

Exceptional service in the national interest



Comparison of DOE and DoD Fire Protection: A first hand account By Daniel Garcia, PE

Outline of Presentation

- My background
- Compare DoD and DOE fire protection requirements
- DoD Lesson Learned #1
- DoD Lesson Learned #2
- Compare my job duties at DoD and DoE
- Apply lessons learned to current position

My background

- BS and MS in Mechanical Engineering, University of New Mexico
- 5 years as fire protection *(design)* engineer with the US Army Corps of Engineers (USACE), Albuquerque District
- 8 months as fire protection *(non-design)* engineer with Sandia National Laboratories (SNL), NM Site
- Currently enrolled in Cal Poly Fire Protection Engineering MS program

Just one letter difference, right?

| Topic to Compare: | DOE (SNL) | DoD (USACE) |
|--------------------------|--|--|
| Governing Criteria | Orders and Standards | United Facility Criteria (UFCs) |
| AHJs | Local site designation | Project Dependant (usually local Base Fire Department) |
| Non-standard Hazards | Open to AHJ discretion | Strict Requirements |
| “Worst” Hazard | Chemicals, Explosives, Experiments, etc... | Fuel fire in hangar |
| Customers | Internal DOE based on site | Air Force, other government agencies |
| # of FPEs (Complex Wide) | Very High | Low |
| Motto | SNL: “Exceptional Service in the National Interest.” | USACE: “Essayons” (“Let us try”) |

DoD Lesson Learned #1: “Don’t Blow a Gasket”!

- High Expansion Foam (HEF) Suppression System in an aircraft hangar at an Air Force Base
- On 2 of the 3 HEF risers, gaskets ruptured and the fire pump kicked on. First time, damage was localized to the mechanical room; 2nd time was full foam discharge
- Contractor’s side: Fire Pumps kicked on for some unknown reason and over pressurized system leading to gasket failure (e.g. “Not their fault!”) even though there was a 10 lb surge arrester/tank upstream of the gasket!
- When asked how system could be over pressurized with surge tank installed, contractor replied “Hydraulics are funny things!”

FIGURE A.3.3.25.1 Balanced Pressure Proportioning (Pump-Type) with Single Injection Point.

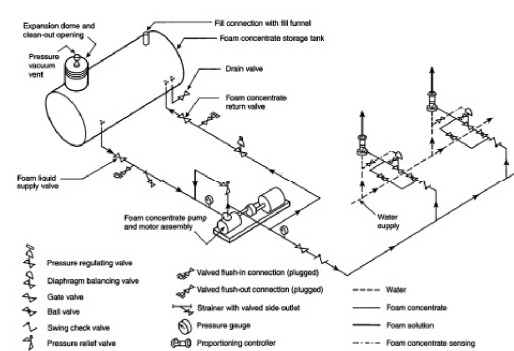


FIGURE A.3.3.25.1.1 (a) In-Line Balanced Pressure (Pump-Type) Proportioning with Multiple Injection Points.

2005 Edition



Food for thought: What’s the proper way to arrange the foam pressurized line from the bladder tank?

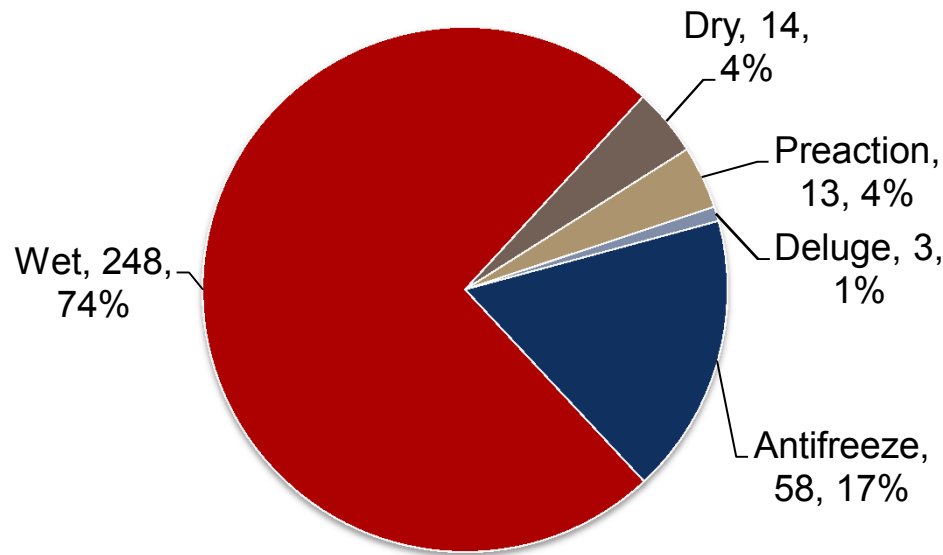
DoD Lesson Learned #2:

“Don’t stand for un-needed pipes!”

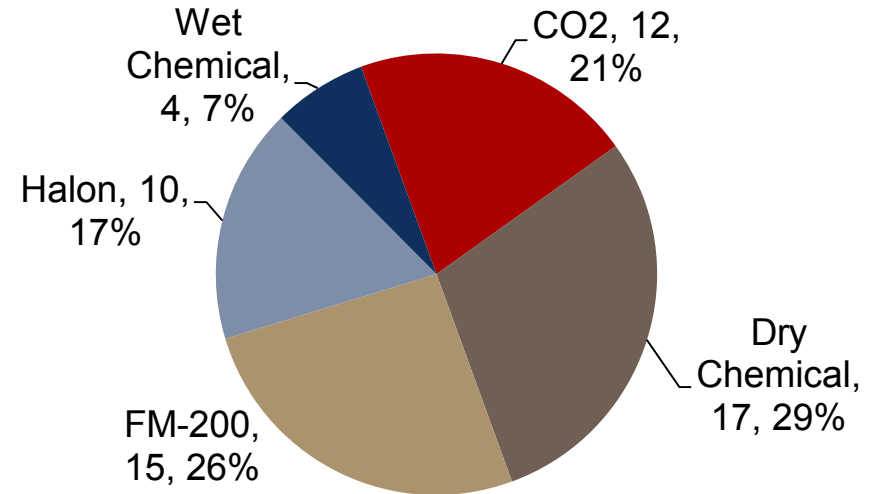
- AHJ at Air Force Base consistently requested (dictated) standpipes for buildings during A/E reviews for buildings undergoing low to moderate level modifications. (Example: Two story building with 200’ maximum travel distance allowed.)
- No mention of standpipe during “Request for Proposal” development except one case where it was required
- DoD criteria is clear: Per UFC 03-600-01 paragraph 4-5.1:
 - Class I standpipes required when building is 4 stories or more in height
 - Class I standpipes required when hose lines would exceed 450 feet.
- Same AHJ has service contract with SNL: No “special standpipes” required!

Fire Protection from different views

- Previous FP role: Design fire suppression and alarm systems
- Current FP role: Fire Protection ITM lead
 - Includes standard sprinkler systems shown below (ITM: in-house staff)
 - Includes specialty systems such as FM-200 and CO2 (ITM: contractors)



Standard Sprinkler Systems Breakout



Specialty Suppression Systems Breakout

Based on 2012 data

Lessons learned applied to DoE job

- AHJ does not equal total authority!
- Follow the Physics!
- Communication is key!
- False Alarms happen!
- It's a big place!



Thank you. Any questions?

