A New Approach to Deck Framing

FastenMaster's Icon ScrewJoists are straight, light, and easy to install

by Raymond Degidio

PHOTOS COURTESY FASTENMASTER, EXCEPT WHERE NOTED

As a builder of high-end decks in southern Rhode Island, I have always been frustrated by the foundations for our decking never being perfectly straight or flat. Installing premium PVC or composite decking on standard pressure-treated framing never felt right, even after we carefully sized the joists, ripped or planed them as necessary, sometimes even shimmed them on the beam, and, in general, took the time to ensure the framing was flat. I knew that, even after all that work, the framing would eventually dry out, shrink, and create waves in the decking.

I'm always looking out for the next innovation in this industry. Usually, that's a new tool or software or railing system—not exterior deck framing. That's why I was eager to try out FastenMaster's Icon ScrewJoist deck substructure system when I was introduced to it last year. Using the same tools we always use for framing, we found that the Icon joists install faster than standard framing and require less hardware. And unlike steel framing, which has a different learning curve, framing with Icon joists is similar to framing with standard PT lumber.

An Icon joist has an open web with

Figure 1. Icon ScrewJoists are fabricated with 2x4 pressure-treated top and bottom chords connected with structural screw webs and are designed to be straight and flat (A). They weigh about half as much as a comparable 2x10 PT joist (B), making them easy to move around a jobsite (C). Instead of requiring a joist hanger, the end of an Icon joist goes over and under the ledger and is fastened to it with pairs of structural screws driven down through the top chord and up through the bottom chord and into the ledger (D). The joists can be ordered with or without waterproofing applied to the top chord.

2x4 KDAT (kiln dried after treatment) PT framing members on the top and bottom and structural screws on angles in the web. When I pick up a 16-foot 2x10 PT board, chances are it'll have a twist, a crown, or a bow; in contrast, a 16-foot Icon joist is straight and flat. The other thing I like about it is its weight: I can pick up a pair of 16-foot Icon joists—one in each hand—and carry them around. Try that with traditional framing (**Figure 1**).

A Learning Process

For the first deck we built with Icon joists, we pushed the design envelope a bit with a 50-foot-long structure varying in depth from 12 feet in one section, to 16 feet in another, and 21 feet in a third area. We started by submitting a plan view that we had drawn of the deck to my FastenMaster contact, Ernie Gasbarino, who sent back a preliminary plan to bring on site and review. After a few revisions and final approval of the plans, FastenMaster delivered a complete set of drawings for the project and a delivery date. Based on this information, we completed all the site work, installed the beams, and set the ledger per FastenMaster's specifications.

Ledger. We ripped the ledger down to $7^3/8$ inches from 2x8 PT stock. When setting the ledger, we needed to keep in mind that Icon joists lap over and under the ledger by $1^1/2$ inches for a total height at the ledger of $10^3/8$ inches, or a tad stronger. After setting the ledger and securing it using FastenMaster LedgerLoks, we flashed it to the wall and laid out the joists based on the spacing and numbers on the drawing.

Icon joists are supported by a ledger and dropped carrying beams. As we installed the joists, we screwed down through the top chord into the ledger with two 3-inch FastenMaster MVP screws (our preferred screws for framing), then up through the bottom chord with two more screws. This engineered connection of four screws—two down and two up—avoids the need for joist hangers, saving time and allowing us to start laying decking sooner.

Figure 2. On this project, the Icon joists bear on a two-ply PT LVL dropped perimeter beam supported by PT 6x6 posts, with the top of the beam 1½ inches lower than the bottom of the ledger (A). Once a joist is positioned on the 16-inch-on-center layout, it's fastened to the beam with a pair of structural screws driven down through the bottom chord into the beam (B). Another intermediate dropped three-ply beam provides midspan support and carries point loads from the columns supporting the porch roof (C).

Carrying beams. We installed a two-ply LVL dropped beam at the front of the deck and a three-ply 2x10 dropped beam near the midpoint of the left side of the deck; the latter also carries loads from a porch roof. We set the beams so that the tops would be 1 1/2 inches lower than the bottom of the ledger to account for the design of the Icon joists. Both beams are supported by 6x6 posts bearing on concrete piers (**Figure 2**).

Connecting the joists to the beams couldn't be easier. Once we had positioned a joist on the 16-inch-on-center layout and screwed it to the ledger, we simply drove a pair of MVP screws—one on each side of the bottom chord—into the carrying beam. In most applications, securing the joist to the beam with these two screws avoids the need for tie-down hardware from joist to beam, saving time and hardware and eliminating another step in the installation process.

Alcove. The house has a small, 7-foot-7-inch-wide-by-5-foot-deep alcove, where the joist span increases to 21 feet. Here, we ran the 2x8 ledger straight across to a three-ply hanger fastened to the framing of the facing wall, then added two more 2x8s to the ledger to create a three-ply inset beam. In this area, the 16-foot joists are supported by the ledger and inset beam assembly, while shorter, 5-foot Icon joists fill in the gap between the longer joists and the wall of the alcove.

This detail illustrates that Icon joists don't have to be supported by a dropped beam; you can build an inset beam instead and set the joists as you would on a ledger. We recently used this detail on a project that had originally called for a two-ply drop beam. When we realized that the drop beam would limit the headroom underneath the elevated deck, we replaced it in the field with a two-ply beam set on posts at the same height as the ledger. Then we removed the front squash block on the Icon joists and installed them on the beam the same as on the ledger. Next, we ripped a 2x12 down to 10 1/2 inches so that it was the same overall height as the joists. We fastened this to the outside of the ends of the

Figure 3. Icon joists can be supported by inset beams as well as by dropped beams. Here, the author removed the squash blocks at the ends of the joists and replaced them with a two-ply 2x8 beam that spans across the support posts, followed by a third ply to strengthen the assembly (A). Inset beams can also be used to preserve clearance under an elevated deck when spans longer than 16 feet are called for (B). Blocking is required midspan and under bearing points but is easy to install because the open web of the joists (C) allows continuous blocking to be inserted from the side of the deck (D). Side rim boards that fit between the top and bottom chords of the edge joists can then be installed.

joists and the inset beam with structural screws to create a three-ply beam. This was an easy change for us (**Figure 3**).

Blocking. A deck framed with standard PT lumber requires a lot of blocking, which involves cutting the pieces to length, installing them between joists, and screwing each side of the blocks into the joists from inside the joist bay, which is a tight fit. Blocking a deck framed with Icon joists is a lot quicker. We rip as many 2x8s as are needed for the size of the deck (as determined by the supplied plans) to 7 3/8 inches, then simply slide the ripped 2x8s through the web of the joists from the side. Once the 2x8s are through all the joists and in position, we install screws through the top and bottom chords into the blocking, and we're finished.

We also use blocking to help us with stair landings if they come off the side of a deck. We install the blocking through the web of the joists in the first three or four bays, then slide the landing joists over the blocking.

We usually picture-frame decking, which on a traditional deck requires installing the end joist, installing a joist 5 1/2 inches in from that joist, installing

PHOTO 3A: RAYMOND DEGIDIO/JALEX BUILDERS

Figure 4. Blocking was also required for the surface-mounted 4x4 rail posts (A). The small landing for the flight of stairs at the end of the deck was conventionally framed and provides access to storage underneath the deck (A). A wider set of stairs at the other end of the deck leads to a poured-concrete patio and sitting area (B).

a 2x6 between them at the top, and screwing them off. With the Icon system, we simply install two Icon joists next to each other, giving us 7 inches of framing to work with. We add blocking where we need it for secure-mount posts or for top-mount aluminum railing systems (**Figure 4**). These areas are highlighted and marked out on the plans, along with any other blocking details.

Cost

A 20-foot-wide-by-16-foot-deep deck framed with PT lumber requires 18 2x10 joists, three 20-foot 2x10s for the ledger, rim, and blocking, three 2x6s for picture frame and rail blocking, several joist hangers and Simpson Strong-Tie H2.5 connectors along with short screws for both (long screws for joist-hanger sides), and FastenMaster LTS brackets. Based on current pricing at my local lumberyard, these materials amount to $1,356 (I rounded off and did not include tax). Icon ScrewJoists are sold as a system, not individually, with a cost of about $10 per square foot of framing. This project required 18 joists, two 2x8x20s for ledger and rim, and one 2x6x16 for rail blocking. I purchase Icon through my lumberyard, Arnold Lumber Company, as a flow-through product that is delivered directly to the jobsite. The total for the Icon system is $2,475. Now most of you will say it's double, but that's not actually true. Let's look at the time involved for a complete price.

To treat each system fairly, we'll agree that the ledger, the footings, and the drop beam are in place and ready to go, and the deck is 4 feet off the ground. For the pressure-treated deck, I conservatively figure three workers at six hours each to set the frame, all the hangers, and the blocking. Assuming that the cost per man hour of labor is $65, the total labor cost for this example would be $1,170, for a combined labor and materials cost of $2,526. You now have a deck frame that is not exactly flat, will move as it dries out, and carries a zero-year warranty for the materials.

After building several decks with the Icon system, I estimate that it will take three workers 1 1/2 hours each to install the framing, for a total labor cost of $293. This brings the materials and labor cost of the Icon deck to $2,768, a difference of less than $250. For that premium, we now have a deck frame that is flat and kiln-dried to reduce movement, and that comes with a 25-year warranty.

If my labor estimates seem low, consider this: We set the joists for our first deck (the one shown in this article), which was 50 feet wide with double beams and an inset beam for one section, in under two hours. We did a 20-foot-wide-by-12-foot-deep deck that was 8 feet off the ground with an inset beam in 28 minutes. We did a 34-by-12-foot deck that was 10 feet off the ground with a drop beam in 38 minutes. It's amazing how quickly the system installs once you are comfortable with it.

Everyone builds decks differently, and this system may not be for everyone (distribution is currently limited to New England and the mid-Atlantic states). We build 90% of our decks with TimberTech Azek decking and railing systems. The decking has a 50-year warranty, the railings have a 35-year warranty, and, now, the frame has a 25-year warranty. We found that the Icon joists install easily, come with a complete set of drawings, weigh less than standard PT lumber—helping prevent injury—and in the end, are a cost-effective solution to better decking. ❖

Raymond Degidio owns Decks By Jalex/Jalex Builders in Narragansett, R.I.

PHOTOS 4A AND B: PJ DOUGHERTY/JALEX BUILDERS