The Dirty Dozen

The 12 Most Common Mistakes Metal Parts Manufacturers Make That Can Lead to Rust and Corrosion (And How to Avoid Them!)

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GREEN PACKAGING, INC.

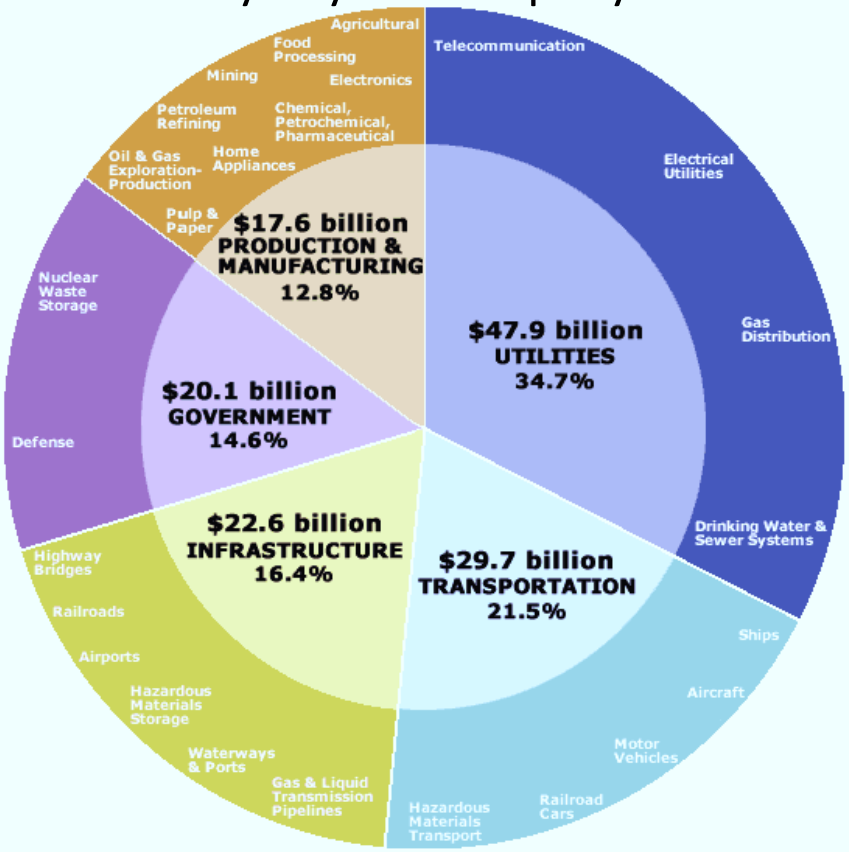
About the Presenter

- 25 Years Experience in Packaging Industry.
- 4 Years as Northeast Regional Sales Manager for Daubert VCI, a leading manufacturer of VCI Products.
- 10 Years as Director of Sales and Marketing for Distributor of VCI products.
- Since 2007, President of my own company, Green Packaging, Inc. and Green-VCI.com. A recognized award-winning leader in the field of anti-corrosion packaging, solving corrosion and rust issues for hundreds of the country's leading Metal Parts Manufacturers, Foundries, Metal Stampers, Heavy Equipment Manufacturers, Spring Manufacturers, Powdered Metal Parts Producers, and many others with eco-friendly VCI products.

Why Should I Care About Rust?

According to the National Association of Corrosion Engineers, last year, rust and corrosion cost American Industry $360 Billion Dollars! Of that amount, nearly $30 Billion Dollars was lost by American Metal Parts Manufacturers.

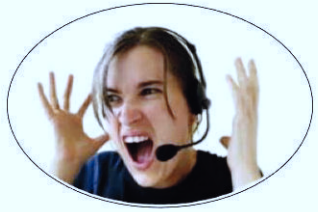
Today, we will show you 12 ways to prevent this tremendous loss of money in your company and increase your company's profits.



How Much is Rust Costing YOUR Company?

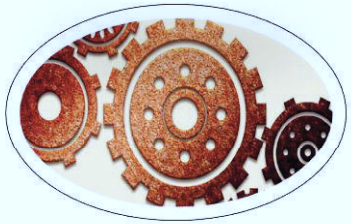
- How much is rust costing your company? Let's think about it….if rusted parts go out to your customer, here are just a few of the costs:
- Return Transportation
- Re-Working the parts i.e. sandblast, acid wash
- Scrapping the parts
- Labor in sorting and cleaning parts
- More importantly, add to this the damage to your company's reputation in the eyes of your customers who receive your rusted parts.

How Can I Benefit from No More Rust?



- ✓ What's In It For ME?
- ✓ No More Angry Customers Calling to Complain About Rust

- ✓ No More Lost Money and Labor in Re-Working Rusty Parts

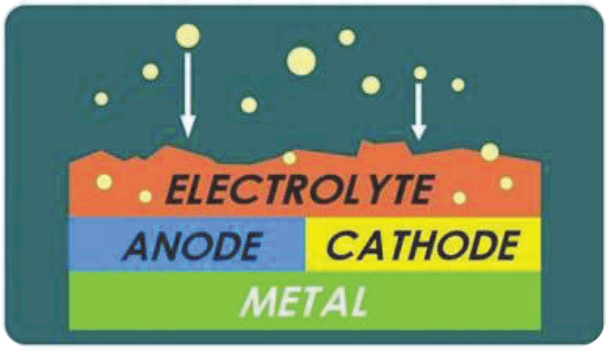


- ✓ No More Money Lost in Scrapping Rusty Parts
- ✓ More Time to Deal With More Important and Productive Activities

Just What is Rust?

MY Definition:

Corrosion is a natural process in which metal tries to return to its original state of ore. Corrosion of metal is an electrochemical process. Electrons move from high-energy areas of metal to low-energy areas through a solution on the surface of the metal. Corrosion cannot take place without this conducting solution. The solution is called an electrolyte, and examples of electrolytes are water, rain, salt water, moisture and humidity.



Traditional Methods of Rust Prevention

Traditionally, the following products have been used in an attempt to prevent rust and corrosion:

- Rust Inhibiting Oils
- Rust Inhibiting Greases
- Tectyl
- Cosmoline
- Motor Oil
- WD-40
- Desiccants
- VCI paper and bags

Top Twelve Reasons For Rust and the Answers

#1: Gloves, Gloves, Gloves!!

#2: Wood is NOT Good!

#3: Cover Up!!

#4: If You Can't Stand the Heat,

Stay Out of the Heat Treat Area!!

#5: "Dry Up!"

#6: Keep it Clean!!

#7: Water is Water is Water….Right? No!

#8: It Doesn't Take a PhD to Adjust the pH!

#9: Keep Your Cool!!

#10: Oil is SO 1990's!!

#11: The Right Stuff

#12: Finally! Use Enough VCI!

#1: Gloves, Gloves, Gloves!!

The #1 mistake that I see when I go around the country visiting metal parts manufacturers is employees touching metal parts with their bare hands.

Acids, oils, and contaminants on human hands can cause and accelerate corrosion.

SOLUTION: All employees who handle metal parts including production workers, inspectors, and packaging personnel should wear gloves when handling metal parts. Simple solution: wear gloves…..every time!

#2: Wood is NOT Good!

The 2nd biggest mistake is having metal parts in direct contact with any of the following:

- Corrugated cardboard cartons
- Wooden Pallets
- Wooden Crates
- Wooden Boxes
- Untreated Paper or Plastic

All forestry products (wood, paper, corrugated) contain moisture, acids, and chlorides that can cause corrosion. Most commonly, this mistake causes "contact corrosion" where parts that are in contact with the wood, cardboard, or paper will have rust or corrosion on the spots that were in direct contact. This often causes sporadic rust, where some parts in a particular shipment are rusty and some are not rusty.

SOLUTION: Create a barrier between your metal parts and any wood or corrugated boxes and/or line boxes, crates etc. with a VCI poly bag, or VCI paper. This creates an effective barrier between your metal parts and the wood products that cause rust.

#3: Cover Up!!

The 3rd most common mistake is leaving metal parts uncovered in the plant. Leaving metal parts uncovered, unprotected while they are in your plant, waiting for secondary operations, or in queue for additional machining, drilling, tapping, or other operations, or while those parts are waiting to be packaged or shipped, leaves those parts susceptible to rust and corrosion.

Leaving metal parts uncovered and unprotected in the plant and making those parts susceptible to corrosion from forklift exhaust. Chlorides, Sulfides, and oxides from fork truck exhaust all contribute to corrosion of metal parts.

SOLUTION: Cover all metal parts with VCI paper or VCI poly bags to protect them from oxygen and contaminants that are in the plant atmosphere.

#4: If You Can't Stand the Heat…… Stay Out of the Heat Treat Area!!

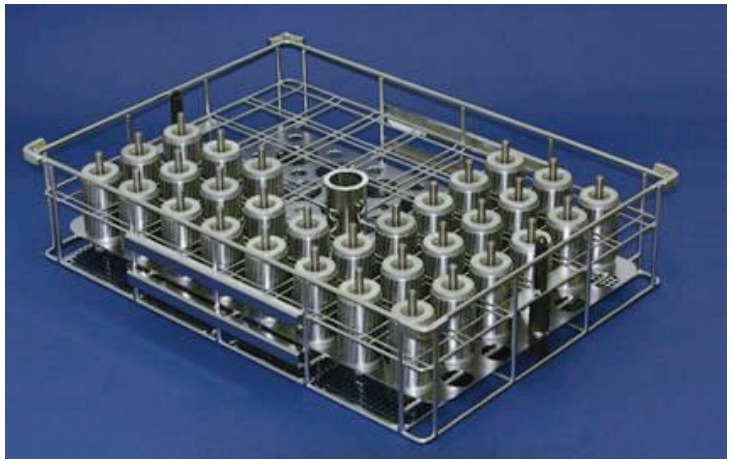
Number 4 is storing metal parts near your manufacturing areas, especially heat-treat processing areas. The heat treating process causes by-products that can cause corrosion on metal parts.

SOLUTION: Move stored metal parts away from the heat treat area, and cover all of your metal parts with VCI paper or VCI poly bags to protect them from heat treat by-products.

#5: “Dry Up!”

The 5th most common mistake is not allowing metal parts to dry after taking them out of cleaning solution. Stacking metal parts on top of each or packing them in boxes after taking them out of the cleaning solution without thorough drying is a recipe for rust. If you are washing parts, make sure that you do not stack metal parts on top of each other or pack them into boxes until the parts are completely dry. Wet parts can rust when stacked on top of each other because the fluid will act as an electrolyte and form a galvanic cell between the two parts.

SOLUTION: Make sure your metal parts are thoroughly dry before stacking them or packing them in boxes. Place metal parts in a wire basket to allow the parts to air dry. Vibratory action, forced air, and heat can dry the parts more quickly. When packaging dry parts, make sure to package the parts quickly into VCI paper or VCI bags.



#6: Keep it Clean!!

The 6th most common mistake is dirty metalworking fluids and dirty cleaning solutions. Small metal particles, also called "swarf" in the solution can end up on metal parts and if not properly washed away can form a galvanic corrosion cell, and corrosion will occur underneath the swarf.

SOLUTION: Keep your metalworking fluids and cleaning solutions clean and free of dirt and swarf. Fluids and solutions should be checked on a regular basis, and kept free of contaminants that can cause corrosion.

#7: Water is Water is Water….Right? No!

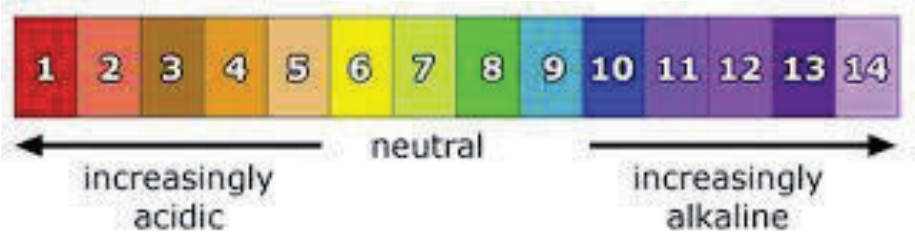
The 7th most common mistake is using public water sources for cleaning fluids and for water-based rust inhibitors. Public water can contain high chlorine levels, and can contain other chemicals that can cause corrosion. The pH of public water can also vary greatly. As we will see in the next most common mistake, proper pH plays an important part in preventing rust and corrosion on metal parts.

SOLUTION: Switch from public water to distilled or deionized water. For water-based rust inhibitors, consider a ready-to-use product, like our Dry Coat Rust Preventative.

#8: It Doesn't Take a PhD to Adjust the pH!

The 8th most common mistake is improper pH of cleaning solutions. Failure to maintain proper pH levels in your cleaning solutions can quickly lead to corrosion. Proper pH levels depend on the type of metal parts you are producing. For ferrous parts, you should maintain a pH level of at least 9.0. For non-ferrous metal parts such as copper, and alloys like brass and bronze, a pH level of 7.0 – 7.5 should be maintained.

SOLUTION: Regularly check and correct pH levels of all your cleaning solutions. Adjust according to manufacturer's instructions.



#9 Keep Your Cool!!

The 9th most common mistake is failure to maintain proper temperature in manufacturing and shipping areas. For every 10 degree Celsius increase in temperature, corrosion rates can double. Fluctuations in temperature can cause metal pores to open, and also can cause condensation to form on your parts. Condensation becomes an electrolyte, allowing corrosion to occur. High humidity can cause electrolytes to form on the surface of metal parts, enabling the corrosion cell to form, and allowing corrosion to propagate. When you package your parts in high humidity, you lock that atmosphere into your packaging.

SOLUTION: Maintain lower temperatures and lower humidity levels by installing climate controls, air conditioning and/or dehumidifiers. Also, be sure to place metal parts into VCI bags or VCI paper as quickly as possible.

#10: Oil is SO 1990's!!

The 10th biggest mistake is using Rust Preventative Oils or R.P Oils instead of VCI packaging. R.P. Oils are the traditional method of preventing rust and corrosion. However, R.P. Oils are messy, labor intensive, and bad for the environment. R.P. Oils are also less effective than VCI products when it comes to preventing rust.

- ✓ Lower labor costs: Simply place your parts in a VCI Bag or wrap them in a sheet of VCI Paper. No coating, spraying, dipping or brushing necessary
- ✓ No need for messy oils and greases
- ✓ VCI molecules reach all recessed areas of your parts for complete corrosion protection
- ✓ Your customer receives your product in a clean dry state
- ✓ VCI protected parts can be used immediately with no need for removal of oils and greases. VCI molecules evaporate into the air when parts are removed from VCI packaging
- ✓ More environmentally-Friendly
- ✓ No employee health and safety issues as with oils: No slip and fall accidents
- ✓ No disposal fees (VCI is completely repulpable and recyclable)
- ✓ Lower insurance costs (due to no flammable liquids)

R.I.P. R.P Oils!

There is additional information comparing R.P Oils to VCI products available on our web site **www.green-vci.com/fyi/vci-vs-rp-oils-a-greases**

In addition, I have prepared a free White Paper detailing the 7 ways that R.P Oils are killing your profits, your employees, and the environment. I would be happy to email this report to you if you just send me an e-mail to **Wayne@Green-VCI.com**

SOLUTION: The obvious solution to this mistake is to switch from R.P Oils to VCI paper or VCI poly bags, or Dry Coat water-based Rust Inhibitor Liquid. We have successfully helped hundreds of companies just like yours switch to VCI products from R.P Oils, with really great results, and we would be happy to help you do the same thing.

#11: The Right Stuff

The 11th most common mistake is using VCI products improperly, such as using a VCI paper designed for non-ferrous metals on ferrous metal parts. Some VCI manufacturers incorrectly state that one VCI formulation will work for every application. This is simply not true. Other mistakes include facing the wrong side of the VCI paper toward the metal, although our VCI papers are coated on BOTH sides to eliminate the possibility of making this mistake.

SOLUTION: Always follow manufacturer's instructions when using VCI products. Consult with a VCI expert like Green Packaging, Inc. to design a VCI system for your specific application, and help you implement the usage of VCI products properly.

#12 Finally! Use Enough VCI!

The final mistake is not using enough VCI paper. The formula is to use at least 1 square foot of VCI paper or VCI poly for every 1-3 square feet of metal surface. Or use at least one square foot of VCI for every cubic foot of void space.