# Fastening Deck Boards

## Speed of installation and cost are important, but so is long-term performance

by Kim and Linda Katwijk

Figure 1. Nailing remains a viable and effective way to fasten decking, particularly when price is a big consideration.

Twenty years ago, choosing a deck fastener was easy — decking was wood, and we nailed it down (**Figure 1**).

Then Trex composite decking came along and introduced a problem: It mushroomed when nails (and the screws of that time) were driven into it. Within a few years, the number of alternative-decking manufacturers had grown to 80 or more. That led to the development of numerous fastening systems, to deal with mushrooming and other issues. I don't evaluate all available fasteners in this article — if I don't mention a fastener, it doesn't mean it's not a good choice. I do explain, in depth, why I choose the fasteners I do.

My main question when choosing fasteners is "How is this fastener going to perform over the life of this deck?" I consider a number of factors, from corrosion to holding power to whether a system creates a situation where freeze-thaw cycles can damage the decking. How you weigh those considerations will depend to a degree on where you build. Freeze-thaw cycles, for example, aren't a concern in Miami. On the other hand, accelerated corrosion from salt spray might be, and how much shear strength a fastener contributes to the deck in a hurricane is also likely to be important.

Of course, no matter where you live, speed of installation will have a big bearing on profits.

### Corrosion Resistance

By now, most deck builders know today's ACQ preservatives are far more corrosive than the CCA they replaced. Even so, hot-dipped galvanizing (although in a thicker coating) has remained a popular way to add corrosion resistance to fasteners. For decks in wet conditions, however,

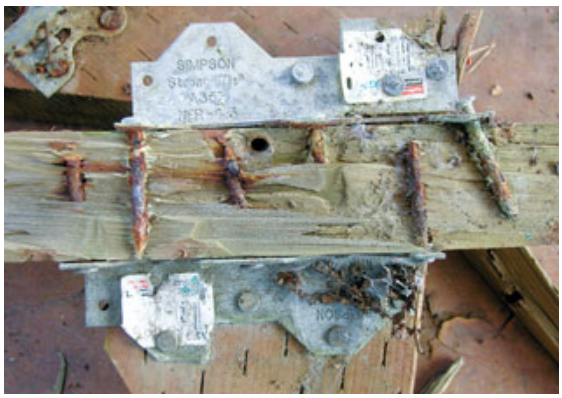
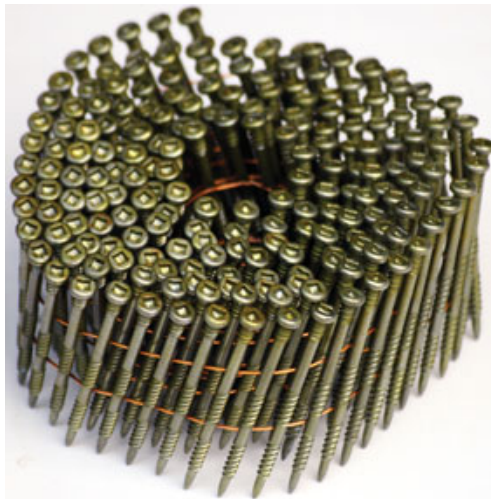


**Figure 2. After one year's outdoor exposure in Olympia, Wash., galvanized fasteners driven into ACQ-treated lumber have begun to corrode (top left). After five years in the same environment (bottom left), rust is apparent everywhere.**



UNIVERSAL FASTENER OUTSOURCING

**Figure 3. NailScrews are relatively new to the market. Driven with a pneumatic nailer, they're as fast to install as any other nail, and their heads allow them to be backed out or driven deeper with a screwdriver.**

stainless steel fasteners may be preferable to galvanized ones, according to testing done by Simpson Strong-Tie (strongtie.com/ftp/fliers/f-deckcode09.pdf). The company also points out that "some treated wood may have excess surface chemicals, making it potentially more corrosive. If you suspect this or are uncertain, use stainless steel."

My own testing also supports the use of stainless steel. When ACQ-treated wood was first available some five years ago, I drove hot-dipped galvanized nails and screws (all of which met the code-referenced standard ASTM A153) into some samples and threw them outside. I opened up two samples the first year (**Figure 2**), another one after two years, and two more when I wrote this article. I was troubled by what I found after just one year: As I gently split open the wood, the nails pulled away from the galvanizing, which stayed attached to the wood. White rust was on most of the steel, and some red rust was on one nail. I use the photos shown here to upsell stainless steel to my clients. Unfortunately, most of my competition uses galvanized fasteners, which puts the more expensive stainless at a disadvantage.

Many anti-corrosion coatings are available in addition to zinc (galvanized), including ceramic, silicon bronze, and silicon copper. These alternatives are all cheaper than stainless steel. One way to compare the different coatings is to look at the results of accelerated salt-spray testing, which most manufacturers publish. Some fasteners begin to rust after 300 hours, while others are claimed to last 3,500 hours. Salt is very corrosive and the test is easy to standardize, but it provides limited information. Even a number of fastener and treating-chemical manufacturers admit that the salt-spray test doesn't predict how long it will take a fastener to corrode in a real deck in a particular environment in contact with a particular treating chemical.

## Speed = Profits

Speed of installation is where profits lie. The fastest way to fasten down a deck is with a pneumatic nailer. You can use ring-shank nails or UFO Ballistic NailScrews (Universal Fastener Outsourcing; 800/352-0028, allnails.net). The thing I like about the NailScrews is that they can be backed out using the screw head (**Figure 3**). (Tip: I've used UFO Ballistic NailScrews on cedar decking, but the plastic collating marred the wood. The wire-collated screw nails, however, work great with cedar.)

The second-fastest method I've

**Figure 4. Nearly as fast as nailing is face-screwing with a collated-screw gun. Screws can be had with heads in a variety of colors to match most composite decking brands.**

found is to use a collated screw gun (**Figure 4**). I've tested every one that I have been able to get my hands on. Most screw guns don't let you see exactly where you are placing the tip of the screw, making precise placement difficult. Most screw guns also make you stand or place your body in an awkward position to operate them. Muro has solved both of these problems with its FDVL41 Speed Driver.

Slowest are the hidden fastening systems — clips, pound-on clips, screws and plugs, screws through the edge of the board, screws from the bottom, screws to the edge, clips that slip under the existing fastened board, and a few others (see "Hidden Fasteners," July/August 2007; free at deckmagazine.com). I've tested most and tried some and, as a result, can shout the praises of two. Of the hidden fastener configurations, the least slow are the clip systems that work with pre-grooved boards (**Figure 5**).

TIGER CLAW

FIBER COMPOSITES

**Figure 5. Hidden-fastener clips usually have either prongs that are driven into the side of the deck board (inset) or tabs that engage in grooves milled in the side of the decking (above).**

## Warranties

About 98 percent of the decking I sell is composite, most of which comes with a 25-year material warranty. Although my company warrants its workmanship for just five years, I suspect many of my clients hear only the "25-year" figure and think the entire package is warranted for that time, including the fasteners. I'm pretty sure that if anything goes wrong with those decks in the next 25 years, my phone will ring with the customer thinking it's my responsibility to make things right. And I'll probably try to do that — my reputation is on the line. So, read the fine print in the fastener warranty. Most companies will refund the cost of failed fasteners but not the labor or damage to the decking that might occur trying to replace them. That's why I choose my fasteners (and every other material) carefully. — *K.K.*

SPOTNAILS

**Figure 6. The Tebo hidden-fastener tool drives a three-prong stainless steel staple. One prong goes into the joist and one into the existing deck board's edge. The third prong faces outward, and the next row of boards is driven onto the prongs.**

Although I try to upsell every potential client to a hidden fastener system (see *Deck Ledger,* "Creating Upselling Opportunities," May/June 2009; free at deckmagazine.com), the additional cost of $4 to $5 per square foot is too much for most clients. The main reason for the extra cost is time. You have to hand-feed two things, the clip and the screw, for each joist. As I write this article, only one hidden fastener system is collated (**Figure 6**) — the Tebo (Spotnails; 800/873-2239, spotnails.com). When others start to collate, the installation cost will decrease, and they may become more feasible.

## Concerns and Conclusions

On the majority of the decks I build, I use EverGrain or Fiberon decking. Unless the client wants hidden fasteners, I typically frame 1 foot on center and set one stainless steel or ACQ-compatible coated screw in each joist, alternating the side of the board that gets the screw. To hold the decking while it's being fastened, I use a pin nailer to drive one nail in every third joist or so. Next, I use a 3/8-inch countersink bit to make a recess for the screws, and I predrill holes for any screws closer than 1½ inches to the end of a board to prevent splitting.

Not that it comes up that often, but replacing a board is easier if you can unscrew it. With some fastening systems, you may need to undo many boards to get to the one you want. With other systems, you can only cut the board out and screw the new board back down. A finicky client won't like that.

Even with hidden fastening systems, screwing down the decking provides the best holding power (meaning fewer squeaky decks and better lateral load transfer). I recommend either of two systems. The first is the DeckPilot system (**Figure 7, page 6**), exclusive to Fiberon Sensibuilt Decking (Fiber Composites; 800/573-8841, fiberondecking.com). Both edges of the boards are fastened with two 2½-inch stainless steel screws at a 45-degree angle. The DeckPilot jig spaces the boards and guides the screws at the right angle, stopping them at the proper depth.

My second recommendation is the Cortex Concealed Fastening System (FastenMaster; 800/518-3569, fastenmaster.com), a screw and plug system (**Figure 8, page 6**). The plugs

## What Deck Builders Are Saying About Fasteners

Some of the top deck builders across North America share how they fasten decks and why they choose the methods they do. — *K.K.*

**Bob Fogarty, Artistic Decks & Arbors, Waxahachie, Texas**

Fogarty usually fastens his decking with Ballistic NailScrews. "The only hidden fastener system I have used is Lumber-Loc (KK Manufacturing Co.; 913/908-9445, lumberloc.com) in conjunction with a black Ballistic NailScrew. I liked it over the others I researched, since it not only spaces the composite properly but has tabs that allow for expansion and contraction. They worked very well on the composite deck boards that we had to heat and bend."

**Bobby Parks, Peachtree Decks and Porches, Alpharetta, Ga.**

"It's hard to argue with the structural stability surface screws provide, especially on diagonally laid decks," says Parks. "We use a significant amount of PVC decking and have found the FastenMaster stainless steel coated trim screw to work well. Recently, we started using FastenMaster's TrapEase coated screws, which work great and provide excellent holding power."

As for hidden fasteners, Parks says, "I've had success with Ipe Clip Extremes (The Ipe Clip Fastener Co.; 866/427-2547, ipeclip.com) with some hardwoods, but we've used them on porch floors where they have some protection from the elements. I consider the FastenMaster Cortex product the best of both worlds in terms of providing structural stability and as a hidden fastening system."

continued on page 5

continued from page 4

**Edmond Ross, The Cedar Fence Co., Provo, Utah**
Ross's crews primarily build with Trex and face-screw with Pam Composite Deck Screws (Pam Fastening Technology; 800/699-2674, pamfast.com). "We like the Pam deck screws best since we can use a longer driver to zip them down — very efficient. However, with grooved boards in both the Trex Brasilia and Accents lines, our customers are increasingly asking us to use the Trex Hideaway Hidden Fastening system (Trex Co.; 800/289-8739, trex.com). Our crews are becoming more skilled with the hidden fasteners, but we have found that it typically takes about twice as long for a deck that is 3 feet to 5 feet off the ground and much longer if the deck is higher or lower than those heights."

**Dan Troxel, Decks and Design by Dan, Kansas City, Kan.**
"Our typical decking is 2x6 cedar or redwood," says Troxel. "We use triple-dipped hot-galvanized 3¼-inch ring-shank nails set ⅛ inch below the surface. We have never had a nail pop up in 18 years. Besides the holding power, this is a very fast system. When looking at a completed project, there are so many other things that catch their eye, most clients never notice the nails."

Troxel adds, "We have used the Fiberon Phantom clip (Fiber Composites; 800/573-8841, fiberondecking.com) with the company's Tropics composite. It gave a very nice look, but this is a slow way to fasten decking."

**David Lombardo, American Deck, Baltimore, Md.**
"I prefer to use TrapEase II screws on most composites from an installation and cost perspective and the matching stainless steel trim screws on softer composites (PVC) from installation, appearance, and cost (higher) perspectives," says Lombardo. "The #8 trim GRK screws (GRK Fasteners; 800/263-0463, grkfasteners.com) are next on the list, except that screw tips break frequently on harder decking materials such as ipe."

For hidden fasteners, Lombardo prefers "the Tiger Claw clip (800/928-4437, deckfastener.com), whether it's made for Trex, TimberTech, or Fiber Composites. We use FastenMaster Cortex on Azek with good aesthetic results and relative ease of installation. I see hidden fastener installation being large in the future on higher-dollar composites; exposed screws on the price-point composites; and a mixed bag for hardwoods. Treated lumber is only 30 percent of our market. Some of those decks are still shot down with ring-shank nails, and the other half are screwed in with galvanized. Cedar gets stainless steel screws."

**Jerry Bannister, Bannister Homes & Decks, Bothell, Wash.**
"Composite decking makes up 80 percent of our decks," says Bannister. "We focus on three types of applications, the first being a color-coated, ACQ-compatible surface screw (Screw Products; 877/844-8880, screw-products.com). These screws drive with a star tip, and we find this to be superior over square or Phillips tips. They are also available in stainless steel. We have found Tiger Claw to be the most effective hidden fastener. We also use FastenMaster's Cortex screw and plug system. Both work well but are very time consuming."

**Joe Wood, Woods Shop Creative Builders, San Diego, Calif.**
"I pretty much use only ipe for my deck floor surfaces," says Wood, "and I've always face-screwed and plugged. I only screw where needed when laying the decking and come back later to drill and screw the rest of the decking off by eye. There is no need for perfectly straight plug lines.

"I use #10 x 2½-inch square-drive stainless steel screws, driven with a cordless drill/driver. I don't like the impact drills; they're too loud and a bit too slow. I use a corded drill for the countersink/pilot holes. The best bit I've found by far is the Snappy Bit (Poly-Tech Industries; 800/334-7472, snappytools.com). I use the ⅛-inch pilot part and a ⅜-inch countersink with face grain ⅜-inch ipe plugs (East Teak; 214/751-8988, eastteak.com). Don't use end grain plugs, as they'll shrink less than the decking as it dries and stand proud a bit after time. I secure the plugs with Titebond III and a regular ¼-inch plug-hole glue tip applicator, making sure to get the sides of the holes well."

**Dave Bartnick, Deck Masters of Canada, Beeton, Ontario**
"Given the choice, all of our carpenters prefer to use the Cortex hidden-fastener screw and plug system — it has tremendous holding power and is virtually invisible when complete. For other composite decks, we currently use color-matched stainless steel screws from Swan Secure (Simpson Strong-Tie Co.; 800/999-5099, swansecure.com). They are a #1 Robertson-head (square-drive — a Canadian invention) trim screw, #7 x 2¼ inches with a beaver-point tip, so predrilling is typically unnecessary. Robertson-head screws offer the advantage of staying on your bit when held horizontally. For securing cedar and pressure-treated decking, we prefer to use ACQ-rated #2 Robertson-head #8 x 3-inch screws."

Figure 7. Fiberon's DeckPilot spaces the decking and guides screws into the edge of the board at an angle.

Figure 8. The Cortex system provides screws and a special driver. This combination countersinks the screw to the perfect depth for the supplied composite-decking plugs to be driven flush with the surface.

match several types of PVC and composite decking, including EverGrain, Azek Deck, Trex Accents and Escapes, and TimberTech TwinFinish. The screw cuts a hole as it's driven into the board. The proprietary bit has a stop that drives the screw to the correct depth for the plugs, which fit the holes perfectly. Once hammered in, the plugs are hard to see. Of the thousands of Cortex screws I've driven, only a handful of plugs didn't fit — mostly due to operator error. If they ever automate this system with a collated screw gun, it will be near perfect. Cortex is the only hidden fastener that lets me choose the width of the gap between deck boards.

While they're heavily marketed, I'm not sold on pre-grooved hidden fastener systems, even when the job's budget supports them. First, my engineer advises the use of additional lateral bracing with them, which adds to the framing budget (see sidebar at right, "Does Decking Add Racking Resistance?"). My second concern is freeze damage. Although I haven't had a callback for this yet, I worry the grooves will fill with dirt, animal fur, and leaf litter and then hold moisture. Over a 25-year lifespan, a deck may go through hundreds of freeze-thaw cycles. Will grooved decking give me trouble over its life expectancy? If so, I have to depend on my customers to get on their hands and knees to clean out the gaps every year. This is a particular problem in the Pacific Northwest, where we have lots of tree litter.

It would be less of a concern if any of the groove-and-clip systems allowed a larger gap than 1/8 inch to 3/16 inch. I use a 3/8-inch gap, which is probably wider than most builders use, to allow debris to fall through. The common big leaf maple in particular produces seed pods that will not slip through smaller gaps. ❖

*Kim Katwijk is a deck builder from Olympia, Wash., and a* PDB *contributing editor.* ***Linda Katwijk*** *is his co-writer.*

## Does Decking Add Racking Resistance?

I asked that question of Richard Rock, a professional engineer and the owner of Rock Engineering. He answered that it partly depends on how the decking is run. If it's run at a 45-degree angle to the house with a positive connection — such as face nails or screws — decking can give significant lateral resistance. Decking run parallel to the house adds less lateral resistance, and a skip-screw method yields even less. Rock's view is that with any hidden-clip fastener system (as well as whenever the decking is not running at a 45-degree angle), additional lateral bracing is needed because the fasteners can't transfer enough lateral load. — *K.K.*