

Technical Report – Paper Mill

Subject: Application of Mascoat Industrial-DTI at a Paper Mill

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Participants:

Art Fleahman – Mascoat– Houston, TX

W.W. Enroughty – Richmond, VA

Paper mill representatives – Virginia

Issue:

At a paper mill (name withheld at request of client) in Virginia, the output of the dryer cans on one of their Fourdrinier machines was less than anticipated when the machine was put into service. The reason for this was deemed to be the machine's lack of insulation and the resulting energy loss. Adding to the problem was heat emanating from the dryer cans, making working conditions uncomfortable for staff working directly around the machine. Dryer cans in paper mills are notoriously hard to insulate because of space constrictions and geometrical shapes. While researching alternative solutions to conventional insulation, the company came upon Mascoat of Houston, Texas. Mascoat manufactures thermal insulating and sound damping coatings for the industrial, marine, commercial and automotive markets.

Trial of Insulation Coating:

After several discussions between the paper mill and Mascoat, it was concluded that Mascoat's Industrial-DTI Thermal Insulating Coating would be a viable solution for the mill's problems. Art Fleahman of Mascoat joined the plant manager in a test application at the mill and sprayed four 300°F steam lines with the coating. In line with what Mascoat said would happen, the temperature of each line was brought down to 110°F. Mascoat then performed an engineered thermal analysis on the 25 dryer cans in one machine, and it was projected that the plant's return on investment would be realized within 18 months. After the successful test and analysis data, the plant decided to coat all 25 of the dryer cans with Mascoat Industrial-DTI to combat energy loss and increase production.

Description of Full Project:

Job Specifications:

- 1 paper machine
- 25 dryer cans on the machine
- 5 feet in diameter each
- 19 feet long each
- External temperature of 365°F
- No previous insulation installed



Figure 1 - Fourdrinier Machine

Before application could begin, the applicator, W.W. Enroughty of Richmond, VA, was required to clean the cans with an industrial cleaner and 3500-psi high-pressure water. There were several areas of the dryers that needed to be cleaned with needle scale equipment and some grinding (SSPC-SP3). The dryer cans were primed with an industrial surface tolerant primer and then allowed to cure. A primer was necessary because the substrate was galvanized metal. Since the coating is water-based and could induce flash rusting, galvanized metal is the only metal that Mascoat Industrial-DTI requires a primer to be applied prior to application.

Since the dryer cans are powered by steam pressure, the coating was a perfect fit for this application. The system loses energy when steam travels through non-insulated lines. Not only does the steam have to be pressurized again, but the pipeline condensates and drips on the floor causing a personnel hazard. By coating the steam line with Mascoat Industrial-DTI, these problems are neutralized.

Application Details:

- 7 coats on each dryer can and steam line
- 20 mil increments with time to cure in between
- Total of 140 mils for each dryer can and steam line
- 4 days allotted for application

Post Application:

After application to the dryer cans and the machines were put back into service, staff at the paper mill quickly realized several benefits. The first comment from production staff working closely to the dryer cans was that it is much cooler working directly around the equipment, making it easier to work near to the machine. Staff also noticed that the cooling oil, necessary for proper functioning of the machine, was 30°F lower than they had previously seen. Plant engineers concluded that this reduction in cooling oil temperature would increase bearing life throughout the machine by 35%. This will result in substantially less maintenance that needs to be performed in the future.

The customer reported astounding results for the steam line once the Mascoat Industrial-DTI was installed.

- Wet End – 8% reduction in condensate return
- Press Section – 30% reduction in condensate return
- Dryer Section– 15% reduction in condensate return

These figures can be directly translated to retaining more energy within the system, resulting in less energy needed for the whole process. The beginning and ending temperatures of the steam line were identical to the test application, with 300°F surface temperatures on the steam lines being reduced to 110°F.

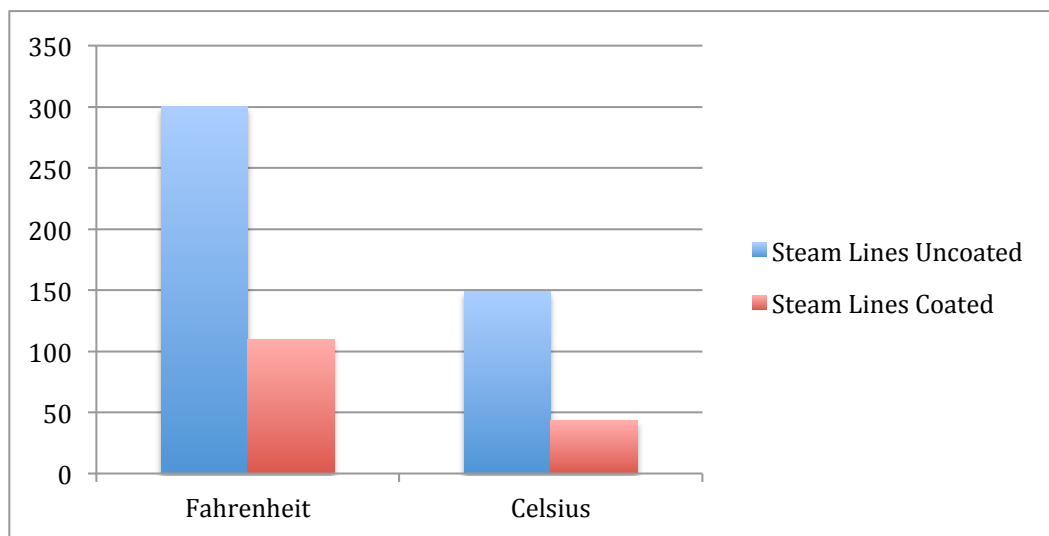


Figure 2 - Temperature decreases after application of Mascoat Industrial-DTI

Conclusions:

The Manufacturing Manager concluded that he was able to increase production of paper by 4 tons per day. While it is too soon to determine the exact energy reduction realized by the application of Mascoat Industrial-DTI, he estimates the return on investment to be about half of what was originally projected due to the increase of paper production on top of the energy savings. Mascoat's thermal analysis only takes BTU loss into account and not increased production capability. This quick ROI is directly attributed to Mascoat Industrial-DTI's effectiveness at combating energy loss. Based on these results, the customer authorized and applied the coating to a second paper machine, which contains 56 dryer cans. It is predicted that the ROI will be in line with the first application, but actual results of the second application are currently pending.



Figure 3 - Dryer can coated with Mascoat Industrial-DTI

Other advantages determined by the use of the insulation coating are the following:

- Insulation easily applied to total surface area
- Rapid application characteristics allowed for the applicator to meet the client's timeline
- Coating could be applied while machine was in service, maximizing production
- Mascoat Industrial-DTI reflects heat back into the dryer cans and steam lines, reducing energy requirements
- Surface temperature of dryer cans and steam lines are greatly reduced, enhancing personnel protection efforts in the facility
- No overspray issues with surrounding equipment, as the product only has a 3-foot dry fall
- Solved safety problem of a hot (300°F) metal surface in a working environment now allowing for meeting current OSHA five-second burn ruling

End report