

The Merchant Ship System

Welcome aboard the Merchant Ship System, or MSS for short. Most of us generally pay little attention to merchant ships, regarding them as mere targets or generic “sea trucks.” However, merchant ships in the first half of the Twentieth Century were every bit as varied as warships and each had its own characteristics and capabilities, which can enrich your naval simulations and campaigns. To fill this long standing void, Bruce and I are pleased to present the MSS, the first systematic approach to standardize the key characteristics of merchant ships and provide you with data for hundreds of merchant ships from the 1930s and the WW II years. In addition, the MSS also presents a number of Convoy Logs with a selection of already prepared merchant Ship Logs for use in your simulations and a set of cardstock counter sheets to print for use until you can commission your own miniature merchant fleet. In short, the MSS has every thing you need to add merchant ships to your simulations.

The MSS is built around the concept that the main utility of a merchant ship in wartime is determined by her cargo capacity and the type(s) of cargo she carries. Accordingly, cargo capacity is defined in dry cargo holds, POL (Petroleum, Oil and Lubricant) tanks, refrigeration spaces (for perishable cargo) and troop berthing spaces - collectively referred to as “holds” - to be listed on her Ship Log, along with the number of Hull boxes, which reflects overall size. The ship’s value at any point in time is dependent on the quantity and type of cargo carried. Victory Points (VPs) are divided into a cargo value and a basic, empty hull value expressed as “C + xx VPs.” A merchant vessel in ballast has VPs only for her basic hull value, while a loaded ship’s VPs are the sum of her cargo and her basic empty hull value. Cargo values and further details are described in **GQ 3.3** rule Section 1.18.5, which is reproduced below for your convenience. In addition to standard cargo values for normal voyages, special values are also provided for urgent and critical cargoes to reflect special tactical and situational conditions. For example, the famous tanker *Ohio*, carrying fuel and avgas to besieged Malta in August 1942 was worth much more than an equivalent AO in a routine 1944 Atlantic convoy.

For your convenience, the MSS is divided into three parts: the Data file, the Convoy Log file and the Ship Counter file.

The DATA file provides the Hull worksheet for determining the number of Hull boxes to list on the merchant Ship Logs, the Formula worksheet listing the formulas used to calculate cargo “holds” and cargo values and Data sheets listing merchant ships by type and nationality. Individual ships are listed on the Data sheets with the following information:

Year - the year launched or commissioned.

Name - the name of the vessel. Naval auxiliaries are indicated in bold font using the naval designation if renamed from her previous commercial name.

Type - AC = collier, AE = explosives freighter, AF = refrigerated freighter, AK = dry cargo ship, AMC = armed merchant cruiser (converted from an AK or AP), AO = tanker (oiler in naval parlance) and AP = passenger liner. AKAs and APAs are cargo and liners equipped with landing craft and cargo handling equipment for amphibious assault operations across open beaches.

Kts - maximum sustained speed.

Engine - propulsion type: C = coal fired steam engine, D = Diesel engine and O = oil fueled steam engine.

GRT - Gross Registered Tons, the standard commercial measure of hull volume. This is a measure of volume, not weight and is quite different from standard displacement tonnage used for warships.

GRT x .75 – a base of 75% of GRT used in calculating the basic, empty hull value of a merchant ship.

Hull VPs - the basic, empty hull value of a ship calculated using 75% of GRT times the factor listed at the top of the column. A larger factor is listed for AE, AF and APAs to reflect the additional value of special cargo handling, refrigeration and insulation equipment required for these types. *Note this value is listed in tenths and should be rounded to the nearest ¼ VP.*

NRT - Net Registered Tons, the standard commercial measure of cargo capacity, determined by subtracting engineering, fuel and crew spaces from a merchant’s GRT. This is a measure of volume capacity and should not be confused with weight, which will vary for each type of cargo. *A cubic foot of iron weighs a lot more than a cubic foot of cotton, etc.*

Holds – this is determined by dividing the NRT by 1,000. Each hold (or tank space for AOs) = 1,000 NRT (Net Registered Tons). The number of holds is then rounded to the nearest whole number. This provides a graphic description of the total cargo capacity for Ship Logs, but does not necessarily reflect the specific cargo hold layout of any individual ship.

Cargo VPs – the loaded cargo value of a ship calculated by multiplying the number of holds times the cargo factor at the top of the column. *Note this value is listed in tenths and should be rounded to the nearest ¼ VP.*

Troops – three columns are provided for troop capacity using the same process as for cargo. The total number of troops in the first column is divided into 400 troop berthing spaces in the middle column and that in turn is multiplied by the factor at the top of the VP column to provide an equivalent VP value in the third column. *Note the troop spaces value is listed in tenths and should be rounded to the nearest whole troop space. The VP value should in turn be rounded to the nearest ¼ VP.*

LOADED VPs – This is an indicative *approximation* of the sum of the cargo hold VPs and basic hull VPs [C + xx VPs] for a loaded merchant ship listed in tenths. Basic hull VPs and each cargo type VPs should in fact be individually rounded to the nearest ¼ VP before being summed together. Therefore, the correct loaded VP value for a ship may vary from the approximation in tenths.

Defensive Armament – this is a listing of the defensive armament broken into LA (low angle), DP (dual purpose), Medium AA and Lt AA (light AA) where specific data has been found. Total guns are listed and need to be broken into **GQ** two-gun Armament boxes and sided AA batteries when preparing Ship Logs.

On the AMC datasheets, a Broadside section replaces the various cargo sections with VP values for broadside guns and torpedo tubes (TT). The total VP value = basic hull value + armament VP value + Raider VP (for those ships operating as disguised merchant raiders). As with other merchant ships,

each section's VP value should be individually rounded to the nearest ¼ VP before being summed together. The "Other" section lists mines. FPs (Float Planes), DCs (Depth Charges) and MTBs carried in addition to the main armament and minor defensive armament listed in the final section. This additional equipment is not used in calculating the Broadside VP value for an AMC. The AMC equivalent value is thus a composite of merchant ship and warship, consisting of a basic hull value (potential for re-conversion to her former cargo or transport capacity) plus offensive armament capacity and a surprise factor, where applicable, for AMCs operating as disguised merchant raiders.

Throughout the datasheets, GRT and NRT data is in bold font when taken from standard commercial data sources of the period. These primarily consist of Lloyds Register of Shipping, Talbot-Booth and equivalent national sources. When only one of the standard volume measures (GRT or NRT) is available, the other has been derived using the standard formula $NRT = .6 \times GRT$. This provides an approximation, indicated by the use of non-bold font, which is consistently quite close to the actual measure. Finally, in a few cases, data has been shaded in light yellow to signify it is estimated or based on incomplete sources pending further research and thus should be used with caution. The Defensive Armament section remains blank in many cases, as reliable data for particular ships has not yet been located.

There were thousands of merchant ships of all sizes and configurations in the 1930s through the WW II years and detailing them is a truly massive project. Thus, the datasheets are a work in progress and will continue to be augmented with new ships to enhance the initial base of more than 400 ships and provide new data when it becomes available. Anyone who has clarifications or additional information on any of the ships listed is invited to contact us through ODGW so that we may update the data for the benefit of all our shipmates.

Ships are listed in worksheets by type, then in alphabetical order by nationality for easy reference. Changes from a preceding revision of a data sheet (identified in the upper right-hand corner) are signified by tan shading of the left-most "Year" column for new ships and the specific data cell for existing ships. The data sheets are designed to provide a handy source for preparing merchant Ship Logs for your scenarios and campaigns. The data can also be easily modified for use with other naval rule systems as needed. The use of standard commercial measures like GRT and NRT was intentional to facilitate wider applicability.

The CONVOY LOGS file contains a number of already prepared merchant Ship Logs for different periods and theaters. Simply circle ships as needed for a scenario, convoy or campaign and your merchant ships are ready to go. You can designate specific cargos for specific ships, if required, as part of the scenario or campaign set-up instructions. Note that the cargo "holds" are color coded to facilitate quickly determining the type of cargo that can be carried. Refrigerated holds are shown in light blue to differentiate them from regular dry cargo holds. The VP values per hold or troop space for the different types of cargo are listed immediately below the lower left Ship Logs on each sheet for ease of reference.

Most merchant ships were initially armed with an old LA (low angle) 3" – 5" gun of WW I or earlier, uncertain vintage for defense against surface raiders, or an improbable attack by a surfaced submarine, and a couple of machine guns. These guns were usually manned by naval gun crews, but operated under local control without any form of centralized fire control, resulting in limited effectiveness. [Note that merchant ships lack the fire control "DCT" designation in the upper, special damage row of their Ship Logs.] As armaments became available and the air threat was better appreciated, many ships were equipped with a DP (dual purpose) 3" – 5" gun and 20mm AA guns. Medium AA 37mm – 40 mm guns were added, when supplies allowed, to merchants that sailed in areas subject to opposing air attacks.

Detailed armament data for specific merchant ships in this era is, unfortunately, seldom available at this remove. Therefore, *representative* gun boxes and AA factors have been used on the Ship Logs in many cases to provide typical defensive armament capacities for the period or theater. Small DP, primarily AA guns are indicated in red as noted in the battery size listed above the top left of the Ship Log. Where specific armament data has been located for a ship, the data listed on the datasheets has been used. This is an area that we hope to upgrade with the assistance of other shipmates (hint, hint).

A blank Excel convoy sheet is also provided to enable you to easily create your own Convoys using the data worksheets from the Data file. Refer to them to quickly determine the number of Hull boxes for a Ship Log, how many and what type of holds or troop spaces to list and the VP value to assign. Example graphics of the various types of cargo holds and troop spaces, along with samples of the armament boxes and fuel type designators, are provided below the blank worksheet so you can easily copy and paste as needed to create new Ship Logs. We will continue to add new Convoy Logs as they are completed and invite you to share yours so that shipmates in our hobby can benefit from each other's labors.

The SHIP COUNTERS file, which Mike has generously developed, contains a number of color counter sheets in four scales for those who don't yet have the requisite miniature merchant fleets. Simply download and print them on cardstock to generate a set of counters to use until you have a chance to commission your own miniatures. Counters are presented in 1:2400, 1:3000, 1:4800 and 1:6000. Select the scale needed to accompany your warship miniatures. The counters are generic renderings of merchant ships, escorts and submarines. While a specific ship may have been used as a basis (i.e. the Allied T2 tanker for the large tanker) for a counter, feel free to use them for any ship of any nation that falls within the general size parameters. Additionally, some ASW escorts and submarine counters have also been included so as to give the all the ships (the hunted and hunters) needed for a potential convoy action. Just download and print them on cardstock if you don't already have the needed escort miniatures or submarines to fill-in a gap or two for a convoy engagement.

The counters in each scale are organized as follows:

AP 01 to AP 30 - Passenger and passenger/cargo liners used primarily as troop transports. Two sizes of AP are provided:

AP 01 to AP 20 - Large passenger/cargo ships (approximately 15,000 – 17,000 GRT)

AP 21 to AP 30 - Medium passenger/cargo ships (approximately 9,000 – 12,000 GRT)

AO 01 to AO 25 - Tankers used to carry all manner of raw and refined petroleum products, everything from raw crude to refined gasoline and AvGas. Two sizes are presented:

AO 01 to AO 16 - Large tanker (8,000 – 9,000 GRT)

AO 17 to AO 25 - Medium tanker (6,000 – 7,000 GRT)

AC 01 to AC 05 - Colliers/ore carriers used for coal or raw ore. A medium collier (5,000 – 6,000 GRT) type is provided

AK 01 to AK 90 - Cargo ships used to carry all types of dry cargo; from food to ammunition, from tanks to toilet paper. Some of these AKs were also used as troop transports after suitable conversion. Three sizes are presented:

AK 01 to AK 20 - Large cargo ships (approximately 8,000 – 10,000 GRT)

AK 21 to AK 50 and **AK 71 to AK 90** - Medium cargo ships (approximately 6,000 – 8,000 GRT)

AK 51 to AK 70 - Small cargo ships (4,000 - 6,000 GRT)

Res 01 to Res 02 - Convoy rescue ships converted from small liners. Used during the early war until replaced by purpose-built rescue ships (based on frigates), starting in 1944

CAM 01 to CAM 03 - Catapult auxiliary ships (based on *Empire Darwin*) with a single Hurricane fighter. CAM ships began appearing in 1941 as an emergency stopgap means of countering German long range air attacks and reconnaissance

AA 01 to AA 05 - Auxiliary anti-aircraft escort ships converted from a merchant (based on *HMS Springbank*). They essentially have the armament, sensors and AA fire control of a light AA cruiser. Several ships were converted from 1940 on

Corv 01 to Corv 10 - Generic ASW escort (based on RN *Flower* class corvette). Similar designs served with the various navies, with the RN *Flower* class being the most numerous

Tr 01 to Tr 10 - Generic ASW trawler (based on RN *Dance* class). Many classes of trawlers were used as convoy escorts

Slp 01 to Slp 10 - Generic ASW sloop (based on RN *Black Swan* class). Several RN classes were used as convoy escorts

SS 01 to SS 06 - Generic medium submarine (based on German *Type VII*) of approximately 750 tons

SS 07 to SS 10 - Generic large submarine (based on German *Type IX*) of approximately 1000 tons

In summary, the MSS provides all you need to add merchant ships and convoys to your simulations. You will find their individuality and varied cargoes will really enhance your scenarios and campaigns. We periodically plan to add new ships and revisions to the MSS files to expand the coverage. With your help, we can make a sizeable dent in a truly massive project and provide a long needed resource for wargamers and naval enthusiasts alike to use.

Repeated for your convenience from *GENERAL QUARTERS* version 3.3, Part 1:

1.18.5 Merchant Ship VPs

Merchant ship VPs are listed on Ship Logs using the format “C+ # VPs” representing the cargo value plus base hull value. Cargo values are standardized as listed below, but can be altered as needed in scenario set-ups, to reflect vital urgent or critical cargoes. Unless unique cargo values are listed for the scenario, the standard cargo values will be used.

Merchant ship values are derived using the Merchant Ship System (MSS), which is based on well known commercial standards: **GRT** (gross registered tonnage), a measure of a vessel’s total hull volume, and **NRT** (net registered tonnage), a standard measure of cargo volume, that are quite different from the displacement tonnage used for warships. GRT is discounted for the volume occupied by the crew, engineering spaces and fuel to derive NRT. If NRT is unavailable, .6 x GRT is a good approximation. Formula details, data for hundreds of merchant ships and additional Convoy Logs are listed in the MSS folder available in the Bonus Files on the ODGW website.

- **Hull Value** A merchant ship’s base hull value is her value empty, without cargo. When sailing in ballast, it is her total value. Refrigeration ships (AFs) and assault transports (AKAs and APAs) have enhanced values for refrigeration, landing craft and special cargo handling gear.
- **Cargo Value** Cargo capacity is listed on merchant Ship Logs as cargo “holds” or troop spaces, each of which represents 1,000 NRT or 400 troops. Individual loaded “hold” or troop space cargo values depend on cargo type:
Mixed (artillery, coal, food, supplies and vehicles) = ¼ VP
Explosives (ammo, bombs, mines, and torpedoes) = ½ VP
POL (Petroleum-Oil-Lubricant or aviation gas) = ½ VP
Troops (400 troops or personnel per space) = ¼ VP
The cargo value of a loaded merchant is equal to the sum of her “hold” VPs. Unless otherwise indicated in the scenario set-up, a ship is loaded with the cargo listed on her Ship Log. *Cargo VP values are also listed beneath the Ship Logs on the Convoy Logs for easy reference.*
- **VP Total** The VP value of a merchant ship is equal to the sum of the cargo value + the base hull value listed on her merchant Ship Log. *Example: a freighter (AK) with “C + 2 VPs” and 6 “holds” listed on her Ship Log has a value of 2 VPs if sailing in ballast (i.e., without cargo). When carrying cargo, her value would be 3½ VPs (2 + 6 x ¼) or 5 VPs (2 + 6 x ½) if carrying explosives.*
- **Special Cargo** Certain cargo values can be specified in the scenario set-up to reflect specific regional conditions and vital tactical requirements. These cargoes must be designated as Urgent or Critical:
 - Urgent** High value cargo urgently needed to meet the current regional logistics requirements. Urgent cargo value = double the standard cargo value.
 - Critical** Military cargo that is critical to sustaining the tactical situation in succeeding days or weeks. Critical cargo value = triple the standard cargo value.
 - AvGas** Aviation gas needed for an airbase under siege to continue aerial operations is a special form of critical cargo equal to 1 VP per “hold.” *When a high speed APD or ML ships a cargo of AvGas, add 1 VP to the VP value listed on her Ship Log for the scenario.*