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Table of Contents

Editorial

We'd like to send out a big thank you to all our readers. The relaunch of the MSB Journal was a great success in our books and we look forward to bringing you many future issues for your reading pleasure.

As with all ventures we participate in it is always nice to hear from our readers with their comments and suggestions about current and future issues. We've had several suggestions for future content and we'll strive to bring them to you. On that note, we welcome all submissions for potential inclusion in the MSB Journal, so, if you have a passion for writing we'd love to hear from you. You can send your submissions to msbj@modelshipbuilder.com.

Those of you on facebook be sure to drop by and visit our groups:

#ModelShipBuilder (brand new) and #NavyBoardModels to see what's going on there!

I'll keep things short so you can get on to reading the great content in this issue.

Until next time

May you have fair winds and following seas

Winston Scoville

Diving The Wreck of HMS *Prince Regent* (1814), Kingston, Ontario, Canada

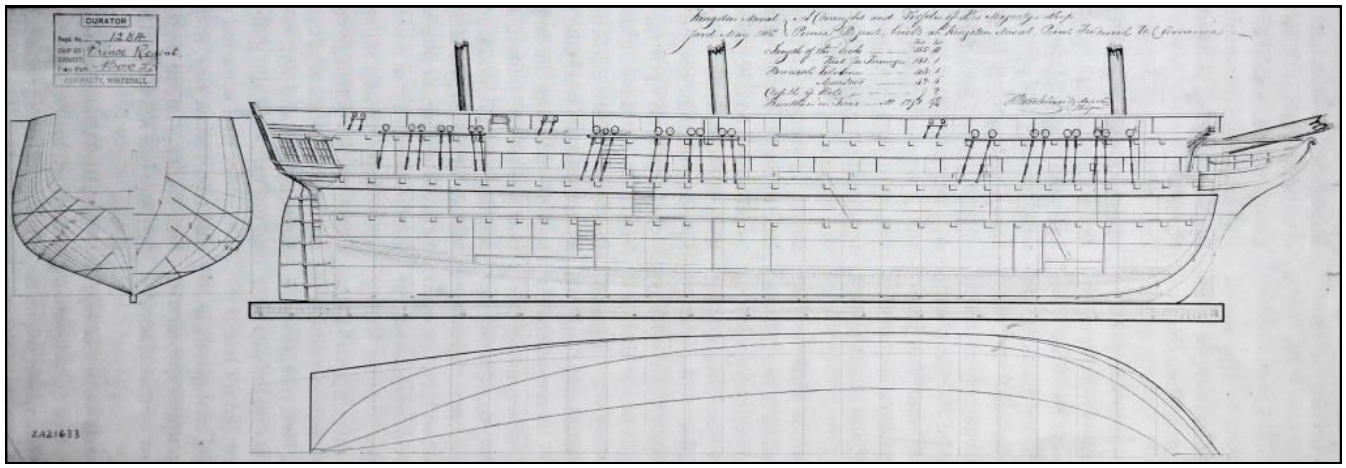
By David Gibbins

An 1817 aquatint of the British squadron at anchor off Oswego on 6 May 1814, based on a drawing by a Royal Marines officer present at the action, Captain William Steele. The frigate to the right, flying the broad pennant of Commodore Sir James Yeo, is HMS *Prince Regent*, flagship of the squadron. The boats being rowed ashore are taking Royal Marines, sailors and soldiers to the assault of the fort atop the distinctive jutting promontory, visible amidst the smoke from the bombardment (National Archives of Canada).

One of my most memorable dives was in October 2015 in only a few metres of water at the head of Deadman Bay, near Kingston at the eastern extremity of Lake Ontario in Canada. My brother Alan and I had gone in search of HMS *Prince Regent*, a British frigate of the War of 1812 that had been abandoned in a backwater and lain undisturbed for over a century and a half. What we saw when we found the wreck far exceeded our expectations. We had known that a large part of the lower hull remained intact, preserved in the fresh, cold waters of the lake, but we had little idea of the haunting, eerie image that would be caused by the weed and algae growth that shrouded the wreck. Fortunately Alan had his video camera with him, and was able to capture the atmosphere of the site in the video you can watch on YouTube here: https://www.youtube.com/watch?v=P-_ojKAVCLQ&t=12s

The story of HMS *Prince Regent* and the two other large warships launched at Kingston during the final year of the war, HMS Princess Charlotte and HMS St Lawrence, is a fascinating one for many reasons. Although the ships only saw limited action – in the case of HMS St Lawrence, none at all – they were one side of the arms race that developed

between the British and the Americans on Lake Ontario during the war, with the Royal Navy Dockyard at Kingston competing with the American yard at Sackets Harbour to build the most powerful ships. Without the extraordinary efforts of the Kingston shipwrights, completing ships in near-record time, the race could have been lost and the war gone badly against the British. The problem was that large warships on the Atlantic could not be brought down the St Lawrence River to the lake, as the rapids above Montreal had not yet been bypassed by canals; the largest warships on the lake before 1812 were sloops and brigs. The ships launched at Kingston in 1814 were to be the only British warships of their size to be built and operated exclusively on fresh water, with design features uniquely adapted to conditions on the lake and reflecting the enormous pressure to complete the vessels in time to act as a deterrence.



A draught and profile drawing of HMS *Prince Regent* made by Royal Navy surveyor Thomas Strickland in 1815. The V-shaped deadrise of the frames from the keel was even more pronounced on the *Princess Charlotte* (National Maritime Museum, Greenwich).

After the Royal Navy commander on Lake Ontario, Commodore Sir Thomas Yeo, ordered the construction of frigates at Kingston, the yard quickly expanded in readiness. White oak was felled, artificers were brought from the yards of Lower Canada and from England, and old ships at Quebec allocated for the purpose were stripped of ballast, guns, canvas and other material to be taken past the rapids to Kingston for the new vessels. By late November 1813, only a few months into construction, the Governor-General was informed that *Prince Regent* promised to be 'as fine and formidable a Frigate as any sailing on the Atlantic.' After what must have been an extraordinary winter of activity at the shipyard, both *Prince Regent* and the smaller *Princess Charlotte* were launched on 14 April, as soon as the lake ice had melted. Within three weeks they had been crewed, fitted out and trialled, *Prince Regent* proving to sail 'remarkably well.'

To the casual observer there would have been little to distinguish these ships from the seagoing frigates of the Royal Navy. They were in fact of heavier construction than had been the norm, with thicker timbers and closer-fitting frames, the British having learnt the lesson of earlier frigate actions in the Atlantic where heavier-built American vessels had withstood shot better than their British opponents. The most striking difference lay below the waterline; because the lake ships had no need to carry large quantities of drinking water - and thus had no need for a capacious hold - they could be sharper in profile, with a steeper frame 'deadrise'. This feature and a shallower draft made them fast and weatherly, and without the weight of water more guns could be carried. Other features reflected the expediency of construction. There had been no time to season the oak

properly, so the wood was green, more vulnerable to rot. Shorter lengths of timber were used than was normally the case, scarfed and bolted together, and there had been no compass timbers or 'grown knees' from which curved elements were normally cut. Nevertheless, with a crew of 550, and armed with thirty twenty-four pounders and twenty -eight carronades - twenty of them 32 pounders and eight massive 68 pounders – she was well up to the task at hand, and with these two ships and several large brigs Sir Thomas Yeo had a frigate squadron as formidable as any that were ranging the high seas in the final years of the Napoleonic Wars.

War Service and aftermath

With the 1814 Spring sailing season underway, Sir James Yeo was determined use his new ships to attack Sackets Harbour, but the Governor-General Sir James Prevost refused to allocate the troops required to mount an assault in strength. Instead, Yeo turned his attention to the less heavily defended Fort Oswego, a staging post from New York via the Hudson and Oswego rivers where it was believed that guns destined for the new American frigates lay in storage. By attacking the fort and taking the guns, Yeo planned to secure advantage over the Americans for the 1814 season. On 3 May, he left Kingston with HMS *Prince Regent*, HMS *Princess Charlotte* and six sloops and brigs, arriving off Oswega two days later. After a delay caused by the weather he landed his assault force of Royal Marines, a Royal Navy landing party and soldiers of the Glengarry Light Infantry and the Regiment de Watteville, over a thousand men altogether. Much of their powder was soaked in the landing, so they attacked at the point of the bayonet. After a bombardment from the frigates and the smaller vessels, they advanced up the slope and took the fort at a cost of some 80 casualties, inflicting some 60 casualties on the Americans and capturing some 30 more.

A 19th century map showing the eastern shore of Lake Ontario, with the entrance to the St Lawrence River dividing Upper Canada from New York State at upper right. At the top of the map is the Royal Navy base of Kingston, to the right the US Navy base of Sackets Harbour and at the bottom the US fort of Oswego, site of the British assault on 6 May 1814. The distance across the lake from Kingston to Oswego is about 45 nautical miles.

Another 1815 aquatint of the Battle of Oswego based on a drawing by Royal Marines officer present at the action - in this case Lieutenant John Hewett, who climbed the flagpole of the fort and took down the Stars and Stripes. In the foreground HMS *Prince Regent* flies the broad pennant of Sir James Yeo; beyond that the British forces are landing and forming up to attack the Americans, who are on the lower slope opposite with the fort behind them. The entrance to the Oswego river, which allowed the Americans to bring up supplies and armaments from New York, is to the right (National Archives of Canada).

The Battle of Fort Oswego and the subsequent blockade was to be *Prince Regent's* only active service. In the event, only a few of the American guns were discovered at Oswego and, despite the blockade, the remainder got through to Sackets Harbour, ensuring American supremacy on the Lake after the completion of their own more heavily armed frigates in July. The tables were turned yet again with the completion of the huge three-decker HMS *St Lawrence* at Kingston in September, but the war ended that winter and she never fired her guns in anger. By July 1815, Thomas Strickland, a shipwright tasked with surveying the ships, described the vessels at Kingston as swinging at their moorings with their top masts removed, laid up and housed over. Only *Prince Regent*, which had been renamed HMS *Kingston* in December 1814, remained in commission, serving as a headquarters and a floating barracks.

Despite their reduction after the war, the laid-up ships in Navy Bay at Kingston still presented a dramatic vista; Lieutenant Francis Hall of the 14th Light Dragoons, in his Travels in Canada and the United States, 1816 and 1817, described how you come by ' ...uncultivated islands, and an uninterrupted line of wooden shore, seem conducting you to the heart of a wilderness, known only to the hunter, and his prey: you emerge from a wood, double a headland, and a fleet of ships lies before you, several of which are as large as any on the ocean.' The Rush-Bagot agreement of 1817, reducing naval forces on the Great Lakes, ended the career of the squadron, with the ships being put 'in ordinary' and suffering badly from leaking and dry rot by 1819, little surprise to the surveyors who knew they were 'built of green materials and of a bad quality.' By 1826 they were described as half-sunken, and only six years after that HMS *Kingston* had disappeared from the Navy List, having been sold and partly broken up in 1832-3. Finally, some time between 1829 and 1843, the hulks of *Kingston* and *Burlington* – the renamed *Princess*

Charlotte - were pumped out and towed round into Hamilton Cove, later renamed Deadman Bay, where their remains lie in shallow water to this day.

A colour aquatint of 1828 by James Gray showing Kingston from Fort Henry, with the Royal Navy Dockyard (site of the present Royal Military College of Canada) in the centre and the town beyond. The housed-over ship behind the soldier's bayonet is probably HMS *St Lawrence*, and that above the solitary lady with the pink top and black hat HMS *Prince Regent*, renamed HMS *Kingston* (National Archives of Canada).

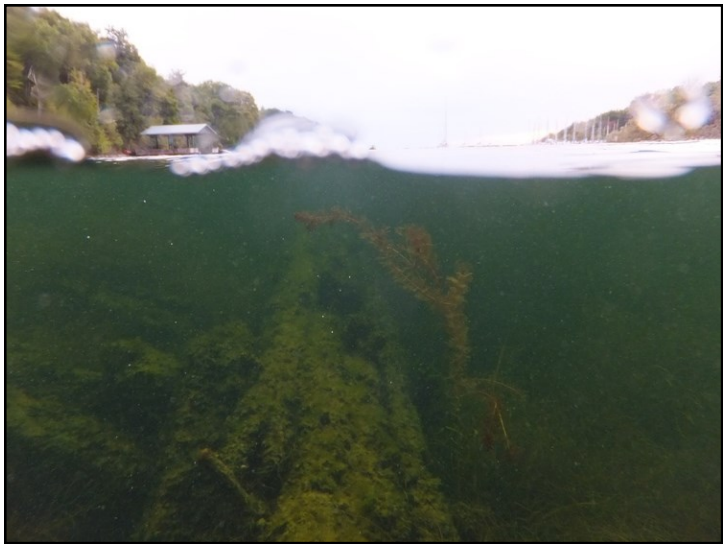
This 1816 map shows, from the left, Kingston town, Kingston harbour, the Royal Navy Dockyard (site of the present Royal Military College of Canada), Navy Bay, the promontory of Fort Henry, and Hamilton Cove, the present Deadman Bay. Today, the wreck of HMS *Prince Regent* is to be found at the very head of Deadman Bay, only fifty metres or so from shore, HMS *Princess Charlotte* about a third of the way down the bay and HMS *St Lawrence* on the opposite shore south-west of Kingston, out of view to the left.

Diving HMS *Prince Regent*

The wreck at the head of Deadman Bay was visited in 1912 by Toronto newspaperman Charles Snider, whose measurement of its length – just over 160 feet – was later used to identify it as the former HMS *Prince Regent*, as the length corresponded with the 155 foot gun deck recorded in Strickland's 1815 survey; the position of the mast steps and the steep frame deadrise has also been shown to correspond with the plans. In 1938, a hard-hat diver was employed by the Fort Henry museum at Kingston to raise artefacts from the

second wreck in the bay, now known to be the former *Princess Charlotte*, including shot, iron ballast blocks and 18 guns, several of them French guns spiked in 1758 by the British when they captured Fort Frontenac – afterwards renamed Kingston - and evidently used as ballast. It seems likely that similar artefacts also existed in the wreck of Prince Regent. In 2000-1 the wreck of *Princess Charlotte* was surveyed by a team under Dan Walker from Texas A&M University's Institute of Nautical Archaeology, and all of the War of 1812 hulls off Kingston have been subject to a survey programme by Parks Canada under the direction of Michael Moore. Two excellent publications arising from those projects are listed below.

We found *Prince Regent* to be an unexpectedly atmospheric dive. Kitting up in the carpark beside the marina on Deadman Bay, we walked down to a small beach and swam towards the head of the Bay. The wreck lies in a backwater, only two to four metres deep, with no boat traffic overhead and only ice and weather being likely to degrade timbers just beneath the surface. We swam over dense masses of weed that rose to within a metre of the surface and obscuring the bottom, and at first wondered whether we would see the wreck. When we did it was an arresting sight, nestled in the weed like the mouldering carapace of a whale. Much of the surface detail of the timbers was obscured by zebra mussels, and covered with thick algae. The hull is heeled over on its port side, with the starboard frames projecting towards the surface like the ribs of a skeleton. The most striking survival is a large part of the stern, including the stern post, gudgeons and a pintle stop. Swimming forward, we saw the unusual mast-steps, formed not from shaped timbers placed on top of the keelson but from gaps in the upper row of the keelson timbers themselves, the sides being made up from timbers bolted on and strengthened with crutches. At many places on the hull we could see where the planking had been attached with iron spikes, and the frames and other timbers with iron bolts.



Surfacing at the bow, my mask half in and half-out of the water, and looking back along Deadman Bay towards Kingston - the eerie image of the timbers shrouded in algae below, and above that the modern yachts of the marina - it seemed as if I was viewing a cross-section through history, and a vivid reminder of the 'war of carpenters', as one contemporary put it, that played such a critical role in deciding the future of North America two centuries ago.

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For more articles by David Gibbins visit his website: https://davidgibbins.com

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HMS Prince Regent hull model, courtesy Royal Museums Greenwich

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Annealing Brass by Bob Hunt

Have you ever built one of those model ships that have brass wire that you are supposed to use to make the chainplates and the brass proves to be impossible to work with because it's so stiff and brittle?

Have you ever built a model ship that came with long strips of brass moulding that you have to bend around the bow area to form rails that go up underneath the catheads and the brass won't bend without breaking?

Photo 1 shows mouldings as I have just described. See how they have to be bent and twisted to flow up underneath the cathead and on the stem flowing around the cheeks onto the wales?

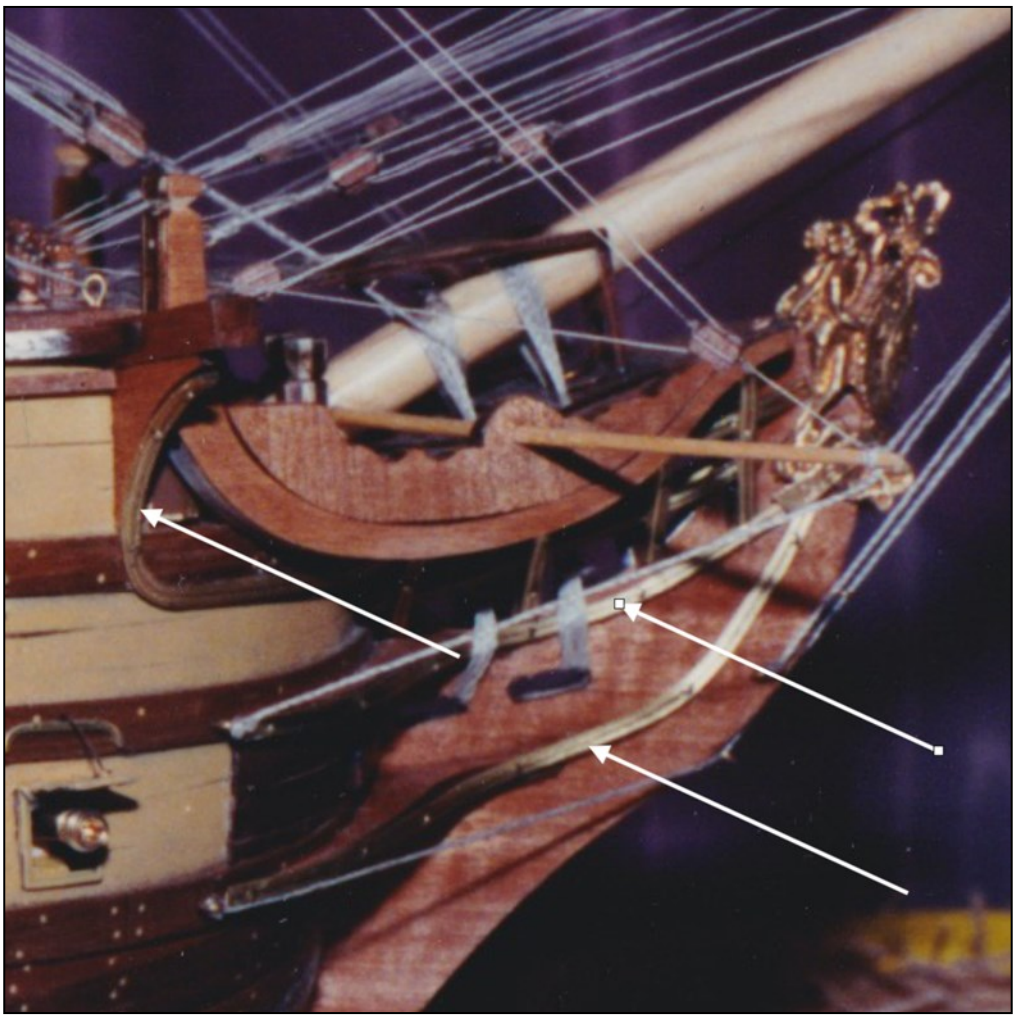


Photo 1

It can be very frustrating trying to fit these brass moldings because they just don't want to bend. Try drilling holes through them to attach the nails such as the ones shown underneath the cathead. Bet you break a lot of drill bits and hardly make a dent in the molding.

There must be something you can do to make this part of the ship's construction less frustrating and easier, right? There is. It's called "annealing."

What is annealing? Annealing metal such as brass is a simple process that softens the metal making it much easier to work with. It works well with brass especially, or what is often referred to as piano wire -- a silver looking wire that is long and straight and often found in kits used to make chainplates.

Like most everything associated with model shipbuilding, you just need the right tools for the job. In this case, the right tool is a small propane blowtorch such as the one shown in Photo 2.

Photo 2

The process of annealing metal is quite simple. Start up the blowtorch according to the instructions that came with it, adjust the flame according to those instructions, and point the torch at the wire or metal you want to anneal. Hold it on the part until the part glows red, then immediately remove the flame from the part and let the part cool down.

I like to use a special "carbon felt welding blanket" I bought years ago to place my parts on when I do this. You can find the one shown in Photo 3 on Amazon.

Photo 3

Of course, the trick is to remove the blowtorch flame the moment the metal turns red hot. If you don't, chances are you'll melt the metal completely which is not the outcome you are trying to achieve. But if you're successful, after the metal cools it will bend easily and hold the shape you bend it into.

Annealing wire can make it much easier to shape chainplates such as the ones shown in Photo 4.

Photo 4

This photo shows a scratch-built model of the ship Confederacy, an early frigate of the Revolutionary War. When I built this model, I was following a practicum written by my mentor in my early days of model shipbuilding, Father William Romero. His practicum came in a binder and was printed in black and white on normal copy paper. This was in the days before the internet and PCs became popular. Can you see the horseshoe parts beneath the gunports (white arrows)? Those hinges are for oar sweep ports.

The metal I made those from was flat brass bar, about 1/16" wide and 1/32" thick. Like a real horseshoe, the ends on the right-hand side as shown in this photo, had to be bent. at a 90-degree angle.

Try bending brass bar consistently like that without annealing. Can't be done! But once I annealed the wire, it was a piece of cake making those special oar sweep hinges. Same with the chainplates which I made using a very thin, long and brittle brass wire I bought from Micro Mark as recommended by the practicum. But once I annealed the wire, it was easy to bend the metal with needle nose pliers and form the shapes I needed before soldering them.

Once you learn this method, you'll wish you had known about it sooner. It will sure make your life easier when it comes to making certain parts for a model ship whether it's a kit or a scratch-built model.

I hope this little tip will be useful to you for many years to come.

Bob Hunt

The Model Ship Plans Dilemma

Let's first get on the same page with vocabulary as that often trips folks up. When we talk about "plans", there are actually 2 types that are of concern to us as modelers:

1. **Historical Ship Plans** - these include drawings of actual ships both old and new obtained from sources such as the National Maritime Museum, Smithsonian, and ship building companies. Typically hand drafted, these plans can vary in the degree of detail and information included. They might only include basic elevation drawings, hull lofting lines, dimensions, and a few details. While others could include complete internal structural and systems details used by shipwrights to build the actual ships. A lot of ship plans can be found in the public domain and are royalty free. For example, if you purchase a set of plans from the Smithsonian they come rolled up in sheets like blueprints. Although much talk is made by modelers about obtaining historical ship plans, they are essentially useless for model building except by experienced scratch builders (more on this in a minute).
2. **Model Ship Plans** - these include drawings of model ships both on paper and in computer (CAD) format from sources such as publishers (Ancre, SeaWatch, etc) and individuals (Hahn, Staudt, Hunt, Passaro, Lankford, etc). Model ship plans are re-engineered from Historical Ship Plans to accommodate the build of scale models. Even the most detailed plank on frame models are not close to how real ships were built so cannot use actual historical plans. Differences in scale, materials, mass, fabrication techniques, physics, and practicality make it next to impossible to go directly from Historical Ship Plans to an actual physical model. The creation of model ship plans requires a vast amount of work far exceeding the actual build of a model itself. High quality model ship plans are extremely valuable and quite rare. Because of this, they are typically copyrighted, tightly guarded, owned by individuals, museums, foundations, model companies, publishers, etc.

So, while it is fairly easy to obtain Historical Ship Plans.... it is not so easy to obtain Model Ship Plans. This is the gap. There are not a lot of people in the world with the interest, skills, or time required to invest in creating Model Ship Plans because it is difficult to ensure any return on that laborious investment up front. We could be talking hundreds if not thousands of manhours work. Since the model ship building market is rather small (approx 1 million people not including China according to Forbes), kit companies with small margins are hesitant to invest what it would take to hire the talent and time required to do the work. When a model ship design does come to the surface, we suddenly see kits of the same ship pop up all over the place. Kit makers are looking for the quick way to market. Very few kit companies have their own internal R&D development teams that do the type of work Weasel Works is trying to do (i.e. innovate and build new models). Most kit companies want to purchase a proven design and then develop an efficient fabrication plan to mass produce that design with the hopes of earning a profit.

There is no short-cut, no skipping a step, and no magic path ... it is pure work. Developing good Model Ship Plans requires a mix of skills to include; model building, drafting, computer and CAD, wood working, fabrication techniques, mathematics, engineering and nautical knowledge. There are no schools that teach all of these things contextually together so it typically takes nearly a lifetime for an individual to acquire this on their own. There are also too few paying jobs in the field to make it an acknowledged occupation. This is why you see most people who design models are in the 55+ year old category. It tends to be a hobby more than a job. Unfortunately, the market needs the skillset in order to grow the hobby.

The fact is; most of your really good model ship designers are lone rangers who only work for themselves. Most are not on the internet and do not collaborate with other modelers. They don't buy or build kits and don't join forums. They may spend 5 years working up a set of model ship plans... build a prototype... then a model.. put the model in their showcase and that's it. The public never sees nor hears of it. Some may donate their work to a museum. As some die, their heirs may sell or donate their work (i.e. Hahn Estate). A few may sell their designs to kit companies for a fee. Fewer still may produce kits of their own design and market them. What I have liked seeing in the past few years is new kits coming from China (YQ, ZHL), Russia (Falkonet), and Marristella with all new designs and new subject matter. This is a positive step forward but as you have seen not always accepted by the old schoolers. Even with this, the R&D lifecycle required for the work is so long it takes forever for a new kit to come out.

Bottom line is; there is a proper methodology for designing a ship model. There just are not many influential investors knowledgeable enough nor a market large enough to sustain and grow what is already out there. This is why you still see 30-year-old kits of the same model. Did you know only about 1 or 2 of every 10 kits sold in the world ever get built? In addition, most of the market who buy new kits are repeat buyers... kit collectors...or people who buy every kit that comes out, puts them on a shelf and they never get built. Eventually this creates a glut so you see kits recycled on Ebay as folks die off, attics get cleared out, and garage sales occur. Not only that, we have a generational problem where younger folks don't seem interested so much in our hobby as it does not bring instant gratification. Kids would rather play computer games than build a model. For folks who do build models, it is typically not until later in life that they attempt wooden ship model building. We don't typically see people younger than mid-40's in our hobby, though they are out there. Part of this is back to the skill-set thing…it takes a while to learn. The other part is cost...takes time to afford tools, kits, bench, etc.

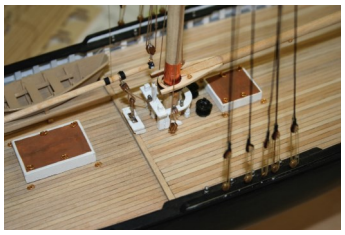
In conclusion, I hope my monologue gives you some insight into why it is difficult for you to find workable model ship plans that can be used legitimately for retail kit production. Although I have a good grasp on the "why" of the situation, I don't have an answer on how to solve the problem. My hope would be that a country as large as China would have the human resources for some young folks, with talent, to take advantage of this "gap" we have and build a new occupation in model ship design and start developing new ship models from the ground up. Don't use Ancre, don't reverse engineer other kits, don't use public domain, don't make deals with amateurs . Find some young smart college kids and do like I am doing with my work on the USRC Bear. Obtain some Historical Ship Plans of a ship that has NEVER been a kit, develop Model Ship Plans, build a prototype, do revisions to the plans, document everything, create a fabrication plan, produce a model and then if you wish market it on/off line or to model manufacturers who have the toolset and market to sell them to.

The College of Model Shipbuilding

by Robert E. Hunt @ www.lauckstreetshipyard.com

Hello, my name is Bob Hunt. I own a small business called Lauck Street Shipyard. I specialize in providing very detailed instruction on how to build model ships from kits or from scratch. Other subjects are also covered in detail as well, which are all part of my College of Model Ship Building

The college of Model Shipbuilding has courses for all levels of experience. For beginners, we have Prep School Courses. These are based on kits that are easier to plank, such as Model Shipways kit, Bluenose.



Our Freshman Courses are also a good place to start if you are a beginner. We have a number of these courses to choose from including our most popular, the Model Shipways kit Armed Virginia Sloop, Mayflower, or HMAV Bounty.

Our Sophomore Courses are designed for modelers with some experience who want to advance their skills and Techniques. These courses include such models as the USS Constitution, the HMS Vanguard, and the Pride of Baltimore.

Our Junior Courses are for modelers with much more experience who want to start learning kit bashing and scratch building. These courses include the Mamoli kit Rattlesnake and the Panart kit HMS Victory.

I hope you'll check out my website today to see all of the course I offer. Just go to https://www.lauckstreetshipyard.com. We also have video Practicums, and other very detailed Practicums on special subjects as learning CAD, learning different planking techniques, and how to rig a model ship. If you have any questions please send me an email at lauckstreet@gmail.com. Use coupon code **NEWMEMBER** at checkout of your first purchase and receive **20% off**!

Lauuck Street Shipyard is a division of LSS Enterprises Inc. (A West Virginia S Corp)

The Myth of left-handed hawser rope [in Ship Modeling]

For the period 1600-1830

by Dirk Karsten

Abstract

There seems to be much confusion amongst model-makers over the ways in which rope was laid for various functions in a ship. The three general ways (hawser-laid, shroud-laid and cable-laid) are clear in their definitions and uses, but the confusion seems to arise when modellers use the wrong lay of the rope for its different uses. Thus there have been many who have claimed that shrouds of 17th, 18th and mid 19th century ships are usually made with left handed plain rope. That is simply not correct. Only cable-laid rope is left-hand laid. It is true that cable-laid ropes were sometimes used as shrouds on large warships, but this was the exception. Shrouds usually used (especially on merchant shipping) were shroud-laid: that being four strands with a central line or heart, laid to the right.

I have seen many contemporary and actual Models, even from World Champions, with left -handed running rigging, and sometimes a mix of left- and right-handed running rigging. This made me wonder why this should be, as it seems at the least illogical.

There have also been many discussions about breeching rope on canons and/or carronades as to whether they were cable-laid or left-handed hawser-laid.

The bottom line is that there are a lot of contradictory statements that are basically never backed up with sources. Some of the wrong things have simply taken root as 'correct'.

This article tries to clear the air about the different uses of rope and show that Hawser-Laid Rope, used for all the running rigging were and is always right-handed, Z-Laid Rope.

It has to be acknowledged that the wide-spread use of left-handed running rigging or left-handed shrouds is historically wrong, unless made as cables or cablets.

Rope Basics

Two Definitions according to Paasch (Englisch & German)

Strand (of a rope). A number of rope-yarns etc., when twisted together make up a strand ; three or more strands laid together formin a rope.

Ducht eines Taues ; Tauducht**.** Der aus verschiedenen Kabelgarnen fest zusammengedrehte Theil eines Taus ; drei oder mehr geschlagenen Duchten bilden ein Tau.

Strand (of a cable-laid rope). One of the three hawser-laid-ropes employed to form a cable-laid-rope.

Kardeel. Benennung für eins der drei trossenweise geschlagenen Taue, aus denen ein kabelweise geschlagenes Tau hergestellt wird.

Source: Paasch, Captain H. (1901). From Keel to Truck, p. 358

Parts of the Rope

In the following images (Figure 1 & 2) you can see very nicely opposite directions of lay of strands and rope, i.e. even if I want to have a left-hand lay (to keep this terminology for the time being) hawser-laid rope, everything has to be spun, twisted and laid in opposite directions on the levels below.

Figure 1 - Source: Art and Science of Rope, May 2018,

DOI: 10.1007/978-3-319-70658-0_15-1

"For French and British post-medieval ship's cordage, it is proposed that we use the historical ropemaker's terms or their foreign-language equivalents, of yarns which are spun, strands which are formed, hawsers which are laid and cables which are closed (Fig. 2)."

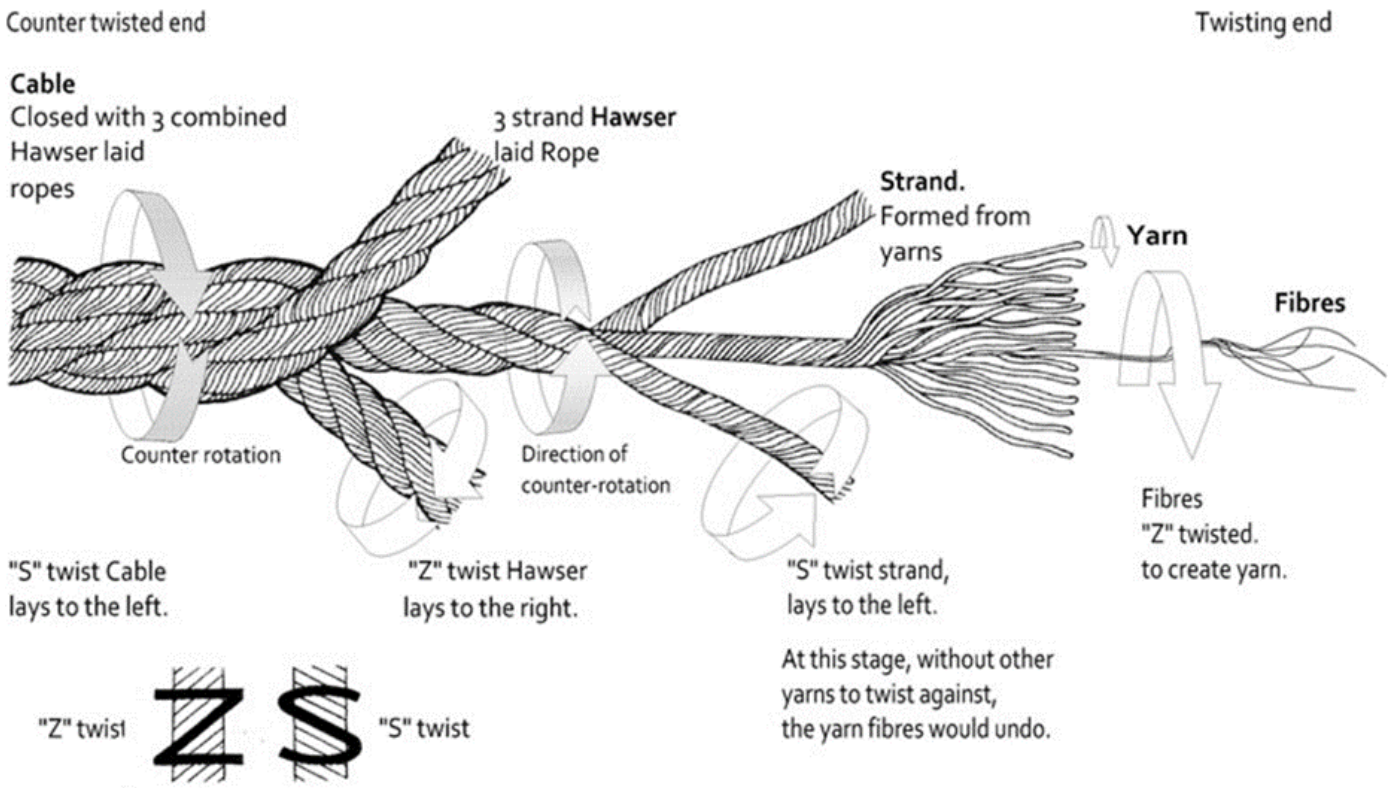


Figure 2 - Source: Knowing the Ropes: The Need to Record Ropes and Rigging on Wreck-Sites and Some Techniques for Doing So Damien Sanders, The International Journal of Nautical Archaeology (2010) 39.1: 2–26, doi: 10.1111/j.1095-9270.2009.00235.x, p. 7, Source: Illustration of generic post-medieval, machine-laid, cordage construction. (D. Sanders, after Tryckare, 1964: 140)

A source of misunderstandings: At around 1847 the wording changed in the USA!

"Hawser-laid and Cable-laid are the same"
Source: William Brady, The Kedge Anchor, 1852

"Former Hawser-laid is now "Common Rope" or "Plain Rope""
Source: Kipping, Rudimentary Treatise on Masting, Mast-Making, and Rigging of Ships, 1921, p. 70

Easy way to identify left (S-Laid)- or right (Z-Laid)-handed rope

Figure 3 - Left- & Right-Handed

Known Wordings in English & German

- **Hawser-Laid Rope** == **Trossenschlag** == Z-Schlag == Z-Twist == Rechts geschlagen aus drei Duchten == Right Handed == Laid with the sun == **Common Rope** == **Plain Rope**
- **Cable-laid Rope** == **Kabel** == S-Schlag == S-Twist == Links geschlagen aus drei Trossen (Kardeelen) == Kabelschlag == Left Handed == Laid against the sun
- **Shroud-Laid Rope** == **Wantschlag** == Z-Schlag == 4 Duchten mit Seele rechts geschlagen (4 strands with a heart, laid right) == Vierschäftiges Tau == Laid with the sun

A Word About Twist

What is meant by left and right lay?

A possible decisive reason for many misunderstandings regarding the direction of lay of ropes is the question of **what is meant by left and right lay. There is a difference between the direction of lay and the result of the lay**. Basically, one talks about the result of the lay, i.e. a right-hand layes hawser rope was made in the left-hand direction on a ropewalk.

The following chapter "A word about Twist" by B.Keith explains this important distinction very well.

by **B.Keith Ropemaker** - http://bkeithropemaker.com/index.html

If you look at Figure 2.6, you can see two ropes, one where the strands follow the center of the letter "Z", and one where the strands follow the letter "S".

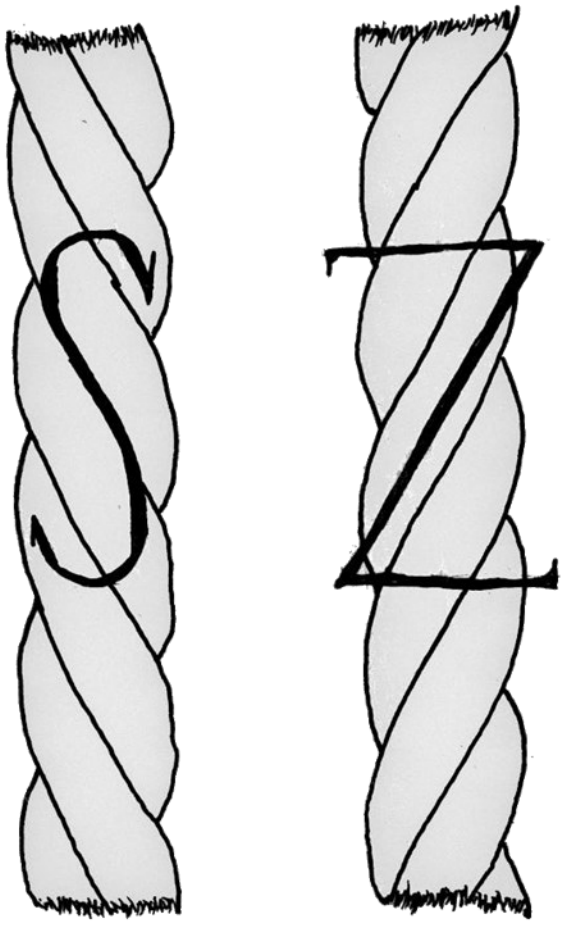
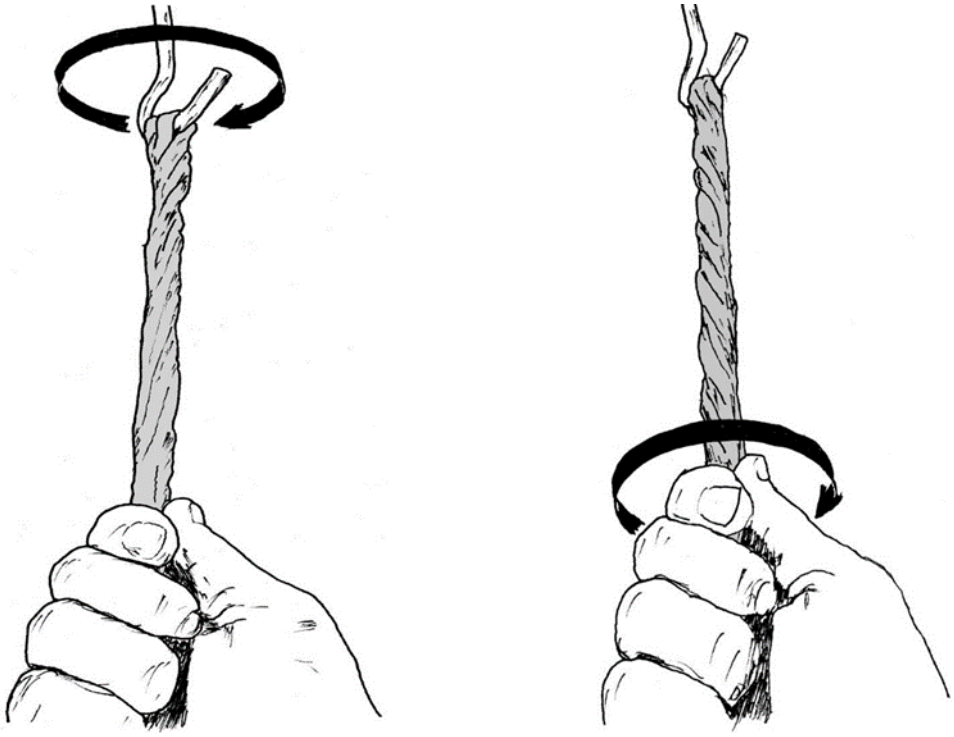


Figure 2.6: Twist Directions.

"S Twist" and "Z Twist" are the approved designations of the ASTM International (formerly known as the American Society for Testing and Materials) and the International Organization for Standardization (ISO). These are not Colonial period terms. These terms were adopted in the 20th Century to avoid confusion over terms like "right twist", "left twist", "clockwise", and "anticlockwise", terms you will often see in texts.

"S" and "Z" twist describe the shape of the rope, whereas right twist and left twist describe the process used in making the rope.



Crank Twisting Clockwise. *Hand Twisting Clockwise.*

Figure 2.7: Twist Perspective.

But the description depends on which part of the process you are talking about. If you are holding a handful of fibers, facing a crank, and the crank is turning clockwise (to the right), the bundle will get a Z twist, as shown in Figure 2.7 (left), above. If, on the other hand, the hook is stationary, and you are twisting the bundle of fibers clockwise (to the right) with your hand, the fibers get an S twist. You do not have to look very far to find a Z twist described as right twist, and left twist, and clockwise and anticlockwise.

Older texts talk of ropes laid "with the Sun". The Sun rises in the East and sets in the West, and its shadow on a sundial travels West to East. Clocks were designed so the hour hand mimics the motion of the gnomon's shadow. With the Sun, or with the Sun's shadow, is clockwise. But as just noted, clockwise can have two meanings when twisting fibers.

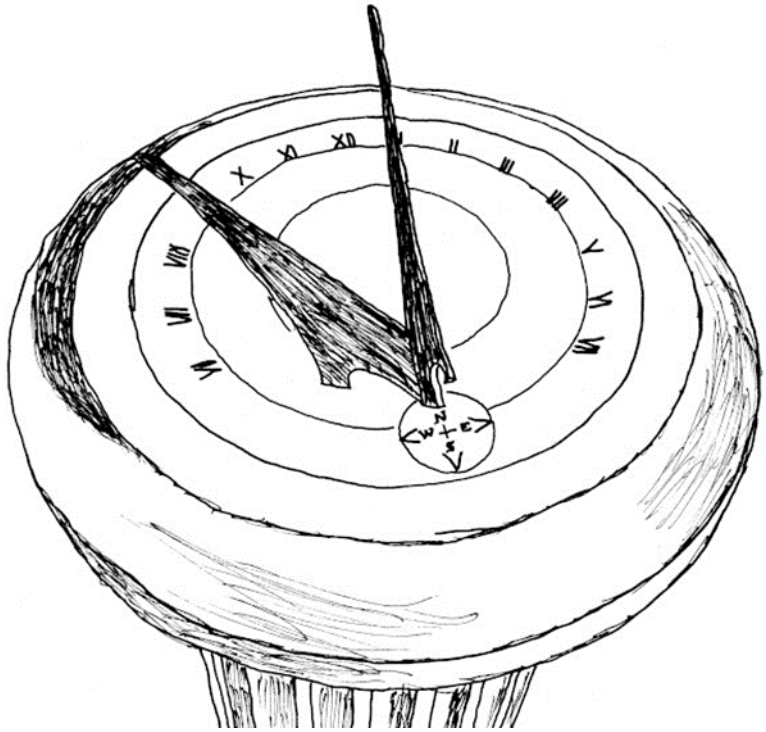


Figure 2.8 : Sundial - With the Sun.

Shakespeare (1564 - 1616) mentions clocks frequently in his plays but the fact is, in the American Colonies, in the late 1700s, clocks were still fairly rare. Benjamin Banneker is credited with producing the first American made clock in 1752. Which he carved out of wood.

Samuel Johnson's 1755 Dictionary defines the clock as, "The instrument which, by a series of mechanical movements, tells the hour by a stroke upon a bell." No mention of hands nor which way they turn.

According to the Oxford English dictionary, the word "clockwise" did not exist until after 1800.

If you said the word "clock", to a Scottish immigrant in the 18th Century, you would be understood to be talking about a "cloak", or the noise a chicken makes - "cluck", or one of several large beetles.

So if you are holding the loose ends of the fibers and want an S twisted yarn, then the crank has to turn counter clockwise, from your point of view.

But if you are giving instructions to the person turning the crank, you have to reverse your instructions since they are facing the crank from the other direction. From their perspective, they have to turn the crank clockwise.

Unless the crank they are turning is driving the hooks with gears. But that depends on how the gears are arranged....

It is easier to just show your cranker which direction to crank by making big hand circles.

Source: http://bkeithropemaker.com/Rope_Chapt_2.html

Contemporary Definitions

The Elements and Practice of Rigging And Seamanship
David Steel, 1794

p. 54 "**CABLES**, ropes made of nine strands, that are nine inches and upwards in circumference."

p. 55 "**HAWSERS**, ropes made of three or four single strands. When made of four strands it is called **shroud-laid**, and is used in merchant-ships."

"**HEART**, a strand slack twisted, used in some four-strand ropes it is run down the middle, to fill the vacancy that would otherwise occur, and thereby forms a round. It is best **hawser-laid.**"

"**LAYING**, the closing of the strands together to compose the rope."

p. 57 "**STRAND**, one of the twists or divisions of which a rope is composed."

p. 59 "**YARN**, called twenty-five, twenty, and eighteen thread yarn, differs only in the fineness; the twenty-five being finer than the twenty, &c. It is thus distinguished, because either twenty-five, twenty, or eighteen threads a hook, make a rope of three inches in circumference, and so in proportion."

p. 61 "**STAY-ROPES** have four strands, with a heart running through the middle, which keeps the rope true; and, when hawser-laid, as a rope, prevents it from stretching, and the strands have each their proper bearing.

The stays are made of fine yarn, spun from the best topt hemp. Twenty threads a-hook make a rope 3 inches in circumference, and so in proportion for any size. The yarn is warped to the length and size for the stay wanted. The strands are warped long enough for one strand to make two, when hauled about and hung upon the back-hook. By this an eye is left for the upper-end of the stay to go through and form a collar to go over the mast-head.

For stays of 9 inches in circumference, each strand should be 3 inches and a half, and so in proportion. The heart must be near the size of the strand, or the rope will not lie round and true.

Particular attention should be paid in making the stays, as on them the safety of the mast, &c. greatly depends.

Main, fore, and mizen, topmast, and some topgallant-mast, stays are cable-laid."

p. 62 "**TILLER-ROPE** is made of fine white 25-thread yarn, untarred, and contains **3 or 4 strands, with or without a heart**. It is **laid harder** than other ropes."

"Ropes, from 2 inches to the largest size, for running rigging, are hawser-laid, and made of 3 strands on a sledge: these take more hardening and closing than those made on a wheel, and, when laid, stand 120 to 130 fathoms. They should be short-laid, a good hard kept up before, and the hook or wheel turned briskly about behind; but it depends much

on the judgement of the layer."

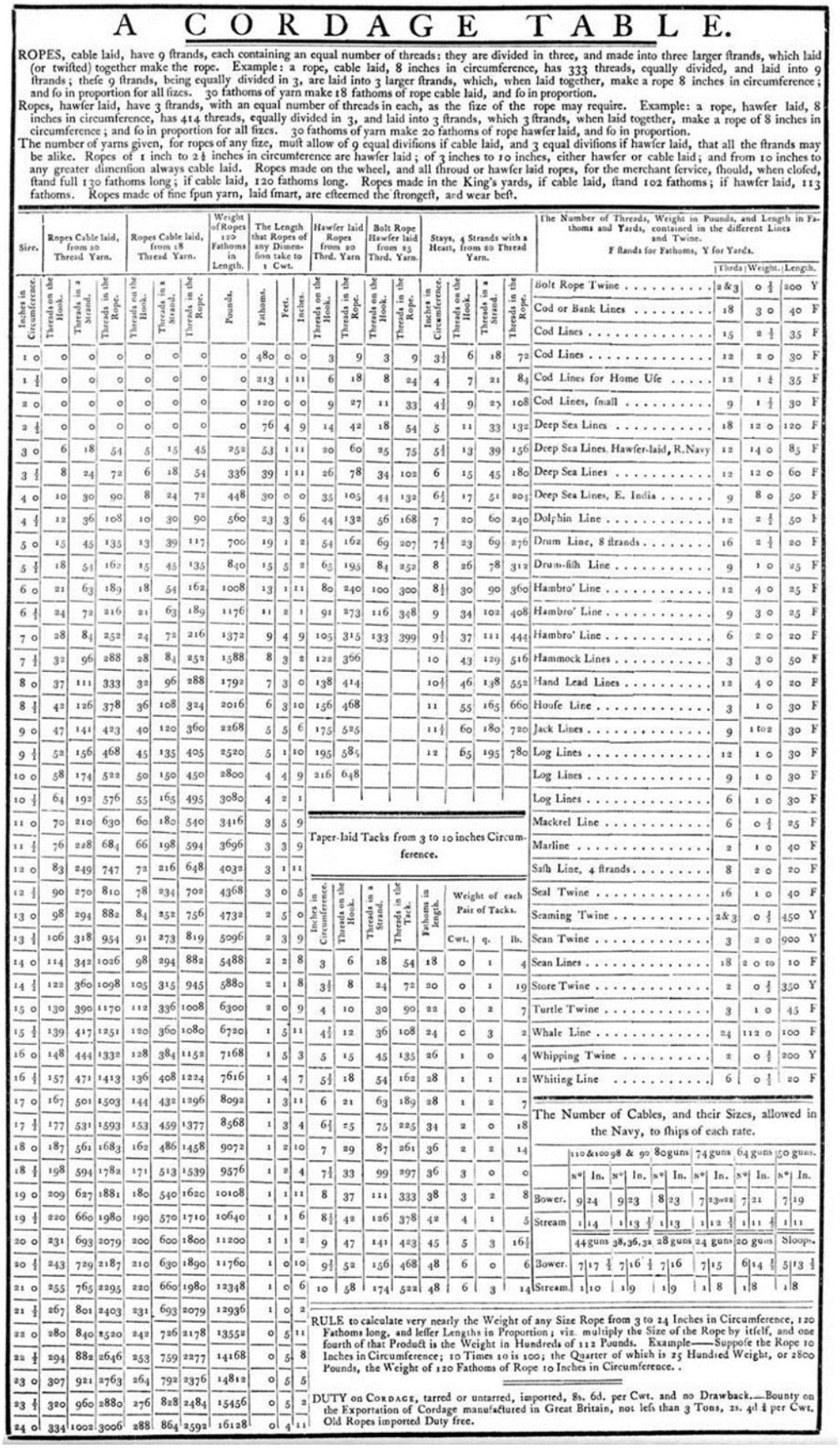
"Ropes made of hemp inferior to Petersburgh braak hemp, viz. half clean or out-shot, ground-tows, and white oakum, purchased as old stores from the navy sales, &c. are easily known by opening the end for two or three feet, untwisting the strands, and opening the yarn a little way; if it appears short, in using it will stretch, and lessen in the circumference.

Ropes made from topt hemp will not stretch so much as common cordage, for the short hemp taken from it hinders it from receiving so much tar."

"Deep-sea lines are **hawser-laid**; hand lead-lines, marline, house and sean lines, sean-ropes, and hammock-lines, are made from groundtows or inferior hemp dressed down to shorts, and what comes from it makes oakum."

p. 64 "Deep-sea lines, for the royal navy, are of 12 threads, **hawser-laid**. Eighty-five fathoms weigh 14 pounds.

Deep-sea lines of 12 threads, **hawser-laid**, are generally for exportation. They have 3 strands, 4 threads in a strand, spun 160 yards, and stand 60 fathoms, which weigh 12 pounds."



A CORDAGE TABLE.

ROPES, cable laid, have 9 ſtrands, each containing an equal number of threads: they are divided in three, and made into three larger ſtrands, which laid (or twiſted) together make the rope. Example: a rope, cable laid, 8 inches in circumference, has 333 threads, equally divided, and laid into 9 ſtrands; theſe 9 ſtrands, being equally divided in 3, are laid into 3 larger ſtrands, which, when laid together, make a rope 8 inches in circumference; and ſo in proportion for all ſizes. 30 fathoms of yarn make 18 fathoms of rope cable laid, and ſo in proportion.

Ropes, hawſer laid, have 3 ſtrands, with an equal number of threads in each, as the ſize of the rope may require. Example: a rope, hawſer laid, 8 inches in circumference, has 414 threads, equally divided in 3, and laid into 3 ſtrands, which 3 ſtrands, when laid together, make a rope of 8 inches in circumference; and ſo in proportion for all ſizes. 30 fathoms of yarn make 20 fathoms of rope hawſer laid, and ſo in proportion.

The number of yarns given, for ropes of any ſize, muſt allow of 9 equal diviſions if cable laid, and 3 equal diviſions if hawſer laid, that all the ſtrands may be alike. Ropes of 1 inch to 2½ inches in circumference are hawſer laid; of 3 inches to 10 inches, either hawſer or cable laid; and from 10 inches to any greater dimenſion always cable laid. Ropes made on the wheel, and all ſhroud or hawſer laid ropes, for the merchant ſervice, ſhould, when cloſed, ſtand full 130 fathoms long; if cable laid, 120 fathoms long. Ropes made in the King's yards, if cable laid, ſtand 102 fathoms; if hawſer laid, 113 fathoms. Ropes made of fine ſpun yarn, laid ſmart, are eſteemed the ſtrongeſt, and wear beſt.

Size.	Ropes Cable laid, from 20 Thread Yarn.			Ropes Cable laid, from 18 Thread Yarn.			Weight of Ropes 120 Fathoms in Length.	The Length that Ropes of any Dimenſion take to 1 Cwt.			Hawſer laid Ropes from 20 Thrd. Yarn		Bolt Rope Hawſer laid from 23 Thrd. Yarn.		Stays, 4 Strands with a Heart, from 20 Thread Yarn.		
Inches in Circumference.	Threads on the Hook.	Threads in a Strand.	Threads in the Rope.	Threads on the Hook.	Threads in a Strand.	Threads in the Rope.	Pounds.	Fathoms.	Feet.	Inches.	Threads on the Hook.	Threads in the Rope.	Threads on the Hook.	Threads in the Rope.	Inches in Circumference.	Threads on the Hook.	Threads in a Strand.	Threads in the Rope.
1 0	0	0	0	0	0	0	0	480	0	0	3	9	3	9	3½	6	18	72
1 ¼	0	0	0	0	0	0	0	213	1	11	6	18	8	24	4	7	21	84
2 0	0	0	0	0	0	0	0	120	0	0	9	27	11	33	4½	9	27	108
2 ¼	0	0	0	0	0	0	0	76	4	9	14	42	18	54	5	11	33	132
3 0	6	18	54	5	15	45	252	53	1	11	20	60	25	75	5½	13	39	156
3 ¼	8	24	72	6	18	54	336	39	1	11	26	78	34	102	6	15	45	180
4 0	10	30	90	8	24	72	448	30	0	0	35	105	44	132	6½	17	51	204
4 ¼	12	36	108	10	30	90	560	23	3	6	44	132	56	168	7	20	60	240
5 0	15	45	135	13	39	117	700	19	1	2	54	162	69	207	7½	23	69	276
5 ¼	18	54	162	15	45	135	840	15	5	2	65	195	84	252	8	26	78	312
6 0	21	63	189	18	54	162	1008	13	1	11	80	240	100	300	8½	30	90	360
6 ¼	24	72	216	21	63	189	1176	11	2	1	91	273	116	348	9	34	102	408
7 0	28	84	252	24	72	216	1372	9	4	9	105	315	133	399	9½	37	111	444
7 ¼	32	96	288	28	84	252	1588	8	3	2	122	366			10	43	129	516
8 0	37	111	333	32	96	288	1792	7	3	0	138	414			10½	46	138	552
8 ¼	42	126	378	36	108	324	2016	6	3	10	156	468			11	55	165	660
9 0	47	141	423	40	120	360	2268	5	5	6	175	525			11½	60	180	720
9 ¼	52	156	468	45	135	405	2520	5	1	10	195	585			12	65	195	780
10 0	58	174	522	50	150	450	2800	4	4	9	216	648						
10 ¼	64	192	576	55	165	495	3080	4	2	1								
11 0	70	210	630	60	180	540	3416	3	5	9								
11 ¼	76	228	684	66	198	594	3696	3	3	9								
12 0	83	249	747	72	216	648	4032	3	1	11								
12 ¼	90	270	810	78	234	702	4368	3	0	5								
13 0	98	294	882	84	252	756	4732	2	5	0								
13 ¼	106	318	954	91	273	819	5096	2	3	9								
14 0	114	342	1026	98	294	882	5488	2	2	8								
14 ¼	122	360	1098	105	315	945	5880	2	1	8								
15 0	130	390	1170	112	336	1008	6300	2	0	9								
15 ¼	139	417	1251	120	360	1080	6720	1	5	11								
16 0	148	444	1332	128	384	1152	7168	1	5	3								
16 ¼	157	471	1413	136	408	1224	7616	1	4	7								
17 0	167	501	1503	144	432	1296	8092	1	3	11								
17 ¼	177	531	1593	153	459	1377	8568	1	3	4								
18 0	187	561	1683	162	486	1458	9072	1	2	10								
18 ¼	198	594	1782	171	513	1539	9576	1	2	4								
19 0	209	627	1881	180	540	1620	10108	1	1	11								
19 ¼	220	660	1980	190	570	1710	10640	1	1	6								
20 0	231	693	2079	200	600	1800	11200	1	1	2								
20 ¼	243	729	2187	210	630	1890	11760	1	0	10								
21 0	255	765	2295	220	660	1980	12348	1	0	6								
21 ¼	267	801	2403	231	693	2079	12936	1	0	2								
22 0	280	840	2520	242	726	2178	13552	0	5	11								
22 ¼	294	882	2646	253	759	2277	14168	0	5	8								
23 0	307	921	2763	264	792	2376	14812	0	5	5								
23 ¼	320	960	2880	276	828	2484	15456	0	5	2								
24 0	334	1002	3006	288	864	2592	16128	0	4	11								

Taper-laid Tacks from 3 to 10 inches Circumference.

Inches in Circumference.	Threads on the Hook.	Threads in a Strand.	Threads in the Tack.	Fathoms in length.	Weight of each Pair of Tacks. Cwt.	q.	lb.
3	6	18	54	18	0	1	4
3¼	8	24	72	20	0	1	19
4	10	30	90	22	0	2	7
4½	12	36	108	24	0	3	2
5	15	45	135	26	1	0	4
5½	18	54	162	28	1	1	12
6	21	63	189	28	1	2	7
6½	25	75	225	34	2	0	18
7	29	87	261	36	2	2	14
7½	33	99	297	36	3	0	0
8	37	111	333	38	3	2	8
8½	42	126	378	42	4	1	5
9	47	141	423	45	5	3	16½
9½	52	156	468	48	6	0	6
10	58	174	522	48	6	3	14

The Number of Threads, Weight in Pounds, and Length in Fathoms and Yards, contained in the different Lines and Twine. F ſtands for Fathoms, Y for Yards.	Threds	Weight.	Length.	
Bolt Rope Twine	2 & 3	0 ½	200	Y
Cod or Bank Lines	18	3 0	40	F
Cod Lines	15	2 ½	35	F
Cod Lines	12	2 0	30	F
Cod Lines for Home Uſe	12	1 ½	35	F
Cod Lines, ſmall	9	1 ½	30	F
Deep Sea Lines	18	12 0	120	F
Deep Sea Lines. Hawſer-laid, R. Navy	12	14 0	85	F
Deep Sea Lines	12	12 0	60	F
Deep Sea Lines, E. India	9	8 0	50	F
Dolphin Line	12	2 ½	50	F
Drum Line, 8 ſtrands	16	2 ½	20	F
Drum-fiſh Line	9	1 0	25	F
Hambro' Line	12	4 0	25	F
Hambro' Line	9	3 0	25	F
Hambro' Line	6	2 0	20	F
Hammock Lines	3	3 0	50	F
Hand Lead Lines	12	4 0	20	F
Houſe Line	3	1 0	30	F
Jack Lines	9	1 to 2	30	F
Log Lines	12	1 0	30	F
Log Lines	9	1 0	30	F
Log Lines	6	1 0	30	F
Mackrel Line	6	0 ½	25	F
Marline	2	1 0	40	F
Saſh Line, 4 ſtrands	8	2 0	20	F
Seal Twine	16	1 0	40	F
Seaming Twine	2 & 3	0 ¼	450	Y
Sean Twine	3	2 0	900	Y
Sean Lines	18	2 0 to	10	F
Store Twine	2	0 ½	350	Y
Turtle Twine	3	1 0	45	F
Whale Line	24	112 0	100	F
Whipping Twine	2	0 ½	200	Y
Whiting Line	6	0 ½	20	F

The Number of Cables, and their Sizes, allowed in the Navy, to ſhips of each rate.

	110 & 100 guns		98 & 90 guns		80 guns		74 guns		64 guns		50 guns.	
	8	In.	8	In.	8	In.	8	In.	8	In.	8	In.
Bower.	9	24	9	23	8	23	7	23 to 22	7	21	7	19
Stream	1	14	1	13 ½	1	13	1	12 ½	1	11 ½	1	11
	44 guns		38, 36, 32 guns				24 guns		20 guns		Sloops.	
Bower.	7	17 ½	7	16 ½	7	16	7	15	6	14 ½	5	13 ½
Stream.	1	10	1	9	1	9	1	8	1	8	1	8

RULE to calculate very nearly the Weight of any Size Rope from 3 to 24 Inches in Circumference, 120 Fathoms long, and leſſer Lengths in Proportion; viz. multiply the Size of the Rope by itſelf, and one fourth of that Product is the Weight in Hundreds of 112 Pounds. Example——Suppoſe the Rope 10 Inches in Circumference; 10 Times 10 is 100; the Quarter of which is 25 Hundred Weight, or 2800 Pounds, the Weight of 120 Fathoms of Rope 10 Inches in Circumference.

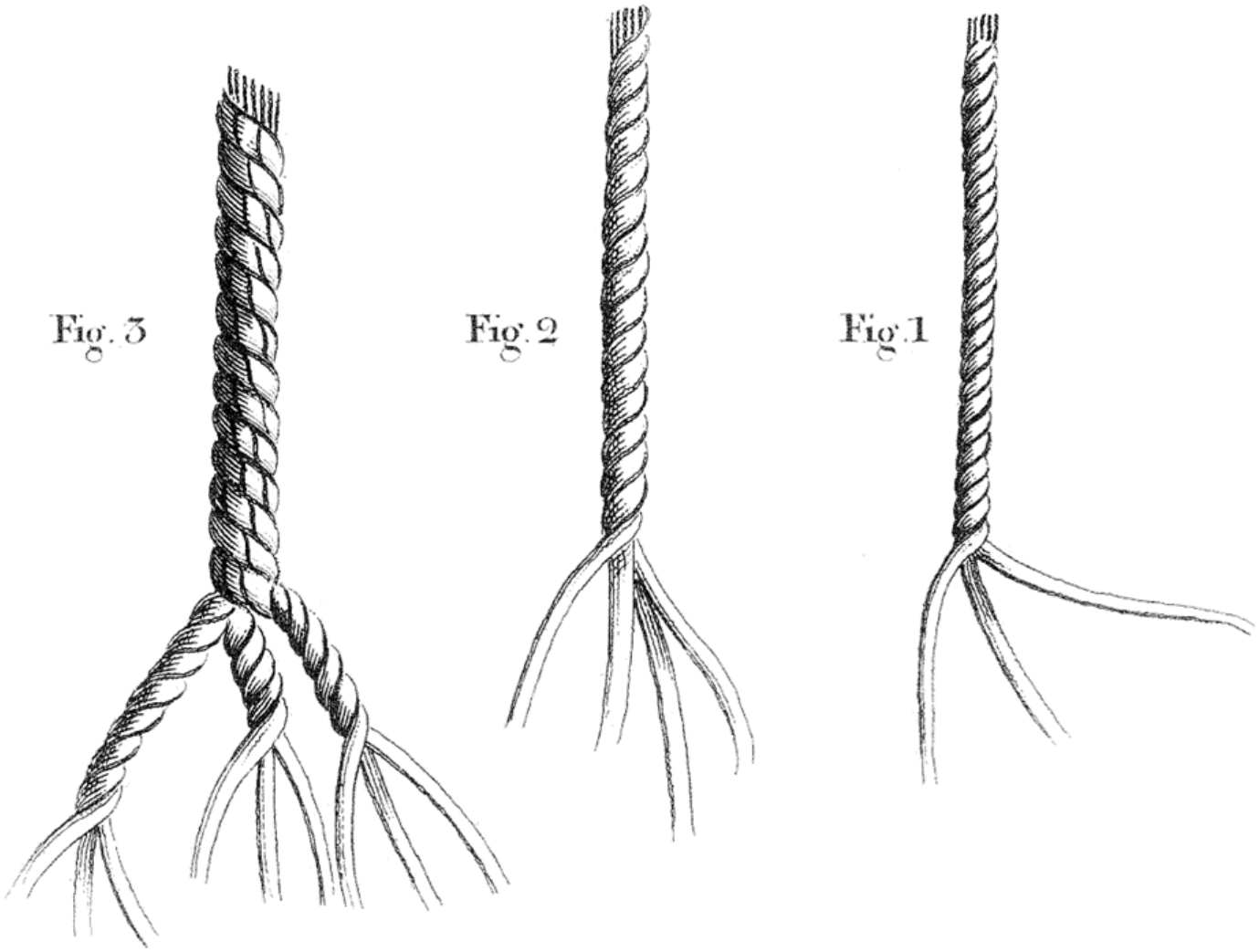
DUTY on CORDAGE, tarred or untarred, imported, 8s. 6d. per Cwt. and no Drawback.—Bounty on the Exportation of Cordage manufactured in Great Britain, not leſs than 3 Tons, 2s. 4d ½ per Cwt. Old Ropes imported Duty free.

Figure 4 - Rope table according to Steel for the Royal Navy. There is no left-hand hawser laid rope listed or differentiated or even mentioned in Steel, which certainly should be if this rope existed.

The young sea officer's sheet anchor
Darcy Lever, 1808

p. 1 "A proportion of yarns (covered with tar) are first twisted together. This is called a Strand; three or more of which being twisted together, form the rope: and according to the number of these strands, it is said to be either **Hawser-laid, Shroud-laid, or Cable-laid.**"

p. 2 "**A HAWSER-LAID ROPE**, Fig. 1, Is composed of three single strands, each containing an equal quantity of yarns, and is laid right-handed, or what is termed with the sun.
A **SHROUD-LAID ROPE**, Fig. 2, Consists of four strands of an equal number of yarns, and is also laid with the sun.
A **CABLE-LAID ROPE**, Fig. 3, Is divided into nine strands of an equal number of yarns : these nine strands being again laid into three, by twisting three of the small strands into one. It is laid left-handed, or against the sun.



p. 22 "**SHROUDS** sometimes are **cable-laid** ; but they are now generally **shroud or hawser-laid**. (See p. 2). They are taken round two fids, or short posts (a, c, Fig. 164)."

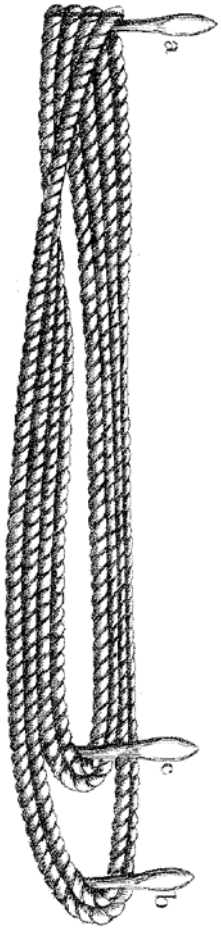


Fig. 164

Fig.167

"Near the end of each pair of shrouds, a dead-eye is turned in, with a throat-seizing, (see p. 9): left-handed, if **cable-laid,, right-handed, if hawser-laid**. In the latter case, the ends of the shrouds will lie forwards, on the larboard side, and aft, on the starboard side. Fig. 167 represents a dead-eye on the starboard side, and the inner side of the deadeye. The end part of the shroud (i) is stopped to the standing part (k), by two round seizings (see p. 9): the end is whipped, and a piece of canvas, tarred, is put over it, called a cap (1)."

Kedge Anchor
William Brady, 1847, p. 84

NAMES OF ROPE
The different kinds of ropes are designated as follows :— **Hawser-laid and cable-laid rope is all the same** ; it is composed of nine strands, each strand having an equal number of yarns. These nine strands are laid into three, by twisting three small ones into one large one ; then the three large ones are laid up, 6r twisted together left-handed, which makes the nine strands ; this is a **hawser-laid**, or **cabled**, rope. A common or plain rope is composed of three strands, of an equal number of yarns twisted together. Shroud-laid rope is made in the same manner, only that it consists of four strands instead of three, and a small strand which runs through the middle, termed the heart of the rope.

When plain-laid rope is laid up left-handed, it is called back-laid rope. There is also four stranded hawser-laid rope, which is used for stays, &c. &c.

Rudimentary Treatise on Masting, Mast-Making, and Rigging of Ships

Kipping, 1853 & 1921, p.70

One of the very rare references to left handed "plain-laid rope". Note the date.
"When plain-laid rope is laid up left-handed, it is called water or back-laid rope. There is also a four-stranded hawser-laid rope, which is used for stays, &c."

Text-Book of Seamanship, The equipping and handling of Vessels under Sail and Steam

Commodore S.B. Luce, US Navy, 1891, p. 22

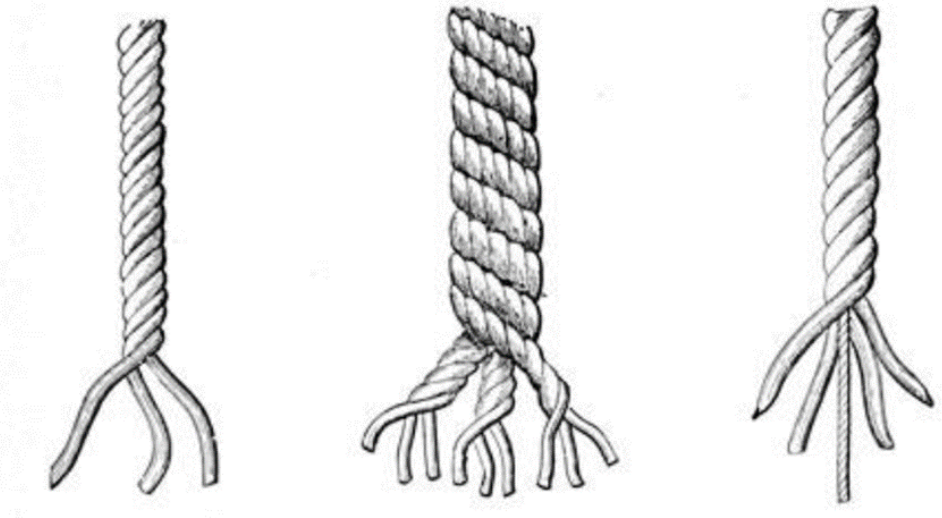
Varieties of Rope. <u>In rope-making the general rule is to spin the yarn from right over to left.</u> All rope yarns are therefore **right-handed**. The **strand**, or ready, formed by a combination of such yarns, **becomes left-handed. Three of these strands being twisted together form a right-handed rope**, known as plain-laid rope. Fig. 14, Plate 7.

White Rope. Hemp rope, when plain-laid and not tarred in laying-up, is called white rope, and is the strongest hemp cordage. It should not be confounded with Manilla. It is used for log-lines and signal halliards. The latter are also made of yarns of untarred hemp, plaited by machinery to avoid the kinking common to new rope of the ordinary make. This is called “plaited stuff,” or “signal halliard stuff.”

The tarred plain-laid ranks next in point of strength, and is in more general use than any other. The lighter kinds of standing rigging, much of the running rigging, and many purchase falls are made of this kind of rope.

Plate 7

Fig.14 Fig.15 Fig.16



Cable-laid or Hawser-laid Rope, Fig. 15, is left-handed rope of nine strands, and is so made to render it impervious to water, but the additional twist necessary to lay it up seems to detract from the strength of the fibre, the strength of plain-laid being to that of cable-laid as 8.7 to 6; besides this, it stretches considerably under strain.

Back-handed Rope. In making the plain laid, it was said that the readies were left-handed, the yarns and the rope itself being right-handed. If, instead of this, the ready is given the same twist the yarn has (right-handed), then, when brought together and laid up, the rope must come left-handed. This is called left-handed or back-handed rope. It is more pliable than the plain-laid, less liable to kinks and grinds when new, and is allowed, in the navy, for reeving off lower and topsail braces.

Shroud-laid. Rope, Fig. 16, Plate 7, is formed by adding another strand to the plain-laid rope. But the four spirals of strands leave a hollow in the centre, which, if unfilled, would, on the application of strain, permit the strands to sink in, and detract greatly from the rope's strength, by an unequal distribution of strain. The four strands are, therefore, laid up around a heart, a small rope, made soft and elastic, and about one-third the size of the strands.

Experiments show that four-stranded rope, when under 5 inches, is weaker than three-stranded of the same size; but from 5 to 8 inches, the difference in strength of the two kinds is trifling, while all above 8 inches is considered to be equal to plain-laid when the rope is well made.

Four-stranded rope is now but little used except for lifts, preventer-parrels, Jacob's ladders and rigging laniards.

Current Research

The Lay of Rope, John H. Harland, Published online: 05 Feb 2014.

The Mariner's Mirror
http://www.tandfonline.com/loi/rmir20

p.84 "My own epiphany about the importance of point of view in this context occurred 70 years ago. Instructor Chief Petty Officer Finch had explained to us training ship recruits: 'A hawser is composed of three single strands, laid up right-handed.' We were all holding bits of rope in our hands and I was unwise enough to ask: 'But Chief, aren't the strands twisting up lefthanded?' This was not well received, but I did learn an invaluable lesson. In the navy, when struck by a bright idea, there is much to be said for keeping it to oneself. Figure 5 makes clear why we were at cross-purposes. Looking directly at the cut end of the rope (A), the strands are laid up counterclockwise (left-handed). By convention, the observer looks along the length of the rope towards the end (B), with the strands twisting up clockwise."

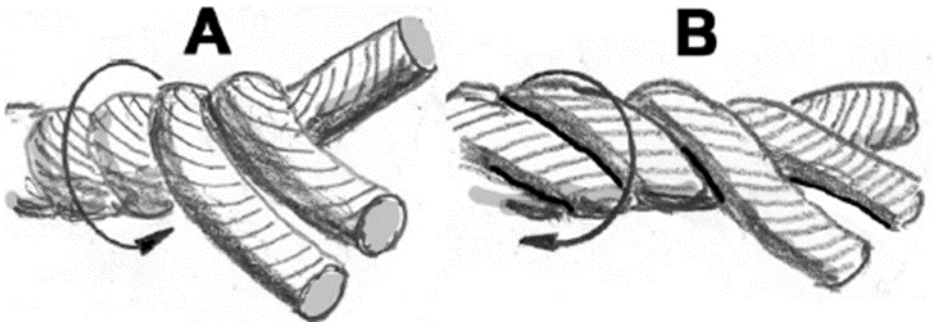


Figure 5 - The spirality of a rope from the cut

p.87 "**Left-hand laid rope**
My conclusion is that RHL predominates, not for any specific reason, but simply because ropemakers have always made it that way. In most maritime applications the lay of the rope doesn't matter in the least, but LHL ropes were in fact produced for some purposes, starting of course with cable-laid cables, laid up by twisting three RHL ropes left-handedly, as seen in figure 1. Cables were used for the heaviest stays and shrouds and for anchor-cable. There are few detailed contemporary references to LHL, but we can offer a couple: Luce describes back-handed rope as follows:

In making the plain laid, it was said the readies (strands) were left-handed and the rope itself right-handed. If instead, the ready is given the same twist as the yarn (righthanded), when brought together and laid up, the rope must come left-handed. This is lefthand or backhanded rope. It is more pliable than plain-laid rope, less liable to kinks and grinds when new, and is allowed in the navy for reeving off lower and topsail braces.

Burney gives a similar description for cordage used with gun side-tackles:

Gun Gear is hawser-laid three-stranded left-handed rope, generally termed *reverselaid rope*. The yarns and strands being laid up right-handed, and the rope left-handed, renders it soft and more easy to handle; for all it is not so durable, as it is more apt to admit the wet and cause it to rot.20"

Source: Burney, Boy's Manual of Seamanship, S.90, 1871

…

"Neither of these are true mirror images of RHL rope, but it would be difficult to distinguish the difference between this and back-laid rope without careful examination. Ashley comments that 'Lang lay' wire rope was constructed in a somewhat similar fashion. The difference is that instead of yarns and strands having the same twist, strands and wire rope have the same twist, as shown in figure 6."

Figure 6 - Lang lay wire rope (Author's sketch)

"John Lang patented this arrangement in **1879**, claiming it wore better than regular lay. Limited quantities of LHL laid were used for the head-ropes of seine nets. A single RHL headrope tended to kink or roll undesirably, because of its internal torque, and this could be neutralized by twinning it with a LHL hawser of similar size."

p.85 "**Right or left lay? Our asymmetrical world**

In 2003 R&W Rope of New Bedford supplied 27 miles of RHL rope, to rig the replica frigate featured in the film Master and Commander. At the time it was asserted that this was anachronistic, in that the rope would have had a left-hand lay in Napoleonic times. This claim is patently incorrect, but it does raise the question why the rope would have had a particular lay in the first place, and why, apart from cable-laid cordage, left hand rope is virtually unknown. In fact, this just confirms the inherent asymmetricality of our world, with imbalance being the rule rather than the exception. As Pasteur put it: L'univers est dissymétrique; and the phenomenon is beautifully illustrated in nature by a study on twining vines, which showed that 92 per cent of climbing vines spiral upward in a right-handed twist, as shown in figure 7."

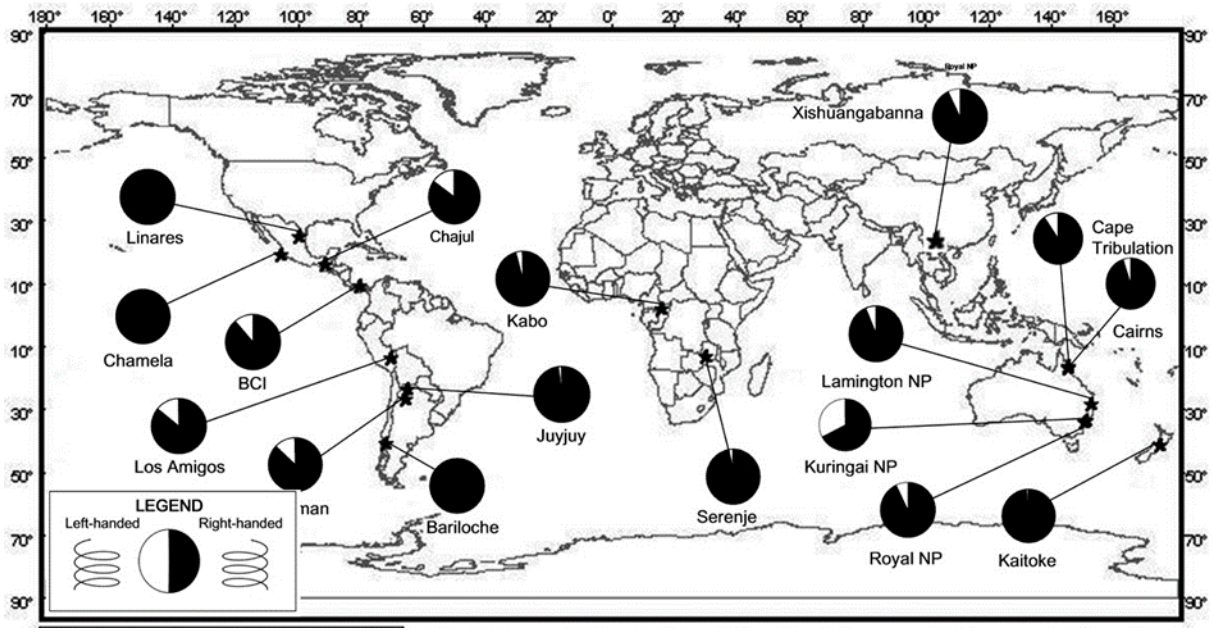


Figure 7 - Twining vines: the white segments show the small proportion of left-handed twists

Harland is largely confirming that right-handed, hawser laid was "standard".

Knowing the Ropes: The Need to Record Ropes and Rigging on Wreck-Sites and Some Techniques for Doing So, Damien Sander, 04 Feb 2010

Gun-carriage cordage

Again on Victory, below decks, all the gunbreeching-ropes are made from either left-laid or possibly reverse-laid ropes (see definitions above), as is the messenger for the anchor-cable. I have never personally found either rope-type on any wreck-site, and have not been able to discover when or where the decision to have these made specially for Victory originated. This goes back to at least the 1950s, when photographs of the quarterdeck show breeching-ropes which appear to be plain-laid (Z-twist hawser), but with S-twist ones on the main gundeck. In the mid-1990s all the gun-breeching ropes were switched to S-twist. More recently the anchor messenger-cable which in the 1950s photographs was a cable has been altered to an S-twist hawser (see earlier comments about the ability to make such ropes as hawsers in the 18th century).

I have been told, and Ashley (1993: 112) states, that backhanded or reverse-laid rope was used for gun-tackle ropes, and also hammocks, because it was less liable to tangle. **Whether this is folklore, and, if not, when and how widely it was adopted, is something for archaeologists to help establish.** Again, the only S-twist hawser-laid rope I have encountered is a short length found in the hull of the Newport ship. Currently both gun-tackle ropes and hammock-lines on Victory are made of hawser-laid rope. Iconographic evidence is totally unreliable. Even if the original drawing was faithful, both it and a subsequent photograph can get reversed during printing and copying processes. **For example, there is a drawing from the Illustrated London News of 28 October 1876 showing one of Victory's guns with S-twist breeching and gun-tackle rope. It has probably been reversed. Many of du Monceau's images are either re-engraved copies, or were not cut as mirror images by the engraver. Once printed, this has turned many of his workers into left-handers, and turned S-cordage into Z.**

A photograph taken on HMS Superb by Nicolaas Henneman in *1845*(!!) (Science and Society Picture Library ref. 10323490), shows S-laid breeching-ropes which appear to be hawsers, not cables, around the 32-pounder guns, and Z-laid shrouds. Other Z-hawser-laid ropes in the image do indicate that in this case the print has not been reversed. An additional twist is the re-use of old rigging elements elsewhere on a vessel. **John Sellar (1691: 162) states that a gunner's stores should include old shrouds for breeching and twice-laid stuff for tackles.** Add this to the probable lack of standardisation of shroud cordage discussed earlier, and it suggests that a whole range of ropetypes might be used on guns, and that the origin of the recent Victory tradition might be as simple as someone who could not distinguish a hawser from a cable lay.

We need to find gun-tackle and breeching-ropes in situ on archaeological sites. Vasa has both, and both are regular three-stranded, Z-laid rope (pers. comm. Fred Hocker). These items have also recently been found on Stirling Castle and Northumberland, wrecked during the great storm in 1703. The Stirling Castle's breech rope is Z-laid hawser, as are the ropes associated with the tackles (McElvogue, 2008). The matter is important, because S-twist hawser-laid breeching-ropes have appeared on HMS Warrior and in association with the Hermione replica in Rochefort. **If this has no historical basis, the spread of the 'contagion' needs to be stopped promptly, or S-twist hawsers of varying confections will be appearing all over the place,** and at considerable unecessary expense.

Source: Knowing the Ropes: The Need to Record Ropes and Rigging on Wreck-Sites and Some Techniques for Doing So, Damien Sanders , The International Journal of Nautical Archaeology (2010) 39.1: S.23/24, doi: 10.1111/j.1095-9270.2009.00235.x

About contemporary Models as Source

We tend to evaluate, to want to evaluate contemporary models as a reliable, meaningful source. Surely the model makers of the time must have known and done everything right. Unfortunately, this is dangerous and often leads astray.

Scott Bradner (https://www.sobco.com/) did a careful review of the models in the **U.S. Naval Museum** looking for rope directions. With very inconsistent results.

- **About 35 relevant models**

Rigging repaired on most, so an unreliable indicator
Except *St. George* – original 1701 silk rigging

- 32 have left-handed stays
  14 clearly cable-laid

- 13 have left-handed shrouds & backstays
  Some cable-laid

- Key models?
  St. George
  Cable-laid stays, right-handed shrouds & backstays

- 3 POW models
  Cable-laid shrouds, left-handed stays & backstays

Source: https://www.sobco.com/presentations/2019-10-01-obsessing.pdf, p. 16

Conclusions

- Three-strand 'Hawser-Laid' Rope is laid right-handed and is the plain/standard rope.

- Four-strand 'Hawser-Laid' rope with a heart is laid right-handed and also called 'Shroud-Laid.

- Cable is laid from three or sometimes four strands (see Sanders) of Hawser/Shroud-Laid Rope as left-handed. It has a circumference of more than 9 inches.

- "Cablets" are laid from three or sometimes four strands (see Sanders) of Hawser-/ Shroud-Laid Rope as left-handed and have a circumference of less than nine inches.

- Cable originated from the necessity that at that time it was not possible to lay "Hawser-Laid" ropes larger than nine inches.

- Cable & Cablets are weaker than "Hawser-Laid" but less sensitive to weather.

- According to Sanders, Cable & Cablets were not always wormed, often simply served (presumably when protection was needed against hawser fillets).

- Ropes were laid to different degrees (slack-laid) according to the area of application.

- **There is no evidence that left-hand "Hawser-laid" ropes were common or used in shipping before about 1830 in any way.**

- **Rigging laid left-handed in the same way as cables or cablets (even in contemporary or museum models) is incorrect.**

- In addition, there is also no convincing evidence that left-hand breeching rope existed before round about 1830 as hawser-laid rope.

- It should be kept in mind that from about 1849 onwards, Americans equate "Hawser-Laid" and "Cable"!

- As Sanders writes in his paper "Knowing the Ropes: The Need to Record Ropes and Rigging on Wreck-Sites and Some Techniques for Doing So" it is incredibly important to stick to existing terminology as there have been and are major misunderstandings.

- With old photos & engravings, always make sure they are not mirrored images (which Sanders says happens).

- **Don't mix sources from different timeframes!**

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Contemporary Images Around 1850

Figure 8 - Running rigging and shrouds "Hawser-Laid", right-handed.

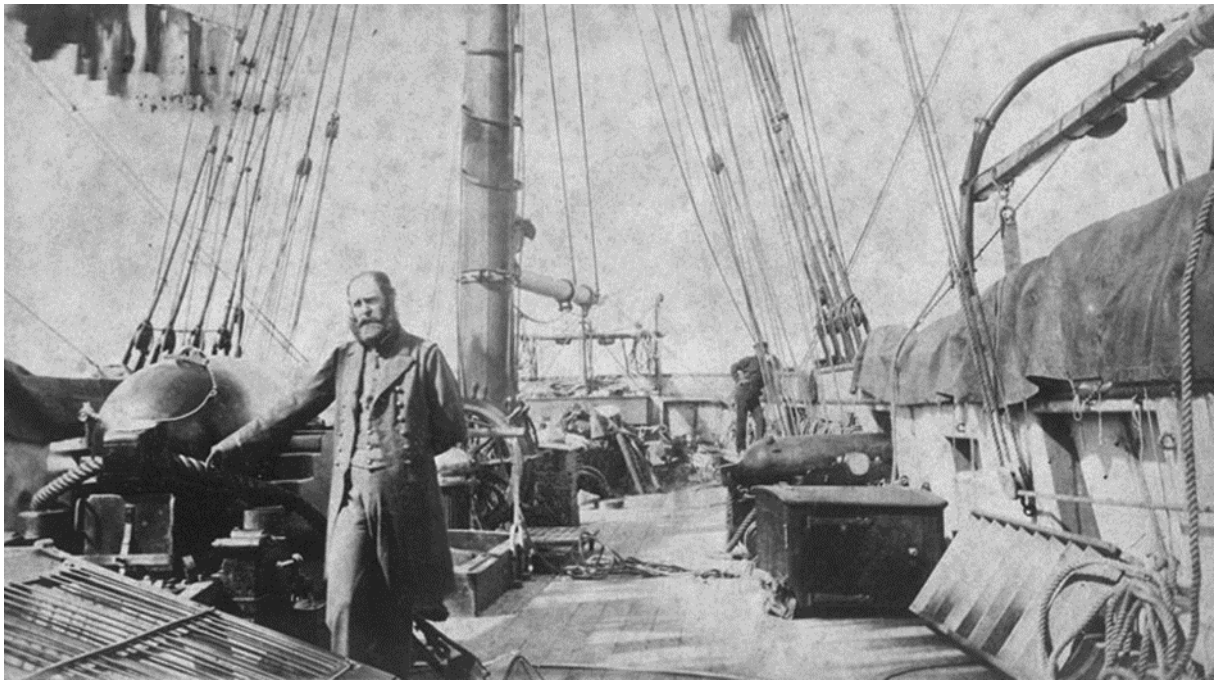

Figure 9 - Running rigging also "Hawser-Laid", right-handed here.

Figure 10 - Running rigging and breeching rope "Hawser-Laid", right-handed, shrouds also as it seems.

Figure 11 - Running rigging "Hawser-Laid", right-handed.

Figure 12 - Running rigging and breeching rope "Hawser-Laid", right-handed.

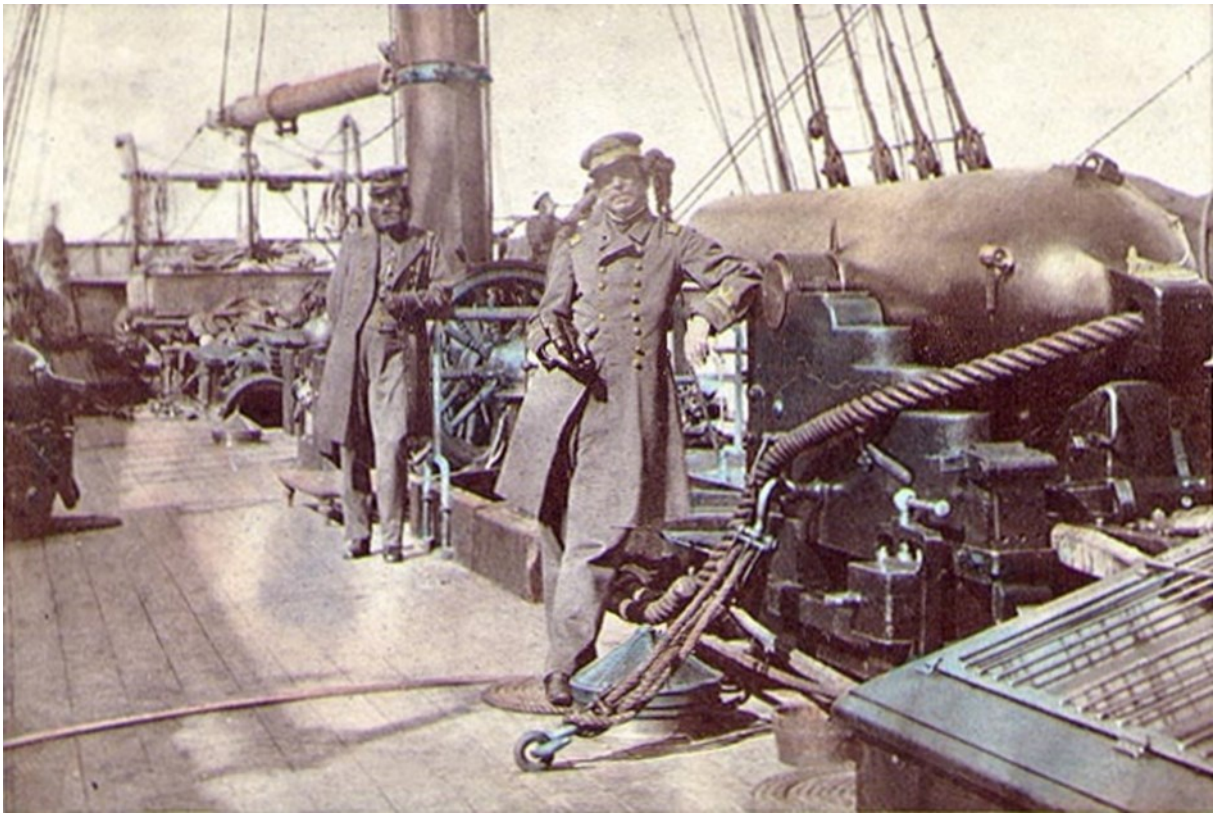

Figure 13 - Running rigging and breeching rope "Hawser-Laid", right-handed.

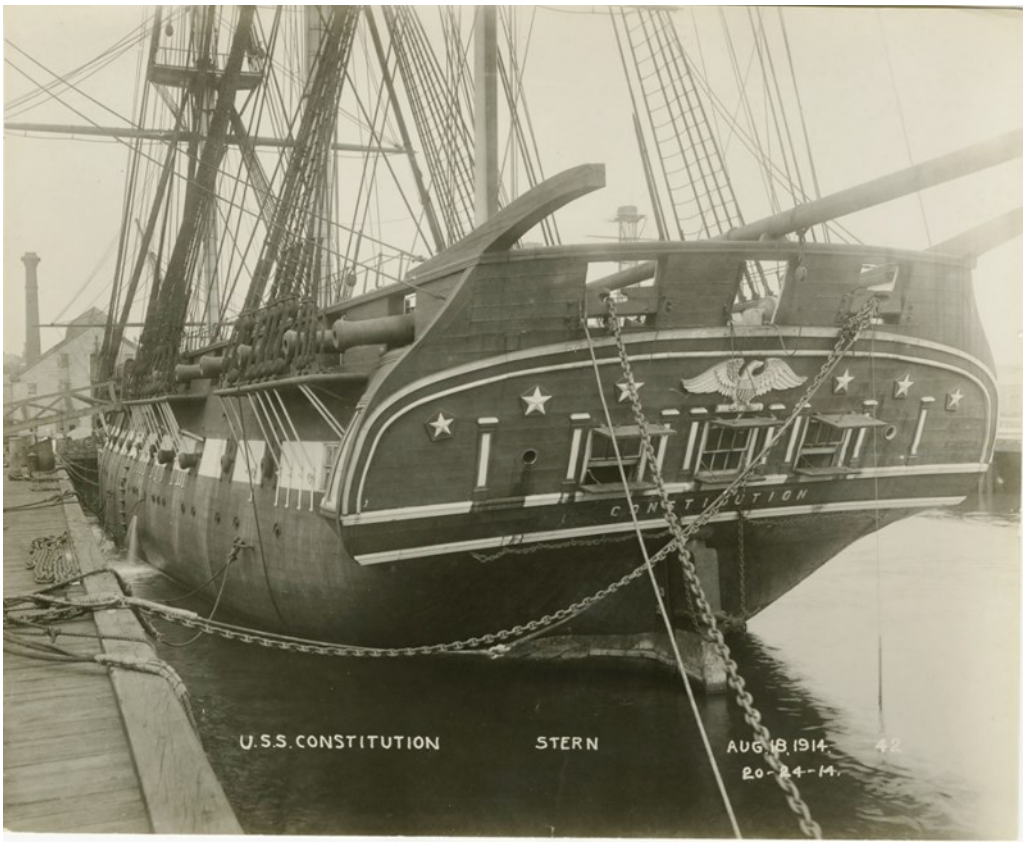

Figure 14 - Running rigging and shrouds "Hawser-Laid", right-handed.

Figure 15 - Running rigging and shrouds "Hawser-Laid", right-handed. Russian frigate, Osliaba, ca. 1863.

Figure 16 - Running rigging and shrouds "Hawser-Laid", right-handed. Breeching rope left-handed. Russian frigate, Osliaba, ca. 1863

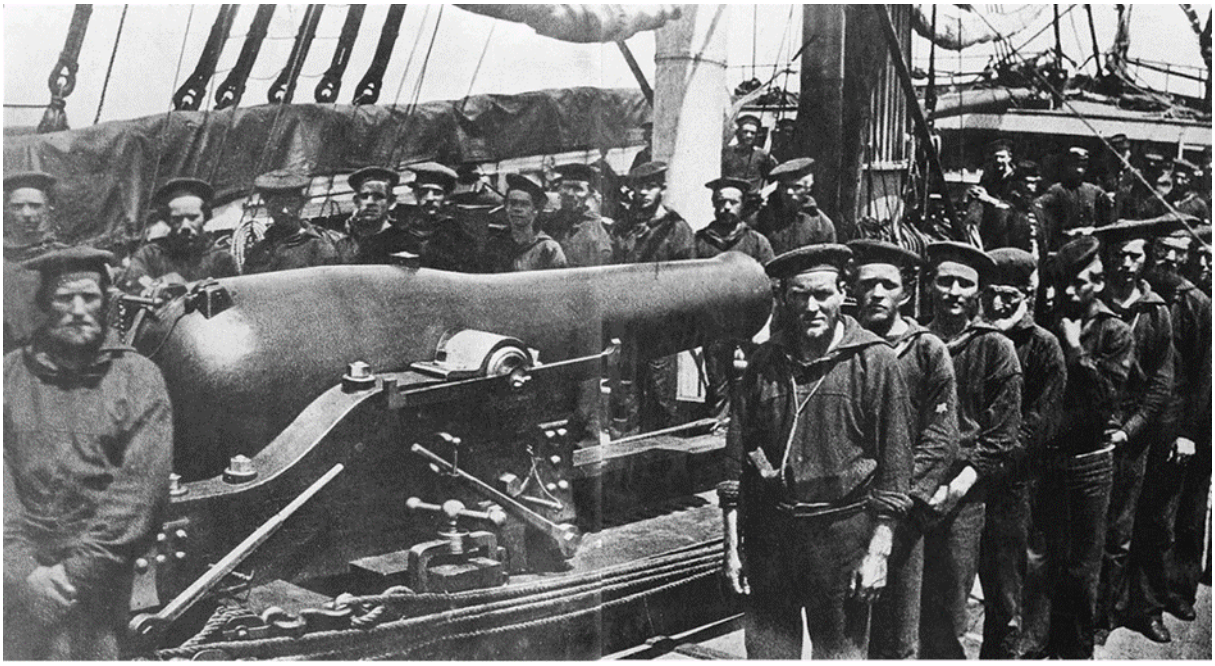

Figure 16 - Running rigging and shrouds "Hawser-Laid", right-handed. Breeching rope left-handed. Russian frigate, Osliaba, ca. 1863

Figure 18 - Running rigging "Hawser-Laid", right-handed. Breeching rope left-handed.

Figure 19 - Running rigging and breeching rope "Hawser-Laid", right-handed. USS Tuscarota, 1863-65

MODEL SHIPWAYS
• QUALITY KITS SINCE 1946 •

NONSUCH 30

1978 CRUISING SAILBOAT 1996

WOOD MODEL KIT

1:24 Scale

BRIEF HISTORY

Built from 1978 to 1996 by Hinterhoeller Yachts of St. Catharines on Lake Ontario, Canada. In the 1970s Mark Ellis designed a cruising sailboat with comfortable accommodations that could still be easy to manage single-handed. Ellis designed a modified Ljungström rig with a wishbone style boom. The 30-foot modern hull has a plumb bow, fin keel and spade rudder. The almost 12 ft beam with rounded cabin-top gives an interior matching that of a much larger yacht.

KIT FEATURES

- Plank on bulkhead wood model.
- Detailed color instruction manual.
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- Laser cut basswood parts for construction.
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The Ship Builder's Machines - Lathes, A Practical Guide Part 1

By Donald B. Driskell

Welcome to this first part series on Lathes. It is nearly impossible to cover all aspects of machining in this article and is not intended to. This article is intended to enhance your ship building hobby. This article is not a study or a course on machining. However, I do want to convey the best I can to get you started on machining your first parts and I emphasize this machining article for hobby purposes.

You can use your lathe for about any hobby that requires such work, and most all shipbuilding will be made from wood and or possibly some plastic parts too. But it is important at the beginning to learn using metal and at the near end of the article, I have a list of three metals for you to learn on. Then we can discuss lathe work for ship models only.

Metal needs to be discussed first as it allows for you to learn the basic principles of turning, facing, and parting, of which all three will be discussed in detail. I just want to stay with the practical applications to help you get up and running. If you are reading this, then you probably fall into some category of a user. Either you were like me at one time and had no knowledge of this type of machine and was somewhat intimidated by it, or you already own one and have already made many things, or maybe you just bought one and do not know exactly how to get started, then lastly somewhere in between.

Machine lathe

This practical guide is for those that are contemplating such as purchase and who knows, for the seasoned user, there might be a little take-a-way for you as well. Yes, you can buy a metal machinist lathe to turn wood too. If you buy a wood turning lathe, then you are pretty much confined to wood only. And in my opinion, really limiting yourself on your possibilities. This is the nice thing about having a mini-machinist lathe as you can turn metal, plastics and wood.

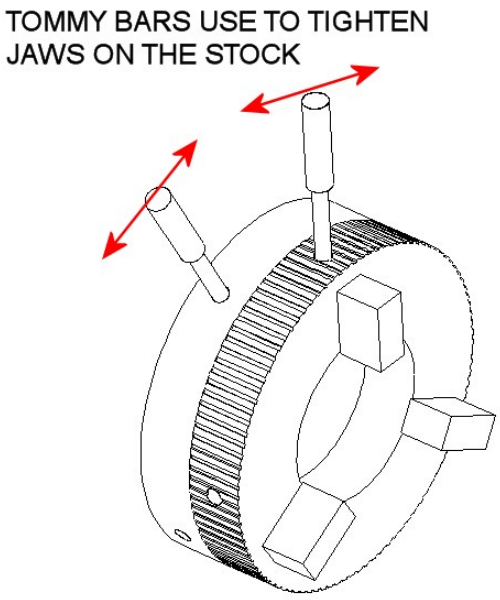
There has been at least one time that I inserted a drill bit in the chuck and mounted my piece (stock) on the cross side to do a special type of bore. The Cross Slide fed the stock "into" the drill. So, these types of operations might not be available on a wood turning lathe only.

Wood Turning Lathe

So, let's get started. When you are working with the lathe, I want to encourage you to keep the surrounding work area free of any clutter that something could fall or somehow move into the working lathe. After most operations are done, please take time to removing or vacuuming the immediate cutting area of debris. It is easy for debris to get caught up into the spinning chuck and sling metal or wood shavings into your face or eyes. Please just use common sense as you only have two eyes. Being in a hurry is also a recipe for something unpleasant. I can tell you of a few experiences I had that I am not proud of to mention. I am not a safely nut, but I just approach things with common sense. However, there are a few things that I always practice.

When you take a break and walk away for a while, I always make sure the headstock motor is set to off. On my lathe, the motor RPM (speed) has a knob that I can adjust the speed to “0” RPM and has a switch that turns the power off. So, when you pull up a chair or walk up to your lathe, then this is the time to make any adjustments to the stock if any and then proceed with turning the lathe back on or increasing the speed again. *Make sure that you do not leave the Tommy bar or Allen wrench adjustment tool in the chuck before you turn the lathe on.* A “Tommy Bar” is just a straight rod that (depending on what type of chuck you have) you insert into the chuck to loosen or tighten the chuck down on the stock you are turning.

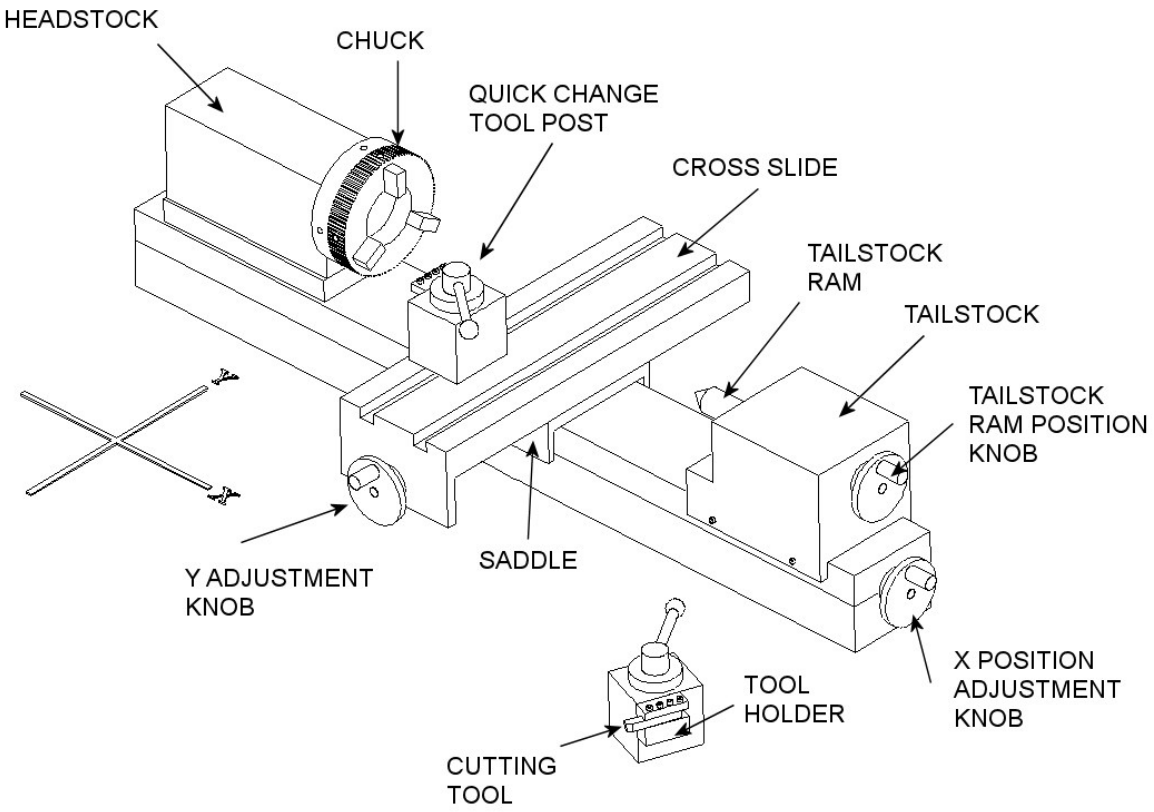
This can happen as the Tommy Bar can be somehow left in the chuck and the bar happens to be on the side of chuck that you cannot see it. Then when you turn on the motor, it is obvious as to what can happen. It is very easy (at least for me) to become distracted get up and come back to lathe and get hurt. If you get distracted, when you step back up to your lathe, just take a few seconds to refresh what you were doing and especially if you were in the middle of adjusting or using the Tommy Bar.



Tommy Bars

It is not very important to know all the parts of a Lathe, but for you to convey to others a procedure or a method, then surely, I highly suggest that you learn as much about your equipment as you can. If you happen to be a member of any forum that discusses machinist tools or ship building forums, then it is good practice to be able to communicate effectively with others. Someone might suggest that you use a “Center Rest” to better accomplish your task, or your “Feed Rate” is too high. There are many books that can be found on machining and lathes. As you all know, from my experience, not one book is going to be the end all books.

Ok, so, first things first, let's get to know our Lathe. All Lathes even the most complicated, are all broken down into your basic components. Headstock, Spindle, Chuck, Lathe bed, Tool Holder, Saddle, Tailstock Ram, Tailstock, Cross Slide, Leadscrew, and maybe a Quick Change Tool Post (QCTP). These are convenient for changing out tools quickly.



At the far-left side of the lathe, we start out with the Headstock. This is either a self-driven motor or a belt driven pulley. On my lathe, which is a Sherline, the Headstock is turned by a belt from separate motor. The motor has a speed control from 0 RPM to around 6000 RPM. You can change out the pulley arrangement to get up to 10,000 RPM. I am not a salesperson, nor a representative of Sherline. If you want to know, I happen to use a model 4410 (metric) “C” Package which includes many accessories. If interested, you can go to www.sherline.com The 4400 is inch or imperial. You can always convert your lathe to metric to inch or otherwise by changing out the Lathe Bed and Cross Slide Leadscrews and calibrated X, Y, and Tailstock control knobs. If you purchase the DRO (Digital Read Out), then changing the measurement is just a matter of a quick push button on the DRO.

Next, we can say a few words about the Chuck as this where you mount your “stock”. You have basically three possibilities, depending on the manufacture of your Lathe, you could have a 3-jaw chuck, a 4-jaw chuck, or a 4-independently adjustable jaw chuck. The first two mentioned, all the jaws open and close at the same time applying equal pressure on the stock. You will also have a set of two “Tommy Bars” which are inserted into holes located on the chuck that you use to open or close the chuck. I think that some manufactures have maybe an allen wrench that serves the same purpose.

Next, is the Cross Slide and this is where you perform your “Y” adjustments and where you usually mount your Tool Post or Quick-Change Tool Post. More specifics on this later.

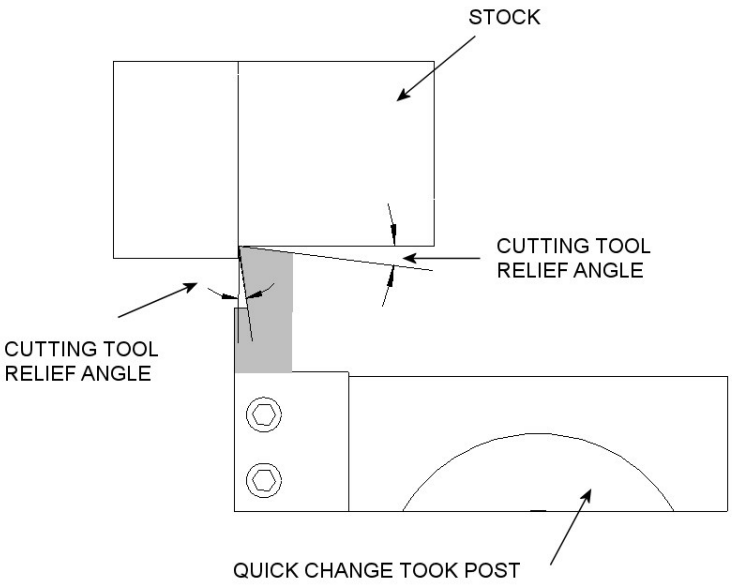
Next is the Tailstock and the Tailstock Ram. If need be, this unit will slide on the Lathe Bed and usually, the Tailstock Ram might be a stationary point or you might employ a “Live Center”. It is named that because the center just turns with the stock and does not build up any heat as it would with a static non-turning Ram. Once the Tailstock is used in a position to the part, then the Tailstock Ram Position will take the fine adjustment.

Then lastly, you have the X Position Adjustment Knob and that is what makes the Cross-Slide move in the “X” direction. Your focus is on the Cross Slide and controlling its movement on the Y and X axis. The “Y” adjustment knob (mounted) on the Cross Slide moves the Cross Slide “inward or away or towards you”. The “X” adjustment knob mounted on the Lathe Bed controls the movement of the Cross Slide left and right. Other lathes will have these knobs located differently.

Next, let's look at the different types of cutting tools you will use. The first one is the one you will be using most often and that is the right-hand tool. Most of your work will progress from the right side of your material towards the headstock. In other words, from right to left. Then you will be using a parting tool or cut-off tool. This is mostly used when you are finished with your turning project and it is time to 'part' your work from the lathe. It is always shaped like a straight and flat blade, but there is more to this flat blade than you can see. Cutting tools have strange shapes to them for a reason.

The different angles of a cutting tool provide what is called “relief”. That is, you only want the tip to do the cutting. The relief part is where you have a “gap” to allow the waste material to “escape” and be free from the cut itself. If not, the tool would bind and therefore not cut and cause serious problems. Not only is the “relief” important, but also the position of the tool itself when starting your cut. This needs to be discussed in detail as this is highly important to have your cutting tool in the correct position.

This drawing demonstrates “relief” and the drawing shows it. It is easier to demonstrate with a drawing rather than to explain. Again, the purpose of the relief is to keep the tool from binding and heating up. Even with wood or plastic, the tool can bind. It is very important to keep your cutting tool sharp. You will be amazed how easy it is with the right setup to be able to cut stainless steel with no problems. The main thing about cutting metal is that you do not want to make a deep cut, but rather many shallow cuts.

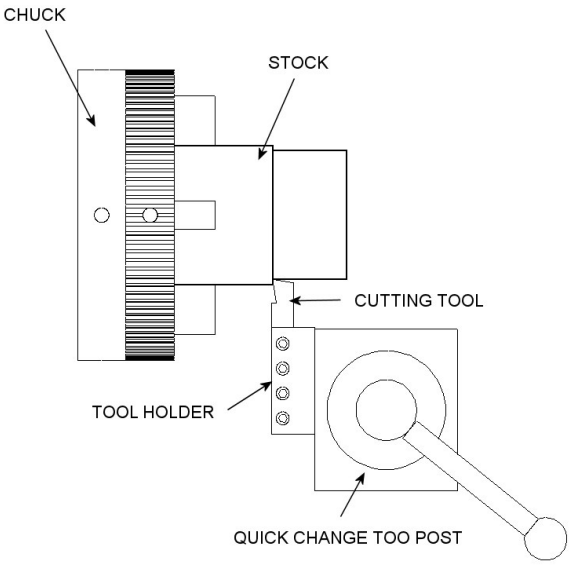


A 2D view showing looking down on your Tool Post and Cutting Tool showing the relationship of the Tool as it is positioned to the Stock. The Cutting Tool is usually at 90° degrees to the material you are cutting into. Take note of the “Relief” angles. This is very important so that the cut material can escape from the cut, otherwise, the tool will bind, heat up and cause chatter and uneven cuts.

One thing I must mention about the parting tool. As a rule when you are parting a part off of the lathe, you must "decrease" your speed by at least ½. So, if you are using 600 RPM and using a ½ bar stock of brass, when it comes to parting off, then run your RPM down to about 270 – 300 RPM.

In some reading materials, and online videos, I have seen some people use a cutting oil for parting. I do not use a cutting oil for parting. The reason is that most of the time, the oil will allow the cutting tool to grab and cut. I will go into cutting oils and when to use them later.

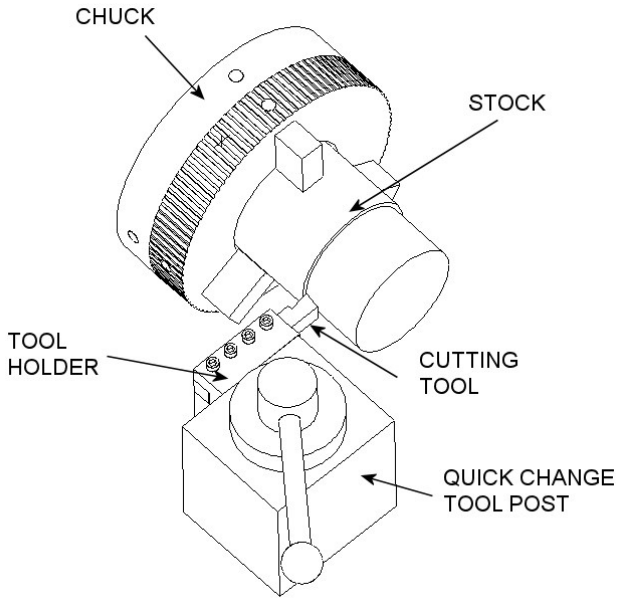
Of all the videos and books, I have on lathes, it is interesting that the very thing you need to know is left out of all the reading material that I have and that is the position of the tool in relation to the stock!!!

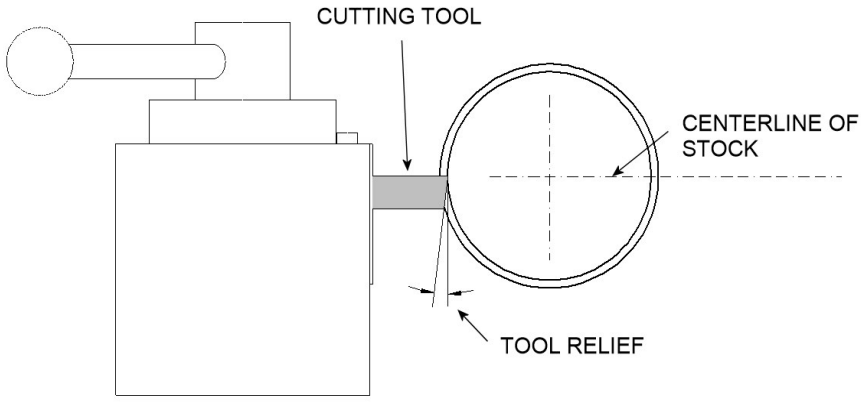


A 2D and 3D view of a Tool Holder and showing a Cutting Tool location. A good feed rate and RPM is when the material curls off at a consistent manner (also depending on what materials you are using). Brass and Aluminum will produce a "curl" of material as it comes off the part. It is common that you can have a curl of aluminum about 12 inches long. This is normal and it shows that you have your machine set up correctly. Stainless Steel will just have small chips to fall off onto the Lathe Bed

If the position of the tool is not correct, all manner of things will not be right. From tool chatter, rough cuts that are not smooth, to tool binding.

You will see that the cutting tool "edge" must be in line with the center line of the part. If the cutting tool is too low or too high, you will not be able to achieve a good cut and you might experience the cutting tool jamming or tool chatter. Tool chatter is when the feed rate and RPM is such that the tool is skipping at a high rate and you can hear the screeching of the tool against the part. In this case you need to adjust your speed up or down until the chatter or screeching goes away.

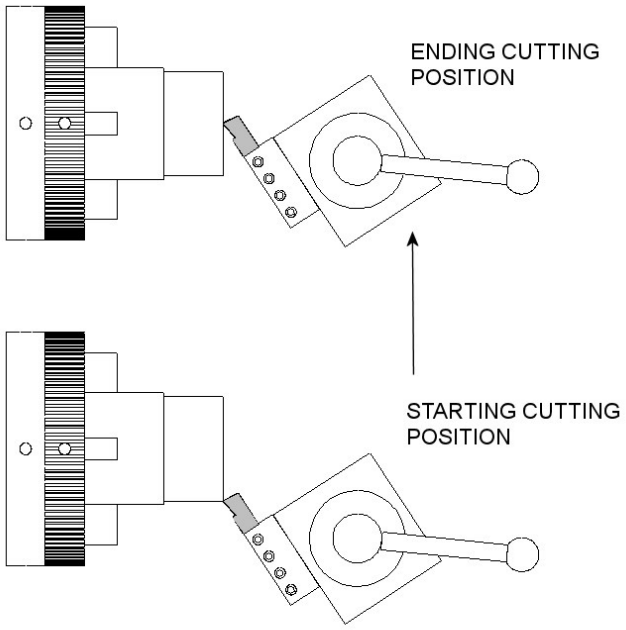




SIDE VIEW LOOKING INTO STOCK. NOTE THE CUTTING TOOL IS AT CENTER OF STOCK.

Another 2D view showing looking into the stock. Notice again the "Relief" angle. Also note that the cutting tool is at dead center of the stock. There are a few ways to make sure you are at center.

Basic lathe operations usually include what is called "Facing a Part" Below is an example of how to face a part. Note, that the tool is now located in a different position. To make this cut, you want to make the face of the bar stock nice and clean with a flat surface. The tool will move away from you in the "Y" direction using the Cross Slide. So, far I have not mentioned the "Depth of Cut". I will later, but for now, the main thing is tool positioning.



NOTE THE DIFFERENT ANGLE OF CUTTING TOOL
PROPER TOOL POSITION FOR FACING STOCK
USE THE "Y" ADJUSTMENT KNOB TO MAKE CUT

TOP VIEW LOOKING DOWN ON LATHE

The top illustration shows the position of the tool at the finish of the facing. The Cross-Slide moves in the "Y" direction away from you. The bottom illustration shows the start of the facing.

At this point, this is first thing to practice on your new lathe before attempting anything. Here we will show you how to "face" a part.

Find a piece of stock that is about ¾ inches in Diameter and about 2 inches long and insert this into the chuck. You want to leave a good 1 inch sticking out from the edge of the chuck. We are going to put a nice clean straight "face" on the end of that stock. This is a common good practice to get into. You always want to start your projects with a good clean part that is square and has a clean "face" to it.

Each time you make a face cut, I recommend adjusting your "X" position of the Cross Slide about .3 mm (0.0118 inches or 1/64 inches) depth of cut. Then proceed with the "Y" direction away from you. Continue to adjust your "X" another .3 mm (0.0118 inches or 1/64 inches) depth of cut doing this until you have a nice clean surface. It might take several passes. The reason is that you might have used a hack saw to make your rough cut to divide your stock, or the stock could come from a store bought that has an unfinished surface.

As a tip, when you are finished with this surface, turn the stock around and put the finished surface into the chuck and repeat for the other unfinished side. This way, the stock is sitting square into the chuck depending on how large diameter the stock is. The stock might pass all the way through the chuck and come out on the other side of the Headstock. In some cases, for a larger diameter stock, the stock will butt up against the front facing of the chuck. In this case, you do want a nice finished end.

The same depth of cut applies to turning in the "X" direction. Try to remove about .3 mm (0.0118 inches or 1/64 inches) at a time to get familiar with the "feel" of how the cut works. If you increase the depth of cut too much, then you run the risk of perhaps the stock dislodging from the chuck, or the tool binding causing the lathe motor to bind and stop.

The "relief" angles needed on cutting tool to make sure material can escape the cut. The relief angles come already ground if you buy them from your manufacture. However, you can grind your own. This will be covered in the last series part.

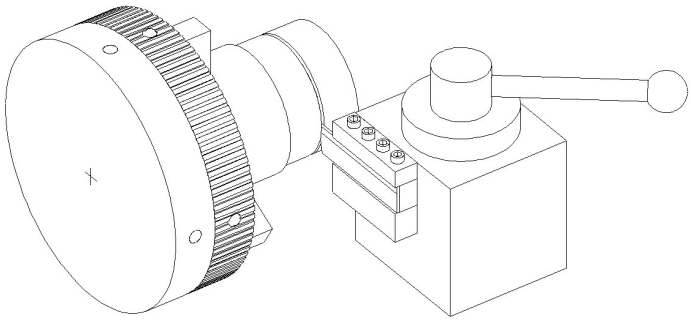
When using the lathe, please do not become impatient. It is very common that it takes longer to setup for a cut than the cut took. I have spent perhaps 20 to 30 minutes setting up the lathe only to make a few passes of cuts that took literally only less than a minute. This is just the nature of using this equipment. It depends on the complexity of the part you are trying to make. So, please take your time and double check what you are trying to accomplish. Have a plan in mind before you start. Later on, I will share my method of making yards and how it is very important it is to plan ahead of what you want to accomplish.

You always want your stock to be longer than your final product. For instance, if I am turning a Yard, then I will need an additional 2 inches (50.8 mm) total for mounting on the chuck and tail stock and cutting clearances. In most cases, your cutting tool is not going to be able to cut all the way up next to the tail stock or the chuck, but you must allow extra free space at each end.

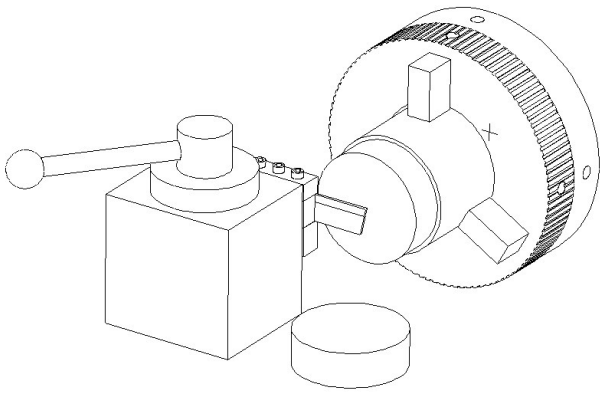
I mentioned feed rates without going too much into it. In short, a feed rate is simple. It is the RPM of the Chuck vs the how fast the cutting tool is traveling from left to right or right to left.

Example, for a bar stock of Brass that is about ½ inch in diameter, you can use 600 RPM and using the X position adjustment knob (usually located at the far right end of the lathe bed), turn that knob about one revolution per second. I know this is not a scientific according to the book, but the purpose is to get you cutting stock. The feed rate I just mentioned is very gentle and should not cause a problem. Same criteria for stainless steel. This is a good starting point for all types of stock. Next, we will discuss the depth of cut. This also adds to the equation of feed rate and RPM. So, to put all this together, you have Depth of Cut vs. Feed Rate vs RPM. All three must be considered before you make your first pass. This is very important. Plan of what you want to accomplish before making your first pass.

This next tool is called a Parting Tool. The main purpose is to part, remove, or cut off the stock that you have finished making. It is very important to note that the position of this cutting tool must be at 90° of the stock for it to cut all the way through the stock. The tool must be at the stock's centerline. The RPM of the motor should be a little less than half RPM to make the cut to keep the tool from binding. Therefore, if you are making a part out of .5-inch stock of brass running at 600 RPM, then when you get ready to part the stock, then run your RPM at about 230 RPM and go very slowly moving your cross-slide table inward. I do not recommend cutting oil for the first time, just go very slowly (about one revolution of the knob per one minute). Cutting oil can make the tool slip and not cut, then you will think that you are not engaging your cutting tool enough and then the parting tool will bind. The reason is that the parting tool is slipping and not actually cutting. Note the parting tool also has relief angles made into tool. This is so that cut material can escape and not cause binding. You cannot ever have a cutting tool or parting tool that is flat on all sides.



PARTING TOOL CUTTING THROUGH STOCK



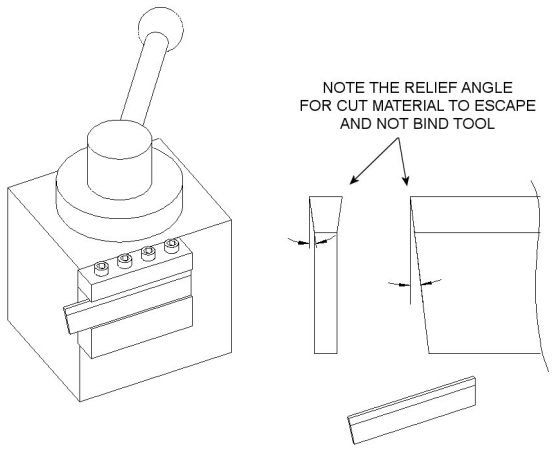
PARTING TOOL COMPLETED CUT

This illustration on left shows the parting tool has completed the cut and excess part has been removed.

Note that the parting tool needs to be adjusted inward on holder to make sure tool passes all the way through the stock. Remember one half of the RPM and go slowly at first. If squealing or chattering, then slow the motor down.

The illustration on the right shows a larger view of the Parting tool.

As you can see, the Parting Tool also has a relief ground into Tool to keep the Tool from Binding as it is parting.

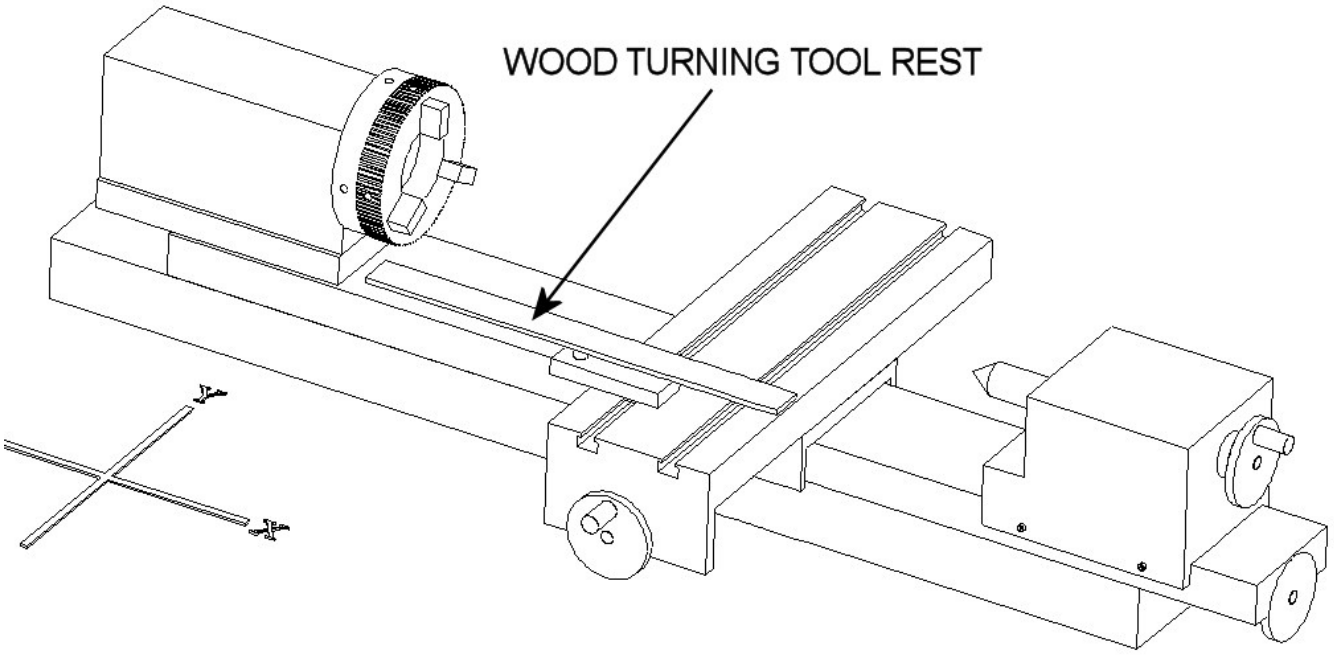


PARTING CUTTING TOOL DETAIL

Continue to practice turning and facing to become comfortable and remember, do not get into a hurry, set aside uninterrupted time and allow yourself time to work with the lathe.

Well, since after all, we are mostly concerned about making Mast and Yards and such for ship modeling, I need to mention one other accessory. Not all machine lathes will come with this and you might need to shop around. Fortunately, Sherline has a Wood Turning Tool Rest that comes in two different sizes (meaning the bar length) .

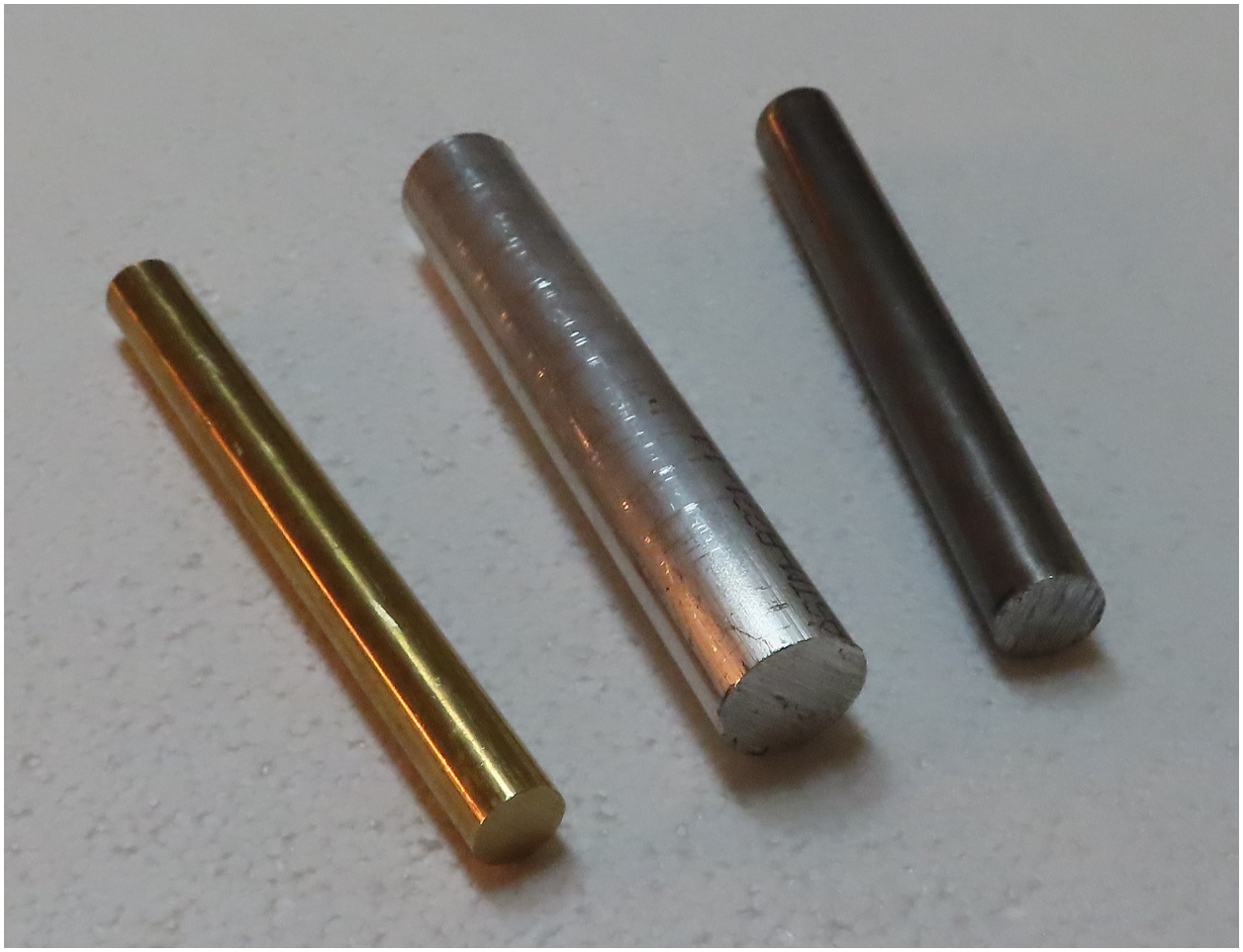
Below is such a Wood Turning Tool Rest.



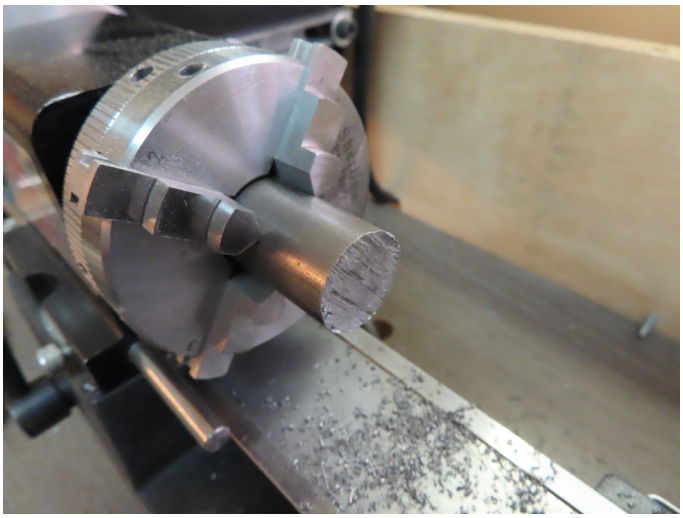
I highly suggest that if you do not have any stock laying around go to http://www.onlinemetals.com and order these materials to have on hand. Do not go to home improvement stores to get your metal. The bar stock they have is not suitable for cutting. I am not sure what it is, but when I got started, it was the wrong thing to buy. Let's just say that those bar stock at the home improvement stores is not meant for machining.

This is what I suggest for your shopping list to get started. These three metals are easy to machine and is not hard on the cutting tool. Nice metals to learn on.

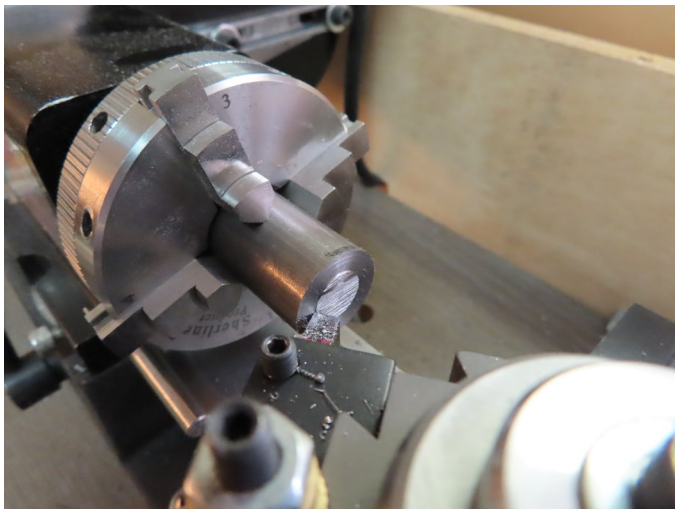
These prices are from onlinemetals.com at the time of this article . The stock has been custom cut @ 6 inches each to help reduce the cost. They are very easy to machine metals.



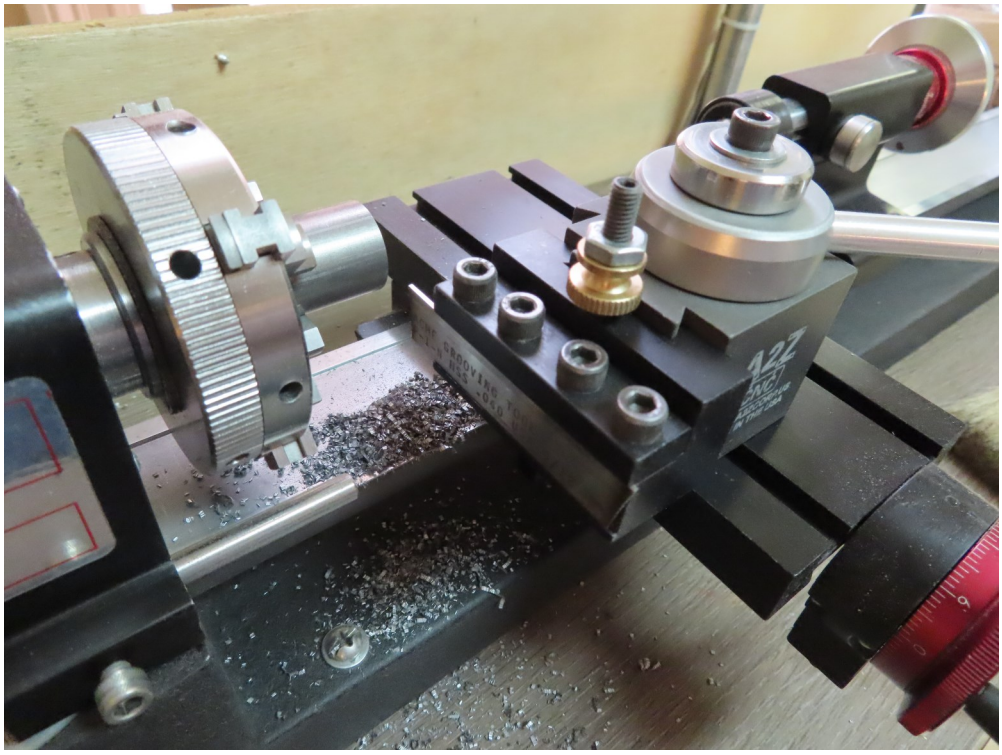
These metals are the exact ones mention that I suggest. From left to right: Brass, Aluminum, and 12l14 Carbon Steel.



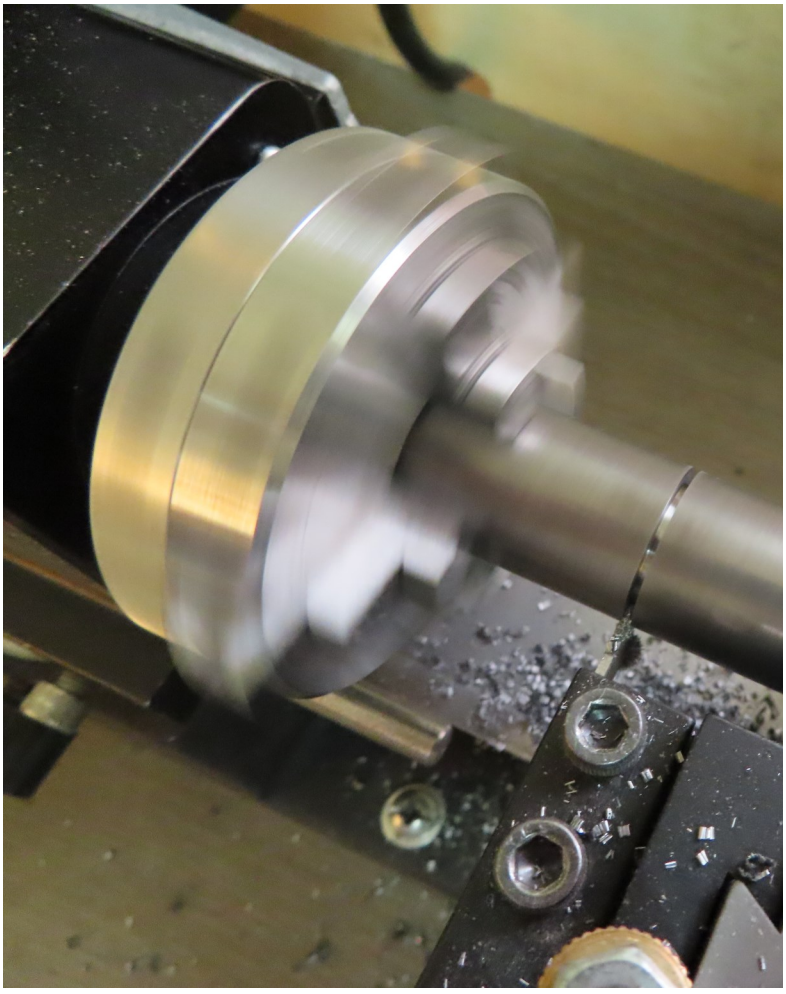
This is 12L14 Carbon Steel from onlinemetals.com. It is cut raw from their company. You can see the unfinished side.



A Facing Operation in action you can see the difference as the tool makes it way across.



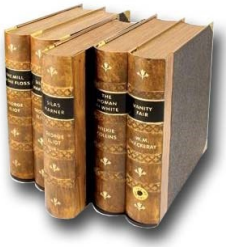
A Parting Tool is now Mounted on the Quick Change Tool Post. The lathe speed will be reduced by 1/2 which in this case was about 180 RPM. I am not using any cutting oil for this operation.



This shows a typical example of how the Parting Tool is starting to make its first cut into stock.

You will use the "Y" adjustment on the Cross Slide to cut into stock and go slowly.

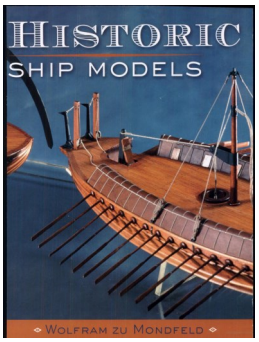
Stay tuned for Part 2 coming in the January 2023 issue



The Book Nook

Books of interest for the Model Ship Builder

This month in the Book Nook we'd like to highlight some great reference books you should have in your modeling library. You'll find yourself referring to them regularly.



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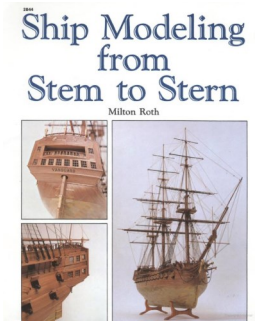

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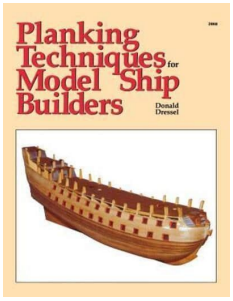

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Genes Nautical Trivia

A Little Nautical Scramble

1. D R C E R E T A O N B	_ _ _ _ _ _ _ _ _ _ _ _
2. S O F E Y A R T	_ _ _ _ _ _ _ _
3. T O R P	_ _ _ _
4. D U R H O S	_ _ _ _ _ _
5. E T N A B E E L R C	_ _ _ _ _ _ _ _ _ _
6. T T I P O F G N L	_ _ _ _ _ _ _ _ _ _
7. V M O B A N G O	_ _ _ _ _ _ _ _
8. R I N P A E T	_ _ _ _ _ _ _
9. C I H N W	_ _ _ _ _
10. D R A B S O R A T	_ _ _ _ _ _ _ _ _

Sailing Terms

Match the descriptions with their term on the right.

A. Sheets, halyards /other lines that control sails

B. Wires that support the mast

C. Turning the boat away from the wind until the boat changes tacks

D. Changing tacks with the wind crossing the bow

E. At or towards the stern (on the boat)

F. At or towards the bow (on the boat)

G. A boats greatest width

H. Leaning action of the boat

1. Tacking
2. Jibing
3. Running rigging
4. Standing rigging
5. Heel
6. Beam
7. Forward
8. Aft

Genes Nautical Trivia

Nautical Terms

S	N	B	E	Y	E	B	O	L	T	S	H	S	S
G	A	I	G	N	A	F	V	O	Y	A	L	T	P
R	P	G	P	A	R	C	L	O	S	E	A	F	H
A	O	H	C	Q	P	M	U	P	H	Y	D	I	N
T	S	T	A	U	R	E	G	G	I	J	R	L	I
I	T	O	P	A	R	R	A	L	T	E	A	Y	P
N	L	A	S	R	S	U	N	A	E	N	O	A	G
G	E	R	T	T	T	V	O	S	K	N	B	W	N
S	S	L	A	E	M	A	R	P	C	Y	N	L	I
B	K	O	N	R	N	I	P	P	E	R	I	I	Y
P	B	C	W	I	U	J	A	Z	B	C	W	A	A
B	R	K	Y	N	M	A	N	G	E	R	A	R	L
J	N	O	T	G	B	P	B	A	D	G	E	R	E
S	C	O	W	F	A	N	T	A	I	L	M	H	B

FANTAIL
RAIL
OARLOCK
BECKET
SCOW
JENNY
BIGHT
MANGER
BOATS
HASP
PARRAL
APRON
JIGGER
FANG
QUARTERING
VOYAL
INBOARD
YAWL
APOSTLES
PROW
BELAYINGPIN
PUMP
EYE
PARCLOSE
NIPPER
GRATINGS
CAPSTAN
PRAM
LIFTS
BADGE
BRACE
STAY

Genes Nautical Trivia

Trivia Answers

A Little Nautical Scramble

1. CENTERBOARD
2. FORESTAY
3. PORT
4. SHROUD
5. TABERNACLE
6. TOPING LIFT
7. BOOM VANG
8. PAINTER
9. WINCH
10. STARBOARD

Sailing Terms

A—3
B—4
C—2
D—1
E—8
F—7
G—6
H—5