

PREVENTIVE MEASURES TO REDUCE THE RISK OF CROSS CONTAMINATION ON DIRECT FOOD CONTACT SURFACES OF CONVEYOR BELTS

Roger Scheffler^{1*}

¹Commerical Food Sanitation L.L.C, a daughter company of Intralox L.L.C, Lemelerbergweg 31 A, 1101 AH Amsterdam, The Netherlands

*e-mail: Roger.Scheffler@cf-san.com

Abstract

Conveyor belts are an essential component of industrial food manufacturing. They can be found in almost every part of the production process – from the receiving area of raw products / live animals up to the area where finished products are packaged. Belts must be easy to clean if they are to satisfy food manufacturing company's stringent hygiene requirements.

The aim of this study is to show the effect of various vectors in food processing plants that influence the hygiene of conveyor belts during production and sanitation. In this study we analyze hygienic design and sanitation criteria for conveyor belts as well as important aspects of GMP's and environmental monitoring when using conveyor belts for food processing.

The study includes measures to reduce the risk of cross contamination in order to protect the food product from foreign body and to ensure a safe food production process using conveyor belts.

Key words: *Easy to clean, Hygiene requirements, Hygienic design, GMP's, Environmental monitoring, Cross contamination, Safe food production using conveyor belts.*

1. Introduction

Conveyor belts are an essential component of industrial food manufacturing. Many factors influence the hygiene condition of a conveyor belt during processing as well as during the engineering phase prior the use of the belt. For conveyor belts that have direct contact to the food product it's crucial to consider hygienic design and GMP [Good Manufacturing Practices] and GHP [Good Hygiene Practices] to be put in place to keep the belt safe for food production. There are many manufacturers of food processing machinery in the world but not everyone offers machines and solutions that are hygienically designed well in order to secure an easy cleaning of the equipment. Food manufacturers now-

adays look more and more into better hygienic design of their processing equipment and cleaning practices that would at the end lead to higher sanitation efficiency and higher food safety. Preventive measures are essential to keep the belt hygienic and to reduce the risk that other food products get contaminated by the belt itself.

2. Factors influencing the belt hygiene and measures to prevent these

Conveyor belts can be found in many food industries and in almost every part of the production process - from the receiving area of raw products/live animals up to the area where finished products are packaged. Belts must be easy to clean if they are to satisfy food manufacturing company's stringent hygiene requirements.

When visiting a production plant using conveyors with direct food contact it's obvious that the conveyors fulfill an important task of conveying goods from A to B as shown in Figure 1.

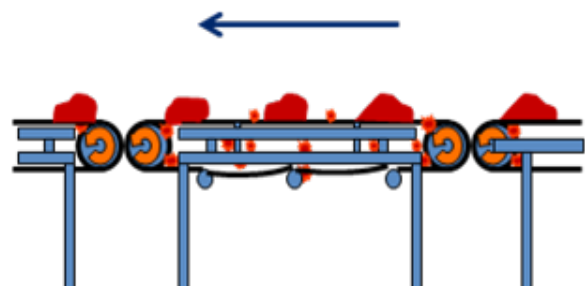


Figure 1. Conveyor transport principle

Looking into more detail proves that food products may be contaminated by the belts if they haven't received proper attention during sanitation (Figure 2).

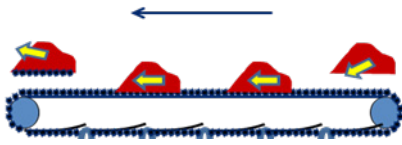


Figure 2. Food products may leave the belt contaminated

Food is not safe when it test negative for bacteria. Food is only safe if it's made sanitary conditions **and** tests negative for bacteria.

To produce food for human consumption on one hand is a privilege; on the other hand it is a continuous challenge when it comes to food hygiene. It is an endless race against the water stream. End users have to paddle fast against this stream to fulfill all aspects of a hygienic and safe food production. They even have to paddle faster if certain criteria in their food processing environment are not in accordance with the general hygiene standards. Some examples:

Food processors have to paddle faster, if.....

..... The available cleaning time decreases. Food factories often produce in 2 shift-patterns of 2 x 10 hours. Remaining time for sanitation is only 4 hours or less as shown in Figure 3.

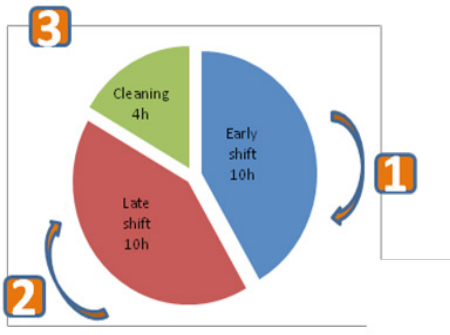


Figure 3. Common production pattern of a food processing plant

Preventive measure is to look into the best possible hygienic design of all processing equipment. Preferably to have design specifications available for the machine manufacturer when starting the buying process.

Food processors have to paddle faster, if.....

..... The traditional flat belts getting cracks and crevices on their surface (Figures 4 and 5) due to aging of the belt and due to the tension in the belt that is required to drive the flat belt (friction driven). According to Dr Zhinong Yan [1] moisture can ingress into the inside of the belt structure as the belt consists of multiple layers of fabrics. It's a potential harbourage point for bacteria.



Figure 4. Cracks and crevices on the belt surface



Figure 5. Cracks and crevices on the belt edge

Preventive measure is to replace flat belts as soon as cracks or crevices are visible. If that doesn't help to solve the issue long-term, it's recommended to retrofit the belt into a Zero-tension belt technology like homogenous positive driven belt type (e.g. ThermoDrive).

Food processors have to paddle faster, if.....

..... Hinges of modular belts are not cleaned thoroughly and debris remained in the hinges as shown in Figure 6.

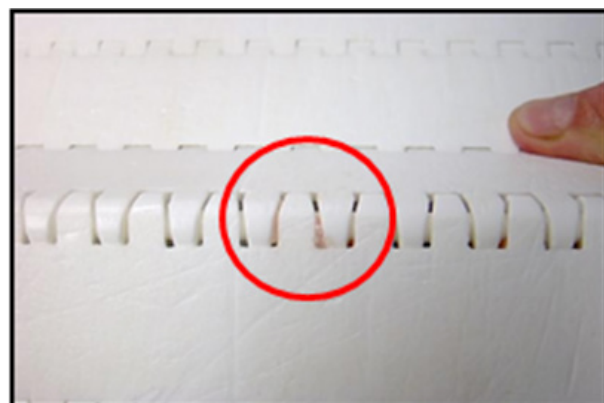


Figure 6. Remained debris in the hinges of a modular plastic belt

Preventive measure is to change standard modular belts into the latest generation of modular plastic belts with a larger degree of hinge opening and greater cleaning access to the hinge area.

Food processors have to paddle faster, if.....

..... Wear strips can't be accessed well for cleaning and dirt accumulates in the inside of the conveyor frame and on the wear strips. Figure 7 shows a belt that has been opened to exposure the wear strips which have not been cleaned for more than 10 weeks.



Figure 7. Wear strip dirt detected after the conveyor belt has been dismantled

It is crucial to enable easy access to all parts of a conveyor. If necessary, additional features like belt lifters and/or idle lifters should be considered to ensure wear strips and other components of the conveyor can be cleaned thoroughly.

Food processors have to paddle faster, if.....

..... Poor conveyor design prevents an easy removal of product debris. Product debris easily collects on areas that are horizontal as shown in Figure 8.



Figure 8. Remained debris in a U-profile

Conveyor design should enable water and product debris to be easily washed and drained down. In this example an angled profile would prevent product debris from staying in food processing equipment after cleaning.

Food processors have to paddle faster, if.....

..... Product debris is not well removed for an effective foaming (Figure 9) or if people step on belts during or after cleaning as shown in Figure 10.



Figure 9. Foam detergent on meat remains

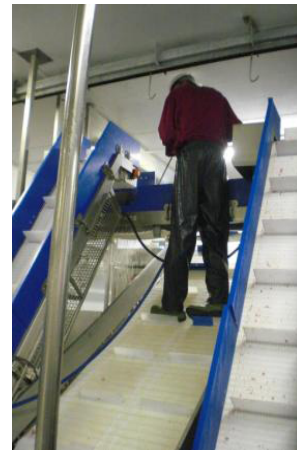


Figure 10. Cleaning personnel steps on belts

Regular trainings help production and cleaning personnel to be educated on the importance of Good Manufacturing Practices [GMP] and Good Hygiene Practices [GHP] during production and sanitation.

3. Conclusions

- The hygienic conditions of a conveyor belt in food processing depend on various aspects.
- Everyone connected to the fabrication, purchasing and use of conveyor belts is requested to make sure that the belts work in best possible conditions in relation to sanitation, hygiene and food safety.
- A good use of a conveyor belt in direct food contact starts with finding the best belt for the right application, considers Good Manufacturing Practices [GMP] and ends with intensive education and training efforts of production and sanitation people.

4. References

- [1] Zhinong Y. (2012). *Examining the microbial contamination of fabric flat belts*. EHEDG Yearbook 2011/2012, EHEDG International.