

# STEEL STORIES

Amazing Coated Steel by BlueScope

## STEEL STORIES FEATURE

### Common Influence of Palm Oil Mill and Smelting Plant on Buildings

In countries with tropical weather, such as Malaysia; it is bound to result in high humidity levels. With an abundance of rain and sunny weather all year round, it is an inevitable factor that buildings in Malaysia are exposed to moisture all year round. Such environment can dictate how a building can deteriorate especially for factories that involves heat and moisture, such as palm oil mills and smelting plants.



# Palm Oil Mill

## Signs

In a typical palm oil mill process, high amount of steam is being emitted as a result of the sterilization process. The sterilization process consists of cooking the fresh fruit bunches (FFB) at temperatures in excess of 100°C using high-pressure steam from the boiler. Upon opening the pressure-cooking chamber to release the cooked fruit bunches, a large amount of steam is usually emitted throughout the building. Like how steam is released from pressure cooker we have at home, the steam can be seen condensing onto surfaces in proximity, especially whatever surfaces right above it. In the case of palm oil mill, that would be the roofing sheets.

From our past inspections of palm oil mills, areas close to the sterilization process are emphasized to detect any influence it has on the buildings. Generally, there are two crucial signs which indicate the influence of condensation, including:

- I. The formation of water droplets, watermarks or even drip marks on the claddings; depending on the intensity of the steam condensation.
- II. Signs of heavy oxidation, typically white dots as a result of the water droplets. As the palm oil mills typically operate 24/7 to keep up with the efficiency and productivity, the claddings are constantly exposed to the steam generated by sterilization or similar processes.

## Causes

As a result of the constant exposure to steam, the claddings run the risk of accelerated corrosion. With white spots forming due to the heavy oxidation, this could be damaging in the long term as it may turn into rusts. However, rusts are typically prone to happen in areas directly above the sterilization chamber.

As the steam is constantly released upwards towards the cladding, this causes it to eventually corrode with perforated holes. In certain severe cases, due to the constant exposure to high levels of humidity internally, the steel structures could fail as some structures may not have been well protected.

## Preventions

In light of the signs and causes, it is vital to implement certain methods to prevent high humidity environments from causing long term damages. One crucial method to be considered would be preventing the steam from being released internally, hence preventing damages. Often these machines are kept in a closed environment therefore the use of chimneys are essential to direct the steam out of the building.

However, the location of the chimney plays a distinctive part; as in certain cases, chimneys are placed too close to the building resulting in the wind directing the steam towards the building. Therefore, the distance and height of the chimney are keys to preventing long term damages. Besides that, the use of a vapour barrier can be a crucial prevention method.

Vapour barriers are barriers that do not have any porosity to transfer the moisture through the membrane. It is typically used as the steam that is released would not be absorbed by the vapour barrier, providing an internal shield to defend the steam from the claddings and other parts of steel structures.



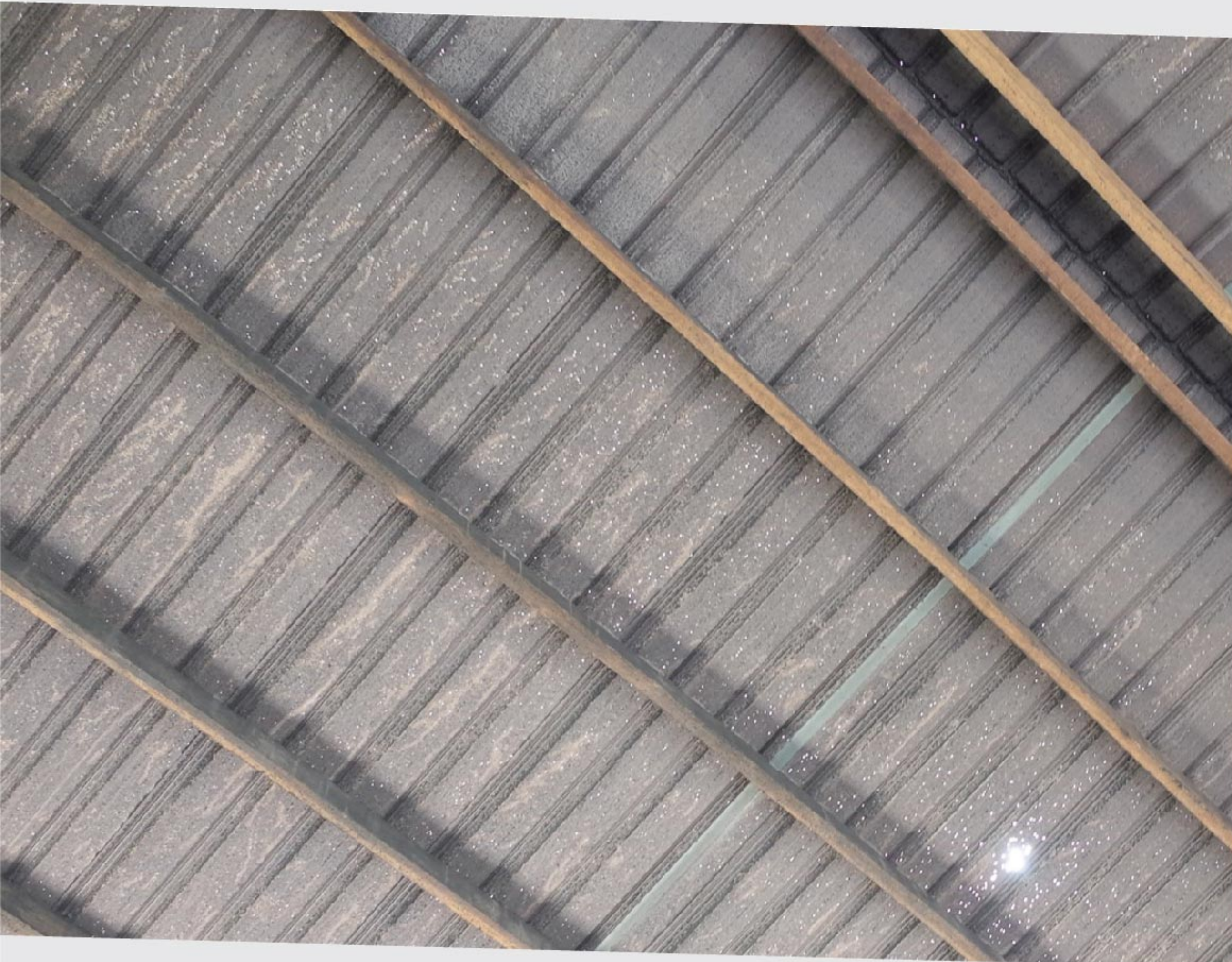
# Smelting Plan

## Signs

Smelting or in layman's term, the process of melting metals at high temperature; usually well above  $1000^{\circ}\text{C}$  has a range of disadvantageous causes to the smelting plants. Due to the nature of the process, it creates an internal environment that is extremely hot and humid and the need for Personal Protective Equipment (PPE) for workers attending to these processes. As molten metals do not contain moisture, occurrence of condensation is not as obvious as steam from palm oil mills, nonetheless condensation still occur in hot and humid conditions.

In order to detect early stages of influences on the building, two key observations should be undertaken, including:

- I. Occasional water droplets from roof nearby the smelting area, possibly during night-time or rainy days.
  - II. White dots appearing on the claddings as well as the walls as a result of the prolonged moisture exposure.
- However, these signs typically depend on the location, i.e. the furnace and places generating large amounts of heat.



## Causes

Similarly to the palm oil mills, smelting plants operate 24/7 and a significant amount of energy is needed to constantly heat the furnace. As a result of this, the external temperature at night may be lower than the temperature within the factory, creating water droplets on the claddings directly above the furnace due to the dew point.

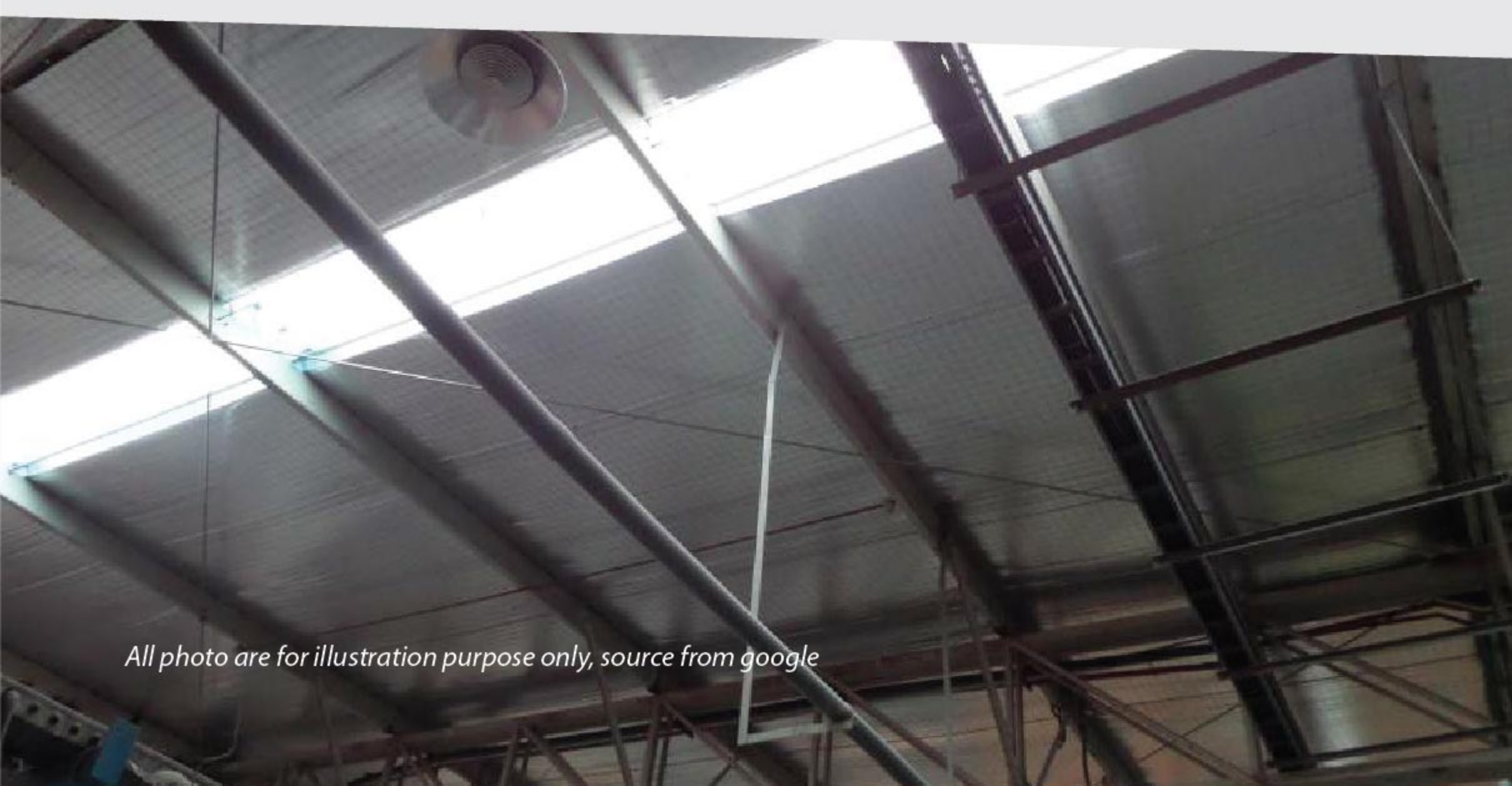
Dew point is the phenomena where water vapour condenses to become water droplets. If the roof surface temperature is lower than the dew point, this then results in internal air condensing onto the colder surfaces. Take the morning dew for example, water vapour condenses to water droplets due to the change in temperature during the night and day.

Therefore, the use of a dew point chart is essential to deduce the point at which condensation starts occurring.

## Preventions

Several precautions can be taken to prevent smelting plants to be compromised in terms of their structure. One crucial method that can be implemented is designing proper and sufficient ventilation to ensure that the internal temperatures do not gush towards the claddings and other steel structures, thus preventing condensation from occurring. Besides that, it is also advisable to increase the roof height of the smelting plant as this could prevent condensation, similarly, to having sufficient ventilation and resulting in a reduction of the internal temperature.

Like the palm oil mills, the installation of vapour barriers on to the roof or on the steel structures could also be implemented as vapour barriers could shield the roofing or steel structure from prolonged condensation.





# Colorbond®

## Steel Installed in Winery and Restaurant

Amid vineyards and an internal environment consisting of a restaurant, brewery process, cold storage area and a warehouse, the Waterkloof Wine Estate is a proud user of the **COLORBOND®** steel for over 12 years. Without compromising the colour performance and with BlueScope's Clean Technology, the **COLORBOND®** steel is indeed well suited for buildings as such.

In the last visit to the Waterkloof Wine Estate, an inspection was conducted to assess the **COLORBOND®** steel performance since its installation in the year 2009. During the inspection, the colour performance of the claddings was compared with an original colour sample and the results were simply profound as the wall claddings showed minimal differences. The overall **COLORBOND®** steel appearance was also improved by BlueScope's Clean Technology, which prevented formation of watermarks on this prestigious building.



Upon comparing the photos of then and now of the building cladded with **COLORBOND®** steel, the beauty of **COLORBOND®** steel is retained at a level that seems it had not aged a day. Indeed, BlueScope is proud to be a part of the Waterkloof Wine Estate construction especially with its achievement of numerous awards for its restaurant and its architectural excellence.



# Steel Connect 1<sup>st</sup> Anniversary Webinar

The Steel Connect Webinar sets the stage as a leader in the industry, focusing on constant innovation to inspire design trends & meet various demands. Since its inception on the 19th May 2020, a series of 12 webinars has been conducted successfully with a number of prolific performance indexes including:



Resulting in a reach of over 3,000 individuals ranging from Architect, Engineer, Developer, Home-owners, Quantity Surveyors, Students, Lecturers and many more.



Over 1000 individuals have been engaged with in order to further solidify these 12 webinars.



A well as enhancing industry professionals' skills & development with accredited Continuing Professional Development (CPD) for Professional Architects and Engineers.

To show our appreciation towards our loyal attendees and supporters who have been connecting with us over the past year, we have lined up an exclusive session with Mr. Fekry Zaky, Coating Specialist from BlueScope Australia. Mr. Fekry has had over 33 years of experience in paint coating and coated product evaluation and will be sharing his thoughts and knowledge. Additionally, we will be giving away branded earbuds for each attendee!

DATE: 28th May 2021 (Friday)

TIME: 10AM – 11AM (1 Hour Session)

Topic: Which coated steel should you choose when all steel looks the same?

## The topic covers:-

What are the differences between a prefinished coated steel vs post-painting steel?

Do all organic coated steels provide the same product performance?

How to identify and choose a reliable prefinished coated steel?

Host: **Mr. Rocky Shet**

Technical Engineer of NS BlueScope Malaysia

Guest Speaker: **Mr. Fekry Zaky**

Coating Specialist of BlueScope Australia

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(First come first serve basis)