

# INDEPTH RESCUE

A Newsletter for Submarine  
Rescue Professionals

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## Submarine Rescue with an Australian Twang

From the perspective of InDepth Project Management Pty Ltd, an independent consultancy specialising in submarine rescue and safety management

It has been a long time between drinks! Between January 2001 and now (mid-2003), there has been a lot of water pass over the bridge and you, dear Reader, have only seen one of the promised newsletters. Hopefully, this will start to remedy that unfortunate situation and we should see this newsletter appearing more frequently.

InDepth Project Management has now established an office in Canberra (address below) and has doubled its full-time staff with the addition of Nick Pelham. Nick's only submarine credentials were his sterling service as Staff Officer to Peter Clarke (now RADM) during his tenure as Deputy Director General Submarines but his contribution to IDPM has, nonetheless, been significant.

We have also recently seen a changing of the guard in Australian Submarine Escape and Rescue. LCDR David Jones has been relieved as SERM by LCDR Ross Halsall while the long-awaited Submarine Escape and Rescue Centre (SERC) contract looks likely to be awarded to a distinctly different team from the ASC/Global Submarine Services arrangement of the past. More of that later.

In this issue, I also discuss whether training for submarine rescue actually prepares a rescue vehicle pilot for the attitude of a disabled submarine (and this is not related to its level of cooperation) and offer a view on the Ming's accident. We have some news of emerging submarine rescue capabilities and, as always, invite comment from our faithful readership.

### DISABLED SUBMARINES

What should we expect to see?

One of the many criticisms directed at the Russian Navy during the Kursk tragedy was that misinformation was released to the world. Those who launch that criticism point to the early advice that the submarine was lying at an angle of 60° in a 2-3 knot current. This appeared to have been refuted by subsequently released video footage showed Norwegian divers swimming comfortably around a submarine clearly settled in a nearly horizontal attitude.

This "evidence" would support those who would argue that submarine rescue vehicle training should concentrate on horizontal attitudes since almost all WWII submarine wrecks have been discovered in an upright position.



I take a contrary view. It is clear from information gleaned from the wreck of the Kursk that Compartment IX (where the survivors were assembled) was intact and initially unaffected by water ingress. That compartment has a volume of approximately 550m<sup>2</sup>, the same volume as one compartment in a Collins class submarine.

If the Captain of the Kursk had ordered main ballast tanks blown at the time of the first explosion, those aft would have remained full of air while, of course, the forward tanks were subsequently destroyed by the explosion(s). This would have left the submarine in a bow-down attitude; quite likely the view gained by the first people to reconnoitre and attempt the rescue. With the bow "anchored", the stern of the submarine would also tend to yaw in the current, possibly creating the impression to a submersible pilot of a strong current. Even if ballast tanks hadn't been blown, those with any experience

of trimming a submarine will understand how sensitive those beasts are to internal weight changes.

We know from "A Time To Die" that Compartment IX subsequently suffered a slow leak through the stern glands. As the compartment filled and gained weight, so would the submarine have settled on the bottom.

What can we learn from this?

Firstly, disabled submarines with flooding forward or aft are unlikely to be found (initially) in a "wrecked" (i.e. horizontal) position. Since flooding is most likely to occur at the ends of the submarine because of the greater number of openings, this is a credible scenario. We should also remember the attitude adopted by HMSThetis in 1939 (even if that trim change was induced by the crew after the event). Who can forget the picture of her "duck's arse" poking out of the Irish Sea?

Secondly, submarines secured to the bottom by tangential contact are likely to "yaw" in the current.

We can train for this by requiring exercise DISSUBs to bottom with a reasonable "bow-down" attitude. The adoption of a small bow-down trim is normal to protect the propeller and after hydroplanes/rudders/control surfaces from impact with the bottom. This requirement would merely exaggerate that effect.

### MING 361. WHAT ACTUALLY HAPPENED?

The death of 70 Chinese submariners in Ming class submarine 361 in May 2003 remains officially a mystery. All that appears to have been released is that a mechanical malfunction led to the death of all 70 personnel onboard. Conjecture that they died because of chlorine gas still abounds but does not stand up to much scrutiny.

We do know that the submarine was towed into port after the accident. This means that it must have been found by rescuing forces already on the surface since there has been no salvage operation.



My theory is that the submarine was snorting and that it pulled a severe vacuum following the possible actuation of an emergency flap valve. While the engineers would have been attempting to shut down the engines, I assess the control room crew would have ordered main ballast tanks blown. Ultimately, however, the engines were unable to be shut down and all concerned would have fallen unconscious due to the extreme vacuum. There would have been no way to break the vacuum and the hatches would

have been impossible to open. I have found support in an article from CDI (Center for Defense Information) on its web-site<sup>1</sup> and the entire article is reprinted below.

### Ming-class Submarine Incident Won't Stop Chinese Navy from "Going Blue"

The recent Ming-class submarine accident highlights Chinese Navy's quagmire of increasing ambitions to expand their influence on the sea, and their obsolete equipment that does not live up to this ambition. As China is increasingly interested in obtaining a maritime military supremacy, not only in the Yellow Sea and Japan Sea near Korean Peninsula, but also South China Sea where it has territorial disputes with a number of Southeast Asian countries, China is shifting its overall defense posture from a land-based strategy (inviting enemies into the inland and fight a "people's war") to a more sea-based strategy (fighting a limited hi-tech war and prevail in a possible war with Taiwan or the United States).

*The issue of Taiwan and the increasing importance of vital sea-lanes as the country's oil consumption expands are behind this shift in policy.* In 2000, China's oil consumption exceeded 230 million tons, with a domestic supply gap of 70 million tons, which it had to import. It is also predicted that China's economy will grow at an annual rate of 7 percent, while its oil consumption expands at a rate of 4 percent annually. Production, however, is only projected to grow at 2 percent annually over the next 15 years. In 2005, China's oil consumption will exceed 250 million tons, with a gap exceeding 80 million tons; and in 2015 the consumption will be 320 million with a gap of more than 130 million tons. Given this high level of predicted interests in oil, China sees the need to maintain a vibrant maritime force, signified by the recent consensus among Chinese military strategists that Chinese Navy needs to "go blue".

Submarines pose the greatest threat to an aircraft carrier formation,

<sup>1</sup> <http://www.cdi.org/cdi-insights/>

said one Chinese strategist Wang Jiasuo. In light of this, they are becoming the core force of Chinese People's Liberation Army-Navy (PLAN). However, China has been confronting technical difficulties in developing and manufacturing more advanced submarines. *Consequently, the PLAN keeps a "big but old" submarine force, including 30 active Romeo-class submarines, with 30 held in reserve, which contain technology comparable to U.S. submarines of the 1950s. Forcing these obsolete submarines to operate regularly and actively is putting their crewmembers' lives at risk.* The recent accident in the Ming-class submarine, a modified version of Romeo-class, is a clear proof of this risk.

According to reports, a technical malfunction caused this deadly accident. In the course of normal operations, a submarine will charge the electrical batteries that power the ship by running its diesel engines, which need to burn a large quantity of oxygen. Therefore, when recharging the batteries, the submarine must get close to the surface, deploying its periscope and opening its air-intake valves. *It seems the valves malfunctioned in Submarine 361, and the craft's diesel engines sucked up oxygen from inside the ship, killing those aboard in a scant two minutes.* Because of the imbalance in air pressure, the gate of No. 361 could not be opened from within. Consequently, those inside who attempted to escape found no way to get out. Because the submarine was undertaking a drill, maintaining radio silence, it essentially cut off all contacts with the outside world. This made it impossible for anyone to learn of the accident for over 10 days.



On the other hand, accidents always occur, especially in sophisticated machines like submarines. An examination of the recorded history of submarine incidents in the period of 1945-1989 will reveal a total of 27 submarine accidents worldwide, including five in the former Soviet Union, four in the United States, three in Britain and four in France. Six submarines were salvaged either because the sinking took place in port or in shallow water. 21 submarines, however, were lost at sea, including two US nuclear-powered attack submarines, the USS *Thresher* (SSN-593) that sank in 1963 near Boston in 8,500-foot waters killing 129 crewmen and USS *Scorpion* (SSN-589) in 1968 in more than 10,000 feet of water, killing all 99 on board.

This unfortunate accident, the first submarine accident self-exposed by the Chinese PLAN, will be a step in Chinese Navy's long endeavor to modernize its submarine force and achieve the capability to confront, on the sea, the supreme U.S. military power, that has pivoted sea control as the basis of its East Asian strategy over the past half century.

Ed - *While not a submarine rescue story per se, this accident goes to show that one can never take submarining*

*for granted. I would guarantee that most Oberon submariners, at least, have suffered from a difficulty concentrating while trying to recover from "snorting in the red" for too long.*

## SUBMARINE ESCAPE AND RESCUE CENTRE

In October 2002, the Directorate of Submarine Sustainment at HMAS STIRLING, WA issued an Invitation to Register Interest in operating the Submarine Escape and Rescue Centre (SERC).

This was an ambitious undertaking since it would incorporate the existing Submarine Escape and Rescue Service (SERS) contract (centred around ASRV *Remora*) as well as the operation and maintenance of the Submarine Escape Training Facility (SETF) which, until now, has been operated by the RAN, albeit heavily dependent on the services of RAN Reserve personnel.

With the supply of escape instructors becoming difficult to sustain, the Navy recognised it needed to commercialise the SETF's operation. After a long process which included the completion revision of escape training into a Competency Based Training and Assessment (CBTA) format and the approval of a Safety Case, the Invitation to Register Interest was released in late 2002.

Over thirty companies registered interest and six were short-listed to proceed to tender. They were:

- ASCOV – a new joint venture company formed by the present SERS contractor Australian Submarine Corporation (ASC) and Covus, a WA-based ROV and diving company;
- British Aerospace;
- Coflexip;
- Fraser Diving;
- Global Submarine Services (the present sub-contractor to ASC) heading a team which included OceanWorks (designer and builder of *Remora*), Divex, Ocean Industries and IDPM; and
- Stolt International.

The Request For Tender was released in early December with a closing date of 13 February 2003 making for an interesting Christmas/New Year break!

IDPM

Ultimately, the decision was made in favour of Fraser Diving and we understand a contract was signed in late June.

With so much of the experience in *Remora* now lost, can we expect the same level of capability as previously was available to submariners? I certainly hope so, but also hope that no one underestimates the learning curve that will be involved for all concerned. Despite its impressive credentials, *Remora* is not a mature system and its good performance relies heavily on individual experience.



## EMERGING CAPABILITY

The recognition by submarine operating nations of the need for submarine rescue systems continues apace with the release to industry of tender documents by Singapore, NATO and India.

At the time of this newsletter, all are still awaiting announcement. Singapore's decision was deferred for a year and the outcome between the two finalists, OceanWorks and Perry Slingsby will be closely watched.

NATO's Invitation To Tender process has been a long drawn-out affair and one has to question whether the constant striving for perfection in defining User Requirements actually delivers any benefit when the final product is delivered. We also understand that India is close to a decision and have heard nothing since rumours started circulating that the PLA(N) was also seeking a new DSRV.

## THE BUSINESS

Finally, the "Plug". If you're in the business of submarine rescue or safety management and feel you could benefit from actual project and operational experience, give us a call. Take a look at our website, read some of the papers but don't let it end there. Make contact.

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