

SEALING LEAKS BY THE FURMANITE PROCESS

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Abstract

Leaks in the sugar industry, as in any other industry, affect production and cause loss of profits. A method of sealing leaks has been developed and successfully applied in various mills in the industry. At Glendale mill, pan flanges as well as crystalliser glands were sealed, on stream, with no loss of production.

Introduction

In mid 1978 Furmanite Reunert undertook their first work in the sugar industry at Sezela mill on the Natal South Coast. Two cast iron vacuum pans and one crystalliser gland were successfully sealed¹. Since then, numerous leaks of varying descriptions have been sealed at most of the major sugar mills. This paper outlines some experiences at Glendale factory.

The two compounds used in the sealing technique are F77V for the crystalliser glands and F73A for the pan flanges.

The F77V has a thermal tolerance of 240°C and incorporates a lubricant for moving glands.

The F73A has a lower thermal tolerance (up to 150°C) and gives far more pliability to accommodate the expansion and contraction of a vacuum pan.

Procedure

Crystalliser Glands

The problems arising from the abrasive and corrosive nature of massecuite are well known to process and engineering personnel alike. Such gland leaks are a problem at most mills and may continue substantially to undetermined losses.

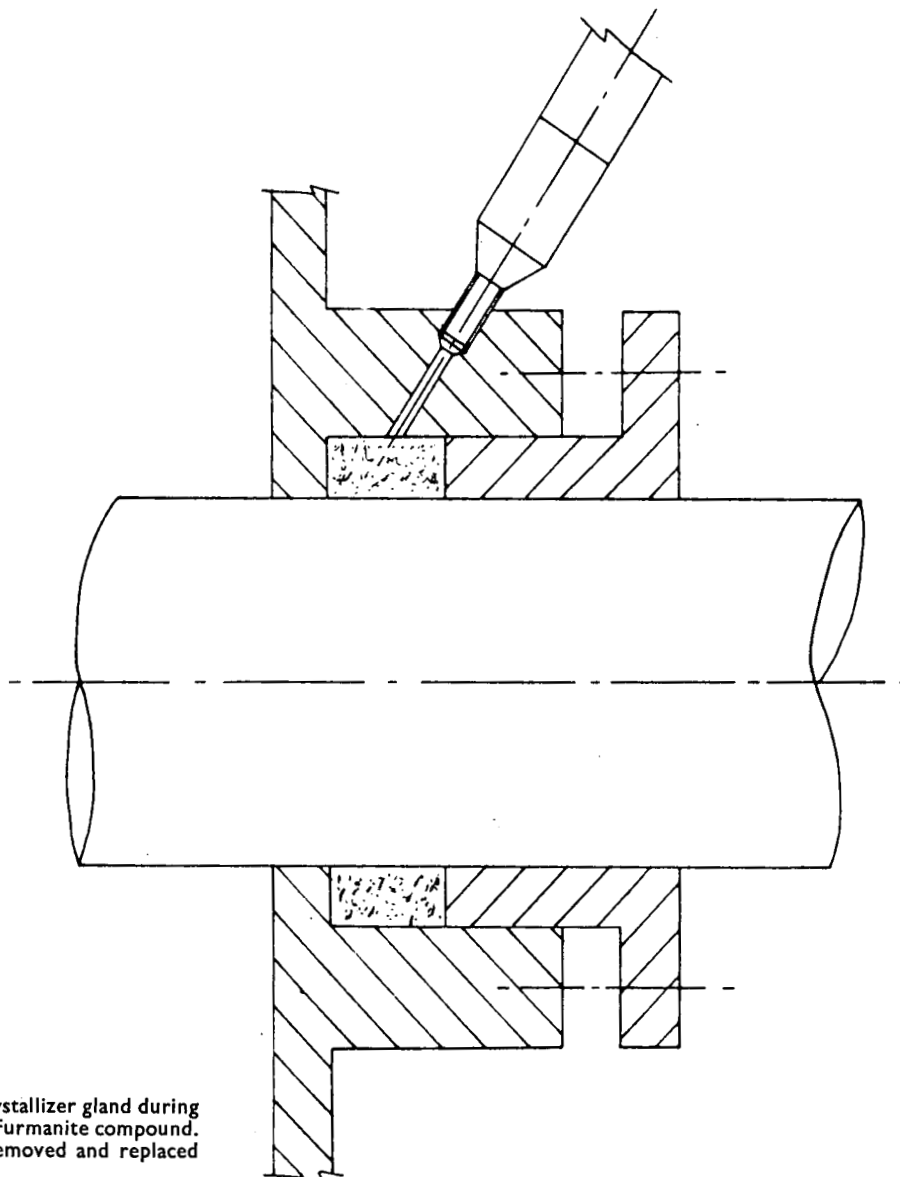


FIGURE 1 Section of crystallizer gland during injection of Furmanite compound. Injector is removed and replaced by a plug.

Furmanite Reunert has now developed a special sealing compound for rotating glands which is resistant to the acidic content of the massecuite and the abrasive nature of the sugar crystals.

The original crystalliser gland at Sezela was sealed whilst the crystalliser was fully operational, remaining sealed without any further attention for the 18 weeks preceding the off-season shut down. This period is considerably longer than most conventional packings, with the added advantage that no product loss occurs should be necessary to pack a gland on the run.

At the commencement of the 1979/80 season this technique of sealing glands was developed further at Glendale Sugar Mill. Two crystalliser glands were opened up and the gland housing and followers as well as the shaft were all brought back to their original dimensions and tolerances.

The process involves packing the glands and then injecting the special compound under hydraulic pressure through an adaptor into the gland, thus ensuring a tightly packed seal. The heat of the massecuite quickly cures the compound into a homogeneous mass that resists abrasion and chemical attack. Because the compound also contains a lubricant, shaft wear is minimal.

No leaks have been observed for the 24 week season past and the glands remain untouched as the 1981/82 season commences.

Vacuum Pan Air Leaks

Being one of the older mills in the industry, there are still some of the old cast iron pans in use. These pans can still boil extremely efficiently providing there are no air leaks. The vacuum pans that required attention at Glendale Mill are both 20m² capacity, being 3,0 metres diameter and 3,5 meters high. As far as can be ascertained, they are Fletcher pans made in early 1900's.

The process of sealing involved the insertion of a 1 mm diameter soft brass caulking wire between the flanges which acts as a retaining dam for the compound, which is subsequently hydraulically injected. The bolt holes are also filled with the compound using special adaptors. The flange circumference sealed was over 9,5 metres per flange and included bolt holes. The whole sealing operation was carried out on line just after start up with no loss in production. A thermo-setting compound was used which cured within forty minutes, successfully sealing the ingress of air.

Conclusion

The crystalliser glands sealing cost was compared with the cost of repacking a similar gland with conventional grease packing.

The conventional grease packing in use at Glendale for these glands was Impact 13000, priced at R58,93 per meter.

Allowing for five rounds of packing on a 101 mm shaft diameter, one gland will cost R94,88. Two glands packed three times a year (as a minimum) means that each crystalliser costs a minimum of R569,00 per season.

The cost of sealing two glands using the Furmanite method is very comparable at R471,70 and becomes even more cost attractive if one considers that there is every possibility that these glands will remain sealed for two seasons.

Acknowledgements

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REFERENCES

1. Anon, "New Method of Sealing Leaks in Sugar Milling Plants." *SASJ*, 62 (ii) 577-9 (1978).