* Note items in “red” …you will need that information later!
For a fire to exist, it has to have:

Fuel

And a Chemical chain reaction

Heat

Oxygen

Remove one of these, and you can put out a fire!
Types of Fires: Class A

- Materials which leave an Ash:
  - Wood, cotton, fiberglass, cushion, sails
- Effective extinguishers:
  - Water (*Caution – load limits!*)
  - Dry Chemical
  - Carbon Dioxide
- Concerns:
  - Fire may be deeply embedded in materials and require “overhaul.” Ok, what is overhaul?
This was a covered marina made of wood! See the boats?
Types of Fires: Class B

- **Flammable liquids (things that boil):**
  - Oil, gasoline, resin, paint, kerosene, diesel

- **Effective extinguishers:**
  - Sodium Bicarbonate (baking soda, **NOT flour**!)
  - Dry Chemical
  - Carbon Dioxide
  - Halon replacements

- **Concerns:**
  - Water may spread the fire!
  - Liquids with high flashpoint may re-ignite (keep covered to avoid vapor release)
Would the fire extinguishers on your boat put this fire out? How hot is it on the bow of this boat…could you stand there?
Where would you go if this happened to you sailing offshore? Could you abandon your boat in two (2) minutes?
How would you get out of this boat if you were asleep in the v-berth? Do you think they had a smoke or CO detector?
Types of Fires: Class C

- **Electrical Fires (shorts):**
  - Wire insulation and adjacent materials

- **Tactics:**
  - Break circuit, **turn off main switch (first step!),** have circuit protection
  - Then extinguish according to what materials are involved
  - **Water is not a choice on Class C fires**

- **Concerns:**
  - Shock hazard (is the power off – are you sure?)
Shore Power Connections

This is one of the most common types of electrical fires boaters experience at a marina.

So, do you have a procedure to disconnect your shore power?

1) Turn off dock’s breaker to the pedestal and then the main AC breaker in boat;
2) Unplug shore power at pier;
3) Disconnect the shore power from boat receptacle;
4) *Reverse the process* when hooking into shore power and remember to verify polarity.
What is on fire here and how would you put it out? Can you breathe below deck on this boat when this picture was taken (hint low oxygen level!) and no visibility (dark)?
Types of Fires: Class D

- **Fires caused by burning metals:**
  - *Flares are the main concern*
  - Nickel Metal Hydride batteries also *(examples are PlayStation devices)*

- **Tactics:**
  - Get it off the boat
  - May use material to try to cool, isolate and smother

- **Concerns:**
  - Does not play nice with water!
Blaze casts pall over catamaran’s racing schedule

Fire ripped through the hull of world’s biggest ocean racing catamaran in Auckland yesterday morning, sending crew scrambling for safety and putting the immediate racing plans of the $8 million boat in doubt.

Fire broke out aboard PlayStation while it was moored on the eastern side of the Viaduct Basin, the Team New Zealand command. The extent of damage was unclear last night.

Rupert Kirby, a tourist catching a sun with his wife, said he saw two small explosions, then heard crew members scrambling from the starboard cockpit and forward hatch, seconds before flames shot out.

The crew tried to fight the blaze with extinguishers but were forced back by the heat.

Steve Fossett, Senior Station Officer Barry Boyes of the Fire Service said it took firefighters about 10 minutes to bring the fire under control. They flooded the hull.

The catamaran, owned by American adventurer Steve Fossett, was in Auckland last year with the aim of breaking ocean racing records. In March, it set the record for the distance travelled in 24 hours (80 nautical miles).

In an attempt to break the record, crossing the Atlantic, scheduled for June, may have to be put off because of the fire.

The catamaran was due to be shipped to America next weekend.

— Tony Wall

FLASH FIRE: The $8 million catamaran that caught fire in Auckland yesterday holds the world record for sailing the longest distance in 24 hours. The New PlayStation was due to be shipped to the US next weekend. The blaze has cast doubts over a challenge to the Atlantic crossing record in June.
What type of extinguisher would you use?
Sources of fires on boats #1

- 55% Poorly installed electrical systems (C)
  - 30% DC shorts and wiring
  - 12% DC engine voltage regulator
  - 4% AC appliance/heater
  - 4% AC shore power system
  - 2% AC wiring/panel
  - 2% DC battery charger
Sources of fires on boats #2

- 24% Engine and Transmission Overheating
  - 19% engine overheating
  - 2% turbocharger overheat
  - 2% transmission overheat
  - 1% backfire
- 8% Gasoline fuel leak
  - 95% of fuel-related fires involve gasoline
- 1% Galley stoves
  - Declining compared to when alcohol stoves were popular
  - *(this happened to me – alcohol stove fire)*
- 12% Unknown or miscellaneous
Portable Extinguishers

- Sodium Bicarbonate
  - Low toxicity
  - Inexpensive
  - Excellent for Class B
  - Messy clean up

Inexpensive Portables
**Tri-Class or Multipurpose Dry Chemical**

- No worry about selecting the right extinguisher
- Forms a crust on Class A fires, making clean up challenging
- Need to turn upside down and shake it to loosen the power on a regular basis!
- Needs to be recharged at least yearly (even if not used)!
Check the gauge. Could it be stuck?
Portable Extinguishers

- Carbon Dioxide
  - Cools and **suffocates**
  - Pretty ineffective - Large extinguishers!
  - Leaves no residue
- Halon and its derivatives
  - Halon 1211 and 1301 cannot be bought, but can be refilled
  - Halotron 1 is a replacement

Halotron Portables
How to use most portable fire extinguishers

P Pull the pin.

A Aim at the base of the fire.

S Squeeze the handle & lever.

S Sweep from side to side.

- Pull & remove ring pin, breaking seal.
- Move to a safe position upwind of the fire.
- Remove hose nozzle from retention clip (if equipped).
- While keeping the extinguisher in a vertical position, aim nozzle at the base of the fire.
- Squeeze operating lever fully to discharge.
- Apply agent in side to side sweeping manner. Be careful not to splash or scatter the fuel.
- After fire is out, stand by and be prepared for any re-flash.

*Always follow the operating instructions and recommended start back distance printed on the fire extinguisher's front label.
Fixed-Mount Extinguishers

- FM-200 Halon replacement
  - Mounted in the engine room
  - Heat causes “stinger” to burst
  - Activated at 175 deg F
  - From 25 to 150 cu ft

Stinger FM-200
Fire fighting tips

- Have extinguishers located in all occupied spaces of the boat, cockpit, and the engine room.
- Fight a fire quickly; fires are virtually impossible to put out if given a head start.
  - Fire volume can double every 7 seconds!!!!
- Use extinguishers to allow you to escape from below.
  - How could you get out of every stateroom, head or compartment if the main hatch was blocked?
- PASS – Pull-Aim-Squeeze-Sweep (Aim extinguisher low at base of fire and sweep across base of flames.).
Fire fighting tips

- Install extinguishers above floor - keep them away from water!
- Have a back-up person assist; close at hand with the extra extinguishers!
- Use a flashlight and stay oriented;
- **Stay low** - avoid smoke (better visibility);
  - Smoke kills more people in fires than actual burns. Do a dry run, with a knit cap and try to get out of your boat without using the main hatch.
- Have an exit plan!
Just like home!

- Have a fire escape plan and practice it;
- Install CO and smoke alarms in each compartment;
- Remember, CO is the silent killer!
- Change your smoke alarm and CO alarm batteries yearly (at least);
- Make sure everyone knows how to call for help;
- Have fire extinguishers readily available and make sure everyone knows how to use them.
The end....

- Questions?

- Ok, time to go outside and have some fun:
  - 1) Fire Safety Trailer;
  - 2) Electrical Short Simulator;
  - 3) Fire Extinguisher Practical Exercise.