

Packing Technology contributes to increasing Value and Cutting Cost

科学降低成本，包装提升价值

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About: Introduction of problems for keeping the product quality unchanged from production line to end user and some solutions how to solve the problems.

A study how to keep your products in excellent condition all the way to end user and same time save in your operational cost.

关于：产品在运输过程中质量保持方面的问题，以及问题的解决方案；
产品从工厂到用户流转过程中，如何保持产品安全，同时节约运行成本的研究

Text 正文：

1. Is packing necessary? Let's take a look at damages caused by Moisture.

包装有必要吗？我们先来看一看潮湿对产品的损坏。

When you are thirsty on a hot and humid summer day, you buy a can of cold drink and almost sudden the surface is wet and moist of condense. This happens not only for your drink, but most materials as well when they are exposed for sudden temperature differences and the relative humidity around is high enough

闷热潮湿的夏天，当你从冰箱里拿出一罐冷饮，冷饮罐的表面会立刻变湿，有水冷凝在上面。这种情况不仅仅会发生在冷饮罐，也会发生在环境湿度高，遭遇气温突变的大部分物体上。

Warm air is able to keep more moisture than cold air,- and when the warm air cools the moisture that warm air could keep, condensates to water and this moisture covers basically everything, and this moisture starts a chemical reaction.

热空气比冷空气能保持更多的水份。当热空气被冷却，空气中保持的水份就会冷凝下来，覆盖到一切接触物体的表面，然后物体表面开始发生化学反应。

When iron reacts with oxygen, it forms a new substance, iron oxide. This can happen when the oxygen level is high enough for chemical reaction. Water acts as the medium to transfer electrons in the electrochemical process and where iron loses electrons by oxidation causing the water to break into hydroxide ions and oxygen and if salt is involved, it helps the corrosion process to speed up.

铁与氧气反应，会形成一种新的物质，叫氧化铁。当含氧量到达一定程度，这种反应就会发生。水在这个电化反应中充当传输电子的介质的角色。如果空气中含有盐（例如被污染的空气），腐蚀过程会加快。

Now the iron that has oxidized reacts with the hydroxide ions and oxygen forms metal oxide. And these salts remain even if the water is gone and they restart rusting whenever they come in contact with moisture.

氧化反应发生后，生成的盐会留在金属的表面，一旦遇到潮湿，这种锈蚀反应会再次发生。

That is the reason why the metals get rusted more quickly near the beaches or salty places, ocean transports or in polluted environment.

这就是为什么靠近海滨或多盐或环境污染严重的地区，金属锈蚀得更快的原因。

2. How do this effect on steel producers 钢铁生产商怎样应对锈蚀反应?

New steel grades are developed for various purposes; Laser cutting for manufacturing processes; car manufacturers etc... are demanding rust free materials. But rust attack metals, even galvanized products suffer from so called "white rust" caused from moisture, for same reason why copper turns green, silver gets black, etc...All customers demand rust free prime products arriving to their manufacturing site and also sometimes to be hold on a stock for a while in their premises. Packing and especially moisture protection is the key element for success.

新的钢种被不断开发用于不同的用途。制造工艺中的激光切割，汽车制造等，都需要无锈蚀的材料。当锈蚀侵害金属时，即使镀锌产品也遭受所谓“白锈”的损害，这种白锈也源自于潮湿，同样的原因导致铜会变绿，银会变黑等。所有的用户都要求产品到达加工现场时是无锈的，有时产品也会在他们的仓库里存放一段时间。产品包装，特别是防潮保护是杜绝锈蚀的重要措施。

How do we prevent products rusting during storage and transport?

在产品储存和运输过程中如何防止产品锈蚀？

Knowing the reason there is a simple solution for that:

了解到原因，只需要对症下药了：

We can prevent metal from getting rusted by not allowing the water and oxygen mixture to come in contact with the metal.

只要防止水份和氧化物接触到金属的表面，我们就可以防止产品锈蚀。

Knowing this it seems that there is very simple solution. The packing should be airtight and reduce the existing air quantity to minimum inside the coil to avoid rust. The smaller the amount of moisture is - the better is the result.

Let's study the packing methods available for Industrial scale production.

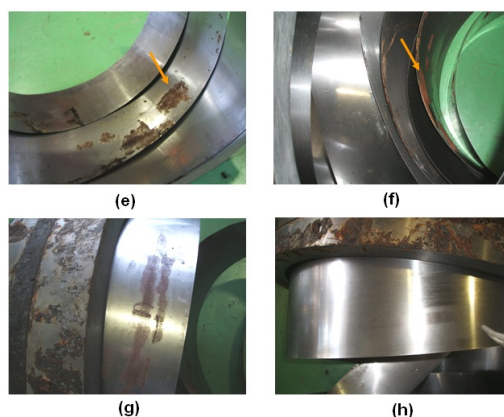
包装方式看似简单，只需将包装做成“气密型”，即可减少留存在产品中的空气，从而防止锈蚀。留存在包装中的空气越少，效果就越好。让我们来看一下工业化生产中现有的产品包装方式：

---Traditionally packing is made manually by workers. The packing is made with single layer moisture barrier. A pre-cut sheet of VCI paper laminated with plastic is folded by operators manually, body-wrapping with paperboard plus steel sheet, adding inner and outer edge protectors.

---- 传统型包装：是由工人手工完成的。防潮层只有单层防潮壁垒。事先切好的塑纸层压防锈纸由工人手工包覆折叠，外加纸板、钢板外包皮、内外护角等。

It is difficult to get the manual packing air tight and considerable amount of air is left inside the package causing rust.

人工包装很难做到“气密”，有大量的空气及所含水份存留在包装材料内，会引起钢卷锈蚀。



以传统包装方式包装的产品常见的锈蚀状况

Common rust occurred to products packed with traditional packing

This packing can not be recycled easily because the paper and the plastic lamination needs to be separated to be recycled in conventional methods this is not easy and that is limiting sales to some countries such as Europe.

因为塑纸层压材料不易分离回收，引起的环境问题会引起产品销售市场受限，例如欧洲市场。

A big area is engaged for packing materials preparation and storage for various sizes of pre-cut materials.

传统包装中，预先制备好的各种型号尺寸的包装材料要在现场占用很大的区域。

Safety areas are difficult to be isolated. Operators have to take the risks of objects falling off, straps springing open, being dragged into turning parts, being cut by sharp things, noise influence and other vocational diseases.

Many operators required. Operational cost is high.

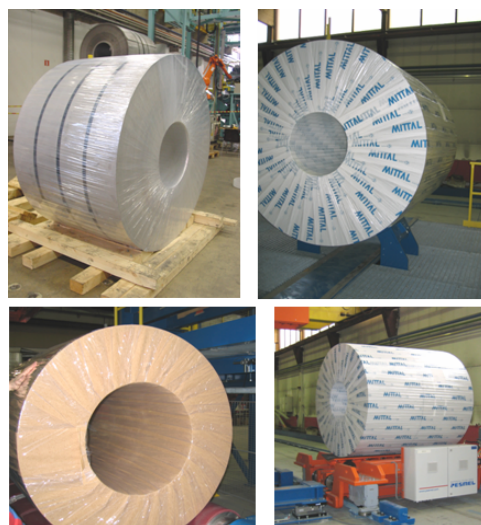
传统包装中，安全区域很难隔离。工人要面临物体掉落、捆带弹开、被旋转部件卷入、被尖锐物体划伤、噪音污染和其它职业病的危险。

3. Moisture protection by wrapping machines, benefiting in cost saving and care for environment

用缠绕解决防潮问题，也兼顾降低成本和环保考量

The Through Eye Wrapping (TEW) machines for coils and strips and stretch wrappers for long products, have been on the market for quite some time already and they have proven to make an excellent result on moisture protection.

卷材和带材的穿心缠绕(TEW)，板材和长材的纵向缠绕，这些包装方式已在市场上存在了很久。事实证明，它们为产品保护起到了很好的防潮保护效果。



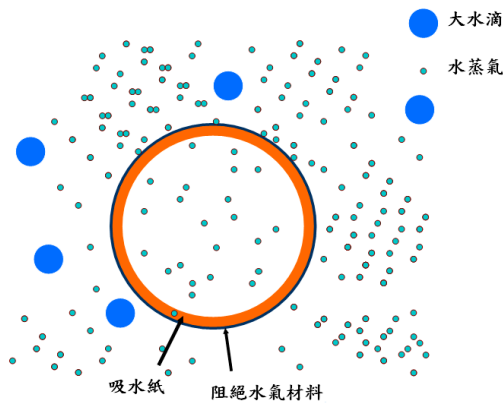
穿心缠绕的效果 TEW result

TEW is stretching commonly used stretch film through the eye of the coil with an overlap to an airtight package; the air inside will be reduced to the tiny amount still in between the layers in the coil. Some of manufacturers as Pesimal OY from Finland as developed additional options to refine the result as to lay a crepe paper simultaneously under the stretch film. Crepe paper is a common cheap paper type with ability to absorb and keep moisture. This paper can be treated with VCI if necessary.

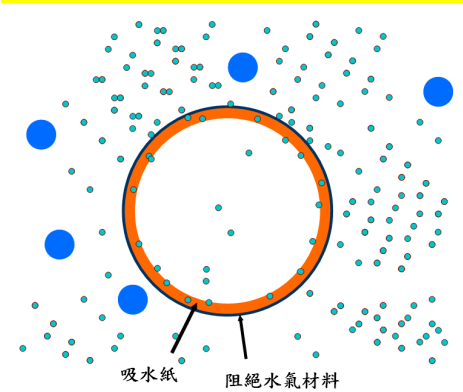
穿心缠绕是使用拉伸膜通过卷眼进行缠绕,膜的层间有搭接,因此可保证包装“气密”;包装内的空气被减少至钢卷的层间,如果层间有空气留存的话。一些包装技术开发商,例如芬兰的 Pesimal 研发了一种附加选择,就是在拉伸膜缠绕的同时在下层缠绕皱纹纸,以强化减少包装内水份的效果。皱纹纸是一种普通的包装材料,它具有吸潮的作用。如有必要,还可对它进行加防锈剂处理。

Rust-proof packing: Water-absorbing paper + PE film

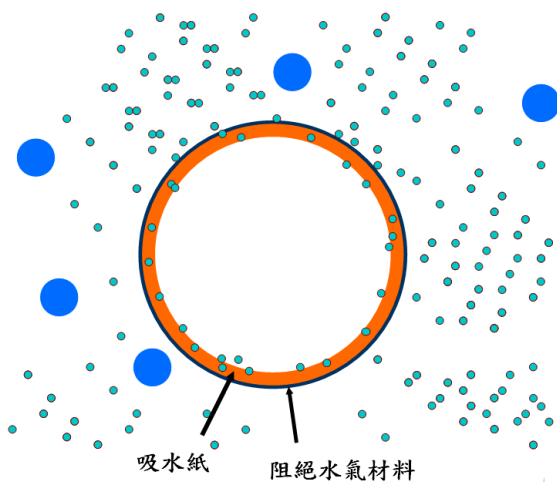
吸水性皱纹纸搭配防水 PE 拉伸膜实现产品防潮的原理:



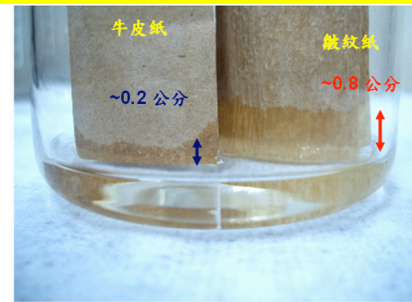
(a) 水氣均勻散佈於包裝系統內外，大水滴由 PE 膜排除在外
Humidity exist inside and outside package.
Big water drops are isolated by PE film



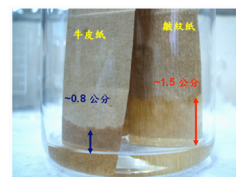
(b) 接近吸水材料之水氣漸漸被吸除
Humidity nearby water-absorbing paper is got rid of gradually



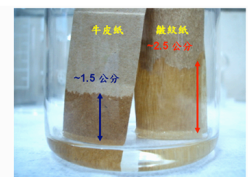
(c) 深層水氣藉由水分子濃度不同擴散以及冷熱循環中加速擴散至吸水紙材。
Humidity in deep inside the paper



(a)



(b)



(c)

皺紋紙吸水率較牛皮紙為佳(左為現行用包裝牛皮紙，右為皺紋紙)

Water-absorbing ability of Crepe paper is better than Kraft paper(the left sample is Kraft paper and the right is Crepe paper)

This method requiring a machine to pre stretch the film to stick on the overlap and create an airtight package where the moisture can't come in from outside, in addition to the crepe paper laid against the coil surface to absorb the little

amount of moisture left inside, the moisture protection comes to be perfect.
这种包装方式需要机器对拉伸膜进行预拉伸，搭接处自动粘接，这样外部的水份就不会进入包装内部，再加上前面提到的缠绕皱纹纸将钢卷内部存留的少量水份吸出，整个防潮保护就非常完善了。

This method is impossible to do manually by workers. It is safe and fast, up to 30 normal sized coils/hour can be wrapped. Operational cost is low.
这种包装方式是不可能由人工完成的。它安全而高效，可做到一小时包 30 个卷。运行成本也相当低廉。

Stretch film is made of recycled material and is possible to recycle fully again. It is also approved environmentally sustainable.
拉伸膜是由完全可回收的材料制成，利于环境保护。

I think today every company has an environmental policy and the awareness of environmental issues is very high and same time it is very important to be aware of cost issues. Here is anyhow some good news, the environmental packing materials are actually cheaper to use than the traditional materials. Secondly every year millions of dollars are lost due to Corrosion and Rusting of Material during transportation and storage. Rejected materials due rust are of course recycled but the environmental effect of unnecessary energy consumption for re- melting rejected material world wide is huge.

我认为，每个公司现在都制定了自己的环境政策，高度重视环境问题，同时也要兼顾成本。这里就有环境和成本兼顾的包装解决方案：环保的包装材料比传统包装材料更便宜。再者，也可避免因产品锈蚀引起的数百万计的产品召回损失。召回的产品当然会回炉再生产，可引起的不必要的能源消耗和环境影响是巨大的。

4. Methods for Mechanical protection 机械保护方式

The mechanical protection against damages during transportation can vary much depending geographical location and how long is the transportation. And that is fair enough and there are many possibilities to protect the product, it is mainly question how to keep cost down and still reach good protection. Here also the new packing materials are doing a great impact for cost savings without compromising the quality. And for automatic packing lines benefits are even greater because the line can form and cut the material and reduce the waste.

在产品储运过程中防止产品的机械损坏，在很大程度上依赖于产品目的地的地理位置及运输距离。对这种保护，有多种可能性供选择，主要问题是如何低成本地

施加可靠的保护。这里有一种新的包装材料，在不牺牲包装质量的前提下，可降低包装成本。在全自动包装线上进行包装，因为材料根据产品尺寸在线“量体裁衣”，成本会降得更多。

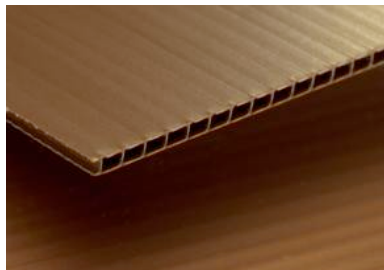


Automatic body Wrapping 自动外体包裹保护

5. New study on packing Materials 包装材料的最新研究成果

Environmental regulations are going to do a big impact on future choices of packing material. European countries have already a lot of regulation around this and there is much more to come.

环保法规正在对包装材料的选择产生更大的影响。欧洲国家已经制定了许多相关法规，并日趋严格。



New Packing Material-Canal Plastic

新型包装材料—中空塑料板

All packing material in near future must be able to recycle.

在不远的将来，所有的包装材料必须是可回收的。

6. Conclusion 结论

The focus on manufacturing process and make excellent products is the primary for all mills. But somewhere in this process is forgotten that the quality is counted when the customer opens the package and find out what condition the goods are. Are they clean, rust and damage free or if they need

reject a couple of layers before they can use the material for their own production. This is of course one important criterion together with the price when they rank the suppliers in good and less good.

专注于生产工艺，制造内在精美的产品是所有工厂的基本原则。但在这个工艺链中，很容易被忽视的一点是：用户打开产品包装时见到的产品质量才算数。它是干净的吗？它有没有生锈？或者产品外面的几层需要废掉？综合考虑产品价格，用户自会对生产商进行评估，是好？还是不好？

There is an old proverb saying.

有一句谚语是说：“习惯的力量是巨大的。”

“The power of tradition is great”

It is always easier to stay with the old than change to new, but actually this investment will pay you back in less operational cost, and better customer satisfaction. We can think only how important the packing is for consumer products to make the brand famous. Considering how important it really is it seems as there is margin to earn and market share to gain.

人们总是习惯于因循守旧，害怕转变。但实际上，对这种新的包装方式的投资会从减省的运行费用中得到回报。我们是否也想到：产品包装对扩大品牌影响有多么重要？企业从这种新的包装方式中，既赢得了利润，又赢得了市场。