

A business case for automatic palletising



There are many relevant factors that can be taken into account when calculating a business case for automatic palletising

Introduction

Many companies are investigating moving from manually stacking products on a pallet to automatic palletising. In many cases, the only cost element that is considered is that relating to the people at the end of the production or packaging line. Although direct labour costs are very important, there are many more factors that should be taken into consideration.

This white paper was written with the aim of presenting the different elements that can be used in calculating a business case for automatic palletising. These will not all be applicable in every case, and sometimes not accepted in a business case calculation because of company rules. However, it is important to understand the full impact of the cost of automating this end-of-line function.

CONTENT

Introduction

The factors in a business case

Investment and implementation

Decrease direct labour costs

Decrease indirect labour costs

Increase productivity and output

Improve internal logistics

Improve product handling

Improve the working environment

Conclusion

How can we help you?

The factors in a business case

There are six areas where you can start looking for savings and improvements when considering transferring from manual to automatic palletising. Starting with (1) decreasing direct labour costs, you can also think about (2) the indirect labour costs that you could save. Many times, there are also significant benefits in (3) increasing productivity and output, or (4) improving internal logistics. Less obvious and not always easy to calculate are advantages in (5) improving product handling and (6) improving the working environment.

It is not necessary to define the savings for every factor (and the sub-factors). Sometimes, the understanding that the types of savings are possible is enough to tip the balance in favour of automating the palletising function. More important than having an accurate figure attached to every sub-factor, is the understanding of the logic behind the business case. This enables you to generate the maximum benefit from such an investment.



On the other side of the equation, there are investments and implementation costs. Suppliers must be paid, people must be trained, the area may need to be prepared, etc. Being aware of all of this is a prerequisite to start a successful investment project, so that the possible savings can be made as smoothly and quickly as possible.

Investment and implementation

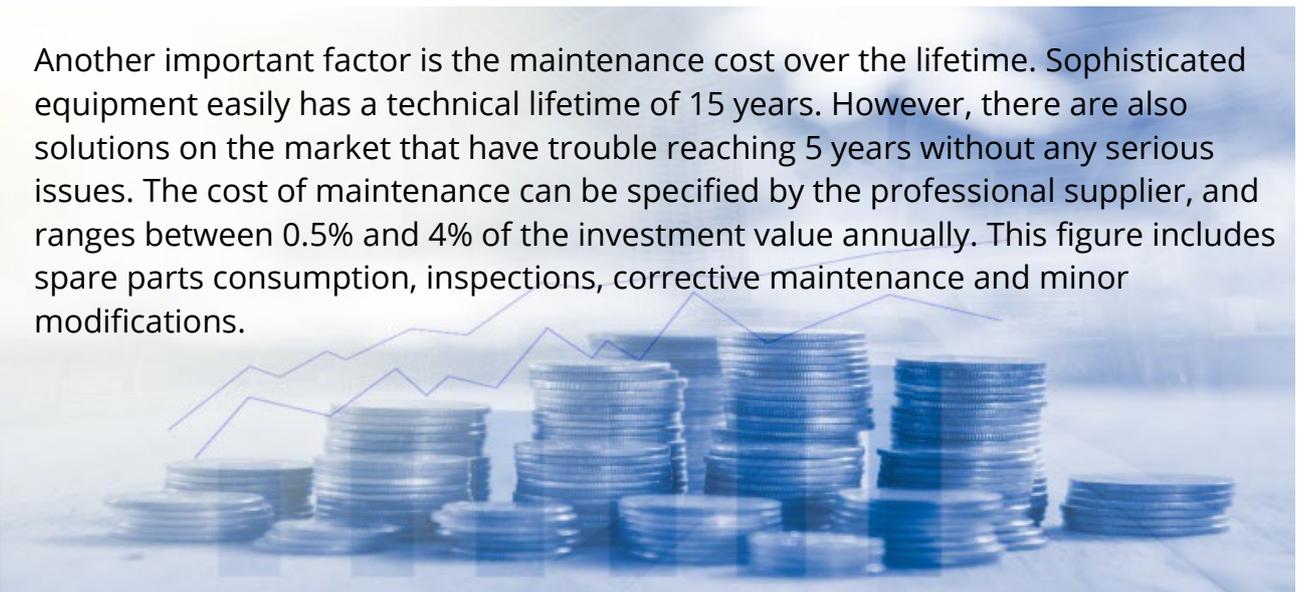
Most professional suppliers of palletising equipment present a complete picture of the investment you can make in automatic palletising. This includes the equipment, installation and commissioning, but also the basic training to ensure your team can operate the machinery.

When making an investment, money must of course be made available. This leads to interest that must be paid. Alternatively, if cash is available, the cost of using it must be calculated. With present interest rates, this no longer tends to be a decisive factor. In the event that you do not want to directly invest, there are multiple financing options available for this type of equipment, going as far as Palletising as a Service (PaaS). Any financing options come with a cost of course.

Utilities may sometimes need to be altered to make automatic palletising possible. Although the electrical power consumption is low, you need to be able to connect to the main grid. In many cases there is also a need for pneumatics (e.g., for robotic end-of-arm tools). The consumption is again low, but it must be made available (at a cost).

Depending on the type of solution chosen, it may be necessary to increase the footprint of the palletising function. Where space is readily available, there is no extra cost. If not, there may be significant additional cost in making it possible to site an automatic palletiser. When using conveyors, you can locate the palletiser theoretically anywhere you want, thus reducing the costs of creating space at the end of a production line.

Another important factor is the maintenance cost over the lifetime. Sophisticated equipment easily has a technical lifetime of 15 years. However, there are also solutions on the market that have trouble reaching 5 years without any serious issues. The cost of maintenance can be specified by the professional supplier, and ranges between 0.5% and 4% of the investment value annually. This figure includes spare parts consumption, inspections, corrective maintenance and minor modifications.



Decrease direct labour costs

Reducing direct labour costs is the first element that comes to mind when analysing the options to automate a palletising function. However, there are several sub-factors that might not have been considered.

The starting point is the total of direct salaries (gross) paid to people who perform manual palletising. Any costs for hired labour also need to be added. When an operator at the end of the line performs multiple functions, estimate how much time is spent on manual palletising and only account for that part of the salary/costs.

Salaries are, however, not stable. The average salary increases worldwide are in the range of 3%–6% annually. In many countries, the increases are even more substantial. With a typical technical lifetime of palletising equipment of 15 years and an economical one of 7 years, this can be a decisive factor.

Further, do not forget the costs of shift working and the additional payments for working at night and/or at weekends. In a less stable situation, you also must also remember any costs for overtime.

Another factor to consider involves the secondary labour costs. For example, think about insurance premiums and wage-related taxes. In some countries, these can be quite high, as manual palletising is not a healthy activity (among other things, leading to soft tissue injuries). In a situation where there is limited availability of personnel, companies are sometimes spending a relatively large amount of money on transport for people to and from the factory, or even providing the transport themselves. In one case, these costs tipped the business case calculation in favour of automation.

In most cases, another small sub-factor relates to other personnel costs, for example contributions to company festivities. However, uniforms, work gear, food and drinks also increase the real costs of people carrying out manual palletising.

Decrease indirect labour costs

By making an investment in automatic palletising, most of the direct labour costs are reduced. However, also bear in mind the indirect costs that are related to the primary functions. Although it is not always possible to actually reduce these costs, as they are more generic and also connected to other functions, there are situations in which reducing the direct labour force lead to a reduction in indirect labour.

People directly related to manual palletising include supervisors, team leaders, shift leaders, HRM personnel and managers, who would see a reduction in the number of people in their group. Fewer meetings, reduced use of facilities, and spending less time on communication would all help to reduce their time on site.

Staff turnover in manual palletising can be as high as 50%, meaning that on average, people do not perform this kind of work for longer than 2 years. In turn, that leads to frequent recruitment, selection and training of new staff members. Many companies are shocked when they take an in-depth look at these costs.

As manual palletising is not a healthy activity and only a few people really like to perform this type of work, illness of staff members is a daily concern. The fact that people do not show up on time and someone else needs to take over is a serious headache for supervisors and leads to many invisible extra costs and disturbances.

Unions and other groups can influence the costs associated with direct labour. Investments must be made, and time must be spent on making sure that people work in an acceptable and safe environment.

One of the most difficult factors to calculate, but certainly an important one in many professional companies, is the increase in employee satisfaction and motivation when the unpleasant job of manual stacking of cases is automated.

Increase productivity and output

The business case is easy when the volumes at the end of the line are such that they can no longer realistically be handled manually. In such a situation, the need for investment is evident.

Nevertheless, have you analysed how reliable the output of the production or packaging line is when working with manual palletising? There are disruptions all day long: employees not showing up, making mistakes, taking unplanned breaks, etc. All these issues can lead to lower output from the line. Compare that with professional palletising equipment, which can have output reliability figures of 99.5% or higher. There are business cases that have been realised where the higher level of reliability led to the payback of a large investment within one year.

Manual palletising is very flexible, but older forms of automatic palletising still require set-up activities. Modern palletising equipment can be prepared and programmed in order to handle a wide variety of products without any change-over times, thus minimising wasted time and increasing flexibility.

An important factor in automation at the end of the production line is the reliability with which data can be collected. In an automated environment, the data reliability is close to 100% — which is certainly not the case with manual stacking. Moreover, a direct analysis of Overall Equipment Effectiveness (OEE) can be carried out if disturbance factors are included. There is no place better suited for this than the end of the line.

A substantial proportion of the overall costs are those related to external transport. Ideally, each pallet is stacked such that a lorry is completely filled. In many situations, this leads to people climbing a ladder to add a few products on top of a full pallet, or to loose products being inserted in a lorry on top of a load. In all cases, this is a very inefficient way of working compared with an automatic stacker that can stack as high as 3 metres if needed.

Improve internal logistics

The use of forklifts or manual pallet trucks in the warehouse and on the factory floor leads to direct costs because of the investment or lease of the equipment, its maintenance, the fuel/electricity consumption and all the costs for a person handling this type of equipment.

Moreover, did you know that on average, a forklift causes some 4,000 euros worth of damage every year? Warehouse racks, fencing, doors, products and barriers are struck by forklifts — and sometimes even people.

Automatic transport of empty and full pallets, with pallet conveyors, Automatic Guided Vehicles (AGV) or Autonomous Mobile Robots (AMR), can reduce the need for forklift trucks in your factory and reduce the time lost due to waiting on the arrival or availability of pallet handling equipment.



An automated process is more streamlined and leads to fewer products and pallets waiting on the factory floor. Do you know the value of a full pallet? Each one less pallet on the floor increases the available cash by that amount.

In one instance, the volume of manual pallet trucks was so high that there was continuous congestion on the route to the warehouse, leading to waiting times and product damage; thus increasing the already high cost of moving the full pallets to the warehouse. This was a decisive factor in the relevant business case in favour of automating all the transport after the palletiser.

Improve product handling

A production line is designed to make and pack your core products. You certainly do not want them to be damaged. With manual handling, stacking and transport, this risk is introduced. A case that falls, a pallet load that hits something during transport or topples over, cases that are damaged during stacking: the risks are everywhere. With an automated system, you can ensure that all your products reach their internal destination undamaged. This certainly leads to a savings and shows the whole team that you care about the product.



Most products are properly packed at the end of the production line. However, we all aim to reduce packaging because of sustainability issues. Are you still sure that the product itself cannot be touched or contaminated in a process with manual handling? What happens if the product is not handled in a hygienic way? Are you certain that everyone's hands are perfectly clean when touching the product?

Sometimes, there is restricted space in the warehouse rack or the lorry for a full pallet. Stacking quality and accuracy is key in such situations. With automated palletising, it is easy to achieve very small tolerances in stacking, reducing repeated work and the risk of damaged products.

It is inevitable that people make mistakes. Analyses show that even in carefully controlled processes, for instance voting, the error percentage can be as high as 2%. What is the cost of the mistakes that are made at the end of the production line? Do they lead to customers being unhappy, recalls and stock miscalculations? When designed and programmed correctly, the error percentage can be reduced to zero by using automated systems.

To be able to transport a full pallet to an external warehouse or to its end user, the pallet needs to be protected. Using a wrapper to apply a film around the load is very common. A balanced wrapping process can reduce the volume of plastic film needed by using a high tension to stretch the film. In some cases, this can lead to the elimination of intermediate sheets, thus increasing the speed of palletising. Some preparation and testing work need to be executed before these benefits can be realised.

Improve the working environment

Improving the working environment does not lead to direct savings. The indirect savings and image improvements, however, can be very large.

A factory floor with full automation is much safer for people than an environment where many people work and interact while performing manual labour. This is particularly the case when it is combined with forklifts driving around. The risk of accidents, the air and noise pollution would be better kept away from the factory floor.

Manual palletising is boring, repetitive and unhealthy work. People have to continuously make the same movements, which by their nature can lead to soft tissues injuries. A professional, modern organisation does not want this type of work in its plants. Insurance companies are increasing their fees, as they come to find that there are long-time costs involved.

A well-automated factory is much easier to keep clean. You will always be able to show a tidy working environment to customers, potential employees and management. Thus, you can create a company in which people want to work, as they understand it is about quality and professionalism. The company image can be boosted if investments in automation are shown to the public.

Sustainability is an important factor in all that we undertake. Taking care of employees is one element, minimising energy consumption and thus reducing the carbon footprint is another. Compared with manual palletising you may think that automated palletising consumes more energy. In a one-to-one comparison, that would be true. However, have you thought about the energy that employees use the whole day long in getting to and from the factory, using heating, lighting, etc. in the places they stay? If you can scale down to a partially unmanned factory, substantial energy savings can be achieved.

Conclusion

There are many different factors that influence the business case for investing in automated palletising. In this document, we have touched on some of these. A more in-depth analysis of the specific situation is needed in order to understand which factors are relevant and what their impact is.

CSi has carried out several such analyses to date, together with our customers. We can support you when you are starting your own investigation. The way the calculation has to be made is mostly decided by the financial department of your organisation. CSi can support you there, but the model has to be validated by the internal team.

How can we help you?

CSi has been supplying palletising equipment for some 40 years. Each time, trying to find the optimal solution and realise substantial savings for our customers. Based on our history, CSi is eminently suited to analyse your situation and advise you on the relevant factors. We can help you realise those savings — not only by implementing automatic palletising, but also by supporting you to have it and keep it up and running for a very long time.

If you would like to receive more information, do not hesitate to contact us.

CSi industries B.V.

Lissenveld 41

4941 VL Raamsdonksveer

The Netherlands

Tel. +31 162 575 000 or info@CSiportal.com

