Marine Corps Small Craft Operations: In Need of a Fix

Small craft are an integral part of the Marine Corps' warfighting capability. Although these craft are absolutely essential to fulfill wartime missions, our inability to operate, maintain, and logistically support them properly prevents us from realizing their full potential.

by CWO2 Jimmie J. McKeral, Jr.

The Marine Corps operates myriad tactical small craft, ranging from 6-man inflatables to 35-foot, diesel-powered riverine assault craft.

But poor procurement practices have generated a lot of problems. Small craft have entered our inventory two ways: either the Marine Corps Research, Development and Acquisition Command (MCRDAC) has bought them or units have open purchased them from local vendors. Of the two, open purchase is by far the worst. By allowing individual units carte blanche to buy whatever they want, we've ensured nonstandardization of equipment. This makes logistics and maintenance support for these craft uneconomical, impractical, and in some cases, impossible.

In light of this, it's apparent that MCRDAC should control procurement. However, we still lack fully integrated logistical support on all our craft. This stems from MCRDAC rushing to get new equipment to the Fleet Marine Force (FMF). While this is a laudable goal, brand new but deadlined equipment awaiting nonexistent repair parts doesn't enhance combat effectiveness. Therefore, we should stop fielding new items of equipment before we can logistically support them. To its credit, MCRDAC has reorganized and implemented measures to correct past mistakes, but the lesson should not be forgotten lest it be repeated in the future.

Marines from 2d Reconnaissance Battalion and Small Craft Repair Platoon, 2d Maintenance Battalion, operate a CRRC powered by twin 35hp outboard motors. Early developmental testing shows that CRRCs powered by twin 35s have many advantages over those powered by a single 35 or 55hp outboard.

The MOS Dilemma

But the problem is deeper than mere procurement and sustainment difficulties. From square one we've failed to realize that operating and maintaining small craft is a full-time job. We have an institutionalized view that these are part-time duties that any Marine can perform. In truth, however, these are technical skills requiring extensive training and experience to fully master. In fact, the length of both coxswain and mechanics training is longer than many formal military occupational specialty (MOS) schools, and still the training is insufficient. For example, no one would charter a fishing boat with a captain who had only a few weeks of boat training. However, we expect to conduct combat operations under the toughest conditions with an equally untrained Marine. Anyone who has spent enough time in over-the-horizon (OTH) training or in surf zones at night with poor running craft and inexperienced personnel will be convinced that coxswain and mechanics should not be trained on an incidental basis.

In special operations there are al-

ready enough things that can go wrong. The last thing we need is a combat failure because we failed to recognize that the nature of the mission required the most experienced and proficient personnel possible. The way to obtain this is to create specific MOSs for small craft operations and maintenance. Some might feel that in this era of budget and manpower cuts, we cannot afford additional MOSs, but what we cannot afford is *unnecessary* MOSs. I submit that new MOSs are absolutely essential for us to have a real small craft capability, and failure to create them is a false economy.

Consider this: Nearly every unit with small craft already has Marines struggling full time to operate and maintain them. Currently, we spend thousands of dollars training Marines and never recoup the investment due to quick reassignments of personnel back to their primary MOS because of transfers. Their replacements usually have zero training in small craft. Without set career paths to develop noncommissioned officer, staff noncommissioned officer, and officer leadership, we're ensuring that our leaders are as technically ignorant as our troops. Unfortunately, despite our 200 years of experience as soldiers of the sea, we Marines are basically amateurs at small craft operations and maintenance. Think about it: We have an MOS for a Marine to drive a truck, but operating a rigid raiding craft (RRC) in Sea State 3 on an OTH raid while navigating in formation at night under emissions control is an incidental duty for a rifleman.

We need to begin by training mechanics capable of repairing all small craft Marines use. Unfortunately, neither the military schooling nor manpower management exists to produce them. We have engineer equipment mechanics, MOS 1341, with minuscule outboard motor repair training; body fender repairmen, MOS 3513, with some fiberglass but no hull repair training; and fabric repairmen, MOS 1181, without training on inflatable hulls. Past attempts at forcing these three MOSs into effective small craft mechanics without extensive retraining have proved futile. This is a ludicrous approach anyway. We don't need three Marines to fix one boat; we need one Marine. The ability to field a Marine fully trained and capable of not only supporting but participating in both special and riverine operations is critical. We simply cannot afford to waste the manpower associated with having three Marines doing one Marine's job. Operational commanders realize this, and many organizations with small craft have taken Marines away from their regular duties to serve full time as small craft mechanics. Currently, no single military course exists that is capable of training Marines to repair all of our small craft. The RRC Mechanics Course at Marine Corps Engineer School (MCES) is no longer offered. It covered RRC hull repair, 70 horsepower (hp) outboard motor troubleshooting, and component interchange. It should be replaced with a small craft mechanics course outlined in Figure 1. (MCES also teaches a 1-week class on the 35hp motor during the 5-month journeyman course (MOS 1341) and a 1-hour class on the 35hp motor ignition system during the basic 1341 course.)

While the quality of instruction in all of these is considered high, it falls short of producing small craft mechanics. This forces commanders to seek training from commercial vendors and to pay for it with unit funds. This training is expensive in per diem, travel, and in some cases, tuition. It also is hard to obtain, which hinders operations.

We also need specifically trained coxswains. Currently, both landing force training commands (LFTCs) and special operations training groups (SOTGs) train coxswains. We should pool our talent and form one school. The location should provide the best mix of open ocean, surf, and riverine environments.

Just as desert operations pose different problems than jungle or arctic operations, the variations in hydrography found worldwide can cause damage rates to vary dramatically from one geographical area to another. Thus methods that work well in one area will not be totally effective in another. For example, the 8th Marine's area of operations (AO) in the shallow New River and along the coast of North Carolina, with its shallow inlets and constantly shifting channels, poses an entirely different problem than found in the 1st Marine's AO. The 1st Marine's generally has deep-water access to the ocean and thus shallow-water damage to small craft is not as high.

This is simply one example of how operations are affected, and if you factor in all of the possible variations in hydrography found worldwide, you can see we still have a lot to learn. Clearly, we should have an FMFM on small craft operations that articulates these problems along with methods to combat them. This FMFM, if written properly, would include advanced tactics, a subject that is essential for developing worldwide expertise vice the regional expertise we have now.

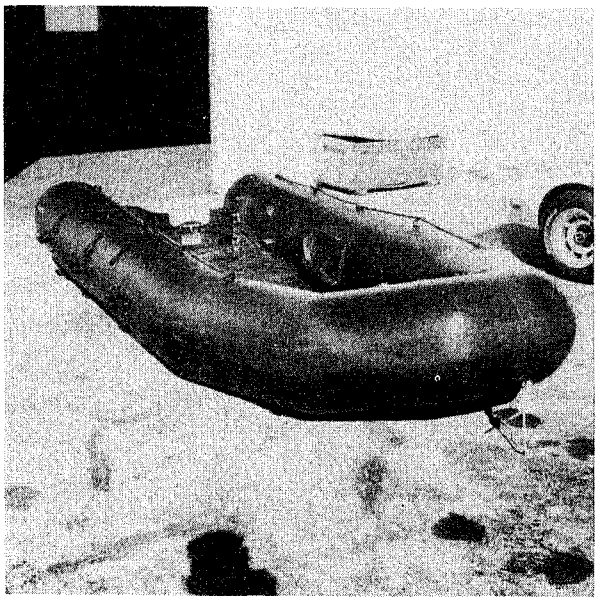
The coxswain's course should provide the FMF with coxswains capable of safe operation of all types of craft, in all types of conditions, and each graduate should possess excellent navigational skills and be thoroughly proficient at operator's preventive maintenance.

Small Craft Mechanics Course (Content)

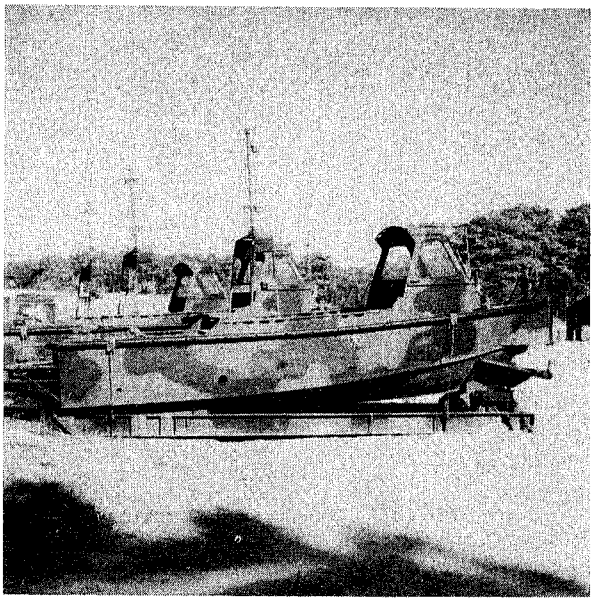
Subject	Length	
Outboards	2.5 Weeks	
Fiberglass Repair	1.5 Weeks	
Avon RIB Repair	.5 Weeks	
Inflatable Repair	1.5 Weeks	
Marine Diesel/ RAC Systems	1.1 Weeks	
Shop Records	.9 Weeks	
Boat Operations	1.0 Weeks	
Troubleshooting	1.0 Weeks	
	10.0 Weeks	Total

Since the RRC mech course is no longer offered by MCES, we should move it to the LFTCs and, as noted, make it a small craft mechanics course.

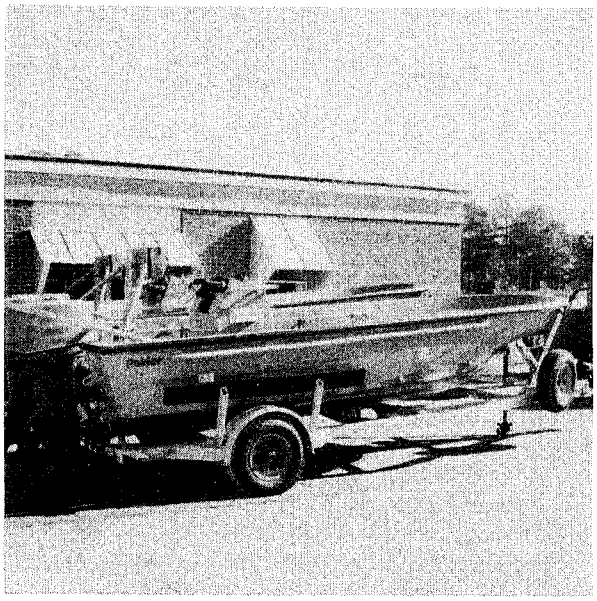
Figure 1



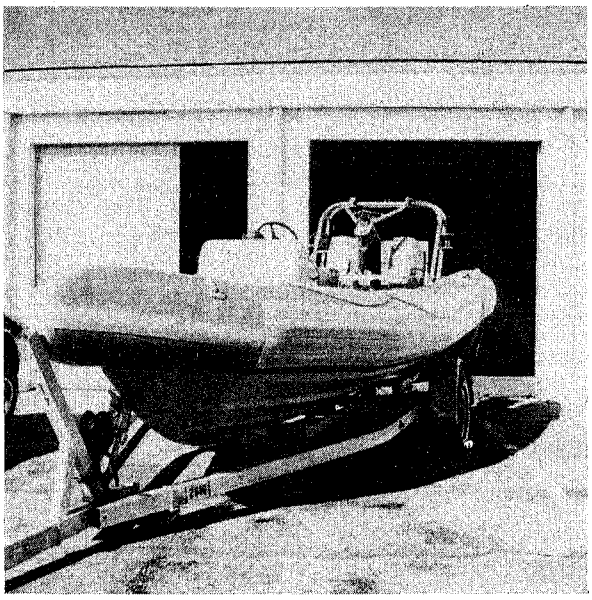
Combat Rubber Raiding Craft (CRRC): *The Avon 450 (shown here), along with the Zodiac F470, the two most common CRRCs in the Marine Corps' inventory, perform many tasks, including reconnaissance, raiding, and support of bridging and topographical operations.*



Boat Bridge Erection: *This boat, powered by two diesel engines with water jets, is designed to support bridging and amphibious operations. Capable of carrying 15 fully loaded troops or 4,400 pounds of cargo, this craft is also used as a general purpose work boat in support of diving operations, for inland water patrols, and as a safety boat for river crossing.*



Boston Whaler Rigid Raiding Craft (RRC): *This craft, used primarily by infantry units, is employed in over-the-horizon transportation of amphibious raid forces. It can operate up to Sea State 3.*



Avon SR6M Rigid Inflatable Boat (RIB): *This over-the-horizon raider is used primarily by 2d Force Reconnaissance Company, which employs it in concert with CRRCs to facilitate landings. Initially designed as a rescue craft, the Avon RIB is capable of operating beyond Sea State 4.*

The Marine Corps must also rethink small craft employment.

These craft suffer exceptionally high damage rates.* While the nature of military operations is hard on equipment, much of the current damage stems from poor employment, making it preventable. For example, RRCs suffer horribly from shallow-water damage, particularly in surf zones. The rising and falling action of the surf causes the props to strike bottom, which bends them. The bent props are out of balance and pitch, causing vibrations that indirectly destroy the motor's lower gearcase and powerhead.

While this seems painfully obvious, the two primary methods used to land troops with RRCs are the J-turn and the high-speed beaching, both of which require the craft to enter the surf zone. High-speed beaching basically entails ramming the beach at high speed, not only causing prop/lower-unit damage, but hull damage frequently occurs on rocky beaches as well. Furthermore, each craft weighs more than 3,100 pounds, making extraction no small task and creating a tactical problem. The J-turn maneuver, in which the craft executes a J-shaped turn and loiters bow into the surf to debark the troops, was invented to solve the beaching problem, but the boat is still in the surf zone.

There is another way. 2d Force Reconnaissance Company operates a 6-meter rigid inflatable boat (RIB) in lieu of the RRC, and it is powered by the same 70hp outboards. Both craft have comparable performance characteristics and have range and speed advantages over the inflatable combat rubber raider craft (CRRC). The CRRC on the other hand is far better suited for surviving heavy surf zones, especially when equipped with the very reliable 35hp military amphibious reconnaissance system (MARS) outboard motor, which by design allows immediate restart after submersion.

Realizing this, 2d Force Recon capitalized on the RIB's range and speed to transport a CRRC from over the horizon to a point just off the beach landing site, from where the CRRC provides transportation ashore. This allows capitalization of the CRRC's strength—surf zone survivability and transportability ashore. This alone is one of the main reasons 2d Force Recon's damage rate is less than 1 percent that of 8th Marines', even though both operate in the same areas. Granted, each has a different mission, recon vs. raid, but the real issue is OTH transport of troops.

While this method requires a little more coordination, the trouble is worth it when hydrographic conditions make shallow-water damage certain for RRCs and range/speed considerations prohibit a CRRC raid.

In 1988 MCES experimented with this method while supporting an engineer recon mission up New River with the objective being a bridge deep in Northwest Creek. Two RRCs each towed a CRRC. At a prearranged point the RRCs dropped off the recon team, which continued the mission via CRRC. At the appointed time, the RRCs returned and picked up the team for the ride home. Once we figured out the length of tow line required for the sea state, the CRRCs rode quite nicely in the RRCs wake. Furthermore, travel time was reduced 50 percent and the RRCs experienced no shallow-water damage.

Of course, there are times when the J-turn or high-speed beaching is the best choice. There are also times when a strictly CRRC raid is called for. However, if we want maximum effectiveness from our forces, we need to recognize the capabilities and limitations of all our craft and employ them accordingly. This is especially critical if we conduct riverine operations where a large number of craft are operating in the same area.

Somewhere along the line we have confused the mission of the infantry unit with that of the combat service support (CSS) element. When it comes to organizing the amphibious raid force, we overwhelm a standard infantry company by handing it more than 100 end items of equipment and then failing to train, organize, and equip it to properly use or maintain them.

Basically there are three distinctly separate missions. Transportation from ship to shore, maintenance, and conduct of the raid ashore. The first two,

*Maintenance records show that RRCs experience a hull damage rate of nearly 100 percent within 8 months. Minor nicks and chips are not counted in this figure. Only structural fiberglass damage or damage to major stainless steel components have been included.

transportation and maintenance, according to *FMFM 4-1, Combat Service Support*, are traditionally CSS functions. Additionally, the majority of the special training required to perform OTH small craft raids is spent on these two skill areas. We need to acknowledge these facts and form a small craft company to perform them (see Figure 2).

This company should consist of four maneuver platoons and one organizational maintenance platoon. Its mission would be to provide small craft platoons to the Marine expeditionary units (MEUs) to transport company-sized forces or to transport a battalion-sized force at the Marine expeditionary brigade (MEB) level when employed as an entire company. This would provide the infantry unit with an already trained small craft platoon/company prior to lock-on for deployment. This allows the infantry to be primarily passengers (with the exception of a few special boat-handling skills), and it allows the raid commander to concentrate on his mission ashore.

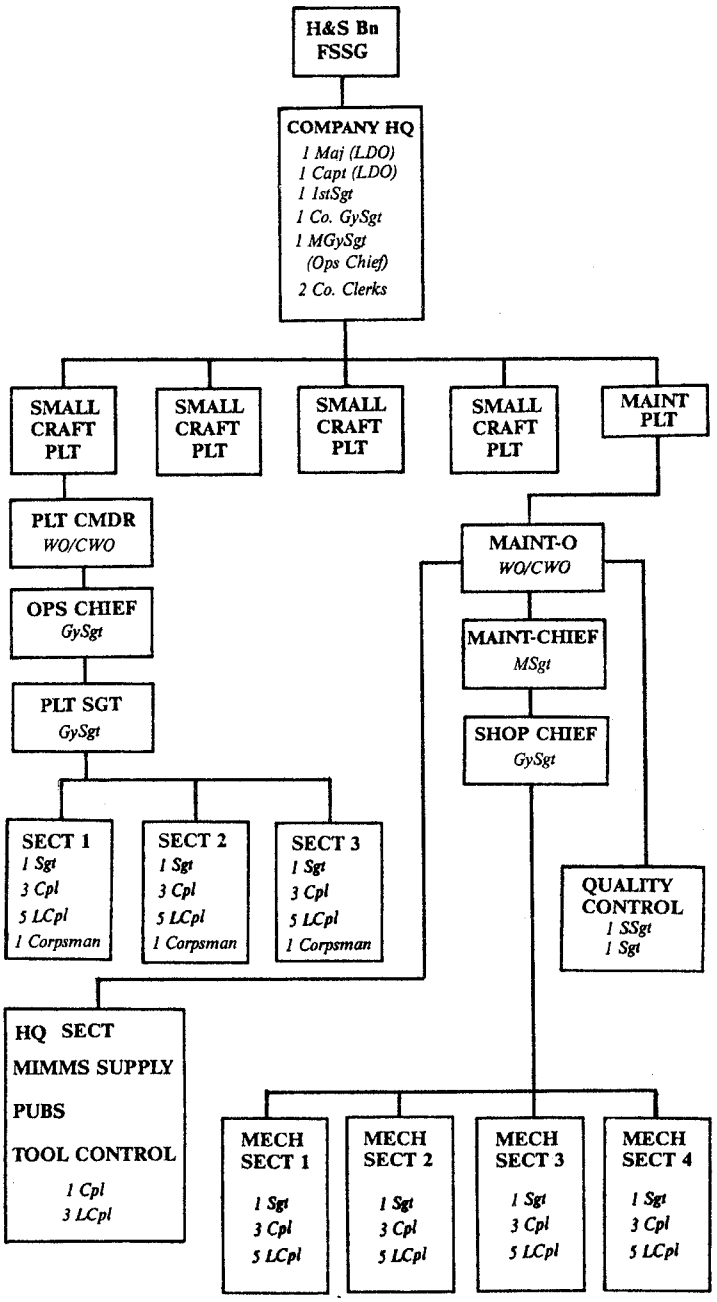
This mirrors the proven force structure we use when assault amphibious vehicles are employed. With MOS-trained coxswains, mechanics, and restricted officers, this company would possess the corporate knowledge necessary for world-class proficiency. Furthermore, if the small craft platoon/company commander were on the MEU/MEB commander's special staff, it would ensure the craft's limitations were understood and considered in the planning phase of operations. This alone will eliminate much of the current equipment abuse, which results from technical ignorance that places the craft unnecessarily in situations where damage and mission failure can occur.

Basically, all other units operating small craft should remain as is, with the exception of adding table of organization (T/O) line numbers for mechanics and coxswains. This is based on the many diverse and specialized missions assigned these units, which precludes effective centralization of craft and personnel.

The Marine Corps must reorganize its intermediate maintenance activities (IMAs) to better support small craft operations.

Each maintenance battalion needs

Recommended Small Craft Company
Table of Organization



Recommended Table of Equipment Small Craft Company

End Item	Unit Price	Qty	Total Price
Rigid Raiding Craft	$33,390.00	60	$2,003,400
70hp Outboards	$ 3,323.00	120	$ 398,760
Combat Rubber Raiding Craft	$ 6,402.00	72	$ 460,944
55hp Outboards	$ 2,292.00	80	$ 183,360
Trailer (RRC)	$ 4,500.00	60	$ 270,000
		TOTAL	$3,046,734.

NOTE: This T/E closely reflects current quantities held by infantry regiments with the exception of an additional 15 RRCs that have yet to be fielded. Dollar figures are included to illustrate the large investment we currently have in the amphibious raid forces craft. If all the other craft within the MEF were included, this figure would easily double.

Figure 2

Recommended Small Craft Repair Platoon
Table of Organization

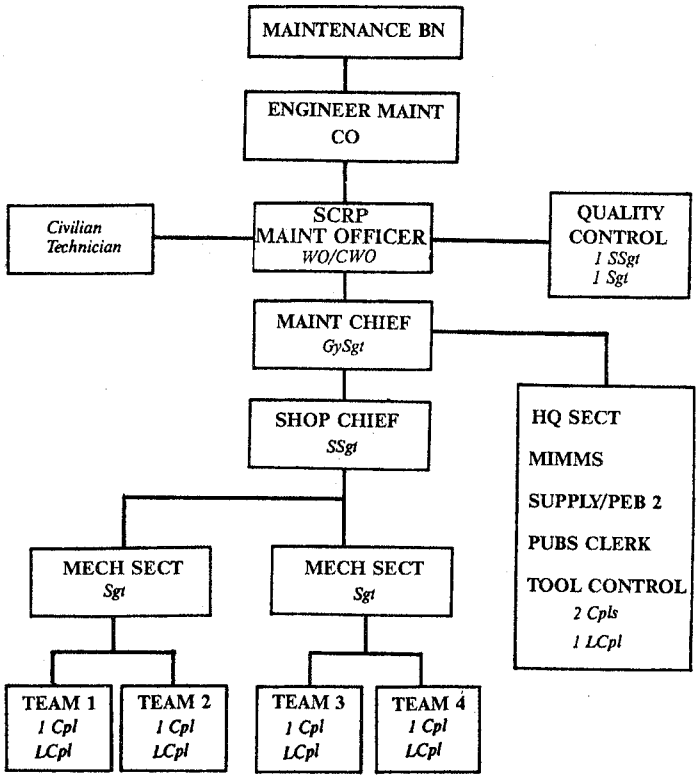


Figure 3

a small craft repair platoon (SCRP) to perform third and fourth echelon maintenance on all the Marine expeditionary force's (MEF's) small craft (see Figure 3). This platoon's efforts would be focused on performing the critical maintenance-intensive repairs such as installing and rebuilding outboard components, fiberglass hull repair, etc. Trained, organized, and equipped for this mission, the SCRP could have a dramatic impact in increasing combat readiness throughout the MEF.

A case in point: In the fall of 1989, realizing that small craft readiness was low, FMFLant directed 2d Maintenance Battalion to start performing intermediate maintenance on all small craft. Further study of the problem determined that the unique nature and the volume of repairs would require a full-time effort. SCRP (1 officer, 23 Marines) was formed from within existing personnel resources. This platoon performed more than 600 major repairs, supporting 17 units within the first 8 months and proving the theory correct. Formation of the SCRP has placed the burden of these repairs on the maintenance battalion, where they belong. Furthermore, SCRP has proven that small craft maintenance can be not only timely and responsive, but done in accordance with all maintenance directives, a feat considered impossible by many. The results are that after 1 year in operation, hardly an RRC within II MEF is deadlined for third or fourth echelon repairs. In fact, average repair time usually takes 1 day thanks to the maintenance float.

Outboard motors, depending on the model, consist of up to five major rebuildable components—the powerhead, lower gearcase, starter, trim/tilt unit, and propeller. SCRP requested the supply battalion designate these as secondary repairables. This concept allowed them to install a good component in place of a bad one and return the motor to the owner. The bad component was then repaired and placed back in the maintenance float. This system allows quick repair time, keeps readiness high, and by repairing vice disposing of components, it saves money.

This program, while highly successful, was started with local funding, making sufficient quantities hard to

An SR6M from 2d Force Reconnaissance Company tows a CRRC in the ocean off Camp Lejeune, taking advantage of the range and speed of the RIB to bring the CRRC to a point off the beach, from where the superiority of CRRC in surf zones makes for better transportation ashore; the 70hp emergency start system developed by the Small Craft Repair Platoon allows a coxswain to quickly start or restart a motor without having to remove the engine cover.

obtain. Furthermore, as this is a local program, MEF interchangeability is impossible. Therefore, each MEF should institute this program.

This program is strongly tied to procurement; i.e., it should be in place prior to fielding. Without it, we have to rely solely on open purchase from commercial vendors. This is expensive (40 to 50 percent markup), nearly impossible to manage while deployed, and slower than a properly working supply system.

For example, while SCRP was being formed, 2d Supply Battalion was tasked to start providing system supply support. As virtually no national stock numbers (NSNs) existed for this equipment, this required thousands of parts numbers to be assigned local stock numbers (LSNs). 2d Supply Battalion did a great job of properly creating them and ensuring provisions were in place to allow each to be routed to the correct source of supply. This, however, placed an incredible burden on the maintenance element, because in order to validate the system, we had to use it—no small task.

Lucky for us, the system had a provision to support most outboard motors from the Defense Construction Support Center's Contractor Operated Parts Depot (COPAD) out of St. Louis, MO. This system has proved very responsive, in that we've obtained parts from them in as little as 7 days. On the other hand, all hull and trailer parts requisitions are now routed through Marine Corps Logistics Base Albany, GA, which hasn't even come close to matching COPAD's support.

Once you get a LSN working and establish usage, however, not only does it get assigned an NSN, it is then stocked in the supply battalion's supported activities supply system management Unit (SMU) as well. The assignment of an NSN makes a part easily attainable by units Marine Corps-wide. Furthermore, by stocking high-usage parts in the SMU, they are readily available for issue, surpassing commercial vendors' response times. Despite difficulties in initially implementing this system, it's well worth it and should be directed by Headquarters Marine Corps.

The present small craft can be improved. In the past, we've procured items ignoring the principle of redundancy. For example, each 70hp motor on the RRC relies on only one battery to electrically start two motors. Should the battery die or starter(s) get wet—both events are quite common—the coxswain must remove the engine cover and wrap a rope around the flywheel to pull start it, a feat that is largely impossible in most operating conditions. However, those of us in the first group of mechanics trained before the boats were even built suggested adding another battery for redundancy purposes and to prevent overcharging, as each motor is intended by design to charge its own, single battery. The Marine Corps decided, however, to install voltage regulators, costing $74 per engine, to solve the charging problem. Redundancy was ignored.

The emergency start problem is also easily solved. At SCRP we found the manual rewind rope starter off a 65hp commercial motor would bolt right on our 70hp motors, allowing retention of the electric starter as the primary means of starting. This manual start is easily operated and requires no fumbling with ropes and engine covers, making it far superior to the rope-around-the-flywheel method. MCRDAC is currently testing this and hopefully it will be incorporated via modification kits.

Another case of improving the product is the 55hp motors locally procured by infantry regiments. Realizing a 35hp MARS-powered CRRC was underpowered for OTH missions, units on their own procured 55hp motors. The 55hp does provide adequate power, but it still has problems. The 55hp has no immediate restart capability after submersion; the 35hp MARS does. The 55hp weighs more than 200 pounds; the MARS weighs 116 pounds. The 55hp is not logistically supportable; the MARS is.

While a need exists for more power, in our rush for a quick fix buy we overlooked a $200 kit than enables two 35hps to be installed and run together. Early developmental testing shows two 35hps to be far superior as far as speed, maneuverability, logistics, and redundancy are concerned. Furthermore, it is easier to carry two 116-pound motors than one 200-pound motor. (SCRP maintenance records show 80 percent of 1990 model 55hp damage was caused by Marines man-

handling or dropping this large, heavy, and unwieldy motor.) In the unlikely event that full-blown testing finds dual 35hps inadequate, we still can at least install on the 55hp the drain valve system that allows immediate restarting after submersion.

There is little doubt in anyone's mind that future advances in antiship missile ranges will push our amphibious ships farther over-the-horizon. Possessing the capability now to strike faster and farther would significantly enhance raid force utility.

Current craft, however, are severely limited in range and speed. Many Marines mistakenly think our craft are at the upper end of the performance spectrum. They get this false impression because a 20-knot RRC ride in a 2- to 3-foot chop is a bone jarring and exhilarating experience. However, our fastest craft are easily outclassed by the many standard production civilian craft, commonly called "go-fast" boats for a lack of a better term. In fact, outboard-powered craft capable of more than 60 miles per hour (mi/h) in Sea State 4 are fairly common on the professional King Mackerel Fishing Circuit. Furthermore, these craft commonly are capable of 200- to 300-mile ranges.

Go-fasts accomplish this by incorporating state-of-the-art hull design with sufficient length to adequately span the wave troughs, producing a surprisingly smooth, stable ride. There are, however, disadvantages. These craft are on average around 12 feet longer than the RRC. This length would limit the number that can be carried by an LPD. Operating at speeds above 60 mi/h in the open ocean requires a larger hull and a lot of horsepower, which gulps fuel and requires large fuel capacities.

Before we reject the go-fast boat, let's consider other factors.

Tests have clearly shown current small craft are inherently unstable as gun platforms. Therefore, machinegunnery is wildly inaccurate except at extreme close range or in perfectly calm water. Furthermore, as open water provides no viable cover, it's unthinkable for a waterborne raid force to stand and fight a shore-bound enemy or larger gunboats. Unquestionably, remaining undetected is the key to survivability. However, if detected, small craft must rely on speed, maneuverability, and supporting arms to escape. Adoption of the go-fast boat would allow us to easily push the current 20-mile OTH range out to around 80 miles and would allow us to insert and extract raid forces up to three times faster, which translates into tactical surprise and survivability. To put this capability into perspective, a Marine amphibious ready group sitting OTH off Camp Lejeune could easily attack as far south as Myrtle Beach, SC, or as far north as Virginia Beach, VA.

This type of craft would prove useful for intratheater operations as well. Launched from shore vice amphibious shipping, this type of operation allows the craft to be introduced in theater administratively. This concept is being studied on the current riverine assault craft (RAC) field user's evaluation.

An example of intratheater use would be a friendly host nation providing a base of operations from which we could launch raids. The go-fasts, unlike the RAC, would allow us to raid or threaten enemy forces exposed to open waters and rivers along a vast (100 mile-plus) stretch of coastline vice just rivers, as the RAC is limited to operations in Sea State 2 or less. This is not an indictment of the RAC; on the contrary, it simply points out a fact of life as far as small craft are concerned—everything in craft design is a tradeoff, and there is no perfect all-around craft design.

Our best bet is to field a small craft fleet with the necessary mix of boats designed to perform assigned missions worldwide. These are bold steps, however, and we must plan for the future. I've witnessed how in the past we rushed acquisition by developing required operational capabilities so fast, very little thought went into them. Current conferences are held at a whirlwind pace, and we do not adequately look at all aspects of the problem. In summary, we had better start planning now. We need to create a working group, sponsored by the Marine Corps Combat Development Command or Headquarters Marine Corps' Special Operations/Low-Intensity Conflict Branch, that is made up of small craft subject matter experts. This group would address issues of doctrine, force structure, logistics, maintenance, and amphibious raid requirements. This group would provide more specific solutions to problems with small craft.

Towards a Solution

Basically we have a small craft problem, not merely an RRC, CRRC, or RAC problem. Considering that these items have now been fielded for several years and we have the hard data on what is needed to support them, we should be able to speed up this process and address it as one problem, not several.

Marines involved with small craft have for the most part brought our capability as far forward as is possible with the limited assets we provide them. This capability, however, remains considerably below the standards of excellence normally associated with other fields of endeavor. We need to improve our small craft capability, and we can do this simply by employing the methods traditionally used to reach high operational excellence in our other commodity areas. Any thing less is simply adding to the problem.

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