RESEARCH ARTICLE

Preventive Detection Method for Leakage of Sheet Tobacco Dryer

Qingyu Feng
Jiangxi China Tobacco Industry Co., Ltd., Nanchang, Jiangxi, 330096, China

Abstract: Content Sheet Tobacco Dryer is an important and key equipment in the tobacco making workshop of cigarette factory, its function is mainly to expand and dry cut tobacco, and the drying process is mainly carried out by the sheet heating plate in the drum through heat conduction, while the energy of the sheet heating plate mainly comes from the steam inside, and there is a risk of leakage through continuous operation of the sheet and its accessories, once leakage occurs, it will cause quality accidents of tobacco products, and leakage can be well prevented and eliminated through regular leakage detection.
Keywords: Test method; sheet leakage; silk dryer

Citation: Qingyu Feng, 2021. Preventive Detection Method for Leakage of Sheet Tobacco Dryer. *Advances in Material Science*, 5(1): 10-12. http://doi.org/10.26789/AMS.2021.01.004

1 Introduction

There are two process sections in the silk drying section of the tobacco-making workshop of a cigarette factory, which are respectively made by two KLD-2Z sheet tobacco dryers manufactured by HAUNI Company of Germany. After continuous operation, among them, the 5000kg/h sheet tobacco dryer found that the expansion joint of its sheet heater pipe leaked once when dealing with other faults, which did not cause any influence after timely treatment.

2 Working Principle

The KLD-2Z sheet dryer in the tobacco workshop of a factory is a product of HAUNI Company. Its technological task is to expand and dry the cut tobacco shreds, remove part of the moisture in the cut tobacco shreds, improve the filling capacity and processing resistance of the cut tobacco shreds, meet the processing requirements of the post-process, highlight the cigarette aroma style, improve the sensory comfort and sensory quality, and at the same time give consideration to the sensory quality and physical quality of the cut tobacco shreds, so as to realize the coordination and unification of the two.

The wall of the tobacco drying drum is equipped with heating plates. When the drum rotates, the blades drive the tobacco to rotate together and transport the tobacco forward through the slope of the drum. Because of the rotation of the drum and its inclination angle, the cut tobacco always contacts with the steam heating plate of the drum.

In this process, the cut tobacco is stirred and evenly heated. The heat carrier (i.e. saturated steam) is sent to the drum wall heating plate of the dryer through the "rotary joint". The rotary joint distributes steam to the steam channels of the heating blades in the drum through pipes and leads the condensed steam out of the dryer. The wall temperature can be adjusted by steam pressure or steam flow. The heat heated by the steam on the heating plate of the drum wall is effectively conducted to the cut tobacco. A fan is used to send ambient air into a heat exchanger heated by steam. The air is heated in the heat exchanger, and then divided into hot air for drying cut tobacco and hot air for heating the moisture removal system. The hot air temperature is adjusted by the steam pressure of the heat exchanger. Cut tobacco is supplied to the dryer through the opening in the inlet mask plate by the vibrating trough conveyor.

3 Leakage Phenomenon

During the inspection, it was found that there was scale and carbon deposition in the steam inlet pipe of a thin plate of the 5,000-line tobacco dryer. It was preliminarily determined that there might be leakage at this place. If

it is not handled in time, the moisture content of cut tobacco will be high and fluctuate greatly in the production process, and wet smoke will be produced in cut tobacco. Through cleaning and inspection, it was found that the expansion joint (see Figure 1) in this pipeline was cracked, and the specific leakage point was detected.

Fig. 1 Leakage of expansion joint

4 Cause Analysis

The thickness of the expansion joint is 1mm, and it will stretch and contract in the process of thermal expansion and cold contraction. The expansion coefficient of the expansion joint is different from that of the pipeline. After running for a certain period of time, the expansion joint will crack and leak due to fatigue.

5 Solution

In view of the above problems, it is proposed to establish a leakage inspection and testing method of the thin plate of the tobacco dryer which is in line with the actual situation of the workshop, which is conducive to preventive inspection.

(1) Design a special flange. According to the actual situation on site, technicians have made special flanges with connecting cones (see Figure 2) to butt the steam inlet and condensate outlet of rotary joints.

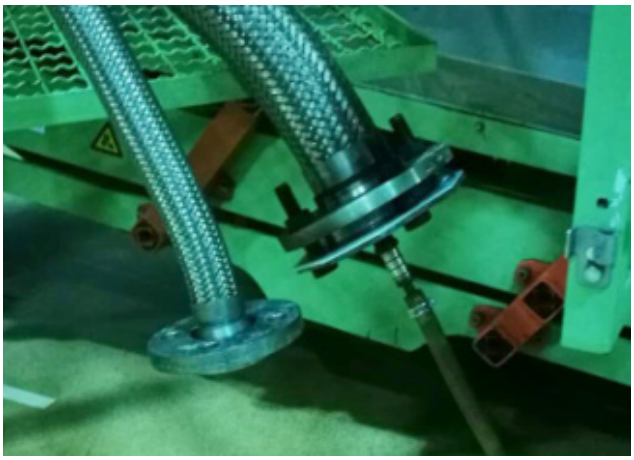

Fig. 2 Special flange

(2) Design test record form (see Table 1).

(3) Implementation steps: (1) Dismantle the protective cover of the rotary joint and open the side access door of the discharge end of the drying drum; ② Disassemble the metal hose connected with the swivel joint in Area 1. Pay attention to the fact that there may still be condensed water in the pipeline at this time. A bucket should be placed here to receive water to prevent it from leaking to

Table 1 Pressure test table

Name of silk dryer: 5,000 sheet silk dryer, 3,000 sheet silk dryer									
serial number	area code	working medium	the test pressure	test medium	Test medium pressure	Pressure measurement start time	End of pressure measurement time	pressurize time	remark
one	Area 1	steam		empty					
2	Area 2	steam		empty					
test result									
test personnel									
time									

the ground and affecting the site environment. ③ Connect the steam inlet of Zone 1 with the manufactured special flange, and connect the condensate outlet of Zone 1 with the plugging flange; ④ Introduce the test medium (compressed air or water) from the special flange of steam inlet, and keep the pressure for not less than 30 min after the pressure gauge shows a stable value; ⑤ When the pressure holding time reaches the specified time, the maintenance personnel enter the drying drum from the access door, and check whether the heating plate is leaking by sound and eyes; ⑥ If leakage is found, the inspection will be finished if the leakage point can be clearly found. If the leak point cannot be judged, water can be used as the test medium for testing again, and the steps are the same as above. ⑦ Test steps of sheet area 2 are the same as those of area 1; ⑧ If leakage is found, repair the leakage point according to the maintenance steps, and then check the pressure maintaining of the sheet according to the leakage inspection method again after repair.

6 Effect Verification

From May 27th to 29th, 2018, the tobacco mill workshop of the cigarette factory carried out the sheet pressure test on the 5,000-sheet tobacco dryer periodically. Before the test, the workshop arranged the personnel arrangement, test method and test time, and recorded the process according to the Pressure Test Table of the Tobacco Mill Drying Machine. On 27th, the water pressure test was carried out on the 5,000-sheet tobacco dryer. In the morning, there was no leakage in Zone 1, and in the afternoon, there was no leakage in Zone 2.

From July 23rd to 24th, 2019, the workshop conducted inspection and test again according to the test cycle, and there was no leakage during inspection, as shown in Table 2.

Table 2 Pressure test table

Name of silk dryer: 5,000 sheet silk dryer □ 3,000 sheet silk dryer □									
serial number	area code	work medium	Be normal press	test medium	Test medium pressure	Pressure measurement start time	End of pressure measurement time	pressurize time	remark
one	Area 1	steam	0.2~0.35MPa	Empty	0.63 MPa	three past four p.m.	twenty to five p.m.	0.6h	
2	Area 2	steam	0.2~0.35MPa	Empty	0.63 MPa	three o'clock pm	half past three p.m.	0.5h	
test result	After holding the pressure with air pressure and water for about half an hour, it entered the cylinder for inspection, and no leakage was found.								
test personnel	* * * Wait for 6 people.								
time	July 2019								

References

[1] Gong Chaowei, Zhang Xinglin, Wu Wei, et al. Eliminating the influence of moisture discharge condensate on the temperature of the drying sheet [J]. Light Industry Science and Technology, 2018,34(12):21-22.

[2] Huang Chuanxi, Chunlei Chen, Gao Xiang, et al. Study on the influence of different drum inclination angles of sheet tobacco dryer on product quality [J]. Food Science and Technology and Economy, 2018,43(10):118-120.