

Temperature Tests of a BS&W Bowl

BY RANDELL POWERS, BAMA COMPANIES, INC.

Bama Companies Inc. manufactures pies, biscuits and dough products for sale directly to consumers, as well as ingredients for other products. Bama Foods Ltd., Bama Frozen Dough and Bama Pie facilities are located in Tulsa, Oklahoma. A few years ago, Bama Foods began a total productive maintenance (TPM) initiative to improve productivity, machine reliability and quality.

One specific issue that plagues most machinery reliability improvement programs is moisture contamination and the problems associated with this contaminant. This case analysis introduces issues around the use of bottom sediment and water (BS&W) bowls that are often used as one of several methods to help control the presence of moisture.

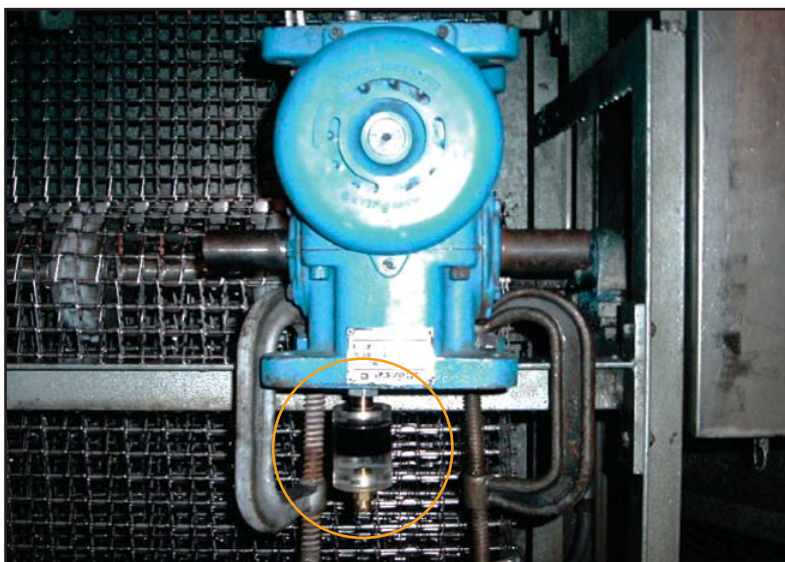


Figure 1. Test reducer installed, BS&W bowl containing one-half ounce of water

Reason for Test

Moisture condenses within the tension station gear reducers. The churning action of the gear reducer mixes the moisture with the oil and degrades the oil. The moisture also causes rust within the gear reducer. The degradation of the lubricant and the presence of rust particles greatly contribute to the failure of the gear reducer. The BS&W bowl provides a location for the moisture to drain from the gear reducer, be visibly noted and drained. Advertised room operating temperature range is -30°F to 150°F. Construction material is methyl methacrylate with Weldon No. 4 adhesive.

Purpose

To determine if the BS&W bowl can successfully operate in the conditions of Bama Foods Ltd. -40°F Northfield spirals.

Test Criteria

The test will be conducted on a gear reducer placed in the -40°F Northfield Spiral (freezer No. 1). Actual running equipment will not be used.

1. Install a one-ounce BS&W bowl on a test gear reducer. (We use BS&W bowls sold by Esco Products, Inc.)
2. The test gear reducer will be placed in the general area of the gear reducers in use on the spiral system.
3. Approximately one-half ounce of water will be placed in the BS&W bowl.
4. The BS&W bowl will then be attached to the test gear reducer.

5. Sufficient lubricant will be added to fill the BS&W bowl, and a small amount will be added to the gear reducer.
6. The gear reducer with the BS&W bowl will be placed in freezer No. 1 and suspended over a gray maintenance bucket. The bucket should be large enough to contain all the lubricant and water used for this test. At no time will the product be placed in jeopardy.
7. The test shall commence on a nonproduction schedule and run through two production schedules, approximately 28 days.
8. The temperature of freezer No. 1 will be monitored.

Performance Criteria

Any cracks, fractures, chipping or breakage will constitute a failure. Photographs will be taken before and after the test for comparisons.

The test was performed from August 31, 2003 to September 27, 2003 in accordance with the procedure authorized by both

maintenance management and quality management departments.

Findings

There were no cracks, fractures, chipping or breakage of the BS&W bowl (see photographs of the BS&W bowl before and after the test). The lowest attained temperature was -41.1°F. The average coldest temperature was -35.2°F. The average temperature was -27.8°F. Freezer No. 1 temperature sheets were compiled for the timeframe of the test. The temperatures were taken every 30 seconds while the freezer processor was powered.

Recommendation

Place the BS&W bowl on the conveyor belt tension stations in the freezer. **ML**



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Figure 2. BS&W bowl (Before)



Figure 3. BS&W bowl (After)