# Note 40mm Bofors effective range 1200 yards, ceiling height 23,000 feet.

# **1.0 Introduction**

A long time ago I looked at several of the rules relating to Air Combat and Ship/Ground to Air Combat that were available, and decided to write my own. I have revisited these rules recently and have sent them in to the magazine in case any of you find them useful.

# **2.0 AA Values for Ships**

I decided to treat AA fire and Aircraft Machine Gun attacks identically, so I first produced a value for the AA fire of each ship according to the following rules:

***2.1 Compute four values for each ship:***

a) all centreline DP/AA guns whose calibre is greater than or equal to 3"

b) all centreline DP/AA guns whose calibre is less than 3"

c) all DP/AA guns on ONE side whose calibre is greater than or equal to 3"

d) all DP/AA guns on ONE side whose calibre is less than 3"

note which centreline guns may fire ahead or astern

***2.2******Direction of Fire***

25% of the side guns from each side may fire ahead and 25% may fire astern, but no guns may fire into more than one arc in one move. If the Arcs of Fire are obvious from the model or a plan then use these rather than arbitrarily splitting the values. For example most US Battleships have 5 twin 5” per side 4 guns of which can fire ahead and 4 astern, this would give 10 points per side, but 4 ahead or astern (per side) rather than the 2.5 that would be obtained by taking a quarter of the points per side.

***2.3 Computing Values for Odd Numbers of AA***

The value of each of the figures in 2.1 above is calculated according to the following table. If the ship does not have the specified number of barrels, multiply the number of barrels pointing in the required direction by 4 and divide by the number from the table below to get a points value (round 0.5 and higher up, less down). Any one of the lines in the table below will generate 4 AA points, see examples later.

|  |  |  |
| --- | --- | --- |
| **Number of Barrels** | **Calibre of Barrels** | **Range** |
| 8 | less than 20mm calibre | Short |
| 7 | 20mm calibre | Short |
| 6 | 25mm calibre | Short |
| 5 | 30mm calibre | Short |
| 4 | 40mm calibre or 2pdr | Short |
| 3 | very late war period 3" DP (eg Vanguard) | Long |
| 3 | any other AA calibre >= 3" | Long |
| 4 | any other DP calibre >= 3" | Long |

XXXX 2pdr has less range than 40mm, are they both short ? 40mm=1200 yard range

Note AA guns are better at that job than DP, several nations replaced DP with AA on destroyers and the like, they would have no reason to do so otherwise.

***2.5 Example of AA Value for a Ship***

The Japanese Seaplane Carrier Chitose had 4x5"DP mounted forward on the centreline, 2x25mm mounted forward on the centreline and two aft and 4x25mm mounted each side. That is 4 AA points on the centreline of long range guns all mounted forward, 3 AA points on the centreline of short range guns, half mounted forward and half aft, and 3 AA points per side. One way to record this would be:

LongCF 4/CA 0/S 0;ShortCF 1.5/CA 1.5/S 3

That is Long range, CentrelineFore 4 AA Points/ CentrelineAft zero, Side zero, etc. AA points are used for both Attack and Defence against Strafing (Defence against Bombs depends on the size of the ship, and against Torpedoes, use the standard Torpedo rules from your normal rules). To compute the total side firing armament, add the Fore, Side and Aft values. For this reason the Short-range Fore and Aft is recorded as 1.5, in this example, rather than rounding it to 2 (the latter case would give an erroneous value of 7 for the side firing Short-range guns).

# **3.0 AA and Other Values for Aircraft**

Aircraft in these rules are treated as generic types, there is no difference between an Me109, a Spitfire, a Hurricane, a Zero or a Mustang. If you wish to take these differences into account, you will have to adjust the Attack, Defence, Range and Speed values. A Gladiator for example would be closer to a Floatplane Fighter than it would be to any of the other Fighters. Aircraft points are calculated according to the following table:



Thus one unencumbered Fighter is equivalent to 4x40mm. (This includes a factor for their manoeuvrability and is not just based upon their weapons, note also that Fighters and Fighter Bombers dropping their payload and acting as an escort have a higher Attack and Defence than they would do if they kept their payload).

Where there are multiple options for the Payload (separated by semi-colons), each aircraft is only allowed to use one of the options.

# **4.0 Aircraft Altitude Bands and Grouping**

There are three altitude bands, Low, Medium and High. It takes one move for a plane to climb a level. It takes one move for a plane to descend two levels. This means that Dive Bombers attacking from High Level cannot be intercepted at Medium Level as they will be over their target when they are this level.

***4.1 Bands that Aircraft Attack From***

Fighters and Fighter Bombers (including float-plane versions of these) with no payload may strafe a target at low level.

Bombers armed with Torpedoes attack at low level.

Fighters, Fighter Bombers and Torpedo Bombers armed with bombs using the Skip Bombing technique attack at low level.

Fighters and Fighter Bombers with a payload (not Skip Bombing) attack at Medium Level.

Torpedo and Floatplane Bombers carrying bombs (not Skip Bombing) attack at Medium Level

Medium, Heavy and Ultra-Heavy Bombers attack from High Level.

Dive Bombers attack from High Level, but release their bombs at Low Level

***4.2 Altitude Bands that AA Guns May Fire Into***

Short range guns may target aircraft at Low, or Medium Level out to 1200 yards

Short range guns may not target aircraft at High Level.

Long Range guns may target aircraft at Low, or Medium Level out to 7500 yards.

Long Range guns may target aircraft at High Level out to 6400 yards.

***4.3 Special Rule Relating to Torpedo Bombers***

If Torpedoes are dropped at a greater range than some or all of the guns on a ship can fire at, then the Torpedo carrying bombers do not suffer gunfire from those particular guns. If you use this rule, ensure that your torpedo rules take the distance that the torpedo is dropped from the target into account. If your rules do not take into account distance between the launch point and the target, assume that the aircraft have to approach within 1200 yards before they launch (so that all guns including short range may fire at them).

Note that if Torpedo Bombers are attacking a ship behind fighters strafing the same ship, then the ship must engage the fighters and do not get a shot at the torpedo carrying bombers either before or after they have dropped their torpedoes.

***4.4 Special Rule Relating to Dive Bombers***

Treat a Dive Bomber as if it were at Low Level for the purposes of firing AA guns at it from the Target of the Dive Bomber. No other ships may fire Short range guns at a Dive Bomber, only Long range guns, unless the ship is within 1000 yards of the target.

# **5.0 Air to Air Combat**

Each move of Air Combat will be split into smaller groups (called combats).

***5.1 Maximum Size of any Combat***

No more than one squadron on either side may be involved in any one combat. This is because the table below will not work correctly for more than 15 aircraft when bombing. If either side has more than one squadron of any type then they have to split these into multiple combats and their opponent must split their forces as evenly as possible between the combats. For example, if the Defending (CAP) player has 3 squadrons of Fighters, and the Attacking player has 2 squadrons of Fighter Bombers escorting their Bombers, then the Fighter Bombers must be split into 3 groups (one for each squadron of Fighters). But note the Bursting Through rules in 5.3 - the fighters may opt to Burst some of their number through the Fighter Bombers if the Bombers are close to their target). In my campaign, a squadron consists of 9 XXXX and other large ac? Heavy or Ultra-Heavy Bombers, or 15 of any other type of aircraft, so the Fighter Bombers would be split into 3 groups of 10 if none of the Fighters elected to burst through them.

***5.2 Types involved in a Combat***

Each side may only have one type of aircraft in each combat. This is because of the difficulty of assigning damage to different types of aircraft from one combat. So for example if the attacking side consisted of 5 Fighters and 10 Dive Bombers and the defending side consisted of 15 Fighters then two combats would have to be created if the CAP player opted to burst through the attacking fighters. This could be 5 Fighters vs 5 Fighters and 10 Fighters vs 10 Dive Bombers. Similarly a mixed escort of Fighters and Fighter Bombers could not attack a single CAP Fighter force. The CAP Fighter force would have to split, part to attack the Fighters and part to attack the Fighter Bombers. The player with the greater total attack value chooses the split, but must ensure that they do not allow their opponents to burst through in one of the combats. For example if the CAP consisted of 20 Fighters and the Escorts consisted of 10 Fighters and 15 Fighter Bombers, the 10 Fighter Escorts would have to engage at most 10 of the CAP. On the other hand, the 15 Fighter Bombers with 45 attack points could take on 11 of the CAP Fighters (defence value of 44).

Note that with the exception of Fighter Bombers carrying no payload, no aircraft with bomber in the name may deliberately engage another aircraft, but may defend themselves.

***5.3 Aircraft Bursting Through the Opposing Fighters or Fighter Bombers***

If one side outnumbers their opponents they may elect to “Burst Through” them, leaving enough aircraft behind to deal with the weaker side. To do this the stronger opponent must leave behind sufficient aircraft that their Attack value equals or exceeds the Defence value of the weaker opponents. For example if there are 15 Fighters on CAP and only 10 in the escort, 5 of the CAP fighters may burst through the escorts to attack the bombers (they may prefer to overwhelm the escorts instead). Another example, 6 Fighters on CAP (defence value 24) attacked by 10 Fighter Bombers (in escort mode, attack value 30) plus 12 Dive Bombers, the Dive Bombers may elect to burst through the CAP, possibly escorted by 2 Fighter Bombers (leaving 24 attack value).

***5.4 Aircraft Placement Prior to Combat***

If the Air Combat is taking place near a target represented by a model, or scenery, some form of marker needs to be placed on the floor or table. In the past a triangle of paper, marked with the number, type and height of each squadron has proved to be the most effective means of doing this. Prior to placement, the attacking aircraft must be split into groups according to their targets. If 15 Dive bombers are to attack a force consisting of a Carrier and two Battleships, and it is decided to attack the Carrier with 9 and each of the Battleships with 3 aircraft, then these must be split into those groups before placing the markers on the floor/table. Escorts may initially be placed in complete or partial squadrons.

***5.5 Aircraft Placement Distance***

If there are any CAP with the force being attacked, then the attackers should be set up at least five moves from the nearest ship (or land area containing AA guns). They may have to set up further away if they have been spotted by some means, such as Scout or Recce aircraft or an outlying ship. Otherwise if there is no CAP, set up at the point where the aircraft will make their attack as follows:

- overhead for Level Bombers or Dive Bombers

- 500 yards away for Strafing Fighters/Fighter Bombers

- 500 yards away for Skip Bombers

- The desired Torpedo dropping distance for Bombers carrying Torpedoes

Note, that if the line of approach of the planes takes them within 1200 yards of any other ship or AA site, they must undergo short range fire from that AA platform, and will in any case undergo long range fire from that AA platform (out to 7500 yards maximum range). In a large formation, use intelligence about which ships can fire at which aircraft. For example if a cruiser is to port of a carrier, it is unlikely to be able to fire at Torpedo Bombers attacking the carrier from starboard, but may be able to fire its long range guns at Heavy Bombers attacking the same ship.

***5.6 Aircraft Placement Direction***

Torpedo Bombers will attempt to attack their target from the side (from 45 degrees ahead of the target). Aircraft employing the American tactic of Skip Bombing will attack from broadside on to their target, and all other bombers will attack from ahead or astern. Fighters or Fighter Bombers in Strafe mode will make a Strafing Attack from the direction of the bombers that they are escorting. If they are not escorting any bombers then they may attack from whichever direction that their controller chooses.

***5.7 Speed of Aircraft on Floor or Table***

An air battle moves towards the attackers' target at two thirds of the movement rate of the slowest aircraft involved if it only contains single engined planes or twin engined fighter bombers (to allow for the fact that the aircraft are manoeuvring. If the combat includes Medium, Heavy or Super-Heavy bombers then these will continue in formation towards their target and will not slow down or attempt to manoeuvre. The combat will therefore move at the speed of that type of aircraft (only fighters or fighter bombers may attack them which are both faster than any of these types of bombers). CAP must break off their attacks before the attackers get within four nautical miles of the nearest ship (or ground installation with AA guns). Aircraft have two speeds given in the table in 3.0, Cruising Speed and Maximum Speed. An aircraft’s maximum range assumes that it will move at Cruising Speed for the entire journey apart from the last move to the target and the first move home. That is, it is capable of two moves at Maximum Speed and the remainder at Cruising Speed. If an Aircraft opts to move at Maximum Speed for more than two moves, then reduce the range by four moves at Cruising Speed for each extra move at Maximum Speed.

For example an escort in a combat for three moves looses 4 moves at Cruising Speed, if it remained in combat for a further move it looses an extra 4 moves at Cruising Speed. This is not usually a problem for CAP unless they are near their endurance when they intercept the enemy, but it will affect escorts. If an escort opts to remain at Cruising Speed for a combat, then lower both the Attack and Defence value of that escort by one. The whole of one side in a combat must be acting at the same speed.

***5.8 Causing Damage in Air to Air Combat***

In each Combat, calculate the total Attack value for one side and the total Defence value of their opponents and express this as a ratio (Attack:Defence). Round this to the next lowest ratio on the table below (except for values greater than 3:1, which count as “Any Higher”). For example 15 Fighter-Bombers (attack value 15x3=45) vs 11 Fighters (Defence value 11x4=44), ratio 45:44, rounds to 1:1. Another example, 15 Dive Bombers (Attack value 15x1=15), vs 4 Fighters (Defence value 4x4=16), ratio 15:16, rounds to 3:4.

Roll a six-sided dice and read off the percentage value in the table below, from the column selected by the ratio above, and the dice value thrown. Multiply this percentage by the number of enemy aircraft, this is the number of enemy aircraft destroyed in this combat this move (but see section 10.0). If the result of multiplying this percentage by the number of aircraft is not a whole number, then treat the remainder as a percentage and roll a pair of percentile dice (10 or 20 sided). If this result is less than the remainder, another aircraft is destroyed, eg if the percentage from the table is 63% and there are three aircraft, the result is 63\*3=189%, this means one aircraft definitely destroyed and an 89% chance of a second being destroyed. Repeat this procedure for the other side but note that as the combat is simultaneous, work with the number of the second side’s aircraft that existed at the beginning of the move.



# **6.0 Air to Ship Combat**

At the speed that the aircraft move in comparison with the speed of the ships, it is unlikely that the ships will be able to fire twice at the same air group. Note also that they do not get a second shot as the air groups are leaving the vicinity. In all cases the ships get to fire at attacking aircraft before a Bomb or Torpedo is dropped (but note the exception to the latter in 4.3).

**6.1 Aircraft Strafing a Ship**

When aircraft are Strafing a ship, they have to undergo long range fire from the ship (compare the Attack value of the Long Range guns with the defence value of the aircraft), without being able to return fire. The ship then fires its short range guns simultaneously with the aircraft’s return fire, count the defence value of the ship as the attack value of its short range guns that can bear on the aircraft (add in the long range value as well if the mounts are open).

Note that if a ship is being attacked by strafing Fighters or Fighter Bombers, they must fire all AA that will bear on those aircraft and may not attack any bombers unless they have guns that will only bear on the bombers.

**6.2 Damage to a Ship from Strafing Aircraft**

Multiply the percentage, selected by the Aircraft’s roll on the above table, by the defence value of the ship (taking into account only the value of the AA in open mounts that can fire at the strafing aircraft). If the result is not a whole number, then treat the remainder as above. This is the number of barrels destroyed or more likely the number of crew that were serving those guns killed.

# **7.0 Bombing a Ship**

**7.1 Movement of Ship While Under Attack**

Jinking a ship to one side then the other is a way of making it a more difficult target for the attacking aircraft and it really affects bomb attacks more than torpedo attacks. To the latter it appears to be a smaller but slower target, to the former the ship can move sideways and the bombs will miss, it has no effect if the aircraft are dropping more than five bombs each. It does however slow the ship to three-quarters of its current speed from a point of view of forward movement (and the on the bombing table below).

**7.2 Causing Damage to a Ship with Bombs**

Aircraft dropping bombs do so using the table in 5.8. Count the number of bombs on one of the aircraft in the group (all aircraft in the group must be identically armed) as the attack value of the aircraft. Count the Defence value of any ship of less than 5000 tons as 2, any ship of greater than 5000 tons and below 15000 tons as 3 and greater than 15000 and less than 36000 tons as 4 and any ship greater than 36000 and less than 50000 as 5 and greater than 50000 as 6. Compute the attack to defence ratio as before and count up the number of column modifies that apply from the table below. Compute the total shift caused by the column modifiers, and then move that number of columns either left or right as appropriate from the computed ratio. Use the resulting column to select the percentage, multiply this percentage by the defence value of the ship to give the number of bombs that have hit.



To use the table above, add up all the Left Shifts and subtract all the Right Shifts. If the initial ratio is 4:1 or greater then, subtract 1 for each Left Shift until 3:1 is reached then shift one column left on the table in section 5.8 for each remaining left shift. Similarly if the ratio is less than 1:4, and there are any right shifts to apply, then count each right shift as reducing the right hand number by one until 1:4 is reached.

**7.3 Example of Heavy Bombers vs a Ship**

For example, five heavy bombers attacking a single Fleet Destroyer (2200 tons) that is not jinking and whose effective forward speed is 36 knots. The column shift effect of this is:

6 Left Bombs dropped from High (2 levels above low)

2 Left Target travelling at 36 knots

6 Left Target less than 5000 tons, greater than 1500 tons

4 Right Four extra aircraft with first.

10 Left TOTAL

The Heavy Bombers are looking for small targets (or Merchantmen) and carrying 16x500 lb bombs, and the defence value of the destroyer is 2, so the initial ratio is 16:2 or 8:1. This is above 3:1 so the first 5 shifts left reduce this ratio to 3:1, the remaining 5 shifts move the ratio down to 4:3. This will generate results between 45% and 68%, which when multiplied by the defence value of the ship (2) gives between a 90% chance of a hit, and a guaranteed hit plus a 36% chance of a second.

**7.4 Example of Dive Bombers vs a Ship**

Five Dive Bombers attacking the same destroyer as above, each is carrying three 500 lb bombs. The Attack to Defence ratio is 3:2 (number of bombs vs defence of a ship less than 5000 tons). The target is now jinking and travelling at an effective speed of 27 knots. The column shift effect of this is:

1 Left Target travelling at 27 knots

2 Left Target is jinking

6 Left Target less than 5000 tons, greater than 1500 tons

4 Right Four extra aircraft with first.

5 Left TOTAL

Five column shifts left from 3:2 is the 2:3 ratio column on the table above, giving a minimum of 27% and a maximum of 40% to be multiplied by the defensive value (2) of the destroyer giving between a 54% and an 80% chance of a single bomb hit.

**7.5 Damage caused by Bombs on a Ship**

Each 500 lb bomb counts as the equivalent of a 14” shell if the armour deck of the ship is less than or equal to two inches, otherwise count as non-essential upperworks hits (may effect AA). Each 1000 lb bomb counts as a 16” shell if the armour deck of the ship is less than or equal to four inches, otherwise as above. Note, if using Skip Bombing tactics from Low altitude, the bomb will hit the vertical armour of the ship (if it has any), compare the vertical armour thickness of the location hit with the penetration as above.

# **8.0 Kamikaze Attacks**

Treat a Kamikaze plane as a Dive Bomber, carrying no bombs but loaded with explosives. It has an attack strength of 6, and if one hits a ship, it does the effect of six 500 lb bombs. The resultant number of hits generated by multiplying the number of aircraft by the percentage selected from the table in section 5.8 is not the number of 500 lb bombs that hit, it is the number of Kamikaze planes that hit, each having the effect of six bombs.

**8.1 Effect of Damage on Kamikazes**

When one or more Kamikazes attack a ship you have to use the Damaged, Destroyed, Diverted sequence suggested in section 10. The difference being that Destroyed will either explode immediately or drop into the sea. Damaged will still attempt to hit the target but with a left shift of 2 columns. Diverted have turned away but you know they will be back (possibly to attack a different target), but at least it gives you another chance to shoot them down with AA.

**8.2 Production of Kamikazes in a Campaign**

I would strongly recommend that production of Kamikazes be restricted in a campaign. I would suggest that they could not be built at all until one side had at least three times more single engine planes than the other (not including floatplanes), and that only the weaker side could produce them. In addition I would recommend that a Kamikaze “squadron” would be 3 planes instead of 15. This would take as long to build as a complete dive bomber squadron (of 15 planes), take up the same resources to produce them (eg take a complete Aircraft Factory for a whole week) but require only one fifth of the amount of raw materials. This represents the difficulty in finding willing pilots and means that no ship may be attacked by more than 3 Kamikazes simultaneously (unless you are talking about the Japanese destroyer class!).

# **9.0 Bombing a Land Target in a Campaign**

In a campaign, aircraft may want to bomb targets on land that are supporting the Naval forces, these could include, Ports, Shipyards, Docks, Airfields, Factories, Army Groups, or Towns. These rules were generated to use with a modified version of Phil Dunn’s campaign rules so I included the above elements.

A Port consists of a Basin and a number of Docks, plus possibly a Shipyard. The latter consists of both slips and special docks where ships complete. Since each Port is likely to be different, I have assigned an attack and defence value to each individual component, players should work out the total attack and defence points for their particular port.

If an Army Group is stationed at any of the above land targets, they may add their attack values to the land target where they are stationed, but note that they may themselves be the target of the attacking aircraft.

**9.1 Attack and Defence elements of a Land Target**

The following table gives the attack, defence and value of various Land Targets. The Attack value is the AA Guns associated with each item (L = Large and S = Small as on Ships).

The Def value is the Defence value of the item to be compared with the number of bombs carried by one of the attacking aircraft (as in attacks vs ships). It is an indication of the size of the target, the larger this is, then the easier it is to hit.

The Value column indicates the number of pounds worth of bombs that the item can take before it is totally destroyed, eg a Warehouse Area can take 50 by 1000 lb bombs or 100 by 500 lb bombs, or any combination of these two size bombs. The only exception to this is that an Army Group consists of 5000 men. A single 500 lb bomb hitting an Army Group will cause 20 casualties, a single 1000 lb bomb will cause 30 casualties (the men are assumed to be reasonably widely spread so the larger blast does not cause a proportionally larger number of casualties). Note the value of the Oil Storage Depot is less than the similarly sized Warehouse area because damage in this area will cause fires compounding the damage.

Note, each gun position in the Basin has to be attacked individually, they each have a defence value of 1 and are destroyed by a single bomb of any size, they are far enough apart that any plane or group of planes cannot attack more than one. AA guns at other Land Targets may be attacked in a similar manner.



**9.2 Causing Damage to a Land Target**

As explained in 9.1 a single bomb reduces the value of a Land Target by the weight of the bomb, except for Army Groups. When a Land Target is reduced by 10% of its value, its capacity is reduced by 10% and its AA fire is reduced by one eighth (round down). When a Dock is reduced by more than 50% it can only have a single vessel of less than 3000 tons moored to it. Similarly a large completion dock or slip is reduced to vessels of less than 3000 tons if they receive more than 50% damage. If a Dock, Completion Berth or Slip takes more than 75% damage they are unusable.

Note that if a single Dive Bomber attacks a land target such as a factory with a single 1000 lb bomb, it is possible to obtain 3.2 hits (three certain hits and 20% chance of a fourth). The lowest hit is 7%x32 = 2.84 (2 certain hits plus 84% chance of a third). This is because the ratio used will land up in the Any Lower column. Whilst this may seem unreasonable, it must be remembered that a single plane attacking a land target is likely to be shot down before it can drop its bombs. Even if this situation does occur, it could be explained by the bomb hitting some particularly flammable part of the target and causing more damage than normal. Note, that if ten dive bombers opt to attack a target individually as ten different forces then each will have to undergo AA attack before they can drop their bombs as if they had arrived on ten consecutive turns. (The cycle is AA attack versus first plane, if first plane survives it drops its bombs, AA attack versus second plane (AA possibly reduced in strength by first bomb attack), if the second survives it drops its bombs, etc).

**9.3 Size of Land Targets**

Each undamaged dock can moor a single vessel of > 3000 tons directly to it, and moor two vessels of less than 3000 tons outboard of the larger vessel. It is able to refuel all three vessels simultaneously and re-arm them if this is necessary.

The Warehouse Areas and the Oil Storage Depot are each considered to be approximately one nautical mile square and lie in a two by two pattern behind the docks area in a port (ie forming a square two nautical miles wide. The Oil Storage Depot is usually a Naval Fuel Storage Depot and as such will be closest to the Docks (to allow easy refuelling of the ships. In my campaign there is a nearby Oil Refinery, Oil offloaded from a Tanker is piped immediately to the Refinery where it is refined into the relevant products and the Naval Fuel piped back to the Oil Storage Depot in the Port. Some of the fuel stored there will also be Air Fuel or Fuel for the Army, which will then be transported back to the overseas colonies where they will be used by the local Air or Ground forces.

My generic Basin (which includes a small shipyard) is approximately one nautical mile square. This allows for two Slips (or Dry Docks) for large vessels, and four for small vessels, plus a completion berth for a large vessel and three completion berths for small vessels. It also has four docks, and can moor three rows of vessels out in the basin in line with the shore. The outer row can take six small vessels, the middle row can take two battleship size vessels plus two cruiser size vessels, and the inner row can take 1000 yards length worth of any sized vessels leaving about 100 yards between each vessel.

# 10.0 Aircraft Losses in a Campaign

If a Campaign is being fought**,** or the actual aircraft losses are otherwise important, the above rules will destroy too many aircraft. The intention of the rules above was to reduce the number of aircraft that would attempt to complete their mission. For more reality, split each group of losses into threes, the first aircraft in each group of three is Damaged, the second Destroyed, the third Diverted. For example if seven aircraft are “shot down” in the above rules, three will be Damaged, two Destroyed and 2 Diverted. If an eighth aircraft had been shot down in the same combat (on the same side) then it would have been Destroyed. Do not carry over the threes from one move to the next, if one aircraft was shot down on the first move and another on the second move, then they would both be Damaged.

**10.1 Damaged Aircraft**

For campaign purposes, a damaged aircraft is one that has received sufficient damage to cause it to return to its base (or another airfield/carrier) without completing its mission (except for Kamikazes). It is however not damaged so badly that it will crash on the way to its base. It may be repaired but this will not be completed until 48 hours after the aircraft has landed at the base. It may do nothing in the intervening time. It costs nothing to repair, it is assumed that there are sufficient spare parts at the base (as long as it is in supply) to repair this aircraft in that time.

Damaged aircraft may be attacked by non-diverted and non-damaged aircraft. They are assumed to have one point of defence and zero points of attack (1 point of attack for Medium Bombers, 2 points for larger bombers). They are also assumed to be travelling at two thirds of their cruise speed and may not make any moves at maximum speed.

**10.2 Destroyed Aircraft**

For campaign purposes, a destroyed aircraft is one that does not complete its mission and either crashes immediately or on the way to its base (or an alternative). It is out of the campaign and may not be repaired or cannibalised in any manner.

**10.3 Diverted Aircraft**

These are aircraft that have been driven out of the combat. They may attempt to complete their mission, but will do so two moves after the rest of the aircraft that they were in the combat with.

Diverted aircraft may be targeted by aircraft that are not diverted, if they are close enough to attack them. In this case the attack value of the diverted aircraft drops by 1 and the defence value of diverted fighters and fighter bombers also drops by 1.

To position a group of aircraft that have been diverted, move them one move directly further away from their target than they were at the beginning of the move. For example a squadron of heavy bombers would normally move 20 miles in one of my moves, any that had been diverted on the previous move would end the current move 40 miles further away from the target than the rest of the squadron. Defenders will move one move directly away from the target that they are defending.

All diverted aircraft, that intend to complete their mission after their comrades, move at cruising speed for the two moves that they are diverted (not two thirds of cruising speed) and should move one move directly away from their mission target, then one move back. In the case of CAP fighters, they will move one move directly away from the target that they are defending then one move back towards it.

10.3.1 Diverted Bombers

Diverted bombers will arrive over their target two moves after the remainder of the bombers in its squadron. The squadron may not opt to wait for them. If several groups of bombers in a single squadron are diverted over a series of moves, the bombers diverted on the second move will arrive one move after those diverted on the first move. Similarly the bombers diverted on the third move will arrive one move after those diverted on the second move, etc.

10.3.2 Diverted Fighters

Diverted Fighters (or Fighter-Bombers with no payload) may re-enter the battle two moves after they were driven out of it if they are close enough. Once their two-move diversion has completed they may move at maximum speed to intercept another group but see 5.7, and also take into account the height difference.

10.3.3 Defenders and Bombers Diverted on the same Move

Defenders and Bombers diverted on the same move will move approximately the same distance away from the target at the end of their first Diversion Move The Defenders may engage the bombers on the move after they were diverted with the same penalties as described above.11.0 Example of an Air/Sea Battle

This is very similar to a Campaign game that I took part in many years ago when I was also a member of the 1200 Scale Society, I had the misfortune of being the Japanese commander although I did much better than the example shows.

The Japanese force consists of the Seaplane Carrier Chitose, with four Shiratsuyu class destroyers as modified in 1942 (ie 4x5"DP and 16x25mm [LongCF 2/CA 2/S 0;ShortCF 2/CA 2/S 4]) plus four unarmed merchantmen. See the maps for the layout of the force and attacking positions of the aircraft. The scenario is that a British Scout Floatplane has sighted the Japanese force and radioed its position before being shot down by the CAP (which consists of 4 Floatplane Fighters). HMS Ark Royal has launched an attack force of all that she has available, 5 Fighters, 3 Dive Bombers and 4 Torpedo Bombers. The Japanese force is heading South, and the British Dive bombers attack from the South at high altitude and are not spotted by the CAP, the other aircraft attack from the South West and set up five moves away in that direction. The 4 Floatplanes pounce on the Torpedo Bombers and are intercepted by the five fighters.

The 4 Floatplanes are worth 12A(Attack) 12D(Defence) (total)

The 5 Fighters are worth 20A20D (total)

The Floatplane Attack to Fighter Defence ratio is therefore 12:20 which rounds down to 1:2, a 5 is rolled causing 28% casualties to the Fighters, ie 1.40 fighters destroyed, this means that 1 is shot down and a roll of the percentage dice gave 34%, ie another shot down.

The Fighter Attack to Floatplane Defence ratio is therefore 20:12 which rounds down to 3:2, a 4 is rolled causing 63% casualties to the Floatplanes, ie 2.5 floatplanes destroyed, the roll of the percentage dice gives 87%, no luck there means that only 2 are shot down.

The remaining Floatplanes continue to attack the Fighters, and the torpedo bombers decide to wait for the escorting fighters before attacking (ie do not burst through the CAP).

The 2 Floatplanes are worth 6A6D

The 3 Fighters are worth 12A12D

The Floatplane Attack to Fighter Defence ratio is therefore 1:2, a 2 is rolled causing 23% casualties to the Fighters, ie 0.46 fighters destroyed, a further lucky roll of 43 means that another fighter is destroyed.

The Fighter Attack to Floatplane Defence ratio is therefore 2:1, a 5 is rolled causing 80% casualties to the Floatplanes, ie 1.60 floatplanes destroyed, better luck (09) this time means that the last two floatplanes are shot down.

The 3 Dive Bombers now peel off to attack Chitose from ahead (the south) while the two remaining Fighters precede the Torpedo Bombers in to attack from the South West. As the Dive Bombers have to pass right overhead Shiratsuyu they elect instead to attack that destroyer. The Fighters set up within 500 yards of Chitose to make a Straffing attack, and the Torpedo Bombers are set up 4000 yards from Chitose, the range at which they want to drop their Torpedos.

First of all Shiratsuyu has guessed that she may be the target of the Dive Bombers and elects to jink to reduce the Bomb hit chances. She therefore fires at the Dive Bombers at 50% of her normal effect. She has 2 points Longrange AA and 4 points of Shortrange AA (2 points forward and 1/4 of each side - a further 1 point from each side). This counts as 3A, when halved, against the 3D of the Dive Bombers, i.e. 1:1, a 2 is thrown and gives 45% casualties, a total of 1.35, a 38 is rolled and one Dive Bomber is shot down. Her aft LR and all her starboard SR except the point fired at the Dive Bombers plus her aft SR may fire at the Torpedo Bombers (again at half effect). Because of the angle, she can see the Torpedo Bombers behind the fighters. This is 2A+3A+2A=7A halved, versus the 4D of the Torpedo Bombers (all firing is simultaneous), for a ratio of 7:8, rounded to 3:4, a 1 is rolled giving 30%, ie 1.20 and a 35 roll on the percentile dice means one Torpedo Bomber is destroyed. Note, the destroyer on the port wing of the convoy could fire her forward longrange guns at the Dive Bombers, but I elected not to do so as it would complicate and already complex example and had only a small chance of doing any damage.

The Shigure fires her after 2A Longrange, and the port side 4A Shortrange at the 2 Fighters for a ratio of 3:4 and a 2 is thrown giving 34% casualties, ie 0.68 destroyed, a 72 is rolled, no effect (Note also that these shells will probably spray Chitose and Shiratsuyu). She also fires her forward 2A Longrange, her forward 2A Shortrange, and the forward quarter of her starboard side 4A Shortrange (ie 1A) at the 4 Torpedo Bombers. She has a clear line of sight on them, for a ratio of 5:4, a 1 is rolled giving 44% or 1.76 planes shot down, again an unlucky dice roll of 84 means only one shot down.

As she is being strafed, Chitose can fire all of her LR armament (4A) at the fighters before they have a chance to fire upon her (she cannot fire them at anything else). This gives a ratio of 4:8, or 1:2, a 6 is rolled giving 30% or 0.60 planes shot down, a percentage roll of 42 shoots one of them down.

Now for the attacking aircraft, the remaining fighter fires at Chitose. The fighter has 4A versus 10D (the defence value of the AA guns), a ratio of 2:5 which rounds down to 1:3. A roll of 3 gives 18% casualties, multiply this by the attack factor of the guns (10) to give the number of points destroyed = 1.80, a percentage roll gives 55 so two of the available points of AA are destroyed. Dicing for this gave one point of LR Centerline and 1 point of Side SR. Note, that 3" and greater cannot be affected by strafing unless they are in an open mount, unfortunately for Chitose, her 5” AA mounts are open so both points of this actually effects the ship. Again Chitose's shells may have hit friendly targets, but probably only Shigure.

Chitose may now fire her shortrange guns (simultaneously with the fighter firing at her so don’t take into account the damage caused by the fighter). All of her starboard side (fore and aft as the fighter is on the 45 degree angle from Chitose, thus allowing the aft guns to bear as well), plus fore centerline SR armament may be fired at the Fighters. She cannot target the Torpedo Bombers as they are behind the Fighters, giving a total of 6A versus 8D of the fighters, this rounds to 3:4, she rolls a 5 giving 41% casualties, ie 0.82 with a very unlucky 99 percentage roll, the remaining fighter is not destroyed.

All firing is now over, and two 1000 lb bombs are dropping towards Shiratsuyu and two torpedoes are in the water heading for Chitose, not a good situation for the Japanese. In addition Chitose, Shiratsuyu, Shigure and one merchantman have been sprayed by 6x5" plus 25mm from close range. The torpedo attack will have to be covered by the rules in use, in my case this involves placing markers on the floor and allowing the ships to manoeuvre. The bomb attack is carried out be taking the number of bombs dropped by the first aircraft (1), comparing this with the defence value of the destroyer (2) to give a 1:2 ratio. The target is travelling at over 20 knots (1 shift left), jinking (2 shifts left), between 1500 and 5000 tons (6 shifts left) and there is one extra aircraft (1 shift right). This gives a total of 8 shifts left, thus the column to use is Any Lower, the remaining 5 shifts are not used. A three is rolled to give 8% of a defensive value of 2, ie a 16% chance of a single bomb hit, fortunately for Shiratsuyu, the dice roll was 35% and the bombs missed.

Of the aircraft, all four floatplanes were shot down, as were 4 of the fighters, two Torpedo Bombers and one Dive Bomber. The merchantmen are still heading for their target with their valuable cargo, protected by at least four destroyers, and if Chitose survived the attack, she still carries at least 12 more aircraft. In the scenario I played this was six fighters and six torpedo bombers, but they were already on their way to attack Ark Royal - and they succeeded in putting two torpedoes into her, slowing her until a submarine was able to finish the job.

# **12.0 Example of an Air/Land Battle**

The following example assumes a large Air formation is attacking a Port. The Air formation is owned by the Green side, hence they are named G... This consists of:

* 10 Squadrons of Heavy Bombers (GHB1 through GHB10).
* 2 Squadrons of Fighter Bombers (these are split into 3 groups of 10 each for purposes of the game and are known as GFB1 through GFB3).
* 1 squadron of Dive Bombers (known as GDB1).
* 1 squadron of Torpedo Bombers (known as GTB1).

All aircraft except the Torpedo Bombers are flying at High altitude (the Torpedo Bombers are already at Low). The group flying at High Level are spotted by a long range Recconaisance aircraft, which warns the port and the local airfield, the Torpedo Bombers are not sighted due to patchy cloud. The airfield contains three Fighter Squadrons owned by the Red side (known as RFF1 through RFF3). The fighters launch early enough that they intercept the Green Air formation when they are five moves away from the port. The Fighter Bombers opt to drop their bombs and engage the Fighters, they had been flying just behind the Dive Bombers in case of just such an eventuality. The Heavy Bombers are further back and the still unseen Torpedo Bombers are closer to the target due to the differences in speed of the various forces. It is intended that all will arrive at the port simultaneously so that they will give the Anti-Aircraft guns the maximum number of targets.

The port (RPO1) consists of a Basin, 5 docks, 2 large Slips, 4 small Slips, 1 large completion dock and 3 small completion docks. Moored to the docks are a heavy cruiser, 2 destroyers, 4 destroyer escorts, (all of these can use their forward firing long range guns to attack the Heavy Bombers), 3 motor vessels, 1 tanker and 2 submarines (these are assumed to have no useful AA armament). Anchored in the middle line in the basin is a Dido, a King George V, Renown and a Town, they can use the AA armament of one side to attack the Torpedo Bombers, although in theory they could use the offside long range AA to attack the Heavy Bombers. In addition, 12 of the long range guns in the basin and 28 of the short range guns can attack the Torpedo Bombers, the remainder of the long range guns will help protect the port from the High Level bombers. As with every port, there is also three warehousing areas RWH1 through RWH3 and an Oil Storage area ROS1. As will be seen later, the HBs assigned to attack RWH3 will not reach their target, so the guns assigned to protect that area will be split to assist the RWH1 and RWH2 areas, 8 guns apiece.

The table below shows what happens on the first move of this combat - the three RFF groups will engage the three GFB groups as the Red commander opts not to burst some of his fighters through the fighter bombers - he preferred to get rid of the FBs first.



The first five columns show the state of each group at the start of the move, its name, attack value, defence value, range from target, and number of aircraft. The next column shows the opponent, the ratio column is the ratio of that groups attack value divided by their opponents defence value. The Avg % column is an average of the possible results from the Table in section 5.8 of the rules, I chose to do this rather than dicing for each result as I wanted the flavour of the likely outcome. The next column is the losses expressed as the number of certain losses and the percentage chance of a further loss. The Rnd column is a randomly generated number to see if an extra loss occurred, I chose to do this as setting the result of the percentile roll to 0.5 (50%) was fairly meaningless. The next column is the range to target at the end of the move, followed by the number of aircraft remaining after the combat, and three columns showing the number damaged, destroyed and diverted. In this case the Diverted aircraft chose to reform as groups GFB4 and RFF4, both of which will fly away from the target. See their distance to target at the start of the next move and note that they only travelled half distance this move (see 10.3) - note as the fighters are quicker, they will go further! None of the bombers have burst through (you don’t need to burst through the diverted fighters and the Torpedo Bombers have not been seen and probably don’t know what is going on above them). The bombers are shown in the lower part of the table, as they are not yet involved in the combat. Note also, that the movement of the main part of the combat is at two thirds of the cruise speed of the slowest aircraft - the Fighter Bombers. All other planes continue at full cruise speed. On to move 2:



As the Red Fighters nearly overwhelmed the Green FBs on the first move the Red controller ordered 5 fighters from each squadron to burst through the FBs and attack the bombers. The first five from RFF1 (as RFF5) attacked GDB1, which was very close at the start of the move, so I opted to allow them to attack during the move. In the case of the remaining 10 fighters (RFF6) attacking GHB5, the distance at the start of the move was much greater so I stated that there could be no attack this move. They would however be engaged by the end of the move and eligible to attack next move. The aircraft that were diverted from GDB1 during this move were not considered to be strong enough to attack later, so the Green commander chose to send them home anyway. As GFB4 is closer to the target than RFF4 they do not need to burst through them next move and may close to attack RFF3 on the following move (move 4). On to move 3:



This move the three initial Fighter Bomber groups are all wiped out (actually sent home damaged), but manage to damage two of their attackers. Again the Green commander opts to send the diverted aircraft home as the numbers are too small. RFF6 has attacked GHB5, but note that there is no reduction in the speed of GHB5 - large level bombers do not manoeuvre they use their formation as their strength instead. GFB4 is close enough to attack RFF3 next move, and RFF4 will join with RFF1 and RFF2 to attack GHB6, a total of 11 aircraft, these will be classified as RFF1 next move. Things look bleak for the dive bombers and the heavy bombers of GHB5. On to move 4:



This move all the diverted aircraft will again head home. The last of the DBs looses out as well as the last of GHB5, as a result both RFF5 and 6 are available to attack other HB squadrons next move, two aircraft will divert from RFF6 to RFF5 to make two 5 aircraft groups. On to move 5:



The remnants of GFB4 and RFF3 are still going at it hammer and tongs, RFF1 almost wipes out GHB6 but for a poor dice throw. The two small fighter groups RFF5 and 6 take a bit of punishment from GHB7 and 8 but succeed in cutting down both of those forces. The remaining undamaged aircraft in GHB6 joins up with GHB7 to make a 7 aircraft group. With the exception of the combat between GFB4 and RFF3, all the attackers have now reached the point where there is a full (maximum speed) move left to reach the target, so the defending fighters withdraw so as not to be shot down by their own AA. In reality they would probably have got a lot closer before breaking off and should probably have got another attack in. On move 6, most of the air to air combat is over, the air to ground battle now commences:



In this move RFF3 finally finishes GFB4 off. GHB1 and 2 attack RWH1, but first have to undergo the AA fire, half of the guns in the RWH3 area also join in as they are within range. This accounts for four aircraft in GHB1 which then drops its bombs. Five of these hit causing 2500 lbs of damage and potentially damaging goods stored within the warehouse (if the warehouse is not full then assign a probability to each part of the goods that are stored there to see if they are damaged). GHB2 then attacks the same target, because the amount of damage from the first attack is less than 10% of the value of the warehouse, the number of guns firing has not been reduced. A further 5 bomb hits are made causing a total of 5000 lb damage (and potential damage to goods stored) which reduces the warehouse to 10%, any further attacks against this warehouse area will only have to face 14 guns until they are repaired. The attack against GWH2 goes similarly but 1 less aircraft is shot down and an extra bomb hits the target. On the first attack against ROS1, more than 10% damage is done on the first attack, so the second squadron only has to face 14 guns, but does not do enough to lower the value of ROS1 by 20% accumulative. Again some oil stored in the area may have been lost. In the action against the port itself (docks, slips etc - RPO1), less damage is done as more guns are firing at the aircraft and 12 out of the 20 aircraft are causalities. The final combat is the torpedo bombers versus the ships moored in the second row in the basin. These aircraft have not been noticed up to this point, but I assumed that an eagle-eyed gunner on the breakwater would notice them and open fire to warn the remainder of the gunners around the basin and on the ships. An incredible number of guns, including short range guns open up on the Torpedo Bombers, and only one of them manages to drop its torpedo. However at that range and against a moored target it is unlikely that it will miss, there is probably one fairly bent King George V class battleship sitting out in the basin.

That is the end of the action, there are no attacks against the aircraft as they exit the area. It was a fairly bloody action, mostly because the Green commander was not aware that the airfield had been completed the previous day and the fighters only just flown in to their new base. Without the fighters things may have gone very differently for Red. The total losses were (it would be possible for the Green commander to send another raid the next day unescorted with 58 HBs vs only 17 FFs or on the following day 82 HBs escorted by 20 FBs against 36 FFs):

