

June 21, 2004

Mr. James Smith
Rotary Kiln and Dryer Metal of America

RE: Plant Evaluation of Rotary Dryer Equipment

Dear James,

We appreciate the opportunity to assist you in the evaluation of your rotary equipment. This inspection was completed under production conditions with non-destructive testing such as ultrasonic thickness testing of the shell, hardness testing of the tires, trunnions, gears and pinions not being performed. Ultrasonic crack analysis of component shafts and vibration analysis was not completed during this inspection.

The Rotary Service Company provides a more detailed technical report for our customers upon request. The report more extensively identifies predictive and preventative maintenance potential of critical components within the unit. The more extensive report identifies potential catastrophic failure within the vessel itself, associated drive components and the vessel support structure of trunnions, shafts bases etc. not apparent through visual inspection of the unit.

Our technicians are trained in a variety of non-destructive testing applications that more accurately analyze the useful lifespan of the critical components of your vessel. This technical inspection must be completed during a period in which the unit can be emptied of product, cooled down and locked out for several hours. Most cases, a vessel entry will be necessary to complete the inspection, with a confined entry permit obtained from your safety department prior to scheduling the inspection. The vessel will need to be observed under production loads to ascertain indicators of alignment problems, and to perform the vibration analysis of the vessel and it's ancillary drive components.

Rotary Service Company provides ovality analysis in units that typically see extreme heat such as kilns and calciners. The Rotary Service Company procedure for ovality analysis is a tried and true procedure, depending upon precision optical measuring devices to accurately depict deflection in the shell over the entire length of the vessel. If necessary, internal measurements can be accomplished to validate sagging or distorted refractory within the vessel.

This report, however addresses only the condition of your rotary equipment as observed during my visit and through our conversation. The inspection completed was an exterior visual inspection and does not address internal maintenance issues of the dryer units.

ASPHALT DRYER – PLANT EVALUATION

The unit was observed visually and under production conditions while running.

ISSUE:

Overall, the unit appears to be running satisfactorily with some vibration being created by the burner. The vibration has caused timing marks across the face of the discharge tire with the trunnions mirroring the tire.



Vibration from the Burner is being transmitted directly to the dryer support frame, affecting the tires & trunnions

RECOMMENDATION:

Isolate the burner and its support assembly from the dryer frame using support legs and cross bracing independent of the main dryer frame assembly.

It appears there is room to install support legs and cross bracing at each corner of the burner support frame to ground elevation. Some engineering will need to be accomplished regarding footing requirements and steel sizing to sufficiently support the burner.

ISSUE:

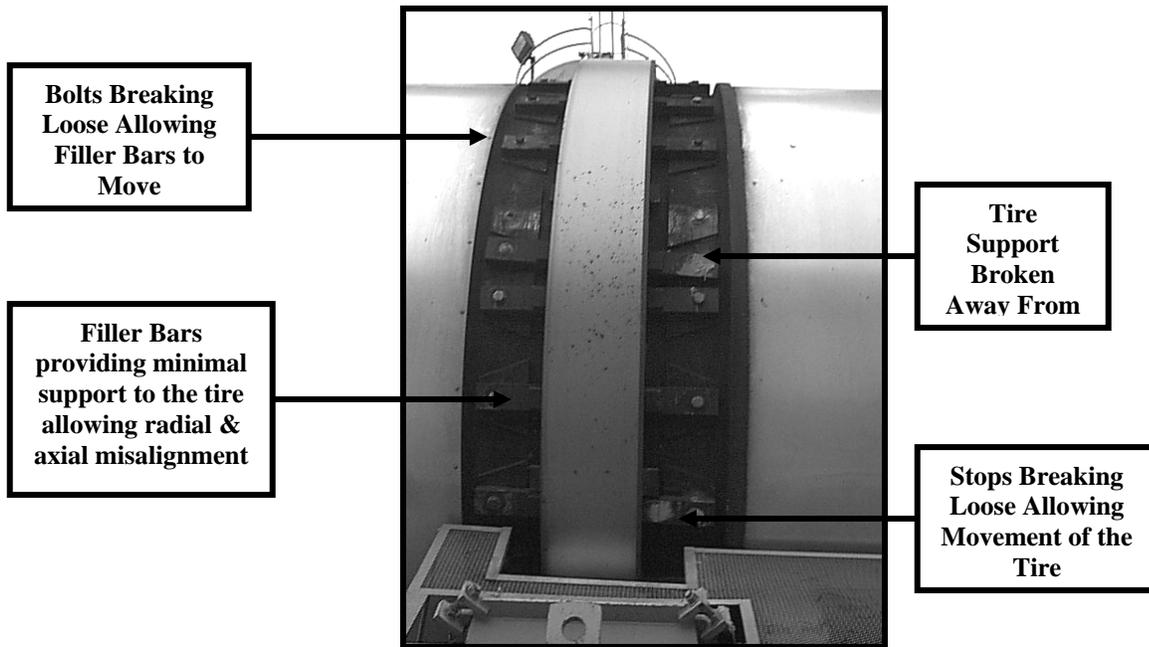
The dryer was thrusting hard on the downhill thrust idler. Understandably, asphalt dryers cannot be expected to “float” between the thrust idlers due to the variance in mix designs, material feed and rates of production. Never the less, the drum should not be allowed to ride hard upon either of the thrust idlers.

RECOMMENDATION:

Alignment of the vessel should be accomplished while running the “average” production load, allowing for movement of the drum for extremes on both ends of the spectrum. Some contact with the thrust idlers is unavoidable, but should only be light contact and not supporting the entire weight of the drum and the material. Light grinding of the tires and trunnions may be required to properly align the vessel.

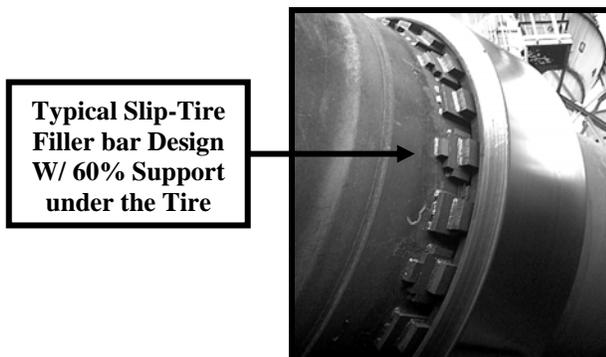
ISSUE:

The tire support system at the inlet tire is failing and should be looked at for replacement at the next opportunity.



RECOMMENDATION:

Remove the existing anti-rotation tire support design, and replace it with a fully supported slip tire design. This design provides much better support to the underside of the tire, preventing premature movement of the tire in the axial & radial alignment to the centerline of the drum. Removal of the anti-rotation stops will stop the tire from peeling away the filler bars every time the tire attempts to creep.



ASPHALT DRYER – Joliet PLANT EVALUATION

The unit was observed visually after daily shutdown.

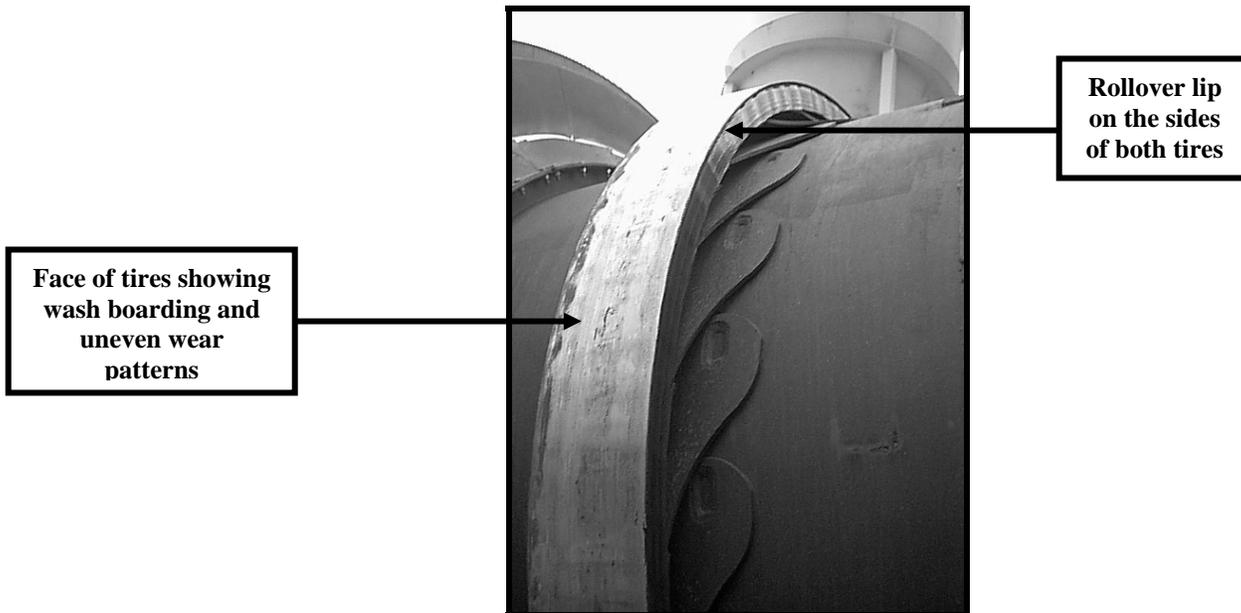
The unit appears to be holding up well considering the age of the drum. The sprung tire support design is appropriate for the application and appears to be adequately supporting the tire.

ISSUE:

Both tires are showing considerable wear with approximately ½” rollover on the sides of the tires. The trunnions appear to be worn out. Testing of the tires and trunnions revealed the following information:

TIRE HARDNESS: 285/325 BRINEL

TRUNNION HARDNESS: 475/550 BRINEL



RECOMMENDATION:

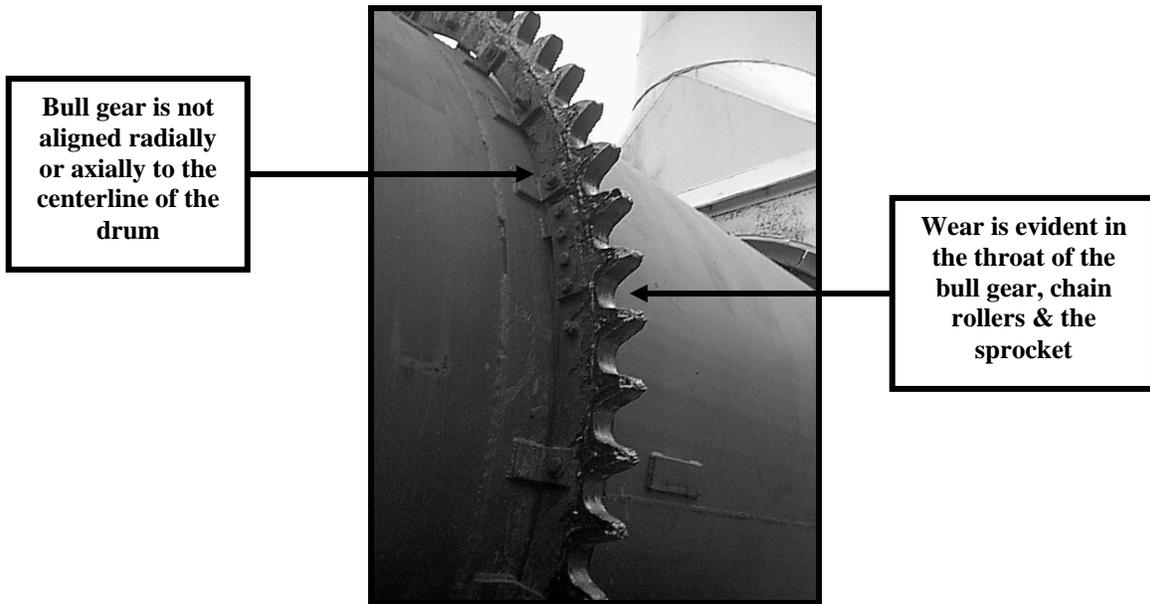
The trunnions should be replaced with new or reconditions assemblies. Bearings should be replaced and housings cleaned, inspected and replaced as necessary.

Both tires should be ground to reestablish axial & radial alignment to the centerline of the drum, with taper, concave or convex conditions removed from the faces of the tires.

Alignment of the vessel should be accomplished while running the “average” production load, allowing for movement of the drum for extremes on both ends of the spectrum. Some contact with the thrust idlers is unavoidable, but should only be light contact and not supporting the entire weight of the drum and the material.

ISSUE:

The bull gear, chain and sprocket are exhibiting considerable wear. Some noise from the drive train is being transmitted to the discharge tire, causing a washboard effect on the face of the tire. The bull gear is bolted to the drum and does not appear to be correctly aligned. This condition causes the chain assembly to tighten and loosen, as the drum is rotated causing loading and unloading to occur across the entire drive assembly. Premature failure of the chain, sprocket, bull gear, or gearbox could result.



RECOMMENDATION:

Replace the bull gear, chain and sprocket as a unit. Align the bull gear to the centerline of the vessel negating the loading and unloading of the drive assembly.

ISSUE:

The shell exhibits wear from extended use. Some repairs have been made to the exterior of the vessel where the shell has worn thin. There is an undetermined amount of wear on the shell due to the extended usage.

RECOMMENDATION:

Have the shell ultrasonically tested at the obvious wear points to determine the amount of damage sustained. Considering results of the testing, install hardened plate at the wear points (preferably on the interior of the shell), or replace the entire dryer if in fact, the integrity of the shell is lost. If the shell can be repaired, internal flighting should be inspected and replaced as necessary.