

CAFS On-Line Orientation

*Montgomery County
Fire & Rescue Service*



Using CAFS



Operations

Module Objectives

- Understand CAFS Resource Limitations
- Understand Operational Concerns
- Understand Attack Line Management



System Limitations



Water Capacity

- 1000 GPM foam manifold
- 1500 gpm pump

Foam Concentrate Capacity

- 5 GPM Foam Pump
- Average .5% Injection Rate for wet foam
- Average 1.0% Injection Rate for dry foam
- 1000 GPM Capacity

Air Flow Capacity

- 210 CFM



What Does This Mean to My Fire Attack Capabilities?



Resource Distribution



Type	Water (GPM)	Foam (GPM)	Air (CFM)
<i>1-3/4" Pre - Wet</i>	120	.60	60
<i>2" Pre - Dry</i>	160	.80	80
<i>2-1/2" Wet</i>	240	1.2	120
<i>2-1/2" Dry</i>	30	.30	200+
<i>3" Portable Master Stream - Wet</i>	340	1.7	170
<i>3" Portable Master Stream - Dry</i>	30	.30	200+

What Does This Mean to My Fire Attack Capabilities?

Attack Line Management



- So when you do the math - the limiting factor is the capacity of the air compressor.
- We can supply a lot of water, and a decent amount of foam concentrate - but as seen on the previous page, one “wet” 1^{3/4} handline sucks up about a third of the CFM that the compressor can produce.



The Hard Truth



Wet

- Combination of up to (3) 1-3/4" or 2" handlines



Or

- (1) 1-3/4" or 2" handline & (1) 2-1/2" handline



Dry

- (1) 1-3/4" handline

Or

- (1) 2-1/2" handline

You can have only one of these configurations at any 1 time!



Review of CAFS Operational Concerns



- What is the water source type?
 - Pressurized, Booster Tank, Draft



- How are we managing engine speed issue with Air Compressor
 - Auto-Fill Utilization / Rear Intake?

- Is the TPM Set?



- Is pump circulating water and staying cool?

- Do we have proper CAFS consistency?



Tactical Uses

- CAFS Uses

- Any attack situation appropriate for a handline other than Class B fuel pool fires
- Overhaul
- Dense fuels (*it may also be appropriate to use foam solution on these*)
 - Brush
 - Dumpsters etc.
- Auto fires



Tactical Uses

- Don't use CAFS

- Sprinklers

- Standpipes

- Sprinklers and standpipe systems are not rated for foam, and it is very hard to flush them out after use.

- “Big” water situations

- If we are pouring thousands of gallons on a fire, does it justify the cost of using up foam; especially if the structure is going to be demolished anyway?

- To supply other engines

- Centrifugal pumps cannot pump air and therefore cannot pump CAFS.
 - With our pumpers you will be able to supply plain water to another pumper and stretch your own CAFS attack line.



Techniques

- With CAFS you can use normal direct and indirect attack techniques
- Because of higher energy from air compressor you can have longer “standoff” distances & better bounce
- Open nozzle slowly because of initial increased nozzle reaction.
- After knocking fire down, continue to apply CAFS for same amount of time it took to achieve knockdown. This continues to cool the fuel.



Techniques

- “Painting” - This is an older concept of denying the fire additional fuel by applying the foam to each surface in turn, usually starting with the ceiling. This technique was developed to cope with the limited flows that earlier CAFS systems produced. It is better to have the required fire flow to start with so you don’t have to use this technique. Painting is not recommended for interior firefighting.
- It is a common misconception with CAFS that you can use less water. You still need the required fire flow as per the NFA & Iowa formulas. With CAFS you achieve knockdown quicker so you will use less *total* water.



Mixture Selection



- Wet
 - All attacks

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- Medium or fluid
 - Final overhaul
 - Immediate exposure protection




- Dry
 - Exposure protection with long lead time




Friction Loss



Plain water friction loss behaves in a linear fashion. For example for a 2" line we add approximately 30 psi of friction loss for every 100' (assuming a 200 gpm flow).



CAFS behaves more like a curve. Under these conditions it is very hard to devise a friction loss equation. Therefore it is easier to use a pump pressure chart to predict flows. The engines are also equipped with flow meters which makes pumping the lines much easier.



As a general rule: 120 gpm for 1.75" line for 100' to 400' at a pressure range from 120 to 140 psi; 160 gpm for 2" line for the same range. See pump pressure chart on Blackboard for more details.

Flushing the Lines



- Turn off Foam Pump and Air Compressor.
- Flow plain water through lines until the water runs clear.
- Make sure that all lines that were used are flushed.
- Be cautious about built up air pressure. Failure to shut off and bleed used lines could be catastrophic.

QuickTime™ and a decompressor are needed to see this picture.



Bad Things With CAFS

- **Slug flow** - air and water do not mix without foam. With some types of CAFS systems it is possible to do this. You get pockets of air and water which causes severe pressure fluctuations.
- **Chatter** - less violent than slug flow. Caused by inadequate foam, not by absence of foam.



Bad Things With CAFS

- Failure to achieve critical flow rate

CAFS allows you to use less total water, but you still need to put the GPMs on the fire.

- Mixing foam types

Do NOT mix brands or Classes!!!

Do Not Mix Class A & B Foam

- Result of mixed foam (in strainer)



Data Capture

- In the Firehouse Unit Report
 - Usage Tab
 - If you use CAFS choose “*Compressed Air Foam*” from the pick list; for quantity record gallons of foam concentrate used.
 - If you use Class A Foam Solution choose “*Class A Foam Solution*” from the pick list; for quantity record gallons of foam concentrate used.
 - If you use Class B Foam choose “*Class B Foam*” from the pick list.
 - For all of these please note any special problems or successes in the Notes area.
- Data collection is an essential part of the program and we need all engine officers to participate.



Data Capture

- For reporting issues with CAFS:
 - Email to
fire.cafs@montgomerycountymd.gov
(of course you will also report any mechanical issues to the appropriate shop)
- Please report successes, failures, problems, solutions etc. We want to hear about it and then be able to circulate good information to everyone.



Review Questions



- Define slug flow:
- Can you use CAFS in sprinkler systems?
- How many “wet” 2.5” CAFS handlines can you flow at one time?
- You run out of Class A foam. You find a couple of old tubs of a different brand laying around the station. Is it OK to add these to the tank? Why or why not?
- What are the flush procedures after using CAFS?

