A PLA Navy “Assassin’s Mace”: Chinese Mine Warfare

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Note: The views offered in this briefing are those of the authors and do not represent the official assessments or policies of the U.S. Navy or any other agency of the U.S. Government.
China’s Voluminous Naval Literature
Why study Chinese MIW?

• Voluminous data
• Corresponds to strategic culture
• Corresponds to likely missions
• Neglected research field
Existing Research on Chinese MIW

• “Even using assumptions very favorable to the PLA Navy (PLAN), a blockade would inflict only limited damage on Taiwan.”

• “...blockades are slow and need to be sustained for many years to have any chance of being effective....”

“Strangulation from the Sea? A PRC Submarine Blockade of Taiwan”
Michael A. Glosny

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Chinese MIW Lessons: Desert Storm

• “[PLA] planners had never imagined the application of the numerous new high technologies developed by the U.S. ...” – David Shambaugh

傅金祝 [Fu Jinzhu]

– “美海军舰艇反水雷能力的软弱性”
  • [Relatively feeble character of USN ships’ MCM]

– “伊拉克 [水雷 战]...思想准备不充分”
  • [Iraqi thinking and preparation for MIW was incomplete]:
    – Inadequate planning
    – Insufficient number laid
    – Inappropriate reliance on moored mines
    – Failure to conceal MIW operations
    – Constraint of adversary air superiority

– “反水雷的艰巨性”
  • [extremely difficult nature of MCM]
**Chinese MIW Lessons: OIF**

- **Fu Jinzhu on 2003 Iraq War**
  - “是成功的…[而且] 反水雷行动中遇到了难题 “
  - [Qualified success, [but coalition] MSM still encountered difficulties]
    - Just six mines discovered in first 36 hours of MCM operation
    - Modern MCM still hindered by sea-floor clutter
    - Iraqi MIW failures due to absolute coalition control of air and sea zones

- **2004 人民海军 [Renmin Haijun]**
  - “美军必须利用海运，但是我国并不是伊拉克，我们有先进的水雷和潜艇，这对于美军的海上运输来说是致命的威胁 “
  - [The U.S. will need to move supplies by sea. But China is not Iraq. China has advanced sea mines ... This is a fatal threat to U.S. seaborne transport...]

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**Warships**

- **U.S. Navy**
  - **LUCM-145**
    - Fixed cost $1.2 million
    - Deployed in 2004
  - **LUGCM-145**
    - Fixed cost $2 million
    - Deployed in 2005

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**Chinese**

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  - [The U.S. will need to move supplies by sea. But China is not Iraq. China has advanced sea mines ... This is a fatal threat to U.S. seaborne transport...]
China: A Long Heritage of MIW
Borrowing Naval Experience
Russian Influences

• “俄罗斯： 世界的‘水雷王国’”
  - [Russia: the world’s ‘sea mine kingdom’]

• “苏联人还认为，在...常规战争条件下，水雷武器在作战活动中的意义和作用已有极大提高.”
  - [The Soviets believed that under conditions of conventional war, that the significance and use of mine warfare had increased substantially.]

• “[这两俄]型火箭上浮水雷...是专门针对美国核潜艇设计的.”
  - [These two types of Russian] rocket rising mines ... are specially designed to target US nuclear submarines.]
China’s Mine Inventory

“预计到年，解放军各型水雷总数可达7万枚以上，运用潜艇，机渔船，火箭炮，水面舰艇及空中等各种布雷兵力，形成强大的水雷封锁站力。” [GJZW, 2005]

[It is estimated that [by 2006], the PLA will have more than 70,000 sea mines, that can be delivered by submarine, motorized fishing vessels, rocket artillery, surface vessel, and by aircraft, creating a mine blockade potential of massive proportions.]

RMHJ, 2005
Numerous and Diverse
Advanced Systems
Interest in Western MIW Technology
Research Vectors

- "Drones" – [Intelligized] mines
- Rocket rising sea mines
- Unmanned underwater vehicles
- "Anti-helicopter rocket rising mines"
- Rocket-delivered sea mines
- Nuclear-armed sea mines
Chinese Mine Delivery Platforms

- Submarines
- Aircraft
- Surface
- Civilian Vessels
**Submarine**

- “两次世界大战中，各国潜艇都曾进行过布雷活动，效果相当显著。” [XDJC, 1998]
  - [During both world wars, all countries’ submarine forces undertook submarine mine-laying – the effectiveness appears to have been outstanding.]

- 潜艇布雷“在敌控制和设防的海区布设攻势水雷，给敌舰船造成突然打击和长期的水雷威胁。” [XDJC, 1998]
  - [Submarines operating] “in sea areas and bastions controlled by the enemy can lay offensive mines, creating a surprise attack for enemy shipping and a threat of long duration.”

- “…特别是自航水雷的出现，容许潜艇在22公里之外，对敌港口或海军基地布雷，这也是其他平台难以做到的。”
  - […the emergence of the self-navigating sea mine permits submarines to lay mines directed at enemy harbors or naval bases from a distance of 22 kilometers away, this is difficult for other platforms to achieve.] [GJZW 2005]

- “解放军有关武器专家对潜艇外挂布雷舱表现出浓厚的兴趣。”
  - [PLA weapons experts have expressed pronounced interest in submarine external sea mine carrying modules.] [GJZW 2005]
Mines and Submarines

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[GJZW 2005]
Weapon Load on Song SS
March 2007
Aircraft

- The PLA naval air force consists of about 700 aircraft of all types, and mine laying is clearly recognized as one of seven major combat missions. [GJZW, 2005]

- The Hong-6 and Y-8 can carry 4 1,000kg bottom influence mines or 12 500kg bottom influence mines, deploying these to distant sea areas... [GJZW, 2005]

- “The sea blockade of Japan during the Second World War and the blockade of major ports of North Vietnam during the Vietnam War which followed were all accomplished through the use of mines laid from the air.” [JSKX-FBIS-95]

- “The history of mining warfare has already clearly demonstrated that using the air arm to carry out offensive mining blockades has particular natural advantages...the cost effectiveness of the aircraft used by the air arm is higher than that of other platforms.” [JCZS-FBIS-99]
The PLA Navy surface fleet has a mining capability from more than 200 warships, as each ship is equipped to carry a large load out of mines.

As part of a realistic (ASW) exercise, (frigates) practiced mine laying.

If the PLA decides to undertake a mine blockade of Taiwan, they will not use aircraft or surface warships to lay the mines… but rather would most likely employ submarines together with motorized fishing vessels.
“...解放军对机渔船的有效组织与指挥控制，这些渔船在战时可临时安装布雷轨道，经良好伪装后可秘密实施布雷作战。”
[...The PLA has effectively organized and commands motorized fishing trawlers, which during war time can be equipped with mine laying rails, and, relying on an excellent disguise, can execute mine warfare.] [GJZW, 2005]

“其隐蔽性和突然性堪与潜艇布雷相比。”
[The stealth and surprise characteristics of such operations are comparable to submarine mine laying operations.] [GJZW 2005]

“The civilian ships that are most suited for mine-laying operations are fishing vessels with a displacement of around 100-200 tons. Such ships represent small targets, their mobility is not bad, and they do not readily attract the attention and suspicion of the enemy. It is only necessary to carry out some minor modifications to be able to install simple mine-laying equipment. More importantly, there are numerous fishing vessels and the fishermen are very familiar with the sea....” [JCZS-FBIS-1999]
PLAN MIW Training

• 无马头 [“Non-pier”] exercises: enemy PGM strikes require decentralization, improvization [JCZS 2005]

• Multiple navigation systems [RMHJ 2002, 2003]

• Sea Mine Warehouses: enhanced deployment & concealment exercises [RMHJ 2005]

• 2003: First 实布实扫水雷 [OPFOR MIW Exercise] [RMHJ 2003]

• “This year, there occurred even more enhanced submarine mine exercises …” [GJZW, May 2005]
Chinese MIW CONOPS –
A First Cut

• “Easy to Lay, Hard to Sweep”
• “Not Attracting Attention”
• “Four Ounces Can Move 1,000 Pounds”
• “Sea Control at a Specific Time in a Specific Sea Area”
• Huge Numbers
• “First Control”

• High and Low Technology
• Submarine-delivery for Concealment and Air-delivery for Speed and Quantity
• Civil-military Integration
• “Undersea Sentry”
• “Mine Management Informatization”
• MIW/MCM Mutual Support
• **Satellite Navigation**
Chinese MIW CONOPS – 2

• “易布难扫”
  – [Easy to Lay, Hard to Sweep]

• “不惹人注意”
  – [Not Attracting Attention]

• 潜载雷为隐蔽，空载雷为多快
  – [Submarine-delivery for Concealment and Air-delivery for Speed and Quantity]
Chinese MIW CONOPS – 3

• “控在一定时间一定海区”
  – [Sea Control at a Specific Time in a Specific Sea Area]

• 巨大数量
  – [Huge Numbers]

• “先制”
  – [First Control]

• “水下卫士”
  – [Undersea Sentry]
Chinese MIW CONOPS – 4

• 高低技术
  – [High and Low Technology]

• “四两可拨千斤”
  – [Four Ounces Can Move 1,000 Pounds]

• 军民联合
  – [Civil-military Integration]
Chinese MIW CONOPS – 5

• “水雷管理的信息化”
  – [Mine Management Informatization]

• 布扫雷互相支持
  – [MIW/MCM Mutual Support]

• 卫星航海
  – [Satellite Navigation]
Poor Man’s ASW – Sea Mines

• “基于海洋战略环境的巨大变化, 解放军自90年代后期起已将自导反潜水雷作为武器研制重点专案, 以用于对美国核潜艇...” [Because of a tremendous change in the maritime strategic environment, since the early 1990s the PLA has made mobile ASW sea mines a focal point of weapons development. [China] is energetically undertaking the research mission [of] using [mobile ASW sea mines] against US nuclear submarines...] GJZW 2005

• “...自导水雷的主要任务, 则是将美国核潜艇隔绝于西太平洋第一岛链之外.” [... the major mission of self-guided sea mines is to isolate American nuclear submarines outside the First Island Chain.] GJZW 2005
15 May 2008
Launch T43

29 July 2008
Sweep Gear
中国海军扫雷舰艇

扫雷舰艇是使用扫雷具搜索和排除水雷的反水雷舰艇，主要装备接触扫雷具、磁性扫雷具、音响扫雷具等探雷设备，中小口径舰炮，本身有较好的防雷性能。用于开辟雷区航道，为舰船编队导航扫雷。在登陆作战中致前扫雷，以及巡逻、护航、警戒、布雷和反潜等。大型扫雷艇或称远洋扫雷艇，排水量一般在600～1000吨，可扫除布设在50～100米水深的水雷。主要用于舰船编队和运输船队在航行中导航扫雷。中型扫雷艇或称近海扫雷艇排水量在500吨左右，可扫除30～50米水深的水雷。小型扫雷艇或称港湾扫雷艇，排水量在400吨以下，用于扫除浅水区、狭窄航道布设在30米以内水深的水雷。
Scenarios Beyond Taiwan

Korean Peninsula – Yellow Sea  

South China Sea
The Taiwan Scenario

200 Meter Curve

2000 Meter Curve
Taiwan MCM

"靠近13艘主力正规扫猎雷舰艇，而对解放军的水雷封锁，其兵力显然捉襟见肘。 [There is only the 13 ship main force of standard minesweeping and minehunting ships, and in confronting the PLA would be ‘pulling down one’s jacket to conceal the raggedness.’] [GJZW, May 2005]

"...台海军如失去制空和制海权时，以飞机及正规舰艇进行布雷完全不可能，只能靠着众多加装布雷轨道的机渔船做自杀式的守势布雷....“ [If the Taiwan Navy loses command of the air and sea, then using aircraft or warships to sow mines becomes impossible, and then there is complete dependence on the masses of properly equipped fishing vessels that will be committing suicide in the process of laying defensive minefields.] [GJZW, May 2005]

- 4 Yung Fung-class
- 4 Yung Yang-class (ex US Aggressive)
Japan MCM

- "实际上, 日本反水雷船艇在世界上不仅数量最多, 同时性能也最先进."  
  [...Japan not only has the world’s largest anti-mine fleet, but also the one with the most modern capabilities.] (JCZS 9-2005)

- "...其...扫雷作战能力位居世界第一."  
  [...Japan’s... MCM ability is the world’s best] (蓝色方略, The Blue Plan, 2003)
USN Minesweepers

“美国海军水雷战能力相对其他作战能力而言，十分薄弱。目前只保留着一支为数不多的专业反水雷部队…根据美国海军的计划，这支部队将于2010年退出现役。”
– Dangdai Haijun June 2003

[Relative to its other fighting capacities, the U.S. Navy's mine warfare capability is extremely weak; at present, it retains only a small force specializing in MCM … According to U.S. Navy plans, this force will be withdrawn from active service by 2010.]

Avenger-class MCM
• 2 in Sasebo
• 2 in Arabian Gulf
• 10 in Ingleside TX

Osprey-class MHC
• 2 in Arabian Gulf
• 10 in Ingleside TX
• 4 Decommissioning in 2006
MH 53E

- Two Squadrons: TX, VA
- 20 Aircraft in inventory
- Viable without Air Superiority?
LCS

"LCS...执行反水雷任务, 使DD(X)驱逐舰专心其对陆火力支援使命.―—”LCS can execute MCM missions, allowing the DD(X) destroyer to focus on land fire support missions.” (GJZW 3-2005)

"LCS还拥有...水雷侦察系统, 遥控猎雷系统.” –”LCS also has mine finding and remote control mine hunting systems.” (DDHJ 7-2004)
Evaluating an alternative view

• Underestimates volume and rapidity of Chinese MIW
  – Restricts analysis to some portion of sub fleet (as delivery platforms)
  – Lay an estimated 1,768 mines over 6 months? (Iraq/NK level threat)
• Problematic assumptions regarding shipping volume under blockade conditions
• Model does not account for attrition to Taiwan MCM/ASW
• Impact of Taiwan identity question on Taipei’s “will to resist” is underestimated
• Does not address Chinese MIW threat to USN

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CONCLUSIONS

- MIW is a dynamic sector in PLAN modernization
- China is on cutting edge of MIW technology and concept development
- Human factor: impressive MIW training regimen
**SOME IMPLICATIONS**

**TACTICAL**
- Modularity and organic systems must provide robust MCM capability
- US subs and perhaps even aircraft face new threat

**OPERATIONAL**
- Allied MCM must be able to operate in contested waters and airspace
- USPACOM requires robust MCM resources
- Demonstrated U.S. offensive mining capability could increase deterrence

**STRATEGIC**
- PRC is already capable of blockading Taiwan
- PRC ability to punish US forces has radically increased over the last decade
- Rapid deployment is fraught with risk
Questions?