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SHOCK MITIGATION

John Haynes, operations director of Shock Mitigation, has been a supporter of *RIBEX* and *RIB Magazine* since the beginning, so the 100th issue is a fitting time to discuss the online Shock Mitigation Directory for professional RIB and High Speed Craft operators.

The world is changing fast and this is especially true in the fast-boat sector. Since the millennium RIBs and High Speed Craft have been at the cutting edge of maritime operations for everything from international security and law enforcement to extreme-weather rescue.

Organisations such as the UK MOD, RNLI, and the US Navy and Coast Guard have been driving the evolution of these craft for over 30 years. They know what has worked in the past and they know

what they want for the future. The questions when selecting a new RIB used to be: how long, how many engines, what fuel type and how fast? Naval architects, engineers and boatbuilders have risen to the challenge, producing boats in aluminium, fibreglass and composites engineered to deliver high performance and withstand the resulting forces.

Although maritime organisations use RIBs and High Speed Craft to perform a wide range of operations, the consistent objective is that crews arrive safely

at their destination ready to do a job, or in some cases 'fit to fight'. With the arrival of 'unbreakable boats', plus a surplus of engine power, 'man' is the weak link. It is time to step back from pure technology gains to consider the individuals who have to go to sea in rough, cold, wet conditions and put themselves into harm's way. The big question for the next generation of RIB builders is: how do you build boats that protect the crew from injury?

The definition of shock mitigation is 'to make a

violent collision or impact less intense'. The professional sector needs a shock mitigation strategy or crews are not capable of doing the job when they arrive at their destination. With an effective shock mitigation strategy the helmsman, crew and passengers benefit from increased comfort and reduced injury, while the organisation has increased operational efficiency. Technical shock mitigation solutions need to include efficient hull forms, responsive controls, ergonomic workstation layouts and improved crew seating. Training coxswains and crews to understand the forces involved and to work with, not against, the sea should be the basis of any fast-boat operation.

Operators also need to identify what sea conditions could be encountered during open-sea transits, then ensure that the type and size of craft they are using are suitable for the purpose. With the correct craft and equipment, professional RIB and High

Speed Craft operators can maximise crew performance, increase sea time and protect employees from injury. The Shock Mitigation Directory brings together specialist boats and equipment for professional operators of RIBs and High Speed Craft worldwide. It is a unique online resource for navies, coastguards, search and rescue, law enforcement, oil and gas, wind farms, environmental agencies and commercial boat operators.

The Shock Mitigation Directory is designed to be quick and easy to use. It is a direct link between manufacturers and international decision makers that have limited time and need concise, relevant information. All product entry pages are a consistent layout with references from professional end-users. For each product there is a contact form that sends an email direct to the manufacturer and a link that goes direct to the relevant product web page. Experienced boat operators know that it is the combination of excellent components and equipment that creates an excellent craft. Where a rescue or a critical task has to be completed, the single point of failure could be impact

damage, or something as simple as a faulty fuel sender or electrical connection. Experienced private RIB owners, who are using their craft for extended passages, sometimes in extreme conditions, also want the best professional equipment.

Besides having many roles in the military and commercial sector, RIBs make excellent personnel and load carriers. The inflatable collar makes the RIB extremely versatile by providing high stability, a softer ride and the ability to fender off vessels without damage. Top speeds can exceed 60 knots, but professional boats have an expected cruising speed and optimum fuel range, with top or 'burst' speed as a rarely used option. Most operate in the 30- to 40-knot range. As part of the 'changing world' scenario there is now a crossover of roles shared between RIBs, foam collar craft and centre console boats. Until recently a RIB with five or seven air-filled tubes was adequate for stopping and searching other craft. If resistance is expected then foam-filled tubes backed up with ballistic protection may be required.

Due to their versatility it is often hard to generalise about the role of RIBs. In the Shock



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Mitigation Directory, RIBs are separated into boat lengths with a broad description of their usual activities. RIBs up to 9 metres are often selected for launching from larger craft, patrolling harbours and coastlines, diving support, fisheries inspection, ship boarding, plus inshore search and rescue roles. RIBs of 10 metres and above may have a cabin and are often selected for extended patrolling, security, law enforcement, special forces operations, ship boarding, plus open-sea search and rescue roles.

In the Shock Mitigation Directory, 'High Speed Craft' refers to planing or semi-planing craft, including pilot boats, dive boats, crew boats, wind farm and fast cargo boats. Tasks include boom deployment, environmental sampling, hydrographic survey, firefighting, search and rescue, law enforcement, homeland security and counterterrorism. A foam-collar craft has closed-cell foam-filled sponsons attached to an aluminium or GRP hull. This is different to a rigid inflatable boat, which has air-filled sponsons. Combination designs use a mix of air-filled and foam-filled sections. The main advantage of foam is that it can be cut, perforated or shot but will not deflate.

Professional RIBs and High Speed Craft can be powered by up to four petrol outboard engines. Multiple inboard diesel engines can be combined with sterndrive,

“With the arrival of ‘unbreakable boats’, plus a surplus of engine power, ‘man’ is the weak link.”

water-jet or surface-piercing propellers. Extreme High Speed Craft are constantly evolving as counterterrorism and enforcement roles change in the military, coastguard and police sector. An Interceptor needs to combine high-speed performance, excellent seakeeping characteristics and protection for the crew. Top speeds are rarely disclosed for extreme-operations craft, which may have stealth characteristics to reduce their radar and heat signature.

The Shock Mitigation Directory includes the latest technology in engines, controls and propulsion. At the Miami Boat Show in 2011 a new outboard motor company launched a 550 hp outboard. The largest engine available at that time was 350 hp. Is this a game changer? Only time will tell. On first impression, to have two engines that deliver the same power as a three-engine set-up, with major weight savings and only two lower legs dragging in the water, is impressive.

However, from operating boats around the world we have learned that durability and a good international spares and service network are equally important.

The high-performance components industry that has emerged around the race boat community of southern Florida has developed upgrades that are suitable for professional-sector boats. Patrolling is often at low speeds, interception is not. To run these multi-engine rigs at full power it is essential to have stronger steering systems, more responsive throttles, performance exhaust systems, plus drives and propellers that transfer power into thrust and control.

In the past the US marine-industry approach to engine size was the same as the Detroit car industry – install maximum horsepower, then use the engines at lower revs, with plenty of power in reserve. Modern engines are designed to be used at higher revs, so downsizing is part of reducing weight, increasing range, reducing fuel bills and improving the environmental footprint. Marine electric motors are starting to make inroads into the lower-horsepower range; the main thing holding them back is battery technology.

RIB and High Speed Craft seating needs to provide a

good ergonomic position for helmsman, crew and passengers. Seat designs need to allow space for life jackets, webbing and sometimes body armour. Having watched the evolution of high-performance seating over many years, it is interesting to see the diversity of potential solutions. Shock Mitigation has a unique understanding of the various technologies, and the latest designs of marine seating have been brought together in the Directory with clear descriptions of their intended uses.

Jockey seats, also known as straddle seats, or padded leaning posts were the traditional seating for commercial RIBs. Due to higher operational speeds, many organisations using RIBs and High Speed Craft are now realising that they need suspension seats. The objective of a suspension seat is to isolate the helmsman and crew from the effects of vibration and impact at sea. RIB and High Speed Craft suspension seating may have 'feet on' or 'feet off' the deck. Seat and suspension designs are constantly evolving to meet the user's changing requirements. Helm stations are now available that suspend instruments, controls and seating in one unit.

Although patrol vessels are





Safe Boat Engines

used all over the world to cover large areas of water, it is the ship's boats that are usually launched to board a suspect craft. Typical illegal cargoes include narcotics, arms and people. The smugglers operate from all sizes of vessels, while the boarding teams and commandos that are the naval forces usually travel in RIBs. Anti-piracy is also a major role for many craft. As criminals increasingly use sea transport, the specification of law enforcement and security RIBs needs to change. New boatbuilders wanting to enter this sector will need to offer ballistic protection and

sophisticated surveillance electronics. The electronics suite may now be more valuable than the boat.

Next-generation electronics include multiple day and night camera systems with laser imaging that is designed for use on fast, open boats that are exposed to the elements and high levels of vibration. Small, tough cameras can be carried by personnel when they leave the boat. These cameras can be linked to improve situational awareness during boarding or search and rescue tasks. Camera images then need to be fed to recording systems to provide evidence in court or for debriefing. Computers have been part of digital navigation systems for many years, but new systems need to focus on 'plug and play' integration between electronics provided by different manufacturers.

The specialist-craft section of the Shock Mitigation Directory includes air cushion hovercraft, personal watercraft and rescue jet skis, which all have a growing use in the professional sector. The new-technology

category includes Wing In Ground Effect craft that skim over the surface of the water, and the growing development of unmanned craft, including RIBs. In some situations the potential for injury is simply too high and you have to take the man off the boat. The maritime world is starting to realise that an unmanned craft may be the ultimate shock mitigation solution. But there are still many challenges for unmanned craft, including the international regulations for preventing collision at sea that require vessels to keep a lookout at all times.

International maritime policy needs a culture of shared information, plus systems and crew training that encourage interoperability in times of crisis. Many tasks within national waters benefit from shared information between law enforcement, customs, border and rescue agencies. The modern law enforcement boat crew needs access to the same information that their colleagues have in a police car. The military have had tough mil-spec computers for many

years, and now marine-grade PCs and rugged laptops are available for RIBs and open boats.

Looking to the future, navies and coastguards around the world will make financial, environmental and operational decisions to use fewer ships and more boats. RIBs and High Speed Craft will need to become faster, multi-role craft with the same navigation, communication and information systems that are found on a ship's bridge. These craft will have modular design features that allow them to vary their deck layouts for different mission profiles. To keep the oceans safe, professional boat coxswains and crews will need to develop specialist skills to operate fast response craft effectively in this rapidly changing environment.

John Haynes is operations director of Shock Mitigation. The Shock Mitigation Directory for professional RIB and High Speed Craft operators is available online at www.shockmitigationdirectory.com



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