News of Interest for and from the Connecticut Association of Home Inspectors, Inc.

CAHI MONTHLY NEWS

September 2019 Volume 12, Issue 09

Presidents Corner

Sorry

No Presidents Corner this month.

Maybe next month.

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Meeting Dates!

September 25th

at the SERVPRO Headquarters

150 Bradley St., in East Haven

Food will be served at 5:30 followed by a brief tour of the facility and and a talk on Mold in residential buildings, new testing techniques and mitigation standards in the industry and the Mold licensing law in place in Florida

October

TBD

MONTHLY MEETINGS – Details & Info

CAHI's regular monthly meetings are held at the Best Western located at 201 Washington Ave (RT 5), North Haven. Meetings are free to members. Most meetings are on the fourth Wednesday of the month from 7-9pm. Guests are always welcome! Guests may attend 2 free monthly meetings to experience our presentations, meet our members, and receive a CE attendance certificate.

Joining CAHI may be done at anytime of the year through our Membership Page

Any inspector who pays attention to the industry doesn't need to be told that there's a different sort of transition occuring in today's housing market.

Energy Expert Inspectors on the Rise

by Brent Loya, ID Energy Program Manager

Ours is an era of great transition, and one of the most dramatic examples of this shift is in the way that we use energy in every aspect of our lives.

The power systems that we depend on are in a state of upheaval across the board—from how electricity is generated to how all fuel sources are used and tracked in our individual homes. New technologies and new policies are coming online every day, each bringing signficant changes to the efficiency, comfort, and the overall quality of those deeply personal places where we hang our hats. One key factor toward the goal of increasing the energy efficiency of American homes is based upon the simple idea that if homeowners and homebuyers actually understand the energy performance of their homes, then they will readily move to improve that performance when it makes clear economic sense to do so. The technical term for this is "energy disclosure," which is bureaucrat-speak for giving a homebuyer an accurate sense of whether the home they're considering is an energy "sipper" or "guzzler." As energy disclosure becomes a more common policy across the country—whether driven by public policy or by smart business—home inspectors in particular will find themselves at the center of the conversation, owing to the fact that there's no more important time to understand the energy efficiency of a home than when you're deciding whether to buy it.

Any inspector who pays attention to the industry doesn't need to be told that there's a different sort of transition occuring in today's housing market as well. Signs of a housing "correction" after a ten-year growth cycle are unmistakable now, and inspectors may soon be competing for relatively fewer clients, who themselves will be more demanding about both the home they're buying and the inspector they hire. Homebuyers are younger, more eco-conscious, independent, and better informed than they've been in the past, and are more likely to shop for a full-service inspector rather than simply take their Realtor's® advice. Brokers are struggling to stay relevant in the online portal era (think Zillow et al.), and the smartest ones are looking to provide their clients with as much information as possible. The "true cost of ownership" metric is important given the fact that energy costs account for more of a monthly budget than either home insurance or property taxes.

The California Association of Realtors® (CAR) currently is funding Home Energy Scores for buyers by reimbursing the cost to have the service performed. Home inspectors who are Certified Home Energy Score Assessors are actually getting more refferals from Realtors® because the Realtors® want their clients to be provided with this kind of energy information. In over 100,000 Home Energy Scores performed, not one has been reported back to me as a deal killer. In actuality, it has promoted the confidence of a buyer to close and move in!

Win-Win

This suggests the HES program is not only a valuable service to perform for your clients but a superior marketing tool as it differentiates you from your competitors. As agents and Realtors® provide home inspectors with 80 percent of their business, being able to stand out from other inspectors in your area makes a difference. With energy disclosure such a hot topic nationally, real estate offices will soon be clamoring to get you in for a presentation to understand this movement better.

The U.S. Department of Energy's (DOE) Home Energy Score has been used by utility programs for several years now, but has only recently been improved to become the perfect fit for all energy disclosure purposes—most importanly those delivered as part of a home inspection. State and local governments around the country recognize the key attributes of the Score—its ease of use, simplicity, and highly credible branding— as ideal for showing homeowners how their homes stack up. What's new, after several years of streamlining program requirements and making necessary partnerships with inspection industry associations and service providers, is that the Home Energy Score is now a viable business-building service for inspectors as well as a reliable public service tool for policy makers. The inspection industry is taking notice of the Score as a viable and in-demand service, across a wide range of business models.

It's perhaps not surprising that many of the early adopters of the Home Energy Score are younger inspectors, especially those who are keyed into savvy marketing strategies. As buyers get more sophisticated, savvy inspectors have recognized a more demanding mindset in their buyers and the ability of the DOE Home Energy Score Certified Assessor™ to confer credibility, professionalism, and technical competence, especially given the relative affordability and reasonable training requirements of the program. The new release of the iPhone app makes collecting the necessary data a significantly lighter lift than before— most inspectors report spending less then an extra fifteen minutes in the field for this task.

While home-focused energy programs at the federal level can charitably be described as unpredictable, cities and even states across the country have stepped into this void to require that a Score (isn't this a federal thing?) be delivered at point-of-sale for every home purchase in order to safeguard homebuyers from unknowingly buying energy-hogging homes. Home inspectors are an obvious fit for these kinds of mandates, a fact that has been proven out in places like Portland, OR, where inspectors led that program's delivery of over ten thousand Home Energy Scores in 2018. Similary, programs of this kind are underway in Denver, New York State, California, Massachusetts, and dozens of other locales around the country.

The Home Energy Score (this should really be defined) is proving itself a viable tool for inspectors who occupy the mainstream of the profession as well, a group that includes single operators, small multi-inspector firms, and even national franchises. Some of the country's top-performing one-inspector shops, in fact, have built the Score into every inspection, since the Score's minimal in-field requirements don't disrupt established inspection processes. Also, the new onboarding process for inspectors is entirely self-directed and remote-based, meaning no expensive travel or

training impacts. Additionally, pressed-for-time single operators are now taking advantage of a suite of marketing services being provided by my company, ID Energy, in addition to our standard services based in training and ongoing compliance with DOE requirements.

A recent development that seems to suggest a watershed moment in terms of HES adoption by the industry is that this past year has seen some of the nation's leading multi-inspector and franchise firms like WIN Home Inspection getting on board with delivering Home Energy Scores. These businesses are characterized by their diligent research and cautious approach when considering new services to include, so their embrace of the value of energy disclosure in general, and the Home Energy Score in particular, is strong evidence of the wholehearted embrace by the home inspection industry.

Our team at ID Energy looks forward to a day when every homebuyer in the country is able to benefit from the budget-critical information contained in a Home Energy Score report, and we are proud of the gains that we've made as industry partners with the DOE to take home inspectors several steps down that path. We see energy disclosure through the HES a win-win for American homebuyers and our larger economy, and will continue to help inspectors build their businesses and strengthen the industry.

About the Author

Brent received his degree in Interior Design and quickly sought out to find solutions to energy efficiency. Working with the U.S. DOE he became a Home Energy Score Assessor, Mentor, received a BPI certification, and helped to form I.D. Energy as the Home Energy Score Program Manager. Brent was awarded the U.S. DOE Leadership Award for "Championing the Home Energy Score" and continues to work with professionals nationally.

Installing a Deck Ledger

Part 1. Use the right fasteners and space them correctly when attaching the deck ledger to the house framing

by Mike Guertin

[Editor's note: This three-part series goes beyond code to offer a best-practices guide to deck ledger installation. In part one, we'll take a close look at attachment details; later, we'll cover moisture protection and lateral-load anchors.]

Deck ledgers are the odd duck of residential construction. Most gravity loads in platform framing rely on stacking building elements, such as joists and rafters on mudsills and plates, beams on posts, headers on jacks, and so on. Instead of stacking the load, however, deck ledgers rely on bolts or screws to transfer the live and dead loads of the deck into the frame of the house. Because of this, fasteners must be positioned accurately along the ledger and into the house rim joist at the spacing required by the building code or the fastener manufacturer's instructions. Incorrectly positioned fasteners can split the ledger or the rim joist, and if the spacing isn't matched to the joist span, there may not be enough fasteners to support the loads on the deck.

Approved Fasteners

The International Residential Code lists two fasteners for directly attaching ledgers to a house: ½-inch-diameter hot-dip-galvanized hex-head machine bolts and ½-inch-diameter hot-dip-galvanized lag screws. Note that "carriage," or "cap head," bolts are not listed (**Figure 1**). The IRC also provides a table (R507.9.1.3(1)) for the spacing of the fasteners (**Figure 2**).

The bolts or lags must be placed along the ledger in two rows—one row along the top and one along the bottom—with the fasteners staggered between the two rows at the spacing indicated by the IRC table. For example, on a deck with a joist span of 15 feet, the lag screws are spaced 11 inches apart. To start the pattern, the first lag is placed on the bottom row approximately 3 inches in from the end of the ledger, and the next lag is located on the top row 11 inches from the first one. The next lag goes on the bottom row another 11 inches over, and the pattern repeats until the other end of the ledger is reached (**Figure 3**).

Eventually, there will be conflict between a fastener head and a joist position (or the flange of a hanger supporting a

PHOTOS BY MIKE GUERTIN

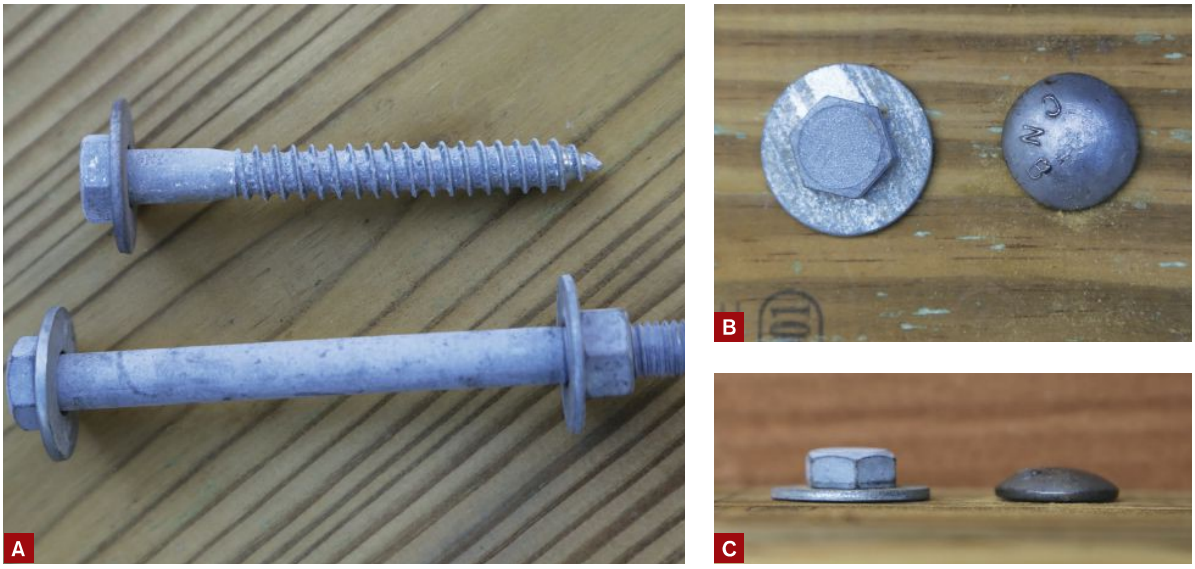


Figure 1. Hex-head 1/2-inch hot-dipped galvanized bolts and 1/2-inch lag screws with standard cut washers (A) are the only two fastener options listed in the IRC for attaching deck ledgers. Carriage (cap head) bolts are not permitted fasteners. The cap-type head has 30% less surface area than a 1/2-inch bolt washer (B) and is thinner than a hex-head bolt (C).

joist). When this occurs, you are allowed to shift the fastener to the left or right up to 3 inches to avoid the conflict. Don't be tempted to countersink a fastener head so that it is flush with the ledger surface—this is not permitted. Even when a fastener is shifted left or right, the spacing pattern of the remaining fasteners continues from the original layout point.

Layout

To make sure the connection between the deck and house framing is structurally sound, the IRC spells out the orientation of the top and bottom fastener rows in the ledger and the house rim joist (**Figure 4**). Each one is simple on its own to understand, but when you combine the two and try to set the position of the ledger and maintain the minimum and maximum spacing of the two rows of fasteners, it can feel like a game of three-dimensional chess.

The limitations of the fastener row placement limit the level of the deck in relation to the inside floor level in the house. The deck's elevation will also be influenced by the size of the house rim joist and the deck ledger (**Figure 5**).

There are installation requirements for bolts and lag screws that aren't specifically noted in the IRC, but are instead found in the *Wood Frame Construction Manual* and the *National Design Specification for Wood Construction*—the core documents that the framing section of the IRC is based on. For example, 1/2-inch-diameter bolts and 1/2-inch-diameter lag screws must be installed with 1/2-inch washers that are 1 3/8 inches in diameter with a 9/16-inch-diameter hole. Bolts will require clearance holes drilled through the ledger, wall sheathing, and house rim joist that are at least 1/32 inch larger than the bolt itself (17/32-inch diameter) but no more than 1/16 inch larger (9/16-inch diameter), a rather narrow range for the hole diameter.

A lag screw also requires a clearance

TABLE R507.9.1.3(1)
DECK LEDGER CONNECTION TO BAND JOIST[a, b]
(Deck live load = 40 psf, deck dead load = 10 psf, snow load ≤ 40 psf)

CONNECTION DETAILS	JOIST SPAN						
	6' and less	6'1" to 8'	8'1" to 10'	10'1" to 12'	12'1" to 14'	14'1" to 16'	16'1" to 18'
	On-center spacing of fasteners						
1/2-inch diameter lag screw with 1/2-inch maximum sheathing[c, d]	30	23	18	15	13	11	10
1/2-inch diameter bolt with 1/2-inch maximum sheathing[d]	36	36	34	29	24	21	19
1/2-inch diameter bolt with 1-inch maximum sheathing[e]	36	36	29	24	21	18	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.
a. Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.
b. Snow load shall not be assumed to act concurrently with live load.
c. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
d. Sheathing shall be wood structural panel or solid sawn lumber.
e. Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, lumber or foam sheathing. Up to 1/2-inch thickness of stacked washers shall be permitted to substitute for up to 1/2 inch of allowable sheathing thickness where combined with wood structural panel or lumber sheathing.

Figure 2. To determine fastener layout on a ledger, identify the joist span (listed in 2-foot increments) and the type of fastener. The joist span is measured from the center of the joist hanger at the ledger to the center of the beam the joists rest on and doesn't include any cantilever overhangs past the beam.

Figure 3. Fasteners are laid out on the ledger in two rows, starting approximately 3 inches in from one end, with the on-center spacing from the code table staggered in a "W" pattern between the two rows. Since bolt and lag heads can't be countersunk into the ledger, the fastener can be moved left or right up to 3 inches to avoid conflicting with joist location or the hanger flange, provided the rest of the fasteners remain on the same layout.

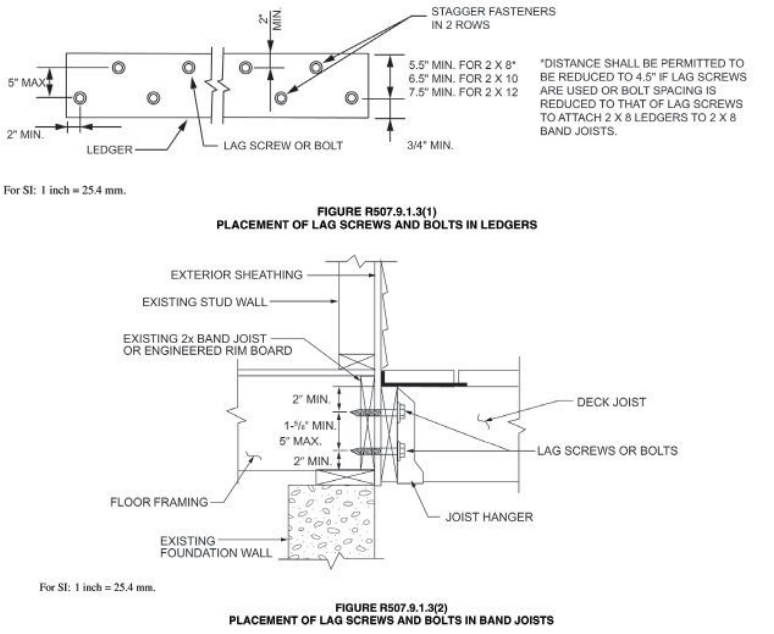


Figure 4. The IRC clearly spells out where the 1/2-inch-diameter lags or bolts should be located in both the ledger (top) and the rim joist (bottom).

hole through the ledger (in the same size range as for a 1/2-inch-diameter bolt), plus a smaller pilot hole through the house rim joist and wall sheathing. The pilot hole should be the same diameter as the root of the screw portion of the lag, generally 5/16-inch diameter (**Figure 6**).

Bolts must penetrate through to the inside of the rim joist far enough to accommodate a washer and allow a nut to fully engage the threads. Lag screws must penetrate through the rim joist by the length of the tapered portion at the end, typically about 5/16 inch to 3/8 inch. Bolts and lags must be tightened enough to draw the ledger and rim joist firmly together, but not so tight that the washers compress the wood on either side.

Whether you use bolts or lag screws, there must be access to the inside of the rim joist in the house for the building inspector to evaluate the ledger attachment. Some builders believe that using lag screws allows them to avoid cutting into a finished ceiling, since no washers and nuts have to be installed. But when inspectors can't verify the rim-joist material, view the edge distance of the fasteners on the inside of the rim joist, or check the penetration of the fasteners, they can't conclude that the deck will be adequately supported by the ledger. In that case, the deck will have to be designed and built to be completely self-supporting.

Structural Screws

Instead of 1/2-inch-diameter bolts or 1/2-inch-diameter lag screws, many deck builders now use proprietary structural screws for attaching deck ledgers. For

Figure 5. Applying the code figures when fastening a ledger can be confusing. The fastener locations through the ledger and through the rim joist differ, so you have to match the zones to ensure that the wood doesn't split and that you provide enough support for the deck.

Figure 6. Clearance holes for ½-inch lag screws and bolts have a narrow range: 17/32 to 9/16 inch. A ½-inch drill bit is too small, and a 5/8-inch bit is too large (A). A pilot (lead) hole through a rim joist should be about 5/16 inch for lags (B, C).

those to be an acceptable alternative to lag screws and through bolts, manufacturers must have their screws tested and obtain third-party evaluation reports that can be presented to a building department. It is up to the local building official to accept or reject the use of these screws, so always check with the building department before using them (**Figure 7**).

These structural screws have a smaller (about ¼ inch) diameter than code-specified bolts and lag screws, so they don't require pilot or clearance holes, resulting in faster installation and less labor. They're coated for exterior use and compatible with the latest types of pressure-treated lumber, and have head styles with integral washers (hex and flat/flush). They typically offer a wider installation range on ledgers and rim boards, with live load capacities that are greater than 40 psf. Most can be used with a variety of engineered rim boards.

When using structural screws, follow the manufacturer's instructions and building code reports, rather than the tables in the IRC. Most manufacturers

Figure 7. Proprietary structural screws don't require predrilled holes and have a wider positioning range through the ledger, rim joist, and even the mudsill or wall plate. Pictured (from left to right): 1. Mitek WSW Pro Series washer head and hex head exterior screws; 2. Simpson Strong-Tie SDWH HDG (short and long) screws, coated SDWS, and coated SDWH Timber-Hex screws; 3. FastenMaster LedgerLok (long and short) screws; 4. GRK RSS (short and long) screws

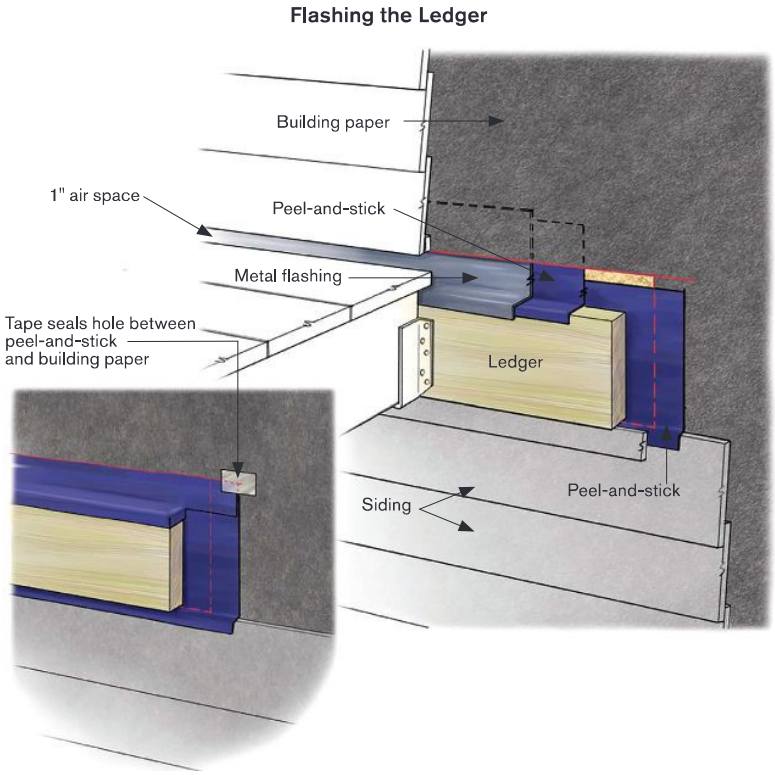


Figure 8. The IRC requires ledger flashing (per R703.4) but doesn't provide any details. Here is the general approach followed by the author.

provide deck-ledger spacing tables that follow the IRC fastener-table format, with joist spans in columns and different rim-joist materials and live loads in rows. However, the proprietary screw spacing will generally be closer for a given span than the code table for ½-inch-diameter bolts or lag screws, so you do need to refer to the manufacturer's information. Each table is unique to each manufacturers' screws, so you can't substitute the instructions of one company for the screws of another.

While the spacing may be different, some of the same installation provisions for the code-specified fasteners apply to structural screws. For example, you can't countersink screws, and you can relocate a screw that interferes with a joist or hanger position by up to 3 inches to the left or to the right. You'll still need to provide access to the inside of the rim joist for the code inspector to verify that the screws are adequately engaged (refer to the instructions for how far the screw tips must penetrate the rim). One benefit to using structural screws is that some manufacturers permit the screws to be installed into the mudsill or top plate of a wall, not just into the rim joist. That widens the range of heights you can position a ledger at so the deck can be set a full step down from the inside of the house, if desired.

Next Steps

Ledger installation takes planning and precise execution to ensure a safe deck, and it shouldn't be rushed. When installed properly, a deck ledger will handle the design loads for many years to come. The next step is to protect the ledger and the wall that it is connected to from water damage (**Figure 8**). I'll cover that in detail in the next installment of this three-part series. ❖

Mike Guertin is a builder and remodeler in East Greenwich, R.I., and frequent presenter at JLC Live and DeckExpo.

ILLUSTRATION BY CHUCK LOCKHART

FRANKLY SPEAKING ON EARLY TAX PREP

Hello Everyone! Frank here, Founder and Director of Future Map Financial. This installment of the FRANKly SPEAKING blog post is about early tax preparation. I'll outline a few steps you can take now to ensure a less stressful tax season and avoid any delays in receiving your tax refund.

It's helpful to be mindful of your taxes throughout the year, which will help you stay organized and avoid the stress that scrambling for documentation and needed information can bring about every year when tax season rolls around. If you plan to prepare your taxes yourself, make sure to educate yourself about the deductions and credits you may be entitled to. If you plan to hire someone, seek referrals and and read reviews (e.g., Yelp and Google Review) to make sure they're reputable. Here are a few key considerations to take into account as you begin the tax preparation process…

CHOOSE A PREPARER

If you don't have a tax preparer, now's the time to find one. A great way to find a preparer is to ask friends and advisors (e.g., an attorney you know) to make a referral. Be sure that the person you choose has a Preparer Tax Identification Number (PTIN) showing that they are authorized to prepare your returns. Also, ask about their fees, which will depend on how complicated your returns are to prepare. The IRS has great tips on how to choose a preparer along with an IRS directory of preparers.

GATHER INFORMATION FOR YOUR RETURNS

By the end of January, you should have received a majority of the information you need to prepare your taxes. Make sure to verify that the information matches your own records. Some of the most common forms include: Form W-2, Form SSA-1099, Form 1095-A, and various 1098s reporting mortgage interest, student loan interest, and tuition payments.

COLLECT YOUR RECEIPTS

The receipts you need will depend on whether you are choosing to itemize your personal deductions rather than claiming the standard deduction. You have the option of itemizing deductions if this provides you with a greater write-off. One way to know for sure, is to determine the amount of your itemized deductions and compare it to the standard deduction amount. Take whichever is greater.

If you have business income and expenses to report on Schedule C, you'll need to share your accounting books/financial records (e.g., QuickBooks or other accounting system; receipts for expenses; bank and credit card statements) with your tax preparer. The more organized you are, the less time it will take your preparer to complete your tax return, which can translate into lower fees for his/her service.

RECORDS FOR CHARITABLE CONTRIBUTIONS

If you made donations to charity and itemized your deductions, you need those records to claim any write-off. For example, for contributions of $250 or more, you need a written acknowledgment from the charity stating the amount of your gift and that you did not receive anything (other than perhaps a token item) in return. If you do not have an acknowledgment, you can always contact the charity and ask for it. The IRS provides a great overview of what type of records you'll need for charitable deductions. Find details here: IRS Publication 1771.

PREPARE FOR TAX LAW CHANGES

No need to become a tax expert, and I'm surely not, but it's helpful to familiarize yourself with the new Tax Cuts and Job Act that became law December 22, 2017, so you will not be caught off guard. For example, the individual healthcare mandate brought in a slew of changes. These changes include new forms for claiming the premium tax credit for eligible individuals who purchased insurance coverage through a Government Marketplace or Exchange, as well as to determine the shared responsibility payment for those who failed to carry coverage and/or do not qualify for an exemption. Starting with the 2019 tax year, there will be no penalty for failing to have health insurance.

CAPTURE YOUR PERSONAL INFORMATION

You probably know your social security number, but also track the number for each dependent you claim. Keep this and other information (e.g., relocation dates; information about property you bought and sold, including buy/sale dates, what you paid and what you received on the sale and expenses you had; include addresses of vacation homes and rental property needed to complete your return.

FINALLY – DECIDE WHAT TO DO WITH YOUR REFUND, AND CELEBRATE!

If you expect a refund, you have several options:

- Apply some or all of the refund toward your tax bill on the next return. The fund will be used for estimated taxes, reducing or eliminating the first installment of estimated taxes (due April 17, 2017).
- Contribute to your bottom line and deposit the refund directly into your checking or a vacation fund.
- Directly contribute some or all of your refund to certain types of retirement or savings accounts (IRAs, health savings accounts, education savings accounts).

You can split your refund among the various direct deposit choices available by completing Form 8888. Be sure to let your tax preparer know how you would like to proceed. And, if you want the refunds used for 2018 purposes (e.g., make a deductible IRA contribution 2018), you will have to inform the institution about the right year for which to apply your payment.

HANDY, DANDY & ACTIONABLE MONEY-SAVING TIP:

Start early doing prep work for your income tax so you will have a successful tax return experience. Ideally, you will have been gathering and organizing your receipts all year. (Apps like Expensify and Shoeboxed make it easier to collect this information, now that the IRS accepts electronic receipts.)

For your convenience, I've assembled the most important steps succinctly in my handy Early-Tax-Prep-Checklist to easily help you be prepared for tax season.

Check the boxes and don't fret because this checklist will help you become organized and ready for tax season!

Common Deck Defects

Here's a look at the framing and flashing details that contractors keep getting wrong

by Bruce Barker

As a home inspector, I examine decks almost every day. Usually, I do this as part of a home inspection following the American Society of Home Inspectors' Standard of Practice for Home Inspections (ASHI SoP). But as more inspectors become specifically trained in ASHI's new Deck Inspection Standard of Practice, I expect to more frequently see deck inspections that are performed independently from a home inspection.

Most decks that I inspect have multiple defects, some of which present serious safety risks. This isn't a surprise on an older deck, but I've also found serious problems on recently built decks. Because I've already examined deck stair defects in a previous article (see "Common Deck Stair Defects," Nov/Dec 2016), I'll focus here on deck framing and flashing defects.

Contrary to what some contractors may believe, home inspectors would rather not find defects during an inspection. Defects cause problems for everyone: the builder, who faces callbacks and the risk of being sued because of a deck failure; the homeowner, who has a potentially unsafe deck; and the inspector, who is faced with writing up a lengthy report.

I don't consider a "defect" simply a failure to comply with the building code. Rather, I consider it a failure to follow current best practices as presented in the American Wood Council's *Prescriptive Residential Wood Deck Construction Guide*, or DCA 6-15. Building codes are the minimum standard; they are not the standard for contractors who build quality decks. Remember, too, that the building official is not responsible for ensuring that a deck is safe, or even that it complies with local building code. You, the contractor, are fully responsible for both of these. A deck that passes local code inspection may still be unsafe; therefore, I consider DCA 6-15 to be the standard to which all decks should be built, regardless of what might be allowed by a code official.

PHOTOS BY BRUCE BARKER

Deck Ledger Attachment

Most of the decks I inspect are supported on one end by a ledger attached

Figure 1. Older decks frequently have ledgers that have been nailed rather than screwed or bolted to the house (A), but the author sometimes finds this problem on recently built decks too (B). Note the nailed double-ledger connection, which is in the process of separating, in photo (C).

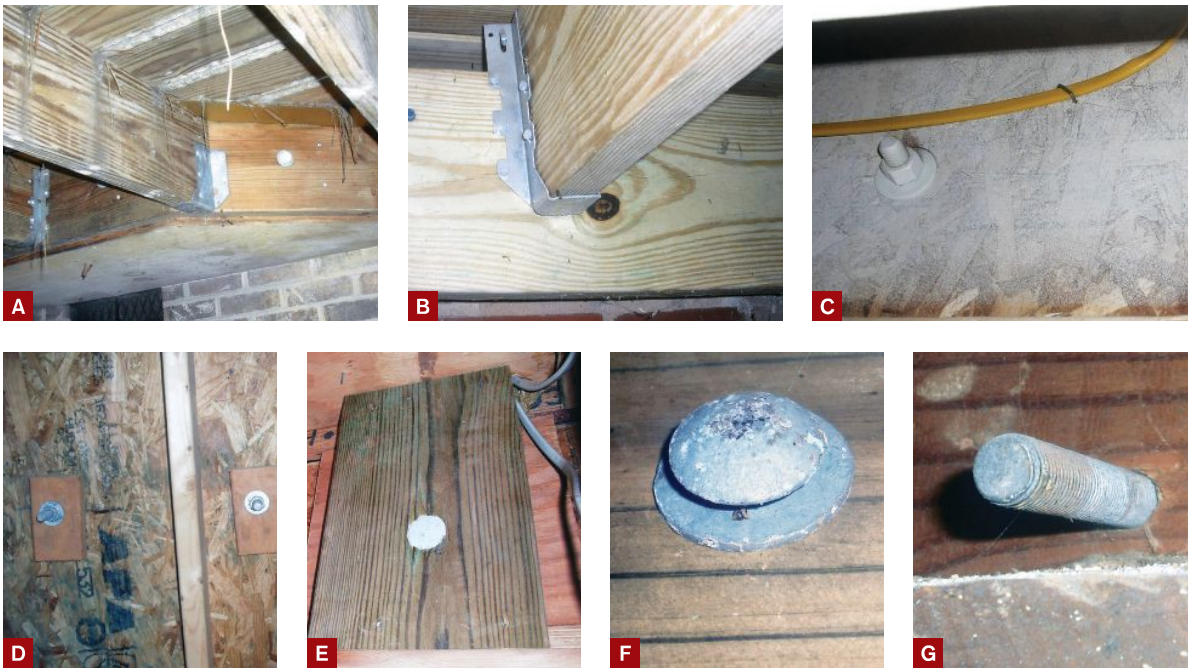


Figure 2. Ledgers shouldn't be fastened to a cantilevered projection (A), to brick veneer (especially with masonry screws) (B), to the web of an I-joist rim board (C), or to OSB sheathing (D). This ledger, on a year-old deck, was fastened to an I-joist rim board with carriage bolts; neither the fasteners nor the method are allowed by code, despite the blocking (E). Adding a washer to a carriage bolt doesn't make the connection code compliant (F), but it's better than forgetting the nut and washer (G). Also note that this bolt is too close to the edge of the rim joist and could cause it to split.

to the building. These ledgers are subject to vertical loads (gravity) that try to pull the deck down from the building, and horizontal—or lateral—loads that try to pull the deck away from the building. The requirement that the deck ledger be positively anchored to the building to resist both loads or that the deck be freestanding has been in the code for many years (R507.8 in the 2018 International Residential Code), but—based on what I've seen—this requirement is still not well understood, and it is still not widely enforced.

For example, surprisingly, I still

Figure 3. White rust is already forming on this joist hanger, which is only approved for interior use (A). Metal-roofing screws aren't approved joist-hanger fasteners (B), nor are roofing nails (C); all of the holes in metal hardware should be filled with approved hanger nails or structural screws, and the hanger flanges should fit snugly against the joist (D). Metal hardware shouldn't be field-modified; with its seat removed, this hanger provides minimal joist support (E).

find ledgers that have been nailed to the framing, which is prohibited by both DCA 6-15 and the IRC (**Figure 1**). When I do, I complete my inspection, then explain the risks to my clients and advise them (and their real estate agent) not to walk on the deck until it is properly attached to the house. In my report, I highlight this defect in red ink to emphasize the importance of this finding and recommendation.

Reactions vary. A few people—usually the agents—believe I'm being overly cautious. On the other hand, most clients seem to appreciate my concern for their safety.

Even when bolts or screws are used to attach the deck ledger to the building, many of these deck ledgers are improperly installed. I've seen plenty of creative—but incorrect—ways to attach a deck ledger to a building. I've discovered ledgers that have been bolted to masonry walls, to OSB sheathing, and even to the web of an I-joist rim board (**Figure 2**).

Another problem is ledgers that are attached to cantilevers. Because cantilevers aren't typically designed to support the loads from a deck, both the IRC and DCA 6 require that the band joist supporting the deck ledger be fully bearing on the structure, effectively prohibiting attachment of a deck ledger to a cantilever.

One of the key details I'm looking for during an inspection is that the deck ledger is solidly attached to a dimensional-lumber band joist or to a 1-inch-thick (or greater) engineered rim board. I also pay close attention to the fasteners, since the primary job of the bolts or screws is to resist the vertical loads imposed on the deck ledger. These fasteners should comply with the requirements in the IRC and meet DCA 6-15 guidelines.

While the bolt and screw rules in the IRC and DCA 6-15 are based on the use of ½-inch-diameter galvanized machine bolts or lag screws, builders sometimes use smaller-diameter fasteners, such as LedgerLoks or Simpson Strong-Tie SDWS and SDWH fasteners. These structural screws need to be installed according to the manufacturer's instructions. You can't simply substitute them one-for-one with

Figure 4. The white rust on this ledger bolt indicates that it is still safe but is nearing the end of its service life (A). The extensive red rust on these bolts indicates that the hardware should be replaced immediately (B). Water intrusion is causing wood rot and the red rust on this lag bolt; the connection is likely weakened (C).

the ½-inch-diameter fasteners spelled out in the code. And while larger-diameter fasteners may be used, the location details change (more distance is required from the edges of the ledger).

Whether or not bolts or screws will provide the necessary lateral load resistance requires a structural analysis of the specific deck. It's a lot easier—and less expensive—to follow one of the prescriptive methods spelled out in the IRC and in DCA 6-15. At around $35 for a set of four SST DTT1Z (or similar) connectors and the necessary fasteners, easy-to-install tension ties are a low-cost way to help ensure full compliance with the lateral-load provisions in the IRC and conform with DCA 6-15.

Joist Hangers and Fasteners

I often find problems with joist hangers and other metal hardware. Sometimes the deck builder has used hangers intended for interior use, when he or she should have used G185 (minimum) galvanized hangers, or even stainless steel hangers in coastal areas. One way to verify that a Simpson Strong-Tie joist hanger is suitable for use on a deck is to look for a Z (galvanized) or an SS (stainless steel) at the end of the model number (**Figure 3**).

It's not unusual to see joist hangers fastened to the framing with roofing nails or drywall screws. Hardware manufacturers typically specify the type and size of fasteners that must be used with their products; in general, screws—except those specifically allowed by the manufacturer—should not be installed, nor should you mix metals.

Curiously, I often find hangers installed with just two or three fasteners. In almost all cases, joist hangers should have a manufacturer-specified fastener in every round and oblong hole.

I often find field-modified hardware too, but in most cases, joist hangers and other hardware should not be bent unless the manufacturer allows bending. Even then, the hardware should be bent only once to the required position.

One of the most important things I look for when inspecting a deck or balcony is white or red rust. White rust appears on metal hardware as white stains, indicating that the protective zinc coating (galvanization) is deteriorating. While white rust indicates that hardware is nearing the end of its service life and should be monitored regularly, significant red rust indicates that the component has reached the end of its service life and should be replaced (**Figure 4**).

Deck Flashing

It won't matter how well a deck ledger is attached to a building if the band joist or rim board it's attached to is water-damaged. The bolts or screws may withdraw from water-damaged wood, and if this occurs, the deck will collapse. Even though flashing details are not spelled out in the IRC, properly installed deck flashing is essential for the long-term structural integrity of a deck (**Figure 5**).

Properly installed flashing is also essential for the long-term performance of the building. Water damages building components and provides moisture that is necessary for fungal (mold) growth. Mold claims can be very costly to deal with. Properly installed deck flashing is, therefore, essential on several levels.

When I inspect a deck, I look for deck flashing that is integrated into the wall drainage system and into the flashing for wall penetrations, such as doors, that open on to the deck. The objective is to direct water away from vulnerable wood and away from entry points into the building, but builders often get the details wrong, with serious—and sometimes catastrophic—consequences. Seemingly minor flashing errors can admit a lot of water into a wall assembly.

Figure 5. The sheathing and band joists on these homes (A, B) are in rough shape, thanks to moisture intrusion from their decks, and require replacement. Improperly installed ledger flashing on a one-year-old deck was the cause of this water damage (C). Flashing is often improperly installed underneath door thresholds (D) and where ledgers intersect with other building components, such as a roof (E). During a new-home inspection, the author discovered flashing that hadn't been integrated with the water-resistive barrier underneath the home's siding (F).

Cantilevered Balconies

During a home inspection, I pay particular attention to cantilevered balconies and their flashing details, since failure to install proper flashing and ventilation where cantilevered balcony joists penetrate the building wall can contribute to catastrophic balcony failure. This is what caused a balcony to collapse on an apartment complex in Berkeley, Calif., in June 2015, resulting in the deaths of six students.

Cantilevered balconies are vulnerable to deterioration and failure, especially if they are covered on both the top and bottom. The framing that supports these top- and bottom-covered balconies can get wet and can stay wet. There is usually no ventilation of these balconies to help the framing dry. This constant wetness hastens deterioration. In addition, these balconies cannot be visually inspected without destructive measures. Deterioration can go on for years until failure occurs.

To head off these problems, I recommend that existing wood balconies that are enclosed be retrofitted with ventilation and inspection openings. These features should also be incorporated into new cantilevered balconies built with wood, along with some version of the flashing details developed by California architect Patrick Burger, which you can find in the *PDB* article "A Path to Safer Balconies" (Mar/Apr 2016), at deckmagazine.com. —*B.B.*

Deck Inspections

If you're not doing this already, you should recommend or offer an annual deck and balcony inspection to your clients. This is especially important if the home is near a large body of water or is a rental property. Regular inspections are important to spot visible indications of unsafe conditions and potential failure. A visual inspection is usually adequate for the annual inspection of newer residential decks and balconies. A comprehensive inspection based on the ASHI Auxiliary Standard of Professional Practice for Residential Deck Inspections is better for older decks and balconies, those near water, and those at a rental property. ❖

Bruce Barker is a licensed contractor and certified ICC inspector. He owns Dream Home Consultants, in Cary, N.C.

BY DON BOIVIN

Opening Up a Bearing Wall

At over 6 feet 3 inches tall, my client always felt as if he had to duck when walking through the narrow pass-through between the dining room and living room in his recently purchased retirement home. For this remodeling project, he not only wanted to expand the width of the opening to more than 8 feet, but he also wanted to raise the height of the opening as much as possible.

Dealing with a bearing wall. The first step was determining if the pass-through was in a load-bearing wall—I suspected it was. The home was a 1 1/2-story Cape, and the wall with the opening ran through the middle of the house, supporting the floor of the living space above. When I stripped the drywall from the studs, the solid header over the existing opening further confirmed my suspicions. The client had also removed ceiling drywall, in anticipation of a kitchen remodel, and the ceiling joists resting on the wall proved beyond a doubt that I was dealing with a load-bearing wall (1).

To modify the opening, I needed an engineer to spell out my options, and I needed to temporarily support the load on both sides of the wall. Because widening the opening would change the point loads, I also had to make sure that the loads would transfer directly to the main girder under the house. I took measurements in the basement to confirm that the side of the new opening would be sitting directly over the floor joists to transfer the load to the main girder.

Header strategies. To support the wider opening, I would need a longer header beam to replace the existing one. In these cases, there are two options for a new header beam: a carrying beam that supports the floor joists from below, or a flush beam that attaches to the ends of the joists via joist hangers.

Because a flush beam sits above the ceiling plane, it would have provided the maximum headroom. But retrofitting a flush beam would have required removing a lot of the ceiling to access the joists, which would then need to be cut back enough to slide the beam up to the subfloor above. Finally, after adding joist hangers, I'd need to put the ceiling material back.

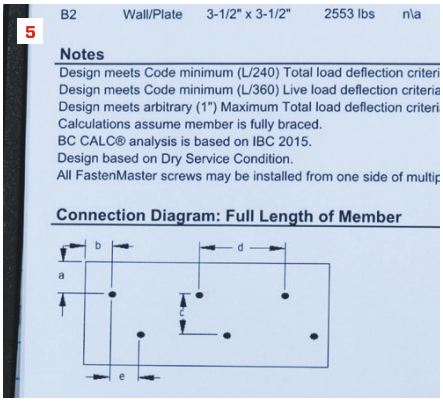
All that extra work would have made a flush beam the more expensive option. A carrying beam, on the other hand, would require much less invasive carpentry than a flush beam. In addition, because it would be visible, a carrying beam would maintain the visual transition between dining room and living room that we wanted.

Engineering consultation. After deciding to use a carrying beam, I visited the structural engineering department at a local building supply company, Shepley Wood Products. The structural designer, Joe Madera, asked a few questions (building and room width, second-floor layout, and the like) and determined that a double 1 3/4-inch-by-7 1/4-inch laminated veneer lumber (LVL) beam would work for the new, 8 1/2-foot opening.

The original header consisted of two 2x10s below a double 2x4 top plate. Removing one of the top plates is allowed in the 2015 and 2018 code (IRC R602.3.2, Exception 3), so with the shorter LVLs, the bottom of the header would

Photos by Roe Osborn

Floor joists resting on the wall plates are a good indicator of a load-bearing wall (1). Temporary support walls should be placed below solid framing (2). Removing one of the plates creates more headroom (3). King studs flank the new opening (4).



A spec sheet with the LVL beams included a connection diagram and fastening schedule **(5)**. After cutting the LVLs to length, the author lays out the fastener pattern **(6)** and then drives the appropriate fasteners at each location **(7)**.

The crew raises the new beam into place and pushes in the first jacks for support **(8)**. The tight fit requires a hammer to drive the jacks home **(9)**. Before fastening the jacks, the author taps the beam into alignment with the rest of the framing **(10)**.

be more than 3 1/2 inches higher. LVLs were more expensive than 2x10s, but the client would be happy with the extra headroom.

Support walls and demo. With the drywall removed, my first task was constructing temporary support walls on either side of the location of the new opening. I measured and cut the vertical studs to fit snugly between top and bottom plates. To put them up, I first measured off the bearing wall top and bottom and set the bottom plate in place. After attaching the top plate to the two outermost studs, I folded in the studs slightly and positioned the top plate at my measurement on the ceiling. Then I just tapped the studs out until they were tight and vertical and added more studs as needed.

One word of caution. Be sure there is solid support above the top plate. In this part of the country, carpenters use furring strips on the ceilings below the joists. For the support against the dining room ceiling, I was careful to align the top plate with a furring strip **(2)**.

Next, my assistant and I removed the studs across the width of the new opening. To keep things simple, we let an existing stud be the terminating point for the framed opening. After removing the studs and the header, I cut out the top plate with a reciprocating saw **(3)**. On one side of the opening, we installed a king stud against the last existing stud. At the exterior wall, we put the king in on top of a short section of plate **(4)**. After plumbing the kings and fastening them in place, we were ready to cut and assemble the beam.

Building the beam. We measured the distance between the kings and then cut the LVLs to length. Although LVLs are supposed to be very stable and these LVLs had been stored under an open cover, the ends had swollen significantly—perhaps as the result of wind-driven rain. I was able to cut the lengths I needed without using the bad ends.

The LVL engineering package included a connection diagram and fastening schedule **(5)**. Madera told me not to bother gluing LVLs together because they are coated with paraffin, which keeps glue from adhering. We set one LVL on top of the other and laid out the fastener locations: 4 inches from the ends, 2 inches from the edges, and then 24 inches on-center in a 1-inch staggered pattern **(6)**.

I was surprised at how few screws I'd need until I realized that

The first screws attach the kings to the header beam **(11)**. Toe-screws fasten the jacks to the plate at the bottom **(12)** and to the header at the top **(13)**. The jacks are screwed to the kings as well. The crew fastens the second jacks the same as the first **(14)**. Toe-screws attach the header to the plate **(15)**, and the support walls can be removed **(16)**.

the specs called for 3 1/2-inch FastenMaster FlatLok Engineered Wood Fasteners. After speaking with the engineer, I used what I had on hand—3-inch FastenMaster Guard Dog Exterior Wood Screws—doubling the number of screws and driving them from both sides **(7)**.

Install the beam. LVLs have no crown, so I opted to place them with the manufacturer's print right-side up. The engineering diagram called for two jacks to support each end, pretty common for spans greater than 6 feet. But it's always good to check local code to be sure. I cut the jacks and set them within reach at each side of the opening.

My assistant and I raised the header in the opening, holding it in place up against the remaining top plate while we slid jacks under each end to take the weight **(8)**. I had cut the jacks for a snug fit, so I needed to tap them into place with a hammer **(9)**. With the jacks now holding the header beam in place, I tapped the beam into alignment with the wall framing **(10)** and aligned the jacks with the king studs we had installed earlier.

Fasteners. Driving nails—either by hand or with an air nailer—can cause drywall fasteners to pop and electrical boxes to loosen. Instead, I opted to screw everything together with 3 1/2-inch hardened screws, breaking out my hammer only occasionally.

The first screws we drove anchored the king studs to the header beam **(11)**. We also screwed the first jacks to the kings and toe-screwed the jacks to the plate at the bottom **(12)** and to the header at the top **(13)**. After tapping the second jacks into place, we fastened them in a similar fashion **(14)**. Along the top of the header, we drove screws every 12 inches or so to anchor the header to the plate **(15)**.

With all the fasteners driven, we removed the temporary support walls **(16)**. Later, the opening would be plastered without trim per the client's request. The rooms will have a much more open feel, and the big man won't have to duck as he walks through the opening.

Don Boivin is a contractor and craftsman from Hyannis, Mass.

For a more detailed discussion of opening up a bearing wall, go to **www.jlconline.com/training-the-trades/opening-up-a-bearing-wall**.

BY ELIOT LOTHROP

Salvaging a Hero's Home

Last summer, I joined a team of local design professionals and volunteers tasked with salvaging and relocating a historic home in Milton, Vt. The small, unassuming farmhouse (built circa 1840) was once owned by Civil War hero and Vermont native George Jerrison Stannard **(1)**.

Stannard, a general in the Union army, is renowned for helping to blunt Pickett's Charge at the battle of Gettysburg. On July 3, 1863, he ordered a series of pivot maneuvers and provided withering flanking fire to repulse the Confederate assault. Later in the war, he was wounded and had his right arm amputated. He resigned from the Army in 1866 and purchased the Milton farmhouse. Stannard later moved to Washington, D.C., where he lived until his death in 1886.

Documenting, dismantling, and storing. Despite years of neglect, much of the home was worth preserving. Starting last April, we began the process of salvaging as much of the original house as possible, which was tricky given that it had been heavily remodeled twice, once in the 1890s and again in the 1930s. We tagged all the timber framing with coded "hand-punched" tin discs **(2)**, nailing them to beams, posts, studs, and rafters (we later documented their locations on a set of drawings). Then, with the help of a telehandler and personnel lift, we started dismantling the building **(3)**.

The home's wide board sheathing was salvageable **(4)**. The doors and windows, though not all original, were also saved. The discovery of a buried casing from an original fan light and visible ghost lines of original bed molding trim were pleasant surprises **(5)**.

The salvaged pieces have been stored and are waiting to be incorporated into the home's restoration on a new site. Visit generalstannardhouse.org for more information about the project.

Eliot Lothrop operates Building Heritage, specializing in historic preservation and timber-frame restoration, in Huntington, Vt.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Photos: 1, courtesy Milton Historical Society; 2–5, Tim Healey

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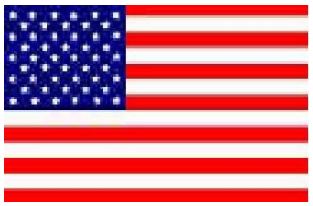

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