



Yankee Dryer Safety Program

Yankee Dryer Safety

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Yankee Program Objectives

- ◆ Personnel protection
- ◆ Loss Prevention
- ◆ Asset Optimization

What is a Yankee?

It is a Cast iron Pressure vessel

- In compliance with American Society of Mechanical Engineering (ASME)

- Need to be inspected annually by Insurance inspector and our Maintenance

- Need to get approval to make changes

Routine Operation

1. Three components of stress in the Yankee are protected by protective devices:
 1. Pressure is limited by safety relief valves
 2. Over speed is protected by drive controls
 3. Bending stresses caused by pressure roll - limited by controls
2. Surface Temperature is not to exceed 380°F
3. Yankee is not protected against thermal abuse
 - Rapid cooling by hoses
 - Stopping of dryer – especially on high temperature hoods
 - Cross deckle and edge sprays
 - Edge sprays should be no greater than 1.5 gpm

Cold Dryer Start up

Dryer Surface temperature 125°F or below

- Warm up steam lines to Yankee – lines free of condensate. (Maint. usually takes care of this)
- Start Yankee in Sunday Drive
- Slowly start to open Sunday Drive steam valve.
- If temperature of dryer is at room temperature it should take 1 hour to heat it to 212°F. Recommend not to go over 5 psig. Hold for 30 minutes.
- We have built in safeties to help control warm up.

	From	To	Time (minutes)
	5 psig	15 psig	7.5
	15	35	5.5
	35	Operating pressure	3.0

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Warm Dryer Start up

Dryer Surface Temperature of 200°F or above and zero pressure in the Yankee

- Repeat the procedures for the cold dryer start up
- Follow the same pressurizing rate.

From	To	Time (minutes)
5 psig	15 psig	7.5
15	35	5.5
35	Operating pressure	3.0

Emergency Shut-Downs

A hot Yankee is susceptible to explosion when it is not rotating.

- ◆ Raise hoods where applicable
- ◆ Turn off heat to hoods
- ◆ Turn off steam to dryer – if Yankee has stopped for over 10 minutes relief valve should open.
- ◆ Turn off all water sprays
- ◆ Try to keep Yankee turning or get it turning as soon as possible.

Yankee Explosive Failures

Main Cause is Thermal Shock

◆ The two major causes of Thermal Shock are:

- Excessive Water Contact
- Start-up Conditions
 - warm-up
 - non-uniform temperature of head and shell

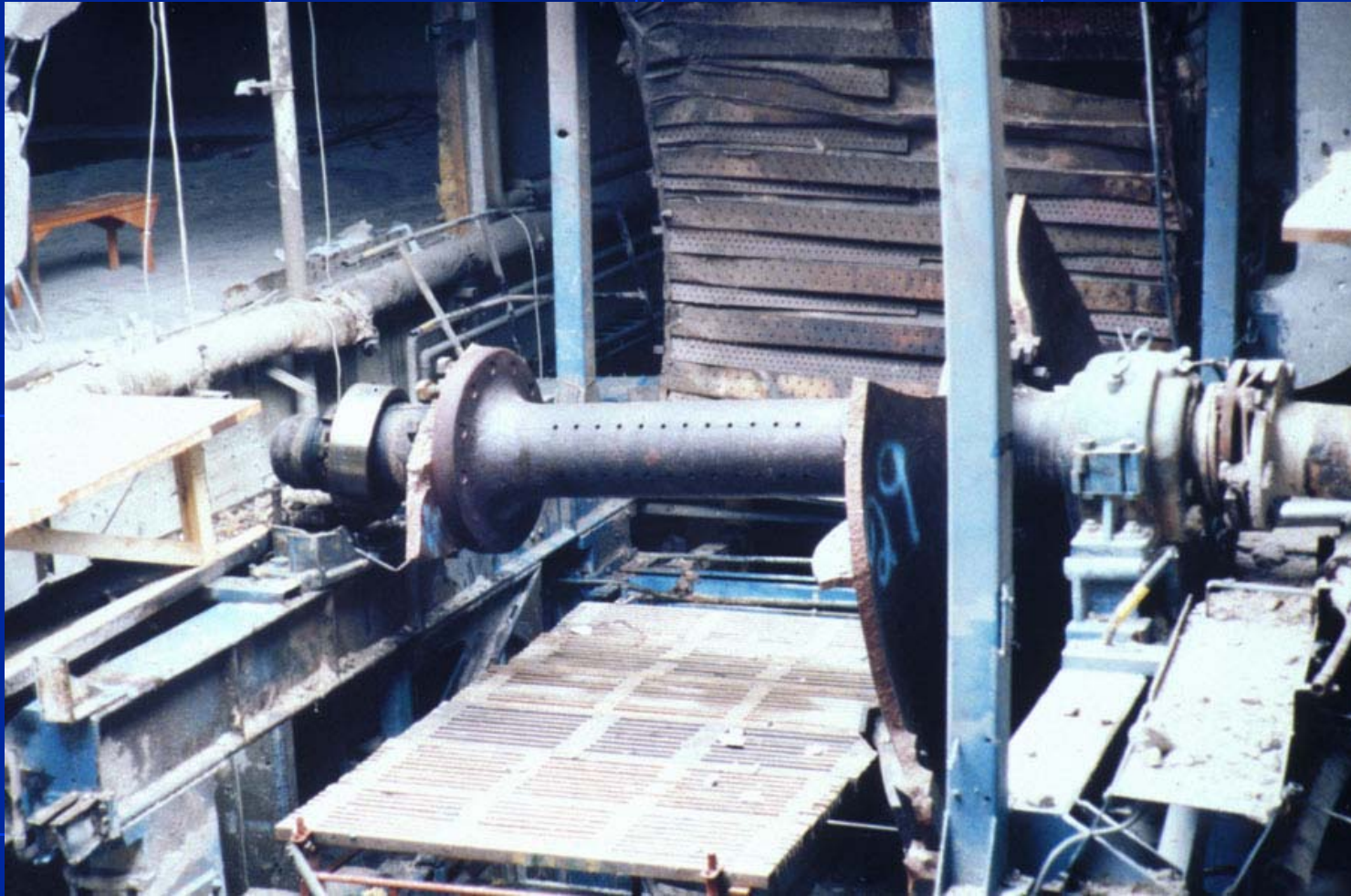
Avoidance of Thermal Shock

- ◆ Hoods
- ◆ Hoses
- ◆ Welding
- ◆ Yankee Coating
- ◆ Sprinklers/Fire fighting
- ◆ Profilers
- ◆ Edge showers

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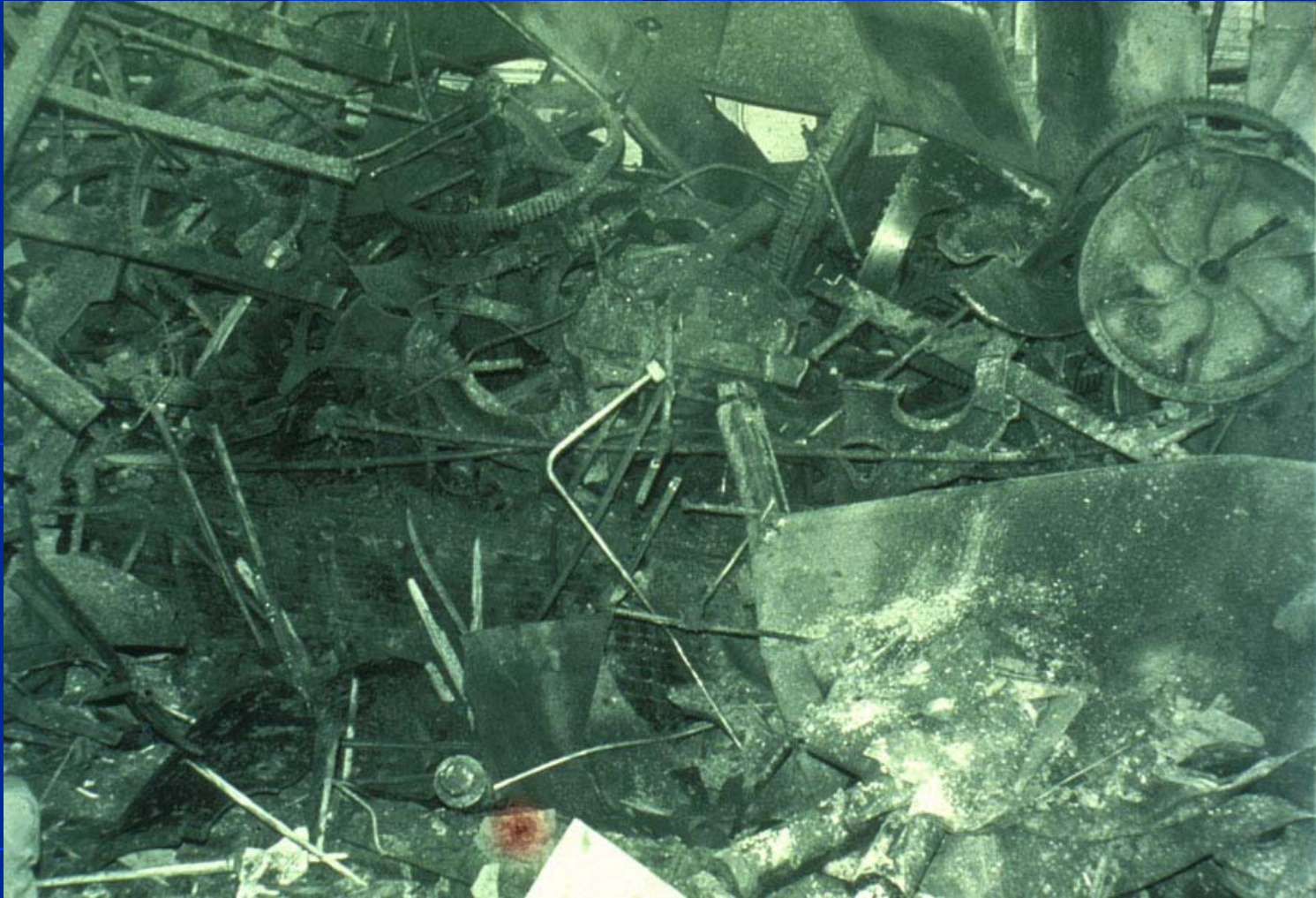
Thermal Shocked Yankee



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Former Tissue Machine



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Fire Fighting - Greece



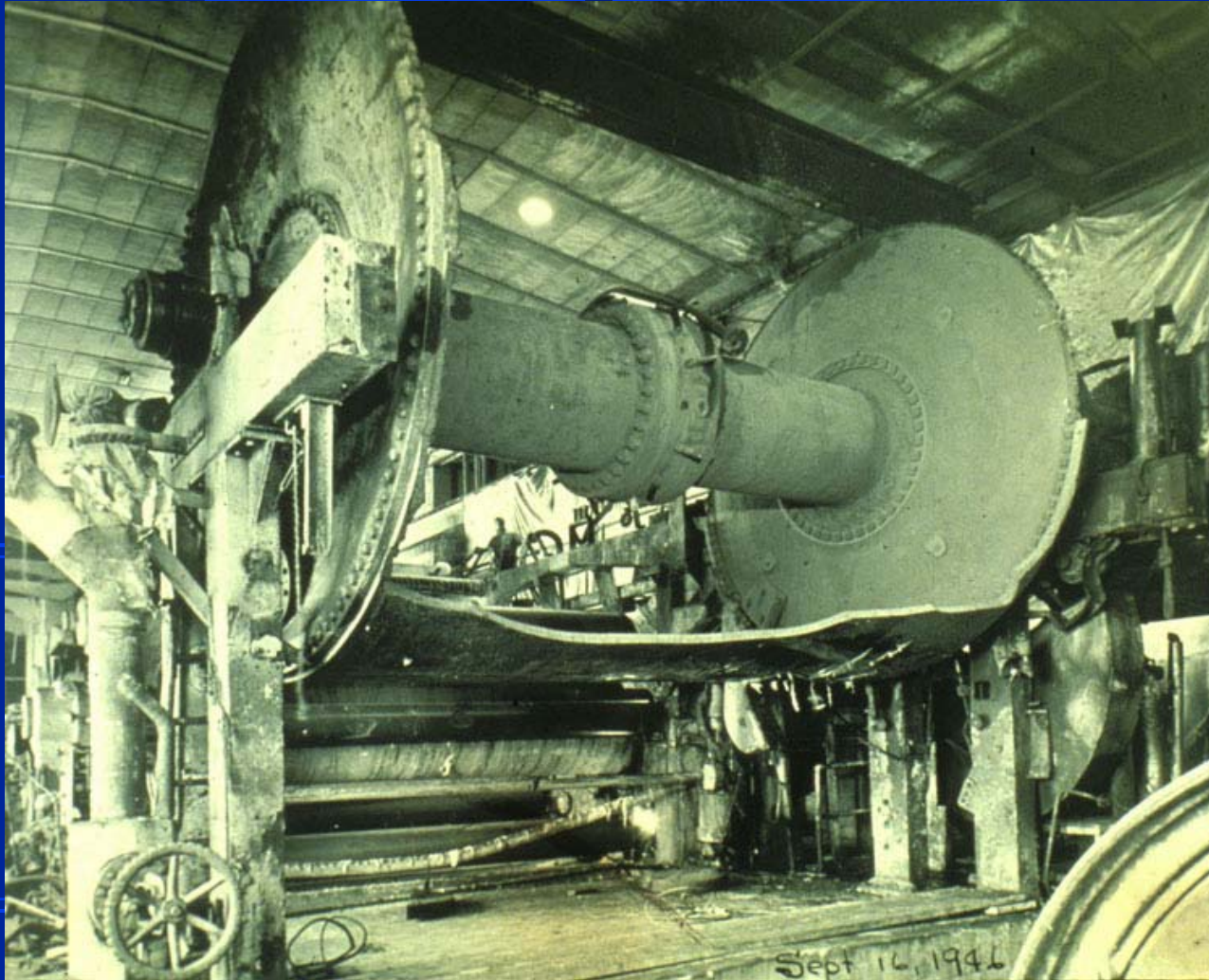
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Fire Fighting Pre-Cautions

- ◆ Evacuate the area of non-essential personnel.
- ◆ Keep the Yankee running if possible.
- ◆ Shut off steam supply to Yankee.
- ◆ Unload pressure roll and shutdown Yankee hoods.
- ◆ Use dry extinguishers, if possible.

Unsuccessful Start-up



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Machine Room Remains Yankee Explosion



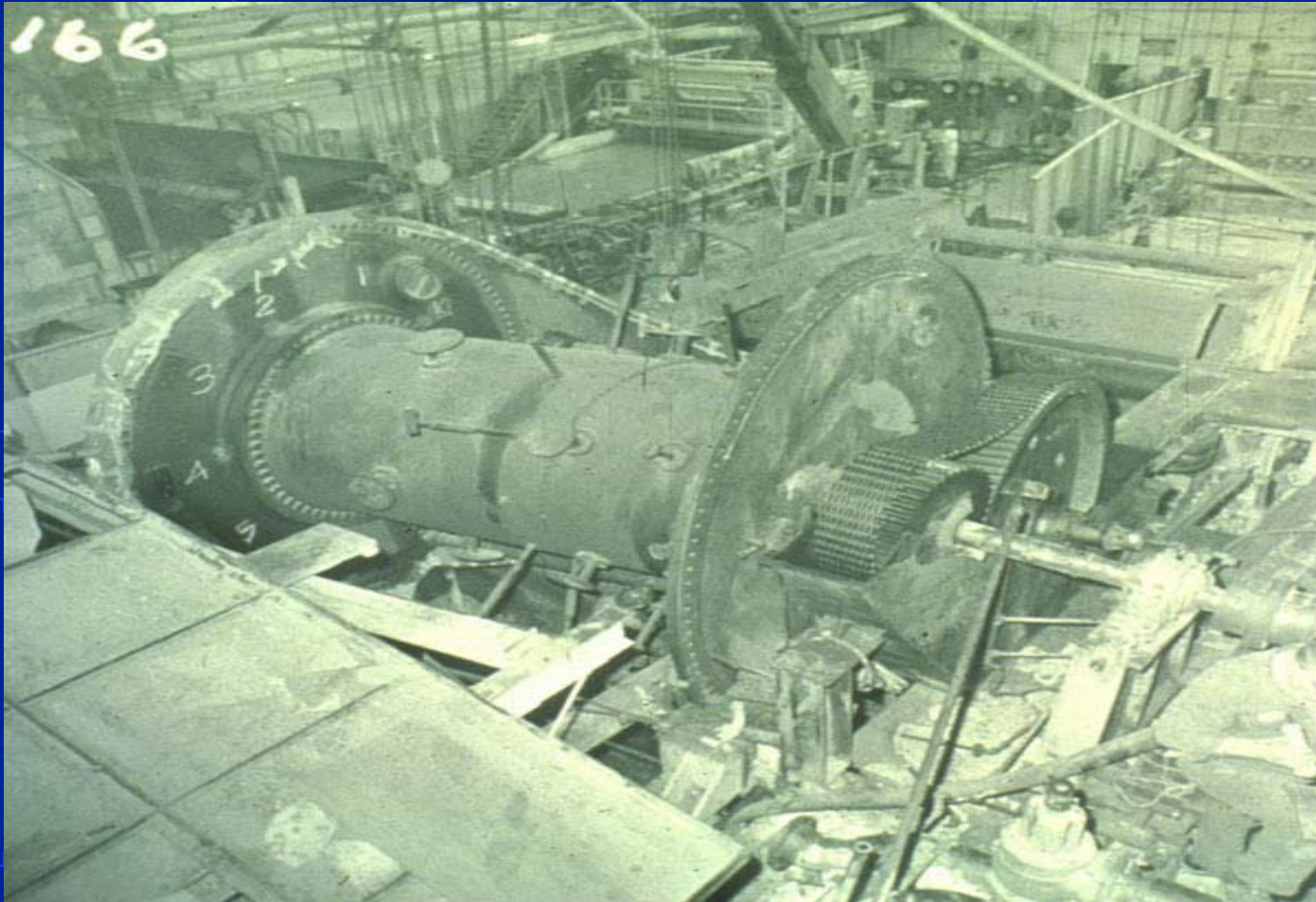
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Fire Fighting Pre-Cautions

- ◆ Avoid, or Absolutely Minimize, water contact on a stopped Yankee.
- ◆ Be aware of the volume of water from sprinkler systems that may be in contact with the Yankee.
- ◆ Insure automatic sprinklers do not directly impinge on the Yankee.

Thermal Shock - Excessive Water



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Fire Fighting Pre-Cautions

- ◆ It's OK for water to “dance” across the Yankee, but avoid steady streams.
- ◆ Use short bursts of water versus continuous flow, if possible.
- ◆ Do NOT concentrate the stream on a single point of the Yankee, even if Yankee is turning.

Thermal Stress



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Fire Fighting Around Yankees

- Yankees have exploded during fire fighting efforts.
- Following these guidelines should insure that a catastrophic failure of the Yankee will not occur during a fire fighting episode.
- Being cautious of how you, and those around you, are handling water around the Yankee will help insure the safety of our fellow employees.

Wrap up - General Rules

- Steam must not be admitted into cold Yankee unless dryer is rotating – keep steam flow slow.
- NEVER hose a Yankee when it is not turning – break up the stream of water
- Maximum time a Yankee can be stopped under steam pressure is 30 minutes
- Use of edge sprays are to be minimized
- Sprayboom must be off when Yankee is not turning