SAND2007-5034P

Mid-Size Mitigation Kit

Lindsay Klennert
Sandia National Laboratories

Overview of Mid-Size Mitigation Kit

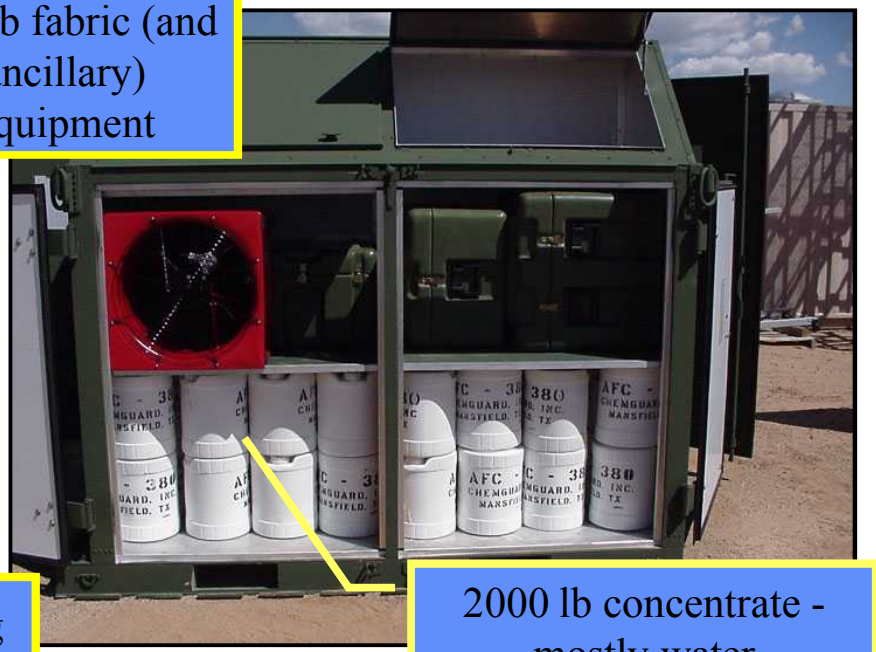
- The current containment pallet is:
  - Capable of addressing a wide variety of situations
  - Self-sufficient, with the exception of water needed
  - Providing desired capture for charges up to 600 lbs
  - Large and heavy (~4000 lbs)
  - Not on-scene soon enough in the event, if it arrives at all

- A Mid-Size Mitigation Kit would:
  - Address a smaller variety of situations
  - Integrate with local fire fighting infrastructure
  - Provide desired capture for charges up to 150 lbs
  - Weigh ~ 500 lbs and have a smaller footprint
  - Possibly fit as part of the first phase of response

Current Deployable Equipment

700 lb fabric (and ancillary) equipment

1500 lb foaming equipment



2000 lb concentrate - mostly water

- **ISU and equipment weigh 4000+ lbs**
- **Self contained equipment set (with the exception of necessary water) – foam generation and containment**
- **Fabric containment structures vary in size from 60 to 60,000 ft^3**

Mid-Size Mitigation Kit

Hardware and foaming Equipment (130 lbs)

30-ft Foam Dome (90 lbs)

16-ft Foam Dome (25 lbs)

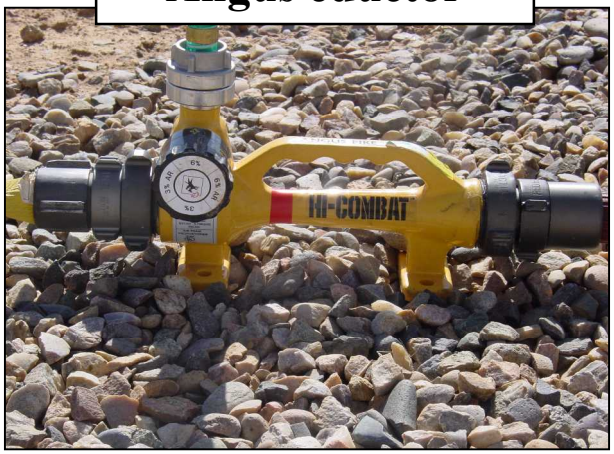
30-gal Foam Concentrate (250 lbs)

Unlimited Release

Angus Foam Generation Equipment

Angus MEX 450U

Angus eductor

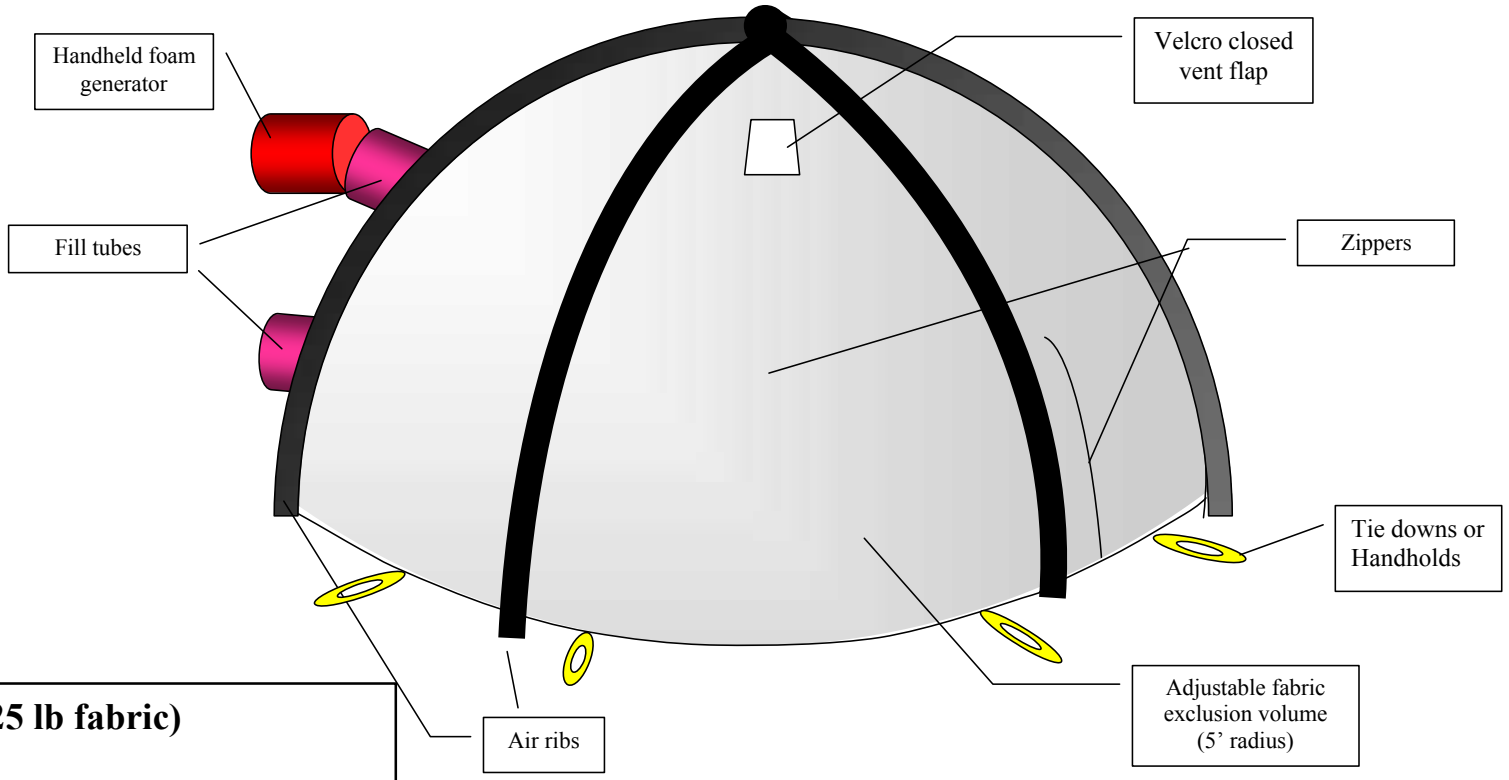


- Expansion Ratio: Volume of foam produced to Volume of liquid phase
  - Depends primarily on selection of foam generator, screen hole size and porosity, and foam concentrate
- Nominal values:

Angus MEX 450U	
Pressure	35 psi
Flow Rate	75 gpm
Foam Output	550 ft^3/min
Expansion Ratio	55:1

- Concentrate is educted at 3% and 6% settings – will operate single Angus handheld
- Best if operated at approximately same height as foam generator

Mid-Size Containment - FoamDome



Weight = 50 lb (25 lb fabric)

Diameter = 16 ft

Foam volume = 1100 ft^3

Volume H_2O/Concentrate = 130 / 8 gal

Foaming Time = 2 min

***Air ribs (shown in black) will not be used (saves 25 lbs)**

16-ft and 30-ft Foam Domes

16-ft dia., 1100 ft^3 vol.
< 15 min

30-ft dia., 7100 ft^3 vol.
< 20 min

Field Testing (30-ft Foam Doam)

Advantages/Disadvantages – Mitigation Kit

- Advantages
  - Light weight and smaller footprint
  - Increased simplicity
    - Reduces training requirements
    - Draws on expertise of fire fighters
  - Greatly speeds up implementation time
  - Can be pre-deployed, decreasing transportation times – could be first tier of an integrated response

- Disadvantages
  - Less flexibility
  - Relies on local emergency response / fire fighting equipment
  - Applicable only to 150 lbs HE for desired capture

Future Possibilities

- Test possibility of supplementing AFFF
  - Need to know expansion ratios, “stackability”, drainage rates

- New, “concentrated” foam concentrate
  - More stable foam than even AFC-380
  - Consistency is more gel-like
  - May require alternate eductors
  - Would reduce weight by 66-75%