



# Seas of War

beta v0.48

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## 1.0. Overview.

**1.1. Scale.** **1:10000 scale** ( $1/_{10000}$ ). Ranges are given in terms of 100 meters (**hectometer**). All game scale measurements are stated in centimeters. When a distance is stated as '30' this means 30 cm. or 300mm on the game table.

**1.1.0.** 1 nautical mile = 18.5 cm= 18.5 hectometers.

**1.1.1.** 1 turn = 2.5 minutes.

**1.1.2.** Ship models can be from  $1/_{2400}$  scale to  $1/_{6000}$  scale. For larger scales special measurement rules can be added so they will work as well.

**1.2. Material.** Players will need model ships, a metric tape measure, Two ten-sided dice of different colors, two six-sided dice.

**1.3.** Markers or counters to represent torpedoes.

**1.4.** Also there is a semi-circular turning template that needs to be printed out. This has key angles marked on it so there is no need for a protractor but one could be useful none-the-less.

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**2.0 Dice and Probability** - Chance plays a big part in the game as it does in war. In the game dice rolls are used to determine if something that has a chance of happening does succeed or not. Generally, the minimum number needed to succeed is derived from tables or charts. Rolling any number higher would also succeed. The dice used in this game are **D100**, **D10** and **D6** are used on different tables. In this system '1' is the lowest number read directly from the die. The highest number read from the die would be what is used to identify the die as a D10 means a ten side die the highest number read off the die is ten (not zero).

**2.1.** The **D10** is used to determine several things the most important being indicating a location of a hit on a ship. The numbers 1 to 10 can be read directly from the dice roll. The number '0' is read to be 10. But it is possible to get either higher than 10 or lower than 1 with the use of what we call '**overs**' and '**unders**'. Numbers over the highest number read from the die are called **OVERS**. Numbers less than one are called **UNDERS**.

**2.1.1. Unders** - If a '1' is rolled on a D10 this can be 'backed up' with a second dice roll. If this second roll is a '5' then the number **0** (zero) has been made. If the backup roll is '4' then a **-1** is made. A '3' then a **-2** is made. A '2' is a **-3**. If the second roll is another '1' this equals a roll of **-4**, the lowest roll possible.

**2.1.2. Overs** - If a '0' ten is rolled this can be 'backed up' with a second dice roll. If this second roll is a '6' then the number **11** has been made. If the backup roll is '7' then a 12 is made. An '8' is a 13. A '9' is a 14. If this second roll is another '0' this equals a roll of 15, the highest roll possible with a D10.

**2.2.** The **D6** roll will be primarily used to determine penetration modifications. When rolling a D6 the numbers from 1 to 9 can be made. The numbers 1 to 6 can be read directly from the dice determined by the number of pips on the die. If a number greater than 6 must be made then a '6' must first be rolled on the die. A second 'backup' die then is rolled. If this second die is a '4' then a 7 has been made. A '5' is a 8. And a second '6' equals a score of 9.

**2.3.** Sometimes the rules indicate two possibilities having a 50:50 equal chance of either being the case. This is sometimes noted by two numbers separated by a slash as in (4/5). Roll either a D6 or a D10 with the lower half of the die numbers being the first case and the high half indicating the choice is the second case.

**2.4.** Some tables require the use of the **D100**. This is two D10 of differing colors rolled at one time. One is the tens digit the other is the ones digit. They generate number from 1 to 100. One hundred being the highest number read from the D100 ('00').

**2.4.1.** D100s can also generate overs and unders. If a '00' (100) is rolled roll a single **D10** to back this up. If a '6' is

rolled this is a 101. If a '7' is rolled this is said to be a '102'. And so on to when a '10' is rolled it is said to be a score of 105. Back up rolls of 1 to 4 are just straight '100'.

**2.4.2.** If a '01' rolled this too can be an under. Roll a single D10 to back this up. If the roll is a '5' the roll is said to score 0 (zero). If the roll is a '4' the score is '-1' and so on until a roll of '1' which is a '-4'. Backup roll of '6-10' in this instance would still be '01'.

**2.4.2.1.** On the Torpedo To-Hit table an alternate notation for D100 unders is used. In this case .5 is .5%.

If a '01' is rolled on the D100 then a D10 backup roll needs to be made. If that D10 roll is '5' then this equals a '.5'. If the D10 backup roll is a '4' then this equals a '.4'. Thus is a D10 backup roll of '1' equals a '.1' roll.

### **3. Torpedo Phase 1.**

**A. Torpedo Launching Impulse 1.**

**B. Torpedo Movement 1.**

**C. Torpedo Attack 1.**

### **4. Ship Movement.**

**(A. Impulse 1.)**

**(B. Impulse 2.)**

### **5. Sighting.**

### **6. Combat.**

**A. Shooters that straddled last turn.**

**B. Shooting previous targets not straddled.**

**C. All other Shooting.**

### **7. Torpedo Phase 2.**

**A. Torpedo Movement Impulse 2.**

**B. Torpedo Attack 2.**

### **8. Damage Control**

### **9. Damage Check**

### **10. Sighting Phase 2**

The standard turn is divided into 10 phases numbered 1 through 10. Some phases are themselves divided into segments.

This turn sequence is primarily for surface actions. As long as there is no aircraft involved in combat in the battle this turn sequence can be used. For actions involving aircraft use the **Air to Sea Turn Sequence** listed in Chapter 17.

## **3.0 Turn Sequence.**

### **1. Orders.**

### **2. Communication.**

## **4.0. Orders.**

In order to change direction of a ship, issue initial fire orders or co-ordinate attacks a ship must have a written order. Orders are given by the player to represent those given by the ship's captain.

**4.1.** In order to turn the ship in the movement phase of the turn there must be an order given to do so. The player must give the turn angle and direction to the nearest 15 degrees or it can be in 15 degree increments. **Example:** the orders may state '3 to port'.

This means to turn 3 arc increments of 15°(45°) to the left. Orders for turns are carried out to within 15 degrees so when it comes time to actually move the model ship there is some leeway in moving.

**4.2.** In order to commence firing on a ship target the order must be written in the orders phase. Orders are also needed to switch firing of the ship's main guns from one target to another.

**4.3.** If the ship has lost the command element or fire control has been destroyed then orders are not needed to commence firing or change targets.

## **5.0. Communication.**

## **6.0. Movement.**

Ships move in the **Movement** phase of a turn. Because the ships must have orders to turn both players may move their ships simultaneously. Ships may be moved their full movement regulated by their orders of the turn. That is

unless there are ships within 50 (50 cm.) of one another.

**6.0.1.** When any two ships are within 50 of one another movement is broken down into two impulses. Moving only half the allotted movement the first impulse and the other half the second. Players roll a D10 to determine who will move first., highest going second. One side moves all their ships first and when they are done the other side moves theirs.

**6.1.** As stated in the Orders section a ship may only turn by command when its orders say to do so. The turns are in 15 degree arc increments. The player does have some leeway in movement in that he can move the ship some part of the last 15° arc increments. Thus if the orders state to turn 90° degrees he could turn the ship 76-90 degrees.

**6.2 Turning.** The minimum tactical turn diameter is regulated by two turning diameter gauges. The outer diameter (8.5) is for ships of size 4 or greater. The smaller green (6.5) diameter is for ships of size 1 to 3 and under going speed under 20.

**6.2.1.** All ships size 1 or more going 20 or more must use the 8.5 diameter turn gauge to make its smallest turns.

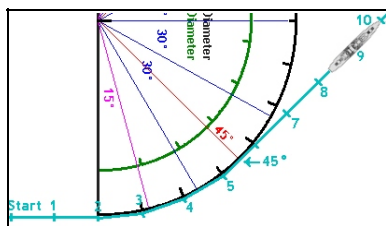
**6.2.2.** Ships using the tactical turn gauge and which turn 90° or more may not shoot their main guns in the game turn.

**6.2.3.** There is no maximum turn diameter. Ships may use a wider diameter than allowed but never a smaller one. Also supplied is a 1 nautical mile (18.5) diameter gauge. Ships using this diameter gauge to turn may fire their main guns no matter how many degrees they turn.

**6.2.4.** The turn diameter gauge have movement ties of 1 cm. movement along their outer edge. Use these to regulate movement through a turn by measuring along the edge. When measuring movement distance always measure from the same place on the ship. This should be the bow for  $\frac{1}{3000}$  or smaller scale ships but from the center conning tower for  $\frac{1}{2400}$  scale and larger scale ships as players have a habit of fish-tailing the sterns out during movement because the radius is often smaller than some larger models.

**6.2.5.** There is a slight delay in a ship responding to an order to turn. If a ship did not turn in the same direction the last game turn it must go straight for a short distance before its begins

to respond to a rudder change. Consult the **Turning Lag** table to find the amount of distance a ship must go straight before it can begin a new turn.



A size 3 ship with speed 10 has been given orders to make a 45° turn to port. Movement is traced along the edge of the 8.5 diameter gauge.

**6.2.6.** Turning also slows ships. Ships will lose speed when making turns and can not attempt to regain this speed until the following turns. The **Speed Loss for Turning** table lists the amount of speed loss for degrees of turns. Both speed and turning gauge will have an effect on the amount of speed loss.

**6.2.7.** Ships cannot increase their speed when moving more than one half their maximum speed and turning 15 degrees or more

**6.3. Changing speed.** A ship may only increase speed by at most  $\frac{1}{5}$  their maximum speed per turn. Except a ship moving 80% or more of its maximum speed may only increase its speed by only 1(cm) per turn. Ships moving more than  $\frac{1}{2}$  its maximum speed and turning may not increase speed. A ship may slow its speed by as much as  $\frac{1}{4}$  their maximum speed per turn.

**6.3.1.** If the ship has lost all power it will still coast at 10 less than its last speed per turn until its speed reaches zero.

**6.3.2. Crash Reverse.** A ship may make a crash reverse to reduce speed up to  $\frac{1}{2}$  their maximum speed per turn. But this may cause a loss of an engine box. On a D10 roll of '1' an engine box is lost from crash reversing.

**6.4. Ramming.** Anytime two ships come within 5 of each other there is a chance of them colliding. Roll one D10 for each of the ships involved.

**6.4.1.** If there is no intent on ramming or colliding then if both numbers are the same the ships have collided. If the numbers rolled is 5 or lower the smaller ship has hit the larger sized ship. If the numbers rolled is 6 or higher then the larger ship has hit the smaller.

**6.4.2.** If there is intent on ramming then the D10 of the ramming ship must equal or exceed that of the target ship.

**6.4.2.1.** If the ramming ship is of a smaller size than the target ship then add 1 to its die.

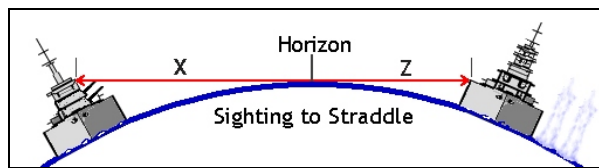
**6.4.2.2.** If the ramming ship is larger than the target ship subtract one from its die.

**6.4.2.3.** If the ramming ship is moving at a slower speed than the target ship subtract one from its die.

**6.4.3.** The ramming ship imparts one half its own number of hull boxes into hull box losses to the rammed ship if the speed is 18 or more. If speed is 10 or more the number is 25% of its hull boxes. If under 10 then it is 10% its hull box number. Fractions are ignored.

**6.4.4.** The ramming ship suffers itself 10% the number of hull boxes of the rammed ship. Fractions are rounded up to but **must** be at least 1. In addition it suffers bow damage. Treat bow damage as if the ship had one extra engine box and that engine box was lost. Thus its top speed is reduced by a fraction of  $\frac{1}{(\text{engines}+1)}$ .

**Example:** The Glowworm ('G' class; 2 hulls, size 1) has just rammed the Hipper (Hipper class; 9 hulls, size 4). The Hipper suffers 1 hull box loss. The Glowworm suffers .9



The distance to see if shells fired are straddling the target ship will be the sum of X and Z column distances.

hulls which rounds up to 1 hull box. Also a crushed bow which reduces its speed by an engine box as if it had 3. Thus this 'engine' type loss cuts the maximum speed from 27 to 18. The loss of 50% of the hull boxes reduces this further to only 9.

**6.4.4.1.** If the rammed ship is larger than the rammed ship the speed of the ramming ship is stopped. Also it will remain stopped (at zero) the following turn.

**6.4.4.2.** If the ramming ship is twice to three times the size of the rammed ship the ramming ship speed drops by half.

**6.4.4.3.** If the ramming ship is more than three times the size of the rammed ship the speed only drops to 3/4 of the current speed.

**6.4.4.4.** Otherwise the ramming ships speed drops to 1/4 of its current speed.

**6.5. Smoke screens.** Ships with working engines may make smoke screens. Use a length of black, gray or brown yarn for the smoke about twice the width of the widest model ship in the scale. For  $1/4800$  scale ships our yarn is 10mm wide and 200mm long.

**6.5.1.** Smoke screens must be denoted in the orders of the turn.

**6.5.2.** The smoke screen will be the length of the movement of the ship for the turn but not more than 20.

**6.5.3.** Smoke screens are placed during movement and shaped to follow the trail of the ship.

**6.5.4.** Heavy winds prohibit the effectiveness of a smoke screen and if winds are over 30 knots they are ineffective.

**6.5.5.** A single smoke screen has the effect of reducing the sighting distance through them to 1/3 the normal distance. No sighting is possible through two or more smoke screens.

## 7.0 Sighting.

Ships can often sight each other by day long before they can effectively fire on each other. Sighting is dependent

on lighting, weather and obscurance the maximum sighting distance is dependent on geometry. This is the distance from the observers on the sighting ship to the horizon added to the distance on the other side of the horizon to the target ship.

**7.1.1.** To find the distance measure sighting and firing from the center conning tower of the ship model.

**7.1.2.** Since we are dealing with scale models that are out of scale to our sea scale some allowances must be made to size. For 1/3000 and smaller scale ships measurements to the ship can be to any part of the model.

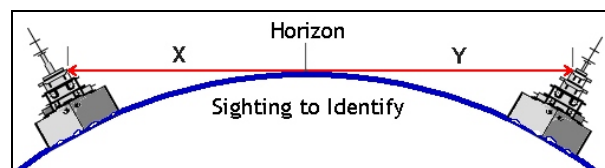
The measuring player gets to choose the spot. (Since spotting takes place over a period of 2.5 minutes the ships aren't at one exact distance the entire time period.)

**7.1.3.** For 1/2400 or larger scale ships measure distance to the ship at any place between the bow and the center of the ship's conning tower. The measuring player gets to pick the spot.

**7.2.** Sighting has two levels in Seas of War. The first is sighting to identify a potential enemy from a friendly ship. This is determent on being able to sight the smoke, funnel configuration and upper superstructure shape. The second level of sighting enables a ship to range the enemy and fire effectively. This is dependent on spotting the shell splashes in respect to the main outline of the ship, in particular the hull including turrets. If the hull can be seen then it can be determined that shell splashes are in front of it or behind it. Thus it can be known if shots are straddling the target or not.

**7.2.1.** To find the maximum sighting range use the **Sight Table**. The maximum sighting range is the sum of two components. The first is the range from the rangefinder of the sighting ship to a point on the horizon.

**7.2.2.** The second range is from the horizon to the part of the target that one is trying to see. This can be one of two



The maximum distance to see and identify another will be the sum of X and Y column distances.

ranges defined by columns. The range to the upper superstructure of the target ship will allow the sighting ship to identify the ship as friendly or enemy.

**7.2.3.** The last column is the range to the hull and turrets which allow the sighting ship to tell if shell splashes are in front of the target or behind it. When shell splashes occur simultaneously in front and behind a target from the same salvo it is a straddle. Observing this betters the ability to

adjust ranges when shooting. Unless the ship falls within this sighting range the shooter can not claim a 'straddle' on the target.

**7.3. Night fighting.** For night fighting the maximum sighting range is 80 with perfect moon light to 40 without. For partial moon light prorate the distance between the two extremes by the quarters of moonlight.

**Example:** In a half moonlit night the maximum sighting range would be 60.

**7.3.1.** Shell splashes can only be sighted via moon light up to one quarter the prevailing maximum night sighting ranges.

**7.3.2. Searchlights.** Ships may use searchlights to illuminate enemy ships. Searchlights can illuminate other ships up to a distance of 40 plus 10 x (the searchlight ship's size) distance. The ship's captain must announce if the ship is switching on searchlights at the start of the sighting phase.

**7.3.3.** Searchlights themselves may be seen to the horizon but no ranging can be done on them.

**7.3.4. Illuminating shells.** These range out to 210 for 8", 160 for 6" size shells, and 140 for 5". Illuminating shells are fired during the shooting phase and illuminate the current turn. When firing these type of shells reduce the number of guns of this type by one when trying to hit with gunfire.

**7.3.5.** Illuminating shells light an area 30 in diameter for one turn.

**7.3.6.** Shell splashes from straddles can be seen out to one half the limit of the searchlights.

## 7.4. Variable Sighting (Optional)

In the sighting phase, when first sighting a ship that is within the maximum sighting distance but is more than one half that distance roll one D10. On a 6 or better the ship is sighted. On a 1 through 5 it is not.

**7.4.1.** Roll one time each turn for each ship that has not been sighted yet.

**7.4.2.** Once sighted a ship will remain sighted until it moves beyond the maximum sighting distance.

**7.4.3.** If the distance less than one half the maximum sighting distance the no sighting roll is done as sighting is automatic.

## 8.0. Ship and Gun Lists.

Ship data and information is contained in two tables. One table describes the armor configuration of the major combat ships and another one describes the weaponry, speed and other attributes of these ships.

**Name or Class** - Identifies the ship class.

**Body Type** - This is the armor configuration scheme used. There are four general types. Cathedral scheme, all-or-nothing Raft scheme, Standard cruiser scheme and Carrier configuration.

**Armor** - The armor value of various locations of major system on the ship is given in inches of WWII Class 'A' US armor plate. Values in black are for vertical armor. Those in red are for horizontal armor. Those without a value indicate there is no armor or it is insignificant. Values separated by a slash '/' indicates there are two possible values. Numbers separated by a '^' indicates there is a tandem amount of two layers of protection.

**Tur F** - Turret front. Can also be gun shield front.

**Tur S** - Turret side.

**Tur R** - Turret rear.

**Tur Top** - Turret top.

**BB** - Barbette of main gun turrets. Can also be shell hoists for main guns on smaller ships.

**Belt Eng** - Main belt thickness protecting the engines, boilers and other machinery. This is often represented in two layers when values include '^'. **For example:** 4^6 shows that the outer layer is 4" of armor and the total of all armor (including the outer 4") is 6".

**Belt Mag** - Main belt thickness protecting the main magazines. This is often represented in two layers when values include '^'.

**Up Belt** - Upper belt. The area of the hull above the main belt. A small armored section protecting the funnel uptakes is listed in parentheses '(x)'.

**Deck Eng** - Deck thicknesses over the engines, boilers and other machinery. This is often represented in two layers when values include '^'. **For example:** 1½^3 shows that the upper layer is 1½" of armor and the total of all armor (including the upper 1½") is 3".

For carriers there are three possible values. The number before the '|' (vertical bar) represents the flight deck armor, that before the '^' is the hangar deck armor plus the flight deck and after the '^' is the total of all armor above the engines.

**Deck Mag** - Deck thicknesses over the main magazines. This is often represented in two layers when values include '^'.

For carriers the number before the '|' (vertical bar) represents the flight deck armor, that before the '^' is the hangar deck plus the flight deck armor and after the '^' is total of the armor above the magazines.

**2<sup>nd</sup> Tur** - Secondary turret gun house or gun mount. Armor in black is vertical front. That in red is for top or horizontal armor.

**Low Belt** - Lower hull belt including bulkhead below the main belt. (Actual armor basis has been doubled to represent water resistance at this depth.)

**AB** - Armored bulkheads at the ends of the ship. Is used in place of main belt when hits come from 0-15° of the bow or 0-15° of the stern of the ship.

**CT** - Conning towers. Command center(s) of ship. Armor is given first for forward tower (f) then aft(a) if one exists.

**FC** - Fire Control Directors. Main guns forward (f) is listed first. Main guns aft listed second. Secondary, anti-

aircraft and torpedo is third. Forward and aft FC can control either main or secondary but only one type at a time.

#### Not listed generic locations.

**Super Str** - Superstructure of ship. Construction steel of bullet resistant or less level. Armor basis of 0.

**Ends** - Unarmored fore and aft sections of the ship of bullet resistant or less steel. Armor basis of 0.

## 8.1. Ship Data Tables.

**Main** - Lists main gun size, caliber length, arraignment. Anti-aircraft value is listed after ‘:’ As in (12:4).

**ROF** - Rate of fire. Multiplier used to increase firepower of guns listed in column to the left.

**Secondary** - Secondary gun batteries.

**Tertiary** - High angle long range AA guns.

**Low AA** - Low altitude short range AA guns. The first number is the number of guns. This usually represents the chance to hit attacking aircraft. The number after the ‘:’ is the anti-aircraft knock down factor.

**Torpedo** - Torpedo tube arraignment.

**Protection - Flash** - Flash fire protection - computed when turret or barbette is penetrated.

**Protection - UW** - Under water protection - used when computing torpedo hit damage.

**Protection - DC** - Damage Control. Factors used in fighting fires and progressive flooding.

**Planes** - Number of scout/spotter planes carried.

**Hulls** - Buoyancy factors - Needed to keep ship afloat.

**Engines** - Maximum speed is divided in this number of parts. Lost of an engine result in that fraction of maximum speed.

**Speed** - Maximum distance a turn the ship can move. This is given in terms of 100 x meters but in game scale it is centimeters.

**Size** - Represents ship’s overall size as a target.

DAF	1	2	3	4	5	6	7	8
Range over	82	131	162	193	224	257	298	343

The DAF is a factor to adjust the ratio of vertical to horizontal target area.

**9.1.** To fire on a ship the target ship must be sighted and within gun range. In order to fire the first time at a particular ship an order must have been given in the orders phase. If the ship has fired on the target ship in the previous turn(s) there is no need for orders to continue shooting. Nor is there orders needed to stop shooting.

## 9.2. Gun Tables.

The gun tables list the performance of a single weapon.

**9.2.1.** The gun identification is to the upper left corner of each table. Along with the weapon name the mark or years of use are also listed. The mark indicates a particular shell was used at certain times by certain ships. This should be listed as notation on the weapons column of the Ship List. Also given in this box is the maximum range of the gun.

**9.2.2.** The center top of the table is the gun’s penetration performance. The numbers in black indicate inches of vertical armor such as main belt or turret that a shell from this weapon can penetrate. The line below this is the range that this penetration is achievable. Beyond this range the penetration will be lower and is given by the next column to the right.

**9.2.3.** The section of the gun table in the lower left and center is the horizontal armor penetration capabilities of the gun. These numbers and ranges are given in red. The ranges for these values are for ranges equal to or more than the range listed. This is because horizontal armor penetration increases with range while vertical armor penetration decreases with range.

**9.2.4.** Armor on ships is given in terms of black for

Max 31,800	AP	3	27	26	25	24	23	22	21	20	19
Up to range	AP	3	26	35	44	53	62	71	81	91	106

Top row is inches of armor penetration. Line below is maximum range this applies. Horizontal armor penetration starts high and as range increases gets lower.

horizontal armor and red for vertical armor. Correspondingly penetration values of horizontal armor is given in black and penetration values of vertical armor is given in red.

**9.2.5. Descent Angle Factor (DAF).** The lower right hand side of the gun tables, the blue numbers, consists of the DAF factor and its ranges. The DAF number serves

				-	1	1½	2	2½	3	3½	4
Range over				0	53	88	125	162	197	226	24

Horizontal penetration is stated in red above the range band.

## 9.0 Combat.

Combat consists of shooting guns or launching torpedoes at enemy ships. Each ship is allowed to fire in the combat phase of the turn. The damage takes place at the end of the combat phase thus it is possible for two ships to sink each other in the same turn.



two important purposes. The number listed at a certain range is chance that the hit will be on a horizontal location. As range increases the DAF increases. As the DAF number increases the chance to hit horizontal locations increase. There are two Hit Location tables one for horizontal and one for vertical areas of a ship. The second purpose of the DAF is to reduce the hit probability by range. The DAF number is subtracted from the total to-hit factors of the Gunnery To-Hit calculations. Like the red table the DAF numbers are for ranges equal to or more than the stated number.

### 9.3. Shooting Sequence.

The calculations of the gunnery is done in the following order.

**9.3.1. Determine the number of guns able to bear on the target.** This depends on the angle the target bears to the shooting ship. All center-line main guns may fire to the broadside. Straight ahead is the bow and is at 0°. Straight behind the is the stern and it is at 180° from the bow. The broadside area is 30° to 150° from the bow. Basically centerline turrets can not fire their guns to within 30° of an obstruction like another turret, a barbette or the superstructure. Thus guns placed amidship or between a barbette or turret and the superstructure will be blocked from shooting at certain angles. While the dead zone may not be strictly precise to the nearest degree, shooting arcs of the guns of real ship it is pretty close to this and too many insignificant details may drag the speed of the game down. For example the Warspite's war arcs of its forward guns was to 140° and to 40° for the rear guns.

**9.3.2. Beaufort Sea State.** Subtract from the number of guns any factors that apply. This will give the effective number of guns. This will be the base number.

**9.3.3. Rate of Fire (ROF).** If applicable multiply the base number by the rate of fire for the gun, rounding down. This is the number of shells fired. This will be the  $N_S$  number.

**9.3.4. Ranging Factor.** Subtract the DAF number from the  $N_S$  number. (The exception to this is for mortars. Do

not subtract the DAF from the  $N_S$  number for mortars.)

**9.3.5. Fire Control & Sighting.** Apply applicable factors to the  $N_S$ .

**9.3.6. Target Orientation and Tracking.** Apply factors to the  $N_S$ .

**9.3.7. Shooter Stability.** Apply factors to the  $N_S$ .

**9.3.8.** When all applicable factors are added or subtracted to the  $N_S$  it will result in a new number. This will be the Gunnery number or  $N_G$ .

**9.3.8.** If the  $N_G$  number is 0 or more roll once (D100) on one of the two shooting tables.

**9.3.8.1.** If the target has been straddled in the previous turn and the gun **Dispersal** is rated as 'N' (meaning the gun can fire narrow ladder) the captain may choose to use the **Narrow Ladder** table.

**9.3.8.2.** Otherwise the captain must use the **Wide Ladder** table.

**9.3.9.** If the result is a straddle or a hit place a marker or chit near the target ship as a reminder for the next turn that the ship is straddled. If a miss remove the marker. In the case of one or more hits go to the next section on Hits.

**9.4. Gun/Turret malfunctions** - Anytime the firing ship rolls a to-hit number lower than the actual base number of guns firing one or more guns malfunction and cannot fire the following turn. Subtract the number rolled from the base number and this is the number of guns that may not fire in the next turn. Malfunctions of this type last only one turn.

**9.5 Temporary Gun Out of Action (Temp OoA)** - In this case it is not known if the guns will fire in a turn until the firing phase of the turn. Temp OoA gun batteries roll a D10 to fire. If the roll is a '1-5' the gun battery remains OoA until it checks the following turn. If the D10 roll is a '6-10' the battery recovers from being Temp OoA and may once again fire.

## 10. Hit - Location

The damage imparted by a penetration shell will depend on the location of the hit and the damage factor of the shell. First for each hit on a ship roll a D10 to determine if it hits vertical locations/vertical armor or horizontal locations/horizontal armor.

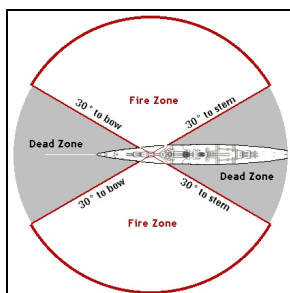
**10.1.** If the number rolled is equal or less than the blue **Descent Angle Factor (DAF)** number then the hit is on horizontal locations. This number is listed in **blue** on the bottom right-hand area of the attacking gun's Gunnery table. The range that this number is effective to is listed below on the line below the number. The range must be the listed range or greater (up to the next range listed).

**Example:** A Japanese 8" gun fires at 22,000m. The DAF is 7.

**10.1.2.** For each hit location roll once per hit on a damage



Turret No. 2 is blocked by superstructure (shaded region) shooting to the stern.

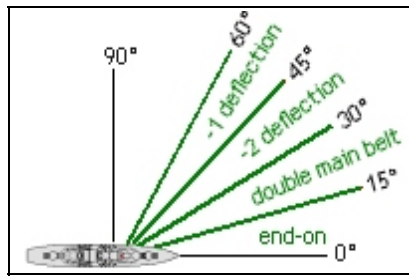


Turret No.3 is blocked by superstructure and barbette no. 2 (shaded region).



table depending on the **body type** of the target ship.

**Example:** The Washington has scored one 16" hit on the Kirishima from 8,200 meters (82 game scale). The range of 71-101 means the DAF is 1, thus on a D10 roll of '1' the location will be somewhere on horizontal locations. The player rolls a '5' indicating the hit is on vertical armor. The Kirishima is a cathedral body ship so the Vertical Cathedral table must be used. Roll a D10 to see what location and subsequently what armor must be penetrated to do damage. An '8' is rolled for the random vertical location. This is the 'UpperBelt' location.



Angles outside normal increase the armor resistance of belts.

**10.1.3.** When the DAF number is 1 or more and vertical armor is hit then it is possible rolling *an over* and hit a location that is below the main belt. When the DAF is 1 or more then overs can be made on vertical locations. Lower Belt can only be hit if the DAF is one or more. Or if using a special Japanese diving shell. Location 12 is usually a Lower Belt hit unless there is some note indicating the ship has a deeper belt such that it must be treated as a 'Belt Eng' hit.

**10.2. Hits on things that there are more than one of.** To determine which turret, gun mount or other weapon system is hit when there are more than one of such item on a ship roll a die to determine which one in particular is hit. Hits should be distributed randomly. If a ship with three turrets is hit in location turret roll a D6 and 1,2 is 'A' turret, 3,4 is 'B' turret and '5','6' is 'C' turret. If a ship has 6 secondary 2 gun mounts roll a D6 to see which one is hit.

### 10.3. Hit Penetration.

If hits are scored on a ship roll one D10 per hit on the Location Hit table of the target ship's armor body type. Compare the armor of the ship at this location to the penetration of the shell at the given range. If the armor is **red** compare it to the **red** armor penetration value. If the armor is **black** compare the **black** penetration value to this value.

**10.3.1. Variable Penetration.** The penetration value is also modified by a random variable. Roll a D6 and modify either red or black penetration number per the **Variable Penetration** table. If is modified number is equal to or higher than the armor then penetration occurs.

**10.3.2.** The D6 roll is subject to overs and unders. If an **over** is rolled (7, 8, 9) then this is considered a Critical

Penetration. The shell has hit an armored seam or been deflected by something into hitting at a more favorable angle for penetration.

**10.3.3.** As with rolls for overs of penetration there are also rolls for unders. When a '1' is rolled this too can be backed up to roll even lower than 1. The penetration will be ¼ normal maximum penetration in this case.

**If a penetration of the armor occurs then perform the damage procedure.** (Note if the penetration number is 4 or more times higher than the armor value then penetration is automatic and there is no need to roll variable penetration.)

**10.4. Over-penetration.** If the listed penetration of an AP or SAP shell is 10 or more times higher than the armor of certain locations then automatic over-penetration occurs. Over-penetration adds a factor to the damage factor of the shell resulting in less chance of severe damage. (Remember to do damage a D10 must be rolled that equals or beats this damage number.)

**10.4.1.** If the over-penetration location hit is a **belt, deck,** or **ends** the damage factor of the shell is +4 to its stated value.

**Example:** A French AP 8" has hit an Italian destroyer in main belt area at a range of 7,500. The listed maximum penetration is 9" at this range. The destroyer is ½" at this range. Thus this is more than 20 times the penetration. The AP shell has a damage factor of 7. Thus this is raised to a 11 to damage.

**10.4.2.** There is no over-penetration for HE or CM type shells.

**10.5. Deflection Hits.** Hits from certain obtuse angles to the vertical belts (Main, Upper or Lower) armor has a greater chance than normal to be deflected.

**10.5.1.** If the main belt or upper belt is hit from an angle 45° to 60° from the bow or the stern there is deflection. Subtract **1** (-1) from the D6 variable penetration die roll.

**10.5.2.** If the Main belt or Upper belt is hit from an angle 30° to 45° from the bow or the stern there is deflection. Subtract **2** (-2) from the D6 variable penetration die roll.

**10.5.3.** If the Main or Upper belt is hit from an angle of from 15° to 30° from the bow or from the stern there is extreme deflection. For hits from these angles **double** the armor values of the main belt or the upper belt.

### 10.7. Damage.

If the armor of the ship at the indicated hit location is penetrated then damage to the ship can be inflicted. Along the location line of the Damage table there is listed the various damage type notes. For each damage type listed roll one D10. If the D10 is equal or higher than the damage factor of the shell the ship sustains the indicated damage. If the D10 number is lower then there is no

damage. Players might want to roll all the damage at once. In such case use a red D10 for fire, blue for Hull, and one other color for special damage like Engine(E) or magazine (X).

**10.7.0.1.** If the armor is a layered type where only the armor before the '^' is penetrated then only the damage listed before the '^' can be attained. If the second value of armor of a layered combination is penetrated then damage listed on both sides the '^' is rolled for.

**Example:** The Main Belt Eng. armor of a ship is listed as '5^7'. This has been hit and shell has penetrated 9 thus has gone through both layers. The Damage for that ship at that location is listed as 'H^H, F, E'. This means two rolls for H damage, one roll for fire and one roll for an E engine loss.

**10.7.0.2.** Carriers can have three layers of horizontal armor. The flight deck will have armor basis before '|'. The hangar deck plus the flight deck will have a basis before the '^'. The final protection basis of all deck armor will be listed after the '^'. Corresponding damage is listed on the Carrier Horizontal damage table.

### 10.7.1. Body Type Damage:

The following are damage types from the Damage tables:

**H** - One hull box on the ship is eliminated. Roll one D10 and if the number is equal or greater than the shell's damage factor one hull box (buoyancy factor) is lost.

**HH** - Up to 2 hull boxes can be removed. Roll two times as per 'H'.

**Pf** - Progressive Flooding. Each Damage phase roll to see if another hull floods.

**F** - One fire factor is given to the ship. Roll one D10 and if the number is equal or greater than the shell damage factor one fire factor is added.

**FF** - Up to 2 fire factors can be added. Roll two times as per 'F'.

**E** - One engine box factor is lost. Each engine factor represents Engine Factor loss. Each engine factor represents 1/engine of maximum speed of the ship.

**Example:** A ship with maximum speed of 21 has 3 engines. If it loses 1 engine box the maximum speed the ship can attain is 14.

Ships losing all engine boxes can no longer move.

**{E+3} - Engine Loss Protection.** Add '+3' to the shell damage factor. Roll one D10 and if the number is equal or greater than this total number then an engine loss occurs.

**Example:** An 11" German AP shell has penetrated to a certain location where {E+3} is the damage. The AP has a damage factor of 5. It would need an 8 to be rolled on a D10 for damage to cause an engine box loss.

**X - Magazine Flash fire.** Roll one D10 and if the number is equal or greater than the shell damage factor a magazine flash fire breaks out. If a magazine flash fire breaks out roll once on the **X - Magazine Flash Fire** table. Once a magazine suffers a flash fire it cannot cause a flash fire

another time. Mark it as inert after the resulting damage. Further hits on that turret, barbette or magazine are ignored.

Further hits on turrets or barbettes may still cause flash fires as long as one was not caused by previous hits. The player whose ship has lost a turret or barbette may choose to voluntarily to flood the magazine to prevent hits on destroyed turrets from causing flash fires. This results in one adjacent turret being disabled too. This is done during the Damage Control phase of the turn.

**{X+2} - Flash Fire Protection.** Add both '+2' and the target ship's **Protection 'flash'** number found on the Ship Data table to the shell damage factor. Roll one D10 and if the number is equal or greater than this total number then a Magazine Flash fire occurs. Roll on the **X - Magazine Flash Fire** table and roll one time for the extent of damage.

**{X+3} - Protection vs. flash fire.** The same as {+2} except '+3' is used instead of '+2'.

**{X+5} - Protection vs. flash fire.** The same as {+2} except '+5' is used instead of '+2'.

**DC** - Damage Control factor is lost. Roll one D10 and if the number is equal or greater than the shell damage factor the ship's Damage Control factors are reduced by one.

**AA** - Anti-aircraft factors lost. Roll two D10. For each roll that is equal to or greater than the shells damage factor reduce the target ship's short range AA factors by 2. AA factors are lost in pairs so it is possible to lose up to 4 factors (2 pairs) with a single hit at this location.

**Example:** A ship with AA factors of '14:3' which suffers an AA loss will be reduced to a '12:3'. The ':3' is the AA knock down power of the guns and does not count as AA factors.

**Turret Destroyed** - One main gun turret and all the guns within are destroyed. This is automatic if the turret armor is penetrated. No Damage die is rolled. (If the ship has no turrets then two single gun mounts are destroyed.) All guns in the turrets are out of action for the remainder of the game.

If this is the result of a turret hit and the turret is a four gun turret with an armored bulkhead between pairs of gun roll a D10. On a 1-6 only two guns are out of action. On a 7-10 all four guns are destroyed. If this is a result of a barbette hit or a magazine explosion then all guns of the turret are out of action (OoA).

**2ndx** - One secondary gun mount destroyed. Roll one D10 and if the number is equal or greater than the shell damage factor a secondary guns mount is out of action the remainder of the game. Roll randomly for the exact mount destroyed.

**TTx** - Torpedo mount. Roll one D10 and if the number is equal or greater than the shell damage factor one torpedo mount along with all its torpedoes is out of action the remainder of the game.

**3rdx** - One tertiary gun mount destroyed. Roll one D10 and if the number is equal or greater than the shell damage factor a tertiary guns mount is out of action the remainder of the game. Roll randomly for the exact mount destroyed. Treat this as a TTx if there are no tertiary guns.

**P - Planes** - An aircraft group (1-3) aircraft are destroyed. If aircraft are loading or loaded with bombs or torpedoes then roll for fire for each aircraft destroyed.

**(Stores)** - Stores and Lockers. Unspecified damage to fuel, water or other stores which reduces the endurance of the ship by 10% for long term operations. Ignore this except in a campaign game.

**(Habitation)** - Habitation. Unspecified damage to maintenance and comfort of the crew. Lessens the ship ability to remain a sea by 10% with every loss. Ignore this except in a campaign game.

**Superstructure Special Hits** - One automatic roll on the Superstructure Special Hits table. Depending on the location roll here the shell must penetrate the specified armor to impart the damage.

### 10.7.2. Superstructure Special Hits Damage:

To cause the complete loss of these areas in the basic game it is sufficient to only penetrate the armor. If the area is unarmored treat as an over-penetration.

**Forward Fire Control Director** - The main or forward fire control director is eliminated. The ship can no longer use director control when shooting unless it has an operating aft FCD which can locate the target.

**Aft Fire Control Director** - The aft fire control director is eliminated. The ship can no longer use director control when shooting the main battery unless it has an operating forward FCD which can locate the target.

**Secondary Fire Control Director** - A secondary fire control director is eliminated. The ship can no longer use director control on one side the ship when shooting secondary guns.

**FCD knocked out** - without a functioning FCD to control the battery the battery no longer receives a +8 when spotting straddle. (It is only a +2 for straddling.) Also there is a permanent -4 subtracted from  $N_S$  when firing.

**Torpedo Director** - The fire control director for torpedo attack is eliminated. No torpedoes may be fired.

**AA Director** - Anti-aircraft high angle fire control director

eliminated. All short range anti-aircraft fire is halved. All high angle long range anti-aircraft fire is quartered. On large ships there often are several of these, one per quadrant of the ship. Thus only one section of the ship will have a loss of AA fire control. Roll randomly to determine which quadrant of the ship is affected.

**Forward Conning Tower** - Forward Fire Control eliminated. Ship's communications cut. Ship command element is eliminated. Ship's command must be passed to secondary control locations. This takes two turns in which ship is without orders. If both forward and aft conning towers are eliminated then for this ship write orders two turns in advance. Orders for change of target must also be written two turns in advance.

**Aft Conning Tower** - Secondary command post. No used unless the forward conning tower is eliminated.

### 10.7.2.1. Miscellaneous Specified Damage -

These are all unarmored elements. AP and SAP shells hits on unarmored targets such as Ends or Superstructure have +4 added to the shell Damage factor (over-penetration) before rolling to damage.

**Funnel** - Holes in funnels cause smoke to obscure aft fire control directors and all fire control abaft of this.

**Main Mast** - Damage to this structure. r - radio, radar, destroyed. sl - search lights destroyed. If ship has two of these systems then only the forward ones are lost.

**Aft Mast** - Damage to this structure. r - rear radar destroyed. sl - rear search lights destroyed.

**Catapult, Launch** - Catapult and/or crane destroyed. Captain's launch and other boats destroyed.

**Plane(s)** - <1-3> planes on deck are destroyed. Plus roll once for a fire.

## 10.8. Other Damage.

**Progressive Flooding** - Internal watertight system damaged such that more hull box losses can occur each turn.

**Rudder** - Rudder is either jammed or lost. If jammed ship can only turn to one direction. If lost ship must try to turn using propellers.

**Movement without a rudder.** Each turn of movement roll on the rudderless movement table for direction of movement. Turns can be no greater than 15° per turn.

**Movement with jammed rudder.** When ship is given orders to make a turn by degrees roll on the Damaged Rudder Movement table to determine how ship responds to attempt to turn.

**Stunned turret** - This is an **optional** rule as it involves additional record keeping and die rolls it is not recommended for fleet actions of more than four ships to

the side.

The ability to stun an un-penetrated turret is the shell damage factor plus 4. {TempOoA +4} When a turret of a ship is struck by a shell which does not penetrate roll one D10 to see if it is stunned. If the D10 is equal to or greater than this stun number the turret is stunned. A stunned turret will have all the guns of the turret temporarily out of action (TempOoA). This means to recover from stun a die roll must be made. Prior to firing the guns the next fire phase a D10 roll of 6 or more must be made to recover. One attempt can be made per turn. Stunned guns can not be further stunned but they can be destroyed or made permanently OoA.

Actually it might be fun to be to stun the conning tower too but at this time there are no rules for it.

## 11. Torpedo Attacks

Torpedoes attack through movement. Torpedoes 'move' on the game table in same manner as ships except their movement is in two phases or impulses. A torpedo attack is confined to a somewhat narrow angle arc of 15 degrees. When the torpedo's course takes it past or to the position of a ship within this narrow arc it is allowed to conduct an 'attack' to determine if it hits the ship.

**11.1.** In order to launch torpedoes the launching ship must be at the proper launch angle to the target.

**11.1.1.** Ships with side launchers like destroyers and cruisers must launch within an angle outside 30° of either the bow and stern.

**11.1.2.** Ships with forward launchers like submarines and Motor Torpedo Boats must launch torpedoes from anywhere within the front 30° of the element.

**11.1.3.** Ships launching torpedoes must move straight at least one quarter their movement distance either before or after the launch. If launching at the beginning of a turn and the launching ship did not move a quarter straight movement the previous game turn it must do so the current turn.

**11.2.** In the Orders Phase of the turn before launching torpedoes the player must 'set' the torpedo. The player must write down the speed of the torpedo if there are multiple speed setting on the type used.

**11.2.1. Optional Rule.** The player may also select to run the torpedoes 'deep'. This is a deep setting which may

cause more damage but will reduce the chance of a hit.

**11.2.2. The Torpedo Gauge.** Included with the game are a number of small wedge diagrams with a letter ID on each. These should be cut out and mounted on some card stock.

Some sort of adhesive or sticky tape can be put on the back of these to prevent them from sliding or moving around the table once placed. (Handi-Tak® might be useful in this.) The feature of the Torpedo Gauge are the various slices or arcs. These are numbered from 1 to 6.

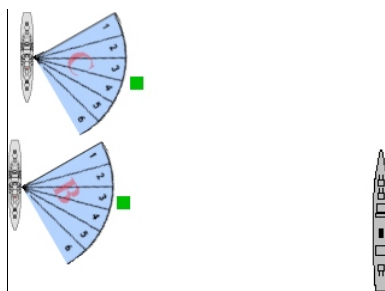
**11.2.3.** The player must secretly write down the number of the arc or arcs that he thinks the target ship will be in when a fired torpedo reaches it. The torpedo gauge and angle would be represented with notation like 'A2' or 'A3,4,5' for the arc or arcs to be used.

**11.2.4.** Write down the number of torpedoes in each arc if any. The notation of a torpedo launch becomes something like 'A2/2' or 'A3,4,5/1,1,1'. Where the number after the '/' is the number of torpedo(es) per arc. If it is possible to set more than one speed setting on the torpedo write 'M' for medium speed or 'S' for slow speed. If no speed setting is written down the speed is assumed to be at the 'F' fast speed setting.

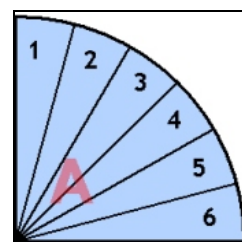
**11.2.5.** When torpedoes are launched the player places the torpedo guide on the table at the launch point at whichever orientation he wishes. This is where the launching player must judge and guess where the enemy's ships will be in the future. Sighting down the various arc rays may help in lining up the target.

**11.2.6.** If the ship is not within the angle band when the torpedoes reach the ship's range there is no chance of a hit. Thus it is important not to move the TG while the torpedoes are still running.

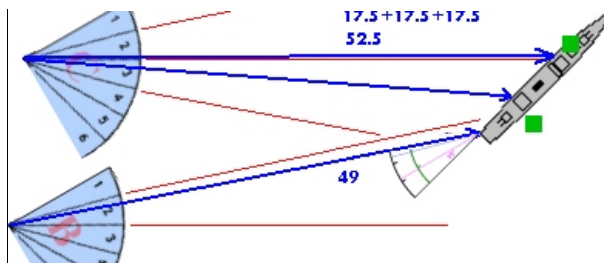
**11.2.7.** Which particular angle arc the torpedoes are running in will not be known to the opponent. Use some sort of chit or counter in conjunction with the TG to mark the progression of torpedoes. Move the counter along the table at the speed of the torpedo to represent the outward spread of the torpedoes. This is not necessarily moved in



Torpedoes launched in the First Torpedo Impulse. Place a Torpedo gauge next to each ship launching torpedoes. Move the green marker for the first torpedo impulse of the turn.



Torpedo Gauge



In the attack from B spread the target ship is 49 away. The angle of attack is somewhere between the 30-45° deflection angle. This causes the range of 49 to be multiplied by 1.5 giving an effective target range of 73.5. The cruiser is a size 3 target at the 75 range, thus having only an 8% chance to hit.

the actual arcs selected in order to throw off the opponent from knowing exactly where they are headed.

**11.3.** Torpedoes are launched only in the first torpedo phase. Torpedoes may be launched by ship at the start of the torpedo phase. In this case the torpedoes are launched from the position of the launching ship where it ended movement the previous turn.

**11.3.1** Torpedoes also move in impulse phase the torpedo is launched in.

**11.3.2.** Torpedoes movement is in two separate phases or impulses. The first torpedo movement phase precedes the ship movement phase. The second torpedo movement phase follows the ship movement phase. Torpedoes always move straight in both phases.

**11.3.3.** The owning player moves a chit or counter along the table to represent the torpedoes outer movement ability. He does not have to move it along in his secretly selected angle. Indeed so as to not reveal what angle he has selected he should move it in a randomly selected angle. The player who is moving torpedoes is required to tell the opponent when any of the torpedoes come within wake spotting distance of any of his model ships. If during ship movement any enemy ship comes within wake spotting distance the owner of the torpedoes is required to announce the presence of the torpedoes.

**11.4.** If the movement of the torpedo reaches any potential target ship in the TG arc there is a torpedo attack.

The **Torpedo Table** is a percentage chance per torpedo to hit a ship. The orientation and spread are taken into account as well as range. Roll 1 D100 for each torpedo in the angle that has reached or moved past a ship in the angle in that torpedo impulse phase.

**11.4.1.** If the ship is at an obtuse or deflection angle to the torpedo launch point the distance is multiplied by a factor to get an effective distance.

**11.4.2.** The target size of a ship is the model size for 1/3000 or smaller scale ships. For 1/2400 and larger ship the target is the center conning tower to the bow of the

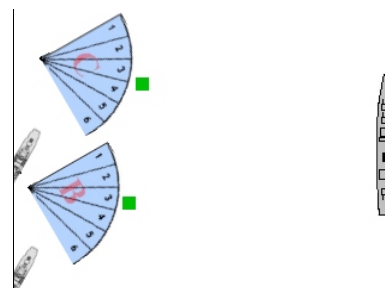
ship. If this region is in the torpedoes arc at the time the torpedo move to or past this point the ship is subject to being hit.

**11.4.3.** If the ship model happens to be in two or more of these arcs and they all have torpedoes moving through them at the time the target ship is a target in each arc.

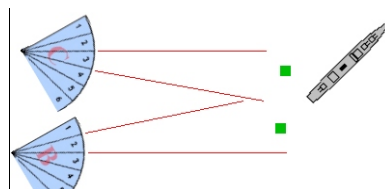
**11.4.4.** The D100 roll must be equal to or LESS than the stated number. Numbers of .5 or less indicate an 'under' needs to be rolled. In the case of '.5' a '01' must be rolled on a D100 and then a '5' or less on a D10. Likewise a .1 means a '01' needs to be rolled on a D100 and a backup roll of '1' on a D10. This is a 1 in 1000 chance.

**11.5.** If a Hit is scored roll a D10 on the **Torpedo Damage Table**.

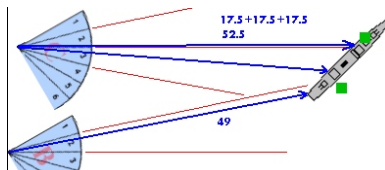
For this table the Torpedo damage is added to a D10 roll. From this total subtract the Underwater protection factor of the ship. The result is the column to the left. Roll another D10 to see if the bow, stern or amidship has been hit. Hits from 15 degrees of the bow end only can hit the bow. Hits from 15 degrees of the stern can only hit the stern. Apply the resulting damage to the target ship.



The ships have now moved in the ship movement phase. The torpedo gauges stay in place.



The target ship sees the destroyers turn away and realizes it could be under attack and turns to avoid the torpedoes. The results of two more torpedo movement impulses have moved the torpedoes within wake spotting range. The torpedoes orders have 1 torpedo being fired in each arc numbers #2, #3, and #4.



In the first torpedo impulse of the following turn the torpedoes reach the ship. Confirmation that the torpedoes were fired and moved properly is made. The true range from launch point to ship model is measured. In this case it looks like torpedoes in arcs #2, #3 of C and #2 of B can attempt to attack the ship.

**11.6.** Torpedoes impacting any ship will no longer continue on beyond the ship. Thus ships beyond the ship will have that many less chances to be hit by a spread of torpedoes.

**1 1 . 6 . 1 .**  
Torpedoes can

only attack one ship one time. This is the closest ship to the launch point. If multiple ships can be hit is the same impulse resolve the closest ones to the launch point first. If two are equally close resolve the largest ship size first. A torpedo can only hit one ship. A torpedo that hits a ship no longer attacks other ships.

**11.6.2.** Because of the nature of back and forth movement impulses a ship may leap in front of torpedoes that have attacked it in a previous impulse so as to appear to be a target again. But once a ship has survived one attack by a particular torpedo it is safe from that torpedo for the rest of the game. However, if the ship crosses into another TG arc into the path of different torpedoes it can be attacked by those even if they were fired at the same time in a spread as the ones that attacked the ship in a different TG arc.

**11.7. Dummy launches.** Ships may conduct fake or make dummy torpedo attacks on ships. As in the case of a real launch the player writes down an angle or some scribbling indicating a dummy launch the turn prior to launching the torpedoes. During movement the launching ship must move in a straight course for 1/4 its move before launching. The player places on the launch point a torpedo guide in any orientation he wishes. During the turn he can move a chit in a ray out from the launch point so as to represent a potential moving torpedo. He does not announce to the opponent which arc the torpedo is in. Thus the opponent is wondering if the torpedoes were launched into an arc that his ship was no longer in or if it was a dummy launch.

Opposing ships may spot launches from deck mounted torpedo launchers if the launching ship is within 'deck activity' spotting range of the ship. In this case there can be no dummy launch arcs placed.

**11.8. Duds.** Dud torpedo rules are optional. Already a small dud factor is added by adjusting the to-hit factor lower. When a torpedo hits a target there is a chance that it will not explode causing no damage and thus be a dud. Roll 1 D10 per striking torpedo. If that number equals or is lower than the Dud column number for that model and year torpedo that torpedo is a dud.

**11.9.** When torpedoes launched from a particular Torpedo Guide can no longer possibly hit any ship pick it up for future use to reduce table top clutter.

**11.10 Advanced Prorated Launch.** Torpedoes may be launched at the mid-point of the ship movement phase if ship movement is broken into two impulses. In this case after all ships have moved their first half of movement play is interrupted and torpedoes can be launched. Orders must have been given for the ship to launch at the mid-point of movement.

**11.10.1.** Torpedoes which are launched at the midpoint of movement after the first movement impulse may only move

one half of their impulse movement in the Second Torpedo impulse as their movement is prorated.

**11.10.2.** Ships launching torpedoes are still required to move straight 1/4 of a full turns movement prior to launching.

**11.11. Forgetful Player Rule.** Since only the torpedo launching player knows the speed and arcs of his torpedoes he is required to take notes and to properly mark and announce their presence when within wake spotting distance. If the player fails in this and the target ship could have had a chance to maneuver to try to avoid the torpedoes then instead of redoing the turn consider the torpedoes to all be duds.

## 12. Radar and Aural Systems

Radar is used to both detect enemy vessels and direct fire on to them.

**12.1.** Before starting each scenario every ship with radar must roll a D100 per the UP% column of the radar table. If the number rolled is over this number the radar set is no working for the entirety of the scenario. In addition the first time the main guns fire the player must roll again in like manner to see if the radar fails for the ship.

**12.2.** For each ship with working radar roll one D10 per turn during the Sighting Phase. Record this number next to each ship as it needs to be referenced later in the turn. Players have the option of not having their radar on. If off there is no die roll.

**12.3.** Working radar can detect the presence of ships up to a determined range. Under 'Detect' there are three columns listed as '3', '6', '9'. If the number rolled is equal or higher than this number then the range to detect is listed below. The range is for locating a size 6 ship. For each size ship less than this reduce the given range by 20.

**Example:** British ship with 284 radar is 230 from the Bismarck (size 7) and 220 from the Prinz Eugen (size 4). The D10 die roll is a '7'. The Bismarck can be detected (240). But the P.E. would not be detected because (240 - 40=200).

**12.4.** Detecting a ship does not entail being able to fire at it. To do that the range to the target ship must be ascertainable. The same D10 roll for Radar applies to this column as well. If the number rolled is equal or higher than 3, 6 or 9 then use the range as the maximum firing range with Radar FC for the turn. This is for a target of size 6. Reduce the range by 20 for each size factor that the target is below 6.

**12.5.** Just being able to fire at a ship knowing its range

does not allow the firing ship to know if it straddles the target. In order to do that the shell splashes must be detectable by radar. Under the columns titled 'Spot Straddle' are the listed ranges to be able to determine if the salvos are actually straddling the target. These ranges are for gun salvos of 14"-18.1" shells. For shells 10"-13.9" reduce the ranges by 25. For shells 7"-10" reduce the range by 50. For shells under 7" reduce the range by 75. The radar die roll done at the beginning of the turn also applies to this case/

**12.6.** Some ships have radar detection systems. These can determine if radar is being used against them. But they are not accurate to range or bearing. If a ship is equipped with this type system it can detect radar up to 50% greater range than that listed as the detection range of the ship. However a detection D10 roll must be made per turn to detect radar. If a '1' or '2' is rolled then the detectors failed to detect this turn.

**12.6.1.** When detecting radar the ship will know to within 30° where the signal is coming from.

**12.7.** A number of ships were equipped with hydro phones. These could detect sounds traveling through the sea emanating from an angle 90° from the bow of the ship. If the source is beyond 90° from the front of the ship the detectable range is reduced by 50%.

**12.7.1.** These can determine within 30° the direction of their source.

## **13. Mines**

## **14. Subs**

## **15. Damage Check.**

After attempting to control fires and progressive flooding the remaining fires and progressive flooding can cause additional damage to the ship. Each Damage phase roll to check to find if there is additional damage.

**15.1. Fire Damage Check** - Raging fires a ship will have a chance of weakening the hull, burning out gun positions or igniting a magazine. Roll each damage control factor roll one D10. For each '1' rolled roll one time on the **Fire Damage** table to see what effect this has.

**15.2. Progressive Flooding Check** - Each damage control phase roll one D10 per **Pf** flooding factor. If a '1' or '2' is rolled one additional hull factor is lost. If the ship speed is over 20 then a roll of '3' will also cause a hull factor loss. If the ship speed is 5 or less then a hull box will only be lost when a '1' is rolled. Progressive flooding occurs until it is controlled or the ship sinks. See the **Progressive Flooding Check** table.

**15.3. Sinking** - A ship will sink when the buoyancy represented by hull box factors is reduced to zero. A ship which reaches a point where its hull boxes have all been eliminated has a 50% chance of sinking. This is only rolled one time. If the roll to sink succeeds it may take some time before the ship actually goes under water.

For each hull box loss over the zero level will result in another roll to sink. Each subsequent hull factor loss will result in an additional 10% chance to sink per hull box loss.

**15.3.1. Sinking speed.** Once a ship has rolled to sink it will only stay afloat 2-20 turns (2x D10). Each hull factor lost below zero reduces this one turn.

**15.4. Abandoning Ship.** When all hull boxes have been lost the ship must be abandoned.

**15.4.1. Ships as obstacles.** As a ship sinks it stops and becomes an obstacle for other ships in the area.



eliminated on a ship damage control may attempt to repair engine factors if all engine boxes have been lost. The ship must be stopped, i.e. dead in the water. Only one engine factor can ever be resurrected from zero. DC factors must be 1 or more. Only a '10' on a D10 Damage Control roll will repair the engine factor.

## **16. Damage Control.**

World War Two naval vessels had a limited ability to repair damage sustained in battle. This ability ranged from considerable to nearly non-existent. Damage Control takes place in the Damage Control Phase. Only two types of damage can be controlled. Fires (F) and progressive flooding (Pf). If the ship has no fire nor progressive flooding damage and has not lost any engine factors skip this and the next phase.

**16.1. Damage Control factor.** This is an abstract representation of ship's power repair, fire fighting ability, pumping capacities, and counter flooding capabilities. Every ship is assigned a damage control (DC) number. This number is representative of effective damage control parties that can be assembled.

The captain will assign a number of DC parties/factors to fighting individual fires or controlling progressive flooding (PF). Parties are assigned to a particular fire or progressive flooding and not to fires or flooding in general. The maximum number assigned is limited to 3. Roll a D10 per party assigned. For each DC factor/party assigned to fight a fire a roll of '10' will eliminate one Fire factor. For each DC party assigned to stop PF a roll of '10' will eliminate one PF factor.

**Example:** A ship has two fires and 5 DC. The captain assigns 3 DC to one fire and 2 to the other. The rolls on the first fire are '6', '10', '10'. Thus a '10' is rolled this fire is put out. On the other fire the rolls were '2', '4'. In this case the fire is not put out.

**16.2. Flooding Magazines** - Hits on turrets or barbettes can cause flash fires even if the turret or barbette is out of action or destroyed. To prevent this from occurring at least one damage control factor must be allocated to flood the magazine. On a D10 roll of 6 or better the magazine will be flooded and rendered inert. Otherwise the magazine is not flooded this turn. Each turn one flooding try per magazine may be made.

**16.3. Repairing Engine Damage** - Once all fires and progressive flooding damage has been controlled and

## **17. Naval Aviation.**

## 18.0 Preparing to Play

Before starting a game it will be of benefit to determine a few things and prepare ship tables. The Beaufort Sea state can be stated or can be rolled for in the case of a campaign game. This will not usually change during the course of a game. Reproduce the Ship's Log page and fill them out to record ship status and damage.

**18.1.** The Ship's log sheet allow players to record battle damage and other stats for ease of play. Fill them out as shown in the figure below.

**18.2.** Write a notation of the gun type as well as the rate of fire (ROF). It would also be useful to multiply out the effective rate of fire to get the  $N_s$  for both a full broadside and for the forward guns. On the ship diagram cross off the circles representing turrets and boxes for side guns not used. Secondary guns will be divided to each side so the  $N_s$  would be per side. The little long boxes near circle No. 5 and 6 would represent torpedo launchers. Or Torpedoes can be tracked using the line for tertiary weapons.

**18.3.** The number of fires and progressive flooding factors can go up and down so it is a good idea to mark the logs in pencil with an eraser.


**18.4.** It is very helpful when computing firing numbers to have the DAF range numbers handy. Copy those of the main battery here if you want.

**18.5.** Boxes representing active Hull boxes, Engine boxes, conning towers, fire controls, radars are provided. As these are lost to battle damage cross out the box.

**18.6.** Included with some game scenarios are pre-made Ship's Log sheets for the ships involved in the battle.

for about two years we moved off to our main interest of micro-armor. However, we do have all these miniature ships and would like to play naval again from time to time. I could not find most of the text to the rules so I had to rebuild and re-invent what appear here. The tables have all be redone from the original but the basic gunnery concept is the same.

Name:	Baltimore	Class:	Baltimore	Size:	4
Main Guns:	Mk 21 8"/55 (3x3)	x	9	ROF	1.75 $N_s$ 15
Secondary	5"/38 (6x2)6	x	6	ROF	2.75 $N_s$ 16
Tertiary		x		ROF	$N_s$
DC	4	AA	48:4,26:2	Torp	
Protection	Flash: 3	Underwater:	1	FC	
Fires		Prog. Flooding		Rng Fdr	+1
DAF	1 80 2 103 3 129 4 150 5 168 6 190 7 218 8 255				
DAF	1 67 2 92 3 111 4 123 5 140 6 158 7 218 8 179				



Ship's Log filled out for the U.S.S. Baltimore.

I am trying to produce a realistic look at naval gunnery. The descent angle factors give a gradual shift from hits on the vertical armor at short ranges to hits on horizontal armor at long ranges. The DAF does not represent an angle. Rather it is a ratio of chance to hit vertical locations compared to horizontal locations on the average capital ship. Taken with the rules for achieving overs and unders produces small chances that effective hits can be scored on small but vulnerable areas of a ship. Even hits below the belt (vertical locations 10 or more) are possible when the angle and ranges are just right.

I didn't like the torpedo rules I had developed in the first version. I could also not come up with a real clean elegant solution from what we had. Other rules either looked at the situation from the attacking ship's point of view as an aiming problem or from the target ship's point of view as an avoidance problem. I decided just to use brute force and look at the situation from above the plane of the sea and approach this as a trigonometry problem. To simply find what percent of an target arc that a target ship represents. If the target is inside this arc when the torpedo reaches it and if takes up a percentage of the area of the arc then there is the same percentage chance of a hit. This doesn't rely on the speed of the target or even the speed of the torpedo. If both come together at the same time it doesn't matter what they were doing beforehand. Of course in the game it is up to the torpedo launching player to actually guess what arc the ship will be in when the torpedoes reach the range of the ship. But this isn't a physics problem it, it is a strategy problem. The only modifiers in our system is the size of the target in relation to the arc. To make this playable I've set the arc as a standard size of 15 degrees. The only factor would be the apparent size of the target compared to the size of the arc at the range both are together. If the target area is smaller because it is end-on or at a deflection to the torpedo run then this acts to make it appear further away. Thus a target at an angle that makes it a smaller target by 50% would have an effective range of two times its actual range.

## Designer's Notes.

By Steven Lorenz

Contributor: Wayne Smith

These rules were originally conceived during the mid '80s. The gunnery rules were exceptionally good but the other rules were not fully developed. After playing naval battles

I've never liked 'ranging' naval games where the captain had to guess the range to the enemy ships to fire the ships guns. However many people do. Now when it comes to torpedoes I have changed my mind. The alternative to doing long division and other higher math problems in order to hit with torpedoes the player must only guess where the target of the torpedo will be when they reach it.

### Some Q&A:

Q: Why is the Beaufort factor subtracted first from the number of guns and before the other factors?

A: This is to represent the heavy seas impacting guns or turrets to make them unusable. If the gun cannot be fired it doesn't matter what the guns stated rate of fire.

Q: What is location 12 and when can it be hit.

A: This represents the side of the hull below the waterline. It can be hit by an overs roll of 12 or more on vertical armor. Hits on location 12 is considered below the main belt armor and is on something called the lower hull armor. A roll equal to or less than the DAF number is needed to roll on vertical armor.

Q: Why can't locations 12 or below be hit when the DAF is 0?

A: I am trying to represent that at certain angles shells can and did hit this vulnerable area. But at DAF zero most shells hitting the water in front of the ship would skip off the water and hit some location above water. This is anecdotal from Rodney's fire on the Bismark. The Japanese had a special blunt-nosed diving shell (Type 88) that didn't skip but maintained its trajectory underwater. This is the only shell allowed to roll for unders when DAF is zero.

### Detail Specifications.

Sea Scale 1:10000. Range in 100 x meters.

Movement Speed: Trials x .95 = sea going speed.

### Port and Starboard

Get your port and starboard mixed up? Here's how I remember. Say I'm a Viking headed in a Viking ship from Norway to the Iceland. Looking to my right over the low freeboard side would be the North star, thus starboard. English ports would be to the south, to my left, thus port.

### Armor values

I use in part data from tables based on research and formulas by Nathan Okum.

From his computer program you get something like the following:

Type armor	Relative Effective
German Krupp Cemented (1896-21)	.828
German Krupp Cemented (1922-31)	.9

German Krupp Cemented (1932+)	1.07
British KC (post 1930)	1.11
US Class A (1911-1922)	.889
US Class A (1935-1943)	1.0
US Class A (1944-1950)	1.025

However this relative quality doesn't tell the whole story. According to Horner US armor was discovered to be flawed until November 1943 thus this would lower the overall class A standard 5% - 50% with an average of 85%. This really complicates the quality issue.

And there are other opinions:

1. Garzke and Dulin Axis and Neutral Battleships of WWII: "The studies and tests made by Krupp resulted in armor plate that was some 25 percent superior to that used in World War I German capital ships." KC n/A

2. Raven and Roberts British Battleships of World War Two "An improved type of armour had been developed during the 1930s and this was fitted in the *King George V* class." "...it was assumed it give an improvement to the resistance of armour-piercing shells, equivalent to about 1,500 yds."

3. Garzke and Dulin Allied Battleships of World War II "The side armor was of excellent quality, providing resistance equal to that of U.S. class "A" armor of 25 percent greater thickness."

**Websites:**

This is where I got most of my armor penetrations:  
[www.geocities.com/kop\\_mic/](http://www.geocities.com/kop_mic/)

Here is good information on armor and penetrations.  
[www.combinedfleet.com/gunarmor.htm](http://www.combinedfleet.com/gunarmor.htm)

The great feldmachinck. This is a device I'm improving on to use in the submarine rules. It will have a 12 x 12 grid of holes to put pegs in.

[Http://perfectcaptain.50megs.com/feldmach.htm](http://perfectcaptain.50megs.com/feldmach.htm)

**Changes.**

Beta V.045

More speed loss from turning.

Beta V.044

Speed loss from turning.

Beta V.042

Loss of Fire Control Director is made more clear.

Beta V.041

Variable sighting.

Beta V.040

Some more language on flight deck armor.

What to do if conning tower loss.

Add an advanced torpedo option to launch at ships midpoint if ship movement is divided into two half moves.

Beta V.039 Added some more damage definitions. As {E+3}.

Three horizontal armor layers for carriers.

Beta V.038 Mostly addition of Air rules and some changes to accommodate these. These are part of the table changes.

Beta V.037. Ramming rules changed. No longer possible for DD to ram cruisers and suffer no hull damage.

Over-penetration no longer applies to CM Common shells. It only pertains for AP and SAP shells

Beta V.036. Added Radar and Aural detection and fire control rules. Added tables for this in the tables file.

Beta V.035

1. Changed the way hits are allocated to vertical/horizontal locations.

Beta V.034

1. Added smoke screens.

Beta V.033

1. Damage Check and Damage Repair switched in the order they are done.

Beta V.03b

1. Torpedoes now are only launched in the first torpedo impulse phase.

2. Added Gunnery Work Sheet to game package.

3. Range Finder type and to-hit bonus added to ships data list.

