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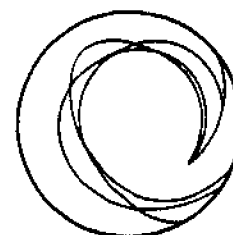
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DIVER EDUCATION SERIES

The Diver's Knife

Lee H. Somers

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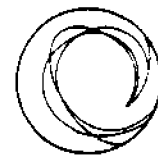
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Price 75¢

DIVER EDUCATION SERIES

THE DIVER'S KNIFE

Lee H. Somers, PhD

All divers carry a knife as a safeguard in the event of entanglement. This is especially important for divers swimming in limited visibility water and at night. Synthetic fish line is difficult, if not impossible, to see even in clear water. In lakes, bays, and coastal fishing areas, lost commercial fishing nets constitute potential entanglement hazards for scuba divers, especially wreck divers. Fatal diver entanglement accidents have included a river diver who apparently becoming entangled in his surface float line and a female diving student diver who became entangled in an underwater guideline during a training exercise. In a non-fatal incident, a lake diver was snagged by a fisherman's hook and pulled to the surface from a depth of about 60 feet. The diver was subsequently treated for decompression sickness.

KNIFE CHARACTERISTICS

The selection of a knife for underwater use is a matter of individual diver preference and task requirements. Knives are popular in today's society. Countless folding and sheath knives are available to outdoor enthusiasts and survivalists. One diving equipment manufacturer offers a selection of 35 different dive knives. The diver can select from an assortment of full size, mid-size, compact, mini, mil-spec, traditional, or commemorative models. Sizes range from 7.5 to 13 inches overall length with blade lengths of 3.5 to 7.75 inches. Knives are available with either a traditional polished metal finish or non-reflective black matte (or teflon) protective coating.

Most dive knives are constructed of stainless steel. However, there are numerous types of stainless steel available for knife construction. Depending upon the mixture of different metals (alloy) used in the composition, the characteristics of the resultant stainless steel can vary significantly. For example, 420 series stainless steel is popular for dive knife construction. This alloy is corrosion resistant, has a high tensile strength, and a Rockwell hardness of 52-53. This material will hold an edge (i.e., sharpness) for a reasonably long time and, because of its high tensile strength, can be used as a prying tool. The knife will exhibit some oxidization (rust) staining unless rinsed after diving, dried, and lightly coated with an oil such as WD-40.

On the other hand, a knife made of 304 series stainless steel has an unusually high rust resistance and will generally never stain. This material (Rockwell hardness: 25-30) produces a

knife that has good tensile strength; however, it is difficult to acquire and maintain a good edge. This is a less satisfactory choice for a diver who wants a sharp knife.

Knives constructed of 440 series stainless steel with a Rockwell hardness test of 55-57 will sharpen to an extremely keen and long-lasting edge. However, this alloy does not give the high tensile strength associated with the other compositions, and knives constructed from it should not be used as a prying tool.

Keep in mind that the higher level of hardness (and edge retention) results from a higher carbon content that also causes the metal to develop rust discoloration (oxidize). Any knife designed for optimum sharpness and edge retention will rust unless the diver takes special care to wash, dry, and oil the knife after use. Superficial rust/discoloration can be removed with steel wool or special polishing materials/compounds supplied by the manufacturer. The black matte coating may offer some added protection and rust resistance.

Titanium is used in the construction of some expensive dive knives. According to one manufacturer (SCUBAPRO) it provides the ideal characteristics for knife construction -- ultralight, completely noncorrosive, high tensile strength, and anti-magnetic. Titanium knives are available in standard sheath and folding models.

A variety of blade configurations including stiletto (or dagger-style), double-edge, or traditional single edge are available. Although most knife blades are designed with a sharp point, a few models are available with a chisel-tipped (squared end) blade. Most dive knives have a portion of one or both sides of the blade serrated in order to facilitate cutting natural and synthetic rope/line fibers. Many have a special line cutter notched into the blade.

Compact all-metal, one-piece skeleton construction knives are increasing in popularity because of their lighter weight and lower profile. Holes or depressions in the metal handle, coarse gripping serrations, and/or hand molding grip designs facilitate comfortable and secure handling. More traditional knives are equipped with molded rubber, fiberglass reinforced thermal resin, or molded plastic handles. Highly visible, brightly colored handles may facilitate locating a knife accidentally lost underwater. Many knife handles have a solid stainless steel butt cap that may be used for hammering tasks.

Knife sheaths for underwater applications are constructed of fiberglass reinforced thermal resin, heavy rubber, rubber and vinyl, or vinyl. Conventional sheaths are designed with a variety of "locking systems" and rubber retaining rings to secure the knife within the sheath. In recent years, several positive locking systems have been designed to provide the diver with quick and easy one-handed access to the knife. One such system incorporates a spring-loaded thumb-operated latch on the sheath

which locks into a hole in the knife handle. Another manufacturer's design incorporates a spring-loaded button into the handle of the knife which extends through a hole in the sheath and locks the knife in place. Sheaths are designed to be secured directly to a diver's scuba harness or weight belt or to the upper or lower arm or leg with vinyl, rubber, or nylon/Velcro/tension buckle straps. Several manufacturers have designed scuba gauge consoles with built-in sheaths for compact knives.

Some divers use compact stainless steel **folding knives**. A folding knife can be carried in a special nylon pouch, in the BC pocket, or clipped to a D-ring. Folding knives for divers are generally about 4.5 inches long when folded and 7.75 inches long when the 3-inch blade is locked in an open position. The blade is usually constructed of a high quality stainless steel characterized for edge retention, and the handle, pins, and locking mechanism are of a highly corrosion-resistant alloy. Titanium models are available.

The folding knife should be designed and constructed to facilitate easy opening with gloved hands and should have a locking mechanism that prevents accidental closing during use. The major disadvantage of a folding knife is the inability to open the knife rapidly with one hand. Many divers feel that this type of knife offers greater versatility. A medium size 3.25 ounce folding knife can be carried and used on a daily basis for general cutting tasks, food preparation, boating, and so on.

SELECTING A KNIFE

If one were to consider all of the dive knives that are available from all of the diving equipment manufacturers plus those included in survivalist catalogs/stores, the scuba diver has well in excess of 100 models and designs from which to select. Often an individual will select a knife on a basis of aesthetics, status symbolism, or notoriety with little regard for utilitarian purpose. This often results in the selection of a knife that is large, heavy, equipped with special survivalist-combat features, and expensive. In other words, a "RAMBO" knife.

The average scuba diver needs a **compact, sharp knife** capable of cutting fish line and net in order to resolve an entanglement situation. Some divers seem to prefer a large knife that can be used for prying and "hacking" objects from shipwrecks, prying marine organisms such as abalone from rocks, and cutting large fiber rope or steel cable. May I suggest that there are more appropriate tools for such tasks. In some areas it is illegal to remove attached objects from shipwrecks. Furthermore, special **diver's tools** are designed for such tasks. The use of a knife to pry abalone from rocks is also unlawful. A sharp knife will generally seriously injure the animal and, in the event that the abalone is too small and must be returned, it is less likely to die if it was originally taken with a flat **abalone iron**. The

requirement for cutting large ropes and steel cable is very unlikely in a scuba diving situation. Should such a requirement arise, an appropriate cutting device can be made available to the diver on a specific task basis. The average diver's knife is less than satisfactory for cleaning/preparing fish and other seafood; a number of excellent fillet knives are available.

It is also highly unlikely that a scuba diver will encounter a jungle survival or combat situation where the knife will have to be used as a defensive/offensive weapon to kill other human beings, fashioned into a spear to kill wild boar, or converted into a grappling hook for use in scaling objects or as an impromptu anchor. The availability of waterproof matches, a cable-type saw, survival compass, aspirin, fishing equipment and so on in the knife handle is probably not necessary for diving in the resort waters of Grand Cayman.

Large knives are cumbersome, heavy, increase resistance for underwater swimming, and often must be worn in less desirable locations on the body. Inexpensive models are often difficult to sharpen, do not retain an edge, and may prove to be ineffective as a cutting tool.

Scuba divers are encouraged to consider the following when selecting a knife for routine diving:

- * Do I have any special requirements other than safety and management of a potential entanglement situation? If so, would a special purpose tool better serve my needs for those specific and occasional tasks?
- * Is the knife constructed of a stainless steel alloy that is characterized for optimum sharpness and edge retention?
- * Is the handle designed so that I can comfortably, securely, and safely handle the knife with bare or gloved hand? Be certain to handle the knife with a gloved hand before final selection.
- * Is the knife designed with a line cutter? This is one of the most important features of a diver's knife.
- * Can I draw the knife with one hand? Either hand? A gloved hand? This is a function of both knife/sheath design and location worn.
- * Is the knife-sheath system designed and constructed in a fashion that will prevent accidental loss of the knife in any position?

- * Is the sheath designed and constructed so as to minimize the possibility of accidental injury to myself when wearing or drawing the knife?
- * Will the knife-sheath system interfere with swimming and underwater movement in any way? If so, consider another model.
- * Daggers, stiletos, and double-edged knives offer little or no advantages to the diver and may, in fact, have some disadvantages from a standpoint of routine cutting and handling safety. They are advantageous for fighting and killing if you are into that sort of thing.

WEARING AND USING A KNIFE

The appropriate location for wearing a dive knife is much a matter of personal preference. **Keep in mind that the knife must be placed so that it is easily accessible with either hand and when the diver is in any position.** I have seen divers wearing knives on both lower and upper legs and arms, on instrumentation consoles, scuba harnesses, weight belts, BC hoses, and pressure gauge hoses, and in buoyancy compensator pockets. West Coast divers often wear their knives on the inside of their lower leg in order to minimize the possibility of catching the knife on sea plants or lines and to prevent a weight belt discarded in an emergency from accidentally catching on the leg-mounted knife.

I recommend that beginning divers observe the position that other divers have selected to wear their knives and experiment with several different positions/locations. Practice drawing the knife with either hand in all underwater swimming positions and with gloves on. Keep in mind that you may have to draw the knife quickly under a stressful situation.

In the event of entanglement, do not use a knife indiscriminately. Most often the diver or buddy can resolve the situation manually and without cutting. The entangled diver must relax and avoid "thrashing about" or placing stress against the offending line or net. Carefully and systematically examine the entanglement visually or by feel. If the material must be cut to resolve the situation, carefully plan each cut. If possible and practical, remove the offending line or net in order to reduce the risk to other divers.

Divers using safety guide lines (i.e., wreck, ice, and cave divers) must take exceptional care to avoid entanglement in their own lines. These divers must receive special training in line techniques and in dealing with entanglement situations. They must be especially careful in order to avoid cutting safety lines that connect them or other divers to the surface or exit point.

KNIFE MAINTENANCE

A dull knife is relatively useless! Periodic sharpening in accord with the manufacturer's directions is required. All divers should own a sharpening stone and a bottle of honing oil. To sharpen a knife, moisten the top of the stone with honing oil. Place the cutting edge of the blade on the edge of the stone and raise the opposite side of the blade about 1/8-inch above the stone. Then, as if cutting a slice from the stone, draw the cutting edge across and along the stone from heel (handle end of blade) to point. Reverse the blade and repeat the motion. Continue until a sharp edge is obtained. Some sharpening kits have two stones, a coarse one for initial sharpening and a hard, fine one for developing an exceptionally sharp edge. A special sharpening tool is available for sharpening the serrated portion of the blade and line cutters. This tool may also substitute for a stone on diving trips. Ideally, your knife should be inspected and sharpened before any major diving trip.

Following a dive, especially in salt water, the knife should be rinsed in fresh water, dried, and, ideally, a light coating of WD-40 or other oil applied. Discoloration and rust deposits may be removed with steel wool or special materials/compounds supplied by the manufacturer.

Periodically, inspect the sheath and straps for wear and security of locking/retaining devices. Maintain locking devices in accord with manufacturer recommendations. Cleaning and lubrication may be required. Some knife handle locking devices must be periodically disassembled for cleaning and maintenance.

KNIFE SAFETY

A knife is a safety tool, not a toy! Treat a knife with the same respect as you would any weapon. With the exception of controlled practice sessions, the dive knife should not be drawn from its sheath at a dive site except in an emergency. Do not use it as a throwing knife for target practice between dives! At home, keep the knife in a secure location inaccessible to small children.

Do not wear your dive knife to a bar or McDonald's after a dive. If you must identify yourself as a diver for social purposes or ego gratification, wear a T-shirt or baseball cap with a diver symbol. If you feel that you need the knife for personal defense reasons, you are in the wrong section of town. Keep in mind that in some areas such knives carried improperly may be considered illegally concealed weapons; open display on a city street or in a public place may also be unlawful.

Be careful in transporting your knife, especially on commercial aircraft. Never pack a dive knife in your carry-on luggage. This can cause embarrassing and unnecessary excitement, confusion, and detainment at security inspection stations.

SUMMARY

A dive knife is a safety tool that must be carefully and objectively selected to meet the needs of an individual diver. The knife must be worn on all dives, **both skin and scuba**, in a secure position readily accessible to the diver with either hand. Avoid expensive, cumbersome survivalist-style knives for routine diving activities. Select a knife for optimum sharpness and edge retention. Handle the knife with proper precautions in order to prevent injury to yourself or others. Periodic sharpening and other maintenance procedures are required for knives and sheaths.