



Friends of the Battleship, December 2011



Celebrating 50 Years in North Carolina

MARVELOUS EVENTS THIS YEAR MARKED THE 50TH ANNIVERSARY OF THE SHIP ARRIVING IN WILMINGTON. REACHING MULTIPLE GENERATIONS, EFFORTS WERE GEARED TO CREATE AN EXCITEMENT LIKE IT DID FOR THE SCHOOL CHILDREN AND MANY OTHERS WHO GAVE THEIR NICKELS, DIMES, AND MUCH MORE TO BRING THE BATTLESHIP TO WILMINGTON IN OCTOBER 1961.



Hugh Morton photo



April: Battleship Salute/Crew Reunion

Partnering with the Azalea Festival, the celebration kicked off with Battleship Salute, a tribute to the ship's crew and a commemoration of the ship's 70th birthday and 50th anniversary. The event featured a three-dimensional Battleship replica cake created by Eat Dessert First. Exclusive viewing was given to the crew of the new Emmy nominated documentary Battleship NORTH CAROLINA: The Showboat Legacy.

June: Beach Music Festival

Nothing says summer fun along the Cape Fear Coast like beach music and participants enjoyed the best in Carolina Beach Music: Mark Roberts and the Breeze, Jim Quick and the Coastline, plus the renowned Band of Oz, The Tams, Chairmen of the Board and The Embers. The party included family activities, food, prizes and lots of dancing.



August: Need for Speed

The Battleship was the first of ten fast battleships when Congress authorized her construction in 1936. Our day captured the thrill of acceleration with games and performances in the park. Attendees were challenged to compete and qualify to win three racing getaways. Prizes included two grandstand tickets to the *Bank of America 500* plus accommodations, two tickets to Nascar's final race of the year in Homestead, Fl., plus accommodations and airfare and two tickets to any 2012 Nascar race.





Celebrating 50 Years in North Carolina

September: Battle of the Schools

Just in time for football season, the ship hosted a battle of the cheerleaders...a battle of the schools! Teams competed for the opportunity to take home bragging rights and a 50th anniversary trophy that included original teak decking. Congratulations to South Brunswick High School for receiving the day's high honors.



October: Reflection

On the anniversary of the Battleship's arrival in Wilmington we opened to the public at 1961 prices. The line began to form at 7:30 AM! Visitors enjoyed a wide variety of events. The Living History Crew interpreted the ship by re-enacting daily duties and drills. A Reflection Ceremony was held on the fantail. Si Cantwell, columnist and community news editor for the *Wilmington StarNews* provided a delightful reflection of the ship's 50 years in Wilmington. The Cape Fear Chordsmen performed the National Anthem while the Beach Music Barbershop Quartet performed "Ain't Misbehavin'" and an all-service music medley. A fly-by of the Spirit of North Carolina, a World War II Douglas A-26 Invader aircraft, provided the dramatic conclusion.

More special musical performances filled the afternoon. UNCW Jazz Band played jazz standards from 1940 to the present while local dance instructor Babs McDance conducted lessons for popular dances. Techmoja performed a tribute to Motown greats. The Imitations followed with hits from the 60s. The day ended with Taps, a very fitting ending indeed to a fabulous celebration of 50 wonderful years in Wilmington.





Battleship Named Attraction of the Year

Battleship NORTH CAROLINA was recognized as the North Carolina Travel Industry Association's 2011 Attraction of the Year. This award is given to the Visitor Attraction that exemplifies excellence, innovation and sets the standard for an exceptional visitor experience. The criteria are:

1. The Visitor Attraction must be located in North Carolina and open to the general public.
2. The Visitor Attraction must work with their industry partners to cooperatively market their community which enhances the economic well being of the destination.

The Battleship is in good company! Past recipients include Grandfather Mountain, Chimney Rock Park, the Blue Ridge Parkway, and the North Carolina Museum of Art.

Battleship Calls on Extreme Makeover



ABC's "Extreme Makeover: Home Edition" came to Fayetteville, NC in August to rebuild a home. Barbara Marshall, a Navy veteran, is fighting to end homelessness among her fellow female veterans. This formidable woman established The Steps-N-Stages Jubilee House in Fayetteville using her own money. Jubilee House offers shelter, support and services such as mentor-

ing and life coaching to homeless female veterans. Since the show was focusing on armed forces and veterans, the Battleship reached out to see if there was a way to chip in. The call came to action as they needed images of the BB55 and wanted to showcase her in one of the rooms. See our name in one of boy's rooms!



New! www.battleshipncstore.com

On cyber Monday the Battleship's online store went live. Visit the website to securely order shirts, novelties, books, prints, glassware, toys, collectibles, jewelry, caps, and more! The store staff will answer your questions via email or phone.

And if you live locally or plan to visit the Battleship this holiday season, visit our large store. You'll find something for everyone on your list. Free parking too!

Store Hours:
Everyday 8AM-5PM



Ship Stability and Damage Control

Before I can explain ship stability and damage control, we need a common understanding of why boats float, capsize, and sink. Let's start with a small boat. It floats because it can displace a weight of water equal to the weight of the boat and what it carries. If more weight is added to the boat, for example, if another person climbs aboard, the hull sinks a little deeper, displacing water equal to the weight of the added occupant. Basically, the weight of the boat and its load pushes down and is equal to the buoyant force of the displaced water pushing up.

Reserve Buoyancy

Reserve buoyancy is the boat's ability to accept additional weight before the hull sinks so deep that the water starts coming over the sides and the boat sinks. If a boat had no reserve buoyancy, it would immediately sink when any weight was added (a leak, a wave, or rainwater), and the crew would have no time to resolve the issue before the boat was lost. The crew has to act quickly; a one-square-foot breach in the hull at 16 feet below the surface will admit 56 tons (125,440 lbs.) of seawater a minute. (2: p. 97)

Stability

Stability addresses the need for ships to recover from upsetting forces. For example, the Battleship NORTH CAROLINA will increase draft one inch for each additional 125 tons of weight (4: p. 63). Symmetrically loaded, the 1,000 tons of additional weight adds only about eight inches to the ship's draft.

Capsizing

Capsizing is a bigger threat than sinking because of symmetrical flooding. We all know not to stand up in a small boat. If we do, we are raising the boat's center of gravity too close to a point called the *transverse metacenter* (similar to the pivot point of a pendulum). The closer the center of gravity gets to the transverse metacenter, the smaller the force that rights the ship after an upsetting event like a wave or a shifting weight. In extreme damage-control situations, a ship's crew would reduce topside weight by throwing searchlights, guns, and airplanes overboard to lower the ship's center of gravity, increase stability, and avoid capsizing. (7)

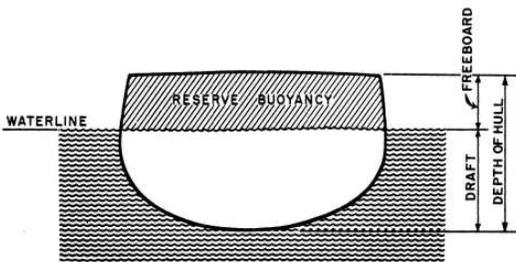
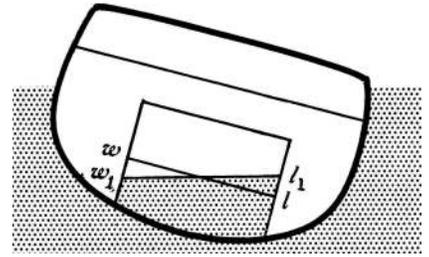
Free Surface Effect

One other concept is *free surface effect*. If liquids or cargo are allowed to shift around a ship, any list would cause them to move to the low side. The resulting movement in the ship's center of gravity would aggravate the list and possibly cause the ship to capsize. NORTH CAROLINA has approximately 650 watertight compartments that served to control flooding. A cubic foot of seawater weighs 64 pounds. A compartment ten feet square, flooded to two feet, has 10,800 pounds of water moving around in it.

That's why the Battleship has watertight compartments and is one of the reasons for the "knee-knockers" on the doors. They allowed the crew to move around while preventing undesirable migration of water in partially flooded spaces. It is important to note that free surface water can come from a number of sources, including rain, wave overwash, and firefighting, in addition to flooding through a breach in the hull.

Torpedo Protection System

The next topic to address is the Battleship's torpedo protection system. Torpedoes, a primary weapon of the Imperial Japanese Navy, were a big threat in WWII. The torpedo protection system was an important consideration in battleship design, especially abeam the magazines under the main battery turrets. NORTH CAROLINA's torpedo protection system was expected to absorb three hits on the same side before the



8.47

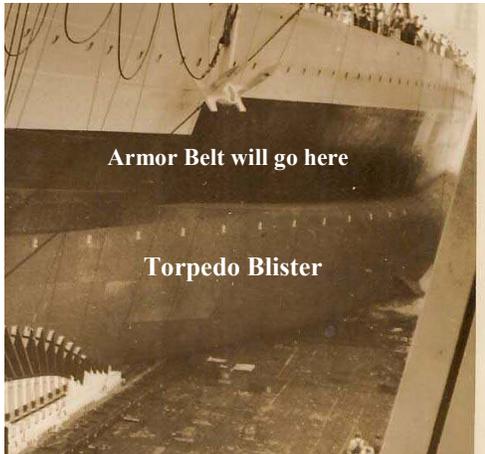
Figure 3-7.—Reserve buoyancy, freeboard, draft, and depth of hull.

(Continued on page 5)

Damage Control *continued*

ship capsized from instability or sank because of loss of reserve buoyancy. (3: p. 266)

The torpedo protection system consists of a bulge called a *torpedo blister* along the sides of the ship just below the armor belt. The armor belt actually sits on top of the blister.



Launching,
June 1940

Inside is a series of four or five vertical compartments either void (empty) or filled with liquid (fuel oil or water), and lastly a bulkhead called the *holding bulkhead*. The system was designed to trigger the torpedo, and each vertical compartment would progressively absorb the explosion's energy as it failed. The energy that finally reached the inner holding bulkhead would be insufficient to breach its watertight integrity. Some of the void compartments in the Torpedo Protection System could be rapidly counter-flooded to eliminate list and trim the ship after a hull breach.

The torpedo that hit BB-55 on September 15, 1942, carried 900 pounds of explosive. However, the ship's torpedo protective system was designed assuming a maximum explosive charge of 700 pounds, and the torpedo pro-

tection system came close to failing. The point of impact (port bow abeam of Turret I) was at a critical position where the ship narrows. At this point there are only four compartments (loaded void/oil/oil/void) in the torpedo protection system, whereas there are five compartments aft of nearby Turret II where the ship is wider. The holding bulkhead (torpedo protection bulkhead # 5) was damaged and sprang some leaks. The Navy Bureau of Ships (BuShips), which deals with construction, repair, and engineering, concluded that the torpedo protection system performed as designed. (3: p. 279)

Torpedo Attack on the Battleship

Now that we understand the ways a ship can sink and the Battleship's torpedo protection system, we can address the torpedoing of BB-55 and how the crew saved their ship. According to BuShips, a ship with an underwater protection system should address problems associated with a torpedo hit in the following order:

1. Control List by counter-flooding.
2. Restore Reserve Buoyancy
 - a. by pumping damage water overboard.
 - b. by transferring fuel oil across the ship and pumping out the counter-flooding water.
3. Correct Trim
 - a. by pumping damage water overboard.
 - b. by transferring fuel fore and aft.
 - c. by pumping liquids overboard from intact tanks at the low end.

Controlling list was important for a number of reasons besides the danger that the ship could capsize. For one, the armor protection system was less effective in a listing ship. The armor belt is only 16 feet high. A list could cause it to ride above the waterline on one side and below the waterline on the other. Sloping decks made it difficult for the crew to perform their duties. Also, listing ships are more vulnerable to air attack because the guns can't depress sufficiently to target low-flying attacking aircraft. If the crew could not control list (and the ship didn't capsize), and the ship kept taking on water (weight), it would still float until all the reserve buoyancy was used up.

How Did the Battleship's Crew Manage a Sudden Hole below the Waterline?

NORTH CAROLINA has 63 torpedo explosion spaces (voids) that can be flooded directly from the sea by operating the valves with hydraulic hand pumps. Each void held between 40 and 60 tons of seawater, and the Damage Control office maintained a chart showing the effect on list, trim, and draft of flooding each void. Each void could be fully flooded in six minutes. The controls are located on the third deck.

According to author Norman Friedman, "the third deck was the damage-control deck, that is, the watertight deck that was expected not to flood in the event of underwater damage. All bulkheads below it are unpierced

(Continued on page 6)

Damage Control *continued*

(fore and aft), so that it was the lowest deck along which men could pass fore and aft.” (3: p. 266) The Battleship also has an extensive system of pumps, pipes, and sealed spaces that allowed the crew to transfer weight and essentially balance the ship.

In terms of survivability and combat capability, the ship’s design is a compromise. The ship was weight-limited, and as a result, the thickness of the armor varied depending on what part of the ship was being protected. The armor belt along the side of the ship had to extend above the waterline to protect against shellfire and below the waterline to protect against torpedoes. The belt is angled at 15 degrees to increase its effectiveness. A list would raise, lower, and angle the protective armor, making it less effective.

The armor belt was designed so that it would be neither entirely submerged nor exposed by the list induced by a single torpedo hit before counter-flooding (3: p. 266), and that’s exactly how it performed. The torpedo hit on the Battleship produced a 5.5-degree list and left two feet of the armor belt exposed on one side and submerged on the other.

A Flooding Effects Chart in the Damage Control office on the Battleship’s first platform contains an interesting diagram on the effects of list and increased draft on the ship. The Battleship’s armor belt is 16 feet high, centered on the designer’s waterline of 31 feet, 6 inches. Therefore, if the draft increased by eight feet, there would be no

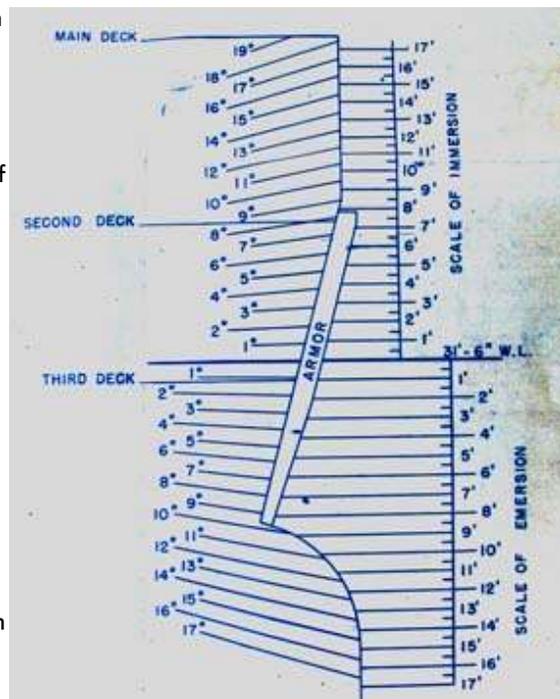
armor above the waterline to protect the ship from shellfire. If the ship listed nine degrees, the armor belt would be completely above the waterline on one side and completely below the waterline on the other. The designer’s waterline is about a foot above the third deck. At 18 degrees of list, the edge of the main deck would have been awash. The edge of the main deck is 18 feet above the designer’s waterline at the midpoint. (Note: The bow is about 12 feet higher than the ship’s center to keep the forward part of the ship dry at high speeds and in rough weather.)

The Flooding Effects Diagram (right) also shows every compartment on the ship below the third deck, along with the compartment’s seawater capacity in tons and its effect (if flooded) on list and on trim (draft fore and aft). This is a remarkable diagram. It not only shows the effects of a flooded compartment but also tells Damage Control where and how much to counter-flood and the effects of removing water from a flooded area of the ship.

When the torpedo struck the Battleship on September 15, 1942, it flooded compartments on the port side abeam of Turret I. Some of the compartments were void; some contained fuel oil. The flooding of the empty spaces represented a net gain in weight that caused the ship to list 5.5 degrees to port. Total weight of the added liquid was 970 tons (2,172,800 lbs) (8: p. 224). The weight of the liquid in the damaged area prior to

the hit was 597 tons. That changed from fuel weight to floodwater weight.

After the torpedo hit, the Damage Control team referred to the Flooding Effects Diagram and directed counter-flooding of voids aft from abeam the Machine Shop on the third deck starboard side to abeam Engine Room #4. Since the damage occurred at a relatively narrow part of the ship, the crew was able to counter-flood with less weight into the voids farther from the centerline. (Think how two children of different weights can balance a teeter-totter.)



It is estimated that 480 tons of water was brought aboard to reduce the list.

Eliminating list with minimum counter-flooding was important because additional weight eats away at the precious reserve buoyancy. Remember, the ship sinks when the reserve buoyancy is ex-

(Continued on page 7)

Damage Control continued



hausted. Following the BuShip priorities, the crew then transferred fuel oil, pumped damage water overboard, and pumped out all unnecessary counter-flooded voids. The goal was to balance the ship in list and trim with the minimum amount of additional weight.

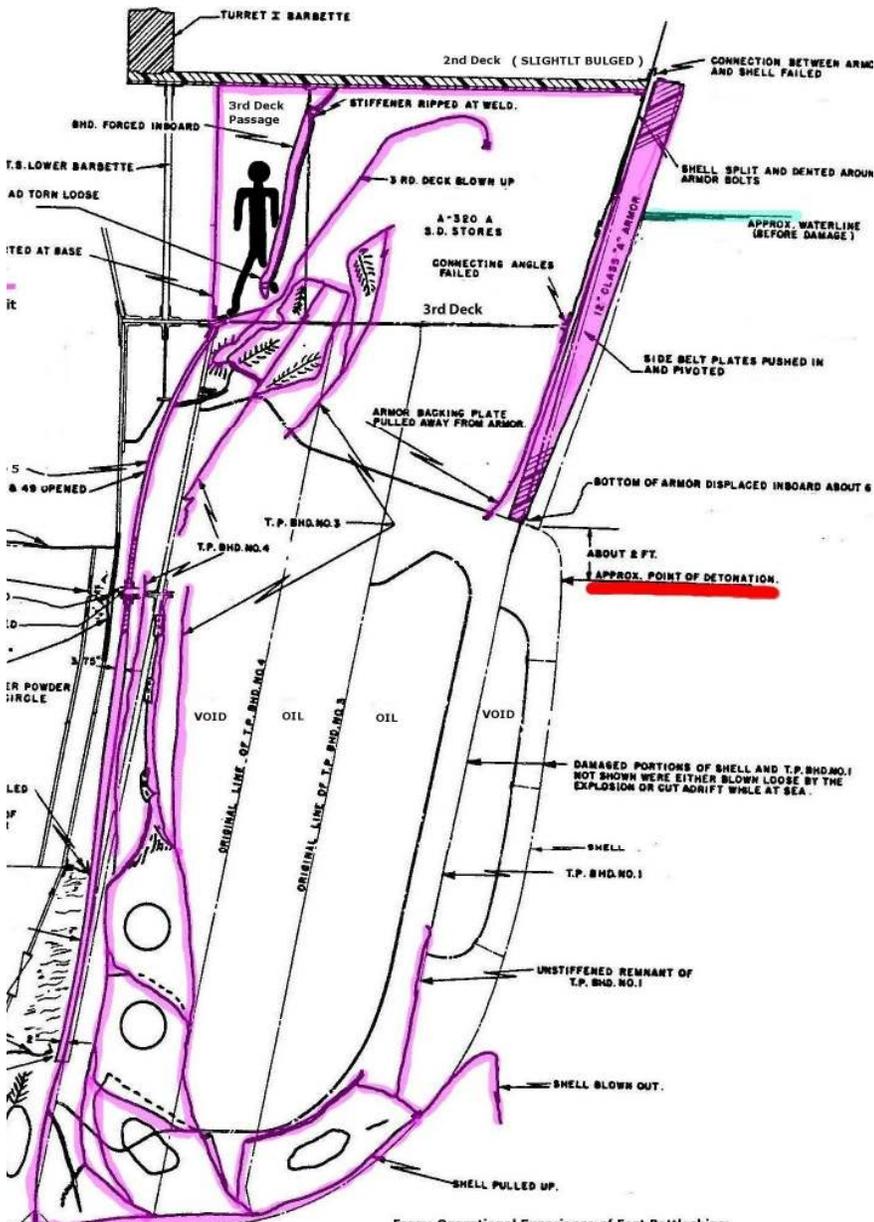
It should be noted that the Battleship has spaces that could not be rapidly counter-flooded but could be pumped into. Water was pumped into some of those

spaces, allowing counter-flood voids to be emptied and therefore ready for rapid counter-flooding in the event the Battleship took another hit.

The damage was much greater than the 18-by-32-foot hole visible from the outside of the Battleship. Behind the armor belt, the damage extended an additional 16 feet to the bottom of the second deck, which had a slight upward bulge in it.

The crew did an excellent job of damage control following the torpedo hit. The diagram illustrates the extent of the damage, showing the area's original design and where the decks and bulkheads ended up following the explosion (in red). The figure of a man is depicted in passageway A-316T where several sailors died when the torpedo hit the ship. The Battleship was saved but the men died.

Ken Rittenmeyer



From: Operational Experience of Fast Battleships: World War II, Korea, Vietnam. Naval Historical Center, Washington, DC, 1989, John C. Reilly Jr. Editor

- Torpedo Damage Frame 46 Looking Aft

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8. *Operational Experience of Fast Battleships: World War II, Korea, Vietnam*. Washington, DC: Naval Historical Center, 1989.

New Program for Area Military Professionals

Through the years the Museum Department has fielded calls from military commanders from Camp LeJeune and Fort Bragg looking for educational opportunities for their personnel. We have obliged on a case by case basis. Recently a professional called in search of a "PME." When asked to define PME, the caller said "It stands for Professional Military Education." The proverbial light bulb went on and inspired the creation of a new program for the Battleship.

Called simply the Professional Military Education (PME) program, it is a two to three-hour presentation plus a self-guided tour opportunity. The program has two tracks: gunnery and medical. Both tracks includes a presentation either on the ship's weapons or medical department, a behind-the-scenes examination of iconic World War II artifacts, and a climb to the top of the 10-story fire

control tower for an unforgettable view of the Wilmington area. Following the formal presentation, groups may enjoy a self-guided exploration of Battleship NORTH CAROLINA.

The program relies on our fine volunteers. For gunnery presenters we have Lt Col Ken Rittenmeyer, USAF (Ret) on the small guns (1.1, .50 caliber, 20mm and 40mm) and Kingfisher; Bill Barnes on the 5-inch guns; and Cecil Ard on the 16-inch guns



Jane Anderson, a nurse, provides the detailed overview of the ship's medical depart-

ment. Our volunteers are fortunate that the ship has a terrific archive to draw upon for research.

We have hosted several groups including a naval medical unit from Camp LeJeune and a long range reconnaissance platoon from Fort Bragg. The groups hang onto every word and love climbing into and around spaces not normally available to our visitors to explore. They also ask excellent questions, much like our groups to our Life Long Learning program participants. Upon starting up the fire control tower, one young man from the Fort Bragg group was heard to say "this is the best tour ever." Comments like that keep us going!

Look on the Battleship's website under "programs" for more information or contact Kim Sincox at museum@battleshipnc.com.



Liberty Cards a Hit on 50th Anniversary Weekend

Mike Resser, a retired U.S. Navy chief and active with the Battleship's Living History Crew (LHC), visits several times a year. Each time he and his fellow LHC crew, Richard Perry and Mike Borawski, bring the Executive Officer's office (XOO) to life for our visitors. They explain the enormous amount of record keeping that took place in the small office which held all of the ship's personnel records.

One of the personnel items was liberty cards. Liberty was granted by watch section and the ship had four

sections. One of the personnel items kept in the XOO were liberty cards. Liberty was granted by watch section and the ship had four sections. The XOO created a liberty card with an assigned watch section for each sailor. Upon returning from liberty, the sailor returned the card to the XOO and they filed them according to the ship's 21 divisions.

For several years Mike Resser has been creating liberty cards for visitors based on the original WWII ones. He assigns them a section and an enlisted rate (specialty) according to their expressed interests. Children

eagerly await their cards, typed on a vintage typewriter.

The XOO worked in full force from September 30 through October 2 in celebration of the Battleship's 50th anniversary. 514 cards were typed. 350 of them were issued just on October 2nd! It equates to approximately 44 liberty cards per hour. Needless to say, our typewriters were banging away almost non-stop. "We were VERY busy." No doubt! On October 2nd the ship hosted more than 5,000 visitors at 1961 admission prices. That was twice as many as the ship's original crew!



Collections Highlight



"This is the 20th century, where things move fast and then are streamlined to move still faster," wrote CDR Frederick Nelson, USN, in August 1942 for the *US Naval Institute Proceedings*. "This is an age where tradition bows to efficiency.... It appears that the naval service has been reluctant to keep its uniforms in step with the requirements of our rapidly changing profession."



The U.S. Navy introduced the officer's cocked (fore and aft) hat following the Revolutionary War. The width of the gold or black lace indicated at a glance the officer's rank. The black beaver fur hat was to be worn for full dress occasions. All commissioned officers were expected to own the cocked hat along with a pair of epaulets.

CDR Nelson argued that it was time the navy "eliminate unnecessary equipment" and cocked hats and epaulets were the first to go. There was less stowage space on ships for the clothing's rigid tin container that also had "a habit of rattling around or crashing down from a locker top...." The epaulets were unnatural to wear – like "two old-fashioned flat irons secured by store string on either shoulder..." and the blue and white cap was perfectly suitable for dress occasions.

The navy agreed. In October 1943, dress caps with embroidered or polished vizors and gold lace chin straps were regulated for formal wear.



In 1999, Rear Admiral Julian Thompson Burke Jr. mailed to us his cocked hat and epaulets inside their original metal carrying case. Ensign Burke served on BB55 from March 1941 to late February 1943, when LT Burke put in for submarine school because he "wanted more action." Burke passed away last August at the age of 93. His officer regalia are prized artifacts in the Battleship's collections and help interpret the transition from the old navy to the new during WWII.

SSN777 Officers Visited Battleship



Commissioned May 2008 in Wilmington, North Carolina, Submarine NORTH CAROLINA (SSN777) is the latest NORTH CAROLINA and currently stationed at Pearl Harbor. The Museum Department and Battleship maintains contact with the submarine in an effort to fulfill our mission "to collect and interpret all ships named NORTH CAROLINA."

The ship was delighted to receive contact from LT Steve Bode, one of the sub's officers, that he along with the commanding officer, and the chief of the boat, were going



to visit Wilmington as well as several state universities.

On Monday, September 19, Commanding Officer Rich Rhinehart, Chief of the Boat Jon Consford, and LT Steve Bode visited. Operations Director Roger Miller provided an overview of the cofferdam work (left) then Terry Kuhn, volunteer Kirk Binning, Mary Ames Booker and Kim Sincox provided a memorable tour of the ship's archives and off-the-tour-route compartments. We hope more of the sub's officers and crew will visit in 2012.

The Navy Supply Corps and the Showboat

In the spring of 1941, the newly commissioned NORTH CAROLINA made her way down the East River from the Brooklyn Navy Yard past enthusiastic crowds to the Atlantic for sea trials. This magnificent vessel was quickly nicknamed "The Showboat" and was for a brief moment the most advanced war-making machine in the world. The United States, after a hiatus of 16 years, launched a truly modern battlegon to meet and defeat any adversary at sea.

used modern, innovative systems to feed a company of 2,000 men, wash their clothes, cut their hair, and tailor their uniforms. The navy provided for their health care, saw that they were paid, and provided recreation.

Before the war, a capital ship replenished its food stocks, general stores, fuel, lubricants and ammunition at naval bases such as San Diego, Mare Island, CA., Bremerton, Pearl Harbor, and Cavite in the Philippines.

boards were specialty ships such as concrete mobile floating dry-docks large enough for a battleship, ocean fleet tugs, hotel barges, aircraft transport vessels, heavy hull repair vessels, and distilling ships.

After the naval victories at Coral Sea and Midway and the combined navy and marines' success at Guadalcanal, planners established new supply and repair bases a thousand miles or more closer to the enemy on islands and atolls won at great cost from the Japanese. Eventually the critical demand for re-supply, salvage and repair facilities was so great, as were the distances involved, that navy planners inaugurated a titanic and ultimately successful effort to feed, refuel and rearm at sea, known as Service Squadron 10. This force advanced with the enormous armada of fighting ships moving closer to the Japanese home islands, severing her sea-going commerce, and annihilating Japan's ability to pursue war.

(Continued on page 11)



Military planners assumed that Japan was the likely enemy and a decisive fleet action such as the WWI naval battle of Jutland would be fought in the South China Sea. Unimagined at the time was a lengthy war that would be fought over a front of thousands of miles – and thousands of miles more from supply and repair facilities. This struggle completely altered the U.S. role in the world and that of battleships in naval warfare, strategically and tactically.

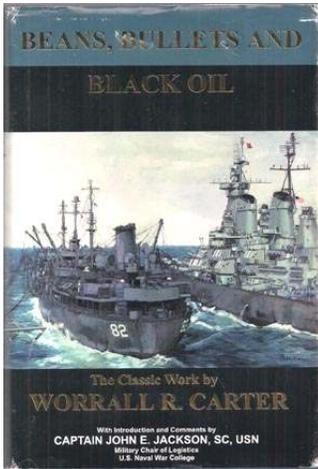
When the NORTH CAROLINA and her sister ship the WASHINGTON were commissioned, they were fast, heavily armored and bristling with technologically advanced weaponry and communications systems. The ships

By the middle of 1942 and BB55's first appearance in the South Pacific, much had changed in the world. All of the Allies' possessions and their natural resources in the Far East and western Pacific were in enemy hands. New supply bases were created in the New Hebrides and New Caledonia, much nearer to the seat of war than Australia or New Zealand.

In the months after Pearl Harbor, the U.S. Navy was largely dependent on antiquated cargo, tanker, and repair craft from World War I, or ships cannibalized from vessels intended for other uses. Almost nothing had been purpose-built and some later auxiliary uses of naval ships had never even been imagined. On the drawing



Ships unloading supplies at Noumea, New Caledonia



Read more about it!
Beans, Bullets and Black Oil: The Story of Fleet Logistics Afloat in the Pacific during World War II, by Rear Admiral Worrall R. Carter. Newport, R.I.: Naval War College Press, 1998.

Supply continued

The Battle of the Eastern Solomons (August 1942) marked a transition for the role of battleships. Instead of combatants slugging it out in big gun duels the battleship became a gun platform for bombarding entrenched fortifications before amphibious assaults. The battleship became an anti-aircraft shield for aircraft carriers, which were emerging as the foremost capital ships in the fleet.

The Battleship's Supply Department had a complement of five officers and 120 enlisted men who were bakers, cooks, butchers, barbers, laundrymen, tailors, cobblers, and storekeepers. The department ordered and maintained all the ship's supplies, including aviation. They also paid the bills, kept inventories, and paid the crew. And like everyone else on ship,

they become warriors at their battle stations. The war brought a heightened sense of urgency, danger, and sheer demand for tireless work that were unprecedented.

The colossal effort of the Navy Supply Corps and Supply departments on most ships in all theaters has been largely overlooked. Unfairly, they've even been made to appear somewhat ridiculous

in books, movies, and on stage in such classics as *Mister Roberts* and *South Pacific*. Too often the more than 400,000 who served in naval logistics are portrayed as misplaced, misfit or larcenous. In fact, many of them were the rawest of recruits, reservists or retirees sent to some remote shore to do the non-heroic, but essential duty of supply that made the victory in the Pacific and elsewhere possible. This was done with

incredible efficiency and dedication. Admiral Chester Nimitz is attributed with saying that "logistics was our secret weapon in the Pacific War. The Japanese never did figure it out."

Michael Hosick



Frequently Asked Questions

Does the Battleship move sideways when the guns are fired? The answer is actually pretty easy - yes. For that concise answer, we can thank Newton's Laws of motion. Newton's third law states that "For every action, there is an equal and opposite reaction," so if they fired something off the ship, an equal force pushed the ship in the opposite direction. There was a force exerted on the ship whether she fired a 16-inch shell or a 20mm round.

How much did the ship move? Newton's Second law states that the acceleration produced is directly proportional to the force and inversely proportional to the

mass of the object. In other words, the force of the powder ignition (force) accelerated the 2700 lb projectile a lot and the 44,800 ton ship very little. The shock wave from the guns flattened the water and made it look as if the ship moved sideways. In reality the ship moved almost imperceptibly.

For the complete calculation of the effects of a 16-inch broadside, see *Do Battleships Move Sideways When They Fire?* by R.A. Landgraff and Greg Locock at www.navweaps.com.

Let's substitute the 44,800 ton weight of the NORTH CAROLINA for the 58,000 ton weight of the NEW JERSEY and we get a velocity of

7.26 inches per second. What do these numbers really mean? If the ship was in outer space, where there was no resistance to sideways motion, it would move opposite to the direction of fire at a velocity of 7.26 inches per second.

An interesting experiment would be to fire Turret III directly aft where it would act similar to a rocket thruster and the Battleship is designed such that it offers minimum resistance to forward motion. If and when we arrange this experiment we'll notify the media. We'll probably just have to do the math to figure this one out.

Ken Rittenmeyer



The USS IOWA firing her guns. Note the shock wave.

Barbershop Beat Aboard the Battleship

What do Kirk Binning, Kent Atkins, Ken Kroeger and Bill Clegg have in common? They volunteer at the ship AND they belong to the Cape Fear Chordsmen, a fine barbershop group in Wilmington. Kent Atkins who approached us about creating a barbershop quartet in residence.

Calling themselves *Beach Music*, the group made their debut on Sunday, October 2, at the ship's Reflection Ceremony. The group performed the 1929 Fats Waller hit "Ain't Misbehavin'" and honored all veterans with an inspiring medley of military service songs. Attired in their 1941-style enlisted man's daily wear of chambray shirt and dungarees, the foursome

looked quite snappy. Comprising the quartet are lead singer Andre Brillaud accompanied by baritone Kent Atkins, tenor Richard Millard and bass Lou Leiner.



As the resident quartet, the group will perform in and around the ship's barbershop

on the 2nd deck monthly and also during special programs. On November 10, they performed at the New Hanover County Senior Center as part of a

Veterans Day program along with Kim Sincox and volunteer Ken Rittenmeyer.

Beach Music carries on the fine tradition of music aboard the Battleship, which had an official navy big band in addition to a church choir, pick-up bands and musical entertainment during talent shows.



L-R: Richard Millard, tenor, Lou Leiner, bass, and Kent Atkins, baritone, surround Andre Brillaud, lead, in the Battleship's barbershop.

Development News

Huzzah! To George and Paula Burn! George is a dedicated Battleship volunteer and enthusiast who celebrated his 70th birthday aboard ship with an elegant black tie dinner-dance on a lovely fall evening. George and Paula made a multi-year pledge of \$15,000 to the ship's campaign for hull repairs and education to honor his birthday. In lieu of gifts, he asked his guests join the Friends, resulting in more than 30 new memberships. It was a night to honor a great man, and help a great lady, our BB55!

Planned Giving – Perpetual Support to the Ship

One of the easiest ways to benefit the Friends of the Battleship is to include a be-



quest in your will. Bequests provide flexibility in making your estate plans and are a very effective way to accomplish multiple goals. There are several ways to make distributions in your will. *Let us know if we can help you work with your attorney or advisor.*

Thank you! Thank you! Thank you!

The following North Carolina groups have awarded grants to the ship this fall:

International Paper – computers to support the Friends and the Museum Department

Azalea Garden Club – landscaping at the entrance to Battleship Park

North Carolina Association of Insurance Agents – safety equipment for guests and staff

Landfall Foundation – A/V equipment to enhance visitor experience

For information contact:
Mary Beth Bankson
Campaign Coordinator
development@battleshipnc.com
(910) 251-5797 x3018

You too can have an event on the Battleship's fantail. Contact Danielle Wallace, Programs Director, for details. 910-251-5797

The Beauty is in the Details for a Devoted Volunteer



1,031.50 hours. That's a lot of hours, folks, and that's how many hours Bill Barnes has devoted to the Showboat as a volunteer since March 2009. For the last three years he has given far more hours than any other Battleship volunteer. Last year he earned the coveted *Charlie the Alligator Legion of Hours Award* which his cat promptly adopted and this year he was presented with the *Platinum Brillo Pad Medal of Distinction*.



Bill started his volunteer work by researching the 5-inch guns and is a presenter for the Firepower Program. He

has scanned images for the archives, served as a tour guide, cleaned the 5-inch upper handling room on the tour, studied the 20mm guns, and helped with school programs.

And then the model builder from New Jersey stumbled on the biggest project yet. Yes, what more could you ask than a model with a 1:1 ratio? On December 9, 2009, Bill started innocently polishing brass and Pandora's Box opened. Here was a project worthy of devotion for a man driving from Southport two days a week. Patiently scouring the ship for every small brass tag, removing paint then polishing and applying sealer, two years later, most of the brass is done. (Thanks also to the fine work of Gary Zenz, another polisher.)

As a modeler, Bill seized on the thought of so much other fine detail buried under years of dirt and paint. The man began to detail the entire ship, uncovering copper and brass and dials and parts that had not seen the light of day in decades. He

began to paint details so they would stand out and the ship would look alive. What had been blobs of white paint began to look like working equipment.

Bill continues as a presenter on the 5-inch guns for Firepower and the new Professional Military Education program, but the focus of his twice a week ship adventures is all in the details. As can be seen in the photograph, his special project in September was removing the paint overspray on the signal bridge flag bag nameplates and repainting the markings.

Bill and his wife, Judy, retired to Southport in 2001. Bill spent years in the classroom teaching and his hobbies were Civil War reenacting and model building. How fortunate we are that Bill's love of learning, history, and modeling can all find satisfaction in volunteering for Battleship NORTH CAROLINA.



Remembering Don Cunningham

It is with great sadness that we mark the passing of our dear volunteer Don Cunningham who died on his 81st birthday, September 28, 2011. Don volunteered for 10 years at the ship before his health forced him to "retire." He came to the Mu-

seum Department on most Thursdays and worked all day diligently maintaining the historical research files.

Don's naval service included duty in the navigation section of flag staff (admiral's staff) aboard various ships so he brought a special under-

standing, dedication and passion to his volunteer duties. We enjoyed hearing about his extensive travels and love of jazz and he had a smile that lit up the room. Fair winds and following seas, Don.

Kim Sincox

Saluting the Battleship's Volunteers

On Sunday, November 13, the Friends of the Battleship saluted the Battleship's volunteers with an annual luncheon. With the growing ranks of volunteers and the attendance of a revitalized Friends Board of Directors, the event graduated to a larger room at the Bluewater Grill, Wrightsville Beach, where volunteers and spouse/guests have enjoyed dining for several years.

(Photo right)

Our volunteers make our programs possible including Hidden Battleship, Firepower, Power Plant, Battleship 101, Professional Military Education, Pearl Harbor Remembrance, NCQSO event, Museum Ships Weekend event, Ham Radio Guest Operator Program, Ghost Ship, Batty Battleship, and 50th Anniversary events. They respond to our call for school and scout presentations and special requests. They organize our archives, write articles, and rework, refresh, and restore equipment and spaces. They serve on our Friends of the Battleship Board of Directors. During the fiscal year 2011, these men and women gave 4,716.75 hours to the Battleship. They help us make and save money too as their hours equate to a value of \$98,344.24!

Volunteers who gave 100 or more hours of service this past fiscal year were:

Bill Barnes, 440.75
 Larry Sackett, 270.50
 Ken Rittenmeyer, 235.25
 Kirk Binning, 173.25
 Carl Filipiak, 155.25
 Richard Riano, 142.25
 Jane Anderson, 130.50



Gary Zenz, 130.50
 Roger Wood, 129.75
 Bob Huebner, 116.50



A special salute to two men who devoted many hours to the Friends Board of Directors along with other projects: John Whitley who gave

203.75 hours and Frank Glossl (shown here with wife Ann) who gave 285 hours.

Of special note, Bob Huebner, shown working in the chart house, is 86 years young.



And Carl "Flip" Filipiak is a real Battleship sailor. He served on the IOWA.



We proudly salute and thank our wonderful volunteers:

Jane and Doug Anderson
 Cecil Ard
 Kent Atkins
 Mona Baker
 Bill Barnes
 Corlandt Barnes
 Kirk Binning
 Jack Bogia
 Trey Bullock
 George Burn
 David Carpenter
 John Carter
 Susan Mason Carter
 Kevin Cerasuolo
 Norman Clemmons
 Robert and Vicki Daughtery
 Dave Derry
 Sarah Digman
 Thomas Edwards
 Carl Filipiak
 Frank and Ann Glossl
 Stephen and Lorrie Gregory
 Floy Hamilton
 Helen Harrington
 Chris Harrison
 G. David Heath
 Mose and Josie Highsmith

Larry and Elaine Hobbs
 Joe Hood
 Mike Hosick
 Bob Huebner
 Jack Jacobs
 David Keefe
 Reg Kidd
 Kenneth Kroeger
 Suan and Abigail Lanier
 Fred Lehman
 Mark McAllister
 Rita McCall
 Babs McDance
 Daryl Millard
 Sandy Monroe
 Linda Newton
 Alicia Norwood
 Mark Oldenburg
 Allan Pellnat
 Patrick Prendergast
 Ronnie Rhodes
 Richard Riano
 Ken Rittenmeyer
 Amanda Ross
 Larry Sackett
 Doug Sincox
 Don Slawter
 Larry Tingen
 Bob Townsend
 Bill Usher
 Andrew Whitley
 John C. Whitley
 Roger Wood
 Mike Wortham
 Michael Zalob
 Gary Zenz



From the Chairman's Desk

As we close 2011 and welcome 2012, I'd like to take a moment to reflect on this year. To say that 2011 was an exciting year for the Friends would be an understatement. The Battleship concluded celebrating her 50th anniversary in Wilmington. There were many celebratory events but none spoke more about what the Battleship means to all of us and to the state than the 5,000+ visitors who walked the decks on October 2nd for 50 cents admission.

Over the past year the Friends Board of Directors saw a number of changes with the addition of several new members and leaders. First and foremost a long time Friends Board member, John Whitley, stepped down as chairman and assumed the position of past chairman. John has given many years of service to the Friends as well as the Battleship NORTH CAROLINA and will continue to do so not only as past chairman but also as the Friends' liaison to the Battleship NORTH CAROLINA's Commission.

Daryl Millard was selected to serve as vice chairman and Ronnie Rhodes as a member at large to the executive committee. At our annual meeting in September

we welcomed Don Loftin and David Carpenter to the board. Sue Mason Carter, Floy Hamilton, Mike Wortham, David Heath, Sandy Monroe, Richard Riano, James Thomas Edwards, and John C. Carter round out the Friends Board.

Over the past year the Friends Board has taken on new responsibilities in our relationship with the Battleship NORTH CAROLINA. Chief among them is the Friends' role as the Battleship's principle fundraising and philanthropic arm. We look forward in the coming years to helping the ship raise the funding to do the necessary repairs to the ship's hull, offer new educational programs, and continue to support the Museum Department. As the state's memorial to all who served and died during WWII from North Carolina as well as honoring all who serve today in our armed forces, we are privileged to carry on the tradition of those who came before us and wish to leave a legacy to those who follow.

The Friends Board also has several new restoration projects in the works. We encourage any interested Friends' member to participate in any or all of these.

First will be the restoration of the Navigator's Emergency Stateroom on the 04 level. Second, the Friends will be restoring a vintage WWII jeep similar to one that was on the ship. In the coming months we will also launch a new website

www.battleshipncfriends.org. If all goes as planned the site will be online in the first quarter of 2012. The site will include news about the Friends, the ability to join or renew memberships online as well to donate to the Friends.

In closing I would like to thank all of our Friends' members, for without your support much of what we do would not be possible. The Battleship NORTH CAROLINA receives no federal or state allocations or funding. All income comes from admissions, gift shop sales, rentals and most importantly memberships in the Friends of the Battleship NORTH CAROLINA. We depend on your support and generosity to help us to carry out our mission.

Thank you and Happy Holidays

Frank Glossl
Chairman
Friends of the Battleship
NORTH CAROLINA

Join Today!

Give the gift of membership in the Friends this holiday season! Each membership level provides a full year of free admission, a 25% discount in the ship's store, discounts to the Battleship's lifelong learning programs, and the quarterly *Scuttlebutt*. There are membership levels for individuals, two adults, and families. And the Friends is a 501(c)3 organization and your contribution is tax deductible as allowed by law. Help support the Battleship and become a friend today!

Friends Members—Thanks for your Support!

Admiral

PPD, Inc.
Rhino Demolition & Environmental Services Corp.

Commodore

Robert Ruffner, *Clancy & Theys Construction*

Captain

Frank McNeill, *Communication Specialists, LLC*
Melvin Starner
John & Melinda Stewart

Commander

Phil Baucom & Sharon Strickland
Betsy Blee
Tom & Mimi Cunningham
George & Susan Currie
Sally Garey
Eric Haines
Leslie G. Hollenbeck
Capt. Wilbur D. Jones, Jr., USN (Ret.)
Wendy & William Knight
Richard D. Moore
William Phillips
Charles & Judy Pierce
Dick & Pat Renno
Glenn & Kecia Roseman
Debra & Steve Taylor
Bill & Diane Usher
Jay Weitzel
John C. Whitley
John Wright

Lieutenant Commander

Robert & Brenda Abbotts
Darrell Adams
Joslyn & Chris Anderson
John T. Arnold
Kent Atkins
Rodney Axsom
Douglas & Karen Barr
Carlisle A. Bateman
David & Emerson Berne
Don & Sally Brauer
William Brooks & Sharon Ambrose
David Carpenter
John J. Carter
Capt. Tracy D. Connors, USN (Ret.)

Donald & Linda Daily
Ben & Ella Deaver
Dave & Carol Derry
Skip & Susan Dixon
Douglas & Karen Davis
Janet & Capt. Thomas Durant, USN (Ret.)
Vernon & Myra Etheridge
Ronald & Pat Fascher
Shawn & Michele Fish
John F. & Kim Gottshall
Scott Hamilton & Mike Pennock
Chris Harrison
Egbert M. Herring, III
James & Rebecca Hill
Dru & John Hopkins, III
Dennis & Jean Hoover
Mark & Renee Howard
Douglas & Pamela Huffman
Chad & Wendi Kittlaus
John & Amy Lindsay
Tom & Jennifer Maness
Pat Marriott
Daryl Millard
Sandy & Clara Monroe
Chuck & Cheryl Moore
Steve & Pat Moore
Les M. Noble
William & Mary Jo Oakley
Colonel & Mrs. Bruce Patterson
Chris & Sandy Pittman
Richard & Sue Price
Pam & Chris Robbins
Todd Sams
Philip Simon
Steve & Leona Skonberg
Larry C. Steffee
Shirlene & Joseph Theriault
Carolyn & Bonner Thomason
Robert & Clara Thompson
Ray & Moroniah Talbot
JoAnn Turzer-Comnesso & Anthony Comnesso
Dave & Joan Tuttle
Bob & Lisa Venema
Sammy Vestal & Ronda Ivey
Philip & Diane Wolfe
Jenny Wright & Richard Knight
Ray Wycoff

Lieutenant

James & Valarie Algee
Walter Allred Jr. & Theresa Ward
Michael & Suzanne Amey

Jane & Doug Anderson
David Autry & Judy Lunceford
Fala Beasley
Daniel & Kathlyn Bireley
Billie Boulton
Mary Ames Booker & Dan Sheret
Robert & Sarah Brand
Mary Lynn & Norwood E. Bryan, Jr.
Jack & E Loraine Callaghan
Susan Mason Carter & Charles Carter
Kenneth & Mary Caswell
Julia Chacey & Ted Gosstyla
Chet & Ardan Ciner
Kay & Steve Clark
Steve & Margaret Collins
Reva & George Cook
Billy & Susan Crocker
Daryl & Nancy Darby
Jennifer & Patrick Drea
Joe & Barbara Duquette
Randy J Egsegian
Betty Jo Ellender
Doug & Margi Erickson
Eric Eschert
Thomas R Falcone
Thomas W. & Glynda Farmer
Paul & Sara Flusche
Drake & Lisa Fox
Germaine & Christopher Glass
Jeff & Regina Gordon
Gary & Rhonda Hall
Fred J. Hall, Jr.
Tom & Karin Hamilton
Helen & Sion Harrington
Reginald L. & Jo Ann Harris
Ralph Harwood
Robert S. Ketchum
G. David Heath & Naomi Kleid
Dennis & Cynthia Hicks
Russell & Elaine Kuhn
Robert Grass & Peggy Lutz
Josiah Hunter & Brandy Evans
William Flowers
Michael & Sandra Giglio
Frank & Ann Glossl
Sandra & CDR Chuck Gore, USN (Ret.)
John & Morgan Graves

Jimmy Jordan & Dale Jordan
Ken & Patricia Levin
Candy & Bill Martin
Willie E. McGee, Jr.
James & Caden Merritt
Victor & Margaret Millings
Rex E. & Suzanne Nelsen
Thomas Newman & Shannon Begay
Ed & Maureen Oeters
Danny & Scarlet Parrish
Billy Patterson
James & Mary Jean Peterman
James & Bo Plant
Martin Pollack
Vernon & Gloria Porterfield
S. Thomas Rhodes
Richard & Margaret Riano
Ken & Pat Rittenmeyer
Michael Robinson
Rick & Lynn Rorie
Marcos & Nathaniel Santana
Keith Sessoms
Dick & Lisa Sherry
Shay & Monika Simpson
Marion & Jim Simrill
Don Slawter
David J. Smith
Susan Cook & Rich Stuart
Sam & Mary Southern
Troy & Jessica Sutton
Alan Tapscott
Joseph & Jennifer Toriello
Jim & Pat Ursic
Devota & Terry Vereen
Ray & Sue Vito
Anthony & Bridgette Welborn
Robert & Roberta West
Thomas & Betty West
Jason & Pamela Wetzel
L. Bruce & Cordelia Faye Whitaker
Raymond & Hannelore Williams
Richard & Phyllis Wilson
Mike Wortham
Rick & Linda York
James & Barbara Marshall-Zank

(Continued on page 17)

Friends Members —Thanks for your Support!

Lieutenant (jg)

Brad Aikens
 Richard Mondragon Avila
 Samuel T. Ashe
 Mary Beth Bankson
 Dan Bennet
 Mark J. Betti
 Major Lance Bevins, USMC (Ret)
 Katherine Brantley
 Capt. Walter M. Bullard Jr., USNR (Ret)
 Robert G. Carnegie
 Lee C. Clayton
 Marc J. Cohen
 HTC Arthur Combs, USN (Ret.)
 Capt. Frank Conlon, USN (Ret.)
 John DiGiantomaso
 James Thomas Edwards, III
 Charles Emerson
 Cris Etheridge

Andres E. Flores, Jr.
 Keith Griffin
 Don Hall
 Floy Hamilton
 L. D. Haynes
 Ann Helms
 Barbara Hennrich
 David Hill
 Richard Johnson
 Wayne Kinney
 Don Loftin
 Larry Malaby
 Mark W. McClendon
 Richard McGowan
 Jim McNeely
 Marc Mereyde
 Michael D. Murphy
 Joshua James Nessel
 Jonathan Payne
 Peter Polk
 Mark Proxmire
 David Rawlins

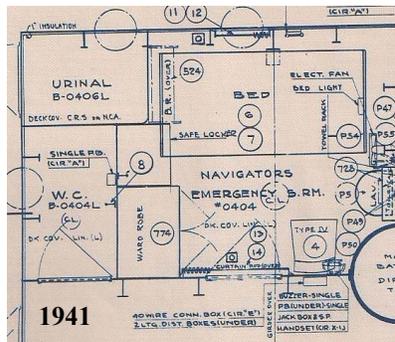
Richard Rennick
 Kenny Robitaile
 Ronnie Rhodes
 Timothy Sanford
 Andrew Smith
 Robert N Steinbrunn
 Andrew Stratton
 Jim Sweetwood
 Ralph S. Swift
 Ralph A. Thurman
 Barry Tomlinson
 Brent Turner
 Martha Ann Turner
 R. Douglas Walton, Jr.
 Thomas Walton
 Andrew Whitley
 Christine Wightman
 Nelson Williams
 Peter Winship

Restoration Dilemmas

Over the years the Battleship has restored selected compartments to their WWII appearance and the work continues in the Chart House and Pilot House. The ship, however, changed over time so selecting a particular period to interpret during the Battleship's active duty spurs discussion, research, and study. The Battleship made visits to navy yards in Pearl Harbor and Bremerton during the war for repairs, new guns and equipment. The ship stayed in dry dock for one or two months depending on the work and changes were made to the ship's interior.

When it was first suggested that the Friends of the Battleship restore the Navigator's Emergency Stateroom on the 04 level, Mary Ames Booker, Curator of Collections, emailed me a copy of an

August 1941 drawing showing plan and elevation views.



I noticed a couple of differences from the current arrangement.

For example, the door was drawn to be hinged on the left but today it is hinged on the right. The drawing also shows a wardrobe in the compartment and today in the same location is a desk. When and why did this change occur? I have a hypothesis.

With the wardrobe in place and the door hinged on the left, the Navigator could easily open the door and enter the stateroom as long as the wardrobe was closed. An open desk would prevent the door from opening fully. However, if the door was hinged on the right it would not open when the desk top was down. And to make sure the door could open fully a curved section from the desk top was cut away. When was this change made and was it done in a navy yard or at sea?

Another mystery is the stateroom's paint colors. Currently the bulkheads and overhead are white and the deck is red. Is that what they were during the war? There is evidence of light green paint near the overhead so when does that date to?



(Continued on page 18)

Restoration Dilemmas *continued*

Crewmember Walter Babcock in an oral history interview recalled in January 1942:

“The decks had this solid inlaid red linoleum. It must have been about a half inch thick because I scraped my part. The stuff would burn so we had to make all decks that had the linoleum on it nothing but solid steel base, scrape it all off. The ship had enamel paint on it which would burn; so being new on the ship that was part of our job then, to get the chipping hammer and start chipping paint. I mean we chipped and then we put after that I think it was just a cold water paint on it. A cold water paint and I guess metal made it rust, but it would still not burn.”

And crewmember Willie Jones also recalled chipping flammable paint and putting on “water paint” which wasn’t flammable. A document in the archives dated October 1945 gives guidelines for painting spaces. Should this post-war time period be the one we choose to interpret?

Reading the Compartment

Ghost marks are indicators where something used to be. A good example is the rather elaborate dimmer switch on the bulkhead behind the door in the Navigator’s stateroom. Located around the switch are indicators (ghost marks) of other instruments that were no doubt connected to the dimmer switch. After closely examining one of the blueprints I found a very small note that proved at least

another instrument was there, but additional marks suggest there were more. More research will eventually answer the question and then we can perhaps find examples in the ship’s storage and install them in the stateroom.

As you can see, a restoration project is not just chipping paint and scrubbing walls. It requires research and analysis. And if you are interested in this aspect of the work please get involved. The opportunities are here!

Mike Wortham
mikewortham@gmail.com

Note: After asbestos issues are resolved the restoration work should begin. Stay tuned!



Getting the Ship in Shape

Getting the Ship in Shape by Edward Martin, photography by Conrad Pope. Reprinted by permission of Business North Carolina magazine. The article appeared in their 30th anniversary issue, October 2011.

It fought in every major naval offensive in the Pacific during World War II. At 728 feet – nearly as long as Bank of America Corporation Center in Charlotte is high – it made a tempting target. In September 1942, a torpedo smashed into its hull. Six times the Japanese claimed to have sunk it. Strafed, bombed and shelled, *USS North Carolina* always steamed on. But the battleship would prove no match for the relentless attack of ionic exchange.

“That’s the reaction between steel and salt water” say Terry Bragg, a retired navy captain and executive director of the ship’s memorial site in Wilmington. “Tide comes in, tide goes out, metal weathers and dries, weather and dries.” The process is eating away the hull. [*Hull damage view right*]

Now a Beaufort-based marine-engineering company is waging a \$2.1 million battle to save the ship from corrosion, with another offensive, is one costing about \$15 million, to follow.

Piece by piece, Taylor Brothers Marine Construction, Inc. is oxyacetylene-torching about 130 feet of the starboard bow, where corrosion has done the most damage, replacing and coating it in a three-step process to thwart

future rust and deterioration. “It’ll be just like the day it was built,” project manager Julius Taylor III says. As important as what’s being done is how it’s being done: The 36,600-ton ship remains in the bed of mud where it has sat since the state’s frantic 1961 campaign to save it from the scrap yard.

Using a cofferdam, Taylor Brothers seals off sections of the exterior hull, pumps them dry and gets to work. The alternative would have been to tow the ship to a dry dock, probably in Portsmouth, Virginia, but that would have cost \$30 million or more, double the price of the ship’s total restoration budget. Plus, there was a more important consideration to mull over. “Her seaworthiness is un-



Getting the Ship in Shape *continued*



Above: view of the cutting torch inside the cofferdam and below, inside the ship.



known, and it would be risky to tow her at sea," Taylor says. The roughly 6,270-mile journey to Virginia would cross a treacherous stretch of ocean known as the Graveyard of the Atlantic. Not to mention other hurdles. "She sits in 30 feet of mud, so we'd have to dredge to get her out. And the Cape Fear Memorial Bridge has been built since she was put here, so we'd have to cut off most of the mast to get her under."

The ship's hull is 60 feet in height, but workers – Taylor Brothers has had seven to 15 on the project since May – are only replacing a 9-foot-tall strip at the waterline, where water and wind are the most damaging. In places, corrosion has eaten through half-inch thick steel. Even spots not leaking are vulnerable. "Over the years, the paltling has corroded," Taylor says, "so it's very thin." The work will be completed this fall, and the ship remains open during the renovation.

Taylor Brothers' contract is for about \$1.9 million, with an additional \$200,000 for work by a marine architect and ship surveyor. Most of the money came from a 1998 fundraising campaign. The USS North Carolina Battleship Commission-

established by the General Assembly and financed through donations and ticket sales* - plans to begin the second, more expensive project in 2014. The commission will try to raise the money itself but anticipates having to ask the state for financial help. The proposed work will include renovating some of the sleeping quarters so that school groups and other visitors can stay aboard overnight.

For Taylor, a sea captain himself who earned a degree in mechanical engineering from the U.S. Naval Academy in 1991, this is more than a job. "This was the most decorated battleship of World War II," he says. "We're a business, and we have to have money to operate. But we don't think too much about that in this case."

*Editors note: The Battleship derives incomes primarily from admission and gift shop sales, and secondarily from rentals, special events, educational programs, Friends of the Battleship memberships, and financial gifts.

Note: Taylor Brothers completed their work on the hull in November 2011. New hull section shown left and below.

Join Us for Lifelong Learning Programs at the Battleship



Hidden Battleship

Saturday, January 14, 2012

8:30-12:30 or 1:30-5:30

\$45/\$35 Friends member or active military [does **not** include regular ship tour]

Program is limited to 40 participants per time slot, ages 12 and older

Join us for a unique, behind-the-scenes tour of un-restored areas of the Battleship. The four-hour tour consists of small groups with guides. Guests explore the bow (officers' country and boatswain locker), third deck (Radio II, brig, after gyro, storage rooms, ammunition handling, Engineer's office, torpedo area), Engine room #1, the refrigerator compartments, and climb inside the fire control tower to the top of the ship. The Azalea Coast Radio Club will be in Radio II to explain their work on the ship's radio transmitters. Choose between a morning or afternoon tour. The tour is limited to ages 12 and older and limited to 40 participants per each time slot. It is not appropriate for those who have difficulty climbing narrow ladders or over knee-high hatches. Wear warm, comfortable, washable clothing, sturdy, rubber-soled shoes and bring a camera! **Registration and payment are due by Thursday, January 12, 2012.**



FIREPOWER

Saturday, February 18, 2012

9 AM – 5 PM

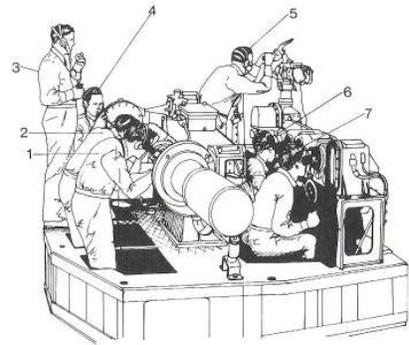
Lunch included

\$95/\$85 Friends member or active military

Program is limited to 40 participants, ages 16 and older



Learn about and explore the Battleship's 16-inch and 5-inch guns from the gun houses to the ammunition loading compartments; the 40mm and 20mm guns, and the weapons that they replaced (1.10 and 50 caliber guns). The finest guns are of little use without the means to direct their fire accurately at the target. Presenters will discuss the various types of fire control equipment (directors/optical range finders, radar, computers) and how main and secondary battery plotting rooms and the combat information center operated. Participants will enjoy a lively, engaging, in-depth program with presentations, hands-on experience, and serious exploration for adult learners. The program is not appropriate for adults who may have difficulty climbing seven to nine flights of stairs. Wear comfortable, washable clothing and sturdy, rubber-soled shoes and bring a camera! **Registration and payment are due by Thursday, February 17, 2012.**



Power Plant

Saturday, March 17, 2012

12—5:30 PM

\$50/\$40 Friends member or active military

Program is limited to 40 participants, ages 16 and older

Join us for an in-depth program on the Battleship's power plant. Learn in detail about the ship's boilers, turbines and reduction gears and turbogenerators, along with electrical distribution, water distillation, and an overview of the ship's fuel system. Working steam engine models bring maritime history to life. Our program features classroom presentations and behind-the-scenes tour. **Registration and payment are due by Thursday, March 15, 2012.**

PLEASE CALL TO REGISTER AND PAY FOR THE PROGRAMS: 910-251-5797