Shipboard Radiological survey & decontamination

Lesson Topic
5.4
Enabling Objectives

- Perform gross and detailed radiological survey procedures, marking, and recording
- Describe shipboard radiological countermeasure procedures, to include radiation surveys and ship and personnel decontamination
Counter measures

- Defensive actions that protect personnel from radiation, air blast, underwater shock & thermal radiation
- Enhance survival of the ship's crew
Counter measures available

- Ship maneuvering
- Shielding
- Personnel rotation & reduced manning
- Counter measure Water Wash Down System (CMWDS)
- Ship decontamination
- Personnel decontamination/monitoring
Personnel countermeasures

- Thermal radiation
  - Seek shelter or cover exposed skin before detonation

- Air blast/underwater shock
  - Brace for shock
  - Loose gear is secured
Ships maneuvering

- Maneuver upwind behind the fallout cloud
- Outrun the fallout cloud downwind
- Avoid the area entirely
- Will not provide protection from initial radiation
Shielding

- Significantly decreased intensity
- Protects from initial & residual radiation
- Shipboard shielding stations
  - Deep shelter
  - Ready shelter stations
Personnel rotation and reduced manning

- Used to minimize personnel exposed in unshielded/poorly shielded locations
- Replacing topside personnel with others from more shielded locations will extend the operational capability of the ship
Factors influencing rotation

- Tactical requirement
- Qualifications
- Dose history of crew
  - Past
  - Present
  - Future
Counter measure wash down system (CMWDS)

- A significant countermeasure
- Wetting down by CMWDS prevents bonding of material to weather surfaces
- Material is either washed over the side or held in suspension until
- Removes up to 85% of radioactive contamination if activated prior to entering fallout area
Counter measure wash down system (CMWDS)

- In conjunction with manual scrubbing, 90-95% of all surface contamination can be removed.
- Permanently installed.
- Disadvantages
  - Ineffective operations in cold climates.
Radiological Survey
Radiological Survey

- Survey may be either gross or detailed
  - Gross surveys
    - Conducted initially to obtain a quick estimate
  - Detailed surveys
    - made later to determine the radiation levels (gamma & beta) on or in specific areas
Radiological monitoring team

- Comprised of as many as 4 personnel
  - Monitor
    - In charge of the team & is equipped with a RADIAC & IM-143/PD
  - Recorder
    - Records the intensity readings
    - Time, location, etc...
Radiological monitoring team

Marker
- Writes the information obtained by the monitor on the contamination warning signs

Phone talker/messenger
- Relays the dose rate readings, obtained by the monitor, to DCC
Gross (Rapid) Internal and External Surveys

- Internal investigations shall be conducted after the shock wave has passed the ship
- Rapid internal survey is made soon after the cessation of fallout
- The rapid external survey will be conducted after the internal survey
Gross (Rapid) Internal and External Surveys

- The extent of the surveys & the priority of locations depends upon the urgency of the tactical situation
- Survey is to determine gamma levels
- The surveys should yield basic information while keeping the exposure of the monitoring team to a minimum
Gross (Rapid) Internal and External Surveys

- Team will consist of two personnel
- Monitor & recorder
- Each team assigned vital areas
Gross (rapid) internal survey

- Immediately after cessation of fallout
- Surveys are performed at vital stations that are inside the ship & at the closest points inside the ship to external vital stations
- Locations are found in the CBR Defense Bill
Gross (rapid) external survey

- Conducted after internal survey
- Used to obtain more precise radiation levels at external vital stations
Monitor holds the RADIAC at waist level & moves about the survey location recording the highest reading.

Data obtained by the external survey team should also be forwarded to damage control central where the measurements can be plotted according to their location and time.
Detailed monitoring survey

- Slow & methodical
- Careful inspection of all accessible areas, equipment & systems that have been exposed to contamination
- Conducted after counter measures have been employed
Detailed monitoring survey

- Detailed radiological survey teams will consist of four personnel:
  - Monitor
  - Recorder
  - Marker
  - Phone-talker/messenger
Survey Procedures

- The RADIAC instrument should always be held at the same distance from the object or surface being monitored
- The RADIAC instrument should always be held in the same attitude during entire survey
- Usually the waist-high method
Survey Procedures

- Contamination will vary with locations, type of surface, & position of objects within the area.
- Objects having poor drainage will give higher intensity readings.
- Large number of readings are needed to give an accurate picture of the radiation field.
Survey Procedures

- RADIAC is held at waist height & close to his/her body
- Make a slow, 360 turn while watching the RADIAC meter
- If the total reading drops by 25% or more, a hot spot may be located behind the monitor
Survey Procedures

- In the presence of a hot spot, direct readings should increase by two or more times the average intensity level.
- The hot spots identified, they are then decon or clearly isolated & marked to warn personnel.
- Monitoring personnel will record the intensity, time & place of each reading.
Marking contaminated areas

- Roped off or barricaded depending on the size of the area.
- Post adequate signs to warn personnel
- Radiological contamination marker
  - Triangular shaped 8 X 8 X 11 1/2 inches
  - White background with word "ATOM" in black
Dose Rate:
Date & Time:
Time of burst:
Ship decontamination

- Same procedures as BW/CW decon
- Decontamination teams
  - Leader
  - 2-4 hoseman
  - 4-6 scrubbers
Ship decontamination

- Work top to bottom windward to leeward
- Scrub contaminated area thoroughly
- Push contamination away from you
- Rinse with fire hoses
Personnel Decontamination

- Same as for chemical
Summary & review

- Countermeasures
- Radiological Surveys
- Decontamination Procedures