

# The Development and Implementation of a Heat Program

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# MYTHS

- Heat not successful because temperatures at floor level were not reached.
- Cannot heat entire facility at once, so partial treatments are not successful.
- Fumigants work better.

# BRIEF HISTORY

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- Spot fumigation theory becomes foundation for mobile program.
- MOBILE PROGRAM - Allowed us mobility to develop history - which led to stationary development.
- Allowed increased flexibility to production vs. traditional fumigations.

# Develop a Multi-Functional Heat Team

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- ELECTRICIANS
- PIPE FITTERS
- MILLWRIGHTS

- Ownership from all disciplines



# FACILITY PREPARATION - CONSIDERATIONS

# HEAT EFFECTS ON DRY SPRINKLER SYSTEM

- High temperature sprinkler heads should be specified for areas which will be heated. High temperature heads (286 degrees F) should be used because hot spots do develop. This will prevent the accidental water release by one of the sprinkler heads.

# HEAT EFFECTS ON CONTROL AND ELECTRICAL EQUIPMENT

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- Identify control and equipment concerns.
- Contact manufacturer - Describe scenario  
140 degrees - 18 - 24 hours

# HEAT EFFECTS ON EQUIPMENT LUBRICATION

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- Oil - Grease

Most probably will withstand 140 degrees.

If there are some special lubricants that have lower operating temperatures, check with the manufacturer for the effect of 140 degrees F. The device may have to be relubricated following heat sterilization.



# HEAT EFFECTS ON EQUIPMENT LUBRICATION cont.

- Gear Boxes -

The air (and the oil) in the gear box will expand when heated. If expanded, warm air can escape through the breather, there will be no problem. If there is no breather, pressure inside the gear box may force the lubricant out of the seals. Or, if the gear box is full of oil, it will also expand and spill or be forced through the seals.

# BUILDING AND EQUIPMENT HEAT LOSSES

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- Close and/or seal all fire doors, man doors, roof vents, wall vents, and windows.
- Areas which are not to be included must be partitioned off if the area cannot be isolated - tarps and plastic can be used as makeshift walls.
- Exhaust and intake vents should be closed and/or sealed.

# REVIEW OF COMBUSTIBLE AND HEAT SENSITIVE MATERIALS IN TARGET AREAS

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- Aerosol Cans
- Adhesives
- Sugar
- Packaging Supplies
- Fire Extinguishers
- Contractor Materials
- A pre-heat walk through should identify any concerns not listed above.

# PRE-HEAT PREPARATION

- Run equipment empty.
- Elevator boots opened and cleaned.
- All sweepings and trash receptacles cleaned.
- Sacks of product removed and portable buggies emptied.
- Open as much processing equipment as possible - Dust collectors, bins, hammermills, feeders, screw conveyors, etc.
- An approved residual spray should be applied at floor-wall junctures and across doorway thresholds to unheated bldgs.

# THERMAL SHOCK

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- 90 Degree differential rule



# The Development and Implementation of a Heat Program

# The Development and Implementation of a Heat Treatment Program

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- Preparation and Planning for Heat Treating a Building.
- Equipment required for heat treatments.
- How to spot treat areas or equipment during production.

# Preparation and Planning for heat treating a building

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- Communicate to everyone what areas will be heated and why.
- It's best to schedule in advance if possible just as you would your fumigation's for the year.
- Place as many of your heaters as possible the day before and do all the connections.



# Preparation and Planning for heat treating a building cont.....

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- Make sure your number placements for temperature check locations are placed.
- Get as much of the set up completed as possible the day before so there are no delays on the start time for the heat treatment.
- Do an equipment check early.

# Equipment required for heat treatments

- Heaters



# Equipment cont....

- Steam hoses.
- Extension cords.



# Equipment cont....

- Tarps.
- Tape.
- Other sealing materials.



# Equipment cont....

- Heat transfer flex hoses for heating inside equipment or remote rooms that are inaccessible for the heat carts.



# Equipment cont....

- Monitoring Equipment.
  - Raytek with Laser pointer.
  - Hobo sensors.
  - Smart Reader / Trend Reader

# Equipment cont...

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- Circulating fans
  - wall
  - pedestal
  - box
  - squirrel cage
  - barrel

# Equipment cont..

- Checklist.
- Tools.
  - Pipe wrenches
  - Channel locks
  - Crescent wrenches
  - Open end / box end wrenches
  - Teflon tape





## HEAT TREATMENT CHECK LIST

- 1) Which area will be heated? -----
- 2) Notify everyone of area to be heated and why. -----
- 3) How many heaters will you need for the area. -----
- 4) Locate heaters in the area where you need them. -----
- 5) Notify Pipefitters and Electricians to hook them up. -----
- 6) Where will you set up computer if used? -----
- 7) Distribute thermistors to proper locations for monitoring temps. & list 1 -----  
2 -----  
3 -----  
4 -----  
5 -----  
6 -----  
7 -----

- 8) Seal any openings that will allow heat to escape or cool to enter. -----
- 9) Walk area to insure all equipment is off. -----
- 10) Shut off any equipment left running. -----
- 11) Set up hoses on heaters if needed. -----
- 12) Remove fire extinguishers if directly in front of heater. -----
- 13) Turn heaters on and raise temperature 10 degrees per hour. -----
- 14) Hook up thermistors to Smart Reader. (Use black as common) -----
- 15) Hook up computer to Smart Reader and program. -----
- 16) Walk area to insure fan isn't blowing on thermistors directly. -----
- 17) Put Heat Treatment signs on doors to area. -----
- 18) Monitor heat hourly, record and adjust as needed.(@ 140degrees) 1st -----  
2nd -----  
3rd -----

- 19) How many hours at kill temps.? (shoot for 24) -----
- 20) Shut off steam to heaters and leave fans running @ 2 hours. -----
- 21) Shut off fans to heaters. -----
- 22) Crack doors open slightly if needed. -----
- 23) Download Smart Reader and turn off thermistors. -----

File Name

- 24) Tear down heaters, hoses, cords and store. Call maint. for help. -----
- 25) Tear down computer, Smart Reader, thermistors and store. -----
- 26) Remove sealing material if used. -----
- 27) Replace fire extinguishers. -----
- 28) Remove Heat Treatment signs. -----

Heat Exhaustion chart is in the Heat Treatment book. If going into the heated area be aware that there needs to be two people and have radio contact with someone on the outside. Watches, necklaces and glasses can become hot. Be Safe during Heat.

# Equipment cont....

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- Bug Checks

# How to spot treat areas or equipment during production

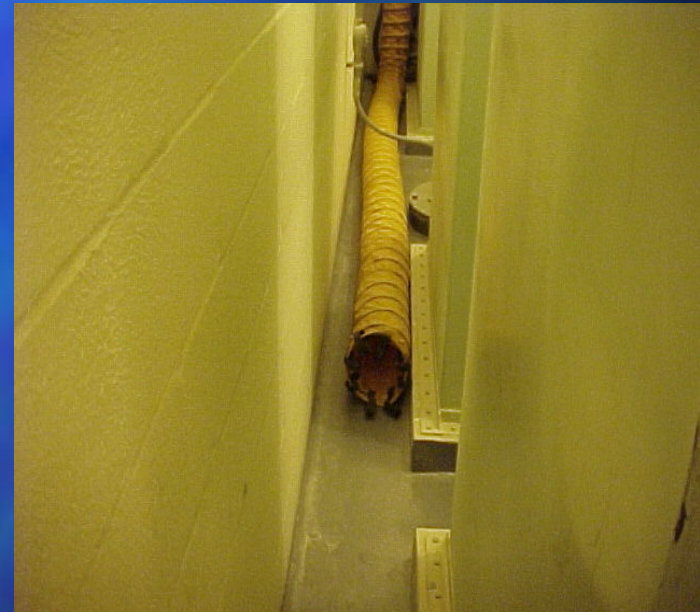
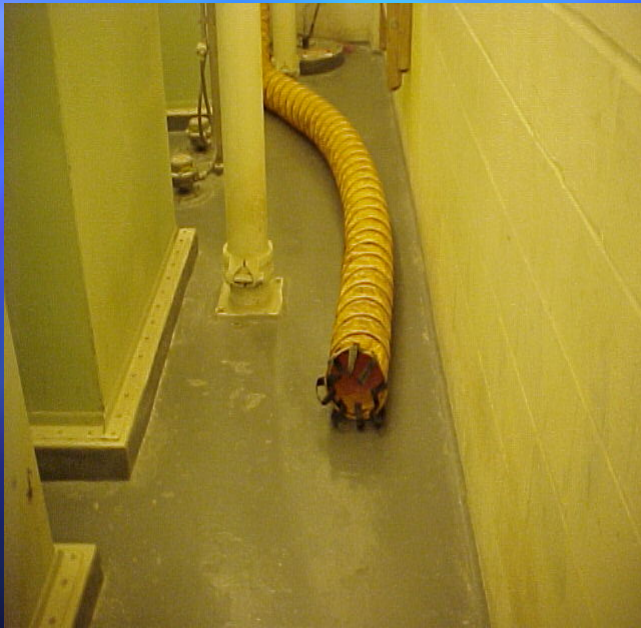
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- You first must determine that the area can be heated without affecting production i.e. no equipment running or a person needing to be in the area.
- Place your transfer hoses on the heater.
- Run your hoses into the room or equipment to be heated.

# How to spot treat areas or equipment during production



# How to spot treat areas or equipment during production



# How to spot treat cont....

- Isolate and seal the area using tarps, tape, plastic, cardboard etc..
- Take an initial temperature reading.
- Turn the steam on to the heater.
- Turn on the fan.
- Bring temperature up to kill at a rate of around 10 degrees per hour.

# How to spot treat cont....

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- After reaching kill temperature hold it for 18 to 24 hours.
- Once hold time is achieved start shut down.
- Turn steam off to the unit and leave fan running. Unless heater is remote!

# How to spot treat cont....

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- Two hours later shut the fans off.
- When the area has cooled down enough you may begin tear down and put away of the heaters.
- Turn on exhaust and intake fans to get the temperatures back to normal.



Any Questions ???????

