

# Knot News



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## The Side Knot Circus

Pieter van de Griend

*There is never a knot without a friend.*  
Clifford Ashley [2, #3099].

### Prologue

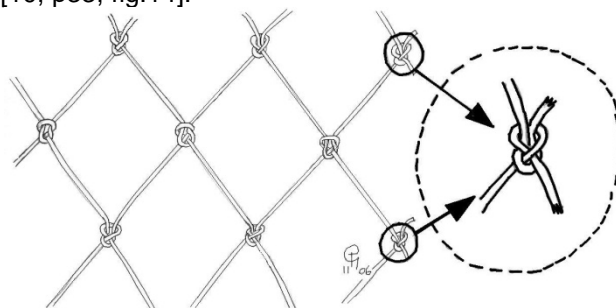
No doubt the world champion Knotting Principle will involve a few of the highly versatile Half Hitches. If Haphazard Half Hitch tying methods are restricted to just two Half Hitches, then interesting observations can be made. In previous articles on industrial fishing knots I introduced maritime occurrences of a dual Half Hitch Principle resulting in the Side Knot Structure [14], [16]. Here we shall see this glorious combination of two modest Half Hitches generate an interesting set of useful hitches and binding knots.

### The Side Knot's natural habitat

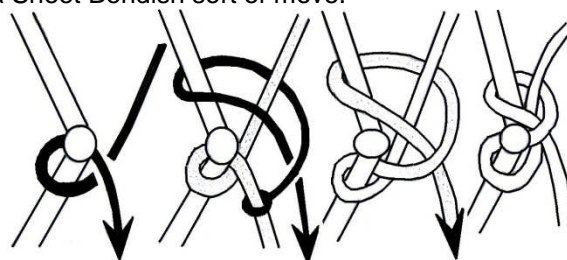
Sad part of our story is that there is no recorded agreement on such a thing as *the* Side Knot. The Side Knot, as *word*, is believed to find its oral origin in the netters' world. However, there is controversy and ignorance about what it actually means. After a haul through some three dozen netting books I found that this term occurs in at least two ways.

First and foremost occurrence seems when a netting panel is cut, the vertical side of the net plate is usually said to consist of Side Knots, i.e. Sheet Bend structures at the side of a mesh. I found Alan Hodson to be one of the first to speak of a Side Knot. He meant the mesh side which is left after cleaning a rip, or slicing off a net plate. Describing part of the net mending process he writes "*Across to No.5, which is named a side knot, and by means of a round turn below the knot and then a sheet bend, the side knot is taken*" [17, p61, fig.39]. John Garner on the Side Knot writes "*two sides of a mesh make what is known as a point.*" [10, p89]. Garner's glossary offers "*one*

*cut mesh, also called side knot, point or diamond*" [10, p33, fig.14].



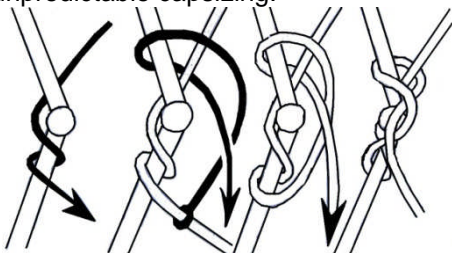
Hodson thus notes that the Sheet Bend structure should be exploited when mending nets. Doing so, in terms of Half Hitches, the Side Knot Structure emerges. The illustration below shows how this can be accomplished. The first Half Hitch stabilizes the netter's twine, the second Half Hitch effectuates from a Sheet Bendish sort of move.



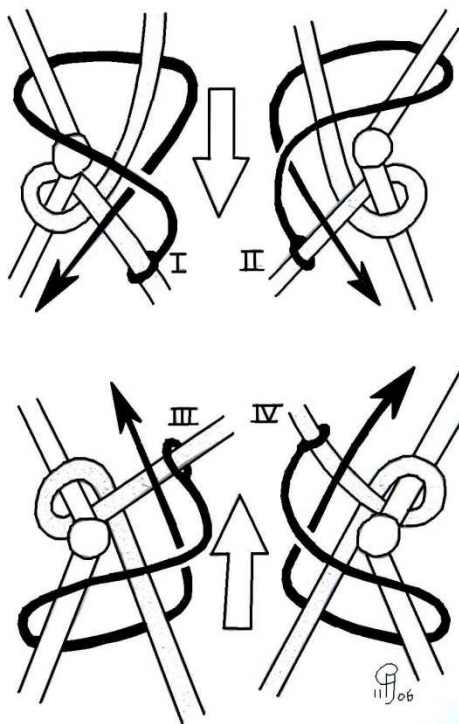
This principle is worded by many sources [4], [6], [19, p49-52], [25]. However, few care to illustrate in detail how the structure actually looks like [7, VII, p19], [11, p59, fig.37]. Fewer still offer any *name* for this particular knot structure.

The second occurrence of the Side Knot in netting literature concerns a name for this knot. Steven speaks of a side knot [25, p81], but is not clear on which knot type is intended [25, p1]. It was not until Barbara Morton that I found the "*Sider Knot*" plus an indication of an alternative tying method [20, p59]. Morton's method is somewhat different from the usual

one, which we have just seen. It is illustrated below, swapping the first Half Hitch by a Round Turn, which results in a generally accepted inferior construct – due to unpredictable capsizing.



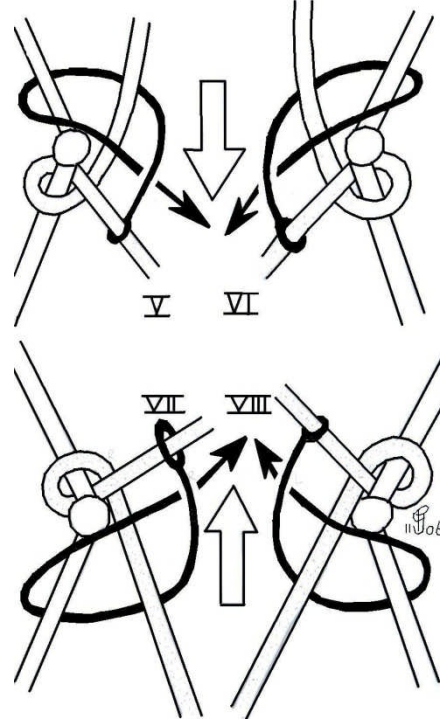
This starts a variation in theme. Usually netters persist in their usage of a particular tying method, often not. Moreover, as will become obvious, the Side Knot Structure may materialize in one of many flavors. In any piece of mended network, floating on the ocean, you will find an assortment of different constructs. New nets, coming right out of the shore-based workshops illustrate the fact that their workers are paid by the hour and therefore place more care in their work. Most trawlermen are less perfectionist and just smack in any convenient (simple) knot.



When it comes to attaching two panels along a vertical edge, or working along a vertical part during the mending of some damaged net, the panels are connected with one strand by Side Knots. During net manufacture one must obviously seek to produce symmetrical knots. This implies that panel side and working direction dictate how the knot should look like. However, awkwardness during net mending causes short cuts to emerge, grossly violating that

noble intention. Depending on the side of the rip and the direction of working, there are four different Side Knots following the principle we have first illustrated. They are given in the illustration above and equipped with Roman numerals for later identification.

There are many netters who make the second Half Hitch in a different manner. They equip it with a twist. As Steven mentions, it is believed to give a better lead [25, pp73-78]. He shows both left- and right hand-side in one working direction (downwards), plus a quick tying method. The resulting 4 types are shown in the illustration below. Few knot authors are aware of this twist's relevance [4, p76].

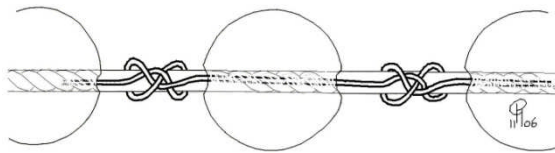


The Side Knot name is well-established on the North Atlantic Ocean, but certainly less well-recorded. My quick scan didn't reveal it in any of my collected French, German or Dutch netting literature. In fact Dutchman Dirk Vink renders it an anonymous object and writes: "*halve steek eronder en een halve steek erop*", i.e Half Hitch above and a Half Hitch below [26, p143, fig.1]. Norwegian Bjarne Skumsvoll speaks of *Sideknot*, but leaves it unclear which specific knot he had in mind. He does mention the fact that there are different methods for making the Side Knot and notes that some of them are better than others at getting rid of twists in the twine. This is a significant observation, as flat netting material torques enthusiastically [23, p154]. Skumsvoll's thought also indicates that there exist netters who do give their knots some non-trivial thought!

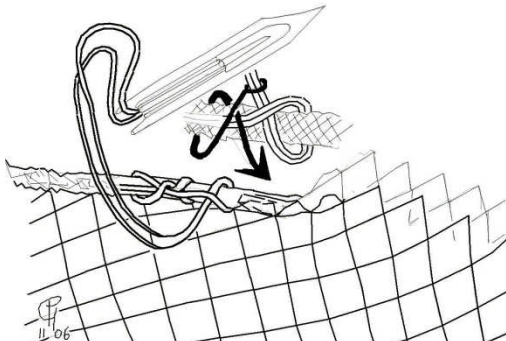
## Miscellaneous applications

A useful principle will be encountered everywhere and, as can be expected, the Side Knot Principle (SKP) shows up in many places during daily shipboard life. Before moving onto some theoretical notes on the Side Knot, I'd like to give a few other applications of this tying method.

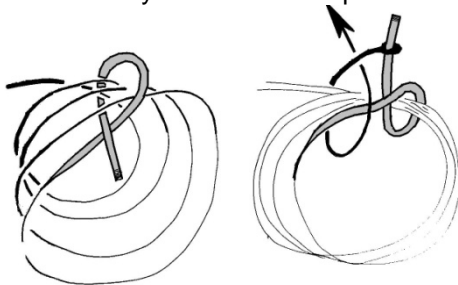
It is used while stringing the floats to the trawl head rope. Faroe man Tørlakkur Hansen, from the village of Nolsoy, told me *Kugle Knutur* (Float Knot) when I asked him what he called this structure. According to me he cooked it up on the spot, as I have not heard other than *Siðu Knútur* on North Atlantic trawlers, i.e. Side Knot in translation [16].



The Side Knot Principle is also to be found while lacing selvages in trawls. Twine is doubled and loaded onto a netting needle, easing the production. Side Knots are often encountered, but that is no uncompromising rule, as there exist countless alternatives [6, pp96-98].



For the finishing touch, whilst coiling rope, there is nothing to beat the Side Knot Principle. Hitched to the railing with a Bowline, no storm will wash your coil away! Even Clifford Ashley is lyrical about this application, comparing it to the Ground Line Hitch [2, p515, #3098], but meaning the Picket Line Hitch, or not? Read on and try to answer this question later.

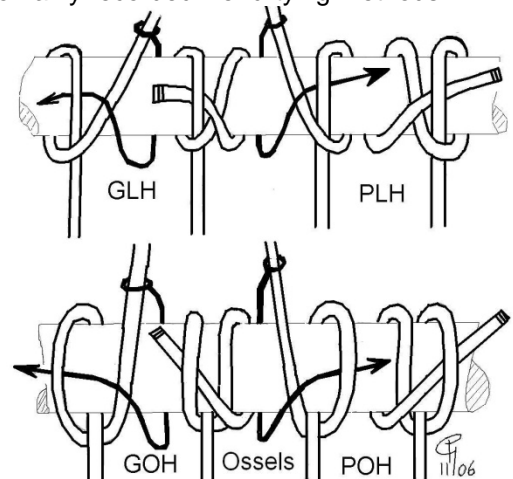


## So, what have we got?

We have seen the principle by which Side Knots are produced along with a few applications. Time is right to list the structures we actually have encountered. So far we have seen Ossel-, Ground Line- and Picket Line Hitches emerge. However, they are reversed in tying direction and load configuration. That is, the working end (**wend**), during tying, may turn out to become the standing end (**stend**) during operation. Should this switch occur, we shall speak of a stend-tying method else we have a wend-tying method. Of course a stend-tying method will not reasonably occur when the stend is under tension

In the illustration below we have our Roman numerals I, IV representing the Ground Line Hitch (GLH). Roman numerals II and III are the Picket Line Hitch (PLH), whereas VI and VII are the Ground Line equivalent of the Ossel Hitch (GOH) and V and VIII are the Picket Line equivalent of the Ossel Hitch (POH). Confusing? They managed to confuse Ashley, Spencer and many others. Even this author ventilated the opinion that PLH and GLH are structurally similar, but their tying methods possess reversed tying directions [16]. As we shall show, they are distinct, non inter-transformable, structures.

The image below shows the four structures we have acquainted so far. They are accompanied by their customarily recorded wend-tying methods.



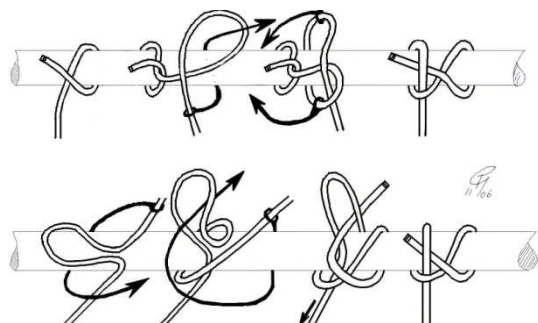
There is no doubt in my mind that the Ground Line-, Picket Line- and both Ossel Hitch Structures have been used since prehistoric times, but let's investigate the recorded statements. I have not conducted any exhaustive record-searching, but instead allowed myself a leisurely walk along the major knot monographs, gathering statements in no particular order.



## Ground Line Hitch - statements

In his unpublished manuscript *“Notes on Knots”* at the Mariner’s Museum in Newport News, Henry North Grant Bushby illustrates the GLH as a Side Knot structure [7, VII, p19-22]. Hjalmar Öhrvall does not show the GLH, but in 1916 makes a textual reference to its existence [28, p81]. Martta Ropponen, in 1931, illustrates the GLH [21, p59, #80]. I have not been able to find the GLH during any cursory scan of Graumont and Hensel’s 1939 EKFR [12]. However, my fruitless search is no evidence that it may not be recorded in this source - somewhere. In any case it does show up in the 1948 collaboration between Raoul Graumont and Elmer Wenstrom on fisherman knots [13, p44, pl.20, fig.55].

Clifford Ashley makes several references to the GLH [2, #277, #278, #1243, #1680, #3098]. He does not show the GLH in his first set of publications, which commenced in 1925. Apparently he did intend to do so [1, #140, p130]. Ashley shows two methods leading to the GLH. They are given below.



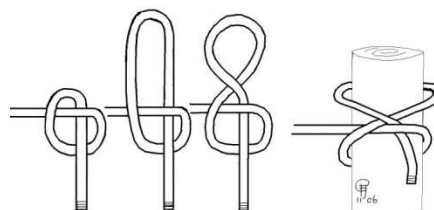
All recordings seem in agreement that there is a direction for loading the GLH structure. It differs from the Side Knot Structures we have collected so far, as wend-stend interchange (**WSI**) has taken place. In fact all resulting Side Knot types have this quality in respect to their identified counterparts. Ashley stresses the special conditions under which the GLH is to be produced – the short media of gangings. Attaching them by means of the SKP certainly helps. Note that one of Ashley’s methods relies on capsizing part of the knot.

## Picket Line Hitch - statements

What I can track of the recorded history of the PLH starts with statements, an illustration plus some tying methods by Hjalmar Öhrvall [28, p78-82]. Öhrvall collected the PLH structure, which did not show up in his works till 1916, in a fishing context from the Swedish west coast where it was used for attaching the snood to a ground line. He gives the Swedish name *känseknut*. He has an extensive section on the structure, including tests he conducted on some

hitches. He concludes that the PLH is among the securest of all. This result is partially corroborated by Benjamin Bayman, whose theory indicates that the PLH has better holding abilities than the Clove Hitch [3, Eq.27], [18]. Bayman has an example to calculate the holding power of a “Ground Line Hitch”, which happens to be our PLH. Adding to the PLH merit list, as Öhrvall notes, it enables easy undoing. It is remarkable that Hjalmar Öhrvall does not show the GLH, but merely fleetingly mentions that if the wend is taken along the other side of the stend and the knot completed in “symmetric fashion” a similar good structure comes forth. It is worthwhile to ponder what causes people to devise two types of a similar knot anyway? What caused Hjalmar Öhrvall to find the PLH in an abundant profusion in a pragmatic knotting fisherman community, whereas the GLH shows up by the millions on long lining boats elsewhere? Statistically you’d expect 50% probability for either type to turn up during any random observation.

Öhrvall offers two methods for tying the PLH. The first one is the run off the mill wend-tying method. Next Öhrvall observed that he could proceed from an Overhand Knot start configuration to present a new tying method for the PLH, illustrated below. It is useful around a pole (or a sack).



Clifford Ashley first shows and names the PLH in English [1, #140, p130]. Further references to it can be found in ABOK [2, #154, #166, #1676].

Chas Spencer shows the PLH [24, p129, Fig.276], but without actually naming this structure. Although under the Stunsail Halyard Bend, showing the same structure, he writes: *“This is another way. It will not slip either way and will not work loose. (Also called Ground Line Hitch)”* [24, p16, Fig.41].

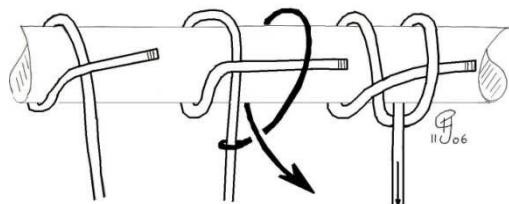
Yngve Rydholm, largely inspired by fellow countryman Hjalmar Öhrvall, mentions 2 types of *känseknut*, one of which is our PLH. The other is a less famous snug hitch [22, p58].

## Ossel Hitches – statements

As far as my leisurely pursuit went, in 1939 Spencer appears to be the first to discuss an Ossel Hitch [24, p27, fig.75]. Cyrus Day dogmatically blames Spencer for the name and hitch of type V (POH). Without

elaborating he also mentions a plate (Vol.1.pl.1) in Duhamel's 1769 work on fishing gear as a source showing a similar hitch [9, p112, #136]. Day does not mention any of the Ossel Hitches in his earlier works.

Spencer has an interesting statement on the orientation and load configuration of the Ossel Hitch. He describes a stand-tying method.

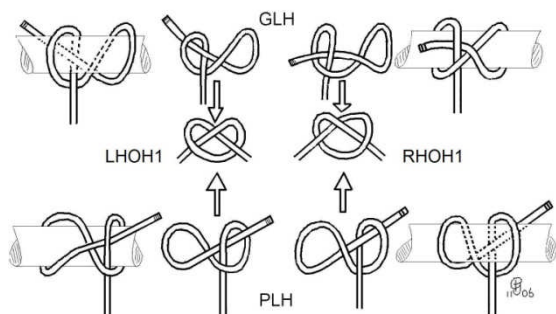


In EKFR Graumont and Hensel show an Ossel Hitch [12, p500, pl.271, fig.314]. Clifford Ashley does not seem to mention one at all. At least I have not yet found it. Although Hjalmar Öhrvall has no Ossel Hitch, Yngve Rydholm has the *Stinteknob*, which is our POH [22, p58].

In the foregoing we have seen distinct names for the GLH and PLH. The Ossel Hitches never made it that far. For curiosity's sake I listed the sources showing either form of Ossel Hitch. There are POH versions in: [5, p149], [9, p112], [12], [22, p58], [24, p27, fig.75], [27, p177, #467]. The GOH version was not referenced by any of the sources I consulted.

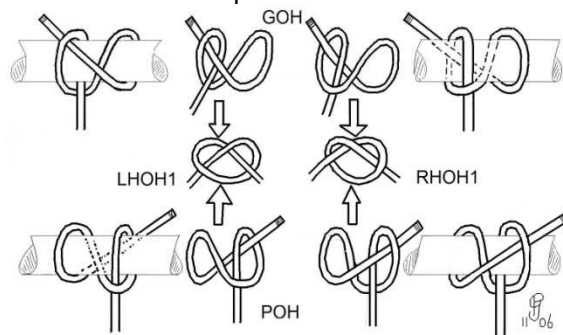
## Side Knot Family Relationships

Interestingly authors rarely remark on the relationship between pairs PLH-GLH and POH-GOH [5]. As we have seen, coming from the netter's perspective, it is an obvious, to be anticipated, relationship due to algorithmic proximity [15]. On the other hand, there is considerable recorded confusion around the PLH and GLH, which is truly peculiar as they are algorithmic proximate to the Clove Hitch – for which there is consensus on just *one* name and not two to discern both versions. For sure both Ossel Hitches generated less confusion. Did nobody care, or is something else going on? My guess is that there are too many subtle family relationships to keep track of. Let's zoom in to take a closer look.



In the image above both GLH and PLH versions up to mirror image are shown. The top row shows how the wend is taken to the left of the stand to form both versions of the GLH. The bottom row shows how the wend is taken to the right of the stand to form the PLH. Note that, when these structures are slipped off the spar, Overhand Knots (**OH1**) of different handedness occur. Why this spar-removal operation is relevant will become clear later.

Either type of Ossel Hitch also has two forms, as is shown in the image below. Slipping them off their spar will also result in pairs of RHOH1 and LHOH1.



Note that the pairs of GLH-PLH and GOH-POH along the diagonals in the diagrams above are closely related as mirror images. But mirroring alone will not map either one onto the other. Below we shall see which additional conditions are required to obtain equality. This first observation, however, already tells us that it will not be possible to continuously transform GLH into PLH (or GOH into POH). It is a well-known fact from knot-theoretical research that the differently handed Overhand Knots cannot be inter-transformed. That is, no amount of twisting and tangling will get one of them into the other.

In our case the relationship between the 4 structures is based on mirroring and rotating. It is clearly non-trivial. Let's move to a more abstract setting in the world of normal forms and tangles to study these aspects.

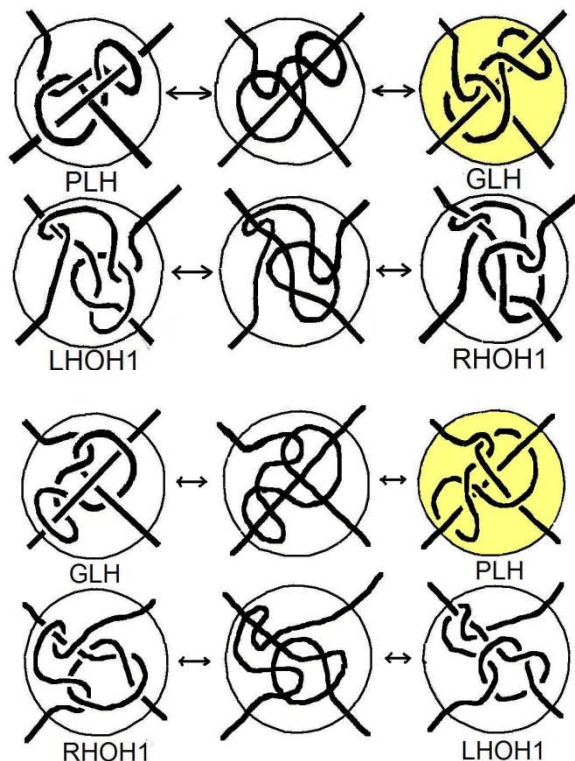
## Normal Forms

Why slip Side Knot Structures off the spar? By doing so, you are in fact ignoring the spar's presence and allowing the other component to twist and tangle into its (preferred) natural state. Note that such processes are reversible, frequently leading to surprising new tying methods, as we seen Hjalmar Öhrvall showed for the PLH. They also tell you that, whatever remains upon spar-removal, is a necessary prerequisite for making the original structure by reinstating all evaporated twists and tangles.

Now consider any hitch as a 2-component structure consisting of the spar and the rope. The hitch is usually portrayed as tied around a solid spar. However, topological deformations may occur if something less rigid than a wooden spar has been used. Around flexible media the same hitch-structure may *appear* totally different, perhaps even present itself as a bend. Bends and hitches harbor 2 normal forms, where either one is said to be the dual of the other. The normal form is, in fact, the so-called knot type of either string in a 2-component structure and exists by virtue of topological invariance. Eliminating the spar offers a beeline to the dual normal form.

## Tangles

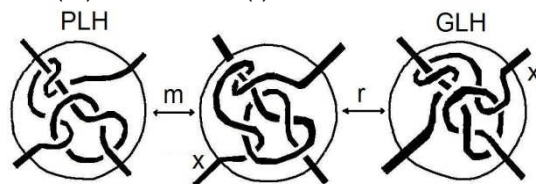
Tangles were introduced into the mathematical research arena by the British mathematician John Horton Conway in the 1970's [8]. By means of tangles our study is stripped of all irrelevant aspects, down to projections of its stringy bare bones.



Hitches and Bends can be represented by tangles on two strings, so-called 2-tangles. When a 2-tangle represents a hitch, one of its normal forms holds the spar, i.e. a straight line. Its dual need not be a straight line, e.g. in the GLH, PLH, GOH and POH case it is a stubborn Overhand Knot (**OH1**), which, conveniently for our purposes, cannot be conjured away. The foregoing diagrams show how the PLH and GLH (in both handednesses) relate. The shaded tangles are the GLH and PLH as they are to be found in the literature. Using the shadow, that is the tangle

without crossing information in the middle column, the structures are easily mirrored.

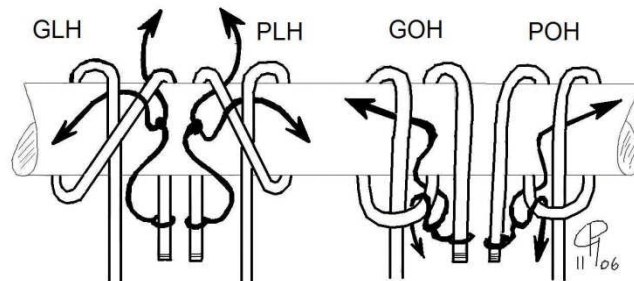
Using the dual normal form, as it contains a clearly distinguishable OH1, we now show that PLH and GLH cannot be readily transformed into each other, as one is LHOH- and the other RHOH-based. Using tangles it is easy to show that the PLH and GLH are mirrored (m) and rotated (r) versions of each other.



We leave it to the reader to show that POH and GOH hold a similar relationship.

## Notes on Proximities

The SKP illustrates an obvious example of algorithmic proximity [15]. Do other hitches exist, which are algorithmically proximate to the Side Knots? The answer is both affirmative and peculiar. The figure below shows how Clove Hitches are algorithmically proximate to GLH and PLH. Likewise Cow Hitches are algorithmically proximate to GOH and POH.



Thanks to Ashley there are distinct English names for the GLH and PLH. This is bizarre, as there is no such nomenclatural distinction for both Clove Hitches! Fun part is that the GLH and PLH have dedicated names, whereas both Ossel-versions do not!

In terms of applicational proximities a pristine field lays awaiting the bold explorer. As Cloves capsize into Grannies and Cows into Reefs, it is of more than academic interest to inquire where GLH, PLH, POH and GOH will lead, bend wise? Some quick and dirty tests show there are no immediate good candidates. In a future article we will show that the dual normal form, containing the OH1, will be the only likely place to encounter some reliable bend.

Note that the GLH-PLH and GOH-POH tangle shadows witness of structural proximity.



So, what have we learnt? The SKP generates hitches, whose counterparts, up to wend-stend interchange, are well-known. Of this set of hitch types GLH, PLH, POH are pretty well-covered and identified in the literature. The distinction between POH and GOH is rarely noted. In fact the GOH structure seems unrecorded. Over time, lacking analysis between all structures, confusion managed to creep into and become recorded in the literature.

The SKP yields a set of structures, which are inter-related by algorithmic and structural proximity. We have seen PLH-GLH to be algorithmic proximity with the Clove Hitches. The POH-GOH structures are algorithmically proximate with the Cow Hitches.

I hope this article has been a useful attempt at rectifying my contributions to the Grand Confusion surrounding Ground Line, Picket Line and Ossel Hitches.

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Stiphout November 2006.



The Pacific Americas Branch of the IGKT  
is celebrating their

Tenth Anniversary of Founding

July 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup> 2007  
in

San Pedro, California

We have secured the Los Angeles Maritime Museum site for our display and demonstrations on July 7<sup>th</sup> and 8<sup>th</sup> and we cordially invite all who would like to be there to join us.

Events will include:

1. Bell-rope tying contest – must be a member of the IGKT or PAB
2. Visit to the Tallships of the Los Angeles Maritime Institute
3. Grommet-tying and tossing contest in San Pedro
4. Lighthouse and Museum visit (guided tours)
5. Fender-making, string-figure making and scoubidou for the kids
6. Decorative knotting contest to decorate aluminum (aluminium to some) or tin container – must be original work

Contest rules available from [secretary@igktpab.org](mailto:secretary@igktpab.org) or from [president@igktpab.org](mailto:president@igktpab.org)

Displays will include:

1. Ditty bags
2. Bell-ropes
3. Knotted pieces
4. Knotted animals
5. Marlinspike seamanship
6. Macramé

A joint conference of the Branches of the North Americas (PAB, NAB, TxB, PKB and all sub-chapters) is planned for Friday, July 6<sup>th</sup> where all members are welcomed to discuss matters of importance to their Branch. Speakers are welcome to present information that we all need to know – where to get cord, how to tie any Turk's Head in hand, how to preserve knotted articles and so on – you name it and we'll make space for you. Be sure to get your favorite topic on the agenda!

## Plan your trip now!

Flights to Los Angeles International Airport (LAX) are recommended or plan your stay at any of the hotels and motels nearby – come and enjoy the fireworks in sunny Southern California! Call President Lindsey Philpott at 1-310-749-3541 or email at [marline.man@verizon.net](mailto:marline.man@verizon.net) or write me at: 3646 Gaviota Avenue; Long Beach, CA 90807-4307 USA for full and further details of transportation, accommodation, comestibles, attractions and whatever! Let us know that you will be coming so that we can help you enjoy your stay. There may be a special treat for those of you who do sign up early!