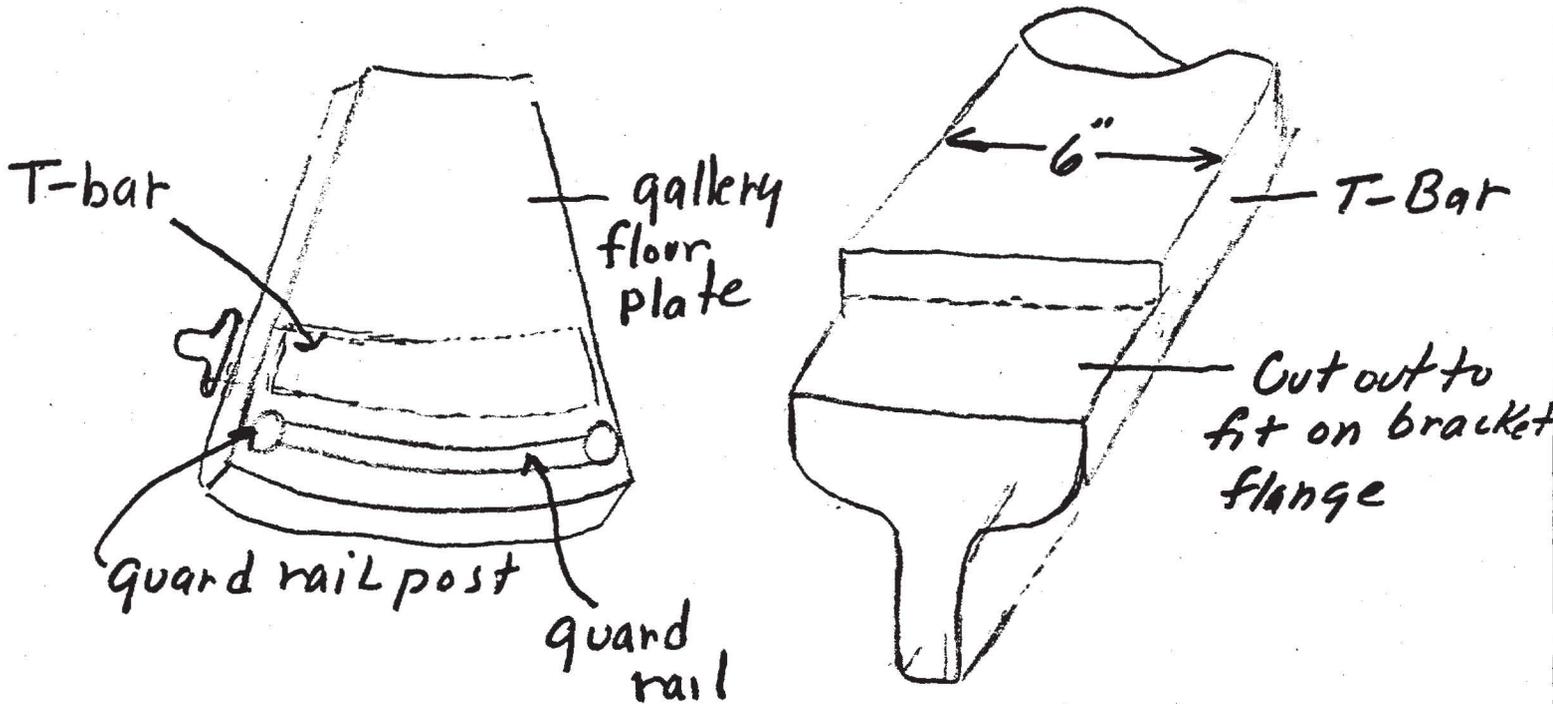


#5 Gallery Floor (cast iron)



The gallery floor has experienced erosion and corrosion in a number of places. The outermost part of the floor which has a heavy lip has many places missing in this lip. This tends to reduce the lip's load-carrying capability. To keep the stiffness near the railing, a T-bar should be placed under the floor plate projecting from each bracket to the next. This T-bar will be anchored (bolted) to the

bracket grid plate. Both will be made of K-Monel.



This T-bar bolted to each bracket will stiffen the gallery floor, and also will tie the brackets circumferentially all the way around.

#6 Lower Part Guard Rail Support and Anchor Nut

There is considerable damage in this area on a number of the brackets. This can be fixed by brazing some pieces of cast iron back into the open areas. Some of the anchor nuts are missing and need replaced. This can be done by casting new anchor nuts and attaching them to the rod projecting from the bottom of the guard rail post. These nuts and the lower part of the guard rail supports will be placed back in the original configuration of the lighthouse. They will be strictly ornamental and will not be called upon to carry any load.

#7 Bracket Large Holes

A study of the wrought iron retaining ring which holds the sixteen brackets in place indicates that it has experienced considerable corrosion and is degraded. A number of the brackets have major cracks at the retaining ring attachment. These areas are imbedded in the masonry. A number of areas have been opened and many areas can not be seen. To compensate for this, a large cable must be placed through the large hole in each bracket and tightened by special clamping to keep all brackets in their original positions. This eliminates any concern with regard to the cracking noted in the bracket at the retaining ring. It is our opinion that to determine the extent of all corrosion and cracking in the metal buried in the masonry would be very expensive, time consuming, destructive to the lighthouse, and may never be completely conclusive. Installing the cable is the least expensive alternative which assures safety.

SUGGESTED METHOD OF REPAIR:

After obtaining all engineering drawings and dimensions, get necessary parts fabricated and brought to site. Set up staging around the bottom of the brackets so that personnel can walk around under the brackets. Open the one window at the top of the stairs so that personnel can climb out on the staging.

First remove guard rail and guard rail posts. Then remove floor plate bolts in one section at a time. Install barrel supports and bracket plates and drill holes in flanges to match floor plates. Install T-bar from one bracket to next as barrels are installed. As these parts are installed, simultaneously repair lower guard rail support. Then install guard rails and drill barrels and guard rail protrusions. Install bolts to anchor guard rail posts. Put on anchor nuts below bracket and braze nut to bracket to insure adherence. Now, install guard rail and braze-weld all parapet wall cracks.