Life Expectancy of Galvanized Fasteners

Q. *What is the life expectancy of electroplated nails, bolts, and lag screws as compared with hot-dip galvanized? Double-dipped fasteners are often recommended, but their cost is almost twice that of electroplated hardware. I have used electroplated on several projects in the past five years and have had no problems — yet.*

A. *Shalea Hardison responds:* There are several methods for coating steel with zinc. The most commonly used for nails, bolts, and screws are hot-dip galvanizing, mechanical galvanizing, and electroplating. The coatings resulting from the different methods have different characteristics and provide varying levels of corrosion protection (see chart below).

Hot-dip galvanizing is the process of dipping steel into a bath of molten zinc, creating a series of metallurgically bonded zinc-iron alloy layers. The fasteners are typically dipped in baskets, then placed in a spinner, or centrifuge, to remove the excess zinc from the threads. The minimum coating thickness for hot-dip galvanized fasteners ranges from 2.0 to 6.0 mils.

The term "double-dipped" is somewhat misleading. It does not mean that the zinc coating on the fastener is twice as thick (and will therefore last twice as long). However, dipping a fastener a second time does improve the overall quality of the outer zinc layer, while adding a small amount of thickness.

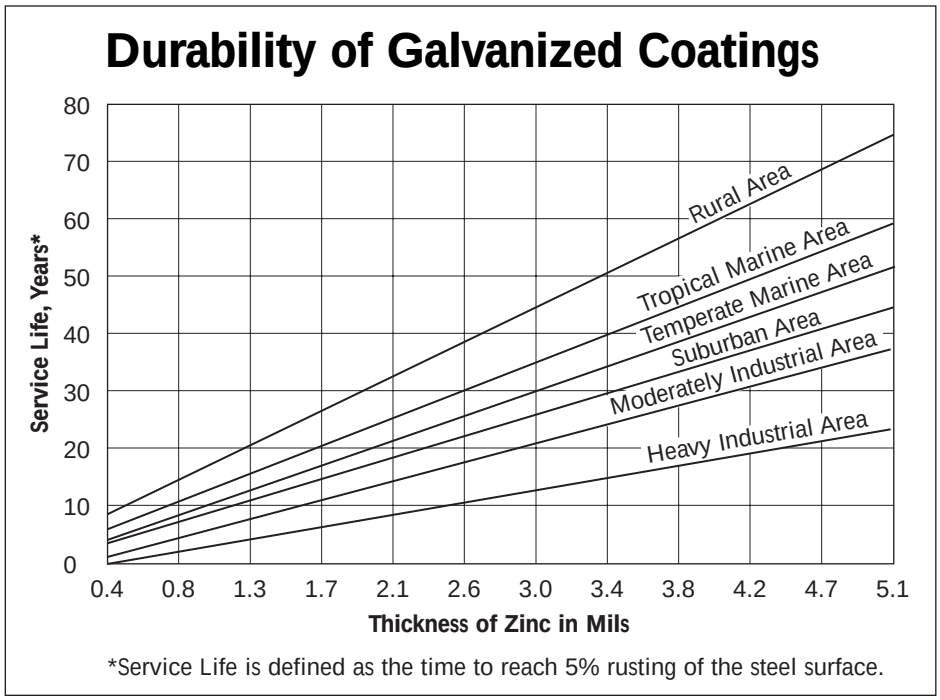
Electroplating is the process of applying zinc to the steel surface by electrodeposition. With electroplating, the zinc does not metallurgically bond to the steel surface. Also, the coating thickness is significantly less than with hot-dip galvanizing, typically between .14 and .28 mils.

With *mechanical galvanizing*, the fasteners are placed in a tumbler with zinc powder and other chemical catalysts. Again, there is no metallurgical bond created, and the minimum coating thickness ranges from .2 to .24 mils.

As a general rule, the thicker the zinc coating, the longer the corrosion protection afforded. As the graph shows, hot-dip galvanized fasteners will last longer than either mechanically galvanized or electroplated products.

In addition to providing longer corrosion protection, hot-dip galvanized coatings have a more uniform and slightly thicker zinc layer on edges and corners. Hot-dip galvanized coatings are also tougher and more durable than other zinc coatings.

In essence, not all zinc coatings are the same. Make sure the coating you specify is suitable for the environment in which the steel will be placed. Replacing an electroplated fastener just a few years after installation may mean spending more money than using a better quality product in the first place.



Shalea Hardison *is the marketing services coordinator for the American Galvanizers Association, in Aurora, Colo.*

Receptacles on Ungrounded Electrical Circuits

Q. *My questions have to do with existing ungrounded circuits in older homes. My understanding is that you should always replace worn-out two-slot receptacles with new two-slot receptacles (although they're not always easy to find). However, I've also been told that in some locales you can install a three-prong receptacle in an ungrounded circuit as long as you fill the ground slot with*

epoxy. This is presumably to prevent someone from using a grounded appliance on the ungrounded circuit. What's the code requirement, and what about this epoxy business?

A. *Redwood Kardon responds:* In my jurisdiction (Oakland, Calif.), two-slot receptacles are readily available and must be maintained on existing ungrounded receptacles, unless the outlet is upgraded with a ground per the NEC. The "epoxy business" sounds funky to me. It is not an acceptable practice where I work, and there is certainly no such "fix" in the NEC. This issue most often surfaces when someone wants to install a dedicated computer outlet. In that case, a separate ground may be run, as noted above, and a three-prong outlet installed.

***Redwood Kardon** is a code official in Oakland, Calif. For more code-related information, visit his Web page at* www.CodeCheck.com.

Concrete Recipe

Q. *Many years ago, a concrete contractor gave me a recipe for mixing concrete by hand or machine. It is the only mix I have ever used. Is there any way to know how strong the mix is? I use 1 part Portland cement, 2 parts clean sand, and 3 parts clean crushed stone (7/16 inch or 3/4 inch, depending on the job).*

A. *Bob Shuldes responds:* The strength of your 1-2-3 mix should be very good, but will vary somewhat depending on the water content (water/cement ratio). If you use 4.5 gallons of water per bag of cement, the strength will be 5,800 psi; at 5 gal. per bag, 5,300 psi; at 5.5 gal. per bag, 4,800 psi; at 6 gal. per bag, 4,300 psi; and at 6.5 gal. per bag, 3,900 psi.

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GOT A QUESTION? Send it to On the House, *JLC*, 932 West Main St., Richmond, VT 05477; or e-mail to *jlc@bginet.com*.