HANDLING NYLON LINES

NYLON, because of itsmany advantages, is gradually being introduced aboard merchant vessels. Its tensle strength is approximately twice that of manila's - a real premium. Nylon lines are lighter, more flexible, less bulky, and easier to handle and stow. They resist rot decay and marine fungus growth. Nylons inherent properties provide the ability to stretch, absorb shocks, and resume normal length when strain is removed. Many of these advantages can be turned into liabilities, however, if the user is not familiar with some of its characteristics.

Nylon is no cureall for the hazards involved in any linehandling situation. Dependence upon its additional strength may cause the seaman to ignore ordinary precautions. Nylon lines will part, as will manila or wire rope, when they are weakened, subjected to greater strains than they can withstand, or when given improper handling. Nylons terrific backlash can cause serious injury or death.

The use of nylon lines presents hazards unique to nylon's physical properties. The is preticularly true under conditions conductive to heavy strain, such as while underway and with headway while mooring or maneuvering into locks. Inexperience with nylon lines may well have been a pertinent factor in casualties in the St. Lawerance Seaway recently reported to the USCG.

When nylon is stretched over 40%, it is likely to part. The stretch is immediately recovered with a snapback that will sound like a pistol shot. The snapback can also be as deadly as a bullet wound. It is therefore imperative that no one stand in the direct line of pull when a heavy strain is applied. This is also tmue for other types of lines, but over-confidence in nylon's strength may lead one to underestimate its sting. A line handler was killed when he neglected this precaution. A vessel maneuvered alongside a quay with a new 6" mooring line as a forward spring. The wind was from astern at 15 miles per hr. making it difficult to check the ahead motion of the vessel with the spring line already under tension. Before it could be slacked, the line parted close to the eye on the ballard. A lineman, standing in the way of the line, was struck and killed. There were many factors which could have contributed to this casualty, but the simple fact remains - if the lineman had been in the clear, there would have been a witness, rather than a statistic.

Three other casualties have occured aboard ships in the Seaway while handling nylon lines. One seaman fractured his left hand when the uppermost turn of a stern line he has been surgging on a capstan jumpped off and struck him with the handling part. In this case, with a heavy strain on the line, it might have been easier and a great deal safer to have backed the line with the capstan rather than by hand. Another seaman lost control of a bow line while surging from a bitt. He was thrown to the deck and hit by the hauling part of the lien. He may not have known that the coefficient of friction for nylon is lower than that for manila. Two or three round turns before figure - eighting the line would have given him better control in easing the line.A third seaman broke his leg when a bow line parted close to a chock which was not of the rolling type. Chaffing gear may well have eliminated this lost time injury.

It may be coincidental that these casualties took place in the Seaway. There have been no accidents attributed to the use of nylon lines aboard U. S. MSTS vessels, where nylon has been under test and in use for the past two years. Perhaps more experience is needed by ocean vessels in Seaway transits. In any case, it is apparent that the cannalties reported here caused by inexperience or lack of knowledge rather than by the inherent properties of nylon.

The following maintenance tips were compiled by the U. S. Navy Bureau of ships and published in the BuShips Journal. They are reprinted here with the belief that greater knowledge of the subject will be of assistance to the officers and man aboard ships now using nylon line. Comments by interested personnel will be appreciated and given consideration for publication in the Proceedings in the interest of marine safety.

MAINTENANCE

1. Nylon rope will hold a load even though a considerable number of the yarns are abraded. Ordinarily, when abrasion is localized, the rope may be made satisfactory for reuse by cutting away the chafed section and splicing the ends. Chafing and stretching do not necessarily indicate the load-carrying ability of nylon rope.

2. Splice nylon rope as you would manila rope except that tape instead of seizing stuff should be used for whippin the strand and rope. Also, nylon rope, because of its smoothness and elasticity, required at least one extra tuck over that for manila rope. For heavy load applications, such as towing, take an additional back-tuck with each strand

3. Should nylon rope become iced over, thaw it carefully at moderate temperature and drain before stowing.

4. Should nylon rope become slippery because of the accumulation of oil or grease, scrub it down. Isolated spots may be removed by the use of light burining oils.

GENERAL USAGE

1. Do not uncoil new nylon rope by pulling the end up through the eye of thecoil. Unreel it as you would wire rope.

2. New cable - laid nylon hawsers tend to be stiff and difficult to handle. To alleviate this condition, tension the cables for 20 minutes at 30% extension (100 ft. when tensioned would measure 130 ft.)

3. When the stretch of nylon becomes excessive, double up the lines by passing the bight, thereby halving the elongation under load. This redudes the hazard of snapback, since the rope will usually part near the eye. In drydocking and other close control work, stretch can be reduced to one half by doubling the lines.

4. When new cable-laid nylon hawsers are strained, sharp cracking noises will be heard. The noises are associated with readjustment of the rope strands in the stretched cable. Under normal safe working loads, the rope will stretch one - third of its length.

5. Wet nylon hawsers under strain emit steam-like water vapor. This phenomenon is normal under safeworking loads.

6.Nylon rope can withstand repeated stretching with no serious effect. When under load, it thins out, but when free of tension, it returns to its normal size. The critical point of loading is 40% extension ; that is, a 10 ft. length would stretch to 14 ft. when under load. Should the stretch exceed 40%, the rope is in danger of parting.

7. When sets of ropes are to be used in paralled, as are boatfalls, do not pair nylon rope with low elongation rope such as wire or manila.

8. Use nylon rope stopper for holding nylon hawsers under load. Do not use manila or chain.

9. When handling nylon rope without a powered reel, avoid coiling it in the same direction all the time since this will tend to unbalance the lay.

10. Bitts, chocks, and other holding devises used with nylon rope should have smooth surfaces to reduce abrasion and minimize surging of nylon ropes under working conditions. Use chafing gear where there are sharp metal edges. During reeling or heaving-in operations, take care that thimbles and connecting links do not chaft or cut the nylon.

11. Since normally, plain laid nylon rope is right-laid, coil it on bitts, capstans, or reels in a clockwise direction.

12. Do not use wire or spring lay rope on the same chock or bit with nylon rope.

13. Plain-laid nylon hawsers tend to elongate around bitts when loaded. To minimize excessive lengthening, take a turn under the horn and cross the line on itself before taking more turns.

14. When nylon hawsers are used on capstans for heavy towing or impact loading, take six turns on the capstans and two turns overlaying the last four turns, This procedure reduces the hazard of sudden surges on rendering out.

15. For mooring purposes with low freeboard vessels where the tide differentials are average, make up at half tide. No further handling should be required.

16. Nylon rope under heavy strain may develop glazed areas where it has worked against bitts and chocks. This condition may be caused by the removal of paint from metal surfaces or fusing of nylon fibers. In either case, the effect on the rope strength is negligible.

ALONGSIDE TOWING

1. Make up forward and backing tow lines as close as possible without regard to sharp bends.

2. Take up slack in relayed line while the other line is under heavy load.

3. When easing pull, the tug may have to reverse engines slightly to conteract the elastic property of nylon and thus avoid snap-back action.

PRECAUTIONS

1. Nylon rope on parting is stretched 50%. The stretch is recovered instantaneously with resulting snapback. In view of this, it is imparetive that no one stand in direct line or pull when heavy loads are applied.

2. Do not use a single part of plain-laid rope for hauling or hoisting any load that is free to rotate. If one part of rope is essential, use cable-laid nylon hawsers.

3. Do not stow nylon rope in strong sunlight for long periods. Cover it with tarpaulins. During stowage, keep it away from heat and strong chemicals.

4. Be extremely careful when easing out nylon rope and around bitts and cleats under heavy loads. Because its coefficient of frection is lower than that of manila, the nylon rope may slip when eased out and cause injury to personnel unfamiliar with its oddities.

5. For control in easing out, take two or three round turns on the bitt before figure-eighting the line. Use of the round turns provides a means for closer control in easing out or surging. Always stand well clear of the bitts during these operations.

LIFE EXPECTANCY

Nylon rope properly handled and maintained should remain servicable more than five time longer than manila rope subjected to the same use. Adherance to the foregoing instructions combined with the usual safe practices followed for manila rope will give all the advantages of nylon rope plus savings in cordage allowances.

KEEP CLEAR OF THE FOLLOWING CHEMICLAS

The chemicals listed here have a permanent effect on nylon yarn. Action takes place at various temperatures and concentrations according to the chemical involved:

Concentrated formic acid
Benzyl alcohol (at a boil)
Phenol
Cresols
Xylenols
Chlorinated phenols
Concentrated nitric acid
Concentrated sulfuric acid
Calcium chloride (in menthanol)
Calcium chloride (in glacial)
Zinc chloride in menthanol
Concentrated hydrochloric acid