Yankee Dryer Safety Program

Yankee Dryer Safety

Cellu Tissue
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.

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<th>From</th>
<th>To</th>
<th>Time (minutes)</th>
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<td>5 psig</td>
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<tr>
<td>35</td>
<td>Operating pressure</td>
<td>3.0</td>
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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.

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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
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
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
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
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