

# AIRCRAFT RESCUE AND FIREFIGHTING

**ICAO/FAA  
Regional Workshop for  
Aerodrome Certification  
Safety Inspectors**



**November 6-8, 2012**

**ARFF**

# **INSPECTING AIRCRAFT RESCUE AND FIREFIGHTING (ARFF)**

## **Tools, records, knowledge and resources**

- ✓ **Results of previous inspections**
- ✓ **ACM**
- ✓ **Refractometer**
- ✓ **Type and size of aircraft operations**
- ✓ **Regulatory requirements**
- ✓ **Operational capabilities of vehicles**
- ✓ **Inspection check list**



# CHECKLIST



## **PHASES OF INSPECTION**

- ◆ **Inspection of physical facilities**
- ◆ **Examination of training program**
- ◆ **Response test**
- ◆ **Inspection of live fire training facilities**



## **REQUIREMENTS TO BE INSPECTED**

- ARFF category correct**
- ARFF capability meets level and ACM**
- Vehicle communications**
- Vehicle marking and lighting**
- Vehicle readiness**
- Response requirements**



# REQUIREMENTS TO BE INSPECTED

- **ARFF personnel properly equipped**
- **ARFF personnel training program**
- **Training curriculum**
- **Training records**
- **Sufficient ARFF personnel**
- **Alerting system**



# REQUIREMENTS TO BE INSPECTED

- **Live fire training**
- **Emergency medical care training**
- **Alerting system**
- **Operational condition of vehicles**
- **Emergency access roads**

# INSPECTION OF PHYSICAL FACILITIES



- Note vehicle color, markings and beacons
- Ensure vehicles and agents meet level requirements and the ACM is current



# INSPECTION OF PHYSICAL FACILITIES

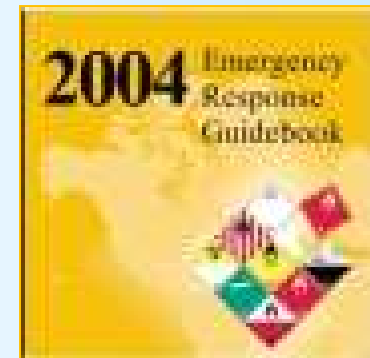


- Conduct walk around inspection of vehicles and fire station with ARFF personnel
- Ask questions throughout the inspection to determine firefighter knowledge

# INSPECTION OF PHYSICAL FACILITIES

- **Each ARFF vehicle must be equipped with or have available through a direct communications link**

- ✓ **The North American Emergency Response Guidebook, or**



- ✓ **Similar guidance for HAZMAT**

# INSPECTION OF PHYSICAL FACILITIES



- Note overall condition of the ARFF vehicles
- A clean vehicle generally indicates a well-maintained vehicle

# INSPECTION OF PHYSICAL FACILITIES



- Note if firefighters know what equipment is located in truck compartments before they are opened

# INSPECTION OF PHYSICAL FACILITIES



- Note what equipment is carried on the ARFF vehicles
- Training records should include training on the equipment

# INSPECTION OF PHYSICAL FACILITIES



- **Inspect equipment for signs of use from practical training**

# INSPECTION OF PHYSICAL FACILITIES



- Have personnel demonstrate or explain equipment operation to help determine the adequacy of the ARFF training program

# INSPECTION OF PHYSICAL FACILITIES



- Check the condition of tires - worn tires provide poor traction in muddy off-pavement conditions



# INSPECTION OF PHYSICAL FACILITIES



- Check nitrogen tank gauges to ensure they are not discharged or below minimum pressure

# INSPECTION OF PHYSICAL FACILITIES



- × ABC rated multi-purpose dry chemical extinguishers should not be on ARFF vehicles
- × They are highly corrosive to aircraft and can cause extensive damage to aircraft engines

- Check fire extinguishers to make sure they are not discharged and are suitable for ARFF use

# INSPECTION OF PHYSICAL FACILITIES



- Check vehicle radio communications

# FORWARD LOOKING INFARED (FLIR)



**Some vehicles may be equipped with FLIR**

# FORWARD LOOKING INFARED (FLIR)



# FORWARD LOOKING INFARED (FLIR)



**New flat screen type monitor mounted on dash in front of driver for better visibility while driving**

# CLOTHING



**Which firefighter is properly equipped with protective clothing to perform their duties?**

# CLOTHING



**The Aluminized Fyrepel Model 700 suit on the left is an industrial type suit and is not designed for firefighting**



# CLOTHING



- ✿ **Acceptable head protection includes a proximity protective helmet meeting NFPA 1976 latest edition**
- ✿ **They can provide additional protection for firefighters if equipped with aluminized neck shroud and 6” face shield**

# CLOTHING

- ✿ **Aluminized clothing provides the best protection**
- ✿ **An aluminized outer shell can reflect 90 % of the radiant heat from a large fuel fire**



# CLOTHING



- ✿ Acceptable hand protection includes a proximity protective glove meeting NFPA 1976 latest edition

# INSPECTION OF PHYSICAL FACILITIES



- Note the condition and adequacy of protective clothing

# INSPECTION OF PHYSICAL FACILITIES



- It is customary in the fire service for each firefighter to have their own set of protective clothing

# CLOTHING



- ✿ **Some airport fire departments have both bunker gear and aluminized bunker gear**

# INSPECTION OF PHYSICAL FACILITIES



- Check SCBA to ensure tanks are fully charged and meet current standards
- SCBA should have positive pressure regulators rather than the old demand type

# INSPECTION OF PHYSICAL FACILITIES



- Check reserve foam for proper extinguishing agents
- Twice the capacity of agent tanks in the required ARFF vehicles is recommended in reserve at the airport



# INSPECTION OF PHYSICAL FACILITIES



- Some airports have their reserve foam on a trailer for use at an accident scene

# INSPECTION OF PHYSICAL FACILITIES



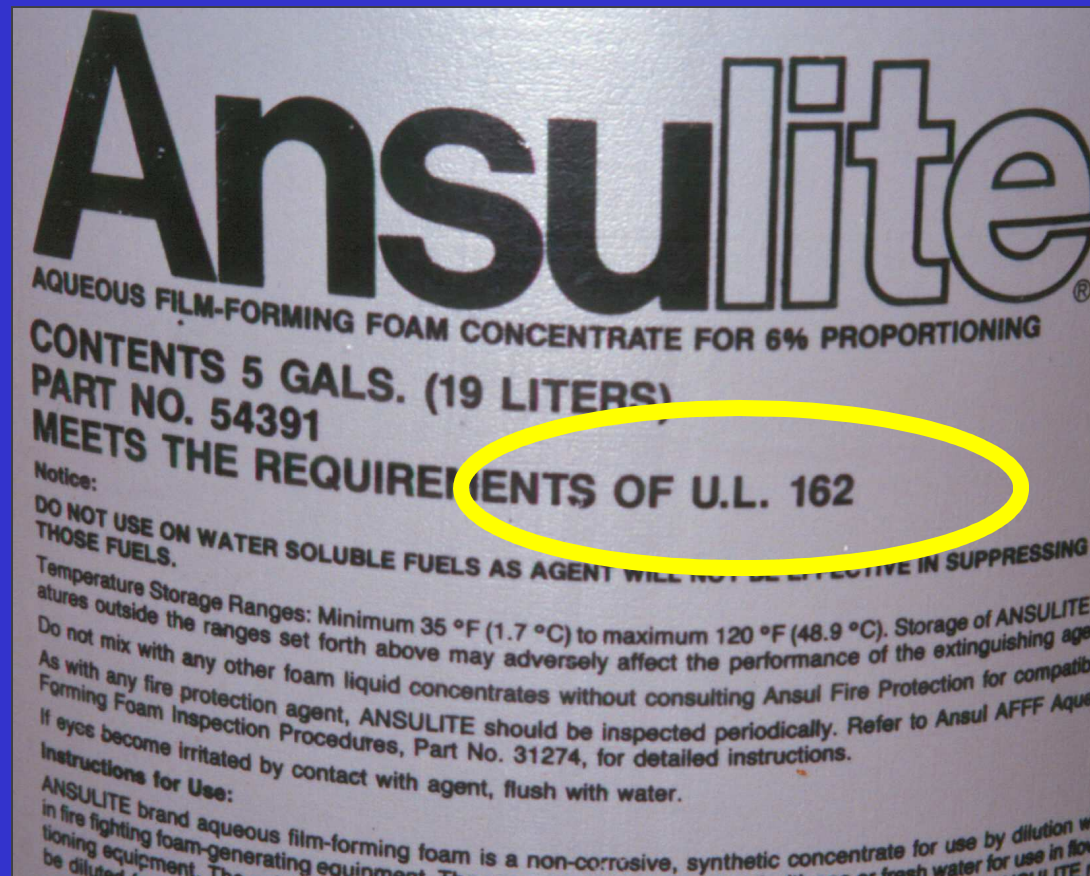
- If ARFF vehicles are set for 3% on their proportioners, only 3% foam concentrate should be in reserve storage

# INSPECTION OF PHYSICAL FACILITIES



- AFFF meeting Military Specification MIL-F-0024385E is mandatory

# INSPECTION OF PHYSICAL FACILITIES



- U.L. 162 and U.L. M375 are acceptable until present supplies are depleted

# INSPECTION OF PHYSICAL FACILITIES



- Check reserve dry chemical to make sure only one type of dry chemical is available – some DC are not compatible

# INSPECTION OF PHYSICAL FACILITIES



- Check nitrogen tanks
- Extra nitrogen tanks should be available for each ARFF vehicle with dry chemical, Halon 1211 or Halotron 1
- Tanks should be chained to the wall to secure them

# INSPECTION OF PHYSICAL FACILITIES



- Inspect other equipment in the fire station such as compressors for refilling SCBA tanks

# INSPECTION OF PHYSICAL FACILITIES



- Review alerting procedures and examine alerting system



# INSPECTION OF PHYSICAL FACILITIES

- From the ACM, discussions and observations, determine if sufficient ARFF personnel are available to meet level of protection requirements, and other supplemental duties do not impact compliance to ARFF requirements

# EVALUATE ARFF TRAINING



- Discuss the ARFF training program with the training officer

# EVALUATE ARFF TRAINING



- Review the curriculum, training schedule and training records

# EVALUATE ARFF TRAINING

- Acceptable training curriculums in AC 150/5210-17, Programs for Training of ARFF Personnel
- ✓ NFPA 1003, Airport Fire Fighter Professional Qualifications
- ✓ Annex 14 Aircraft Rescue and Fire Fighting Training guide
- ✓ Locally developed ARFF training program addressing the 12 required subject areas
- ✓ Some curriculums are available on the web

# EVALUATE ARFF TRAINING

- Discuss emergency medical training and live fire training
- Review records and check for currency – may have different expiration dates
- Conduct a question and answer session with the ARRF personnel to compare their required knowledge levels to the knowledge and training requirements of the curriculum and training program

# EVALUATE ARFF TRAINING

- **Require practical demonstration of use of equipment such as the perishing nozzle, turrets, hand lines, rescue tools**
- **All ARFF personnel must have participated in and acceptable live fire drill**

# CONDUCT TIMED RESPONSE TEST



- Brief firefighters to discharge foam into the grass rather than on the pavement or signs

# CONDUCT TIMED RESPONSE TEST

- **Prior coordination with ATCT needed**
- **Prior coordination with local emergency dispatch may be needed so only airport vehicles respond**
- **Safety should be stressed with firefighters prior to response drill (*Times not released*)**
- **Prior coordination needed concerning use of foam - firefighting systems may be checked later at discretion of ACSI**



# CONDUCT TIMED RESPONSE TEST



- Many ACSIs conduct the response test from the ATCT

# CONDUCT TIMED RESPONSE TEST



- Other ACSIs prefer to ride along on the response

# CONDUCT TIMED RESPONSE TEST



- Personnel pulling a hand line during a response test are expected to be wearing proper protective clothing

# CONDUCT TIMED RESPONSE TEST

## Response test conducted from ATCT:

- More effective coordination with AT controllers
- Better visibility of response route
- More accurate timed response from initiation of alarm

## Response test conducted from airfield:

- Ensure that firefighters are in normal station posture for response test
- Evaluate driver's performance
- Evaluate vehicle performance
- Verify operation of foam system if tested during response
- Better feel for problems during response test

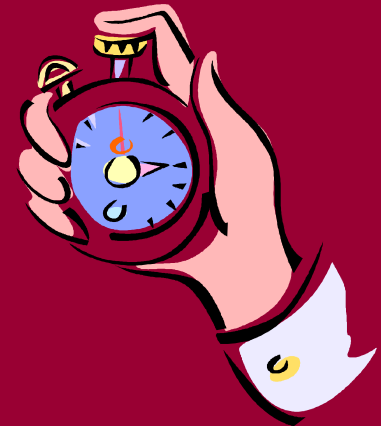
# CONDUCT TIMED RESPONSE TEST



- Any point of the farthest runway could be a mile or more from the tower, making it difficult to see the nature of any problems during the response

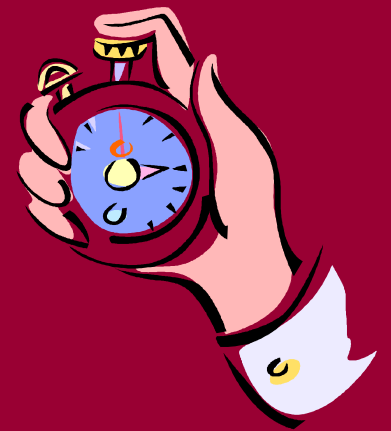
# CONDUCT TIMED RESPONSE TEST

- Response times are checked
- Remember that required response times are based on a direct path on dry pavement under good weather conditions
- If required times not met, may consider a re-test



# CONDUCT TIMED RESPONSE TEST

- **Inspection must not be concluded until**
  - ✓ **A successful ARFF response is conducted, or**
  - ✓ **An operational procedure is in place and tested to enable a successful ARFF response**



# CONDUCT TIMED RESPONSE TEST

- Alarm system and communications adequate
- ARFF personnel
  - ✓ Are properly cloth and equipped
  - ✓ Follow appropriate procedures
  - ✓ Are proficient in operating equipment
- ARFF vehicles operational



# ALARM SYSTEM



- ★ **ACSI needs to inspect the adequacy of the alarm system when ARFF personnel are involved in other duties such as law enforcement, maintenance, inspections, etc.**

# ALARM SYSTEM



# CONDUCT TIMED RESPONSE TEST



- If the ACSI wants to evaluate use of SCBA, request donning SCBA and using hand line after turret discharge

# CONDUCT TIMED RESPONSE TEST



- Storing SCBA in trunks is not practical for rapid donning

# CONDUCT TIMED RESPONSE TEST



- Better ways of doing things can be emphasized during the response drill and written recommendations can be made to improve ARFF operations

# DISCHARGE OF AGENTS



- **Foam can be evaluated during the response test or during an operational test of equipment after the response test**

# DISCHARGE OF AGENTS



- A problem with the foam system in the truck on the left came to light during the response test

# DISCHARGE OF AGENTS



- A test of firefighting systems may be better conducted off the movement area in the event that a system fails to operate



# REFRACTOMETER/CONDUCTIVITY TEST



- A test should be conducted by airport staff or ACSI if foam does not appear to be proportioned correctly

# REFRACTOMETER/CONDUCTIVITY TEST



- Procedures for conducting a refractometer test are included in Order 5280.5 Appendix 24

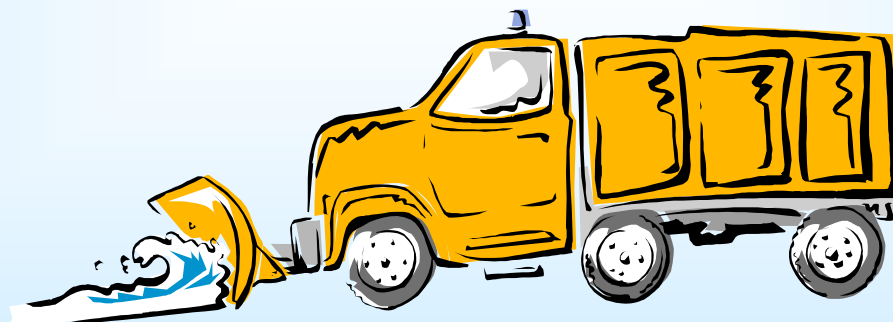
# INSPECT LIVE FIRE DRILL FACILITIES



- If the airport is conducting live-fire training on or near the airport, the ACSI should inspect the facilities

## SECTION 139.319(k)

- **Ensure that roads designated as emergency access are maintained to support vehicles during all weather conditions**



# COMMON ARFF PROBLEMS

- ① **Inadequate training curriculum**
- ① **ARFF personnel not properly trained**
- ① **All ARFF personnel did not participate in live fire drill in past 12 months**
- ① **ARFF vehicle foam or DC systems not operable**
- ① **Failed response test**

# COMMON ARFF PROBLEMS

- ① **Incomplete or missing training records**
- ① **Training not completed within the 12 month requirement**
- ① **Poor maintenance procedures for the vehicles**
- ① **Poorly organized training program**

# TOP 10 INDICATORS OF ARFF PROBLEMS



**10**

The airport foam storage area is on the EPA's top 100 Superfund cleanup sites

# TOP 10 INDICATORS OF ARFF PROBLEMS



**9**

**The ARFF vehicles have highway tires**



# TOP 10 INDICATORS OF ARFF PROBLEMS



**8**

**During the response test, a firefighter discharges agent into the wind**

# TOP 10 INDICATORS OF ARFF PROBLEMS



**7**

**10 year old rescue equipment is still covered in protective wrapping**

# TOP 10 INDICATORS OF ARFF PROBLEMS



**6**

**During a foam system check, foam discharges out the wheel well rather than the turret**

# TOP 10 INDICATORS OF ARFF PROBLEMS



**5**

**Helmets are still wrapped in protective plastic bags**

# TOP 10 INDICATORS OF ARFF PROBLEMS

This letter is to certify that I have had Aircraft Rescue and Firefighting Training in the following areas, prior to January 1, 1991:

1. Airport Familiarization \_\_\_\_\_
2. Aircraft Familiarization \_\_\_\_\_
3. Firefighter Safety and Protective Clothing \_\_\_\_\_
4. Airport Emergency Alarm and Communications \_\_\_\_\_
5. 1975 Ford Quick Response Vehicle Operation and Familiarization \_\_\_\_\_
6. 1954 International ARFF Vehicle Operation and Familiarization \_\_\_\_\_
7. Application of Extinguishing Agents \_\_\_\_\_
8. Emergency Aircraft Evacuation Assistance \_\_\_\_\_
9. Types of Aircraft Incidents \_\_\_\_\_
10. Anticipated Emergencies & Standby Positions \_\_\_\_\_
11. Hot Brakes & Wheel Fires \_\_\_\_\_
12. Firefighting Operations \_\_\_\_\_
13. Post Incident Operations \_\_\_\_\_
14. NTSB & Aircraft Accident Investigation \_\_\_\_\_
15. Hazardous Aircraft Cargo \_\_\_\_\_
16. Emergency Plan Familiarization \_\_\_\_\_
17. Rescue Equipment Familiarization \_\_\_\_\_

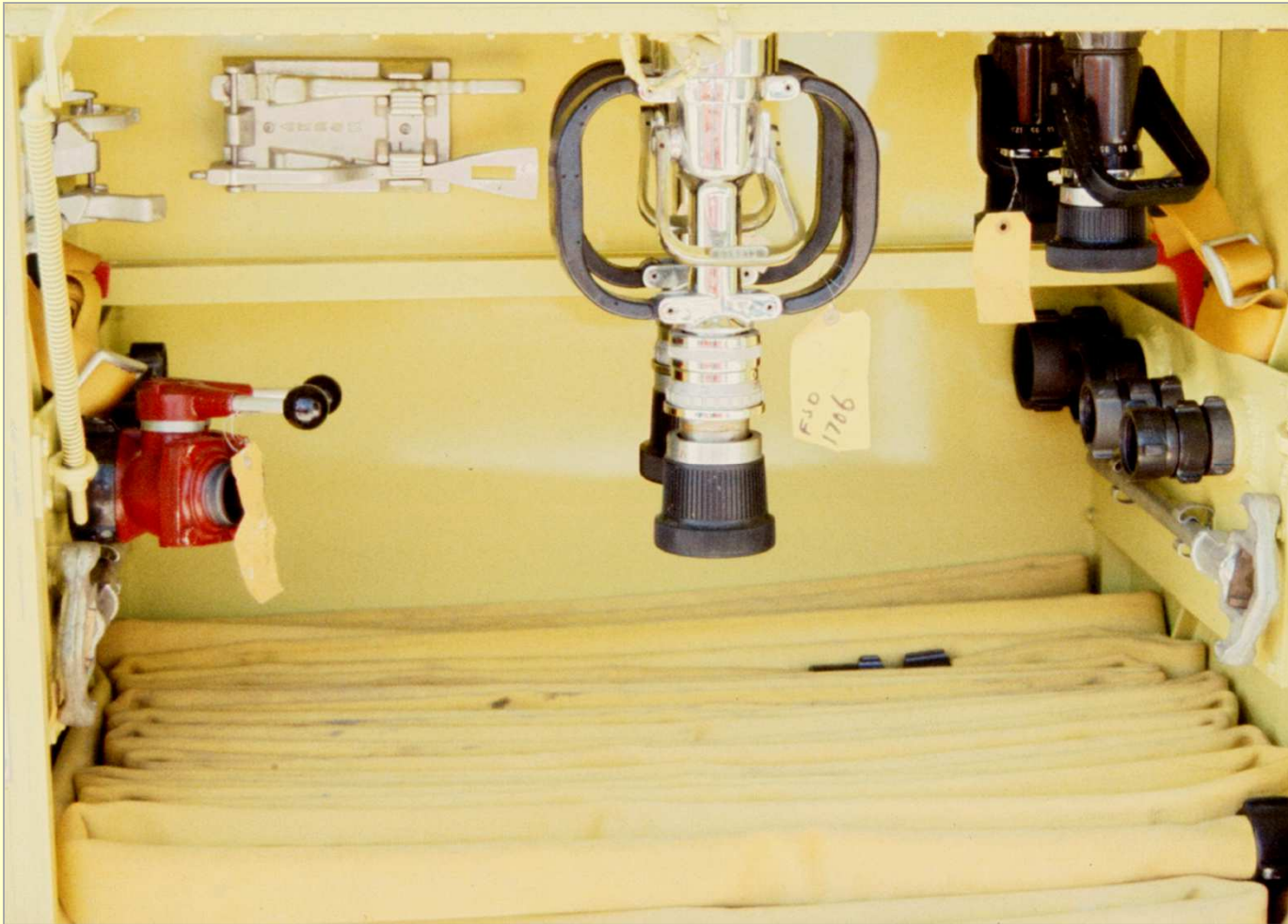
\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**4**

**Yearly ARFF training records consist of one page**

# TOP 10 INDICATORS OF ARFF PROBLEMS



**3**

**Nozzles and appliances still have shipping tags on them**

# TOP 10 INDICATORS OF ARFF PROBLEMS



**2**

The ARFF vehicle has a plow mounted on the front

# TOP 10 INDICATORS OF ARFF PROBLEMS



1

The ARFF vehicle must be carefully maneuvered around an ice machine that firefighters scrounged up when the airport restaurant closed