McCLOUD
PEST SOLUTIONS SINCE 1904

CASE STUDY REPORT

PEST RISK ASSESSMENT FOR A BOURBON DISTILLERY

Introduction

Rickhouses are large, multi-story warehouses used to store and age bourbon in wooden barrels. These rickhouses are oftentimes constructed of hardwoods and softwoods and are not environmentally conditioned (i.e., ambient temperature and relative humidity). Rickhouses have serviced the industry well for several decades, but with age they have become susceptible to damage from severe weather and pests. Rickhouses, although not homogeneous, do exhibit many similar characteristics. Rickhouses are typically constructed of large wooden support poles with horizontal storage racks known as "ricks." The rickhouse is sheathed with corrugate tin metal which provides little protection from ambient environmental conditions. They're prone to temperature swings and high relative humidity, particularly during warmer months. This construction has led to many rickhouse collapses in 2018 and 2019. This prompted the bourbon industry to investigate methods to reduce these collapses in order to avoid worker injuries, product loss, environmental damage and dangerous recovery missions. Wood-destroying insects such as powderpost beetles, roundheaded borers and subterranean termites, while never proven as root cause for rickhouse collapses, should be managed to decrease structural integrity degradation of rickhouses.

Challenge

McCloud Services was tasked with developing a comprehensive wood-destroying insects (WDI) risk assessment for a whiskey company's rickhouses. The client wanted to mitigate WDI's affecting the structural integrity of the rickhouses, identify conditions conducive for WDI development and provide a road map of WDI activity within each rickhouse. In addition, McCloud suggested expanding risk assessments to include pest activity such as insects, spiders, bats and other wildlife living in or around the rickhouses.

Investigation

McCloud Services Technical Director designed a risk assessment to identify and address WDI's and other pests within the client's rickhouses. Data suggested rickhouses were most likely to be affected by powderpost beetles, particularly beetles in the Anobiid family. Anobiid powderpost beetles are especially troublesome because their larvae can attack aged hardwoods and softwoods. Anobiids can digest cellulose extracted from their food sources so wood age is not important. Lyctid powderpost beetles, on the other hand, depend on starch of newer hardwoods and rarely attack older wooden members. Lyctid powderpost beetles are rarely a long-term problem in rickhouses. Roundheaded borers are also known to infest rickhouses constructed with softwoods like pine. These insects can survive for 2-10 years. As larvae, this pest lives within the softwood where they consume heartwood prior to emerging as adults. Although less common than Anobiid powderpost beetles, roundheaded borers can attack and substantially damage softwood in rickhouses. Termites can also damage wood within rickhouses and should be included in rickhouse risk assessments. Typically, subterranean termites are present at lower levels of rickhouses because of their relationship with the soil near poured footers.

Solution

The client's rickhouses were inspected by qualified McCloud Services personnel to identify WDI and additional pest activity. A well-trained inspector knowledgeable in WDI damage and pest identification is essential as rickhouse inspections are tedious and require PPE, such as intrinsically safe environmental monitors, knee pads and hard hats. Full-day inspections are common, so the inspector needs to be prepared (i.e., drinks, food, etc.) since many rickhouses are in remote areas. During the inspection, pest activity was designated on rickhouse facility maps on each floor level. Moisture meters were used to determine moisture levels within the wooden members on each floor as well. Moisture levels above 12% were considered susceptible to WDI activity. Moisture damage was also noted when found. Inspected rickhouses revealed that most of them had been constructed of softwood and were being attacked by roundheaded borers. However, exact species were not determined because adults were not found during the assessments. Although, it could only be one of two roundheaded borer species – old house borer and flat oak borer – since these pests are known to attack rickhouses in Kentucky, where the client is located. However, management of both species is similar. Brown recluse spiders were also found in a few of the rickhouses and were immediately treated. In addition, stinging insects and bats were found in the rickhouses, particularly on the upper levels.

Summary

Powderpost beetles and roundheaded borer management in rickhouses has limited options and very few are practical on a large scale. Most experts, including our team of entomologists, conclude wood-destroying beetle management consists of moisture reduction, wooden member replacement or treatment with borates (e.g., Timbor® or Bora-care®). When wooden members are replaced in rickhouses, they can be treated to prevent attack from WDI's as it is a relatively inexpensive and easy treatment. Subterranean termites can be easily controlled using soil drench methods used throughout the pest control industry. However, their ability to significantly damage structures should not be underestimated and their presence should not be tolerated in rickhouses. Wooden members with excessive WDI activity should be evaluated by structural engineers to determine if they are sound or if they need to be replaced. Damaged wood can be further evaluated by using a resistance microdrill. This requires a trained and knowledgeable person familiar with this type of work. However, it may be prudent to simply replace wooden members exhibiting extensive WDI damage, if practical. WDI inspections should be performed at least semi-annually or annually to assess ongoing WDI presence within them. Doing so provides a proactive approach to WDI management and can potentially reduce rickhouse collapses.