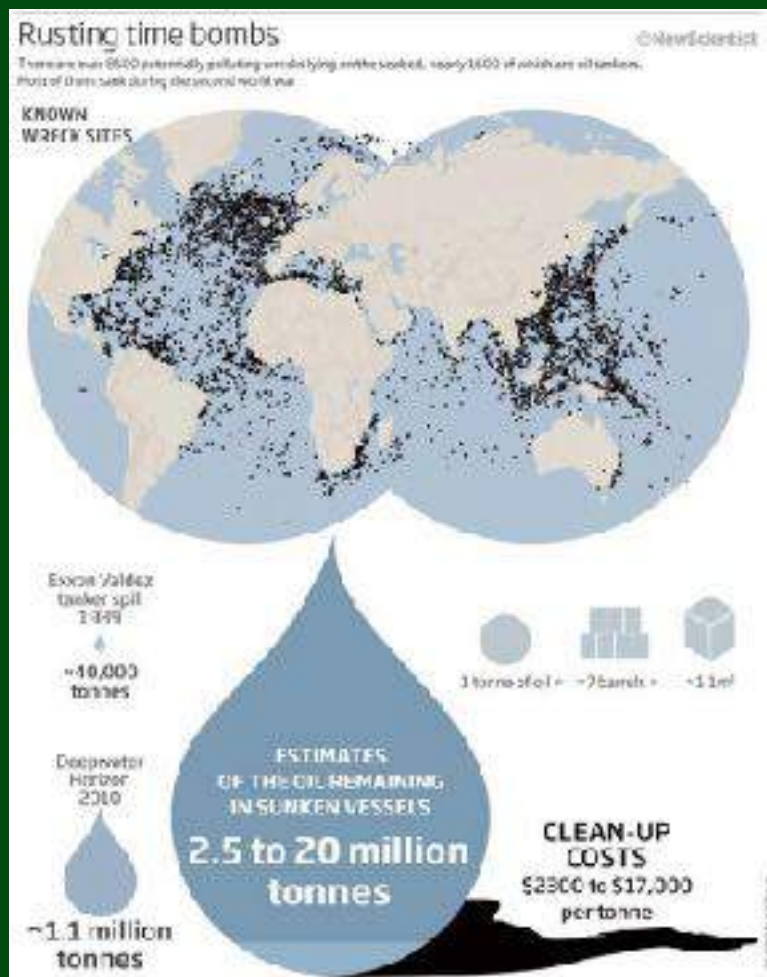


# USS *Mississinewa* in Micronesia

- Sunk with over c. 4 million gallons of oil aboard—2001, 2 million gallons pumped out and sold





A big operation!



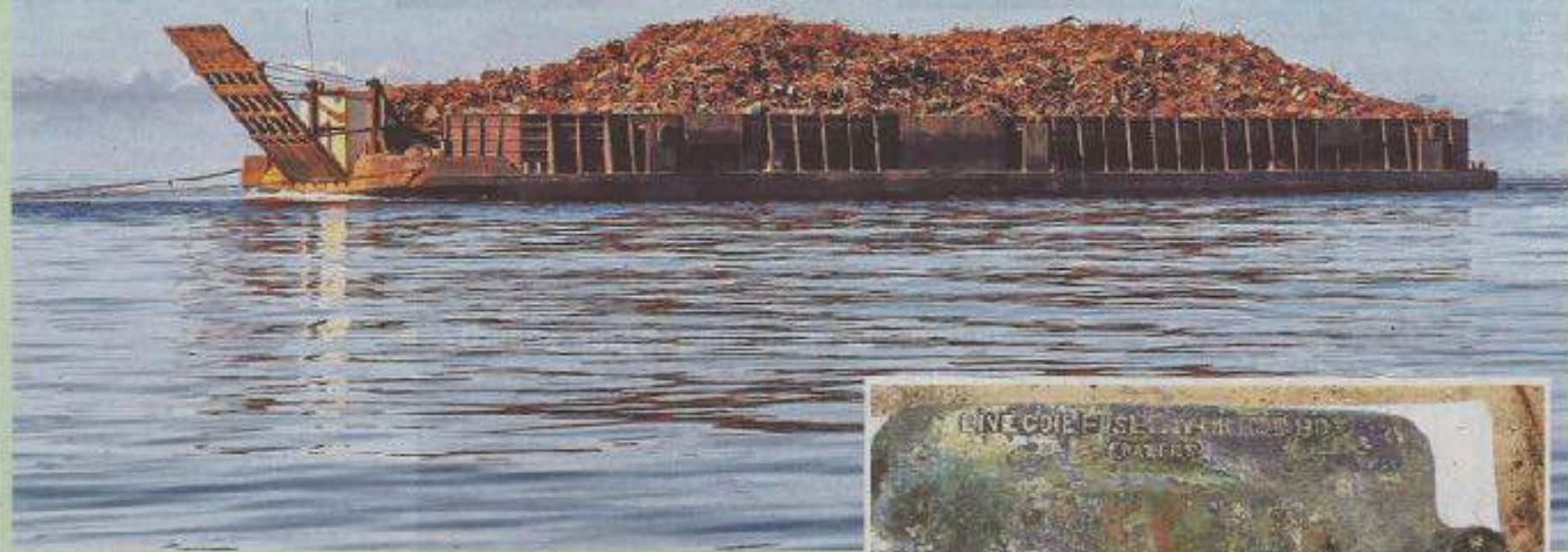
<http://www.newscientist.com/article/mg20727761.600-why-wartime-wrecks-are-slicking-time-bombs.html#Ufsk5G3RJqk>

## Tourism in Chuuk: Diving, diving, and more diving





# Shady salvagers steel-ing from WWII shipwrecks



Recreational wreck diving aside, a whole new illegal 'industry' has surfaced around sunken warships in Malaysian waters, plundering them for their valuable low-background steel. An international syndicate has hired Malaysian salvage firms to harvest this highly sought-after metal, making it hard for the authorities to detect the illegal operation.

> See reports by **EDDIE CHUA** on Page 3

**EXCLUSIVE**



**Prized metal:** Huge chunks of metal taken from a Japanese warship that sank in the South China Sea are being pulled by a barge in the open seas. (Inset) A copper plaque from a navy phone circuit onboard British battleship HMS Prince of Wales was among the steel stolen from the sunken wreck.





## Some hazards in regard to the effective management of the Chuuk Lagoon shipwrecks— pertinent to all WWII UCH

- Corrosion, instability and loss of integrity (collapse)
- Poor natural heritage ‘health’ of the shipwrecks
- Oil leaking and polluting island environments
- UXO, instability and detonating underwater
- Dynamite Fishing—killing fish, stripping corals and accelerating loss of integrity
- Dive Tourism impacts
- Laws, government and community involvement
- Illicit salvage and souveniring

What is the risk (potential that these hazards could impact effective management) and how can they be managed

## Corrosion, stability and loss of integrity

- Made of iron (ongoing corrosion) and impacted by typhoons, dynamite fishing, UXO detonations, tourism (anchoring practices, diver impact), deteriorating over time and **THEY WILL COLLAPSE**
- What can be done?:
  - Corrosion, UXO surveys
  - In Chuuk, corrosion surveys carried out in 2002, 2006, 2007, 2008 and 2016 (assessment made about collapse c. 2015-2020)
  - More effective management of dynamite fishing and tourism issues
  - Sacrificial Anodes
  - Potential for divers to be impacted by collapsing structure

# Natural heritage health of the shipwrecks

- Factors impacting natural heritage health:
  - Toxins in the water impacting flora and fauna—genetic adaptation?
  - Dynamite fishing
  - UXO explosions
  - Tourism practices?
- What can be done?:
- Fish and benthic surveys of the shipwrecks and comparative areas—up-wind and down-wind of the shipwrecks
  - Surveys carried out in Chuuk found good and bad impacts:
  - A rare coral was found on one shipwreck
  - Abundant fish on some shipwrecks, but few large fish
  - Crown of Thorns were abundant
  - Corals damaged by boat anchors



# The potential for a major release of oil/fuels from the shipwrecks

- Do the shipwrecks still contain large quantities of oil?
- USS Mississeniwa in Ulithi Atoll in Yap (2 million gallons pumped out of the 3.78 million gallons it held)
- What can be done?:
  - biological surveys (for example as previously mentioned)
  - sampling of any leaking oil
    - The tanker Shinkoku Maru in Chuuk oil leaking was mix of diesel and a heavier product such as motor oil, lubricating oil, or bunker fuel and with significant evidence of microbial attack
- historical research
  - In Chuuk the three tankers potentially do not hold vast amounts of oil (further research to support this should be implemented)—many of the ships were leaking oil as soon as they were sunk in 1944 and potentially much of the oil may have already leaked away

# The stability of the Unexploded Ordinance (UXO)

- JMAS investigating
- Are they a hazard and threat to the integrity of the shipwrecks, and are they a hazard to divers?
- In Chuuk, some UXO exploded in the 1970s on Gosei Maru and Fujikawa Maru, with controlled detonations taking place in 1970s, but further explosions heard on Gosei Maru in 1990s
- Many of the shipwrecks in Chuuk and other World War II UCH contain UXO
- Are they benign or still dangerous?
- What would set them off
- Dynamite fishers have been recovering them for many years



# Dynamite Fishing

- It is detrimental to the shipwrecks, to the natural environment, to those practicing it, and to divers.
- Is it still practiced in Chuuk? In other localities?
- Laws prohibiting the practice in Chuuk, but difficult to enforce
- Potential for a lot of money to be made (I was told c.\$2,000 per boat load of fish)

# Diving Tourism

- One of Chuuk's main industries—its main tourist attraction
- 4,414 Tourists in 2013 (50% of Market share for whole of FSM) but has been declining 2.5% in last 5 years
- Divers pay a \$50 annual fee for diving the shipwrecks
  - Is the money spent in managing the shipwrecks?
- In addition to the Chuuk government who benefits from tourism—tourist operators, hotels, local businesses, airlines...
- Dive tourism can have negative impacts on the shipwrecks (small boat anchor damage, souveniring artefacts, degradation of shipwreck and flora and fauna)



# Development of a Risk Reduction Strategy

## How?

- In consultation with interested parties, including: Chuuk and FSM government agencies, USA, Japan, relevant NGOs, and diving tourist operators
- Implement field investigations, analysis and recommendations
- Take into account the social, cultural and political issues, which are of fundamental importance in effective site management involving a risk reduction strategy
- Undertake Capacity Building to build expertise for program
- UOG Field school 2019 in Chuuk—Competent Authority
- Implement avocational ‘training’ Nautical Archaeology Society
- Raise Public Awareness

# Collaborative effort

- Any country—developed or developing—would find the management of c. 60 large shipwrecks (as in Chuuk, Palau, Solomon Islands) daunting
- Must be a collaboration of interested parties: USA, Japan, other Nationals and Local Government, Diving Tourist Operators, NGOs, AND Community
- Develop Multi-lateral and Bi-lateral agreements
- The UNESCO Convention on the Protection of Underwater Cultural Heritage 2001 facilitates and calls for collaboration:
- UNESCO Articles outline how this can implemented







Thank you

- FSM
- Chuuk State
- UNESCO

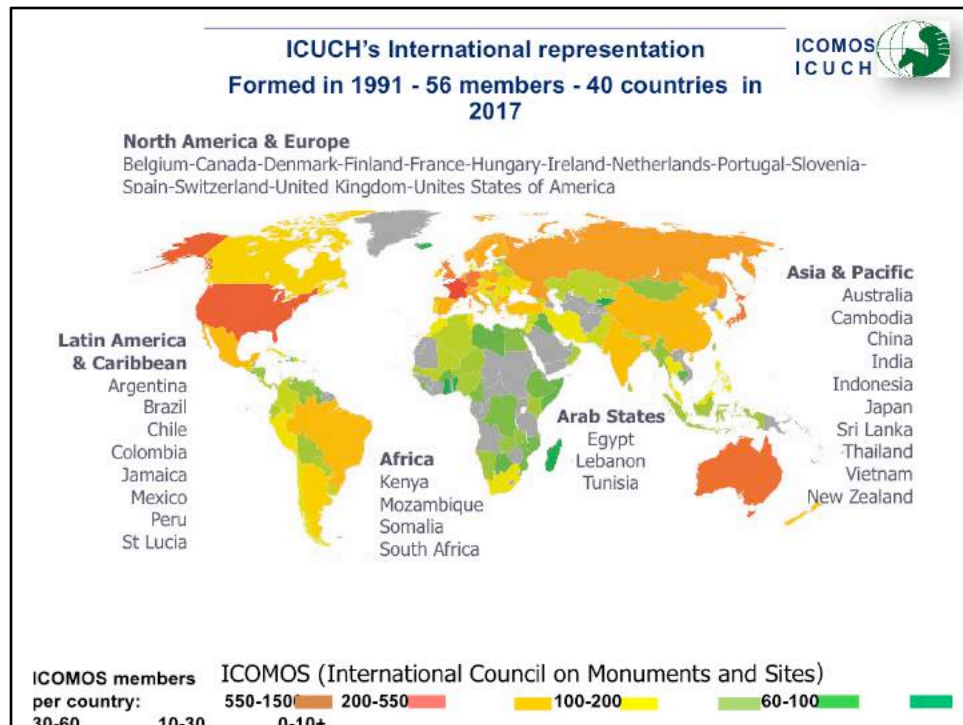
**"Role of ICOMOS for international cooperation"**

**ICUCH (INTERNATIONAL COMMITTEE ON  
THE UNDERWATER CULTURAL  
HERITAGE)**

*National Consultation on the Underwater Cultural  
Heritage Safeguarding in FSM  
(Blue Lagoon Resort, Chuuk, 6 – 8 March 2018)*

**Jun Kimura, TOKAI UNIVERSITY, JAPAN**





Need for a critical mass to become more effective - more than 75 States -  
 Currently Netherlands and Australia are on the path - UK, maybe?



# ICOMOS-ICUCH History



Centre International  
pour l'étude et la protection  
du patrimoine mondial  
ICOMOS  
International Council  
on Monuments and Sites

## CHARTER ON THE PROTECTION AND MANAGEMENT OF UNDERWATER CULTURAL HERITAGE (1996)

Ratified by the 11th ICOMOS General Assembly in Sofia, Bulgaria, October 1996.

### INTRODUCTION

This Charter is intended to encourage the protection and management of underwater cultural heritage: in wreck and shipwreck objects, in shallow seas and in the deep ocean. It focuses on the specific attributes and circumstances of cultural heritage under water and should be understood as a supplement to the ICOMOS Charter for the Protection and Management of Archaeological Heritage, 1980. The 1980 Charter defines the "archaeological heritage" as that part of the material heritage in respect of which archaeological methods provide primary information, comprising all vestiges of human existence and covering all species relating to all manifestations of human activity: abandoned structures and remains of all kinds, together with all the tangible cultural material associated with them. For the purposes of this Charter, underwater cultural heritage is understood to mean the archaeological heritage which is, or has been removed from, an underwater environment. It includes submerged sites and structures, wrecksites and wreckage and their archaeological and cultural context.

By its very character the underwater cultural heritage is an international resource, a large part of the underwater cultural heritage is located in an international setting and derives from international trade and communication in which ships and their contents are lost at a distance from their origin or destination.

Archaeology is concerned with environmental conservation: in the language of resource management, underwater cultural heritage is both finite and non-renewable. If underwater cultural heritage is to contribute to our appreciation of the environment in the future, then we have to take individual and collective responsibility in the present for ensuring its continued survival.

Archaeology is a public activity: knowledge is entitled to draw upon the past in informing their own lives, and every effort to control knowledge of the past is an infringement of personal autonomy. Underwater cultural heritage contributes to the formation of identity and can be important to people's sense of community. If managed sensitively, underwater cultural heritage can play a positive role in the promotion of recreation and tourism.

Archaeology is driven by research, it adds to knowledge of the diversity of human culture through the ages and it provides new and challenging views about life in the past. Such knowledge and ideas contribute to understanding the today and, thereby, to anticipating future challenges.

Many marine activities, which are themselves beneficial and desirable, can have unfortunate consequences for underwater cultural heritage if their effects are not foreseen.

Underwater cultural heritage may be threatened by construction work that alters the shore and seabed or alters the flow of current, sediment and pollutants. Underwater cultural heritage may also be threatened by insensitive exploitation of living and non-living resources. Furthermore, inappropriate forms of access and the incremental impact of recreational "boomburbs" can have a deleterious effect.

Contribution to the draft of the ICOMOS Charter on  
the Protection and Management of UCH in 1996

## The Sofia Charter 1996



The 1990 ICOMOS Charter defines the "archaeological heritage":

'as that part of the material heritage in respect of which archaeological methods provide primary information, comprising **all vestiges** of human existence and consisting of places relating **to all manifestations of human activity**, abandoned structures, and remains of all kinds, together with all the portable cultural material associated with them.'

'For the purposes of this [Sofia] Charter underwater cultural heritage is understood to mean the archaeological heritage which is in, or **has been removed from**, an underwater environment.

**'It includes submerged sites and structures, wreck-sites and wreckage and their archaeological and natural context.'**

**Forms the basis of the Rules in the Annex to the 2001 Convention**

## ICUCH's Current priorities



- \* **Increase committee membership**

- \* Emphasis on Asia and Pacific, Africa, and the Arab States



- \* **Advocate**

- \* For the ratification of the 2001 Convention on the Protection of the Underwater Cultural Heritage
- \* For courses aimed at increasing professional capacity
- \* Against the commercial exploitation of UCH
- \* For the inclusion of UCH located in the Buffer Zone of World Heritage properties in these properties Conservation Management Plans



Need for a critical mass to become more effective - more than 75 States -  
Currently Netherlands and Australia are on the path - UK, maybe?

**ICUCH's involvement in professional training**

**UNESCO foundation & short courses**



---

1. Build regional capacity in the protection and management of underwater cultural heritage.

---

2. Promote effective networking among partner UNESCO Member States by encouraging close collaboration and dissemination of best practices.

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3. Provide the grounds for cooperation in international research and training.

---

4. Prepare Member States for the ratification and implementation of the 2001 Convention and its Annex.

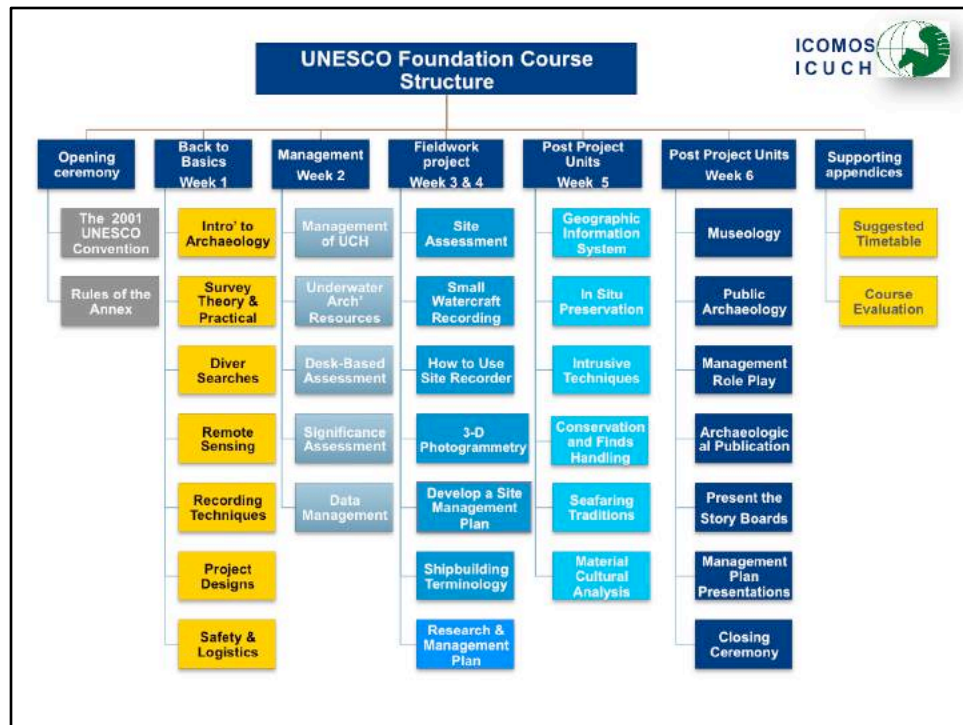
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**Feel free to change the photo.**

1. To build regional capacity in the protection and management of underwater cultural heritage through professional training in field Manuals.
2. Provide effective networking among partner Member States by encouraging close collaboration and dissemination of best practices, thereby promoting regional cooperation through exchange of information on the conservation and management of a shared heritage.
3. Provide the grounds for cooperation with international research and training institution linked to underwater archaeology for further training and research programs.
4. Prepare Member States for the ratification and implementation of the 2001 Convention and its Annex.







Need for a critical mass to become more effective - more than 75 States -  
Currently Netherlands and Australia are on the path - UK, maybe?

## Legacy

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~180 Students from more than 60 countries

---

Many students are government based

---

Creation of mutual support groups

---

Research projects – publications – presentations

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Greater awareness of UCH

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Greater understanding of the 2001 Convention

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Social community with its own platforms Facebook - LinkedIn

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Trainers from 16 countries former students becoming trainers

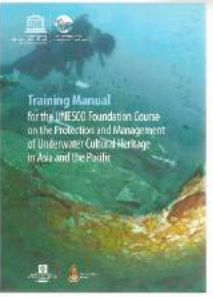

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Students in tertiary education (Flinders - Leiden - Oxford - Southampton)

---

Advanced courses: *In Situ* Preservation - GIS - Recording & surveying



The last section needs finishing and can't be too long. 2-3 slides?

I like the maps for impact, but they need updating. Unless you have something, I'll see what I can produce.



ICOMOS  
ICUCH

**SIGNIFICANCE - SOCIAL RELEVANCE -  
SOCIAL VALUE  
OF  
UNDERWATER CULTURAL HERITAGE**







<b>1</b> NO POVERTY 	<b>2</b> ZERO HUNGER 	<b>3</b> GOOD HEALTH AND WELL-BEING 	<b>4</b> QUALITY EDUCATION 	<b>5</b> GENDER EQUALITY 	<b>6</b> CLEAN WATER AND SANITATION 
<b>7</b> AFFORDABLE AND CLEAN ENERGY 	<b>8</b> DECENT WORK AND ECONOMIC GROWTH 	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	<b>10</b> REDUCED INEQUALITIES 	<b>11</b> SUSTAINABLE CITIES AND COMMUNITIES 	<b>12</b> RESPONSIBLE CONSUMPTION AND PRODUCTION 
<b>13</b> CLIMATE ACTION 	<b>14</b> LIFE BELOW WATER 	<b>15</b> LIFE ON LAND 	<b>16</b> PEACE, JUSTICE AND STRONG INSTITUTIONS 	<b>17</b> PARTNERSHIPS FOR THE GOALS 	

Echoing the Paris Declaration of 2011, our vision for the new era is “the recognition of cultural heritage as a driver and enabler of sustainable development, through effective contribution to the implementation of the United Nations Agenda 2030 and the Sustainable Development Goals



**Goal 3: Well being** - Ensuring healthy lives and promoting the well-being for all at all ages is essential to sustainable development. Significant strides have been made in increasing life expectancy and reducing some of the common killers associated with child and maternal mortality. Major progress has been made on increasing access to clean water and sanitation, reducing malaria, tuberculosis, polio and the spread of HIV/AIDS. However, many more efforts are needed to fully eradicate a wide range of diseases and address many different persistent and emerging health issues.

**Goal 4: Quality Education** - Obtaining a quality education is the foundation to improving people's lives and sustainable development. Major progress has been made towards increasing access to education at all levels and increasing enrolment rates in schools particularly for women and girls. Basic literacy skills have improved tremendously, yet bolder efforts are needed to make even greater strides for achieving universal education goals. For example, the world has achieved equality in primary education between girls and boys, but few countries have achieved that target at all levels of education.

**Goal 8: Work and Economy** - Roughly half the world's population still lives on the equivalent of about US\$2 a day. And in too many places, having a job doesn't guarantee the ability to escape from poverty. This slow and uneven progress requires us to rethink and retool our economic and social policies aimed at eradicating poverty.

A continued lack of decent work opportunities, insufficient investments and under-consumption lead to an erosion of the basic social contract underlying



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## Protection of UCH in the Pacific regions

- \* UCH as cultural resources
- UCH is part of ocean environments and marine resources
- Rich UCH from for human interactions with sea, such as exploration, immigration, colonization, and trade as well as the setting for naval battles and warfare
- UCH extends with cultural identity and distinctive cultural heritage
- WWII-era wreck diving tourism



The Pacific Ocean has been a significant path for exploration, immigration, colonization, and trade as well as the setting for naval battles and warfare. Underwater cultural heritage (UCH) in this region reflects periods from prehistoric times to World War II. The wrecks include the remnants of craft from submarines to aircraft. Of the identified UCH, vessels assigned to the WWII period constitute a large proportion.



### UCH protection activities in the Pacific led by UNESCO APIA



- \* UNESCO's First Regional Workshop on the Pacific UCH place in December 2009 in Honiara, Solomon Islands
- \* Feasibility study for a Pacific Capacity Building Program (Flinders University) in 2011
- \* National UCH capacity building course the Palau Historic Preservation Office (HPO) in May 2013 with the financial assistance of UNESCO
- \* Supports on the attendance of the Pacific delegation at the Second Asia-Pacific Conference on Underwater Cultural Heritage (Honolulu, May 12–16, 2014).
- \* Issues of UCH management in Small Island Developing States (SIDS) were addressed at the Third UN International Conference on SIDS (Apia, Samoa, September 2014) and Pacific Underwater Cultural Heritage Partnership (PUCHP) was formed.

The underwater cultural heritage program in the Pacific was launched at [the First Regional Workshop on the Pacific UCH, which](#) took place in December 2009 in Honiara, Solomon Islands. As possible steps toward building capacity for managing UCH, participants at the workshop identified the following needs: systematic recording and maintenance of a database of submerged and underwater sites; exploring licensing activities directed at underwater sites; and developing a training and education program for managers. The papers presented by experts at the workshop were compiled, edited, and published online as *Underwater Cultural Heritage in Oceania* (Guérin et al. 2010).

Based on the recommendations made at the Honiara workshop, [a feasibility study for a Pacific capacity building program](#) was prepared by Flinders University with UNESCO support. While this study was shared with the development partners for their interest and support, the Palau Historic Preservation Office (HPO) organized a national UCH capacity building course in May 2013 with the financial assistance of UNESCO.

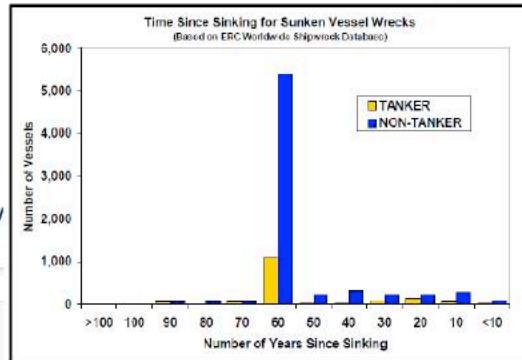
In 2014 the Second Asia-Pacific Conference on Underwater Cultural Heritage (Honolulu, May 12–16, 2014) was another milestone in regional cooperation. Some 135 UCH experts and professionals from 27 countries got together to present papers and engage in discussions (Van Tilburg et al. 2014). The Best Paper Award went to Elia Nakoro of the Fiji Museum for his paper "The Fiji Museum's Efforts towards the Preservation of Underwater Cultural Heritage Sites in Fiji."

A series of activities on UCH management in Small Island Developing States (SIDS) were held at the Third UN International Conference on SIDS (Apia,

## Issues and conflicts



- \* Pillage activities
- \* Oil spilling
- \* Unexploded ordnance (UXO) and toxic weaponry



**Shipwreck Artifacts**

**1715 Fleet/Atocha Collectors 1808**  
Authentic  
\$24.95  
\$34.95  
View Details

The artifact is a large caliber musket ball recovered from the wreck of the "HMS Astora" which sank on a voyage from the British Virgin Islands on May 23, 1900. The musket ball was recovered by the...

Some of the WWII-era underwater cultural heritage present certain risks, such as unexploded ordnance (UXO), toxic weaponry, and crude oil, which threaten not only local communities but also visiting tourists.

## Pillage Activities at the WWII wrecks





**Naval History and Heritage Command**

Connect with us: [Facebook](#) [Twitter](#) [YouTube](#) [LinkedIn](#) [Instagram](#)

**Research - Underwater Archaeology - Preservation Policy and Resource Management - Sunken Military Craft Act**

**Sunken Military Craft Act**



**American Battlefield Protection Program**



**American Battlefield Protection Program**



**WORLD WAR II MARITIME HERITAGE TRAIL**

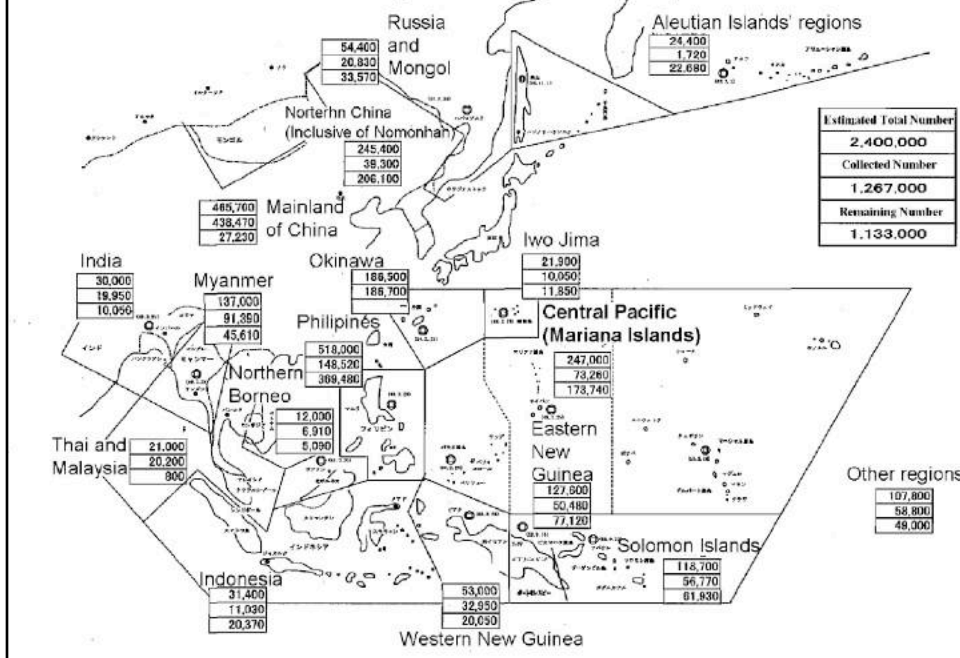
**BATTLE OF SAIPAN**

- \* Sunken war craft is legally protected by some states
- \* Human body remains and associated artefacts are entombed

The Sunken Military Craft Act (SMCA) was enacted on October 28, 2004. Its primary purpose is to preserve and protect from unauthorized disturbance all sunken military craft that are owned by the United States government, as well as foreign sunken military craft that lie within U.S. waters. Pursuant to the SMCA, the Navy's sunken military craft remain property of the U.S. regardless of their location or the passage of time and may not be disturbed without the permission from the U.S. Navy.

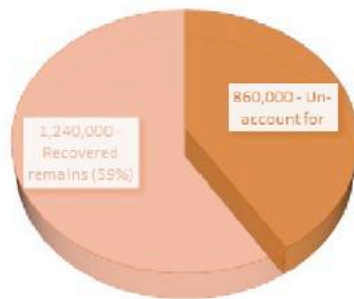
NHHC's Underwater Archaeology Branch manages the Navy's collection of over 17,000 ship and aircraft wrecks located around the world

# Fallen Solders' state (As of Aug/13/2012)

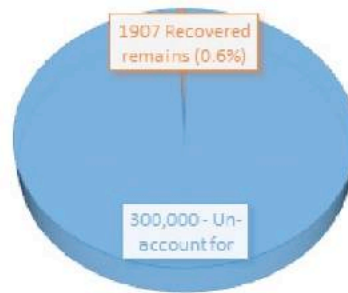




## JAPANESE LOST ON LAND



## JAPANESE LOST AT SEA/ENTOMBED IN SUNKEN VESSELS



## Risk of Oil Spilling in the Pacific

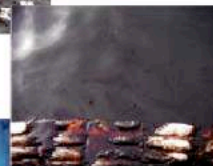
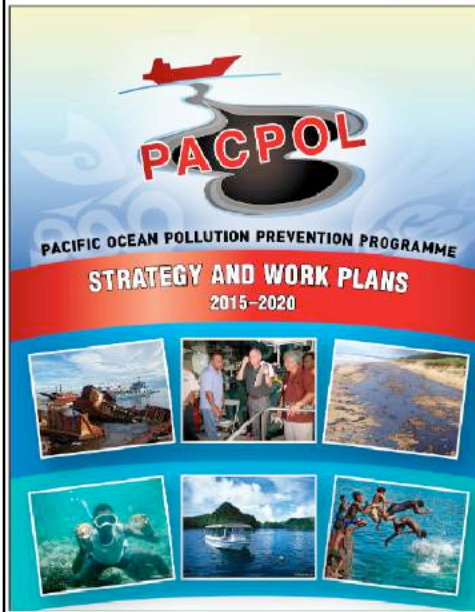


- \* The issue of the oil spill risk has been widely addressed in the international society. Approximately 1080 WWII shipwrecks were initially in the registry of the Pacific Ocean Pollution Prevention Program, managed by the South Pacific Regional Environment Programme (SPREP). The SPREP WWII Shipwreck GIS, developed for oil spill risk assessment, contains more than 3,800 WWII wrecks at present, with a combined tonnage of 13.5 million tons. at the meetings of SPREP



At the 2011 Pacific Islands Forum Leaders Meeting, leaders called on relevant international bodies and development partners to assist in addressing UXO in the region; and called for the safe removal of oil from shipwrecks”

## Oil Spilling



Sugi Bark Oil Sorbent



## Toxic weaponry



- \* A UXO clearance operation at an unidentified shipwreck, now called the Helmet Wreck, by the Japan Mine Action Service (JMAS), a non-profit organization specializing in explosive ordnance disposal, is a benchmark example of aid for in situ disposal of UXO in an environment.





## Mitigation strategies and approaches need to develop

### \* Pillage activities



Legal protection, cooperation with local industries and stakeholders (e.g. diving industries and fishery industries), and the development of a training and licensing system

### \* Oil Spilling and Toxic Weaponry

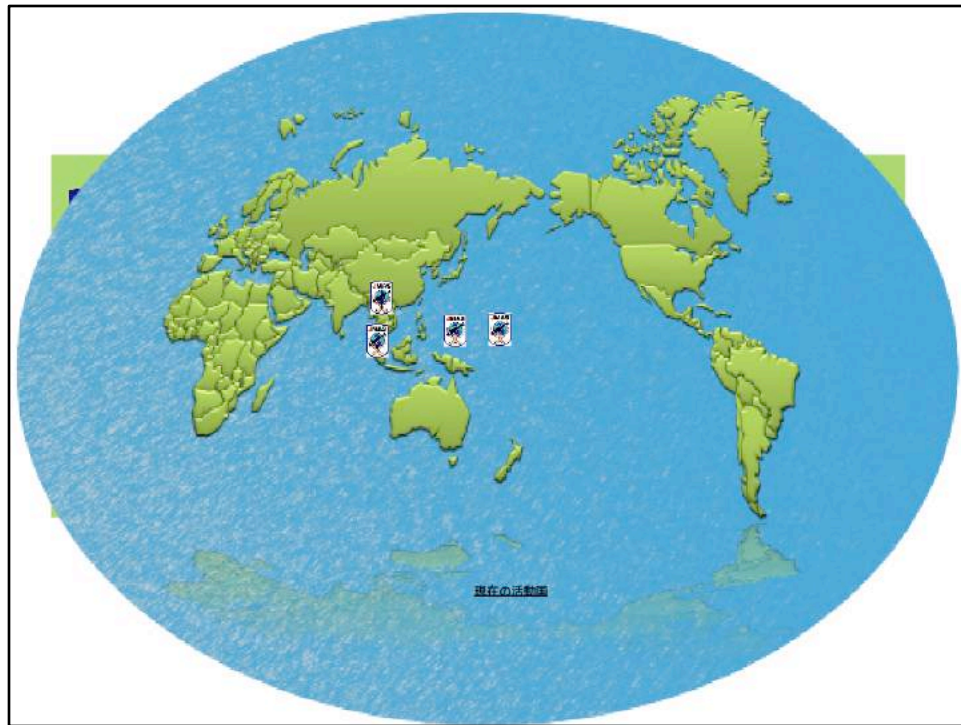


Monitoring, mutual cooperation between professionals and local authorities

- **Awareness rising among stakeholders**
- **Networking**
- **Policy developments**
- **Capacity building**

## FSM UCH for SDGs

Thank you



JMASは、専門技術を有する自衛隊OBが中心となり、技術指導を通じた地雷・不発弾処理や、地域復興支援プロジェクトを実施しているNGO団体です。

JMAS is an NGO organization which is mainly engaged in mine and unexploded munitions through technical guidance and a regional reconstruction support project, mainly by SDF expert OB with expertise.

2002年「我々にしかできない仕事」との思いから活動を始め、現在は4か国で支援事業を行っています。「地雷・不発弾のない安全な世界」を目指し、「人々自らの発展」を支える国際貢献活動を続けています。

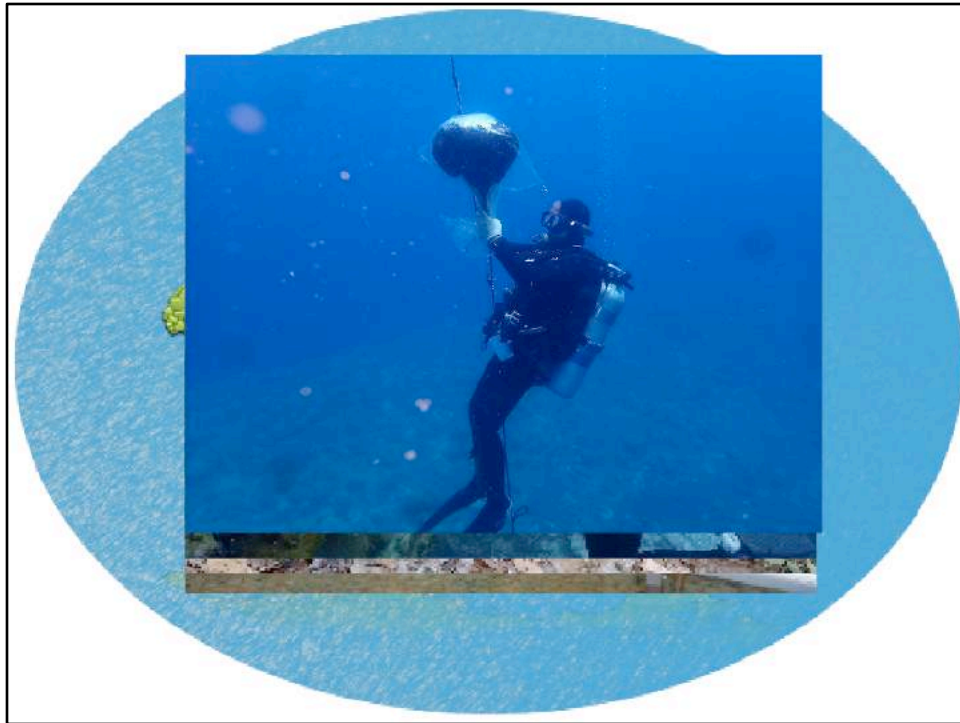
In 2002 he began his activities with the thought of "work that can only be made for us", and now we are doing support projects in four countries. We aim to become a "safe world without landmines and unexploded ordnance" and continue our international contribution activities supporting the "development of ourselves".

世界中の紛争跡地には今なお膨大な数の地雷・不発弾が残されたままであり、多くの人々が危険な環境下で生活し、土地の利用ができないため貧困から脱却できない状況におかれています。

A huge number of landmines and unexploded ordnance remains in the site of the conflict around the world, and many people live in a dangerous environment and can not use the land, so they can not escape from poverty It is.

カンボジアをはじめ地雷・不発弾汚染国は、処理組織を設立して除去活動を行っていますが、終了するまでにはこの先何十年もかかると見込まれており、広く国際社会に支援を求めています。

Cambodia and other landmine / unexploded ordnance polluted countries have established treatment organizations and are carrying out removal activities, but it is expected that it will take decades to come by the end of the process, and we are seeking support from the international community widely I will.



ミクロネシア・トラック環礁海域における戦没船油漏れ対策事業  
Oil leakage countermeasure project from WWII WRECKS of the Federated  
States of Micronesia・Truk Lagoon marine area  
油脂漏洩防止応急処置等

位置の特定された沈没船の積載物、積載量を確認・推定するとともにその漏洩状態を調査する。漏洩物質が、海中環境を汚染し、生態系に危害を及ぼしていると認められる場合は、漏洩防止のための応急処置を行うとともに、滞留している漏洩物質は可能な範囲で回収する。

First-aid measures to prevent oil leaks

Check and estimate the load and load amount of the sunken ship where the position was specified and investigate the leak condition. When leakage substances contaminate the underwater environment and are found to be harmful to ecosystems, first aid measure to prevent leakage is taken, and leaked substances staying are collected to the extent possible.

この作業実施中に、E R W (Explosive Remnants of War) が発見され、炸薬の漏洩が認められ、生態系に有害なピクリン酸であった場合は、油脂の場合と同様に漏洩防止処置を行う。

また、船倉内に遺骨を発見した場合は、その状況を確認し関係機関へ報告する。

If ERW (Explosive Remnants of War) is found during this work, leakage of explosive charge is recognized, if it is picric acid harmful to the ecosystem, leakage prevention measures are carried out as with oils and fats.

Also, if you find the remains in the hold, you will check the situation and report it to the relevant agencies.

技術移転

ミクロネシア連邦チューク州の環境庁・水産庁の関係者で、州政府から指定された者（各期4名程度を予定）を対象とし、海中の探査、測量に関する技術、油等有害物質の漏洩防止応急処置に関する技術、E R W取扱法、潜

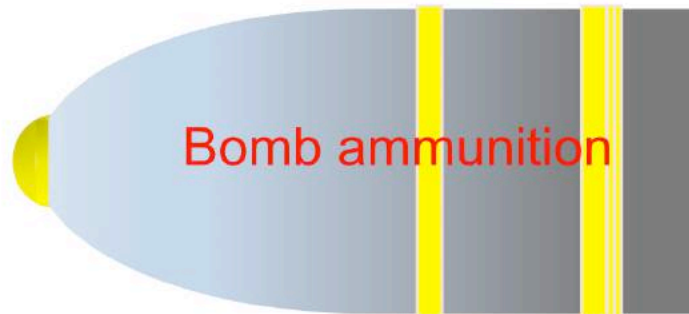


旧日本軍の弾薬類  
**JAPANESE EXPLOSIVE  
ORDNANCE**





## Technology Transfer Item Table



## Technology Transfer Item Table

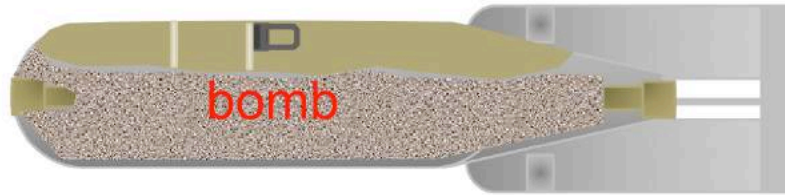




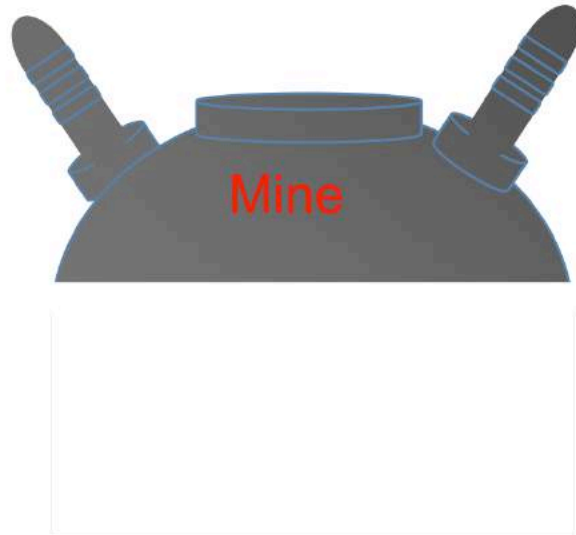
## Technology Transfer Item Table



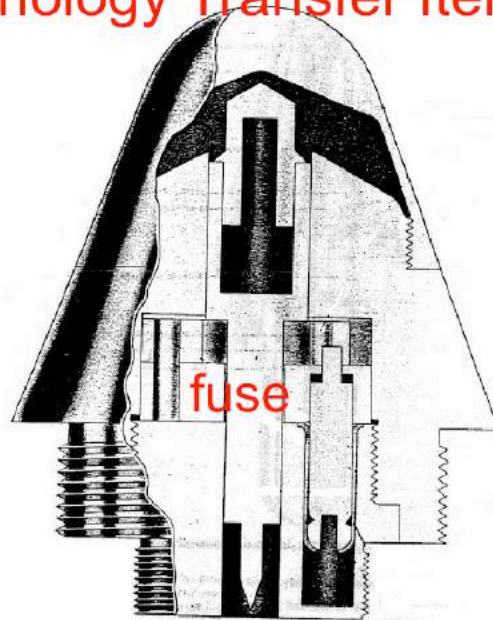
## Technology Transfer Item Table



## Technology Transfer Item Table



## Technology Transfer Item Table



# Chapter 1

## JAPANESE BOMBS



The contents of this section are divided into two main parts, Japanese Army Bombs and Japanese Navy Bombs.

The Japanese Army and Navy have separate air forces each of which its own distinct types of bombs and fuzes. These ordnance items are dissimilar in construction and identification features, and each service utilizes its own system of designation.

For the most part the two types of bombs and fuzes may not be used interchangeably. Special adapters have been developed, however, which allow flexibility for this rule. This has been particularly demonstrated in the use of Navy bombs by the Army in conducting antisubmarine warfare.

このセクションの内容は、日本軍爆弾と日本海軍爆弾の2つの主要部分に分かれています。

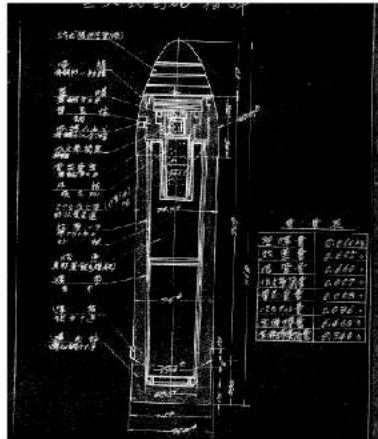
日本軍と海軍はそれぞれ独自の種類の爆弾や爆弾を持つ空軍を別々に持っています。これらの武器アイテムは構造および識別機能が異なるため、各サービスは独自の指定システムを利用しています。

ほとんどの場合、2種類の爆弾とフュージは互換的に使用することはできません。しかし、このルールに柔軟性を持たせる特別なアダプターが開発されています。これは、対潜水艦戦争を行う際に軍隊による海軍爆弾の使用で特に実証されている。



# Chapter 1

## JAPANESE BOMBS



The Japanese designations of bombs are used in this book. A general discussion of the system is presented here. A more detailed explanation is given in the introduction to each section.

### System Designation

*Type number.*— Items of ordnance, as well as most other items of military equipment, are given a type number indicating the year the article was finally adopted for service use. This may occur several years after ordnance has been in production and actual use.

Until the reign of the present emperor, (Showa era; started in 1926) items were designated by the year of era. Now, however, the year of the Japanese Empire (Japanese year 2600 corresponds to our 1940) may be used. For items introduced up to the year 2600 the last two numbers are used in the designation. Thus type 99 means the item was adopted in 2599 or our 1939.

この本には日本の爆弾の指定が使われています。システムの一般的な議論がここに示されています。より詳細な説明は、各セクションの序文に記載されています。

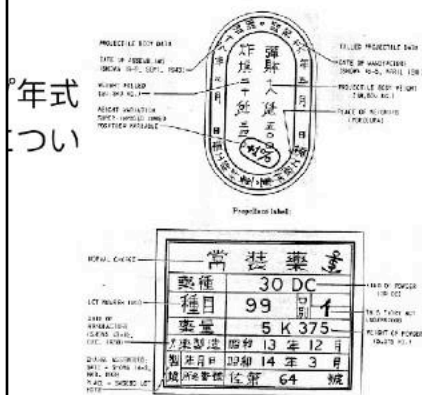
### システム指定

型番.-武器の品目、その他ほとんどの軍用品には、最終的に兵役のために採用された年を示す型番が与えられている。これは、武器が製造および実際に使用されてから数年後に発生する可能性があります。

現在の皇帝の治世まで（昭和1926年に始まった）、時代によって指定されたものがあつた。しかし今、日本帝国の年（日本の2600年は1940年に相当する）が使われるかもしれません。2600年までに導入されたアイテムについては、最後の2つの数字が指定に使用されます。したがって、タイプ99は、そのアイテムが2599年または1939年に採用されたことを意味します。

# Chapter 1

## JAPANESE BOMBS



The year 2600 may be represented as type 100 or type 0, in a designation. The year 2601, 2602, etc., are usually represented by the last digit such as type 1, type 2, etc.

Experimental ordnance items are assigned experimental type numbers indicating the year of the Showa era during which the experiments was authorized.

Ordnance items standardized in the eras preceding the Showa era; namely, Taishio 1912-1926 and Meiji 1867-1912, will be designated by the 1922, type 41 (Meiji) = 1908.

2. Mark Numbers.—Some ordnance such as Navy bombs developed for a special purpose will be designated by a mark number.

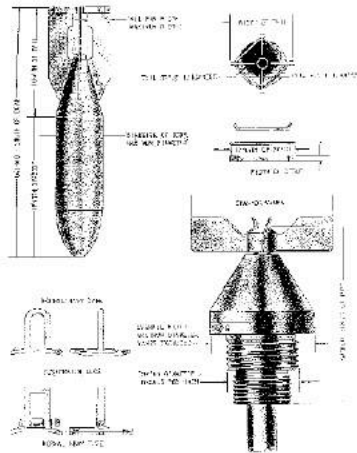
2600年は、タイプ100またはタイプ0として指定することができます。2601年、2602年などは、通常、タイプ1、タイプ2などの最後の数字で表されます。実験武器アイテムには、実験が許可された昭和の年を示す実験タイプ番号が割り当てられます。

1 昭和以前の時代に標準化された服飾品。大正1912-1926、明治1867-1912は1922年、41号（明治）= 1908年に指定される。

2 マーク番号。特殊目的のために開発された海軍爆弾のような武器は、マーク番号で指定されます。

# Chapter 1

## JAPANESE BOMBS



3. Description of ordnance.—Some items may have a word or two following the type number which gives a brief description of the particular piece of ordnance.

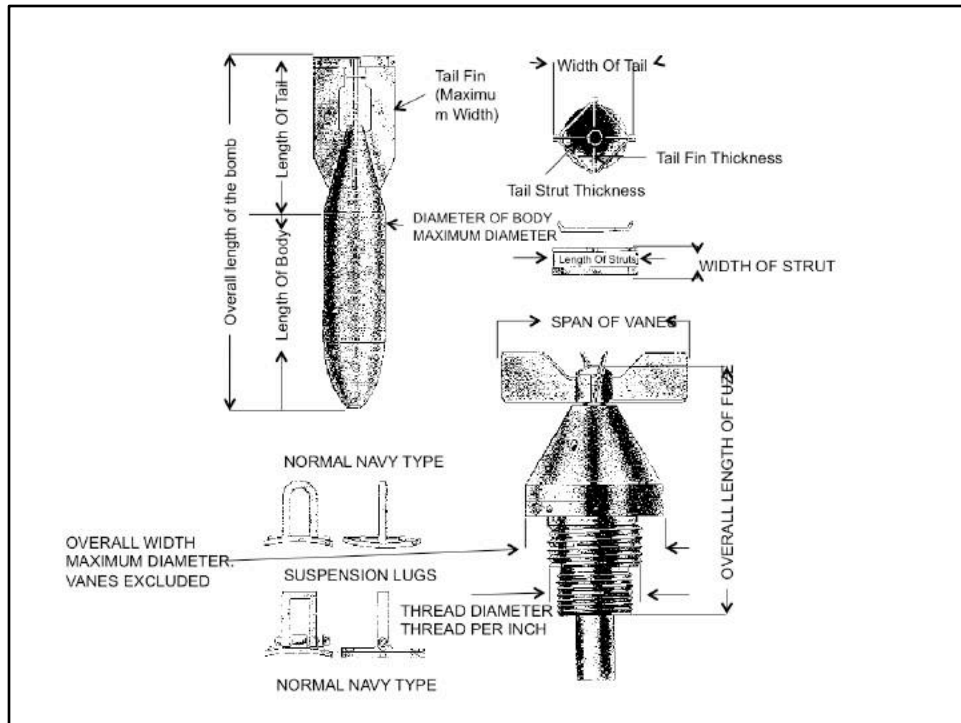
4. Model.—This term has several meanings but generally it indicates a change in basic design.

5. Modification.—This is used to represent minor changes in design or a change in explosive filling.

3 武器の説明。 - いくつかのアイテムは、特定の武器の簡単な説明を示すタイプ番号の後に1つまたは2つの単語を持つことができます。

4 モデル - この用語にはいくつかの意味がありますが、一般的には基本設計の変更を示します。

5 変更 - これは、爆薬充填の設計変更や変更を表すために使用されます。



## 前書

The Japanese Army Air Force and the Japanese Navy Air Force each use a distinctive set of fuses. Therefore, this section is divided into two main parts, Army and Navy.

Individual fuses and Gains of each service are generally interchangeable for use in bombs of that service but are not interchangeable for use in ordnance of the other.

Each group possesses certain definite identifying characteristics:

日本陸軍と日本海軍はそれぞれ特有のヒューズを使用しています。したがって、このセクションは2つの主要な部分、軍隊と海軍に分かれています。各サービスの個々のヒューズとゲインは、通常、そのサービスの爆弾で使用するために交換可能ですが、他の武器で使用するために交換することはできません。各グループには、特定の明確な識別特性があります。

## ARMY FUZES

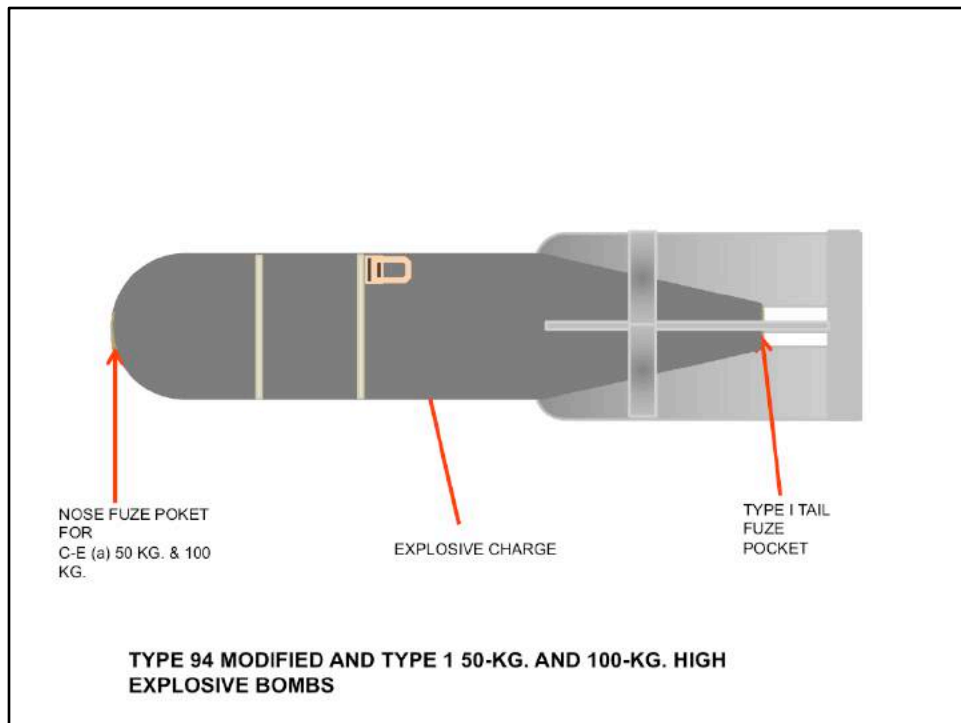
1. Arming vanes have holes for arming wires.
2. Safety forks are usually fitted over the vanes into holes in the top of the fuse boy.
3. Most fuses have the primer as an integral part of the fuse.

## 軍用品

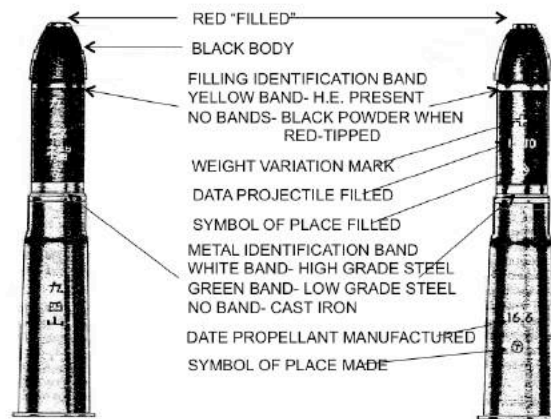
アーミングベーンは、アーミングワイヤ用の穴を有する。

2.安全フォークは、通常、羽根の上にヒューズ・ボーイの上部の穴に取り付けられます。

3.ほとんどのヒューズは、ヒューズの不可欠な部分としてのプライマーを持っています。





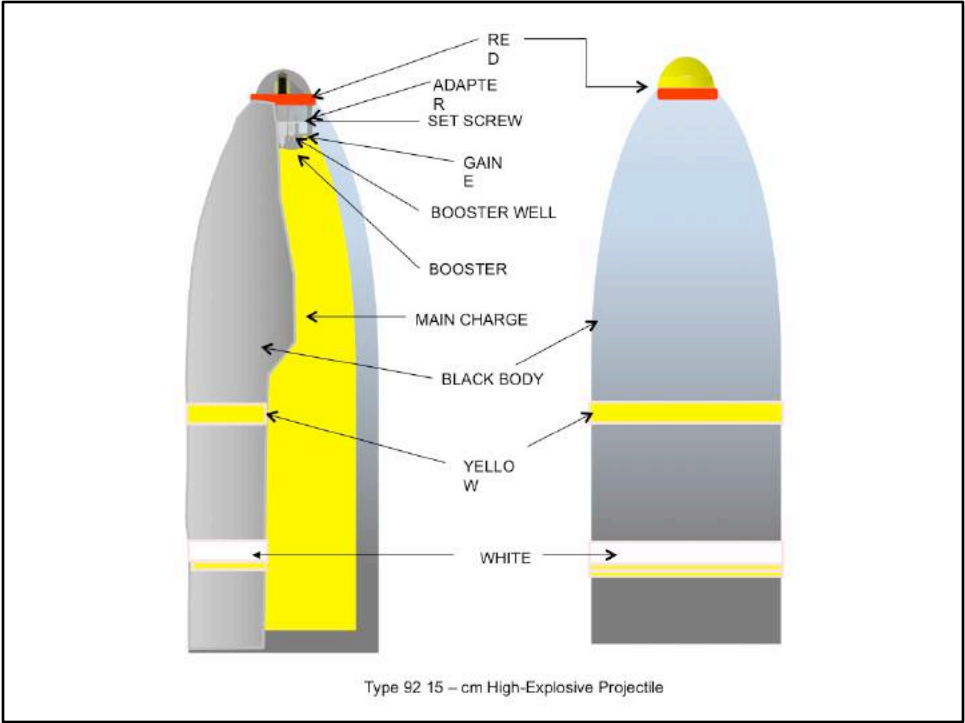


ARMY-Old Color System

ammunition	ammo	munitions	弾薬	dud	不発弾	projectile	弾丸
fuze	cavity	空洞	cartridge case	薬きょう	primer seat	雷管室	
explosive	火薬類	explosion	爆発	burst	さく (炸) 裂	striker	撃鉄
s					firing pin	striker	撃針
complete detonation	完爆	initiation	点火	explosive train	火薬系列		
bursting charge	さく (炸) 薬系列	propelling charge	発射薬系列				
explosive train		explosive train					
					disarm	安全化	
nose fuze				base fuze			
point fuze				tail fuze			
point detonating fuze	弾頭信管	P D		base detonating	弾底信管	B	
PD fuze				fuze		D	
				BD fuze			
hand grenade	手りゅう弾			disposal of explosive	火薬類の廃棄		



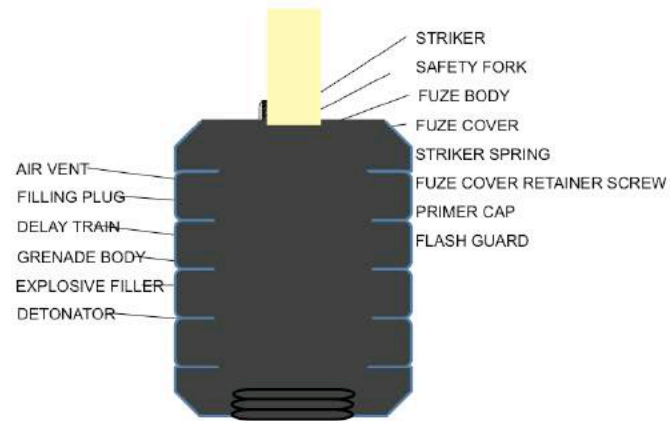
Type 92 15 – cm High-Explosive Projectile



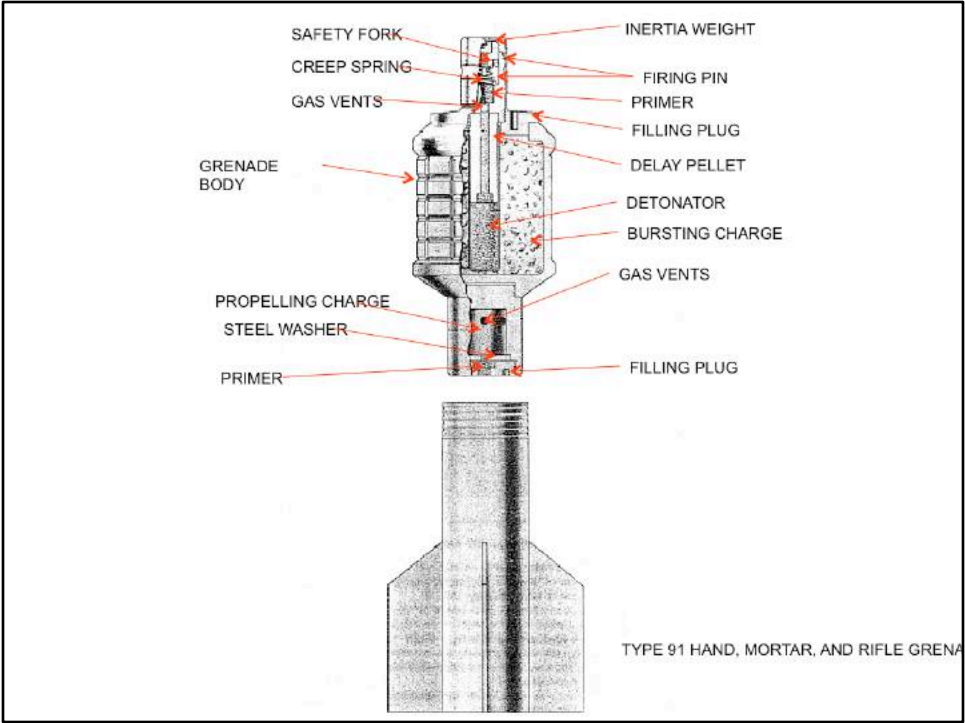


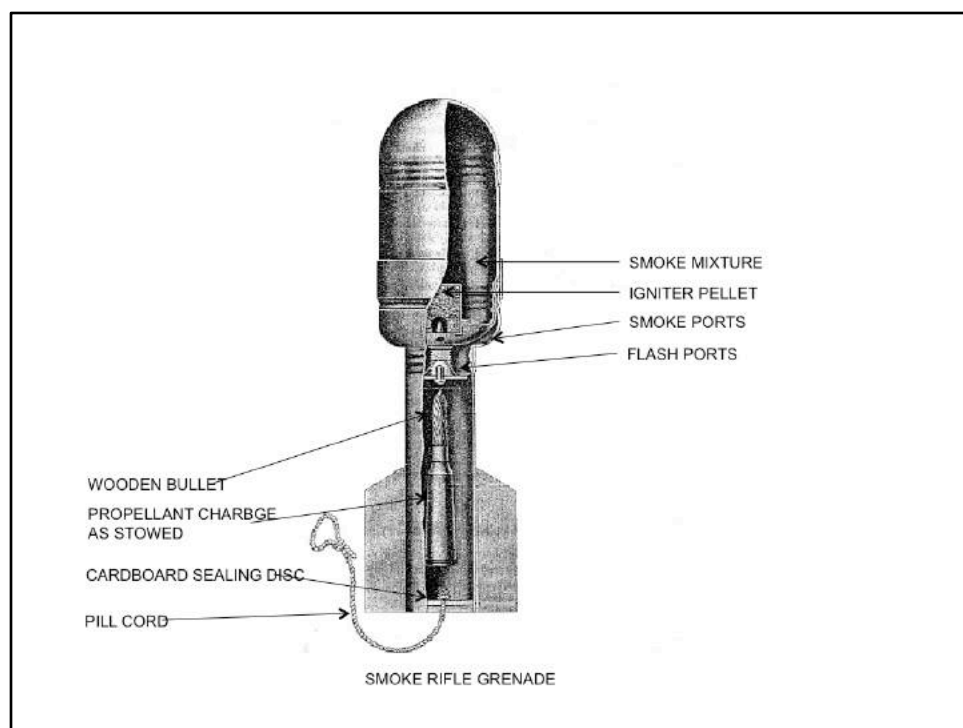
TYPE 99 HAND GRENADE

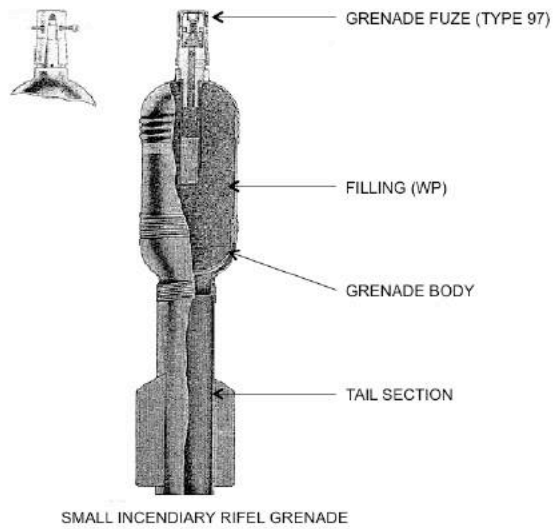




TYPE 99 HAND GRENADE



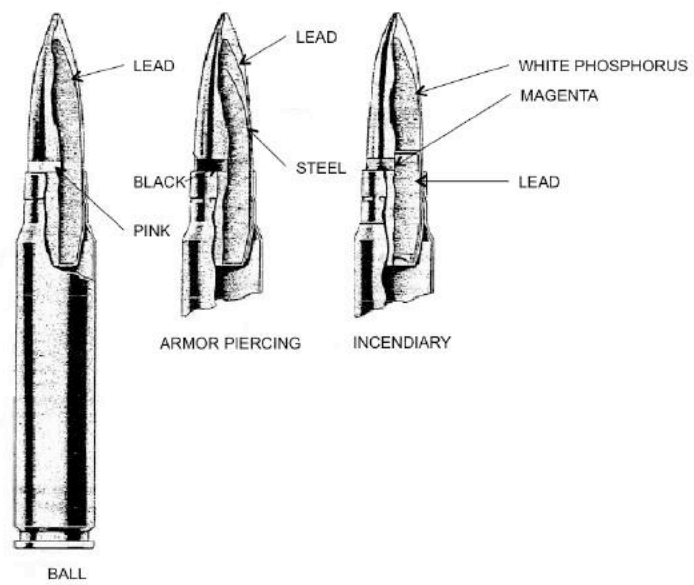






7.92 – mm Aircraft Machine Gun





7.92 - mm Aircraft Machine Gun



8 – mm Pistol Ammunition

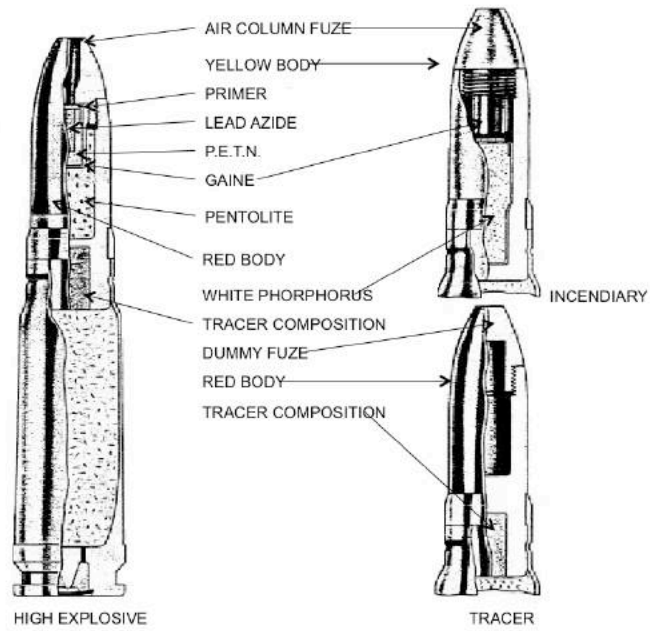
LEAD

CUPRO-NICKEL

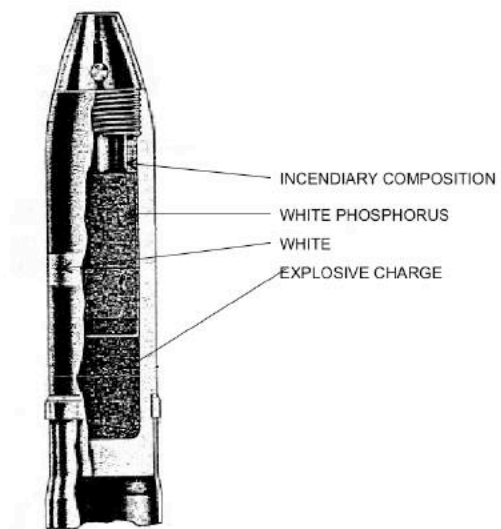


9 – mm Pistol Ammunition

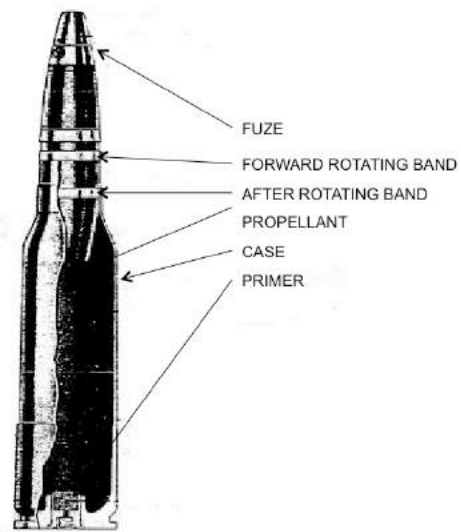
LEAD



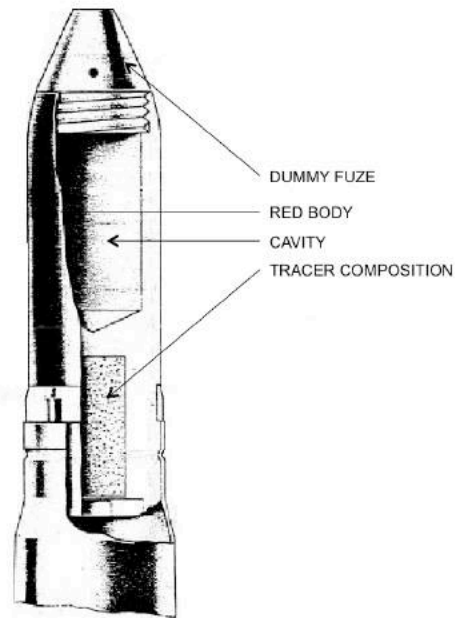
13 - cm Aircraft Machine Gun Ammunition



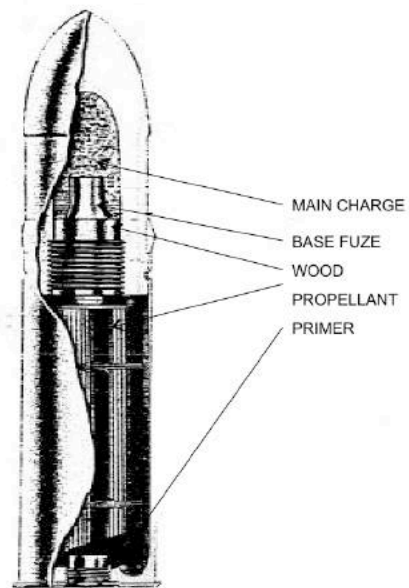
20 – mm High-Explosive Incendiary Projectile



25 - mm Ammunition



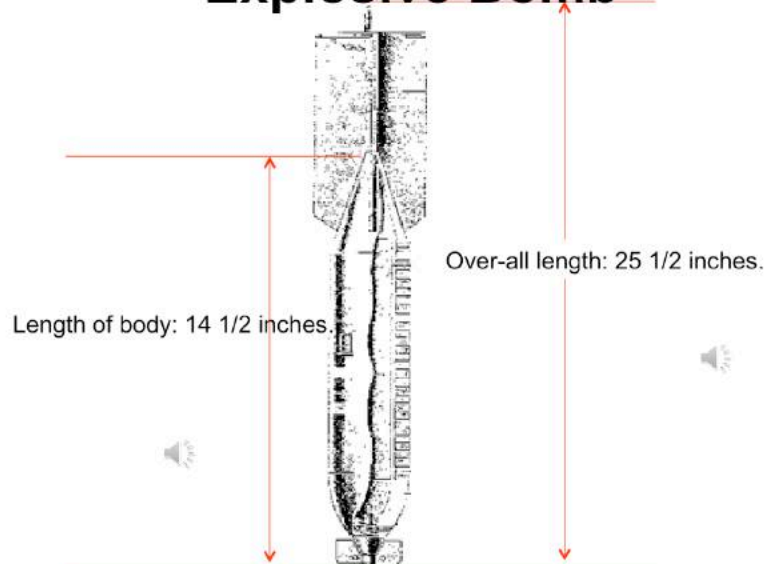
Type 5 30 - mm Tracer Projectile

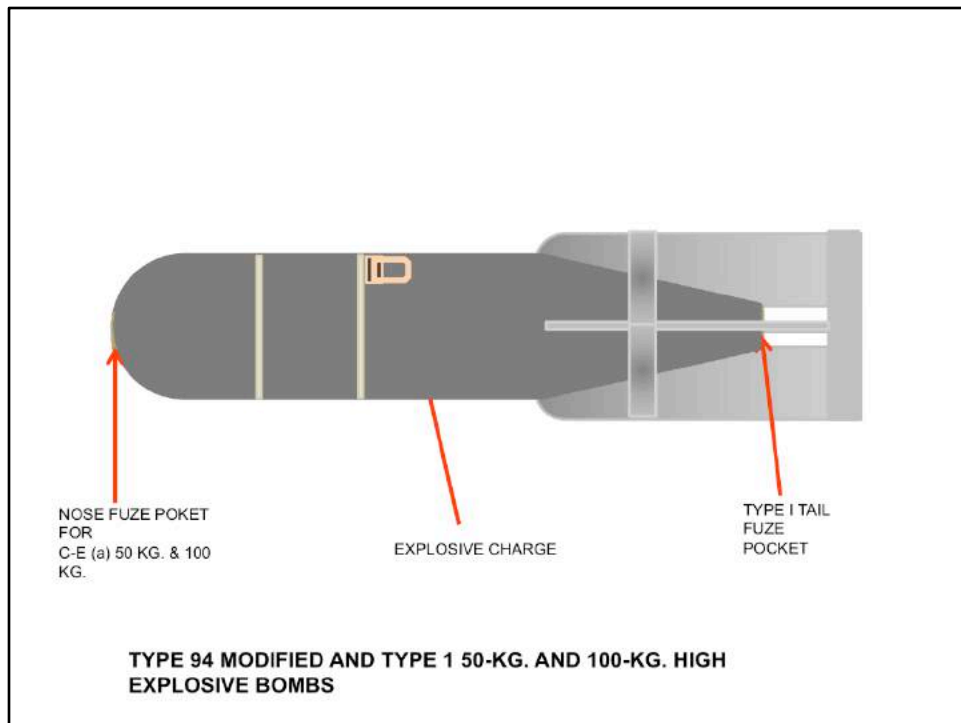


40 – mm Armor-Piercing Projectile



**Figure 2—Type 92 15-kg. High-Explosive Bomb**







#### **Type JE Antiboat Mine**

Diameter: 20 ¼ inches

Height: 10.62 inches

Thickness of wall: 3/16 inch

Material of wall: Steel

Weight: 106.5 pounds (not including horns detonator, booster, and wiring)

Weight of filling: 46.5 pounds

Type of filling: Type 98 explosive (HND/TNTN 40/60) with picric acid booster and tetryl detonator.

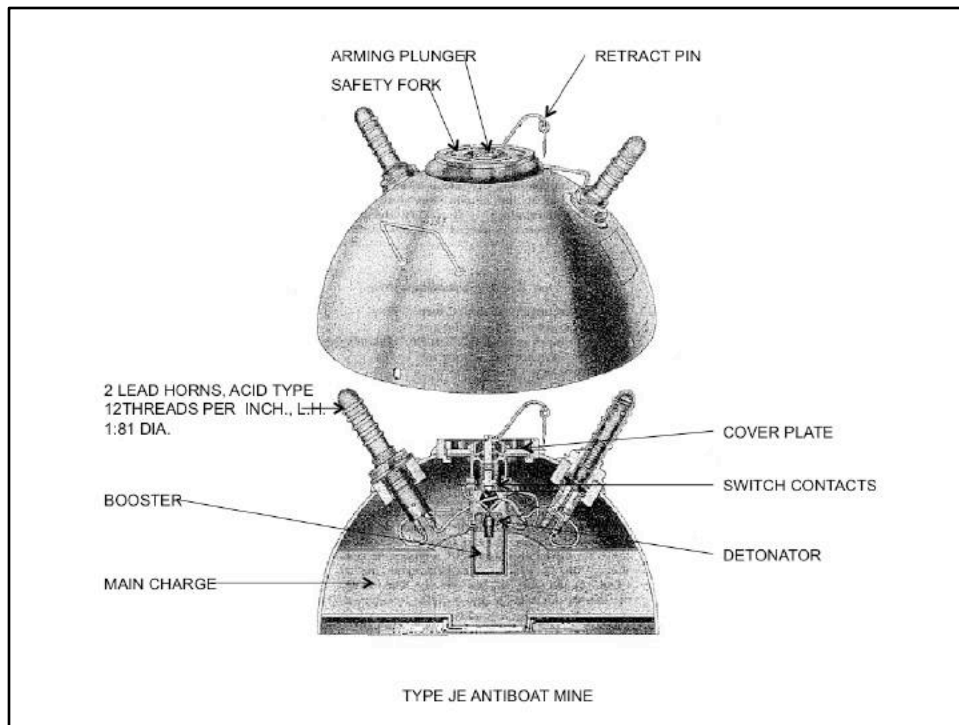
#### **See Page 221 for Figure 167-Type Antiboat Mine**

1. Arming Plunger
2. Safety Fork
3. Retracting Pin
4. 2 Lead Horns, Acid Type 12 Threads Per in. Lh
5. Booster
6. Main Charge
7. Cover Plate
8. Switch Contacts
9. Detonator

Description: This is a hemispherical, chemical horned, all-welded mine. The outer body forms a hemisphere and has two handles on its upper portion, a central opening on top to take the booster and safety switch, and two horn openings 180degrees apart. The mine is divided internally into an explosive chamber and a chamber containing booster, wiring, safety switch, and horn electrodes. The division is made by a shallow, saucer-shaped steel section, which forms less than a hemisphere which is pressed into the outer body from the bottom and welded in place. A plate is then fitted into the bottom of the mine and is also welded in place. This last mentioned plate carries a filling plug in its center and is inset 13/16 of an inch to allow clearance for the plug. The horns, two in number, appear to be standard lead-acid mine horns. They are set at an angle of 65 degrees and project above the level of the mine top; threads are left hand. In the firing circuit is a spring loaded plunger whose upper end projects through the safety switch cover. A rubber diaphragm in the top of the cover insures water tightness but allows the plunger to move. There is a tapered, threaded hole in the center of the top of the plunger and a groove around the plunger near the top. Until the mine is in position a safety fork engages this groove and holds the plunger up against its spring. The inner end of the plunger is thus withdrawn from between two contacts in the electrical firing circuit and the circuit is incomplete.

Employment: Used on beaches as an antiboat mine. It can also be used on land as an antitank mine by burying or otherwise concealing it.

Operation: After the mine is laid the safety fork is removed. The contact plunger moves down under



#### **Type JE Antiboat Mine**

Diameter: 20 ¼ inches

Height: 10.62 inches

Thickness of wall: 3/16 inch

Material of wall: Steel

Weight: 106.5 pounds (not including horns detonator, booster, and wiring)

Weight of filling: 46.5 pounds

Type of filling: Type 98 explosive (HND/TNTN 40/60) with picric acid booster and tetryl detonator.

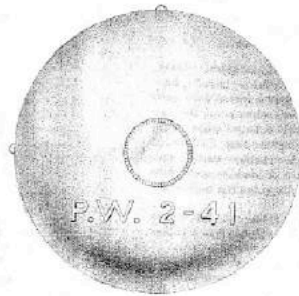
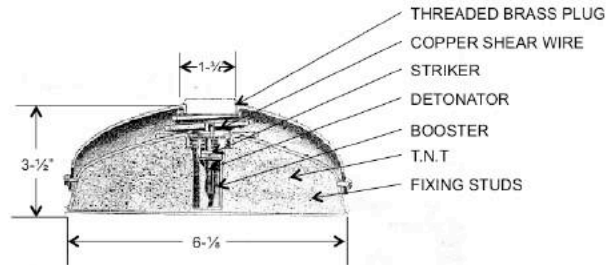
#### **See Page 221 for Figure 167-Type Antiboat Mine**

1. Arming Plunger
2. Safety Fork
3. Retracting Pin
4. 2 Lead Horns, Acid Type 12 Threads Per in. Lh
5. Booster
6. Main Charge
7. Cover Plate
8. Switch Contacts
9. Detonator

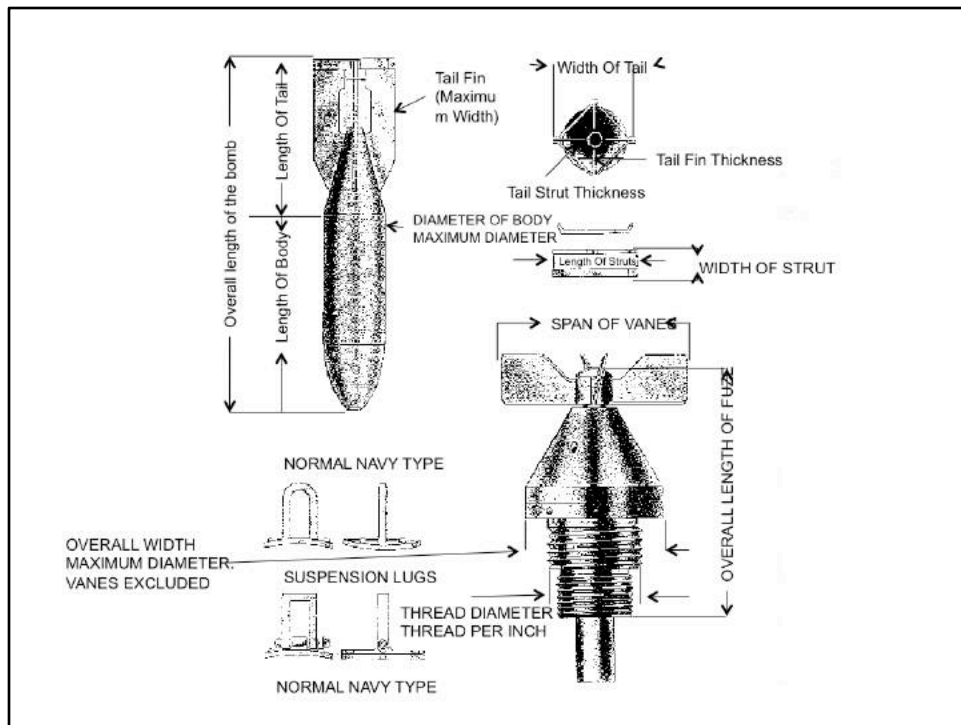
**Description:** This is a hemispherical, chemical horned, all-welded mine. The outer body forms a hemisphere and has two handles on its upper portion, a central opening on top to take the booster and safety switch, and two horn openings 180degrees apart. The mine is divided internally into an explosive chamber and a chamber containing booster, wiring, safety switch, and horn electrodes. The division is made by a shallow, saucer-shaped steel section, which forms less than a hemisphere which is pressed into the outer body from the bottom and welded in place. A plate is then fitted into the bottom of the mine and is also welded in place. This last mentioned plate carries a filling plug in its center and is inset 13/16 of an inch to allow clearance for the plug. The horns, two in number, appear to be standard lead-acid mine horns. They are set at an angle of 65 degrees and project above the level of the mine top; threads are left hand. In the firing circuit is a spring loaded plunger whose upper end projects through the safety switch cover. A rubber diaphragm in the top of the cover insures water tightness but allows the plunger to move. There is a tapered, threaded hole in the center of the top of the plunger and a groove around the plunger near the top. Until the mine is in position a safety fork engages this groove and holds the plunger up against its spring. The inner end of the plunger is thus withdrawn from between two contacts in the electrical firing circuit and the circuit is incomplete.

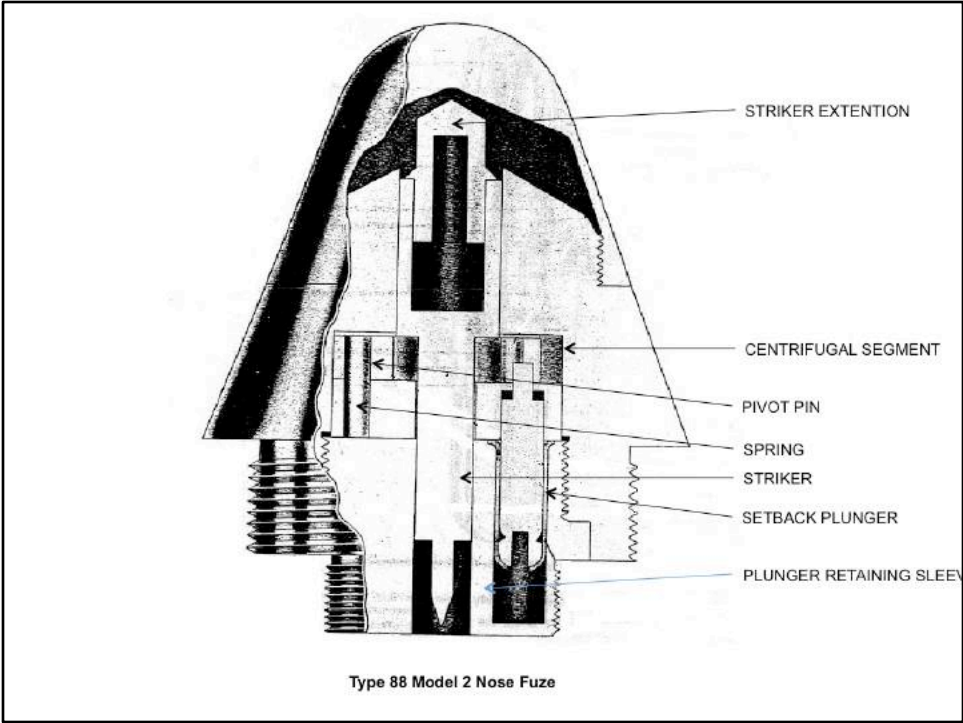
**Employment:** Used on beaches as an antiboat mine. It can also be used on land as an antitank mine by burying or otherwise concealing it.

**Operation:** After the mine is laid the safety fork is removed. The contact plunger moves down under

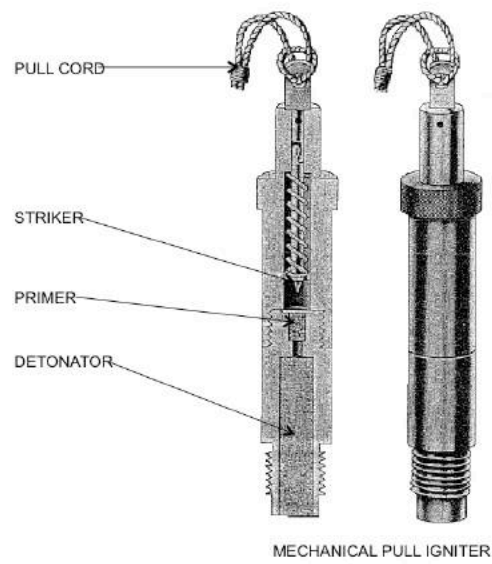


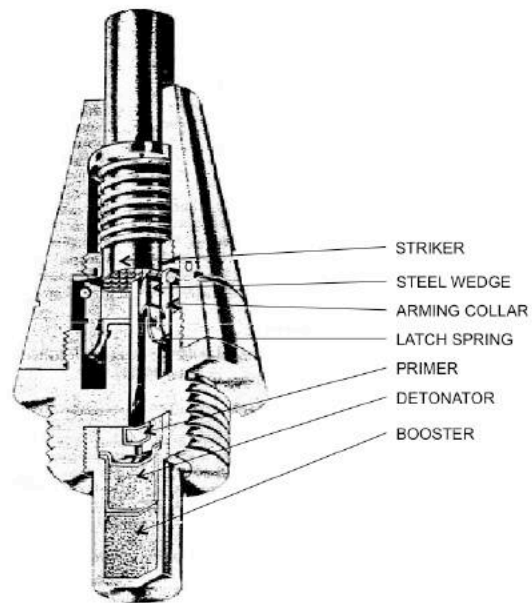
DUTCH ANTITANK AND ANTIPERSONNEL LAND MINE



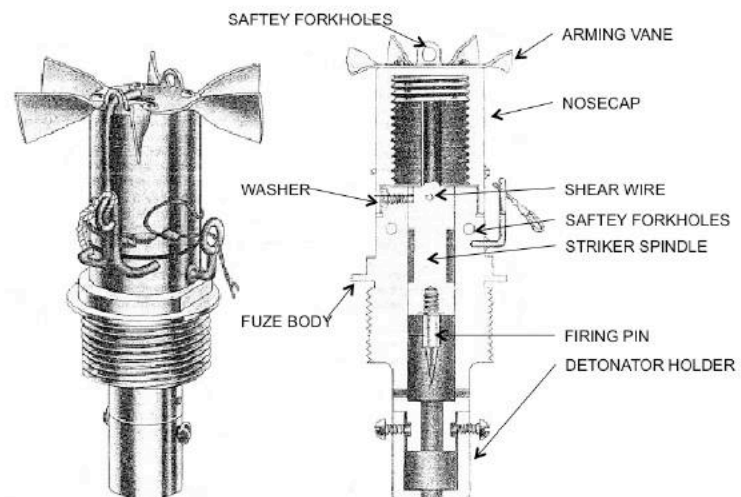




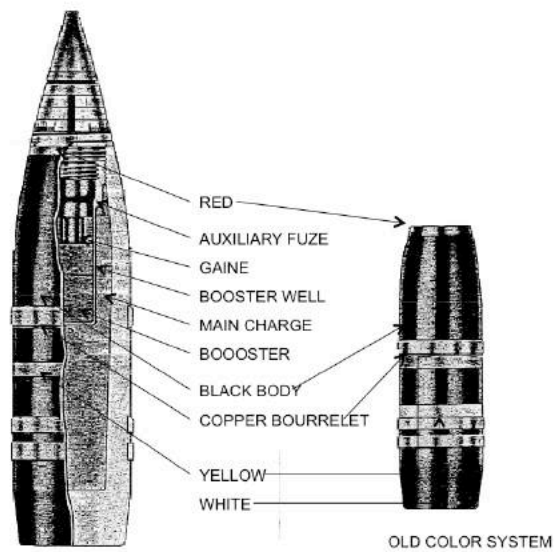




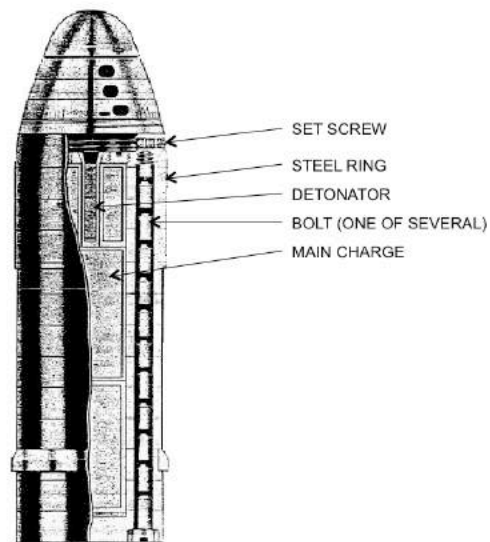
Type 88 Instantaneous (Gun and Howitzer-Mortar) Fuze



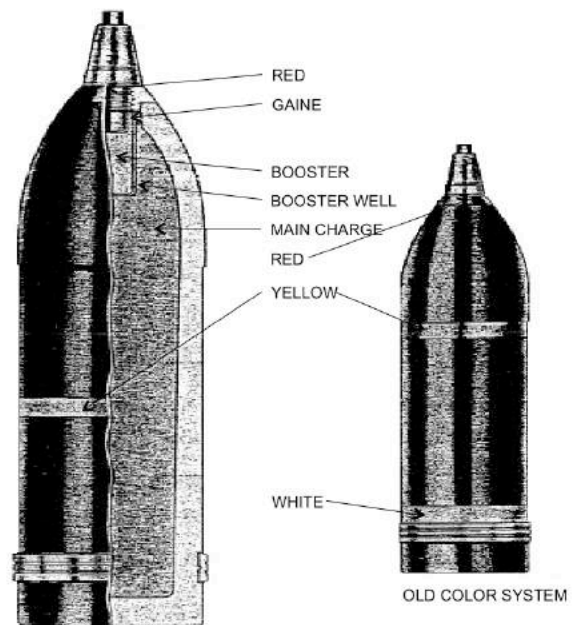
Explosives Name	color	Hammer sensitivity "cm"	Explosion speed "M / sec"	Explosion point "°C"	Characteristic	Use
Picric acid	yellow	33	7800	322	1 Reacts with heavy metals to produce sensitive metal salts. 2 It reacts with animal tissues such as skin and dyes it yellow. 3 Dissolve in water, acetone.	1 、 Old Japanese army main drug 2 、 Cardiac medicine of fuse line
Ammonium picrate (D-explosive)	Yellow to orange	43	6500	318	1 、 It is insensitive to friction and impact 2 、 Degraded by moisture, liberate picric acid. 3 、 It reacts with animal tissues such as skin and dyes it yellow. 4 、 Dissolve in water, acetone.	Armor pill
T N T Trinitrotoluene	Light yellow	36	6900	475	1 、 It is not hygroscopic and insoluble in water. 2 、 It does not work with metal. 3 、 It does not degrade naturally. 4 、 The melting point is 81	1 、 Medicine 2 、 Explosive drug



Type 90 7 - cm High-Explosive Antiaircraft Long-Pointed Projectile

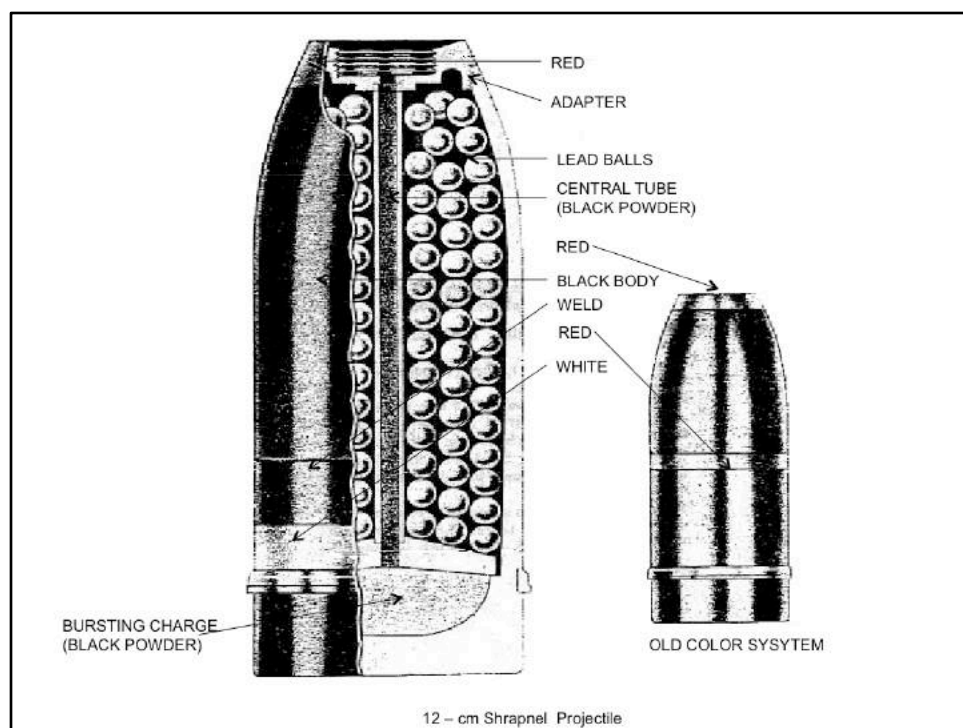


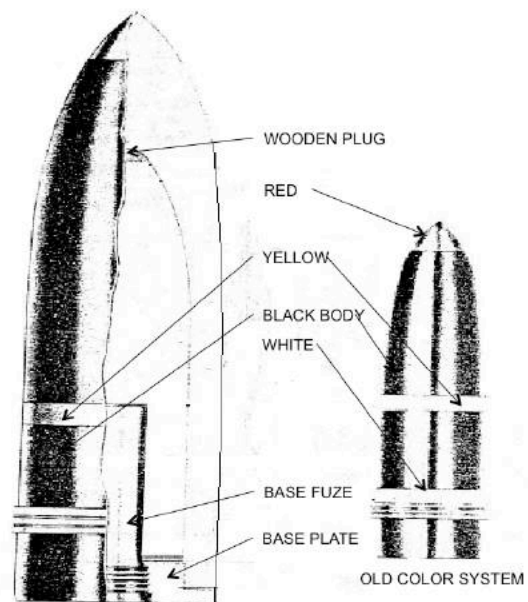
7 - cm High-Explosive Antiaircraft Projectile



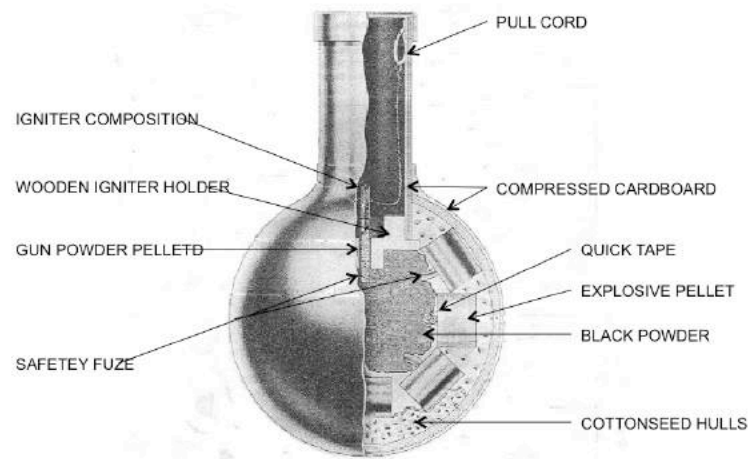
Type 91 10 - cm High-Explosive Projectile



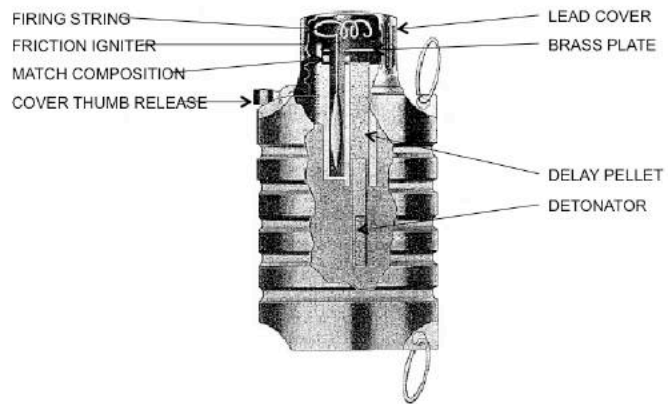




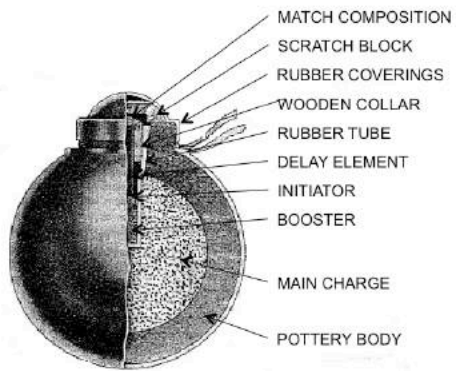
Type 95 15 – cm Armor-Piercing High-Explosive Projectile



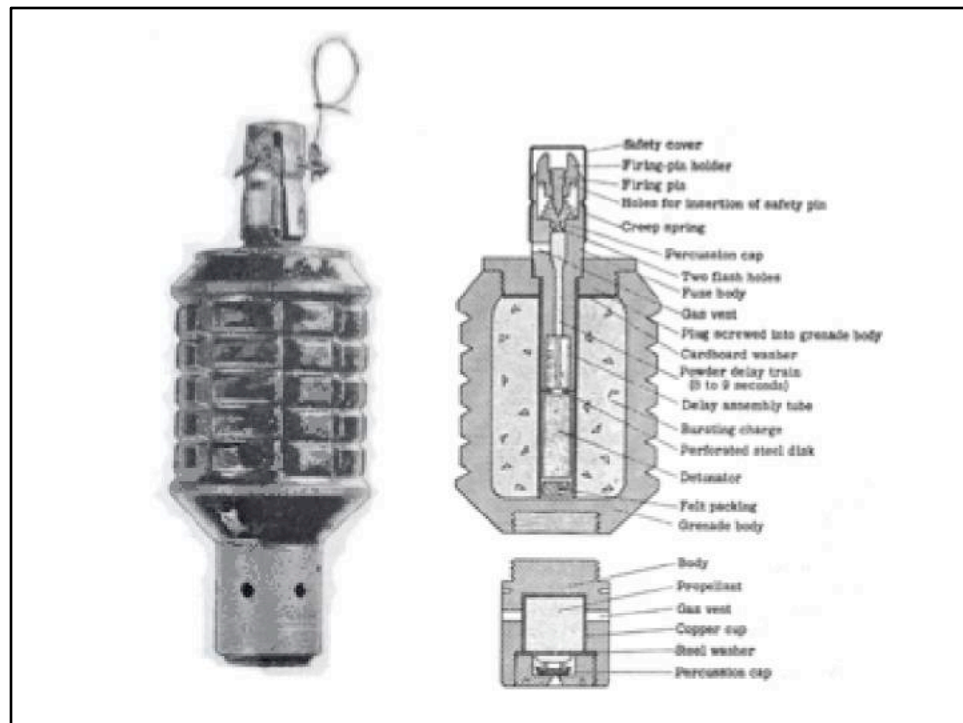
TYPE 1 1-KG. AIRCRAFT MISSILE

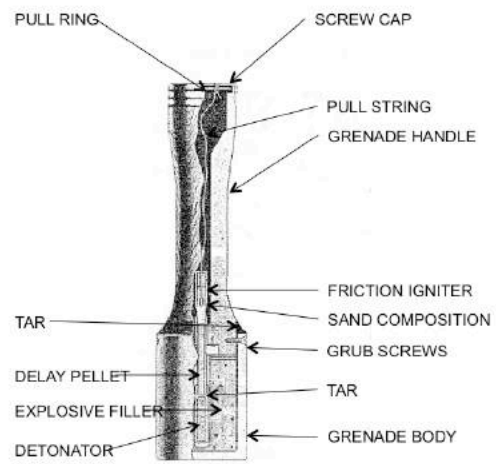


TYPE 23 HAND GRENADE

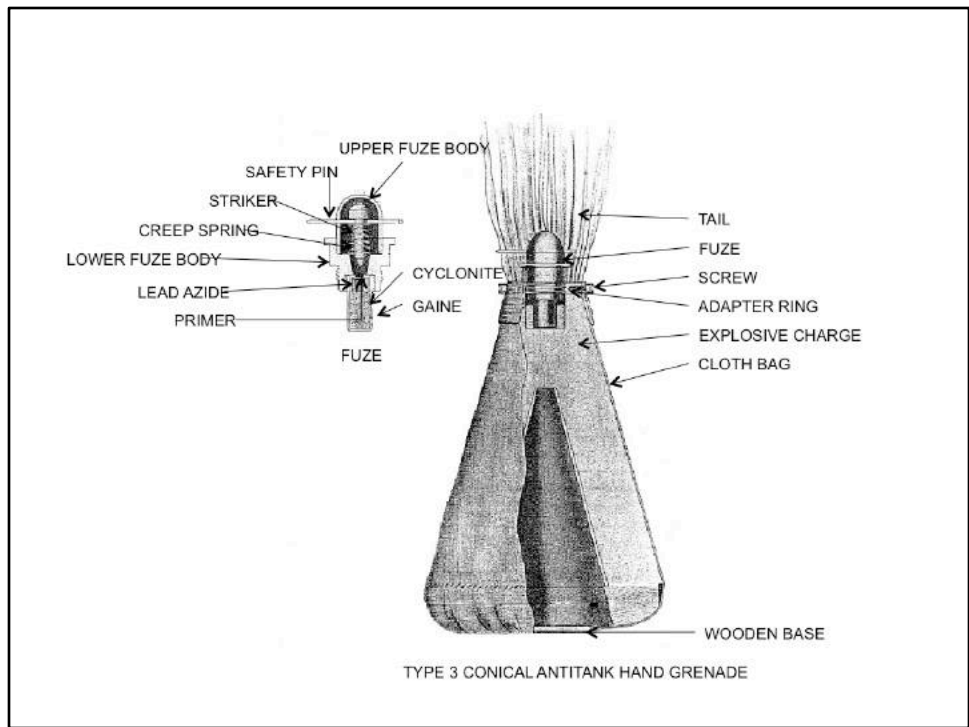


TYPE 4 POTTERY HAND GRENADE

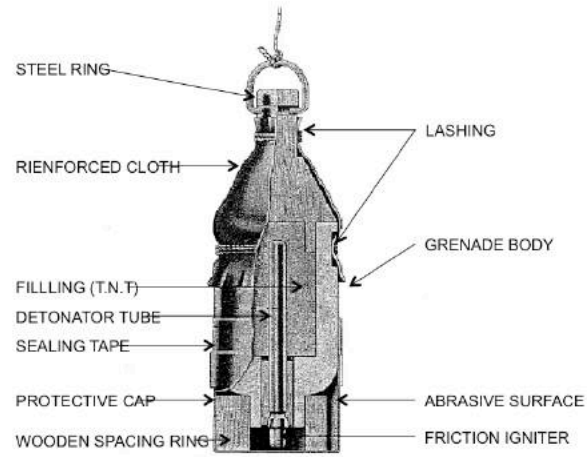




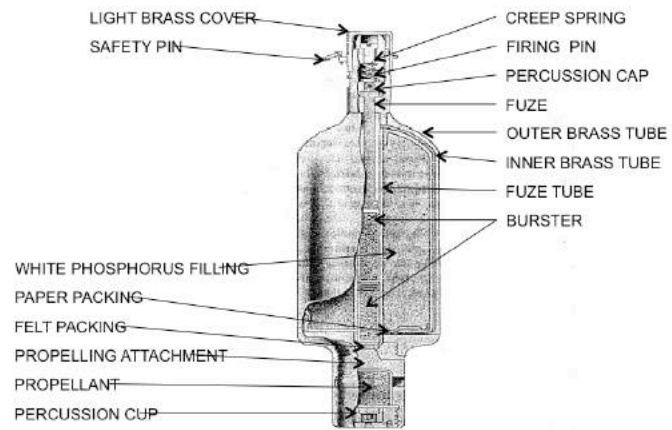
TYPE 98 STICK GRENADE



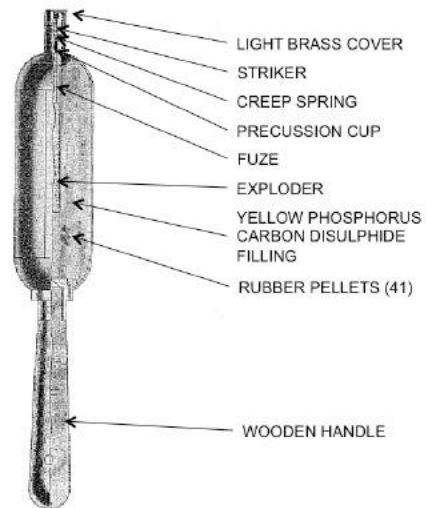




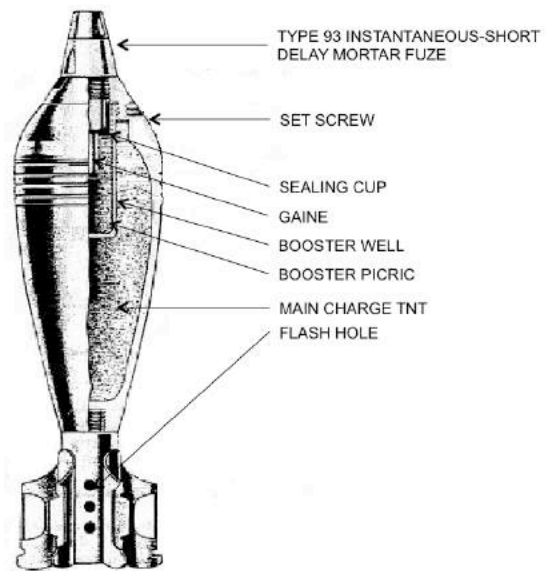
SLING HAND GRENADE



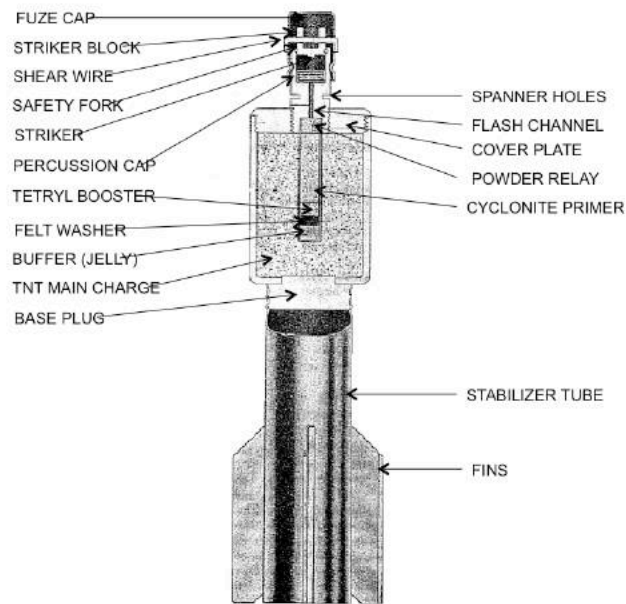
1/2-KG INCENDIARY HAND OR MORTAR GRENADE



INCENDIARY STICK GRENADE



Type 97 81 – mm High-Explosive Mortar



MODEL 3 MODIFICATION 1 RIFLE GRENADE