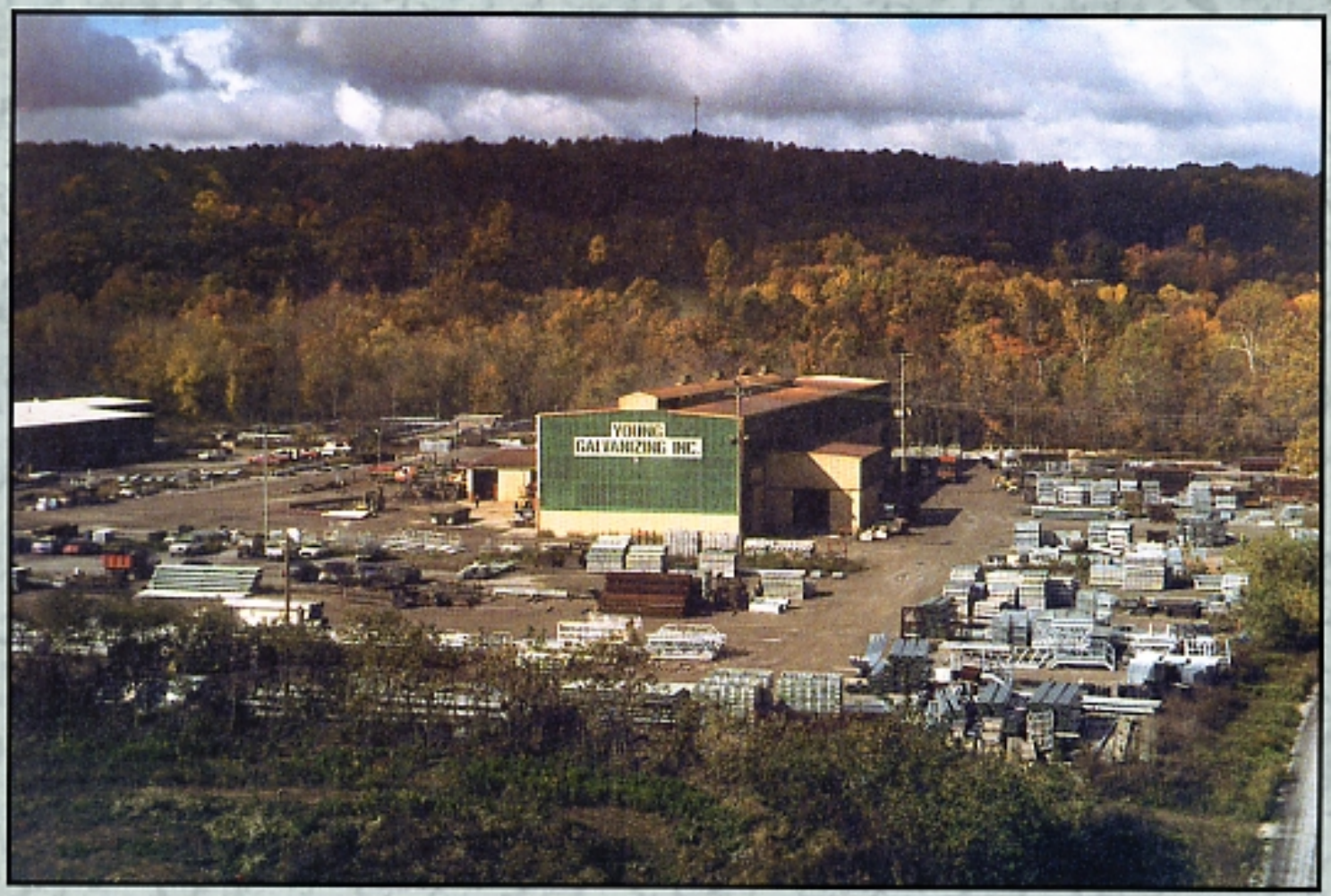
# young galvanizing, inc.




*Your Galvanizing Department*

P. O. Box 334 - Route 551
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# Why are we talking about Galvanizing?

Corrosion prevention! Steel in its unprotected state will rust, trying to get back to its natural state. Corrosion of steel is an *electrochemical* reaction between your steel and the environment. *Expensive for you to repair once it has taken place!*

# What is Hot Dip Galvanizing?

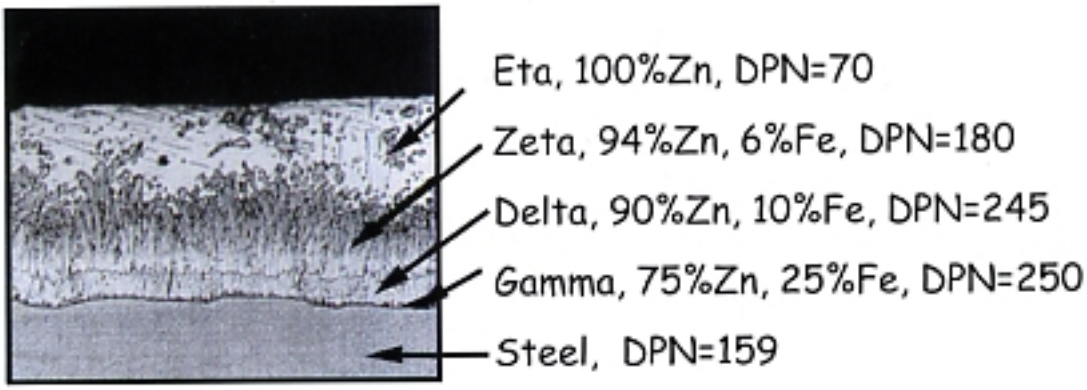
Hot dip Galvanizing (HDG) is the immersion of steel into a bath of liquid, molten zinc, for the express purpose of corrosion prevention.

This process was patented in the 1800's, it is very well proven and is very predictable.

The 850 degree bath imparts a *metallurgical* bond between the zinc and the steel. It is this bond that makes galvanizing a very tough, durable, long lasting and abrasion-resistant coating.

*About the zinc coating;* Four distinct layers of zinc and zinc alloys are formed on every piece of HDG steel. Three of these layers are actually harder than the base steel, providing excellent abrasion resistance and long lasting barrier protection.

The micrograph below shows the four layers and their hardnesses.




## KETTLE SIZES

48' long x 5' wide x 8'6" deep
and
24' long x 5' wide x 6' deep

We regularly galvanize pieces 90 or more feet long!

# Galvanizing protects two ways!

- The tough barrier protection we already talked about. *It can withstand 3600psi, some paint only 350psi.*

- Cathodic protection, often described as self-sacrificing. If the zinc surface is scratched, surrounding layers of zinc will *electrochemically* protect the exposed metal. Zinc by-products also protect the zinc. As the free zinc layer

weathers, zinc by-products prevent further deterioration of the zinc layer, which in turn protects the steel.

Between these two types of protection your steel product will be given a much longer lifespan than would be possible with any other system.

*For a lot less short and long term costs!*

# The Hot Dip Galvanizing Process

**1) Cleaning** - A hot caustic bath is used to remove soils, rolling oils,grease and soluble paints. However, it will not remove vinyls, asphalt or welding slag. *Mechanical removal of these materials should occur before shipping.*

**2) Pickling** - A bath of hot sulfuric acid is used to remove surface rust and mill scale to provide a chemically clean metallic surface.

**3) Galvanizing** - The cleaned product is then slowly lowered into the bath of 850 degree zinc. The high temperature provides the metallurgical bond.

**4) Quenching** - The product is then cooled in a bath of water and chromate. The chromate provides protection from the formation of wet storage stain. *A service few galvanizers provide.*

**5) Inspection** - Time is then taken to check for complete coverage.

# Economic Considerations

As a project manager, fabricator, engineer or architect, your job is to perform miracles and accurately estimate what the long term costs are going to be. You are required to find the best practical form of corrosion protection that can be applied for minimum cost while providing the longest service life possible.

# Four ways HDG reduces costs

1) Initial costs. These are the costs involved in first installing your corrosion protection system. With paint, be sure to include surface preparation costs.
*HDG can be expensed over the life of a project.*

2) Maintenance costs. With paint, additional cost of surface preparation, materials, labor and removal of residual paint disposal will be necessary. This will usually be required several times over the life of the project.
*Not with Hot Dip Galvanizing!*

3) Life cycle costs. These are the initial costs plus all maintenance costs to maintain a corrosion prevention system.

4) Intangible costs. These are the costs that are harder to put a dollar value on. They include costs resulting from slowdowns and shutdowns of production and traffic problems if replacing bridges.

*For a more comprehensive study of this subject and how galvanizing costs compare to other systems please contact Young Galvanizing and we will be happy to supply you with all the information we have.*

1998 Excellence in Hot Dip Galvanizing award winner by Young Galvanizing

Cleveland Browns Stadium handrail by Young Galvanizing

# More advantages of Galvanizing!

In addition to the two types of protection, HDG offers many other advantages over other forms of corrosion protection.

**-Complete coverage** - inside surfaces as well as outside surfaces are given equal protection, and any place where you see the zinc layer you can be sure you have the bonded protection.

**-Edge protection** - because the zinc reacts with the steel it forms an equal layer at every point, so edges are protected just as well as flat surfaces, often better, with a thicker layer of zinc.

**-Quick processing time** - the HDG process is not weather dependent. *Young works hard to get your product back ASAP!*

**-No handling problems** - HDG is tough, so no special handling requirements are needed. This is especially helpful in rebar applications.

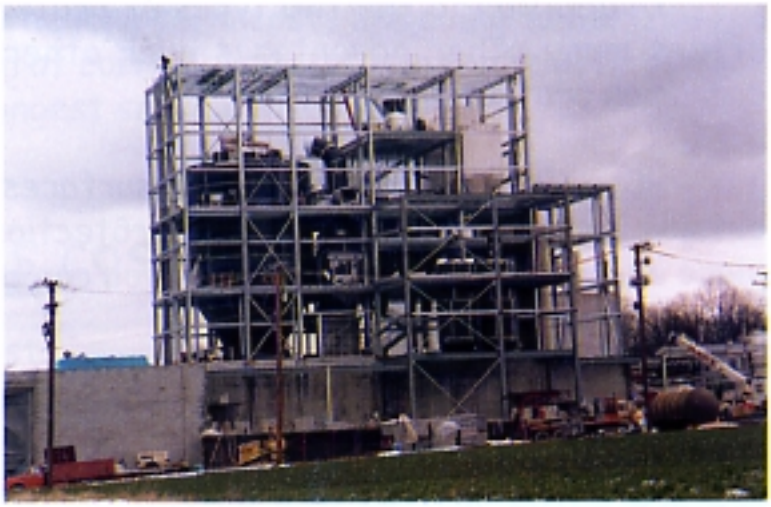
**-Few size considerations** - nearly anything can be galvanized, from larger structural pieces to small fabricated pieces.

**-Environmentally friendly -** zinc is essential for all life, and can be found in most minerals, and nearly 30% of the world's supply comes from recycled zinc. *Some doctors say it even fights the common cold!*

**-Long term protection** - a typical galvanized surface in a rural environment can be expected to last up to *75 years* before it reaches first maintenance or a 5% breakdown of surface protection.

# WhyYoung Galvanizing?

**-Quality through experience.** Young has consistently provided the highest levels of zinc coating quality as well as service, receiving numerous awards and a reputation for quality within the galvanizing industry. The reason for this reputation is experience. Our managers and foremen all have at least 20 years of experience with our company and a majority of our workforce has more than 10 years each. This cumulative experience adds up to a better product for you.



**-Young Service.** We process a wide variety of products, from small custom pieces to large highway products. Our customer base covers the northeast, mid-atlantic, southeast areas, and extends as far west as Chicago, with our customers' products going around the world.

**-Kettle sizes.** Young uses one large kettle, 48'long x 5'wide x 8'6" deep and one smaller kettle, 24' long x 5' wide x 6' deep. Young can galvanize products up to 90 feet long.

**-Zinc baths.** Young's own onsite metallurgical engineer is constantly monitoring the kettles to be sure proper levels of additives, including aluminum and nickel, are present in the zinc bath to provide the best possible quality and appearance for your product.

**-American Galvanizers Association.** As a long term member we meet all ASTM and AASHTO specs, as well as access to all the latest information concerning galvanizing.

**-Location and plant size.** We are located near Interstates 80, 79 and Rt. 60 in Western Pennsylvania, affording easy access from any direction. We have an easy to find plant with over 10 acres of available storage space. Our large storage lot ensures that your steel will be handled minimally, reducing the chances for damage, so you get a better product.

# Tips for getting better product.

Young Galvanizing goes the extra mile to be sure that the product that you send us gets the best possible finish, but there a few things that you can do to insure the best finish at the lowest cost.

-Use a high quality, non-reactive steel with low levels of silicon and phosphorus.

-Remove welding slag, splatter guard, paint and asphalt. Zinc will not bond in these areas because our cleaners will not remove them.

-Proper seal welding and bracing prevents warpage in the zinc bath. Examples below.

-Avoid exteme cold working of the product

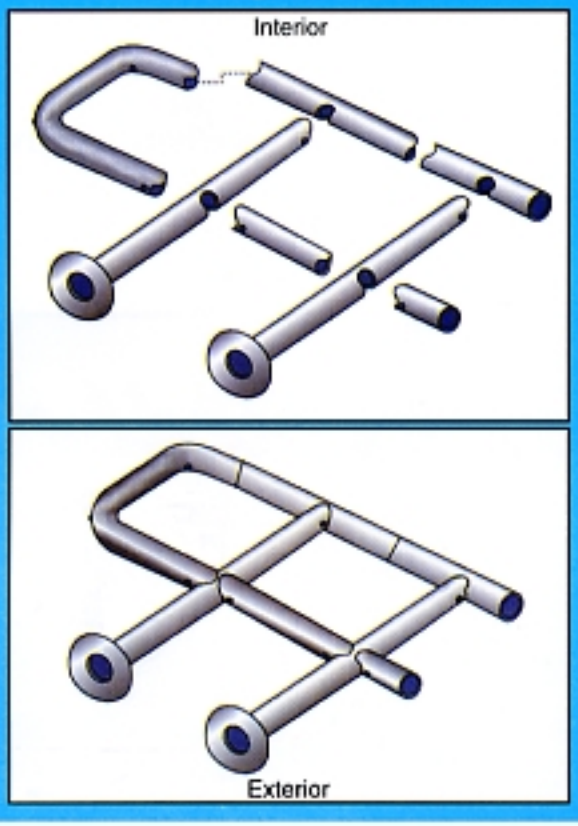
-Castings should be blasted to remove sand and other casting impurities that will cause a rough HDG surface

-Markings should be welded, stamped into the product, or metal tags wire tied to the product.

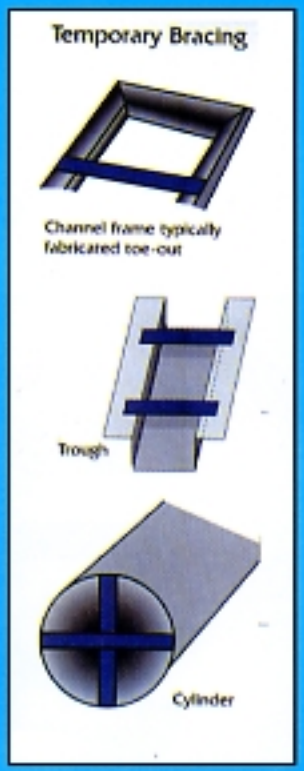
**-Very important!** Because we are lowering cold steel into an 850 degree liquid, any liquids in the product will turn into steam. If this steam is trapped in the product it is likely that there will be an explosion. It is necessary to properly ventilate the product you send to us. Below you will find examples of proper ventilation and bracing in various products.

*You will also get a better HDG product if the zinc can flow all through your steel!*

## Venting Examples




## Bracing Examples



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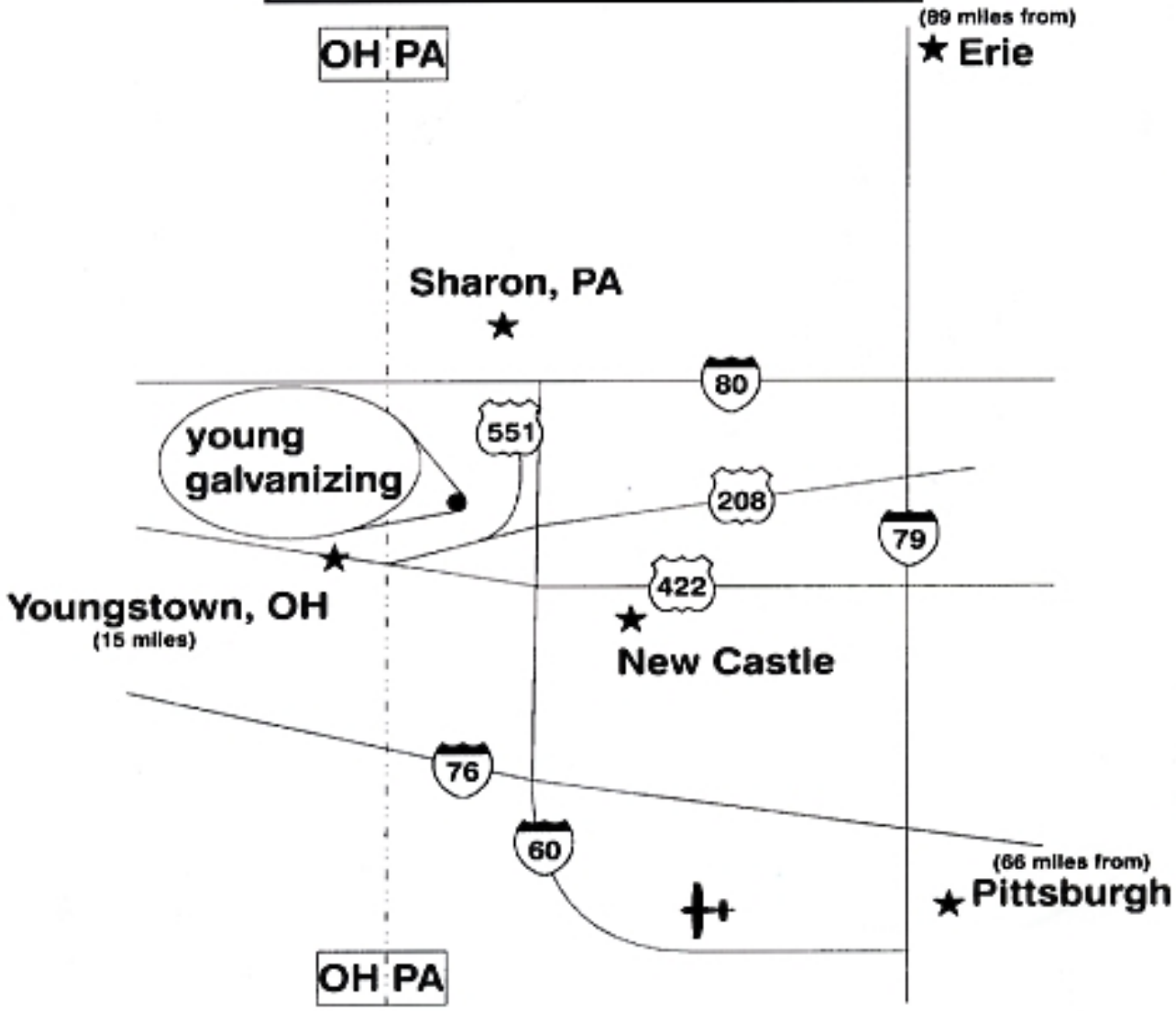


# We've Got You Covered!

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AGA American Galvanizers Association
Protecting Steel for Generations