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# 6 QUESTIONS FOR THE DESIGN OF THE OPTIMAL CONVEYOR BELT

# INTRODUCTION

Manufacturing a conveyor belt is not assembly-line work. Nevertheless, machine manufacturers believe they can achieve maximum results with standard solutions. However, when the standard solution is put into operation, the results turn out to be disappointing. An informed choice for a conveyor belt makes all the difference for the output. This whitepaper assists in making an informed choice when designing an installation with an conveyor belt.

## Especially for recycling

With a view to sustainability, recycling is an increasingly popular subject. The growth in the recycling industry is due to the increased awareness of both private individuals and businesses who want to deal with the environment in a responsible manner. Within a recycling installation, conveyor belts are used to transport the product from A to B. Within such an installation, there are multiple recycling machines that go through a sorting process using conveyor belts. In the waste processing installation, conveyor belts are a necessity between each separation machine. This whitepaper poses general questions about conveyor belts, but contains specific information about conveyor belts in the recycling market.

## Make better choices!

This whitepaper poses six questions to help you make the right choice for a suitable conveyor belt in advance. A conveyor belt that is built to perform at a maximum level for a long period of time. And one that is suitable for the product and takes into account all requirements that come into play during its use, as well as taking maintenance in consideration. The extensive experience of the specialists working at LBS is incorporated in this whitepaper.

We sincerely hope that it will help you. Together we create!

*Eric Telgenkamp*



# INHOUD

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**01.**

**HAS A CALCULATED  
CHOICE BEEN MADE?**

# 01. HAS A CALCULATED CHOICE BEEN MADE?

TAKE INTO ACCOUNT ALL INFORMATION WHEN MAKING A CALCULATION

**Purchasing a conveyor belt has to be carefully considered. How much should I invest, what are the benefits and how long will it take to recoup my investment? The quality of the calculation will eventually decide which solution is selected.**

## **There are more costs than just the purchase price**

It is important to keep disruption of the production process to a minimum during maintenance. This means that the conveyor belt has to be durable and be able to last a longer period of time. This keeps the downtime of the machines to a minimum. What are the key considerations in the choice of conveyor belt material to keep the costs low and to ensure an optimal efficiency? The costs for keeping the conveyor belt running are not limited to the purchase price. Maintenance costs, repair costs and the loss of production time (due to, for example, downtime or failure) have to be factored into the calculation. Only by looking at this in its entirety, it becomes clear what is the 'best' conveyor belt for an installation.

## **If you buy cheaply, you pay dearly**

Searching for the cheapest conveyor belt is not the best investment. The difference between an expensive and a cheap conveyor belt is reflected in the quality of the resources that are used in the conveyor belt, the maximum output of the entire installation and the design specifications of the conveyor belt that will be produced. When a choice is made for a conveyor belt that doesn't have the correct specifications for the application of the conveyor belt, it causes issues when it runs on the installation. In such cases, the conveyor belt will repeatedly and unexpectedly shut down. This results in production standstill, repeated assemblies and eventually a replacement of the entire conveyor belt. The downtime of the conveyor belt causes higher total costs during the lifespan of the conveyor belt and eventually in loss of production.



**02.**

**ARE THE RIGHT STAKE-  
HOLDERS INVOLVED IN  
THE DESIGN?**

## **02. ARE THE RIGHT STAKEHOLDERS INVOLVED IN THE DESIGN?**

PRODUCED WITH THE RIGHT KNOWLEDGE ON BOARD

For the design process, the selection of stakeholders is important. They decide on the most important choices, which means they have influence on the end result. The more specialist considerations that have been taken into account, the better the conveyor belt.

### **Conveyor belt: a wearing part or a factor for success?**

To reach the best and maximum output of a conveyor belt, it is of paramount importance that the right stakeholders are present during the design phase of a new installation. When looking at the entire installation, a conveyor belt is often viewed as a wearing part, which means a choice is often made for an existing concept based on previous installations. The overall effect of a conveyor belt on, among others, the best and maximum output is underestimated, only coming to light after the installation is put into operation. When applicable, get a specialist on board who can help you with the right conveyor belt on the right conveyor.

## **Is the necessary knowledge present?**

For example, does your sparring partner have relevant knowledge of the market in which you operate, and applicable knowledge of your installations and processes at your end customer? This is a crucial factor to be able to provide a solid contribution to your design process. And is there, for example, knowledge of related industries, which may lead to a good cross-pollination? Which existing concepts can be found outside of your own market and the installations and processes at your end customer? Besides only conceptually contributing ideas, are there possibilities to provide one-time prototypes which allow for simple and low-key testing? What is the readiness to invest for your sparring partner? Do they dare to be honest, transparent and to enrich each other during the process? Even when it would lead to a result that is commercially undesirable?

Involving the right stakeholders at the start of the design process of the installation and the conveyor belt will lead to the right substantive discussions about the eventual sales price, the added value and what the benefits will be for you and your end customer. Prevent the trouble of buying cheaply and paying dearly.



**03.**

**HAS THE RIGHT BELT  
CONSTRUCTION BEEN  
SELECTED?**

# 03. HAS THE RIGHT BELT CONSTRUCTION BEEN SELECTED?

## FINDING REAL QUALITY CAN BE TRICKY

**Manufacturing conveyor belts is not assembly-line work. A conveyor belt has to be designed especially for the work it will perform. The technical possibilities are endless, and there are great benefits for the output of the belt in using the 'concealed technology'.**

### **Use the 'concealed technology'**

Contrary to what most people think about conveyor belts, they contain a lot of concealed technology. Ranging from different qualities and technical properties in top and bottom covers, intermediate layers and fabrics, to the entire construction of the belt. Everything hinges on the right belt construction. The eventual installation and the product that is transported on the conveyor belt help determine the configuration of the belt construction. With the most suitable technical properties and right considerations in the belt construction, the maximum output is realised.

## **The belt construction is the main key to success**

The final layout of the installation will be decisive for the eventual belt construction. A fundamental choice in this process is whether the conveyor belt has to be cross rigid (and the degree of rigidity). This choice is, for example, influenced by a straight or L-shaped conveyor belt, a trough or the choice for an installation that pushes or pulls the conveyor belt. This involves a choice on the number of inner layers (including the type of fabric) and the overall maximum tensile strength. Choices that are made in the total assembly of the construction decide the steering properties and the flexibility of the conveyor belt. The quality of the top & bottom cover depends on the product that is transported, with a major influence being environmental factors. Think for example of reduced materials (such as glass and sand), all the way to compost or household waste and synthetic oils and greases. The choice of the right belt construction lays the foundation for the best and maximum output of a conveyor belt.

## **Choices for recycling**

The product that will be transported can range from light recycling, such as plastic, cans, empty packaging and household waste, all the way to recycling scrap metal, asphalt, concrete and debris. No two conveyor belts are alike in the recycling industry. Amongst other things, a durable rubber conveyor belt is most often used in the heavy industries, and it is an important prerequisite within the recycling industry. Because a lot of sharp and heavy (metal) materials are being processed, conveyor belts with an incorrect belt construction are more prone to damage. Because a lot of sharp and heavy (metal) materials are processed, lighter applications of conveyor belts are generally more prone to damage.



**04.**

**IS CONVEYOR  
BELT OPTIMALLY  
CONFIGURATED?**

# 04. IS THE CONVEYOR BELT OPTIMALLY CONFIGURATED?

## THE SPECIALIST'S FINISHING TOUCHES

**A belt construction is important, but the optimal configuration is just as important for the right output. A wrong configuration will lead to a suboptimal result. Even when the belt construction is optimal.**

### **Guarantee the right capacity and output**

In the decision for the right belt construction, the constructed conveyor(s), tools, product and environmental factors were taken into account. Now we turn our attention to further configuration to guarantee the right capacity and output. The choice for flat, profiled or confection is decided by two key factors: the angle of transportation and the product (including the minimum throughput required and the desired output). Therefore, the maximum belt width and the layout of the installation play a part (think for example of pulley diameters).

### **Some essential questions**

There are various choices to make for a flat or straight conveyor belt. At what angle does the conveyor belt run? Which product is being transported, and under what circumstances? Is the product compact, with enough own mass to be transported on a flat conveyor belt? And is it possible to transport it at an angle? Which profile should you use if the product moves? What is the applicable profile height? Do we want to increase output, or increase the angle? Which Hotcleat® cleats will we apply in that case? Will we go vertical? Which Hotcleat® cleats in combination with sidewalls? For a lot of these questions, you have to take into account that there should be no or minimal product loss.

## **Profiled belts**

Profiled belts have a standard profile height of 17, 25 or 32 millimetres with various profile widths and shapes. A number of specials with lower profile heights are also available. Within mobile installations it is often applied as a discharge belt, whereby a substantial height can be bridged over a short distance. Furthermore, profiles are also applied to keep the product moving on a flat conveyor. These profiles are often readily available in predefined qualities, belt constructions and belt widths. Furthermore, tailormade production is possible to perfectly meet with the requirements based on profile, belt construction and quality.

## **Tailormade solutions: Hotcleat®**

Apart from these profiled conveyor belts, one can also choose a design with the confection of hot vulcanised Hotcleat® cleat and additional Hotcleat® sidewalls or spill edges. Hotcleat® cleats are often over 40 millimetres and available in various shapes such as T, TC and C. Hotcleat® spill edges can also be applied to reduce sideways loss of material and sidewalls to increase the capacity and completely eliminate any sideways loss of material (especially in a 90° angle).

The right configuration combined with the right belt construction contributes to the best possible and maximum output of a conveyor belt.



**05.**

**IS IT DESIGNED  
TO MINIMISE  
MAINTENANCE?**

## 05. IS IT DESIGNED TO MINIMISE MAINTENANCE?

### THINK ABOUT MAINTENANCE DURING CONSTRUCTION

**When designing an installation with a conveyor belt, it is important to start thinking about maintenance. The more one thinks about it in advance, the more it will save future maintenance costs.**

#### **Smart design = less maintenance**

When designing an installation, one has to take into account the potential maintenance of the installation or the conveyor belt. The eventual replacement of the conveyor belt is also included in the thought process. This requires specific tools that take up a lot of space during their use. Especially when the output after maintenance or replacement is expected to be similar to the situation before maintenance was required. A practical example is the method of making the conveyor belt endless during maintenance or replacement compared with the original. The definitive design of an installation can be optimally suited for a hot vulcanised joint, but not for a mechanical fastener or cold glued joint that is applied during maintenance. For example due to the lack of space which arises in that scenario. Various aspects that contribute maximally to the output with a hot vulcanised joint in combination with the installation may lead to unplanned downtime and premature additional maintenance when using an mechanical fastener or cold glued joint.

## **Tools for less maintenance**

Unplanned downtime and associated maintenance can also be reduced further by applying the right seals, scrapers and accessories for the purpose of belt steering. A wide range of design options and tools are available that contribute to minimal unplanned downtime and reduced planned maintenance stops. This therefore prevents spillage of the product, pollution and wear.

## **Check for environmental factors**

Premature maintenance or unplanned downtime can also come about by various environmental factors. Think for example of extreme temperatures, weather influences (rain, snow) but also the effect of UV and ozon. This leads to accelerated wear of the conveyor belt. Another practical example is when a mobile installation is unstable and not flat due to the terrain. This may lead to misalignment of the conveyor belts in the installation, which in turn leads to wear and tear on the side.

To ensure the best and maximum output for as long as possible, awareness about maintenance aspects and the environment in which the installation will be used at the end customer is essential.



**06.**

**ARE THE CONVEYOR  
BELTS MANAGED  
IN A RESPONSIBLE  
MANNER?**

# 06. ARE THE CONVEYOR BELTS MANAGED IN A RESPONSIBLE MANNER?

## TAKING GOOD CARE OF CONVEYOR BELTS

However well the conveyor belt is designed, day-to-day management is indispensable. Organise the management of conveyor belts by asking the right questions.

### **Attention to management**

After an installation is put into operation, the assurance of the best and maximum output is monitored by the operator. It includes a great responsibility to keep the investment that is made in optimal condition. This is primarily easy to execute with minimal effort and basic knowledge. An important prerequisite is that one consequently takes the time periodically at planned moments, and structurally safeguards the same points.

A number of questions about the conveyor belt that need to be checked regularly:

- Are there damaged hot vulcanized joints or similar?
- Is the belt tension sufficient?
- Is the productload centred?
- Is there misalignment or wear and tear on the side of the conveyor belts?
- Are there wear marks that get worse with time?
- Is there contamination with product residue surrounding the installation or on the scrapers?
- Is there damage to the frame of the installation?
- Are there rotating components that are stuck?
- Are there worn down components that are in contact with the conveyor belt?
- Are there any worn-out seals?

During the design, one has to take into account management and maintenance to realise the best and maximum output. How long one can benefit from a conveyor belt is eventually due to the dedication of the operator and his knowledge on the management of conveyor belts.

## **TOGETHER WE CREATE**

The six questions for the design of an optimal conveyor belt is a good starting point for the design of a suitable conveyor belt. However, the questions, examples and solutions described here are universal and generic. Every conveyor belt is unique, because every demand is unique. LBS doesn't think in terms of existing solutions, but develops what you really require. A long-standing cooperation is our goal in this regard.

Do you want to work together on a future-proof conveyor belt that delivers maximum performance over a longer period of time? Click on the button below and get in touch.

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