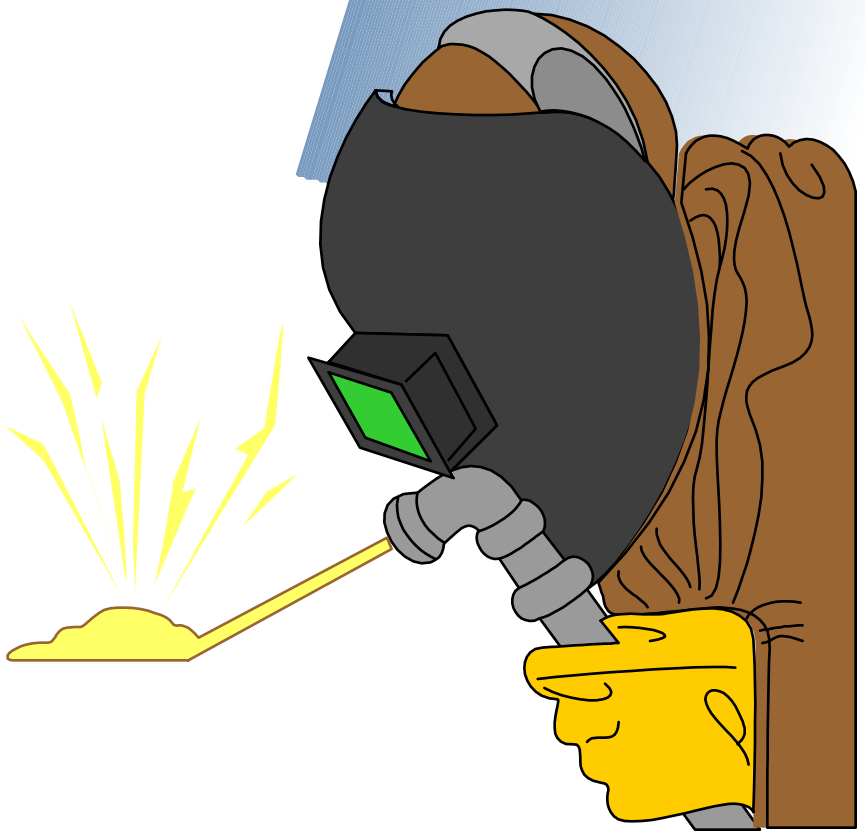
QUALITY ASSURANCE PROGRAM



ENABLING OBJECTIVES

- STATE the duties, responsibilities, and qualification requirements of the following personnel in relation to Quality Assurance:
  - CO
  - XO
  - DHs
  - Division Officer
  - Work Center Supervisor
  - Craftsman
  - Quality Assurance Officer
  - Quality Assurance Inspector
  - NTD Examiner
  - NTD Inspector
- DESCRIBE facets of Technical Work Documents including:
  - Maintenance Procedures
  - Formal Work Packages
  - Controlled Work Packages
- DESCRIBE the purpose of a departure from specification.
- STATE the purpose, conduct, and periodicity of a Quality Assurance Program audit.

REFERENCES

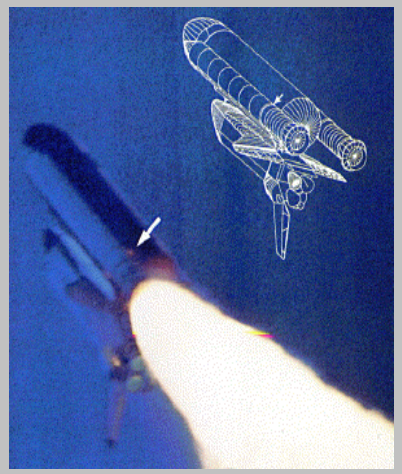
- JOINT FLEET MAINTENANCE MANUAL (JFMM)
  - COMFLTFORCOMINST 4790.3 Rev A Ch 3 (VOL V)

HISTORICAL PERSPECTIVE

- 10 APR 1963: USS Thresher (SSN-593)
  - Sea Trials off Maine coast
  - Likely Seawater System Piping Failure
  - Flooding Casualty
  - Lost all hands
- Result: SUBSAFE

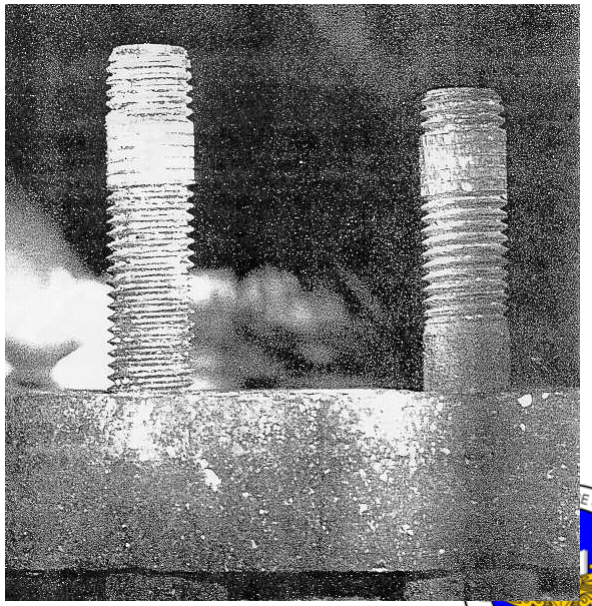
HISTORICAL PERSPECTIVE

- 28 JAN 1986: Space Shuttle Challenger
  - Catastrophic explosion
  - Known O-ring erosion to blame
  - Seven astronauts lost
- Result: Heightened QA Awareness



HISTORICAL PERSPECTIVE

- 30 OCT 1990: USS Iwo Jima (LPH-2)
  - Completed foreign contractor SSTG work
  - Improper nuts/studs used on SSTG root valve bonnet fasteners provided by S/F.
  - Steam line rupture kills 10
- Result: QA Manual
  - Removal of all Black Oxide Coated Brass Threaded Fasteners (BOCBTF)



Quality Assurance

- Systematic review of Quality Control records and all production actions which will provide adequate proof and confidence that work performed or material manufactured will perform as designed & there is documentary evidence to this effect

Quality Assurance

- Procedures and Guidance to Ensure:
  - PASS - FAIL
  - *Quality the first time*
  - Operator confidence in equipment
  - Maintenance personnel are responsible for the quality of their work
- Poor quality = Rework
  - Wasted time & money
  - Potentially dangerous operations
  - Frustrated sailors

Commanding Officer

- Designate a QAO in writing
- Approve Technical Work Document for Nuclear repairs
- Certifies all QA personnel qualifications (except CV/CVN)
- Review and sign MOA with repair activity for Nuclear or Level I work.
- Approve DFS requests while at sea

Executive Officer

- Monitor QAO's administration of programs
- Spot check of QA training by attending/monitoring training.
- Provide command level authority for QAO
- Assign Asst QAO

Department Heads

- Verify sufficient Quality Control Inspectors (QAI) and Controlled Material Petty Officers (CMPO)
- Participate in QAI and QA Supervisor (QAS) oral boards
- Review/Approval for opening and closing Formal Work Packages (FWP) and TWD
- Review DFS for technical accuracy

Division Officers

- Review TWD/FWP as required
- Verify controlled work accomplished IAW CWP
- Maintain welder and brazier qualifications
- Ensure assigned personnel perform QA surveillance, qualifications and training

Work Center Supervisors

- Review and ensure FWP complete
- Prepare TWD when Lead Work Center
- Ensure all controlled work accomplished IAW CWP
- Ensure proper work authorization prior to starting work
- Ensure only qualified ship's force members accomplish work
- Ensure only material specified in applicable instructions ordered and installed
- Initiate Departure From Specification (DFS) when required

Craftsman

- Perform maintenance IAW approved procedures
- Initiate DFS
- Ensure Test, Measuring and Diagnostic Equipment is calibrated

Quality Assurance Officer

- Administers the QA program
- Reviews TWD/FWP as required
- Verifies testing requirements and OQE met
- Maintains completed CWPs, QA assessments, surveillance and deficiency corrections and controlled material.
- Review DFS for accuracy prior to Department Head
- Maintain file of DFSs
- Ensure QA training is conducted
- Implement formal qualification program for QAIs, CMPOs and
- Conduct Oral qualification interviews for QAIs, CMPOs and certifiers

Quality Assurance Inspectors

- Verify work completed and sign documentation
- Verify “Material ID and Receipt” (QA Form 2) tags correct
- Verify work and material meets requirements
- Ensure TMDE calibrated
- Report all discrepancies to DH and QAO via CoC, ensure resolved before work continues
- Review DFS and forward to DivO and QAO

Non-Destructive Test Examiner

- Designated in Writing by CO
- Ensures submittal of reports of certification
- Schedule and administer NDT Inspector surveillance
- Approve and qualify activity NDT procedures
- Train, certify and monitor NDT Inspectors
- Schedule eye exams for NDT Inspectors
- Maintain qualification records for NDT Inspectors and welders

Non-Destructive Test Inspectors

- Verify CWP for NDT inspection accuracy
- Ensure NDT inspections completed correctly
- Ensure equipment used calibrated
- Monitor welder quals if no NDT Examiner assigned

TECHNICAL WORK DOCUMENTS

- 3 Types of TWDs
  - Maintenance Procedures (MPs)
  - Formal Work Packages (FWPs)
  - Controlled Work Packages (CWPs)

TECHNICAL WORK DOCUMENTS

- TWD required for Repairs of:
  - Propulsion train repair
  - Gas Turbine repairs (gas path, gearbox, bleed air)
  - Freon systems
  - FMA non-nuclear controlled work req hydro test
  - Flammable liquid systems
  - Electric motor rewind
  - Main Propulsion or Generator Turbines
  - Aux Turbines & Pumps
  - Boilers & Diesels
  - Level I systems
  - Etc…

Maintenance Procedure

- Maintenance Procedure (MP)

Maintenance Procedures

Examples of MP's:

PMS
Technical Manuals
Technical Repair Standards
Shipyard Process Instructions
ShipAlt Instructions
Steam and Electric Plant Manual
Shipyard Task Group Instructions
NAVSEA Assembly/Disassembly Dwgs
Reactor Plant Manual OP's, OI's, MRI's, MRRP's

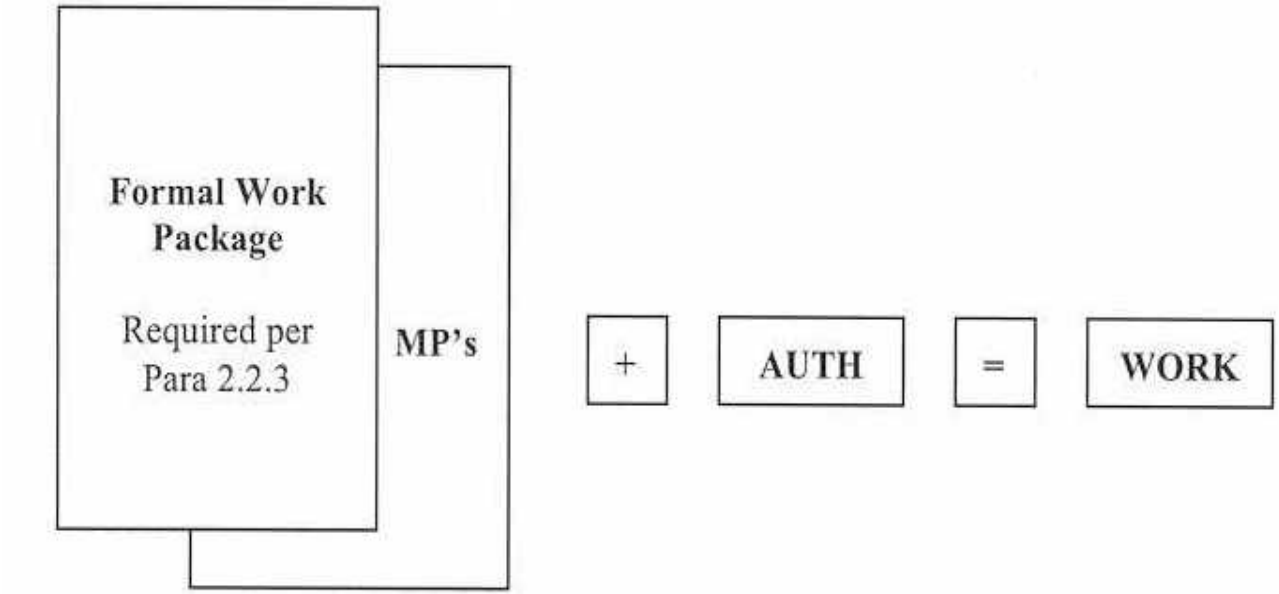
+	AUTH	=	WORK

Formal Work Package

- Coordinates for a selected maintenance task, that does not fall under Level I work:
  - Materials required
  - Initial conditions
  - MP
  - Test and inspections
  - System restoration

Formal Work Package

- Formal Work Package (FWP)



Controlled Work Package

- Required when higher authority requires record of repairs/maintenance on:
  - Level I systems/components
  - SUBSAFE
  - Nuclear

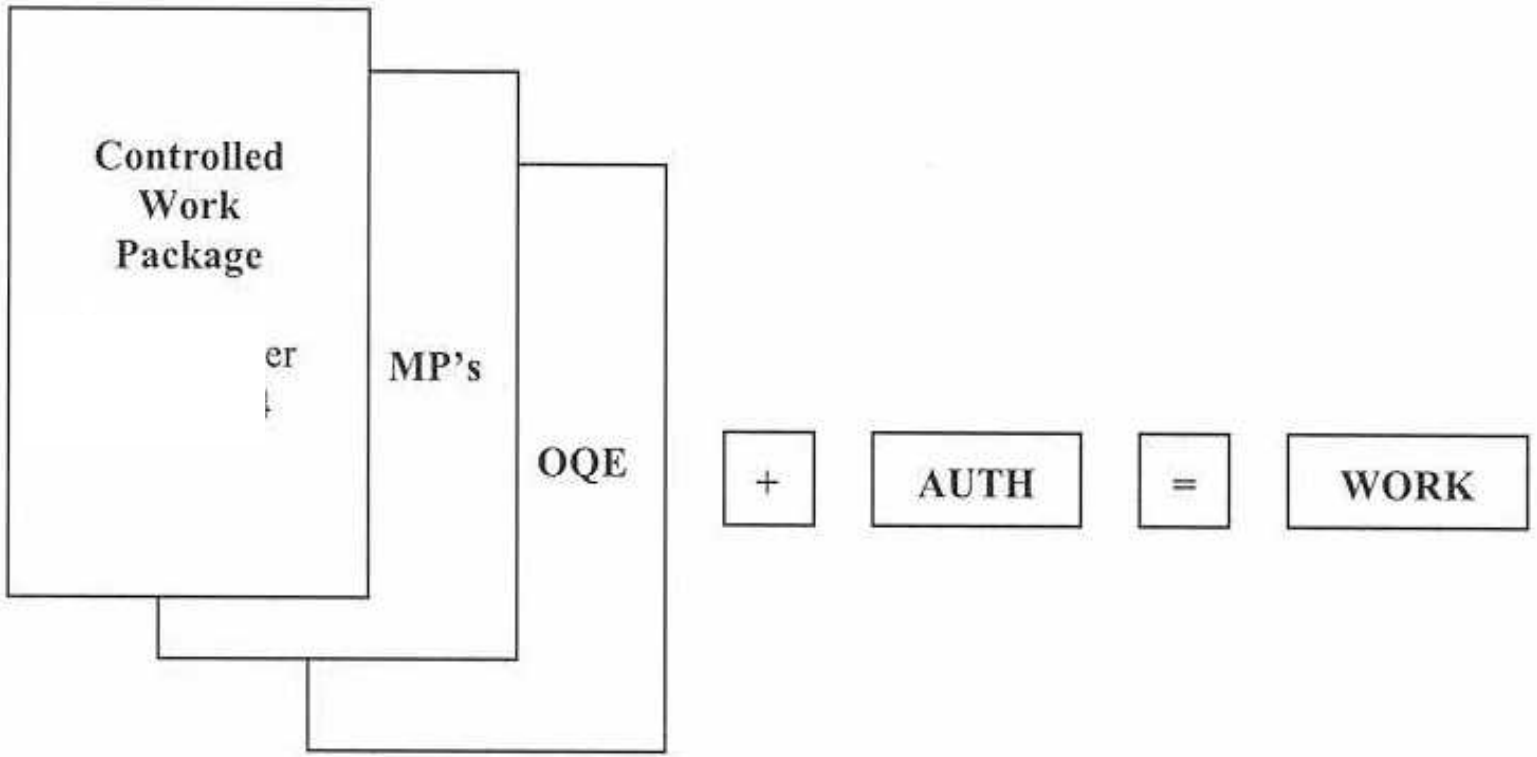
NON-NUC, SURFACE, LEVEL I SYSTEMS

- Main Steam & Catapult Steam (including branch piping) > 775F
- Gaseous O_2 Systems
- O_2N_2 Systems

- Controlled Material only
  - must be identified, verified, and regulated through the manufacturing, installation, or repair process

Controlled Work Package

- Controlled Work Package (CWP)



DEPARTURE FROM SPECIFICATIONS (DFS)

- Mechanism used to document and resolve a lack of compliance with any authoritative document, plan, procedure, instruction, etc.
- Ships request them
- Approved by:
  - NAVSEA
  - TYCOM
  - ISIC

DFS CLASSIFICATION

- MAJOR or MINOR
- TEMPORARY or PERMANENT

MAJOR DFS

- Major DFS is one that affects:
  - Performance
  - Durability
  - Reliability or Maintainability
  - Interchangeability
  - Effective use or operation
  - Weight or appearance (if a factor)
  - Health or safety
  - System design parameters such as schematics, flow, P, T, etc
  - Compartment arrangement or function
- Requires TYCOM and/or NAVSEA approval

MINOR DFS

- Minor DFS is any DFS which is NOT a Major DFS
- Minor DFS is approved by ISIC, TYCOM or NAVSEA
  - Often based off previously approved, precedent setting DFS

QA RECORDS

- CWP Log
  - Keep for life of the ship
- CWPs
  - Stored onboard for 3 years, then moved to shore
  - Keep unique references with the CWP
  - Retain all OQE enclosures (QA Forms)
- FWPs
  - Record not required

QA RECORDS

- Qualification
  - Master list of qualified personnel
  - Qual file for each person (date qualified + qual test results)
- DFS
  - Outstanding DFS
    - Serialized index and copy of DFS
  - Cleared DFS for 24 months
  - Approved, permanent DFS

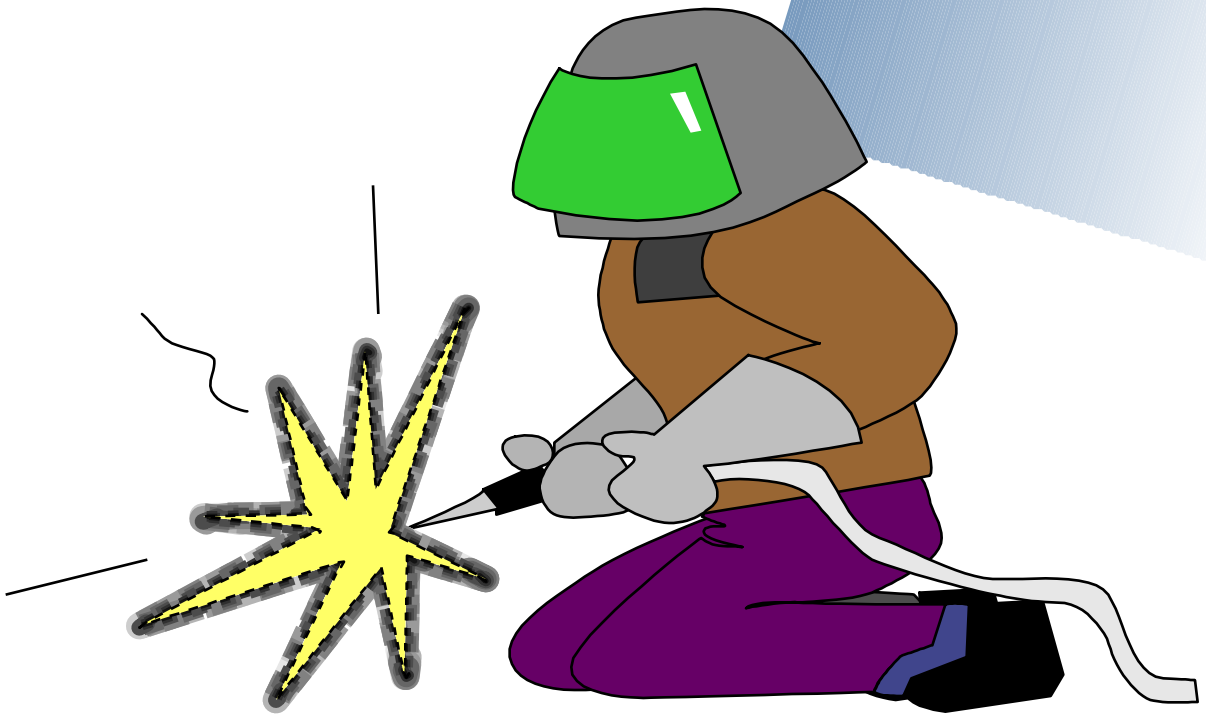
QA Audit

- Units should conduct internal AQ surveillance periodically
- ISICs will audit unit QA Programs during training cycle
- Ensures compliance with QA procedures and standards

WHEN DO YOU NEED TO SUBMIT A DFS?

- WHENEVER YOU HAVE A LACK OF COMPLIANCE WITH ANY AUTHORITATIVE DOCUMENT, PLAN, PROCEDURE, INSTRUCTION, ETC..

Welding and Brazing Quals



REFERENCES

- NSTM 074 VOL 1 WELDED ALLIED PROCESSES
- NSTM 074 VOL 2 NDT PROCEDURES
- NSTM 074 VOL 3 GAS FREE ENG.
- MIL STD 278F (SH) WELD & CASTING STANDARDS
- MIL STD 248D WELD&BRAZ PROC. & PERF. QUALIFICATION
- MIL STD 22D WELD JOINT STD

ENABLING OBJECTIVES

- STATE personnel responsibilities
- DESCRIBE the requirements to obtain and maintain welding/brazing qualifications
- STATE the safety precautions related to welding
- DESCRIBE types of NDT processes

RESPONSIBILITIES

- CO: ensure compliance
- XO: ensure page 13 entries are reviewed and entered into service record
- CHIEF ENGINEER:
  - Review welder's log semi-annually for validation of NEC's
  - Review & process pg 13 entries
  - Ensure proper NDT procedures are carried out on any critical welds

RESPONSIBILITIES

- DCA
  - Maintain welders qualification log
  - Ensure welders receive annual eye exam
  - Arrange for maintenance of quals with RMC, tender, shipyard
  - Submit page 13 entries as required in NSTM 074 vol 1

RESPONSIBILITIES

- ‘R’ division LPO:
  - Maintain welders’ working log: process used, filler material, base material, and position.
  - Supervises on-the-job safety
  - Inform DCA of qual status

WELDER QUALS

- Initially pass written exam with score of 75% or greater
- All qualifications and re-qualifications shall be completed as expeditiously as possible
- Complete welder school for NEC 4955
- Quarterly requal done by Divo
  - Demonstrate the process and inspect the test assembly (visual and NDT)
- Annual eye exam

BRAZER QUALS

- No NEC for brazers
- Individual activity responsible for validating qual
- Quarterly requal done by DivO
  - Demonstrate the process and inspect the test assembly (visual and NDT)
- Annual eye exam

So what's the difference?

- Soldering – joining metal with a filler of melting point <800 deg
- Brazing – joining metal with a filler of melting point >800 deg
- Welding – joining metal, with or without a filler, by melting the two pieces together

SAFETY PRECAUTIONS

- Proper grounding of welding machine
- Do not wrap welding leads around top of welding machine while in use
- Wear proper respirators
- Adequate ventilation & remote ducting
- Flash curtains and black paint on bulkheads

SAFETY PRECAUTIONS CONT…

- Helmets with proper goggles
  - Select proper shade for goggle
  - Fire watches properly attired, too
- Fire watches qualified and in all required places
- Leathers worn to protect skin

NON-DESTRUCTIVE TESTING

- VISUAL (VT)
- DYE-PENETRANT (PT)
- MAGNETIC PARTICLE (MT)
- ULTRASONIC TESTING (UT)
- RADIOLOGICAL TESTING (RT)

SUMMARY

- Quality Assurance ensures ALL work and maintenance complies with standards that will ensure safe operation of equipment
- QA audits ensures compliance to these standards
- IMA performs initial qualifications on welders and brazers; division officers maintain these records

Questions

What is the NEC required for Welding?

- 4955 - HP Plate /Pipe Repair

Questions

How often must a welder/brazer have an eye exam?

- Annually

Questions

LIST 5 TYPES OF NDT:

- VISUAL
- DYE-PENETRANT
- MAGNETIC PARTICLE
- ULTRASONIC (ULTRASOUND)
- RADIOGRAPHY

QUESTIONS?


DAMAGE
USN
CONTROL


SURFACE WARFARE OFFICERS
SCHOOL COMMAND