

## 3e Spelljammer:

# Ship Construction

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## Materials

A wide variety of materials are used in ship construction, and some are quite rare and wonderous. The most typical are detailed here and used throughout these rules. For other materials the DM will need to determine its properties and costs.

**Bone:** The bones of large creatures, such as kindori, are often used as ship materials by the desperate and poor. Bones are not particularly sturdy, but they do work.

**Wood:** This is normal terrestrial wood, typically a hardier variety such as oak.

**Iron Wood:** Iron wood is normal wood that has been treated with iron wood solution, which is an alchemical concoction. Normal wood can be treated with iron wood solution after a ship is built, and so is a popular upgrade.

**Dark Wood:** There are a number of different tree types whose wood is collectively known as dark wood, and all of them grow in spheres whose primary gives off less light than normal. Dark wood is stronger, but because it is found on fewer worlds and individual trees tend to be smaller, it is more expensive than normal wood. Dark wood cannot be treated with iron wood solution; the dark wood does not absorb it.

**Stone:** This is some form of durable stone, such as granite or marble, often mined from asteroids.

**Crystal:** Crystal is a type of stone, but it resists attacks better and is more durable. Crystal is hard to mine in sufficient sizes and quantities, and so few ships use it. The neogi are fond of crystalline hulls for their ships, mined with the help of their umber hulk servants.

**Ætherstone:** There are places in wildspace where the barriers between the material plane and the ethereal plane break down, and streams of ethereal matter stream into our world. This matter calcifies quickly and becomes ætherstone. It is rare, but treasured by those who use stone to build ships, due to its durability. It is also surprisingly light, weighing one-third as much as granite.

**Iron:** This is normal iron.

**Flowsteel:** The odd medium of the phlogiston has strange effects on many things that remain in it for long periods of time, and this includes iron ore within asteroids that find their way into the Flow. Over the centuries this iron ore becomes what is referred to as flowsteel, and is highly coveted by the dwarves, who often drag asteroids into the flow, so as to “farm” the

flowsteel at a later time. The drawback to flowsteel is that it does not resist fire as well, and fire attacks against ships that use it do not halve their damage.

**Pyre Iron:** While most all fire bodies have a connection to the elemental plane of fire, some sphere primaries have a “deeper” connection, and give off elemental energies that have nearly a spiritual component. Asteroids with iron ore that orbit these primaries at just the right distance manage to absorb this energy without boiling away. Once smelted, pyre iron glimmers oddly, even without light, appearing as if flames danced across its surface. Getting to these asteroids typically requires magical protection, but because of the durability of pyre iron the dwarves are willing to pay the expense (and pass it on to their customers). Pyre iron has the added bonus of being very resistant to fire and heat (DR 50), though it also means it requires impressive magics to shape it.

**Mithral:** This is a very rare silvery, glistening metal that is lighter than iron but just as hard. Few ships bother with mithral because its primary advantage is its lightness, and this isn’t that important for most ships.

**Adamantine:** Found only in meteorites or asteroids and the rarest of veins in magical areas, this ultrahard metal is the ultimate shipbuilding material. Ships whose hull or plating is composed of adamantine gains a natural enhancement bonus to AC. This bonus does not stack with other enhancement bonuses. If the hull is adamantine, this bonus is +2. If the plating is adamantine, it is +1. If the ship has both an adamantine hull and plating, the total bonus is +3. These bonuses are not included in the AC indicated on Table XX, but rather are added on top of them.

## Step One: Choose Form

The form of a spelljamming vessel is its shape and design, and plays a role in how maneuverable the ship is. A ship designed by a spacefaring shipwright is shaped to work with the way a helm functions, so the ship moves with the helmsman, rather than fighting him. Ships not designed to take advantage of the freedom and three dimensional aspects of space are less maneuverable.

There are three broad categories of ship form: space, terrestrial, and poor. There is no cost difference between them, nor does it take longer to build; what determines the difference

is who designed the ship. Spacefaring shipwrights create space ships, while groundling shipwrights without knowledge of the workings of spelljamming create terrestrial ships.

Space form ships are designed to take advantage of the free and open nature of space, to work with the motivational force of the helm and the steering mechanisms used to maneuver. It is misleading to think that an overall shape is the only factor in space design. The truth is that a good spacefaring shipwright understands the subtleties required to make a design work. For example, the whaleship looks far more bulky than a terrestrial galleon, but is still considered a space design. This is because the designers of the whaleship understood the science of spacefaring ship engineering, and used this knowledge to make the ship as maneuverable as possible for its size.

Terrestrial form ships are primarily planet-based ocean-going vessels that have been retrofitted with a helm, which gives this form its name. Examples include the galleon and the cutter. Despite the name, though, the terrestrial form can also include non-planet-based ships. It can include space form ships that were altered, ships designed by less experienced shipwrights, or ships that require they be a certain shape.

Poor form ships are vessels whose design almost actively defy the free nature of space and maneuverability. Their shape and poor steering mechanism layout make the ship rather unwieldy, and hard to maneuver. Ships with the poor form are usually created when the designer of the ship has little actual knowledge on what it takes to build any kind of ship. They can also be created by clumsy ship modification. The most common examples of poorly designed ships are those built and used by gnomes.

### Advanced Form

Spacefaring shipwrights have refined their craft over centuries, with the results being superb ship designs that take advantage of the nature of space. In the last few years, though, some radical thinkers have been taking new approaches to ship design, using magic to more closely study the interaction of the ship with the field created by a spelljamming helm. The end result has been the triop, an odd looking ship that is inherently more maneuverable. The triop has a new form, termed *advanced*. Because so few shipwrights understand the nuances of the advanced form, the triop can be built in only a few major ports, such as Bral

The advanced form increases the cost of the hull, frame, plating, and rigging by 50%. It must have a heavy frame or better, due to the stresses put upon it by the optimized shape. Finally, the interior of an advanced form ship has a large number of low nooks and spaces that are ultimately unusable in most situations, dropping available internal tonnage by 10%.

The triop is currently the only known ship design that uses the advanced form. Coming up with additional designs using the advanced form would take several years of expensive research.

Ultimately, the DM has final say on what the form of a ship is. In most cases the skills of the shipwright will determine its form, but in some cases the required shape will determine the form. It doesn't matter how skilled the shipwright is, a rectangular, box-like ship is not going to have a space form.

To illustrate how the system works, we will build a ship as an example.

*A successful band of mercenaries and privateers have recently come into a lot of money and three Huge helms, and so wish to purchase some ships that can make better use of the more powerful helms. They look at the standard designs, but decide to have three custom built ships, better designed for warfare. They decide to call the ship class the Tiger Shark, since they will base it on the Hammerhead.*

*The ship will be designed and built by spacefaring shipwrights, and so will be a space design.*

## Step Two: Choose Tonnage

Tonnage is a measure of the ship's volume. One ton is equal to 1,350 cubic feet (50 cubic yards). The actual dimensions of the ship is considered unimportant in this system; a 60 ton ship (81,000 cubic feet) could be a cube of approximately 43.25 feet per side, a 52' x 52' x 30' rectangle, or any other dimensions that total to a volume of 81,000 cubic feet. Tonnage is normally a whole number, for ease of use, but there is no technical reason you can't have a ship with a fractional tonnage (e.g. 10.5 tons). Round fractions up when determining size.

The minimum tonnage for a ship is one ton. There is no real maximum ship tonnage, although helms that can move ships above 128 tons are rare and expensive. This system can also be used to create structures that aren't exactly ships, such as floating drydocks or space stations.

Once you have a ship's tonnage, you can then determine its size; ships have a size, just as creatures do. The size of the ship modifies a number of things, such as the ship's Armour Class and how hard it is to attack from it with heavy weapons. It also determines how maneuverable the ship is. Consult Table XX to find the ship's size. The effects of size can be found in sections XX, and Chapter XX: Ships and Ship Combat.

Note that while ships use the same names for size, these size categories are not the same as creature sizes. A small ship is much larger than a small creature. See Chapter XX: Ships and Ship Combat on how these categories correlate.

**Table XX: Ship Size By Tonnage**

Ship Size	Tonnage
Tiny	1-2
Small	3-6
Medium	7-14
Large	15-30
Huge	31-62
Gargantuan	63-126
Colossal	127+

After some consultation, the mercenaries decide on a tonnage of 50, since this allows them to tow a few smaller ships (fighters) if necessary, and stay within the Huge ship size.

## Step Three: Design the Frame

The frame is the internal structure of the ship, the skeleton upon which all other components are built. It is the really the only component a ship must have to be considered a ship. It is also one of the most important, since it determines how big the ship is, and thus how many people and weapons it can carry, and is the primary factor in determining how much damage it can take.

There are two factors in frame design. The first is the materials that make up the frame; better, stronger materials make a ship more durable. They also cost more gold. Table XX has the costs by tonnage.

The second factor in frame design is how much of the material goes into the frame: the more materials you use the stronger the frame becomes, at the expenditure of gold and space. The more space used to build the frame, the less space you have in the ship to house people or cargo. There are five types of frames: light, standard, heavy, extra-heavy and super-heavy.

Each frame type is generally found on ships serving a particular purpose.

A *light frame* is the lightest type, and is found mostly on ships designed to carry large amounts of cargo or on shuttles and small pleasure craft. The frame is basically just enough structure to mount a hull upon and support cargo. The lack of material saves both money and space, but drops the durability of the ship severely.

A *standard frame* is the most common type, used for

**Table XX: Frame Cost**

Material	Cost Per Ton
Bone	150 gp
Wood	300 gp
Ceramics	600 gp
Iron Wood	600 gp
Dark Wood	900 gp
Stone	1,500 gp
Crystal	1,800 gp
Ætherstone	2,100 gp
Iron	2,700 gp
Flowsteel	3,000 gp
Pyre Iron	3,300 gp
Mithril	4,500 gp
Adamantine	6,000 gp

most ships excepting those expecting to see a large amount of combat. This includes most traders and groundling ships.

*Heavy frames* are used on ships designed to be combat capable, but whose primary use is not always combat. They are often used as trading ships in rough territories, or as secondary trade ships providing protection to a caravan. Heavy-framed ships are also popular with adventurers and freebooters. Some

examples of heavy framed ships are the hammership and squidship; both can hold their own in a fight, but they also are multi-functional enough to see non-combat use.

*Extra-heavy frames* are almost always found on ships whose primary

**Table XX: Frame Strength**

Frame	Cost Multiplier
Light	x0.5
Standard	x1
Heavy	x2
Extra-Heavy	x3
Super-Heavy	x5

purpose is warfare. Their lack of space and high cost make them impractical for most other purposes.

*Super-heavy frames* are found mostly on ships made from hollowed out objects, such as the asteroid-carved citadels of the dwarves. Super-heavy frames have very thick walls, often close to a foot. For walls beyond this thickness, such as asteroids that have only a small percentage of their interior hollowed out, see the option Asteroid Ships in Section XX. Note that the cost for the super-heavy frame assumes that the materials are being assembled like any other ship. For hollowed out objects the price may drop or rise, depending on the extent of work that needs done.

The type of frame used will affect the cost, figured as a multiplier to the base cost from material type. This is shown on Table XX.

The type of frame will affect how much internal space it uses; a heavier frame uses more space. See Section XX for more on internal space usage.

*Looking over the materials available, they find that metal is far too expensive, and the various types of stone are expensive and impractical, so they stick with the standard of wood. An extra heavy-frame seems a natural, but since they tend to carry a large number of mercenaries and supplies for them, they decide to go with heavy, so they don't have to give up on space.*

*At 300 gp per ton for wood, the 50 ton frame will cost 15,000 gp. Modified by the x2 multiplier for a heavy frame, the total cost is 30,000 gp.*

## Step Four: Design the Hull

Whereas the frame is the skeleton of the ship, the hull can be considered the skin. It provides protection to the crew and cargo of the ship, both from attacks and the elements. The cost for the hull, per material type and per ton of the ship, is shown on Table XX.

A ship is not required to have a hull, which will reduce the cost and construction time, but reduces durability and the Armour Class, as well as allowing attackers to target specific internal sections of the ship. It also prevents the ship from being able to land in water.

It is possible to add additional materials and bracing to the hull, which makes the ship more durable (i.e. adds hit points). This doubles the cost of the hull, but multiplies the hit points from the hull by 1.5. See Section XX for more on determining the ship's hit points.

*Again, the mercenary company would like metal, but the cost is prohibitive for the full hull.*

**Table XX: Hull Costs**

Material	Cost Per Ton
Bone	50 gp
Wood	100 gp
Ceramics	200 gp
Iron Wood	200 gp
Dark Wood	300 gp
Stone	500 gp
Crystal	600 gp
Ætherstone	700 gp
Iron	900 gp
Flowsteel	1,000 gp
Pyre Iron	1,100 gp
Mithril	1,500 gp
Adamantine	2,000 gp

They decide to go with wood, and will look at metal plating later. The cost is 5,000 gp. They decide to add bracing, which doubles the price to 10,000 gp.

## Step Five: Decks and Enclosure

Most ships in space have an open top deck, much like any groundling sailing vessel. This makes the mounting of weapons and rigging much easier and more space efficient. Some ships instead opt to have their ship partially or fully enclosed, reducing their deck space but increasing the ship's level of protection, and thus Armour Class. The drawbacks of a reduction of deck size is a reduction of the amount of weapons and rigging a ship can mount without complication. Enclosure of any kind is fairly uncommon. It is most often seen on ships designed either for warfare or vessels that try to avoid warfare, or ships that depend on other ships for protection, such as large cargo ships and passenger liners.

To have either partial or full enclosure the designer simply decides; there is no change in cost or construction time. Partial enclosure reduces the number of weapons a ship can carry by half. Full enclosure drops it to zero; all weapons must be mounted internally or on the hull of the ship. See Section XXX for how enclosure affects rigging choices and Section XX for the affects of enclosure on Armour Class.

It is also possible to have more deck space, which also costs nothing. This is simply a function of widening the deck while making the ship more shallow, or adding decks to other parts of the ship, such as the underside. The benefit of this is that it increases the amount of weapons that can be added. The drawback is that it decreases the Armour Class, as flat surfaces are much worse at deflecting shots, and bigger deck makes it an easier target. See Section XX for the affect on Armour Class.

There are two levels of deck expansion: partial and full. Partial increases the number of weapons that can be added by a third, and full increases it by two thirds. This extra deck space can also count as a second deck, usually on the other side of the ship, but this will likely preclude the ship from landing in water.

Expanded decks and enclosure are mutually exclusive.

*The Tiger Shark will not have more than standard rigging, so they opt for partial enclosure. This will reduce the number of weapons they can mount, but they expect to mount some of their weapons internally anyway. This costs nothing.*

## Step Six: Calculate Hit Points

At this point the hit points of the ship can be calculated. Hit points are based on the ship's tonnage and the materials used for the frame and the hull. Table XX below lists the hit points per ton for the frame and the hull, based on materials; simply multiply the ship's tonnage by the listed hit points. The strength of the frame will modify the frame hit points: multiply the frame hit points by the frame strength multiplier from Table XX. Bracing will multiply the hull's hit points by 1.5. Once you have the frame's hit points and the hull's hit points, add them

together, rounding up to the nearest multiple of 5. This is the ship's total hit points.

*The Tiger Shark has both a wooden frame and a wooden hull. It has a heavy frame and a braced hull. Frame hit points is 750 (12 hit points per ton, multiplied by 50 tons, then multiplied by 1.25 for the ship's frame strength multiplier). Hull hit points is 300 (4 hit points per ton, multiplied by 50 tons, then multiplied by 1.5 for the hull bracing). Adding these together gives the ship a total of 1,050 hit points.*

**Table XX: Hit Points**

Material	Frame HPs Per Ton	Hull HPs Per Ton
Bone	9	3
Wood	12	4
Ceramics	14	5
Iron Wood	16	5
Dark Wood	20	7
Stone	24	8
Crystal	28	9
Ætherstone	32	11
Iron	36	12
Flowsteel	40	13
Pyre Iron	44	15
Mithril	36	12
Adamantine	48	16

**Table XX: Frame Strength**

Frame	Hit Point Multiplier
Light	×0.75
Standard	×1
Heavy	×1.25
Extra Heavy	×1.5
Super Heavy	×2

## Step Seven: Choose Rigging Type

Because the helm's primary purpose is propulsion, it makes a relatively poor steering device on its own. Nearly all ships rely on other steering devices to help maneuver the ship. Although some ships use rudders and fins rather than sails, they are all referred to as rigging. There are five types of rigging: none, minimal, standard, terrestrial and topped-out, all of which can have an effect on the Maneuverability Class of the ship.

No rigging is just what it sounds like: a ship that does not use any sort of additional steering device beyond the helm. Few ships are designed this way intentionally, since it makes the ship extremely sluggish while maneuvering. Of those few that are, most tend to be small in order to offset the penalties, or extremely large, at which point maneuverability becomes nearly a moot point anyway. On the other hand, any ship can end up without rigging if it is destroyed or the rigging crew are all dead.

Minimal rigging uses just barely enough steering devices to allow the helmsman to put most of the maneuvering work into the hands of the riggers. It is fairly rare, mostly found on ships that depend on other ships for defense, such as large cargo ships

**Table XX: Rigging Cost**

Rigging	Cost Per Ton
None	none
Minimal	25 gp
Standard	50 gp
Topped-Out	150 gp
Terrestrial	150 gp

and transport ships, or on small pleasure and shuttle craft, which are designed to stay close to a larger base or craft.

Standard rigging is found on the majority of ships in Arcane Space, representing what is considered by most the optimal ratio of maneuverability and manpower requirements.

Topped-out rigging adds additional steering devices, but also increases the manpower to use them properly. The additional rigging allows the crew to use more specific steering devices for certain situations, which increases the Maneuverability Class of the ship. There are two drawbacks to topped-out rigging. First, it requires twice as many riggers to operate. Second, if all of these men aren't available, the ship drops to minimal class rather than standard. This is due to the fact that the rigging has been thoroughly optimized, and a lack of a few men throws the system off.

Terrestrial rigging is required for any ship of terrestrial origins (i.e. galleons, cogs). This will be most ships with the terrestrial design form, but there are exceptions (e.g. a ship built by a spacefaring shipwright, but has a terrestrial form due to an oddly shaped forecastle would not need terrestrial rigging). Seafaring ships require far more rigging and men to maneuver than spacefaring, as such ships have rigging designed for water travel rather than space travel, which needs more sails to function. It takes all of those sails used at their maximum potential just to maneuver in space as well as they do. Anything less and they are considered to have minimal. Ships that require terrestrial rigging cannot have topped-out rigging, and standard rigging functions as minimal, but has the standard crew requirements.

A ship that has either full or partial enclosure is limited by the amount of rigging it can have, since decks space is the primary location for steering devices. A ship with partial enclosure can not have more than standard rigging, and one with full enclosure cannot have more than minimal rigging. The only way around this is by installing the rigging internally, which takes up space. The space requirements are all a percentage of the ship's tonnage, based on the type of rigging: 5% for minimal, 10% for standard, and 20% for topped-out. Terrestrial rigging cannot be mounted internally. This internal space usage represents the spatial requirements for crew and the portion of the steering device they directly handle. The fins, rudders and sails still stick out of the ship and can be attacked. On the other

hand, the crew cannot be directly attacked, although they can potentially be damaged by attacks to the area they occupy.

The cost of rigging depends on the type and size of the ship, as shown on Table XX. Mounting rigging internally doubles the cost. It is possible to have minimal, standard or topped-out rigging made of solid materials, such as wood, rather than sails. Such rigging is more expensive, but it has the benefit of being harder to damage. Solid rigging costs three times as much as normal rigging.

Standard and topped-out rigging have a number of hit points equal to five times the the tonnage of the ship. Minimal rigging has half of this (x2.5). Double these numbers for solid rigging. Terrestrial rigging has hit points equal to seven times the tonnage of the ship. Rigging has AC 20, modified by size (see Table XXX), and rigging is smaller than the ship it is on. Minimal is three sizes smaller, standard is two sizes smaller, and terrestrial and topped-out are one size smaller. Solid rigging adds +5 to this. Sails have no hardness and solid rigging has the same hardness as the hull material (or frame material if it has no hull).

*The mercenaries have no desire to pack around extra riggers for topped-out rigging, and so go with standard. This costs 2,500 gp. They don't want to be vulnerable to rigging shears, and so pay the extra cost for solid rigging, for a total of 7,500 gp. Their rigging will have 500 hit points (50 tons multiplied by 5 for 250, multiplied by two for solid rigging), and will have AC 25*

## Step Eight: Calculate Maneuverability Class

Now that the various factors involved with maneuvering a ship have been decided, we can calculate it's Maneuverability Class. A ship's Maneuverability Class is based on it's size, its type of rigging and its form. Table XX indicates Maneuverability Class based on size, then Tables XX and XX show how rigging and form modify it. The best a ship can have is MC A, and the worst is MC X.

*The Tiger Shark is a Huge ship, which is MC E. They are of a space design and have standard rigging, neither of which modifies Maneuverability Class.*

**Table XX: MC by Ship Size**

Ship Size	MC
Tiny	A
Small	B
Medium	C
Large	D
Huge	E
Gargantuan	F
Colossal	G

**Table XX: MC by Ship Form**

Ship Form	MC Mod
Space	none
Terrestrial	-1
Poor	-2
Advanced	+1

**Table XX: MC by Rigging**

Rigging	MC Mod
None	-2
Minimal	-1
Standard	none
Topped Out	+1
Terrestrial	none

## Step Nine: Choose Armour

Although the term “armour” tends to conjure images of things such as knights in plate mail or tanks covered in slabs of steel, all ships with a hull are considered to be armoured. The hull serves to protect the internal frame of the ship, as well as crew, passengers and cargo. A ship can also have additional materials plated over the hull, improving its Armour Class.

It is uncommon to find most merchant vessels or cargo ships with any additional plating, simply relying on their wood hulls to protect them. Ships that expect to see combat but are generally designed to be useful in other situations, such the hammership and the squidship, add additional wood plating. Metal plating is typically reserved for ships either designed completely for combat, or as an upgrade for other ships (see the Ship Modification system for more on upgrading a ship). Note that plating is different from hull bracing; a ship can be both braced and plated with the same material, or have one or the other.

Another factor in a ship’s Armour Class is its size. Smaller ships are harder to hit, while larger ships are the opposite.

All ships have a base AC of 10. Their hull type adds a

**Table XX: Ship AC By Size**

Ship Size	Tonnage	AC
Tiny	1-2	+2
Small	3-6	+1
Medium	7-14	—
Large	15-30	-1
Huge	31-62	-2
Gargantuan	63-126	-4
Colossal	127+	-8

bonus to this (Table XX), as does additional plating (Table XX) and the ship’s size (Table XX). The cost of plating is shown on Table XX.

Finally, ships with enclosure have a bonus to AC: +1 for

partial, +2 for full. Ships with expanded decks will have penalties: -1 for partial, -2 for full.

In addition to Armour Class, all ships have a hardness rating. This measures the ability of the ship’s frame, hull or plating to absorb damage. Hardness for the different types of materials is shown below. Hardness is based on either the materials used in either the frame, hull or plating, whichever is better.

**Table XX: Armour**

Material	Plating		Hull AC	Plating AC
	Cost	Hardness		
Bone	25	2	+4	+2
Wood	50	5	+5	+3
Ceramics	100	5	+6	+4
Iron Wood	100	6	+6	+4
Dark Wood	150	7	+6	+4
Stone	250	8	+7	+5
Crystal	300	9	+7	+5
Ætherstone	350	9	+7	+5
Iron	300	10	+8	+6
Flowsteel	333	11	+8	+6
Pyre Iron	367	12	+8	+6
Mithril	500	15	+8	+6
Adamantine	667	20	+8	+6

Although it is expensive, the mercenaries decide that iron plating is worth the price. This will cost them 15,000 gp (50 tons multiplied by 300 gp). Adding the bonuses for a wood hull (+5), iron plating (+6), partial enclosure (+1) and Huge size (-2) gives them an AC of 20.

The hardness of the metal plating (10) is better than that of the wood frame and hull (5), so the ship’s final hardness is 10.

## Step Ten: Add a Ram and Shears

Rams are common weapons on warships in space, and adding one is fairly simple. To mount a ram a ship must have at least a standard frame, since a light frame is not up to taking the shock from ramming, making it likely to break off and take a sizable chunk of the ship with it. Even with a standard frame a certain amount of reinforcement needs to be done. Heavy, extra-heavy and super-heavy ships are considered reinforced.

There are three types of rams: piercing, blunt and grappling. The cost of piercing and blunt rams is based on the frame material and the ship’s tonnage, as shown on Table XX. If the frame is standard and needs reinforced, add 25% to the final cost.

Grappling rams allow a ship to latch onto another ship, and is popular with pirates and slavers. It uses some sort of clamping mechanism to entrap the ship. The most common example of a ship with a grappling ram is the deathspider, used by the neogi. To find the cost of the grappling ram determine how large of a ship the ram can grapple. Then determine the materials the grappling ram is made from; stronger materials are harder to break free from. Use Table XX to find the cost per ton it can grapple based on its materials.

Grappling rams require internal space to house its operational mechanics and crew, equal to 10% of the maximum ship size it can entrap. For example, a ship that can entrap up to a 50 ton ship would require 5 tons for the operational mechanics and crew. See Internal Facilities for more on this.

Many ships designed for combat mount rows of blades along the bottom of the ship’s hull. Called rigging shears, these blades are used to cut away rigging on enemy ships. To function properly it takes a quantity of blades proportional to the ship’s size; less than this and it becomes too difficult to maneuver into a shearing attack. Rigging shears cost 25 gp per ton of the ship. This price is doubled if the ship has a stone (stone, crystal, ætherstone) or metal (iron, flowsteel, pyre iron, mithril, adamantine) hull, due to increased cost of mounting. This does not include plating. If the ship has no hull the cost is based on the frame.

**Table XX: Ram Costs**

Material	Cost Per Ton
Bone	50 gp
Wood	100 gp
Ceramics	200 gp
Iron Wood	200 gp
Dark Wood	300 gp
Stone	500 gp
Crystal	600 gp
Ætherstone	700 gp
Iron	900 gp
Flowsteel	1,000 gp
Pyre Iron	1,100 gp
Mithril	1,500 gp
Adamantine	2,000 gp

A ram is a must for any sort of combat ship, and sticking with the shark theme they decided upon a blunt ram, with the nose as the ram. The frame is already heavy, so overall reinforcement is not needed, just the reinforcement of the nose. The cost for this is 5,000 gold (50 tons multiplied by 100 gp).

The ship also mounts rigging shears, which costs 1,250 gp.

## Step Eleven: Choose Internal Space Usage

A ship is not particularly useful without passengers and crew, and those passengers and crew require space to live and work in. So does everything else that goes inside of a ship, from space for cargo to facilities for dining. This space is rated in tons, and a ship has internal tonnage equal to its actual tonnage. See Section XX for more on tonnage. Note that fractions are not rounded in the internal space section, as fractional tons are still useful.

A ship's frame will take up a portion of this space. The amount depends on its type. Standard and heavy frames take up 10% of a ship's internal space. Light uses 5%, extra-heavy uses 20%, and super-heavy uses 30%. Beyond this, the designer must decide to do with this free space. Space for the crew to rest, and eat in, as well as space to prepare food, is generally considered minimal.

Below are the descriptions of rooms and their uses. How much space they use and the cost is shown on Table XX. It does

not include internal weapon bays, the rules for which are found in Section XX. Note that these numbers all include the various hallways used to access rooms, and thus the space allocated does not necessarily translate into exact room size for most rooms. Allocating one ton to an officer's room does not mean the room itself is exactly 1,350 cubic feet, as the one ton includes hallway space. The Dungeon Master will have to determine the actual space of a room, should it be deemed necessary, but the basic rule of thumb is that a room is 75% of the space allocated to it. Cargo is an exception to this; the space allocated to cargo is the actual space available.

Keep in mind the minimum crew requirements when assigning internal space, and remember to include space for additional men that might be needed, such as cooks, astrologers, helmsmen, weaponeers, marines and passengers.

Note that these rooms are just examples, and the numbers can be tweaked with the approval of the DM. In particular, the space devoted to any of these rooms can be increased. If the designer is the captain and wants a 4 ton room, he can have it.

Anything not specifically allocated to a room becomes cargo space, which costs nothing, unless the designer of the ship expressly wants to keep the space open. Open space is just that; there is no floor, no walls, just the support beams of the frame.

### Rooms

#### Standard Crew Quarters

These are the standard quarters for most members of the crew. It includes space for a bunk, personal storage and room to dress and move about in, as well as space for a chair. Quarters are typically grouped together in one or more rooms. Includes: bunk, chair, storage cabinet.

#### Cramped Crew Quarters

These are the same as Standard Crew quarters, but with less personal space. There is enough room for a moderate size chest for personal belongings, plus room to dress, but little else. Includes: bunk.

#### Bunk Only

This is simply a bunk in a wall, and includes no space for anything but sleeping. Storage is above the person in nets or bags hung from corners. Privacy is through a curtain, and there is no room to stand; dressing is done in the hall or room where the bunk is. Includes: bunk.

#### Standard Room

A standard room differs from standard quarters in size, giving additional room for a dresser and a small desk. Like quarters they can be grouped together, but are just as often their own rooms. Includes: bunk, storage cabinet, dresser, small table, chair.

#### Spacious Room

A spacious room is like a standard room, with more space for additional chairs and a table, or for

**Table XX: Space and Cost of Internal Facilities**

Rooms	Space	Cost
Standard Crew Quarters	.5 tons per 2 men	100 gp per man
Cramped Crew Quarters	.3 tons per 2 men	75 gp per man
Bunk Only	.05 tons per man	25 gp per man
Standard Room	.5 tons	125 gp per man
Spacious Room	.75 tons	150 gp per man
Luxurious Room	1.5 tons	175 gp per man
Suite	3 tons	225 gp per man
Storage	Space	Cost
Cargo	1 ton per 1 ton of cargo	None
Weapons Locker	Varies	75 gp per ton
Larder	Varies	50 gp per ton
Facilities	Space	Cost
Mess Hall	.25 tons per 2 men	75 gp per man
Fine Dining Facilities	.25 tons per 1 man	150 gp per man
Galley	.5 tons per 10 men per hour	100 gp per man
Saloon/Lounge	.25 tons per 1 man	100 gp per man
Laundry Facilities	.5 tons per 10 men per day	50 gp per man
Helm Room	.75 tons or more	Varies
Chart Room	.5 tons or more	100 gp per ton
Basic Engineering	1.5 tons	300 gp
Advanced Engineering	3 tons	600 gp
Docking Bays	Space	Cost
Internal, Specific	Docking vessel tonnage plus 10%	50 per ton
Internal, General	Docking vessel tonnage plus 20%	50 per ton
External, Passenger	1 ton	200 gp
External, Cargo	2+ tons	200 gp per ton

other larger furniture. It has enough room that it could be considered a berth or dorm room. It is often used as a captains quarters on larger ships, or as a room on passenger liners. Includes: bunk, storage cabinet, dresser, small table, chair. Other furniture items will have to be provided.

#### ***Luxurious Room***

A larger version of the spacious room, it has enough space for both additional furniture such as a couch and large stuffed chair plus a table with several chairs around it. Includes: bunk, storage cabinet, dresser, large table, chair. Other furniture items will have to be provided.

#### ***Suite***

Basically a fair sized room you would find in a house; space enough for everything in a Luxurious room, plus space for luxuries like more couches, stuffed chairs and self-serve bars. It has a separate room for the sleeping chambers. Includes: bed, storage cabinet, dresser, large table, several chairs, bar. Other furniture items will have to be provided.

### ***Facilities***

#### ***Mess Hall***

Simply space for people to eat. It is a room with tables and chairs. Most ships only allocate enough room for half or less of its normal crew to eat, since others will be asleep or working. Some let men eat on deck or in their rooms, and assign no room to dining facilities. Three times as many people can be packed in if they are simply there to talk, and it is often used for ship meetings. Included: benches and tables.

#### ***Fine Dining Facilities***

The same as Standard Dining Facilities, except designed for more spacious accommodations. Almost never used for anything other than luxury passenger liners. Includes: tables and chair

#### ***Galley***

This is the cooking facilities for the ship. The amount of space depends on how many people they expect to serve in an hour. It has space for storage for pots, pans and utensils, plus standard cooking ingredients (i.e. spices, barrels of water, flour, and so on). Includes: stove(s).

#### ***Laundry Facilities***

Most ships will not have any sort of laundry facilities, as most spacefarers tend to do little in the way to wash their clothes, and will generally do it themselves. On some larger ships, usually capital ships or luxury lines, there are facilities to do laundry. These facilities are generally not as capable as a land-based laundry, as water is used sparingly. It includes the tubs and other equipment used for cleaning.

#### ***Saloon/Lounge***

This is a place for the crew or passengers to relax, and possibly have a drink. It is generally more spacious than the mess hall, and may have a bar in it. It is essentially the same thing as Fine Dining Facilities, the main difference being quality of the tables and chairs. Includes: bar, tables and chair

#### ***Basic Engineering Room***

Enough space for a one-man shop. Includes: shelves and workbenches. Tools are separate.

#### ***Advanced Engineering Room***

Like the basic version, but supports a three-man shop and more equipment. Includes: shelves and workbenches. Tools are separate.

#### ***Helm Room***

Ships will usually have a separate room for the helm. Size can vary, as low as .25 tons, but 1 is the standard, as few ships have separate chart rooms for the astrogators, and it allows the captain, first officer and the helmsmen to hold private meetings. The cost is essentially nothing if it is nothing but a room for the helm. If it is used for astrogation and charts, use the cost for that room.

#### ***Chart/Astrogation Room***

Uncommon except on larger or exploration ships, this room is designed to hold the charts and equipment need to astrogate. Includes: shelves, desk, chairs. This can also be used to represent offices or libraries.

### ***Storage***

#### ***Cargo Space***

Simply open space to store goods. Includes: a variety of rings and pinions mounted on walls, floors and beams to tie cargo off to.

Note that cargo space can be used for a variety of things besides cargo. People can sleep in the cargo bay, food can be eaten or courses can be astrogated. It is just that the cargo area does not fully support such actions (i.e. no walls for privacy, no shelves or desks for working at, and so on).

Included free of charge is a basic hatch or door to move cargo in or out.

#### ***Weapons Locker***

Any cargo space can be used as weapon storage, but a weapons locker includes cabinets and racks for weapons and armour. One ton can generally hold weapons and armour for up to 50 men, or weapons only for up to 100 men. Includes: racks and cabinets.

#### ***Larder***

A larder is simply a room with a large number of shelves and slots for barrels, to hold food and water for the kitchen. Kitchens on smaller vessels won't need one; generally a half-ton of larder per 3 tons of kitchen works fine. Includes: shelves and barrel holders.

### ***Docking Bays***

#### ***Internal, Specific***

This is a docking bay that is designed for a specific type of ship. Other ships will have a very hard time fitting it, often not fitting at all, unless they are of a very similar design or much smaller. It includes a door, plus space around the ship to access most of its surfaces above its deck (or rough approximation thereof).

### Internal, General

This is a docking bay that is designed to fit a variety of ships within a certain size. The dimensions of the bay are used to figure the cost, and the additional twenty percent in size is for the docks and accesses to the ship. Thus if a bay was 100 feet long by 50 feet wide by 50 feet tall it would be a 90 ton bay. With the additional 20% it would take up 111.1 tons. The GM will have to decide if a given ship can land in the docking bay based on the ship's dimensions and shape and the docking bay's dimension and shape. The cost includes a sliding door if the GM deems it feasible, based on size.

The general internal docking bay assumes the docking ship will use the gravity plane of the larger ship. This can cause problems if the larger ship enters the gravity of an even larger ship or a planet. To get around this the bay can be outfitted with a drydock system. This is more expensive, raising the price to 200 gp per ton.

### External, Passenger

This is a docking bay designed to allow a ship to come along side and dock. The size of the docking ship isn't really important, as it won't be actually entering the ship it docks. The passenger external docking bay is designed primarily to allow passengers and small parcels to be passed from one ship to another. It includes mooring points, a basic dock extension, a sliding door over the bay and space for a group of people to wait for boarding.

### External, Cargo

This is the same as the Passenger docking bay, except it is designed to allow the transfers of larger objects. The actual size of the docking bay can vary upwards from two tons, depending on the size of the cargo that is expected to be moved. Two tons will work for most barrels and smaller crates, while stuff like lumber or ore might require from four to six tons. Half of the space can be used as temporary cargo space when no ship is present. It otherwise comes with the same stuff as a passenger bay.

#### Example One: The Tiger Shark

*The Tiger Shark is a ship designed to carry mercenaries, either to transport them or to use them as marines. It requires only limited cargo space, enough for the standard stock of food, water, and extra shot for the ship weapons.*

*It has a heavy frame, which requires 10% of the its internal space. At 50 tons, this would be 5 tons.*

*They set aside 10 tons for cargo, which they feel is the minimum. They also plan on using 8 tons for internally mounted weapons, and so set that aside, This leaves them 27 tons for other things.*

*They will have two helmsman, plus two war wizards, and a priest, and give each a Standard room. The Captain and first Officer get their own Standard room as well. At .5 ton each, this is 3.5 tons.*

*A mess hall that can serve 32 men at a time takes 4 tons. The cooking facilities to feed 30 men per hour takes 1.5 tons.*

*They give 1 tons to a helm room, which is also used as a meeting room for senior staff. They also designate a Basic Engineering Room, at 1.5 tons.*

*The remainder of the tonnage, 15.5 tons, is used for standard crew quarters. Anything not used for riggers and the cook are used for weaponeers and marines, allowing for 62 men. With the captain, first officer, two helmsman and the three spellcasters, this works out to 69 men when full manned.*

#### Example Two: A Cargo Cruiser

*This 100 ton ship is designed to carry as much cargo inside an enclosed ship as possible. It depends on its size for its durability, and has a light frame. The frame takes up 5 tons of space.*

*The ship has minimal rigging, and so requires 9 men. The ship carries 13 riggers, plus a cook. The ship has only bunks for these men, taking up .7 tons. While these bunks are hardly spacious, the ship is rarely completely full, and men typically find other space to lay out a bed roll, so the space isn't a problem.*

*The two helmsman share a spacious room, taking .75 ton for the both of them. The captain and first officer each have their own spacious room, at 1.5 tons. The ship has a 1 ton helmroom.*

*The ship has enough cooking facilities to feed 10 men per hour, taking .5 tons, but no dining facilities; the men eat wherever they can.*

*All of this takes 9.45 tons, leaving 90.55 tons for cargo.*

## Step Twelve: Internal Weapon Bays

Typically, little consideration is given to weapon design when designing a ship, since most weapons are mounted on the deck of the ship, and is easily done post-construction. See the Ship Modification system for information on mounting weapons on decks or the hull of the ship.

Ships designed for warfare tend to carry many weapons, and the most common way of carrying weapons beyond what can be

**Table XX: Internal Weapon Bays**

Weapon	Tons
<b>Ballista</b>	
Light	1
Medium	2
Heavy	3
<b>Stonethrower</b>	
Light	1
Medium	2
Heavy	3
<b>Catapult</b>	
Light	1
Medium	2
Heavy	3
<b>Bombard</b>	
Light	1
Medium	2
Heavy	3
<b>Jettison</b>	
Light	0.5
Medium	1
Heavy	2
<b>Accelerator</b>	
Light	.5
Medium	1
Heavy	1

**Table XX: Internal Weapon Bays**

Material	Cost Per Ton
Bone	13 gp
Wood	25 gp
Ceramics	50 gp
Iron Wood	50 gp
Dark Wood	75 gp
Stone	125 gp
Crystal	150 gp
Ætherstone	175 gp
Iron	225 gp
Flowsteel	250 gp
Pyre Iron	275 gp
Mithril	375 gp
Adamantine	500 gp

mounted on the deck is through internal weapon bays. These are simply rooms with windows and shutters that the weapon can fire through. The cost for internal weapon bays is based on the hull material of the ship; the actual space is free, since it is little more than cargo space, but the window and shutters cost gold. The amount of space required for the weapon is shown on Table XXX. The cost per ton per hull material is shown on Table XXX.

These prices do not include the weapon itself; it is merely a specific room for weapons. It is

possible to mount smaller weapons in rooms meant for larger weapons, though not vice versa. It is also possible to mount weapons of different types in space meant for other weapons, as long as it is at least 1 ton less in space requirements.

*Having set aside space for 8 tons worth of internal weapons, they decide to add rooms for two medium catapults, port and starboard, a medium catapult in the aft and a medium ballista in the fore. With their thick wood hulls, costing 25 gp per ton, 8 tons of weapons would be 400 gp.*

## Step Thirteen: Landing Capabilities

By default, a ship is only capable of docking on a gravity plane or a special dry-dock; the capability of landing on either water or ground requires additional construction.

Water-landing capability requires that the hull be sealed, which can only be done for wooden or ceramic ships, unless

**Table XX: Landing Capabilities**

Landing Type	Bone	Stone
	Wood	Crystal
Ground, Partial	Ceramics	Ætherstone
	Iron Wood	Iron
Ground, Full	Dark Wood	Flowsteel
		Pyre Iron
		Mithril
		Adamantine
Light Frame	60 gp	120 gp
Standard Frame	50 gp	100 gp
Heavy Frame	40 gp	80 gp
Extra-Heavy Frame	30 gp	60 gp
Super-Heavy Frame	30 gp	60 gp
Light Frame	120 gp	240 gp
Standard Frame	100 gp	200 gp
Heavy Frame	80 gp	160 gp
Extra-Heavy Frame	60 gp	120 gp
Super-Heavy Frame	60 gp	120 gp

magic is used. The cost of this is 50 gold per ton. It also requires approval of the Dungeon Master, based on its shape. Some ships are not shaped properly and will capsize even if the hull is sealed. Some examples of these are the cuttle command and the dolphin.

There are two forms of ground-landing capability: partial and full. The difference is in the type of ground they can land on. With partial ground-landing a ship can land on any clear, mostly flat surfaces without trouble. Any other kinds of surfaces can cause problems such as tipping over (as determined by the DM). Partial landing is mostly a function of reinforcing the hull and frame to support the weight of the ship. The cost depends on the frame's materials and type, as shown on Table XX.

Full landing allows a ship to land on most fairly clear land surfaces, including hilly or mountainous areas. Full ground landing typically requires the addition of landing struts, like those seen on the wasp. See Table XX for costs.

*The DM decides that it would be feasible for the craft to land in water, and so the mercenaries have it sealed, which costs 500 gp.*

**Table XX: Water Landing Costs**

Material	Cost Per Ton
Bone	25 gp
Wood	10 gp
Ceramics	10 gp
Iron Wood	10 gp
Dark Wood	10 gp
Stone	20 gp
Crystal	20 gp
Ætherstone	20 gp
Iron	15 gp
Flowsteel	15 gp
Pyre Iron	15 gp
Mithril	15 gp
Adamantine	15 gp

## Step Fourteen: Figure Base Repair Cost

Each ship has a base repair cost (BRC), which is used to determine how much it costs to repair damage. To figure a ship's BRC, take the cost of one ton of the frame material, modified by frame strength, and add it to the cost of one ton of the hull material, modified by bracing, and and one ton of the

**Table XX: Base Repair Costs**

Material	Frame Cost Per Ton	Hull Cost Per Ton	Plating Cost
Bone	150 gp	50 gp	25 gp
Wood	300 gp	100 gp	50 gp
Ceramics	600 gp	200 gp	100 gp
Iron Wood	600 gp	200 gp	100 gp
Dark Wood	900 gp	300 gp	150 gp
Stone	1,500 gp	500 gp	250 gp
Crystal	1,800 gp	600 gp	300 gp
Ætherstone	2,100 gp	700 gp	350 gp
Iron	2,700 gp	900 gp	300 gp
Flowsteel	3,000 gp	1,000 gp	333 gp
Pyre Iron	3,300 gp	1,100 gp	367 gp
Mithril	4,500 gp	1,500 gp	500 gp
Adamantine	6,000 gp	2,000 gp	667 gp

plating material, if any. Note this down. Then, take the ship's tonnage and divide it by the ship's total hit points. This represents how many tons it takes to make up one hit point. Multiply this number by the unit cost noted earlier. This is the base repair cost.

*The tiger shark has a heavy wooden frame (300 gp, multiplied by two for the heavy frame, for a cost of 600 gp), a braced wooden hull (100 gp multiplied by two for the bracing, for a cost of 200 gp) and metal plating (300 gp). This totals to 1,100 gp. The ship is 50 tons, divided by 1,050 hit points, which equals .048. Multiplying this by the cost per ton of 1,100 gp gives a base repair cost of 52.8 gp, rounded up to 53 gp.*

## Step Fifteen: Other Important Statistics

At this point the ship itself is complete. The only thing left is figuring out a few other important statistics.

### Minimum Riggers

The minimum number of riggers needed to run the ship is based on its rigging. This does not include people such as the captain,

**Table XX: Required Riggers**

Rigging	Riggers
None	none
Minimal	1 per 12 tons
Standard	1 per 6 tons
Topped Out	1 per 3 tons
Terrestrial	1 per 1.5 tons

officers, support crew, weaponeers or other crew not necessary to flying the ship, nor does at include the helmsman. Table XX indicates the minimum number of riggers

needed, based on ship size and rigging.

These numbers are how many riggers are needed to fly the ship at any one moment, but almost all ships carry extra men as back up, or for extra shifts.

### Air Supply

Air supply is the number of man-days of air the ship carries within its gravity. A ship can support one man for two months with fresh air for every ton of the ship. To find out the number of man-days this equals, multiply the ship's tonnage by 60 (days in two months). Every day a ship has to rely on its own air envelope, subtract the total number of air-breathing crew from this. If this number drops to zero, the air is considered stale. The ship then has the same number of stale man-days of air. After that the air turns deadly.

*The Tiger Shark is a 50 ton ship with standard rigging, and so needs 9 riggers.*

*At 50 tons, the Tiger Shark can carry 3,000 man-days of air. If they carry a full crew with all their mercenaries, typically 69 men, they could go 43 days before their air became stale.*

## Advanced Options

These are various options that can be used during ship construction. They tend to be either options that add a layer of complexity, or things that the DM might not want to allow in his games.

### Composite Hulls

It is possible for a ship to have a composite hull, where different sections are made from different materials, such as a metal aft and a wooden fore, rather than one material over another. This can be used to protect specific portions of the ship, or to add a bit more durability. To do this simply decide how much of the ship's tonnage each material covers, finding the appropriate cost of each. Add these two together, plus 10%, for the final cost.

To calculate hit points for a ship with a composite hull, add up the hit points for each section, adding the results together. For example, a 60 ton ship with 20 tons of stone and 40 tons of wood would have 320 hit points from the hull, 160 hit points from the stone section (20 x 8) and 160 hit points from the wood section (40 x 4).

A ship with a composite hull will have two Armour Classes, one for each section, based on its size, hull material and plating; each section can have its own plating as well. Whenever a ship with a composite hull is targetted with a weapon, the weapon crew will have to decide if they are going to target individual portions of the ship—typically targetting the weaker materials—or if they will just target the ship as a whole. See the rules for ship combat for further details.

### Composite Frames

While ships with composite hulls, made up of more than one material, are not uncommon, ships with composite frames are more rare. There are two types of composite frames.

*Split Frames:* These are ships that have two or more materials making up distinct sections of the ship, such as a metal aft and a wooden fore. The drawback of such a design is that the place where the two materials join tends to be a weak spot. Find the hit points for each section and add them together for the total, but subtract 10%. To find the cost for split frames simply find the cost of each section, then add them together, plus 10%. Each section of a split frame ship has its own hardness. See the combat rules for details on how this affects combat.

*Shell Frames:* More common than split frames, a shell frame is a frame of one type of material wrapped around a frame of another material, completely or mostly enveloping it. This is done to protect certain key areas of the ship, such as cargo vaults or the helm room. The hit points are figured the same as for the split frame, but it does not have the drawbacks. The cost is figured the same, except add 20% to the total. The hardness of the frame is based on the materials enveloping the inner materials.

### Shell Ships

Despite the name, this is not ship made from a giant seashell, but rather a smaller ship than somehow fits into a larger ship, in some sort of mooring cradle, and becomes its motive force. For

example, a small 10 ton all metal ship could be built and outfitted with a helm. Then a 90 ton ship with a sort of socket that the smaller ship fits in and is moored to could be built. As long as the smaller ship was firmly attached to the larger, and the helm could move a ship of that total size, it could propel and maneuver the entire ship as one. Then, if the larger ship becomes severely damaged, the smaller ship can be used as an escape craft.

To design such a craft build both ships, but the larger ship must designate a portion of its volume to holding the smaller ship. How much space is up to the designer, but the less space devoted, the more of the smaller ship's volume will be revealed, and the less sturdy the connection will be. The percentage of the smaller ship's tonnage that is devoted to the smaller ship is used to determine the smaller ship's level of cover in combat. For example, a 60 ton shell ship designates 3 tons to hold a 6 ton ship. This is 50% of the smaller ship's tonnage, giving it half cover.

The cost of creating shell ships is minimal: each ship must have the mooring equipment, which costs 50 gp per ton of the smaller ship. Mooring one ship to another takes 2d4 rounds, though if the head of the team makes a successful Rope Use roll against DC 20 this time is cut in half.

The larger ship does not count the mooring space in its volume when it calculates hit points. The designer could even allocate no tonnage, but the ship would then simply be lashed on, which is precarious at best. It is possible to build two equal sized ships this way, with one being the propulsion unit.

Note that the shell ship is different from the shell frame in that it is actually considered two different ships, and do not combine their hit points. See the combat rules for more on shell ships in combat.

## Solid Mass

There are times when a ship wishes to add a large amount of bulk to a ship, without actually adding any usable space, to reduce the cost. The most common reasons for this are to increase a ship's gravity field, and thus air supply, or to achieve a certain appearance or motif. A good example of such is the

octopus, whose tentacles add a fair amount of mass, but no space.

This option is rarely used in ship construction, as it is not deemed particularly useful. While it would seem that the solid mass would add a fair amount of hit points, the truth is that on most ships the parts that are not solid mass are large enough to be targeted without penalty, and most ship crews of any appreciable experience can recognize this, and simply target the normal mass of the ship. See the combat rules for more on this.

Table XX shows the cost, hit points, Armour Class and hardness for solid mass sections of a ship. So, a 10 ton section of solid wood would have 1,800 hit points. These hit points are calculated and kept separate from the rest of the ship's hit points. Solid mass has no internal space to be used, but decks can be built upon it, so the space does count towards weapon capacity.

## Asteroid Ships

Although some dwarven Citadels and similar ships can be created through the use of the super-heavy frame, there are times when only a small percentage of the internal "space" of an asteroid or similar body is used. For example, a 20 ton rock that has a 2 ton helm room and a 3 ton cargo room, with all other facilities being on the surface.

In cases like these, instead of bothering with the frame at all calculate all non-used space as solid mass (as per the option, above) for calculating hit points, adding the total together, unlike normal solid mass sections. Figure armour and hardness as for solid mass as well. Most such ships are also at least partially enclosed, and often fully enclosed.

These type of ships typically have no rigging, but it can be added. The cost is doubled, since adding masts and such will require extra work. Unless extensive work is done, an asteroid ship is going to be of poor design, and thus not particularly maneuverable. It might be possible to find a rock that could be classified as terrestrial, but they are going to be quite rare. Anything beyond this will take radical redesign work.

Cost for such asteroid ships will be based more on mining costs than actually ship building costs, and is likely to be more expensive, especially if nice, flat walls and squared rooms are used. This should also be taken into consideration for other aspects of ship building and modification. For example, adding internal weapon may require some additional mining work to open a hole to fire through. Another example is landing capabilities: many asteroids will be fully capable of landing on the ground without paying for it, but are unlikely to land straight, due to odd their shape.

**Table XX: Solid Mass Costs**

Material	Solid Mass	Hit	AC	Hardness
	Cost	Points		
Bone	1,500 gp	180	+6	2
Wood	500 gp	240	+8	5
Ceramics	6,000 gp	280	+10	5
Iron Wood	6,000 gp	320	+10	6
Dark Wood	9,000 gp	400	+10	7
Stone	2,000 gp	480	+12	8
Crystal	18,000 gp	560	+12	9
Ætherstone	21,000 gp	640	+12	9
Iron	27,000 gp	720	+14	10
Flowsteel	30,000 gp	800	+14	11
Pyre Iron	33,000 gp	880	+14	12
Mithril	45,000 gp	720	+14	15
Adamantine	60,000 gp	960	+14	20

## Sample Ship Stats

**Hammership:** 40 tons (Huge); 840 hit points; AC 16; MC E; Space form; Heavy Wood frame; Braced Wood hull; Wood plating; Standard decks; Standard rigging (200 hit points, AC 20); 20 tons of weapons; Water (Yes), Ground (None); 7 man rigging crew; 2,400 man-days of air; 50,347.5 gp; BRC 40 gp

*Internal Facilities:* Heavy Wood frame (4 tons), Standard Crew Quarters (36 men, 9 tons), Standard Room (7 men, 3.5 tons), Spacious Room (1 men, 0.75 tons), Cargo (13 tons), Larder (0.45 tons), Mess Hall (16 men, 2 tons), Galley (16 men per hour, 0.8 tons), Saloon/Lounge (16 men, 4 tons), Helm Room (1 ton), Basic Engineering (1.5 tons)

*Weapons:* Blunt ram

**Squidship:** 30 tons (Large); 630 hit points; AC 17; MC D; Space form; Heavy Wood frame; Braced Wood hull; Wood plating; Standard decks; Standard rigging (150 hit points, AC 21); 15 tons of weapons; Water (Yes), Ground (None); 5 man rigging crew; 1,800 man-days of air; 37,015 gp; BRC 40 gp

*Internal Facilities:* Heavy Wood frame (3 tons), Standard Crew Quarters (32 men, 8 tons), Standard Room (4 men, 2 tons), Spacious Room (1 men, 0.75 tons), Cargo (11 tons), Larder (0.3 tons), Mess Hall (14 men, 1.75 tons), Galley (14 men per hour, 0.7 tons), Helm Room (1 ton), Basic Engineering (1.5 tons)

*Weapons:* Piercing ram

**Wasp:** 12 tons (Medium-Size); 216 hit points; AC 19; MC C; Space form; Standard Wood frame; Braced Wood hull; Wood plating; Partial Enclosure; Solid Standard rigging (120 hit points, AC 27); 3 tons of weapons; Water (No), Ground (Full); 2 man rigging crew; 720 man-days of air; 12,057.5 gp; BRC 30 gp

*Internal Facilities:* Standard Wood frame (1.2 tons), Standard Crew Quarters (12 men, 3 tons), Standard Room (3 men, 1.5 tons), Cargo (5 tons), Larder (0.15 tons), Galley (8 men per hour, 0.4 tons), Helm Room (0.75 tons)

**Deathspider:** 70 tons (Gargantuan); 2,695 hit points; AC 20; MC F; Space form; Heavy Dark Wood frame; Braced Crystal hull; Crystal plating; Full Enclosure; Standard rigging (350 hit points, AC 19); zero tons of weapons; Water (No), Ground (Partial); 12 man rigging crew; 4,200 man-days of air; 282,575 gp; BRC 85 gp

*Internal Facilities:* Heavy Dark Wood frame (7 tons), Grappling Ram Mechanics (7 tons), Internally Mounted Rigging (7 tons), Standard Crew Quarters (20 men, 5 tons), Cramped Crew Quarters (60 men, 9 tons), Luxurious Room (1 men, 1.5 tons), Cargo (13.5 tons), Mess Hall (10 men, 1.25 tons), Galley (15 men per hour, 0.75 tons), Helm Room (1 ton)

*Internal Weapon Bays:* Stonethrower, Medium (4 bays, 8 tons), Jettison, Heavy (1 bays, 2 tons)

*Weapons:* Grappling ram (Dark Wood, 70 tons)

**Galleon:** 35 tons (Huge); 630 hit points; AC 13; MC F; Terrestrial form; Standard Wood frame; Braced Wood hull; None plating; Standard decks; Terrestrial rigging (245 hit points, AC 20); 17 tons of weapons; Water (Yes), Ground (None); 12 man rigging crew; 2,100 man-days of air; 29,137.5 gp; BRC 27 gp

*Internal Facilities:* Standard Wood frame (3.5 tons), Cramped Crew Quarters (35 men, 5.25 tons), Standard Room (5 men, 2.5 tons), Luxurious Room (1 men, 1.5 tons), Cargo (17.75 tons), Larder (0.25 tons), Fine Dining Facilities (6 men, 1.5 tons), Galley (15 men per hour, 0.75 tons), Helm Room (1 ton), Chart Room (1 ton)

**Man o' War:** 40 tons (Huge); 1,000 hit points; AC 18; MC E; Space form; Heavy Ceramic frame; Braced Ceramic hull; Ceramic plating; Standard decks; Solid Standard rigging (400 hit points, AC 25); 20 tons of weapons; Water (No), Ground (None); 7 man rigging crew; 2400 man-days of air; 84,662.5 gp; BRC 68 gp

*Internal Facilities:* Heavy Ceramic frame (4 tons), Standard Crew Quarters (35 men, 8.75 tons), Standard Room (8 men, 4 tons), Spacious Room (1 men, 0.75 tons), Cargo (10 tons), Weapons Locker (0.5 tons), Larder (0.5 tons), Mess Hall (20 men, 2.5 tons), Galley (20 men per hour, 1 ton), Saloon/Lounge (20 men, 5 tons), Helm Room (1.5 tons), Basic Engineering (1.5 tons)

**Flitter:** 1 ton (Tiny); 25 hit points; AC 23; MC A; Space form; Heavy Ceramic frame; Braced Ceramic hull; Ceramic plating; Partial Enclosure; Solid Standard rigging (10 hit points, AC 33); zero tons of weapons; Water (No), Ground (Partial); 1 man man rigging crew; 60 man-days of air; 2,075 gp; BRC 68 gp

*Internal Facilities:* Heavy Ceramic frame (0.1 tons), Bunk Only (6 men, 0.3 tons), Cargo (0.25 tons), Helm Room (0.35 tons)

## Master Materials Table

Material	Frame Cost Per Ton	Hull Cost Per Ton	Plating Cost Per Ton	Frame Hit Points Per Ton	Hull Hit Points Per Ton	Hardness	Hull AC	Plating AC	Ram Cost Per Ton	Water Landing Cost Per Ton	Solid Mass Cost Per Ton
Bone	150 gp	50 gp	25 gp	9	3	2	+4	+2	50 gp	25 gp	1,500 gp
Wood	300 gp	100 gp	50 gp	12	4	5	+5	+3	100 gp	10 gp	500 gp
Ceramics	600 gp	200 gp	100 gp	14	5	5	+6	+4	200 gp	10 gp	6,000 gp
Iron Wood	600 gp	200 gp	100 gp	16	5	6	+6	+4	200 gp	10 gp	6,000 gp
Dark Wood	900 gp	300 gp	150 gp	20	7	7	+6	+4	300 gp	10 gp	9,000 gp
Stone	1,500 gp	500 gp	250 gp	24	8	8	+7	+5	500 gp	20 gp	2,000 gp
Crystal	1,800 gp	600 gp	300 gp	28	9	9	+7	+5	600 gp	20 gp	18,000 gp
Ætherstone	2,100 gp	700 gp	350 gp	32	11	9	+7	+5	700 gp	20 gp	21,000 gp
Iron	2,700 gp	900 gp	300 gp	36	12	10	+8	+6	900 gp	15 gp	27,000 gp
Flowsteel	3,000 gp	1,000 gp	333 gp	40	13	11	+8	+6	1,000 gp	15 gp	30,000 gp
Pyre Iron	3,300 gp	1,100 gp	367 gp	44	15	12	+8	+6	1,100 gp	15 gp	33,000 gp
Mithril	4,500 gp	1,500 gp	500 gp	36	12	15	+8	+6	1,500 gp	15 gp	45,000 gp
Adamantine	6,000 gp	2,000 gp	667 gp	48	16	20	+8	+6	2,000 gp	15 gp	60,000 gp

### Table XX: Ship Size By Tonnage

Ship Size	Tonnage
Tiny	1-2
Small	3-6
Medium	7-14
Large	15-30
Huge	31-62
Gargantuan	63-126
Colossal	127+

### Table XX: Frame Strength

Frame	Cost Multiplier	Hit Point Multiplier	Internal Tonnage
Light	x0.5	x0.75	5%
Standard	x1	x1	10%
Heavy	x2	x1.25	10%
Extra-Heavy	x3	x1.5	20%
Super-Heavy	x5	x2	30%

### Table XX: Ship AC By Size

Ship Size	Tonnage	AC
Tiny	1-2	+2
Small	3-6	+1
Medium	7-14	—
Large	15-30	-1
Huge	31-62	-2
Gargantuan	63-126	-4
Colossal	127+	-8

### Table XX: MC by Ship Form

Ship Form	MC Mod
Space	none
Terrestrial	-1
Poor	-2
Advanced	+1

### Table XX: Rigging Cost

Rigging	Cost Per Ton
None	none
Minimal	25 gp
Standard	50 gp
Topped-Out	150 gp
Terrestrial	150 gp

### Table XX: Required Riggers

Rigging	Riggers
None	none
Minimal	1 per 12 tons
Standard	1 per 6 tons
Topped Out	1 per 3 tons
Terrestrial	1 per 1.5 tons

### Table XX: MC by Rigging

Rigging	MC Mod
None	-2
Minimal	-1
Standard	none
Topped Out	+1
Terrestrial	none

### Table XX: MC by Ship Size

Ship Size	MC
Tiny	A
Small	B
Medium	C
Large	D
Huge	E
Gargantuan	F
Colossal	G

### Table XX: Landing Capabilities

Landing Type	Stone	
	Crystal	Ætherstone
<i>Ground, Partial</i>	Bone	Iron
	Wood	Flowsteel
	Ceramics	Pyre Iron
	Iron Wood	Mithril
	Dark Wood	Adamantine
<i>Ground, Full</i>	Light Frame	60 gp / 120 gp
	Standard Frame	50 gp / 100 gp
	Heavy Frame	40 gp / 80 gp
	Extra-Heavy Frame	30 gp / 60 gp
	Super-Heavy Frame	30 gp / 60 gp
<i>Ground, Full</i>	Light Frame	120 gp / 240 gp
	Standard Frame	100 gp / 200 gp
	Heavy Frame	80 gp / 160 gp
	Extra-Heavy Frame	60 gp / 120 gp
	Super-Heavy Frame	60 gp / 120 gp

**Table XX: Space and Cost of Internal Facilities**

Rooms	Space	Cost
Standard Crew Quarters	.5 tons per 2 men	100 gp per man
Cramped Crew Quarters	.3 tons per 2 men	75 gp per man
Bunk Only	.05 tons per man	25 gp per man
Standard Room	.5 tons	125 gp per man
Spacious Room	.75 tons	150 gp per man
Luxurious Room	1.5 tons	175 gp per man
Suite	3 tons	225 gp per man
Storage	Space	Cost
Cargo	1 ton per 1 ton of cargo	None
Weapons Locker	Varies	75 gp per ton
Larder	Varies	50 gp per ton
Facilities	Space	Cost
Mess Hall	.25 tons per 2 men	75 gp per man
Fine Dining Facilities	.25 tons per 1 men	150 gp per man
Galley	.5 tons per 10 men per hour	100 gp per man
Saloon/Lounge	.25 tons per 1 man	100 gp per man
Laundry Facilities	.5 tons per 10 men per day	50 gp per man
Helm Room	.75 tons or more	Varies
Chart Room	.5 tons or more	100 gp per ton
Basic Engineering	1.5 tons	300 gp
Advanced Engineering	3 tons	600 gp
Docking Bays	Space	Cost
Internal, Specific	Docking vessel tonnage plus 10%	50 per ton
Internal, General	Docking vessel tonnage plus 20%	50 per ton
External, Passenger	1 ton	200 gp
External, Cargo	2+ tons	200 gp per ton

**Table XX: Internal Weapon Bays**

Weapon	Tons
<b>Ballista</b>	
Light	1
Medium	2
Heavy	3
<b>Stonethrower</b>	
Light	1
Medium	2
Heavy	3
<b>Catapult</b>	
Light	1
Medium	2
Heavy	3
<b>Bombard</b>	
Light	1
Medium	2
Heavy	3
<b>Jettison</b>	
Light	0.5
Medium	1
Heavy	2
<b>Accelerator</b>	
Light	.5
Medium	1
Heavy	1

**Table XX: Solid Mass Costs**

Material	Solid Mass Cost	Hit Points	AC	Hardness
Bone	1,500 gp	180	+6	2
Wood	500 gp	240	+8	5
Ceramics	6,000 gp	280	+10	5
Iron Wood	6,000 gp	320	+10	6
Dark Wood	9,000 gp	400	+10	7
Stone	2,000 gp	480	+12	8
Crystal	18,000 gp	560	+12	9
Ætherstone	21,000 gp	640	+12	9
Iron	27,000 gp	720	+14	10
Flowsteel	30,000 gp	800	+14	11
Pyre Iron	33,000 gp	880	+14	12
Mithril	45,000 gp	720	+14	15
Adamantine	60,000 gp	960	+14	20

**Table XX: Internal Weapon Bays**

Material	Cost Per Ton
Bone	13 gp
Wood	25 gp
Ceramics	50 gp
Iron Wood	50 gp
Dark Wood	75 gp
Stone	125 gp
Crystal	150 gp
Ætherstone	175 gp
Iron	225 gp
Flowsteel	250 gp
Pyre Iron	275 gp
Mithril	375 gp
Adamantine	500 gp

## Weapons

The following information is copied from the Ship Combat System for reference during ship construction.

### Standard Turret

Turrets are used to rotate a weapon into a new firing arc. It takes one man one round to rotate a light weapon into a new arc. It takes one man two rounds, or two men one round for medium and ship weapons. This can be done during reloading, but men rotating the turret cannot also assist in reloading. A standard turret costs 750 gp.

### Free Turret

Invented by the gnomes, a free turret is a framework that a weapon is set in that allows the weapon to be pivoted into a wide range of positions, and includes counterbalances for the weight of the weapon, making it fairly easy to move even large weapons. When mounted in a free turret the weapon is

considered to be on a ship two sizes smaller when determining attack penalties due to ship size. They also have the benefits of a normal turret, without the drawbacks of requiring extra men or time to reposition; a free-turreted weapon can be positioned to any available firing arc as a free action.

The downsides of a pivot turret are price and fragility. Free turrets add 5,000 gp to the cost of a weapon, and must be built into the weapon; you cannot add a free turret to a weapon later. Second, if the weapon takes half or more damage it is non-functional; the counterweight system is quite fragile and easy to throw off.

Free turrets will only work with ballista, stonethrowers, bombards and accelerators.

### Stonethrowers

These are a cross between a ballista and a catapult. They use the same firing mechanism as a ballista, but have a cup for holding a stone, like a catapult. Because of the weight of the stone they are not as fast and as accurate as a ballista, but do more damage.

**Table XX: Ship Weapons**

Weapon	Attack Bonus	Damage	Threat/Critical	Crew	Reload	Tonnage	Range	AC	HP/Hardness	Cost
<i>Ballista</i>										
Light	+4	1d3 x 5	x2	1	2	1	3 hexes	19	24/5	600 gp
Medium	+4	1d6 x 5	x2	2	3	2	3 hexes	19	48/5	1,200 gp
Heavy	+4	2d6 x 5	x2	2	4	3	3 hexes	18	72/5	2,400 gp
<i>Stonethrower</i>										
Light	+2	1d6 x 5	19-20/x2	2	2	1	2 hexes	19	24/5	700 gp
Medium	+2	2d6 x 5	19-20/x2	3	3	2	2 hexes	19	48/5	1,400 gp
Heavy	+2	3d6 x 5	19-20/x2	4	4	3	2 hexes	18	72/5	2,800 gp
<i>Catapult</i>										
Light	+0	2d6 x 5	x3	2	3	1	1 hex	19	24/5	800 gp
Medium	+0	3d6 x 5	x3	3	4	2	1 hex	19	48/5	1,600 gp
Heavy	+0	4d6 x 5	x3	4	5	3	1 hex	18	72/5	3,200 gp
<i>Bombard</i>										
Light	+2	2d6 x 5	18-20/x2	2	3	1	2 hexes	23	48/10	1,600 gp
Medium	+2	3d6 x 5	18-20/x2	3	4	2	2 hexes	23	96/10	3,200 gp
Heavy	+2	4d6 x 5	18-20/x2	4	5	3	2 hexes	22	144/10	6,400 gp
<i>Jettison</i>										
Light	+0	2d6**	***	1	2	1/2	1 hex	19	12/5	400 gp
Medium	+0	3d6**	***	2	3	1	1 hex	17	24/5	800 gp
Heavy	+0	4d6**	***	3	4	1 1/2	1 hex	16	48/5	1,600 gp
<i>Accelerator</i>										
Light	+6	1d6 x 5	19-20/x2	1	0*	1/2	4 hexes	25	24/10	XXX gp
Medium	+6	2d6 x 5	19-20/x2	1	1	1	4 hexes	23	48/10	XXX gp
Heavy	+6	3d6 x 5	19-20/x2	2	1	1 1/2	4 hexes	22	72/10	XXX gp
<i>Fire Projector</i>										
Light	+0	3d6	***	3	2	1	****	23	48/10	XXX gp
Medium	+0	4d6	***	4	3	2	****	23	96/10	XXX gp
Heavy	+0	5d6	***	4	4	3	****	22	144/10	XXX gp

\* If two skilled men load the accelerator and one of the crew has the Heavy Weapon Loader (Accelerator) feat, they can load and fire a light accelerator twice per round.

\*\* Jettisons never do damage to ships with hardness of 1 or better.

\*\*\* Neither jettisons nor fire projectors are capable of critical hits.

\*\*\*\* Fire projectors are close-range weapons. The attacking ship must be within 25 feet of the target.