



## Roofing: Wood Roof Installation Details

### **Technical Information Regarding Wood Shingle Installation**

Four different installation applications have been identified and attempted at different sites over the last forty years at Historic New England. There are two applications that occur with no modifications to existing details and two applications which result in changes to the detail at the eaves and rake boards.

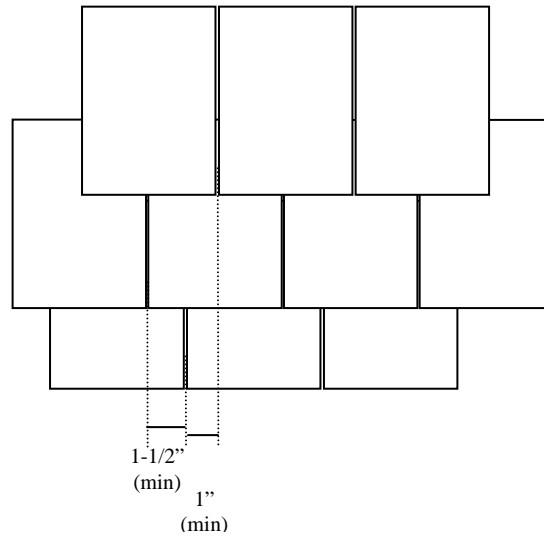
### **No Modification to Visible Detail**

#### *Traditional Installation*

A traditional installation would include the application of the wood shingles directly to the wood roof sheathing (vertical or horizontal). The use of roofing felt should be avoided to promote ventilation from the attic or rafter space beneath the shingles. Failed sheathing boards should be replaced in kind; the replacement of sheathing boards with plywood is not acceptable.

- The starter course is typically doubled at the eave and the shingles (18") would be installed at an exposure of not less than 5" to weather. The ideal exposure results in triple coverage of all shingle surfaces. Shallow pitched roofs would require closer exposure spacing to insure weatherproofing and steeper roofs could allow for greater exposure spacing.
- Note that a double starter course does not provide for the recommended triple coverage at the eave. To retain the triple coverage at the eave and reduce the obvious build up of material at this point, the bottom layer of shingles may be stepped back 1" to 1-1/2".
- Individual shingles should be spaced no more than 1/8" apart (side to side) if dry and lightly touching (less than 1/16" gap) if wet or damp. If the shingles have been stored outdoors prior to installation, lightly touching is acceptable. Leaving a 1/4" gap in this scenario will ultimately result in gaps approaching 1/2" which would be problematic for the life of the roof.
- Vertical joints between shingle courses should be staggered a minimum of 1 1/2" – 2" to eliminate a direct path for water infiltration. Vertical joints should be staggered by 1" – 1 1/2" over three shingle courses.

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- Installed shingle widths should range from 3.5” to 8”. Anything more than 8” is more prone to cupping and breakage; anything less than 3.5” would result in less than the required 1-1/2” side overlap.
- Shingles should be installed with nails of a length appropriate to penetrate three layers of overlapped shingles and travel 3/4” into the underlying substrate.
- Nails should be spaced 1/2” to 3/4” from the edge of the shingles. Only two nails should be used per shingle. Care should be taken to avoid nailing into the center of the underlying shingle as this can promote breakage of that shingle.
- Nails should be no more than 1-1/2” above the exposure line.
- Nails should be set flush to the shingle’s surface. If approved for the job, pneumatic nailers should be adjusted to avoid overdriving the nail and crushing the shingle surface.
- The use of metal drip edges (flashing) on the eaves and rake boards is usually avoided.
- The shingles along the rake boards should typically extend to 3/4” beyond the edge of the finish trim. In this case, prudence requires the nailing to line up with the rake board and thus be more than 3/4” from the edge. These shingles should be of an appropriate width such that this nailing does not occur in the middle of the shingle.
- The starter course of shingles along the eave should protrude at least 1” and sometimes more to insure that the roof drip line is in or near the center of the gutter, if one is present.
- Use of cant strips at rakes and wall/chimney intersections will encourage water to stay on the roof to the eaves where a gutter may be located.

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#### *Felt Paper and Spun Fiberglass Mesh Installation*

The last quarter of the 20<sup>th</sup> century saw the introduction of spun fiberglass mesh membranes as an underlayment for wood shingles on both roofs and sidewalls. This membrane is promoted to allow the shingles to breathe, since it provides spacing under the shingle that would provide for the circulation of air. Typically, the roof sheathing is covered with 3' wide, 30# roofing felt, stapled directly to the wood sheathing.

- The 3' wide fiberglass mesh is stapled over the felt paper.
- In order to take advantage of the ventilation capabilities of the product, manufacturers recommend the use of a similar mesh material at the ridge cap. The use of both these products will raise the profile of the roof and ridge approximately 1/4".
- The wood shingles are installed consistent with the specifications of the *Traditional Installation*.

#### **Modification to Visible Detail**

The following two applications require a change to the detail along the eaves and rake boards. Because of that change a philosophical statement must be written defending the change of detail and why this was important.

#### *Strapping Installation*

- Ventilation of wood shingle roofs with solid sheathing can sometimes be improved by installing horizontal sleepers over the roof deck. 1"x4" spruce or pine strapping is installed with the centerline of each course being equal to the exposure spacing of the finish shingle courses.
- The installation of sleepers can also be used to protect original sheathing that is in poor condition yet not fully deteriorated requiring replacement.
- The use of sleepers requires the modification of eave and rake board details, often changing the original trim dimensions of the roof.
- In order to take advantage of the ventilation offered by raising the shingles 3/4", a reveal at the ridge and eave of up to 1/4" covered by black wire mesh which would typically read as a shadow line is recommended.
- An alternative installation of a base of vertical sleepers followed by horizontal sleepers (spaced as noted above) provides for more ventilation, but raises the profile by 1-1/2".
- To minimize excessive banging on the existing roof framework, it is recommended that the sleepers be secured with stainless steel or galvanized screws. Note that the use of this strapping can aid in the overall roof stability by helping to pull out any sagging sections of the roof. Using screws allows for the easy removal of the strapping in subsequent re-roofing efforts.
- All remaining aspects of the installation of the shingles are consistent with the specifications of the *Traditional Installation*.

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#### *Plywood, Modified Bituthene and Spun Fiberglass Mesh Installation*

When it is desirable or essential to waterproof the roof surface before installing wood shingles, a sacrificial surface can be introduced to the installation system. This may be appropriate for a very low-pitched roof or for a roof that is prone to ice-damming in the winter.

- A layer of modified bituthene could be installed directly to the roof sheathing to waterproof the roof. The direct adhesion of the product to the roof would permanently alter the original building fabric and would be irreversible. Instead, a layer of 1/4" exterior grade plywood is installed to the historic roof sheathing, acting as a buffer between the new roof and the old roof.
- The exterior grade plywood is installed using galvanized staples to minimize the damage to the wood.
- The modified bituthene can be installed to the plywood, with or without a primer (depending on product). This action renders the roof surface virtually waterproof.
- A spun fiberglass membrane is then stapled to the Ice & Water Shield® before installing the wood shingles.
- Some modification is required at the eaves and rake boards to compensate for the 1/4" layer of plywood plus 1/4" of fiberglass mesh.
- Alternatively, a layer of aluminum flashing can be tacked/stapled to the sheathing and the top 12" of bituthene can then be secured directly to this flashing. This technique would virtually eliminate the profile change expected from the use of 1/4" plywood.
- The wood shingles are then installed consistent with the specifications of the *Traditional Installation*.