



North Texas Battle Group Rules of Construction

Adopted February 11, 2007

I. SCOPE

- A. This rule set deals with construction, fitting out, and preparation of ships, shore batteries and targets, and other tangible items used in battle games sanctioned by the North Texas Battle Group.
- B. This document includes a Technical Appendix containing data arranged in tables for convenient reference.

II. RULES CHANGES

Rules changes are to be submitted in the manner outlined in the North Texas Battle Group ByLaws, II. Rules Changes.

III. RESEARCH AND DEVELOPMENT (R&D)

- A. Any new development in technology, or change in rules affecting ship or equipment capabilities may be tested over three combat events if approved by two club officers.
- B. After three combat events the issue is automatically submitted for a rule change as per Section II.
- C. The XO shall be responsible for ensuring that rule change proposals generated through the R&D program are submitted in accordance with club rule change policies.

IV. TECHNICAL CERTIFICATION

- A. Safety and Technical Inspection
 - 1. Prior to usage all weapons must be inspected, tested and certified as described herein and in the Technical Appendix. If the Safety Officers determine that the weapons are unsafe, or fail to meet the criterion described in the rules, the weapons shall not be operated until the problem is corrected.
 - 2. Weapons certification will be valid for one year from the date of certification, or until any modification to the weapon or it's CO₂ delivery system is made.
 - 3. Certification of equipment and testing of weapons is the responsibility of the Technical Officer(s).
 - a. The results of all certification tests will be recorded in a Certification Log.
 - b. Complete certification requirements are described in the Technical Appendix.
 - 4. The club Secretary will maintain original copies of all Technical Certification Logs.
- B. Ships and other equipment that have been certified are immune from becoming out-of-spec due to a later rule change, except where such rule changes are safety affecting.

- C. Construction certification of other Big Gun clubs is specifically recognized, so that a ship with another club's technical inspection can be assured that it is automatically certified to participate in battles sanctioned by the North Texas Battle Group. A list of recognized Big Gun R/C Warship Combat clubs with which the North Texas Battle Group has reciprocal technical certification agreements is maintained by the Club Secretary.

V. WAIVER OF RULES

- A. Technical Officers (TOs) are authorized to issue construction waivers to ships that do not meet the specifications defined in this document, provided that such conditions do not provide an unfair advantage in scale model combat.
- B. Modifications that are determined to give a ship an unfair advantage will not be allowed and shall not be approved for waiver.
- C. The CO may veto any construction waiver issued by a TO.

VI. SHIPS AND OTHER CRAFT

- A. Period, Reference Source and Scale
 - 1. Only powered vessels that were laid down or in commission between the years of 1900 and 1946 may be used. Sailing vessels are not authorized.
 - 2. Reference Source
 - a. *Conway's All the World's Fighting Ships 1860-1905*, *Conway's All the World's Fighting Ships 1906-1921* and *Conway's All the World's Fighting Ships 1922-1946* (*Conway's*) shall be the only authorized reference sources for ships, except as defined in item b.
 - b. The Technical Officer(s) are authorized to approve waivers to *Conway's* and these rules, provided that such waiver does not provide a ship with an advantage in combat that would not be available without the waiver.
 - 3. Ships may only be used for the purpose for which the prototype vessel was originally built or actually modified, and may be constructed and operated either as they were originally specified, or in their modified state.
 - 4. All vessels must be built to a scale of 1:144 (1 inch = 12 feet) to a tolerance of $\pm 5\%$. This tolerance is to allow for honest building errors.
- B. Prototype Ships
 - 1. All ships used in games sanctioned by the North Texas Battle Group shall be based on an actual prototype ship, and have the appearance and general characteristics of the original prototype modeled in the scale defined.
 - 2. All ships of the same class may have the technical specifications of any particular ship of the same class. An example would be the Tirpitz and Bismarck, where the Tirpitz is armed with torpedoes, but Bismarck is not, but both of these ships are allowed to have torpedoes.
- C. All Ships Must be Capable of Being Sunk
 - 1. The finished ship must be capable of sinking so that the main deck is below the water's surface.

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2. No means of delaying, or slowing down the sinking of any ship is allowed except as is specifically allowed in this rule set.
3. Ships may be constructed of a neutral buoyancy design that prevents the ship from sinking to the bottom of the pond, but this must be accomplished within the design of the superstructure. No buoyancy may be added to the hull, or interior of the hull of the ship, to retard it from sinking and the deck itself may not be made buoyant.
4. Ships whose top-most decks are sealed water-tight shall have a minimum of 3/8" hole in said deck to allow air to escape by way of a smoke stack, air vent, or other opening to prevent an air pocket from slowing down a sink.

D. Hull Construction

1. Frames (Ribs)

- a. Frames (ribs) may be no thicker than 3/8 inch and on the bottom-most interior surface of the ship may be no higher than 1 inch above the bottom.
- b. For every 1 inch of ship's length the frames (ribs) are spaced apart, the frame may be 1/8 inch thick to a maximum of 3/8-inch thickness. For example, 1 inch space = 1/8 inch thick, 2 inch space = 1/4 inch thick, 3 inch space = 3/8 inch thick; 4, 5, 6 or more inch spacing = 3/8 inch thick. Spacing may be mixed on the same hull. Example: 3/8" ribs with 3 inch spacing at middle of hull, 1/8" ribs with 1" spacing in the bow, 1/4" ribs in stern with 2" spacing, but the larger space must be adjacent to the thicker rib (i.e., shorter spacing begins with a thinner rib).
- c. The hull area of the bow and stern may be made of any material provided the combined length of these two sections does not exceed 15% of the total length of the ship's hull at the waterline and the ship does not have an unfair advantage as determined by the Technical Officer(s). This 15% does not include the thickness of the ribs. Rib thickness and spacing is covered above.

2. Deck And Cap Rail

- a. The maximum combined thickness of the deck and cap rail shall not exceed 3/8 inch except as defined in item b.
- b. On ships with at least 1-inch penetrable freeboard remaining the cap rail may be 1/2 inch thick.
- c. The cap rail will be located up to 1/8" below the top-most deck of the hull. On an aircraft carrier, the top-most deck of the hull is defined as the hangar deck.

3. Penetrable Areas

- a. The thickness of the hull will be based on actual armor thickness at the thickest part of a given ship's armor belt, per Table 1 of the Technical Appendix.
- b. The penetrable area of the hull shall be about 85% of the hull area within one inch +/- of the waterline.
- c. Penetrable areas are defined as all points below the cap rail to a point 1 inch below the waterline, below which the hull may be constructed of any material. Areas below the waterline where the hull curve exceeds 45 degrees inward from vertical can be constructed of any material and need not be penetrable. The area protected by the frames (ribs) as defined in this chapter is exempt from this specification.

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- d. Only lightweight 6 pound density balsa wood may be used on areas defined as penetrable (see b. and c. in this section for further information).
 - e. The penetrable area of the hull and all other areas of the hull may be covered with a single layer of lightweight silk span, applied to the interior or exterior surface of the hull in addition to the approved paints.
4. Armor Plate
- a. To give the effect of armor plate on ships that had such, a horizontal stringer made of any material no more than 1/8 inch wide and flush with the outboard side of the frames (ribs) may be installed.
 - b. This will provide additional non-penetrable area of no more than 1/8 inch around the horizontal perimeter of the armor plate.
 - c. The 1/8-inch wide stringer may not be on the waterline.
5. Watertight Compartments
- a. Watertight compartments may be used to protect electrical and electronic equipment.
 - b. The compartments may only be large enough to hold the equipment, shall not provide enough buoyancy to help keep the ship afloat and may not impede water flow through the ship.
6. Water Channeling
- a. Water channeling to direct water towards the pump is approved.
 - b. Channeling shall be no higher than 1/2 inch above the bottom-most interior surface of the hull.
 - c. Blast shields shall not be sealed to the water channeling.
7. Allowed Hull Modifications
- a. Any modifications not present on the ship's plans or not of scale must be submitted for a waiver under R&D rules.
 - b. To increase the displacement and allow installation of hardware, frames (ribs) may be 3/8 inch higher than specified on ship plans for ships less than 15,000 tons displacement, heavy load. The water line shall be at the same placement and the free board shall be the same area as shown on the plans.
 - c. On ships with a high bow the frame may be constructed so the bow is 3/8 inch lower than shown of the plans to allow guns to fire over the bow.
 - d. Modifying the profile of the bow or hull to increase drag as a means of slowing down the ship is not allowed.
8. Waterline and Boots
- a. All ships shall float at scale waterline as shown on the ship plans.
 - b. Boot toppings shall be in scale position as shown on ship plans, must be 1/4 inch wide and may be painted or striped with one layer of hobby pinstripe tape.

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9. Lamination, Paints, Fillers, Wood Hardeners

a. Lamination

- i. Laminations are not permitted in penetrable areas.
- ii. Holes in penetrable areas may be plugged with the same thickness of balsa allowed for the ship, hull sections replaced, or holes may be covered with one layer of lightweight silk span.
- iii. The silk span may not exceed more than 3/8 inch beyond the size of the hole being repaired and may not overlap areas of previous repairs. Multiple layers of silk span cannot be allowed to build up on the hull so as to increase the thickness of the hull as multiple repairs are made.
- iv. Technical Officer(s) may declare a hull out-of-spec. if, in their judgment, excessive repair build-up provides an unfair advantage. The captain of any ship so declared will be required to re-skin the hull to remedy the situation. This is a judgment call on the part of the TO(s), and may not be appealed.

b. Paints

- i. Only model dope, lacquer-based paints, water-based paints or acrylic enamel paints may be used on penetrable areas. Epoxy, oil-based, or house-type latex paints may not be used.
- ii. No paint shall be used on penetrable areas that increases the hardness, strength, or elasticity of the balsa wood.

c. Fillers

- i. Water-based wood fillers may be used, but such fillers shall not add strength or thickness to the balsa wood on penetrable areas.
- ii. Wood hardening materials such as penetrating liquids may not be used on the wood covering the penetrable areas of the hull.

E. Propulsion and Steering

1. Rudders

- a. Rudders may be made of any material and may be up to 25% larger in area than on the prototype ship.
- b. Rudders must be the same shape and installed in the same position as on the prototype ship.
- c. All rudders carried by the prototype ship need not be installed or operational.

2. Propellers and Screws

- a. Ships may have up to the same number of propellers as the prototype ship.
- b. All propellers need not be installed.
- c. Propellers that are installed must be in the same position as on the prototype ship and have the same number of blades.

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- d. Propellers may be up to 50% larger in circular area than on the prototype ship.
- e. Bow thrusters may be used only if the prototype ship was so equipped.

F. Motors and Speed Control

- 1. Only electric motors may be used in conjunction with factory-sealed batteries. Environmental concerns prohibit all R&D efforts other than electrical or pneumatic-based propulsion systems. Fuel, pyrotechnics, combustible liquids or gasses, etc., are prohibited.
- 2. All vessels shall run no faster than specified trial speed (or design speed where trials speed isn't specified) as defined in *Conway's*. A minimum speed of 24 knots for a warship is allowed. The speed of convoy ships shall be a minimum of 22 knots, not to exceed the ship's specified speed of over 22 knots. This speed shall be converted into scale speed per Table 5 of the Technical Appendix. If the trial speed (or design speed, if the former is lacking) is not defined in *Conway's*, the Technical Officer(s) may approve running a given ship at a trial speed (or design speed if trials is still found lacking) defined in at least 2 (two) other credible reference books provided that both Technical Officers agree.
- 3. Motors or throttles may not be set to increase power in a turn to improve the maneuverability of a ship, or to increase power during acceleration or deceleration to improve the starting and stopping characteristics of a ship.

G. Recovery Device

- 1. All ships must have a recovery device in the form of a float with a line securely attached to the ship and float.
- 2. The float shall break free of the ship as the ship sinks and the line shall deploy.
- 3. The line shall be of sufficient length to allow the float to reach the surface of the water when the ship is on the bottom, marking the location of the ship and allowing recovery of the ship from the water surface. Recommendation: The length of float lines should be three times the maximum depth of the water that ships operate in.

H. Blast Shields

- 1. A blast shield is a barrier to prevent rounds from passing through both sides of a ship's hull, or from damaging internal hardware.
- 2. Blast shields may be made of any material and must be mounted no closer than 5/16-inch from the hull skin of the ship on the interior of the ship.
- 3. Blast shields may not obstruct rounds that have penetrated the hull from falling away from the hole towards the bottom of the ship.
- 4. The blast shield may not impede water flow in any way or allow rounds (balls) to impede water flow.

I. Superstructure

- 1. The superstructure may be made of any material and must resemble the appearance of the prototype ship, from all directions.

2. Level of detail included is left up to the builder. The Club encourages builders to build ships that are realistic in appearance when viewed from approximately 20 feet or more.

J. Pumps and Pumping Capacity

1. All vessels may have one or more bilge pumps, but the combined pumping capacity shall not exceed the rates defined in Table 2 of the Technical Appendix.
2. A cut-out area in the bottom surface of the hull to house the pump is approved, but may not protrude below the keel, or more than $\frac{1}{2}$ inch below the bottom of a ship and must not be larger than necessary to allow placement of the pump.
3. The pump discharge rate for all convoy ships of the liner, cargo ship, or oiler variety shall be a Category 0 for ships under 24,999 tons or a Category 1 pump for all non-warships 25,000 tons or more.(see Table 2 of the Technical Appendix).

K. Specialty Ship Types

1. Aircraft Carriers

- a. An aircraft carrier is any craft whose primary mission is/was to serve as a mobile base for combat aircraft operations.
- b. Aircraft Simulation: Primary Guns
 - i. For every 10 combat aircraft on a given carrier one (1), $\frac{1}{4}$ inch barrel is allowed.
 - ii. The guns must be installed under the flight deck with approximately $\frac{1}{2}$ of the guns pointed directly forward and the remainder pointed directly rearward and the guns may not rotate. The spacing between barrels shall be the same as for cannon.
- c. Secondary Guns: The secondary guns must be installed in the same approximate position as on the prototype ship.
- d. Aircraft
 - i. Aircraft carriers may launch aircraft.
 - ii. Aircraft must be launched from the flight deck forward over the bow and are scored as defined in *Rules of Combat, Scoring*.
 - iii. One aircraft may be launched every eight seconds.
 - iv. Aircraft must be 1:144 scale and of a type actually carried by the prototype vessel.
 - v. Aircraft may be made of any material but must not weigh more than $\frac{1}{2}$ ounce each.
 - vi. Aircraft must be constructed such that they are recoverable and may not be allowed to sink to the bottom of the pond and be lost after firing.
- e. Side Defensive Systems: One side defensive system may be installed on each side of the ship. Side defensive systems shall be comprised of triple torpedo tubes and shall follow all rules pertaining to torpedo tubes.

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f. Aircraft Carrier Construction

- i. Aircraft carriers must meet the construction requirements of other ships except the hanger deck area, which may be made of any material, provided that at least 1 inch of penetrable free board remains above the waterline.
- ii. Aircraft carriers are inherently top heavy, so to achieve a stable balance the waterline may be raised ½ inch, effectively reducing the free board and increasing the displacement, provided that at least 1 inch of penetrable free board remains above the waterline.

2. Convoy and Cargo Vessels

a. Definition: Convoy and cargo vessels are those ships whose main function was the delivery of war materiel, supplies, and troops.

b. Construction

- i. Cargo ships' rudder area may be 100% oversize.
- ii. Cargo vessels must otherwise meet the construction requirements of other ship types.
- iii. Ships converted into convoy vessels, such as ocean liners and destroyers, must meet the same construction requirements as other ships, but do not get the added 100% rudder area of cargo ships.

c. Weapons: Cargo vessels may be armed as per the prototype ship.

d. Raiders and Q-Ships

- i. Raiders and Q-Ships are armed warships and may not haul cargo, but do get the oversize rudder of cargo ships but the minimum speed of a cargo ship.
- ii. Raiders and Q-Ships may carry only weapons as historically armed and documented.
- iii. Raiders and Q-Ships may render their excess weapons inoperative and serve as cargo ships, but may not serve as cargo ships and warships during the same sortie.

3. Submarines

a. A Submarine is any craft whose prototype vessel was capable of operation while submerged beneath the water's surface.

b. Submarines' weapons and construction requirements are the same as for any other warship type.

c. Submarines may be developed under the R&D program.

VII. COASTAL TARGETS (CT)

A. Coastal targets are intended to serve as targets for the opposing team in scenario games.

B. The CT should be approximately scale in size and a minimum of 2 stories or about 1-½ inches in height.

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- C. The CT may be constructed of any material, however, they must be constructed such that hits can be detected and scored. In other words the material used must be soft enough to be penetrated or dented by gunfire so hits can be scored, or some other method of scoring hits must be devised and approved by the TO.
- D. CT must be installed at the water's edge and in an area so they are visible to the opposing team.
- E. The lowest-most point of the CT must be a maximum of 1½ inches above the water surface.

VIII. ARMAMENT AND WEAPONS SPECIFICATIONS

A. General Specifications

1. The length of barrels must be the same as on the prototype ship within 5%. Barrel length is measured from the end of the barrel to the face of the turret.
2. The number of weapons allotted is the same as on the prototype ship. Not all weapons need to be installed.
3. Single-barreled cannon may be installed in a turret where the prototype ship had multiple barrels, and may be fired at rate and a number of times equal to the number of barrels in this turret. In the case of a multi-barreled gun that arms several turrets, the effected turrets may be fired at rate and a number of times equal to the number of barrels in those turrets, followed by the appropriate delay specified in Table 3 of the *Technical Appendix* before firing again.
4. Gun barrels may not elevate higher than horizontal, which is defined as parallel with the water's surface while the ship is in a stabilized level condition.
 - a. Zero-elevation must be maintained at all points in the gun's arc of rotation.
 - b. The effects of pitch and roll while a ship is on the water are not considered when calculating barrel elevation.
5. Weapons must be installed in the same position as on the prototype ship and barrels must be the same height above the deck as on the prototype ship. However, 3/8-inch of barrel height may be added to allow ships with a high bow to fire over the bow when gun barrels are horizontal. The Technical Officer(s) may approve minor waivers to scale gun placement to allow guns to fit into a particular ship.
6. Weapon caliber shall be the same as on the prototype ship to the scale size defined in Table 3 of the Technical Appendix.

B. Gun and Torpedo Effectiveness

1. Guns and torpedo tubes of a single battery shall not have converging barrels that allow the balls fired to strike at the same point at any given distance.
2. Performance and operation parameters of guns and torpedoes is covered in this chapter under Weapons Testing Procedure and Operating Parameters.
3. The minimum spacing between barrels shall be 0.5 inch center-to-center, or the width of the outside dimension of a barrel between the barrels, whichever is greater.

C. Gun Rotation

1. Only ships that had rotating guns may have rotating guns and these guns shall be in the same position as on the prototype ship.
2. Coastal Battery guns may rotate.

D. Torpedoes

1. Only ships that had torpedoes may be so armed.
2. Torpedoes shall be represented by ¼ inch diameter ball bearings.
3. The maximum number of torpedoes on any ship shall not exceed the number of tubes on the prototype ship per side.
4. Rotating guns may be installed to accommodate tubes on both sides of a ship.
5. The spacing of the tubes shall be the same as for cannon barrels.

E. Coastal Batteries

1. Coastal Batteries are intended to defend the coastal targets, the port area of the team to which they belong, or control passage through some limited area of water. They may not have a field of fire covering the entire battle pond.
2. Coastal Batteries must meet the same construction and safety requirements as ship-mounted cannon.
3. Coastal Batteries may have a total of 3 working barrels of any caliber defined herein.
4. Coastal Batteries must have a system of cut-off switches, one per barrel, capable of rendering the cannons inoperable by gunfire from warships. The number of cut-off switches shall equal the number of barrels, with all the switches having to be shut off before disabling the gun.
 - a. The cut-off switches must be a minimum of 1 inch in height and 1 inch in width and must have a minimum target area of 1 square inch.
 - b. The lowest point of the target area of the cut-off switches may be a maximum of 1-½ inches above the water surface.
 - c. The cut-off switches must be capable of being disabled from gunfire from any caliber weapon firing at rated power from a minimum distance of 6 feet.
 - d. The target area of the cut-off switches must be positioned so they can be engaged and hit by gunfire from warships on the water at any angle that the cannon can fire on the warships.
5. The Coastal Batteries may have deflectors installed to prevent cut-off switches located close to one another from being hit by ricochet fire, provided that the deflectors do not interfere with 4, above.
6. The barrels of the Coastal Batteries may be a maximum of 12 inches above the water surface, with a maximum of 0 degrees positive elevation.
7. The appearance of the Coastal Batteries should be semi-scale in nature.

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8. Both Technical Officer(s) and Executive Officer must approve the construction of the Coastal Battery.
9. Once certified, the gun need not be re-certified unless modified.

F. Weapons Testing Procedures and Operational Parameters

1. Operating Parameters

- a. Maximum operating pressure shall not exceed 140 psig, but may be required to operate at below 140 psig to meet the penetration requirements defined herein.
- b. Maximum penetration shall not exceed that described in this section.

2. Weapon Testing

Prior to certification, guns (shipboard as well as coastal batteries), and torpedoes must be tested by checking penetration as follows:

- a. Test weapons by firing into DOW Styrofoam, square edge extruded polystyrene insulation that is 2 inches thick.
- b. The foam must be held solidly during the test and may not be allowed to move, flex, or otherwise absorb the shot's impact.
- c. The test material must be mounted 12 inches from the end of the barrels of the weapon being tested.
- d. The guns shall be fired a minimum of 5 times with delays between shots varying from 10 seconds to 10 minutes.
- e. If any ball penetrates completely through the test material, or makes protrusions in the backside of the test material the weapon fails the test. Reduce the operating pressure and retest.

3. Weapon System Safety (Gasses, Tanks, and Compressors)

- a. Only CO₂ or compressed air may be used as a propellant.
- b. All systems must be of a commercial design suitable for the pressures used in combat vessels.
- c. All armed vessels and Coastal Batteries must have an on-board shut-off switch in an easily accessible location so guns can be enabled after the ship is placed in the water and disabled before the ship is removed from the water without removing decks, superstructure, or other ships' components.
- d. The shut-off switch must bleed the pressure from the lines supplying the actuator, solenoid valves, or firing valves in such a manner as to completely disable the guns.
- e. The maximum pressure delivered to the weapon systems shall not exceed 140 psig.
- f. All tanks fittings operating at non-regulated pressure must be of a commercially approved design and must meet state and local laws.
- g. No device may be installed in any pressurized portion of the CO₂ system that will prevent the pressure regulator from performing its function throughout the entire system.

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G. Mines

1. Mine designs should limit damage to attacked ships. Mine designs should float and be recoverable. Mines fields or nets are limited to 1 linear foot, measured on the longest dimension, for every 10 mines the ship historically carried.
2. The mine string must be weighted at one end with sufficient weight to anchor it. The length of the anchor line shall be 3 feet.
3. Every mine string shall have for its length a weight, 3 feet of string, 1 float, 1 foot of string, etc., for a maximum of 6 floats. Maximum length of a mine string is 8 feet from weight to last float at the end of the mine string which equals 50 mines historically.

IX. OTHER SHIPBOARD SYSTEMS

- A. Lights, anchors, horns, and similar devices are allowed. Shipboard smoke generators are allowed, provided no propelled/exploding pyrotechnics or liquid fuels are used. Commercially sold smoke bombs are acceptable, but should be placed in a hollowed-out smokestack lined with a nonflammable material.
- B. All shipboard systems not specifically listed are subject to approval by TO and SO.
- C. Aiming devices to simulate radar are allowed under R&D.
- D. Automated coupling of range and/or bearing sensing devices, allowing them to control the train and/or elevation of cannons is prohibited.
- E. Automated devices that fire a weapon without human input are not allowed.
- F. All other shipboard systems added that are visible on the exterior of the ship must maintain the scale look and appearance of the ship.
- G. Systems and features not specifically described in this document may be allowed by approval of both TO and SO.