

HULL BUSTERS

APRIL 1990



News of Nats./ Hotel Accommodations

The negotiations for the hotel are now complete and the price is set for \$186.69 for two for 7 days - to include room cleaning on every other day. For more than two in the room, \$10 each, but the rooms have two full size beds only. The name of the hotel is Laurel East Motor Inn, 3440 Fort Meade Road, Laurel, Md. 20707. (301)-490-9595, (301)-490-9596. The Manager's name is Kumar Sadana. For the special rate mention the Model Boat Club (Marine Division of Meade Modelers is the card that John French left with him.) So get your reservations in and see you in Maryland for the week of July 9 through the 13th.

N.E. Regionals set

Spring regionals in the Northeast are now scheduled for May 26-27. Battling will begin at 10:00 am each day and if you are not on the pond at that time, you may be left out of the first battle of each day. Battling in this regionals is normally fleet battle by and large, and is generally Axis/Allied. Although this year with two of the experienced Allied captains moving over to the Axis side (for a total change in relative strength of 4), it may not be possible to maintain the customary sides.

Battling is normally set up for two fleet battles on Saturday (possibly three) and at least one and one half fleet battles on Sunday - second is often only one sortie.

The pond used is the same one which will be used for Nationals this year and this battle would be a good one to get the feel of the pond. The pond is a medium size one (at least 300 feet by 150 feet or more) with many interesting geographic features spread out on it including many islands and several narrow passages to liven the game. One of these passages (Danny Bottom Straights) has played important roles in some of our past battles, such as last years battles in the fall regionals when several ships ran aground in the straights or on it's fringes.

Come to the Northeastern Regionals and join with a sizable group of combatants as they play at one of the craziest hobbies on the face of the earth.

Observations of the Founding Father



Greetings Combatants!
We are into the 50th Anniversary of WWII. Some of us are very interested in the history of

naval battles of WWII as well as the sport/hobby of R/C Warship combat. We have some time to plan for some 50th Anniversary Commemorations of WWII Naval battles if we want to. We could commemorate the Bismarck/Prinz Eugen battle in May of 1991. We have over a year to get ready. And in 1992 there are several US/Japanese naval battles that could be commemorated like the Battle of Cape Esperance. Back in 1982 we commemorated this one in Amarillo. Since I am the club's official "Historian" (mainly of the early days) I have to do this stuff. Ah yes 1982, when men were men and the "Legendary" Mk IXs were going up in price from \$24.95 to \$39.95. Schneider knew how to make Mk IXs work better than their inventor. We also had a shortage of Japs. I was begging for someone to build a IJN Nachi. My IJN Aoba (first Jap Ship to sink a ship, eat yours hearts out, Gerrald, Scott and Jeff, and Dirty) was used in the commemoration story that follows. The following is a December 1982 Hullbusters "Observations of the Founding Father" recount of that battle:

"The Cape Esperance Commemoration battle was held in Amarillo, Texas on Oct. 11, 1982 as scheduled. Only 3 of 4 Allied cruisers were on station for the clash. As battle opened Tom Pace commanding the Axis flagship, IJN Aoba, blasted Billy Gainers (New Orleans) San Francisco, our flagship. The other two Axis ships also fired on her and before the first sortie was over she went down. This was captured on video tape by Sherry.

In the next sortie the Houston (Boise) was damaged to the point that her pump ran continuously. She did survive the sortie. Jeff managed to put a BB in Aoba's waterline.

In the final sortie Salt Lake City put 3 holes in the Graf Spee's Hull and received a few herself. All in all it was fun and Tom Pace now has over 300 points. History was not exactly repeated. As a matter of fact it was almost exactly reversed."

That was fun but too short. We have the opportunity to plan out some really good commemorations in the future if we want to. They would be fun and they would be very good to write about for the national model magazines (pronounced More New Members). Also we could have excellent video coverage from several directions from several cameras. We could sell Videos. Local news medias would be more interested. And us frustrated "Red/Blue" team members would get to play Axis/Allied with great accuracy. I would like to find out how many people are interested in participating in one of these commemorations. I think we should have requirements (about minimum detailing allowable) that are considerably more strict than normal combat ships for better photos and video. Some people would have to build ships especially for commemorations (though they could be used for normal combat). Another good reason to do commemorations would be to use it as an excuse to borrow a lake and get your foot in the door about a more permanent use of the same lake for regular battles.

We could have convoy commemorations of real convoy/surface warship battles. There were a few really good ones in WWII on the Murmansk runs. I would really like to participate in some commemoration battles so if you would too let's try to get together. We could have some special regionals or even a day or two of some future NATS set aside as "Commemoration Battles". I would even consider taking vacation in the middle of a week to have it on the right day. Well think about it. We still have time to do some really good quality planning for it. So what else is new?

EXTRA EXTRA EXTRA EXTRA EXTRA EXTRA

Herz Fluegel family is expecting again!
CONGRATULATIONS Fluegels! Is this going to
upset the balance of power?

Also, we have been blessed with a never used
car. Its a 1982 Cutlass Ciera. It's pretty
nice. I hope it will prove to be as reliable as
an AMC but I doubt it.

Well, until next time GOD BLESS YOU ALL and

Let's Battle (Commemoratively)!
Stan

Stan

DOPING FOR DOPES

By Tom Jass

Fluegel and Stan Watkins have asked me to write an
article for our beloved "rag" describing how I
finish my ships with silkspan and dope. Even
Fluegel has admitted that my beloved British ships
look good, although they're "dogs and easy sinks".
This article will explain in detail how you too
can produce a finish on your ship that will be the
envy of Fluegel and the Axis.

Why do I use lacquer (hereafter called dope) on
your ship rather than enamel, floquil or even
latex house paint (as Fluegel does)? Dope has
several advantages over any other finishing
method: since it dries quickly (3 to four minutes)
it doesn't warp the soft balsa wood that we build
our ships with and it can be used at pondside
between sorties; it is available at hobbyshops in
a variety of colors and container sizes.

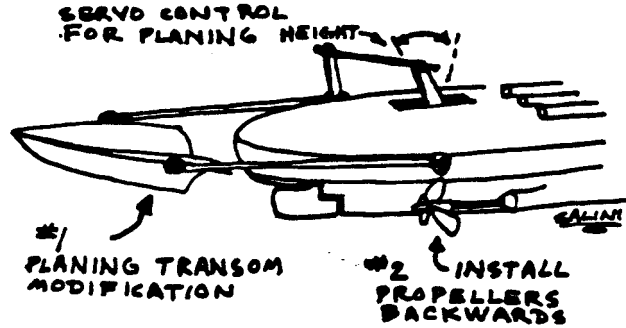
Why do I use silkspan over balsa wood rather than
just painting? The silkspan fills the balsa grain
and consequently produces a smooth "metal-like"
finish with fewer paint coats and less weight.
Real metal ships did not have wood grain showing
beneath the finish. Also the silkspan on top of
the balsa wood acts like a thin coat of fiberglass
cloth, strengthening the balsa and minimizing
splits when a bb penetrates.

I always use AeroGloss dope products. This is a
carryover from my model airplane days. While we
don't require the fuel proofing characteristics
that AeroGloss dope provides, AeroGloss is easily
available and relatively cheap. AeroGloss makes
dope in many colors, but I generally use Cessna
Gray and Light Cloud Gray for the ship's hull and
superstructure and Fokker Red (the color of the
German WWI triplanes) for the below waterline
areas. Balsa Fillercoat is the AeroGloss filler
you should use (not Sanding Sealer).

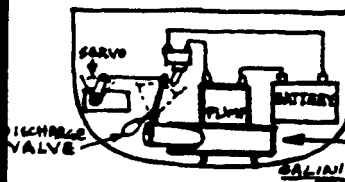
FINISHING THE HULL

I sheet (skin) my ships with 1" X 3" or 1" X 4"
sheets of soft balsa. Sig Contest Grade balsa is
by far the best, but it is only available in 3"
wide sheets. Use it when you can. I use grade "00"
silkspan; it is the thinnest grade available and
is easiest to work with. A good hobby shop will
carry it or order it for you. It comes in sheets
approximately 60" by 36". Before applying it to
our ships it must be wrinkle-free. You can iron
out any wrinkles with a household iron set to a
medium heat setting. Don't ask your wife (or
friend) to do the ironing, you can handle it!!
This is a necessary step. Any wrinkles are easier
to iron out before beginning than to work out (by
sanding) after the silkspan has been applied to
the balsa. Let's assume you are using a 1/32" X 3"
X 36" balsa sheet to skin one partial side of your
hull. Cut a length of silkspan 3" X 36" to cover

ITALIAN SECRETS



ITALIAN WARSHIP BATTLE SECRETS #1 & 2



SCUTTLING PUMP
CAUSES SHIP TO
SINK BEFORE THE
ENEMY ARRIVES,
THUS RESULTING
IN ONLY 100 POINTS
LOST.

ITALIAN WARSHIP BATTLE SECRET #3



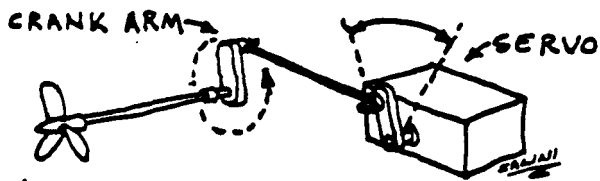
SCOP OPENS DURING HIGH-SPEED
REVERSE OPERATION FOR SCUTTLING
IN LESS THAN 6 SECONDS.

ITALIAN WARSHIP BATTLE SECRET #4

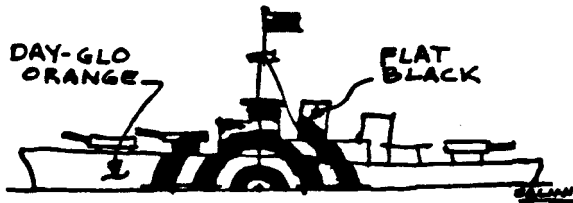
the INSIDE of the hull skin. Lay the balsa sheet
on your workbench and paint on a thick coat of
balsa fillercoat. After the balsa fillercoat has
dried, sand it lightly to smooth out the surface.
After sanding, paint the balsa sheet with a thick
coat of clear dope. Carefully lay the silkspan
onto the balsa sheet while the clear dope is still
wet. Attach the silkspan to the balsa sheet using
YOUR FINGERTIPS AS A ROLLER. The clear dope is the
adhesive that attaches the silkspan to the balsa
sheet. Work with your fingers from the middle of
the silkspan sheet out to the edges, working out
wrinkles as you go. The silkspan can be lifted
from the balsa when a bad wrinkle occurs if the
clear dope is still wet. The entire process is
just like wallpapering, but you use your fingers
rather than a roller or wallpaper brush to smooth
out the paper and attach it to the surface. A
paint brush can be used rather than your fingers
-- but it will not work as well. This process is
just like attaching fiberglass cloth to the hull
bottom with epoxy. Use a liberal amount of clear
dope to attach the silkspan to the balsa wood.
When the silkspan is attached to the balsa sheet
and the clear dope is dried, brush on one thick
coat of balsa fillercoat. Sand the sheet lightly
when the balsa fillercoat is dry and apply one
coat of Cessna Gray (or Fokker Red if you're Curly
Barrett) to the sheet. This process should be
repeated on the number of balsa sheets that are
required to skin both sides of your ship's hull.

ITALIAN WARSHIP BATTLE SECRET'S

IMPROVED DRIVE SYSTEM TO REPLACE
THE HAMPSTER CAGE DRIVE:



1. OPERATE SERVO BACK-AND-FORTH FOR FORWARD.
2. OPERATE SERVO FORTH-AND-BACK FOR REVERSE.



SECRET ALLIED CAMOUFLAGE PAINT SCHEME

The balsa sheets must now be zapped to the ship frame. This process could be the basis for a complete Hull Busters article, but lets assume that you have completed the skinning process and you're ready to silkspan and finish the exterior of your hull. The balsa skin should be sanded thoroughly with light sandpaper and all dents and dings filled with a waterproof filler (do not use Dap Spackling as it will absorb water) and sanded smooth. When you're satisfied with the condition of the sanded hull skin, apply two thick coats of balsa fillercoat to the raw balsa skin, sanding lightly after each coat. Cut a wrinkle free strip of silkspan approximately 4" wide to cover as much of the hull skin in a fore and aft direction as you can at one time. Brush a thick coat of clear dope onto the hull skin area where you will attach the silkspan strip. Begin at the ship's deck edge (gunwhale) and attach the silkspan to the hull USING YOUR FINGER TIPS as a roller. Work from the deck edge downward to the bilge curve. Since you're now covering curved areas rather than a flat sheet, this process is more difficult than silkspanning the inside of the hull skin. But if you work carefully and slowly you can produce a wrinkle free silkspan covering. In the days long past I have covered model airplane cowlings using the silkspan and dope method over compound curve shapes -- it works well if you are patient and work slowly. Remember, mistakes can be sanded off and silkspan reapplied. Several tips will help you as you work the hull areas where there are serious curves or compound curves. Cut relief slits into the bottom half of the silkspan sheet at rib locations where the hull curves to the keel. This will allow the silkspan to overlap in these areas and eliminate wrinkles. If a bubble or wrinkle occurs in spite of your best efforts, slit the bubble with a sharp razor blade and press out the bubble with your finger tips after applying additional clear dope to the area. Remember, you can only work out wrinkles and bubbles while the silkspan and dope are still wet. Once the dope dries, wrinkles can only be removed by sanding and recovering the sanded area with a subsequent silkspan patch. In hull areas where extreme curving occurs, it may be possible to only cover the area between adjacent ribs at one time. Work slowly.

After the entire hull has been silkspanned (no small feat your first time), brush on one thick coat of balsa fillercoat to all silkspanned areas. Let the balsa fillercoat dry and then sand it with light sand paper. Examine the entire hull for areas where wrinkles and/or bubbles still exist. Sand these imperfections out and attach a silkspan patch to the sanded area using clear dope as an adhesive; apply balsa fillercoat to the sanded areas first. Sand especially the areas where you had to overlap the silkspan. Brush on another thick coat of balsa fillercoat and sand with a light sand paper. The hull is now ready to finish with two or three coats of colored dope using whatever color scheme you desire.

I also cover all superstructure areas with silkspan and finish them with dope in the same manner as above. It is much easier to cover the top and sides of the individual superstructure "boxes" as they are built but before they are all attached together. Silkspan can be applied over plywood and hardwood by using clear dope as the adhesive after applying one coat of balsa fillercoat to fill the wood grain. Sanding is still the key to all finishing methods -- a poorly sanded surface will look crummy after any paint type is applied.

The general sequence of finishing with silkspan and dope is:

One coat of balsa fillercoat over raw balsa wood

One coat of clear dope to attach the silkspan

Two coats of balsa fillercoat to seal the silkspan

Two coats of colored dope to complete the finish

News from the Northeast

Spring Regionals are scheduled for May 26-27 th. at our normal regional pond in Bowie, Maryland. Contest Director will be Bob Amend to get him used to battling people as well as boats. For information write or call Will Montgomery, (301-760-8991) 110 Thomas Rd. Glen Burnie, Md. 21061. The regionals will be fought on the same pond as will be used for Nationals ... so this is a chance for all to get a feel of the lake. We presently have 17 people planning to attend - howfully we will have more by then. There are a few not so distant rookies who have been building for the past year and their ships ought' to be about ready now. Of the people planning to attend now, 11 are Axis and 6 are Allied - come on fellow Allies - we need help!

The activities of the Maryland Attack Group are numerous at the beginning of the season this year including sponsering a second annual precision steering contest in Maryland on June 9, and sponsering the regionals. At least some of our battlers intend to go to the Southeastern regionals in Decatur, Ala. Others are involved in other model boating contests through May and June including sailboat racing and the Valley Forge Precision steering contest.

Most of the recent activities have been in the shipyards, with Will, Bob, Frank, Nathan, and Ron producing new ships. Most of the rest of the local group are refitting their existing ships. Several Rookies in Maryland, Penn, and even MA claim they will be come operational this year, we hope so.

Marty

Mark 1 Magazine Connection

Ron Thibault

In the past there have been two common methods of attaching the magazine tubes to the interrupter blocks (the part with the ball bearing or piston). The first is to use compression fittings. The second is to solder the tube into the fitting.

Soldering the tube gives you a gas tight seal but creates two problems. You can not see the piston to adjust it when you assemble the gun (or have to take it apart), and it makes for an awkward (sometimes impossible) job of installing or removing the gun.

While the compression fitting assembly allows for the previous problems it has some of its own. The main problem is that to get a gas tight seal with just the fittings you have to tighten the fitting to the point that it crushes the copper tubing past the point where a BB can go thru. I therefore solder the compression ring to the tube and use teflon tape to seal the joint. This generally does not do a good job. Also you still need to tighten the assembly with a wrench. This is generally not to much fun either with the limited room available.

I have come up with a fitting method that solves the problems associated with the regular compression fitting joint. The joint is gas tight (yes I've tested it) and can be tightened finger tight. The joint uses an o-ring and a modified compression ring. A cross-section of the joint is shown below (fig. #1). The compression ring has the sloped portion of one side cut off. This ring is then soldered to the copper tubing with the newly created flat toward the end of the magazine. An o-ring is pushed over the tube and the joint assembled. The compression ring should be positioned so there is about 1/2 of an o-ring width between it and the interrupter block when the magazine is in position and no o-ring is installed (fig #2). The o-ring I used was the same size as that in the quick disconnect that "Dirty" Dave Hayes talked about in the Feb 90 issue. This o-ring is just smaller in inside diameter than the 1/4 inch tube outside diameter.

To cut the compression ring, slip it over a scrap piece of 1/4 in. tubing (fig. #3). Then cut two pieces of brass tubing (one ea.) the next two sizes larger than the copper. Slip these up to the ring and tack solder the outer one to the ring. Be careful not to solder the ring to the copper tubing. Clamp the assembly in a vise (clamp the end with the brass tubing). Cut the ring on the sloped side of the ring that is soldered to the brass. This should leave you with a modified ring with a sloped side and the center flat part. Remove the ring from the stub of the copper and sand the cut edges smooth. This is not as tricky as it seems, I managed to make three good rings out of four tries.

Slip a compression nut onto your magazine followed by the modified ring (flat side toward the end). Put the end of the magazine into the interrupter block. Position the ring so that there is about 1/2 o-ring

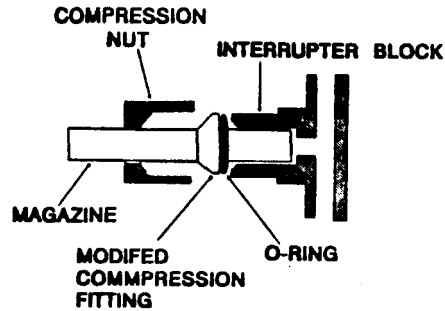


FIGURE #1

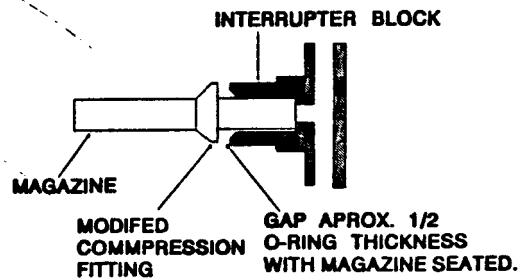
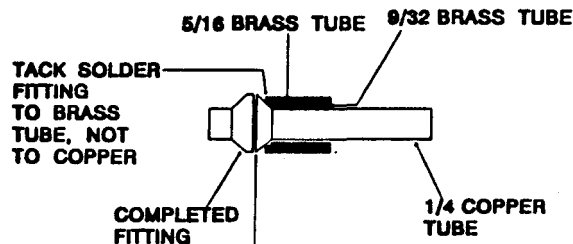


FIGURE #2



CUT ON DISCARD SIDE OF FLAT

FIGURE #3

thickness gap between the flat side and the end of the block. Mark this and solder the ring on (solder from the nut side). You now have a gas tight Mark 1 fitting.

If you are careful you can unsolder the brass tubes from the scrap piece and reuse them a few times.



Casting Multiple Parts with epoxy

Rick Schultz introduced me to the techniques of casting parts in epoxy when I needed to come up with several lifeboats for the Warspite (and God knows we need them). The process is easy and payoff great. Rick first made a solid balsa plug of a lifeboat and laid it out on a flat surface. He then covered the balsa plug with a coating of Vaseline. On top of the Vaseline he build up a coating of RTV (Room temp. vulcanizing rubber) or silicon rubber. This coating was between 1/8 and 1/4 of an inch thick. Now we allowed the silicon to cure. When it had shape and form we then covered it with additional coatings until we had a mold of the lifeboat which could easily support itself.

Now for the casting process, coating the inside of the mold again with Vaseline, we mixed some epoxy (5 minute for example) mixed it with micro balloons and poured it in to the mold. Because the lifeboat was solid and had a great area, I also added balsa bits to take up interior space so I could conserve on epoxy. Allowing the epoxy to dry for several hours, I could then pull out my lifeboat hull. There were a few air bubbles in the skin but these were easily filled in or ignored and the top of each of the lifeboats were sanded off on a disk sander. Since these were to be the steam picket boats which had superstructure added to the top there was no problem in having the flat tops. I could have made a second mold for the top details and cast those pieces separately but I haven't. For lifeboats with an interior plan you would have to construct a mold top to imprint the interior details. In the case of some objects which do not have a shape which constantly increases in girth - small cuts to the top of the mold would release the tendency to be locked in the mold because the mold is flexible.

Rick used this mold process to produce his secondaries for the Andrea Doria and they have seemed to be resistant to shell damage through two regionals and a nationals (on the Axis side in '89). So it seems the process got a good test under war conditions.

I have also seen a pretty similar technique used for molding details for scale boats although they used casting compound rather than epoxy. Their products had greater definition of details but I don't think they were as shell resistance and the casting material was more expensive. Also I am told that vibration during the early parts of the curing process will eliminate a good deal of the bubbles which I had in my lifeboats. I intend to use my electric jig saw for the vibration input. I am also told but have not witnessed that the application of air pressure or vacuum will aid the process of eliminated air bubbles. Perhaps?

independent people. The modern Greek state as we now know it was founded in 1829 when the Greek 9 year war of independence resulted in Greek victory against the Turkish Ottoman Empire. The years of our study (1905 to 1946) were tumultuous ones in Greek history including wars, invasions, and political insurrections. Being almost totally surrounded by water and having many islands the Greek navy played and important role in this history. The entire Balkan Peninsula of which Greece is a part has been described as the powder keg of Europe with its frequent wars and uprisings. The Great German statesman Prince Otto Von Bismarck once said that if a World war ever came to past it would probably start over some damn silly fool thing in the Balkans. Bismarck did not live to see it but this is exactly what happened in the First World War. After the war of independence the next war for Greece pitted her and her Balkan neighbors against Turkey in 1912 and in 1913. This war saw the alliance break up but the war continue. The break of the alliance caused the Greeks to fight her former Ally in 1913 as well as the Turks when the Bulgarians attacked Greece. This quick succession of wars was known as the Balkan wars. This war like most of the Greek wars with the Turkish Empire resulted in no clear cut victory for either side. The 2 countries remained bitter enemies with their quarrels often flaring into open combat. The war with Bulgaria showed her to be something of a wild card in the region and caused her to be watched closely by the Greeks also. Greece began World War One as a neutral but an internal political crisis along with anti German feelings and Allied intervention resulted in the fall of the Greek King. King Constantine abicated the Greek throne in favor of his son, who became King George the 2nd. of Greece. A pro Allied Government was formed and Greece entered the war on the Allied side. The Allied victory gave Greece Territory in Thrace, Smyrna on the Anatolian Peninsula, and the islands of Tenedos and Imbros. However in 1922 resurgent Turkish forces drove the Greeks out of Smyrna and Imbros in a short campaign. This last conflict stabilized the situation between the Greeks and Turks for a time. The precieved enemy of Greece remained Turkey and each country tried to match or out do each other in naval affairs. Italy began to become a threat to Greece also when Mussolini came to power in Italy. Mussolini wanted a greater place for Italy and began to extend Italian infuence over the Balkans This new Italian foreign policy erupted in violence in 1923 when Corfu on the Greek coast was attacked and bombarded by the Italian fleet as a direct result of a border incident involving the the Italians in Albania on the Greek border. After this things remained fairly quiet until 1940 when further Italian pressure resulted in the Italian invasion of Greece. The Plucky Greeks not only stopped the invasion by superior Italian numbers but drove the invaders back into Albania. The situation then crystalized with neither side able to gain an advantage until the ivasion of Greece by the Italian Axis partner Germany over ran the country in 1941. Many Greek ships succumbed to air attack during the German invasion. The remainder of the Greek fleet escaped and joined the British Mediterranean fleet after the fall of Greece. The Greek ships fought in the Battle of Crete and other operations. They also helped to convoy Allied ships in the Mediterranean and Red Sea areas. The exiled fleet suffered a short lived communist inspired mutiny during the war but this was quickly put down. The Greek fleet helped the British to prevent a communist take over of Greece after the war ended. During the war the Greeks were given 2 British Destroyers and were loaned several other Allied vessels at the wars end to help rebuilt their fleet. Now that we have some general background in the events effecting the navy lets look at our real interest the fleet and its ships.

The Ships and Facilities

The main Greek naval bases were at Athens, Salonika, Salamis, Pireus, Suda Bay, and Corfu. The largest ships in the Greek navy were the Kilkis class Predreadnought Battleships. The Battleships were the former American Battleships

YOU ARE OF COURSE AWARE HANS,
OF THE CURRENT THEORY IN THE
WEST...

THAT WITH THE COLLAPSE OF
COMMUNISM COMES THE END
OF HISTORY.

THE DEMOCRATIC SYSTEM HAS
TRUMPHED, THEREFORE NO MORE
CONFLICTING IDEOLOGIES.

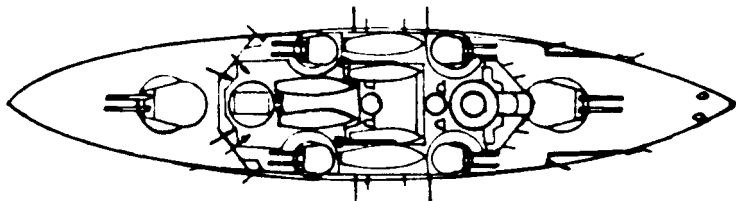
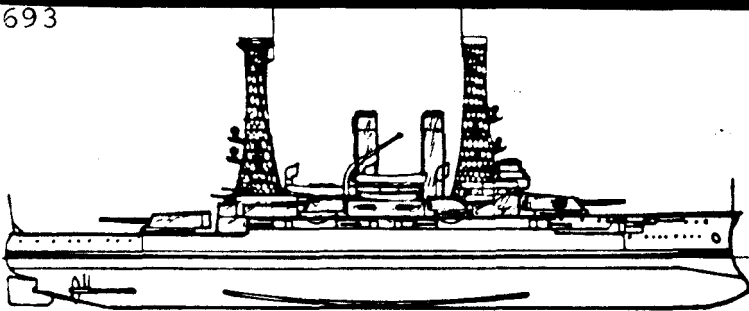
THEREFORE NO MORE WARS
ANYWHERE IN THE WORLD. EVER.

AT LEAST NOT UNTIL WE HAV A
UNITED GERMANY, HANS!

THIS TIME LUCKY,
MEAN POWER!

Naval Review

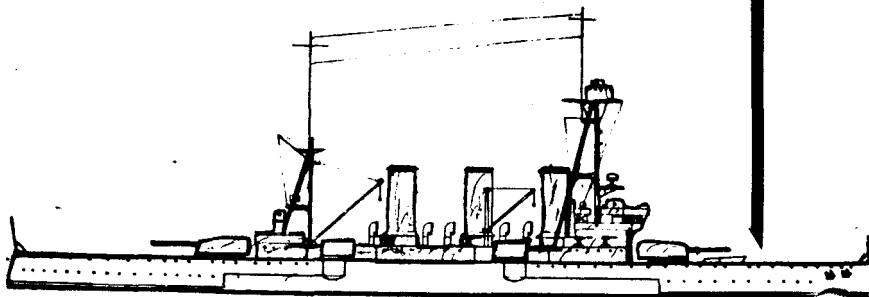
This review takes us south to the sunny Mediterranean Sea and the country of Greece. Greece although once the cradle of free civilization was part of various Empires down thru the centuries. The Greeks are however a fiercely



Kilkis BATTLESHIPS

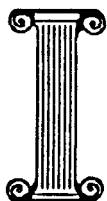
of the Mississippi class bought by the Greeks in 1914 for 12.5 million. The Kilkis became the Flagship Ship of the Greek navy. The Battleships were stationed in the Aegean Sea in the First World War and operated there with the Allied forces after Greece entered the war on the Allied side. After the war they covered the withdrawal of Greek forces and civilian refugees from Smyrna on the Anatolian peninsula in 1922. The Battleships did not experience any action during the Italian invasion in 1940 and they were sunk by air attack during the German invasion in 1941. The Greeks ordered a Dreadnought type Battleship in 1912, the Salamis from the German yard of Vulkan in Hamburg. But the war prevented her delivery and resulted in the purchase of the American Predreadnought Battleships. The Salamis was launched by the German yard after the outbreak of war but was not completed. Following the war the Greeks refused to

accept the uncompleted ship as she was not ready at the time specified delivery date of 1915 and because there was no way to complete her in Greece at this time. The main guns of the Salamis had been built in England and were used by her to complete the Abercrombie class monitors there. The Greek Government was sued by the German building yard who collected a small indemnity, the Greek down payment, and the uncompleted ship. The ship would have had 3 shaft propulsion for a speed of 23 knots, 8 X 14 inch guns in 4 twin turrets, and a 10 inch armor belt. She was scrapped in 1932 after no buyer had appeared for her. It was said that South American authorities and the Russians were at times interested in her. The Armoured Cruiser Georgios Averof was named after the Greek Millionaire who donated funds to improve the Greek navy. She was built in Italy for the Greek navy but armed with British 9.2 inch guns, excellent long range weapons. She fought actively during the Balkan wars as the Flagship of the Greek fleet. She was refitted in 1925 to 1927 being fitted with new engines, new boilers, improved fire control, and anti aircraft guns to modernize her. The refit was carried out in France. In the Second World War she escaped death by air attack and joined the British fleet and served on convoy duties for the remainder of the war. She has been preserved by the Greeks at Poros island just south of Athens as a Greek naval memorial. The Greek Protected Light Cruiser Helle started life as a Chinese Cruiser ordered from the United States in 1910 as one of



(GEORGIOS) AVEROF *armoured cruiser*

President's Column



By Tom Jass

Don't forget to send me your radio frequency. I know Fluegel really jobbed me in the last issue when he reduced my Frequency Return Form to the size of a postage stamp, but if you can fill out the form (with the aid if a microscope) I'll read it. We need this data -- looks like the growth in our hobby will require the use of "A" and "B" fleets at regionals and Nats.

HALF UNITS: WINNERS & LOSERS

Dan Hamilton proposed a rule change in the February issue (and Chris Pearce a similar, but separate one in December, 1989) whereby large ships within a class would be awarded an additional half unit if they were "more powerful" than the other ships within that class. Since I have transferred the Ship List from my obsolete Apple III computer to an IBM machine at work I can sort the entire shiplist six ways from Sunday. It's now a simple task for me to play with all the ships as all are on one file (the old Apple III couldn't handle one file with that many entries).

Shown below are all the ship classes that have gained or lost a half unit or a whole unit per Dan

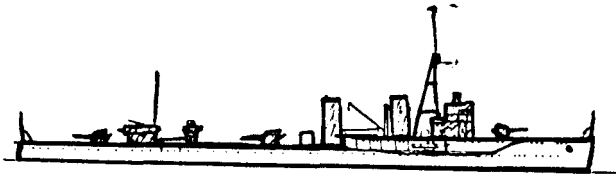
Hamilton's proposal. Remember that all pre-dreadnought BBs and all cruisers (light and heavy) built before 1922 retain the same number of units as at present. I have omitted DDs to keep the list shorter, but all DDs that are of buildable size (1500 tons and greater) gain 1 or 1/2 unit under Dan's proposal.

SHIP CLASS	NAT	NEW # UNITS	CHANGE IN UNITS (+/-)

CLASS 1 BBs			
YAMATO	JAP	7.5	0.5
IONA	USA	7.0	1.0
VANGUARD	GBR	7.0	1.0
BISMARCK	GER	7.0	1.0
LITTORIA	ITA	7.0	1.0
S. DAKOTA	USA	6.5	0.5
RICHELIEU	FRA	6.5	0.5
KING GEORGE	GBR	6.5	0.5
N. CAROLINA	USA	6.5	0.5
NELSON	GBR	6.5	0.5

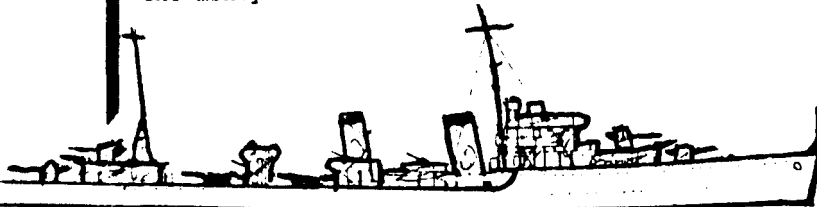
CLASS 2 BBs			
TENNESSEE	USA	6.0	1.0
MARYLAND	USA	6.0	1.0
MAGATO	JAP	6.0	1.0
NEW MEXICO	USA	6.0	1.0
PENNSYLVANIA	USA	6.0	1.0
NYUGA	JAP	5.5	0.5
FUSO	JAP	5.5	0.5
ALMIR. LATORRE	CHL	5.5	0.5
BAYERN	GER	5.5	0.5
RIVADAVIA	ARG	5.5	0.5
G. ELIZABETH	GBR	5.5	0.5
REVENGE	GBR	5.5	0.5
AGINCOURT	GBR	5.5	0.5
NEVADA	USA	5.5	0.5
TEXAS	USA	5.5	0.5

the Chae Ho class. She was bought by the Greeks when the Chinese did not complete payment. She served with the Allied fleets during the First World War having arrived too late for service in the Balkan Wars for which she had been purchased. She was refitted along with the Averof in France in 1925 to 1928 receiving new engines, boilers, bridge structure, fire control, and additional anti aircraft guns. In 1940 Italy making preparations to attack Greece engineered several incidents to heighten tensions, one of these was the sinking of the Helle by a so called mystery Submarine torpedoes. The Greek Cruiser was on a visit to Tinos in the Cyclades islands in 1940. Helle was



HELLE class cruiser

dressed up over all for the feast of the assumption at the time of the attack. The discovery of Italian torpedo fragments in the wreckage left no doubt as the identity of her attacker. The Aetos class Destroyers were originally ordered in England for the Argentine navy but were purchased for the Greek navy in 1912 in the Balkan war build up period using some of the money donated to the navy by Georgios Averof.



They were refitted in England 1924 to 1925 during the fleet modernization program. The refit like those being carried out in French yards to other Greek warships was quite extensive. The ships were reengined giving a new silhouette of 3 funnels instead of 5, new boilers, higher speed, improved anti aircraft weapons, and better fire control. The Leone was sunk by air and artillery attack during the German invasion of Crete at Suda Bay on Crete. The survivors escaped to join up with the British fleet and served with the Mediterranean fleet until the end of the war. The Ydra class Destroyers were designed and built in Italy for the Greek navy in the 1930's which seems odd considering the state of Italian Greek relations at this time. Perhaps the Italians thought they would get them in the end anyway when they conquered Greece. Two of the class were war losses and the remaining pair served with the Allies until the wars end. The next class of Destroyers was ordered in England for the Greek navy. They were modified versions of the British G class Destroyers. They were completed and delivered to Greece on the eve of war with Italy. Both members of the class were war losses. The British gave the Greeks the Destroyers Boreas which became Salamis in Greek service and the Echo which was renamed the Navarion. These British prewar built Destroyers helped to rebuilt the strenght a little of the Greek navy compared to the Turkish navy at the end of the war.

Combat Use

The Kilkis Class Battleships are very small 3 unit Predreadnought class Battleships but have enough displacement to allow building as combat Battleships. They have twin shafts and they are only 32 inches long but are 7.7 inches wide in 1/144 scale. This would make them very stable, short, maneuverable, hard to hit combat ships. I have a plan for this class already in our scale if anyone is interested. they are however very slow. The Averof is a little faster but it is still slow for a 2 unit ship. The Helle Light Protected Cruiser is a small 1 unit Cruiser and the same speed as the Averof. The later Greek Destroyers are workable designs but they are on the small side for combat purposes. In general all of the

CASILEFS GEORGIOS class destroyers

CLASS 3 BBs

KAISSER	GER	4.5	0.5
IMP. MARIYA	RUS	4.5	0.5
GANGUT	RUS	4.5	0.5
BRETAGNE	FRA	4.5	0.5
KING GEORGE	GRB	4.5	0.5
ERIN	GRB	4.5	0.5
ANDREA DORIA	ITA	4.5	0.5
CONTI DI CAVOUR	ITA	4.5	0.5
MELGOLAND	GER	4.5	0.5
ORION	GRB	4.5	0.5

BATTLECRUISERS

HOOD	GRB	5.5	0.5
TIGER	GRB	4.5	0.5
KONGO	JAP	4.5	0.5
ALASKA	USA	4.5	0.5
RENOUN	GRB	4.5	0.5
DUNKERQUE	FRA	4.5	0.5
LION	GRB	4.5	0.5
HINDENBERG	GER	4.5	0.5
SEYDLITZ	GER	4.5	0.5

HEAVY CRUISERS

PRINZ EUGEN	GER	3.5	0.5
NIPPER	GER	3.5	0.5
BALTIMORE	USA	3.5	0.5
TAKAO	JAP	3.5	0.5
DEUTSCHLAND	GER	3.5	0.5
KRA KAVKAZ	RUS	2.5	-0.5
VIENT DE MAYO	ARG	2.5	-0.5

LIGHT CRUISERS

FILBERTINO	ITA	2.5	0.5
FIJI	GRB	2.5	0.5
ALFONSO	SPA	2.5	0.5
TRE KRONOR	SWE	2.5	0.5
OYODO	JAP	2.5	0.5
GLORIE	FRA	2.5	0.5
EMERALD	GRB	2.5	0.5

MONTECUCCOLI	ITA	2.5	0.5
OMAHA	USA	2.5	0.5
TROJIN	FRA	2.5	0.5
LEANDER	GRB	2.5	0.5
PERTH	GRB	2.5	0.5
MURBERG	GER	2.5	0.5
PROFINTERN	RUS	2.5	0.5
OKINOSHIMA	JAP	1.5	-0.5
TSYGARU	JAP	1.5	-0.5
TRUMP	NET	1.5	-0.5
CAPITANI	ITA	1.5	-0.5
YUBARI	JAP	1.5	-0.5
ABDIEL	GRB	1.5	-0.5
NING MAI	CHN	1.5	-0.5
BRUMMER I	GER	1.5	-0.5
BRENER	GER	1.5	-0.5
BRUMMER II	GER	1.5	-0.5

In summary, the above list can be represented thusly:

- CLASS 1 BBs All ships gain 1 or 1/2 unit
- Class 2 BBs 5 of 19 ships gain 1 unit
10 of 19 ships gain 1/2 unit
- Class 3 BBs 10 of 25 ships gain 1/2 unit
- Battlecruisers 1 of 17 ships gain 1 unit
8 of 17 ships gain 1/2 unit
- Heavy Cruisers 5 of 39 ships gain 1/2 unit
2 of 39 ships lose 1/2 unit
- Light Cruisers 14 of 47 ships gain 1/2 unit
10 of 47 ships lose 1/2 unit

SHIP TESTING AT NATS

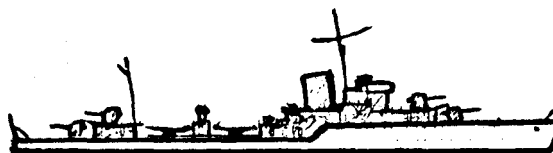
Bob Amend and I have been in contact throughout the winter and have decided to definitely perform ship testing at the 1990 Nats on Sunday. Models will be tested for weight, speed and construction.

CLASS	NAME	# SHIPS (FEET)	LM (FEET)	BEAM (FEET)	STNDRO DISP (TONS)	FULL DISP (TONS)	HEAVY	ARMOUR (INCHES)	GUNS #	DIA (INCHES)	SPEED (KNOTS)	BUILT	OFF/DEF CLASS	SPEED (SEC/100 FT)
							MODEL DISP (LBS)							
PREDREADNAUGHT	MILKIS	2	382	77	12,900	15,000	11,253	9.0	4	12.0	14.00	1908	4	20
HEAVY CRUISER BEFORE 1922	6 AVEROF	1	442	69	9,900	12,400	9,382	8.0	4	9.2	22.00	1910	5	28
LIGHT CRUISER BEFORE 1922	NELLE	1	322	39	2,400	3,500	2,426	1.0	3	4.0	20.00	1913	6	28
DESTROYER	AETOS	4	293	28	1,000	1,500	1,125	NA	4	4.0	35.00	1906-07	7	22
	YDRA	4	315	32	1,400	2,400	1,880	NA	4	4.7	38.00	1932-33	7	22
	V GEORGIOS	2	323	34	1,500	2,500	1,875	NA	4	5.0	34.00	1939	7	22
	SALANIS	1	323	33	1,400	2,300	1,725	NA	4	4.7	35.00	1931	7	22
	MAKARINON	1	329	33	1,400	2,400	1,880	NA	4	4.7	34.00	1935	7	22

Greek navies ships are buildable but do have certain built in limitations.

Conclusions

By 1939 on the eve of the Second World War the Greeks had created a modest fleet of 2 small Battleships, 2 old but well armed Cruisers, and 10 modern Destroyers. The Greek navy was small but served the nations needs and proved itself to be a help to the Allied cause during the Second World War in the Mediterranean area as the country itself did. I hope you have enjoyed this visit to the history of Greece and its navy in our time period of study.



YDRA class destroyers

No ship will be allowed to battle during the week unless it has been tested. Any violations will be corrected prior to battling or a "pass" must be allowed by all participating captains if a ship cannot be corrected in a reasonable time. This last scenario is primarily to allow rookies to battle even if they have not constructed their ship correctly. But remember, ONE DISSENTING vote means that a ship cannot battle until it is corrected to a legal condition. Bob will include a "Ship's Data" form in your Nats entry package. You must have this form filled out for each of the ships you plan to battle prior to beginning the testing process. Ain't the paperwork becoming just like the real Navy?

CORRECTION TO 1990 CONSTITUTION

When June and I transferred our 1990 Constitution to an IBM computer, we omitted the rule section that allows ships of over 40,000 tons (standard) to cover all four quadrants with guns. (And I'm building the HMS VANGUARD, which falls into this category!!) I have included for Fluegel a copy of the omitted rule. He will publish it in this issue (DO NOT REDUCE IT, FLUEGEL). Clip it out and tape it as a flap on the correct page of your 1990 Constitution. Sorry for the error and confusion.

Spring is here and the 1990 battling season has already begun; soon John and I will be trekking south to Alabama for the Spring SE Regionals. Hope to see many of you there!! The Texans have already begun their (unsanctioned) 1990 Triple Crown. Sink Fluegel!!



... AND HERE IS THE CONTEST DIRECTOR TRYING TO GET A CLOSE-UP PHOTO OF HIS "USS ALABAMA".

The following sections have been omitted from the copy of the 1990 Constitution. Please clip out these sections and tape them on the appropriate page of the by-laws:

Add to H.7.C

Any ship over 40,000 tons standard displacement can cover all four quadrants with guns.

Add to H.8.A

Any ship over 40,000 tons standard displacement may have one rotating turret with one gun. This would allow two guns in a side quadrant by including the rotating gun.

ACE Radio Equipment Review

Ron Thibault

As far as we (Northeast Group) can determine ACE is the only manufacturer that really meets the 1991 specs for a more than 2 channel radio. In addition we know they are the only ones who will supply the "odd" channels. The "odd" channel RF decks and crystals will be available in January 1991, not before.

After reading the ACE catalog and calling ACE R/C about some questions I had, this is a run-down of their R/C equipment.

The standard gimbal SILVER SEVEN does have trim adjustments on the front. They are integral with the gimbal. The picture in the catalog was not clear.

There are two major ways to buy the radios, completely assembled or as a kit. The kit comes with the RF deck (the critical part) already assembled. You build the Transmitter board, install the controls, and then hook them up to the board. The receiver comes as a PC board case and parts. ACE says 2 evenings to assemble the transmitter and one for the receiver.

If a kit with servos is ordered one comes assembled, the other 3 are kits. Indications are that this is the most difficult part of assembling the radio. As it is an additional \$100 or more for the servos, I recommend buying another manufactures servos. Any Positive Pulse (all those in common use today) servo will work. You will have to change the connector on most servos to Deans connectors. The exception is servos with a FUTABA AM (old) connector. The ACE receiver is available with this connector. You must specify this in the order. There is no addition cost for this option in the kit. There may be a slight extra charge for this in an assembled radio. The battery pack and switch will still use Deans connectors.

To change channels (same band) with the ACE you need to buy another RF deck (\$18.95) and a crystal for the receiver (available from ACE). You change the deck and crystal and then tune the receiver with a voltmeter or scope. If you want to change between bands (ie. 75 to 27 mhz.) you need a RF deck and another receiver built for that band. For 27mhz you need a different receiver for each channel, ACE does not sell separate 27mhz crystals. You can use the same transmitter.

On the seven channel transmitter the first 4 channels are the standard sticks. Channel 5 is a switch HIGH/LOW, used for gear retract on an airplane. We could use it for a gun or pump. Channels 6 and 7 are proportional, controlled by slide pots similar to trim controls. The seven channel also comes with three of the channels setup for dual rate, controlled by a switch for each channel.

The 4 channel radios use the same electronics as the 7 channels, comes assembled, and less servos. ACE says that they can be upgraded to seven channels with little difficulty. However, you cannot add all the optional boards available with the 7 channel.

This would not effect us greatly, but might make selling it later a little harder. A fifth channel and dual rate for three channels is available as options without you having to add them. Because the same electronics and receiver is used as the 7 channel changing channels should be just as easy.

The cost of of an assembled 4 channel with channel 5 and dual rate is about equivalent to a 7 channel kit (manuf. list price). I would estimate that all that is required to go to 7 channels from 5 is the slide pots. ACE sells trim pots separately for about \$6 ea. that I think would work. If you plan to convert the radio ask for the instructions when ordering ACE with give them to you.

If you are really adventuresome ACE also sells just the transmitter board and RF deck so that you can convert a existing transmitter from another manuf. The you can buy it with the transmitter board as a kit or assembled. The RF deck comes assembled. Ace said that the only trouble you might have is fitting the board into your existing case. However, ACE also sells a complete line of their metal cases, both punched for their setups as well as unpunched. The list price for the board and RF deck is \$70 kit and \$88 assembled.

ACE says that the narrow band transmitters will drive a wide band receiver, but some tuning of the receiver may be necessary.

ACE is sending me a manual for the Olympic 5 as well as the instruction sheet for converting it to seven channels. When I get it I will inform you of the procedure.

ACE does not generally give volume discounts for factory orders. However, they said to write the president of the company with a list of a volume order and he would decide about a discount on a case by case basis.

Below is the manufactures prices for the equipment. All prices are for narrow band transmitter (with standard gimbals, all metal gimbals are available for about \$80 more) and narrow band receiver.

Silver Seven	
Transmitter, Receiver, etc. w/o servos	
Kit	\$230
Assembled	\$360
Transmitter only, w battery, w/o charger	
Kit	\$160
Assembled	\$260
Receiver only, w/o battery or switch	
Kit	\$80
Assembled	\$100 -
	\$112 depending on connector type.
Olympic 5 (4 ch)	
Dual stick assembled	\$175
Channel 5 installed	\$17
Dual rate installed	\$15
Transmitter only, w bat	\$100
Transmitter electronics	
Kit	\$70
Assembled	\$88
RF deck assembled	\$19
Receiver crystal	\$10
Cases	\$9

OF ROTORS AND MOTORS

By Steve Baker

Background-

After returning home from the SE fall regionals last year one of the things that I wanted to improve was my pump system. In order to do this I decided to build a test rig to test different combinations of pump rotors and motors.

The Motors-

I used three motors in my tests. The Dumas (pronounced Dumb ass) 4.8, a Tamiya 380, and a RS385SH

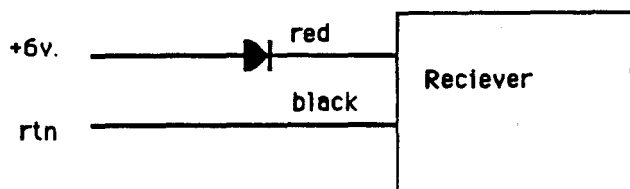
that I obtained from Skunkworks.

The 4.8 is very familiar to most of us. Some people swear by them and some people swear at them. Anyway it's a 3 pole motor that will run at 8 volts with good power and really screams at 8 volts. I found out the hard way that 10 volts is just too much by burning out two motors doing these tests.

The Tamiya 380 motor is also a 3 pole motor with the same preference for 8 or 8 volts. This motor is the most powerful of the lot but uses the most current by far. There is no free lunch!

The RS385SH is a 5 pole motor that will work from 8 to 12 volts but really comes into it's own from 8 volts up with a very low current draw. I obtained this motor from Skunkworks.

Cheap Insurance for your receiver



Fluegel asked me to write this article about how to protect your receiver from a incorrectly installed battery when using ship board power. Most of the Maryland Attack Group use on board power for their receivers (that is the main propulsion batteries rather than a separate receiver battery), and although most ships battery connections are keyed or color coded or something to prevent the batteries from being installed backwards - murphy's law can get in and ruin your day. Installing the batteries backwards will do more than make the ship run backwards.

What is the solution - well, there is an electronic device know as a diode which only permits current flow in one direction which can

prevent damage due to reversed application of the power. If we put this in the main power source wiring we can save the entire ship from reversed wiring but this would require a large one to carry all of the current use in an R/C ship and would drop the voltage going to everything (motors, pump, etc.) by about 0.6 volts. This would not be good.

The receiver is the main thing which we want to save however, so we will put the diode only in the receiver ckt. by cutting the power leads coming from the receiver to the rest of the ship. You can do this where you put in the switch to control the receiver or any where along the power line. We will cut the positive power (usually the red lead) and install a diode in series with the receiver. You will cut down the voltage going to the receiver by the same .6 volts but this should not be a problem as the 5.3 is still above the 4.8 volts normally used by the receiver on it's own batteries but not so large as to damage it. MAG boats have run for years on 6 volts to their receivers without damage.

The diode is usually marked with a diode symbol or just a band and we want to install the diode so that the band is toward the receiver or the arrow head points to the receiver. This allows the voltage to travel to the receiver when it is of the proper polarity. Just to double check power up the cable without the receiver installed and measure the voltage across the two power pins. Assuming you have voltage (plus 5.3v. on your red lead and return on the black), now reverse the power and you should not measure any voltage. Reverse the power connections again and you should be able to install the protected receiver and not worry about Mr. Murphy getting to your receiver through polarity.

Marty Hayes, Capt. of the HMS Warspite

The Rotors-

I started by using two different rotor designs in this test. In the course of testing I decided to modify one of the rotors to give me a third configuration and to play out a hunch(more on this later).

The first rotor I call Skunkrotor(SKNK RTR) as I obtained this one from the good folks at Skunkworks. For those of you who have not seen one it is a simple design, consisting of 4 blades, an open face, and 1 1/4" Dia. During testing this rotor exhibited good draw and excellent pump action. Typically the amp meter would show near maximum rating for 90% of the test run.

Next comes the Foster Turbo Rotor(TRBO RTR). I constructed this rotor per the article in the June 87 issue of Hullbusters(Ask Fluggie for a reprint). It was alot easier to build than I thought it would be. This rotor measures 1 1/8" dia and has 4 blades that are curved for maximum area. I used 1/4" wide brass stock for the blades. I also installed a lower plate on this rotor that is the same dia as the upper plate but with 5/8" hole giving this rotor a closed face. I assumed that this lower plate would enhance the pumping action of this rotor by providing a better seal for the bottom of the rotor. However, during testing this rotor would constantly load and unload, the amp meter telling the tale. It would rise to the max reading(the one recorded for generating the amp draw graphs) but fall off to 60 or 70% of max and cycle this way through out the pump run. This lead me to modify this rotor by deleting the lower plate and run it as an open faced rotor for my third rotor.

This modified or actually unmodified Foster rotor(MOD RTR) exhibited the same excellent pumping characteristics as the Skunkworks rotor confirming my suspicions that the lower plate was preventing a good supply of water from reaching the rotor blades.

The Housing-

The housing used in these tests was a stock Skunkworks issue pump housing. Nothing special here, just a 1 5/16 " inside dia plastic housing that the pump motor mounts to. It features a 1/4" inside dia discharge port. I fitted a piece of plastic tubing with a inside dia of 1/4" to this port. The tube was 3" long and has a nozzle installed in the other end. I made the nozzle from a 1/4" inside dia. brass tube with a plate soldered over the end that was drilled with a 1/8" dia hole. I also drilled a .059" (#53 bit) hole in the top of the housing to prevent air from becoming trapped and cavitating the rotor. This allows a very small amount of water to bleed out of the housing but is a necessity and its effect on pumping efficiency is minimal. To prevent this water from squirting out of the test rig and throwing off the test results(as well as soaking the bathroom) I installed a small plastic guard to divert this water back into the tank.

The Tank-

One of the many sacrifices the wife of a battler makes, besides hours of neglect while you and I are out in shop or at regionals or nationals, is the confiscation of

various kitchen and household goodies that are just the right size for this or that. Such was the case with a certain 9"X13"X2" baking pan that was just right for my test tank. Around this was placed and elastic strap to hold the subject pump firmly to the bottom of the pan. Although she may deny it in the future, my wife Jenni suggested that I use her baking pan and also suggested the elastic strap--you don't really want that rusty old pan back do you? And about your bra....

The Test-

Off we go the bathroom armed with the pan, a stop watch, amp meter, pump, 1 quart pitcher, various combinations of batteries and wire harnesses, a pad and pencil and usually my son Dan. Place the pan in the tub. Put the pump under the elastic strap and point the nozzle so that I don't hose me, Dan or the rest of the bathroom down. Pour 1 quart of water in the pan. Hook up the wiring harness using the 6 volt battery with the ammeter in series. Allow the pump to pump the pan as dry as it can. Shut the pump off. Then add an additional qt of water, hit the stop watch and turn the pump on, observe the maximum amp draw, and wait for the pump stop pumping(I actually waited until the pump could no longer pump the water past the edge of the pan), hit the stop watch and see how it did, writing down the result. Repeat this several times to arrive at a consistent result. Then I would change voltages and repeat the process. Dumas 4.8 and 380 motors were tested at 6 and 8 volts only. The 4.8's destroyed themselves on 10 volts and while the 380 would run at 10 volts it didn't sound or smell like it would for long so I did not include that data in this test. The 385 motors were tested at 6, 8, 10, and 12 volts. As you can see there were 9 different combinations of motors and rotors. This same test was performed with each of them.

The Graphs-

Pump Output(fig 1) shows how many seconds it took for the various motors/rotors to pump one quart of water. There were 9 different combinations and presenting these on one graph was just to difficult to make sense out of. Also, due to software limitations, I was only able to present the best six combinations. I broke it down to show the two best performing rotors installed on each of the motors.

Pump Amp Draw(fig 2) shows the Maximum amperage displayed on my meter during the test. I should emphasize the word Maximum here. If the Amp Draw graph shows 3.5 amps, that doesn't mean it draws 3.5 amps all the time, but that's the highest value I saw during the test. The same motor/rotor combinations from fig 1 are used in this graph.

The Conclusions-

Rotors

The Modified Foster Turbo Rotor(MOD RTR) was just marginally better than the Skunkrotor(SKNK RTR) Wether or not it is worth your time to make one or get 95% of the result by purchasing a rotor from Skunkworks is up to

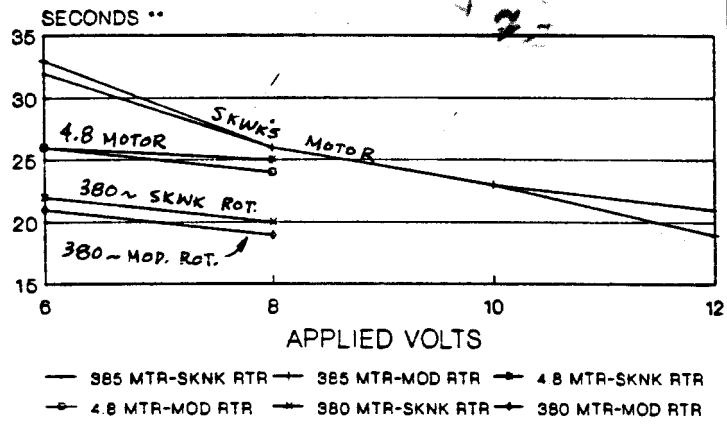
you. The Foster Turbo Rotor (TRBO RTR) with the lower seal was a dismal failure. As this information was not graphed it give you an example of its performance for comparisons sake. Using a 380 motor at 8 volts it pumped a quart of water in 25 seconds. Using the same motor, with the lower seal removed (shown as MOD RTR on the graph) did the same job in 19 sec. It should be pointed out that the same Foster rotor was used, first with and then without, its lower seal for these tests.

Motors
I don't think that any motor could be considered a winner or loser as there are many factors that determine what motor you would use. However, I was impressed by the flexibility of the RS385SH motor. At 12 volts you can pump the same amount of water as a 380 motor and draw only 3.1 amps while the 380 motor draws 10 amps.

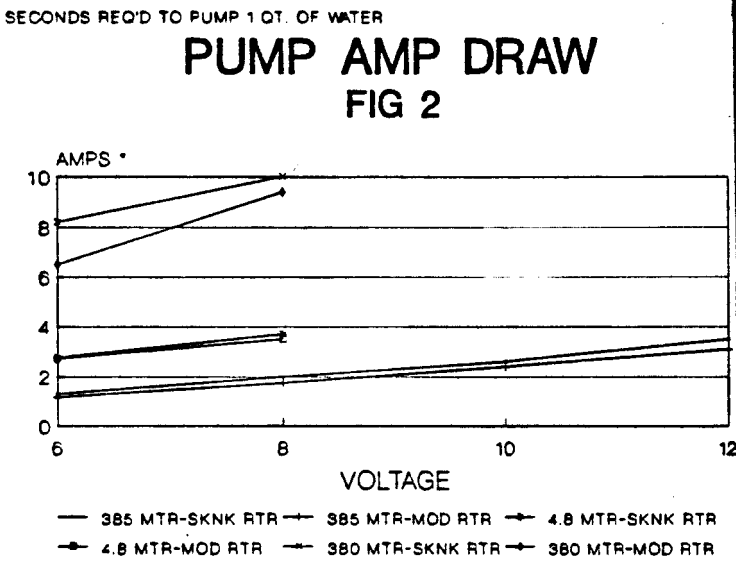
The End-
The motivation for this article came from EL PRESIDENTE JASS after a phone conversation we had. The pump performance shown is not meant to represent the best achievable, but a base line for comparison. If there is a rotor design that you would like tested or a graph of a particular combination that I did not show that you would like to see please contact me and I would be glad to help you out.

Your Obedient Servant
Ensign Steve Baker
Commander DMB Pola

PUMP OUTPUT
FIG 1



PUMP AMP DRAW
FIG 2



Values shown are max. amps during test

By Wade Koehn.

In the interest of furthering the Axis cause, not to mention filling two columns with one bird, I've decided that a reader's poll is just the trick we need. Yep, that's the ticket, all right.

Don't forget that the secretary has received a promotion and a transfer and now makes his home in the Axis state of Texas! Mail your responses, requests, letters, etc to:
Hon. Sec'y Wade Koehn
301 Wilcrest
Apt. 2801
Houston Tx
77042 713 784-5328

Back to that poll. Here's how it works: any and all proposals published between August 1988 and the last issue will be listed below. First, the issue it appeared in, then the author, then a gist of the proposal. Next to each you will find the numbers 1-5. Depending upon your reaction to the proposal, you will circle the appropriate number: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree. Please return your response ASAP in order to make the next issue.

Note: Allied personnel may continue to use my old address in New Orleans, where your letters will be cheerfully retrieved by my ex-downstairs neighbor, Millie, a seventy or eighty year old psychopathic humpback I am only too happy to get rid of. Millie will read your letter and then throw it away, which is about what I do with Allied mail, so what the hay...

- 1989 Ron Thibault
Deutschland and Des Moines class to go from 3 to 4 units 1 2 3 4 5
- Oct 1989 Tom Jass
Penetrable hull based on length of shortest ship in class 1 2 3 4 5
- Penetrable freeboard 1 2 3 4 5
- Dec 1989 Chris Pierce
Classify ships, number of units to each class 1 2 3 4 5
- Feb 1990 Dan, Gerald, Marty, Eric Noble
Proposal on rudder area 1 2 3 4 5
- Feb 1990 as above
Ship classification and units 1 2 3 4 5
- Feb 1990 Danny Schultz
Give the Maryland a higher classification 1 2 3 4 5
- Feb 1990 as above
Speed variation #1 1 2 3 4 5
- Feb 1990 as above
Speed variation #2 1 2 3 4 5
- Feb 1990 as above
Speed variation #3 1 2 3 4 5
- Feb 1990 as above
Speed variation #4 1 2 3 4 5

ALLIED TIP OF THE WEEK: Hey Allies! Want to improve your survivability? Paint your ship Hot Pink! Research has shown pink to have a calming and soothing effect on hostile individuals. You can put those nasty Axis boys right to sleep. Guaranteed? You bet! C U at Nats!

by
Hon. Sec'y w. koehn
Tech support and wardrobe by Industrial Cane & Wicker, Ltd.

Hull Busters The Form

Name _____ Phone (____) _____
Address _____ State _____
Zip _____

I am subscribing and have enclosed \$ _____
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 I have a new address, see above.

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If you are planning to attend Nats send the above/below form to me and you will receive an information packet. This packet will have helpful information about the MD area and the 1990 Nats. Send to:

Bob Amend
812 W. Poplar St.
York, PA 17404

Name: David HAYNES
Address: 1141 SANTOS ABILENE TX 79605
Phone #: 915 673 5130

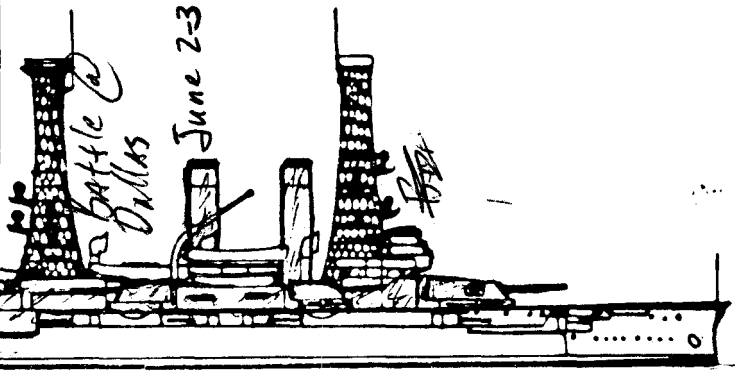
Axis / Allied Ships Name
Freq. 1. KONGO
2. _____
3. _____

Comments: _____

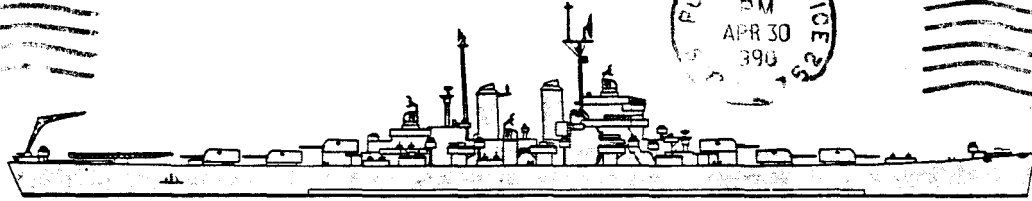
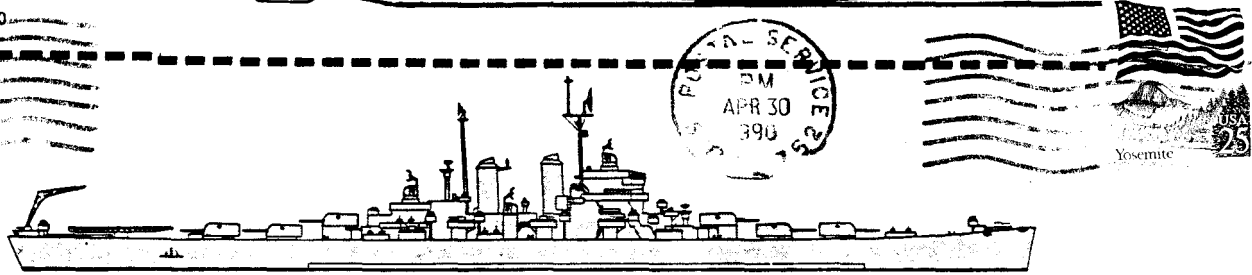
**Proposed Additions to the
Turning System Rules**
Ronald Thibault
12/20/89

Ron Thibault → RON THIBAUTI
Marty Hayes → MARTY HAYES
John French → John FRENCH.

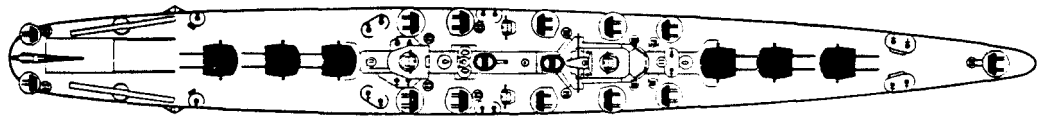
These three people make this an official rule proposal. It is printed in the last issue. I got the names after I printed the proposal.



HULL BUSTERS VERY LIMITED
3524 GRAY DRIVE
MESQUITE, TX 75150



David HAYNES
1141 SANTOS
Abilene, TEXAS
79605



The Worcester (CL 144) as in July 1945, with catapults aft and armed with 20mm and 40mm guns.

HULL BUSTERS