

GPL'S FIELD SERVICE PROGRAM

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Chimneys Punctuate the Urban Skyline

Since their introduction in Europe in the 12th century, chimneys, lone sentinels of the rooftops, have helped define the peculiar aesthetic of the urban skyline. In dense areas they appear with a staccato-like repetition. In the colder months, these vertical regiments of brick have labored to warm us, expelling smoke, the first evidence of a slumbering City coming alive in the dim light and still air of early morning. Coal and hardwood-scented wisps evoked the call to rise and prepare for the morning's work.

CHIMNEYS LONG WERE functional necessities, but when the more exuberant 19th-century High Victorian Gothic and Queen Anne styles became popular, and later in the Craftsman era of the early 20th century, richly articulated chimneys became an integral part of eclectic, often asymmetrical designs. Thoughtful designers, like Portland architects Alexander Parris, Charles Alexander, Francis Fassett, Frederick Tompson, and John Calvin Stevens, incorporated chimneys as important design elements.

Chimneys also document the northern hemisphere's reliance on solid fuels for heating and power, and they're reminders of the environmental cost. Historic views of cities often depict chimneys belching smoke, smog hanging over the skyline. As green design and energy-conservation measures take hold, the common chimney will become an endangered building element. In Portland's downtown, most of the wall chimneys on commercial blocks of the late 19th and early 20th centuries have already been taken down and lost. In new construction, direct-vent combustion systems and rooftop solar applications are becoming



Chimneys define Portland's skyline with variation and repetition in this view looking toward the Park Row.

ing more common. Still, the surviving chimneys remain important functionally and aesthetically.

Deferred Maintenance and the Importance of Inspections

A chimney is often a solitary, unprotected element on a roof, a slender structure vulnerable to water, thermal expansion, freeze-thaw cycles, lightning, wind and seismic damage, gravity and vegetative incursion. Climate change is likely to accelerate deterioration of chimney features if destructive weather patterns become more frequent or extreme. Without maintenance, even a well-built chimney will deteriorate.

Hundreds of private homes and commercial buildings erected after the Great Portland Fire of 1866 are approaching 150 years in age. Because disrepair is hard to see, hard to reach, and often expensive to fix, many

property owners overlook or defer inspection and maintenance of chimneys. But deteriorating chimneys can pose safety hazards and increase vulnerability to cataclysmic failure. Chimneys without tile, concrete or steel flue liners or with broken mortar joints may allow carbon monoxide into the building or become unsafe to use. Such conditions, if discovered by underwriters, could increase insurance premiums or nullify property coverage. Therefore, properly inspecting and repairing an older or historic chimney could save thousands of dollars in repair and legal liability costs.

In fact, the cost of deferred maintenance grows exponentially. A destructive pattern slowly progresses: falling bricks, deteriorating mortar, creosote staining, and wind- or ice-damaged flashings. If water leaks through the roof, failed flashing, or mortar joints, it can destroy sheathing,

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Chimneys

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rafters, joints, and truss connections; saturate masonry-bearing walls; penetrate wall framing and plaster finishes; attract insects; or damage electrical systems.

Chimney Repair and Maintenance

The primary issue is preventing water from penetrating the chimney lining, and infiltrating masonry units and mortar joints. In winter, accumulated water freezes and upsets the brickwork. The junction where the chimney meets the roof is an often-neglected area that is especially vulnerable to water. Step and counter-flashings made of copper, sheet lead, or aluminum must be kept in top condition in order to resist wind-driven rain.

Parging is the smooth-plastered surface of cement lining that contains hot flue gases. When it breaks down, it must be patched or replaced. Otherwise, rain-water gets in, and when combined with creosote or soot, forms sulfuric acid, which breaks down common masonry mortars. Several proprietary flue repair system franchises offer services which allow re-lining the flue with an injectable, ceramic-based fluid mix. Stone or sheet metal rain caps may be installed to prevent rain-water penetration from above.

When repairing, re-pointing, or re-building a chimney, the correct mortar composition is important, particularly when matching existing work. The properties of compressive strength, aggregate size and color, ratio of lime (or cement) to sand, tint, and water quantity, all affect the durability of masonry repair or repointing. After mortar joints have set, using the correct tools to strike the joints is critical for shedding water and to match the joint profile. To match the weathered appearance of adjacent older mortar joints, a stiff bristle brush or burlap cloth may be needed to replicate the joint finish.

In lightning-prone areas, especially where chimneys are taller than surrounding trees, copper cable systems prevent many problems. Check with your insurer before installing lightning-protection systems to determine which carry the necessary approval ratings.

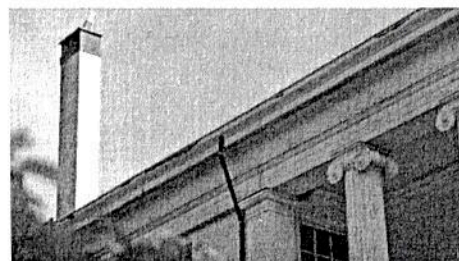
What to Do About Obsolete Chimneys

Some chimneys may be historically significant, but functionally obsolete. Others are too damaged to be safely used. Even if a chimney is no longer usable for its original purpose, there are aesthetic and economic reasons to retain them.

At its Safford House (1858) headquarters acquired in 2009, Greater Portland Landmarks inherited over 100 years of deferred maintenance hidden within the roof structure, belvedere, and chimney stacks. To preserve the historic appearance of the building, which is located on a prominent corner, GPL reconstructed



GPL restored the Safford House chimneys (left) to last another 100 years.



A chimney's lone vertical presence makes it striking but also vulnerable to the elements.



With modern heating systems, the common chimney will increasingly become an endangered building element.

When chimneys are beyond repair or causing a dangerous condition, there are several options to consider:

Mothballing / Removal from Service – Brick masonry, corbelling & flashings can be re-pointed and repaired to avert future water leaks, and deterioration slowed with a sheet metal closure cap. (Closure caps should have an adequate drip profile, and must be set on half-inch spacers to promote air circulation.) Fireplaces and stove flues should be closed and openings sealed. This conserves the character-defining features of the building, and stabilizes the chimney for future repair.

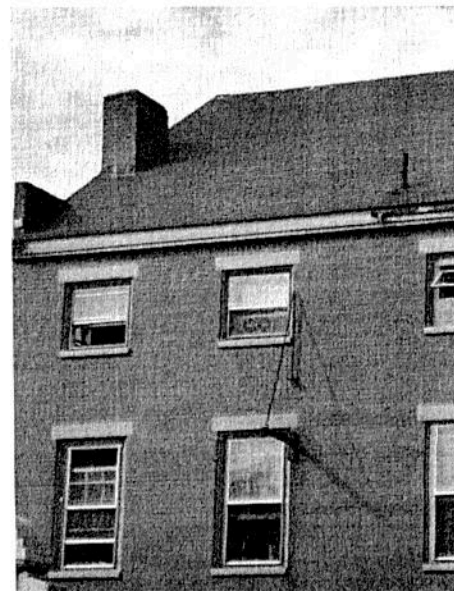
Documentation & Partial Dismantling – For badly deteriorated or damaged chimneys where immediate repair isn't possible, document the structure with elevation photographs and scaled drawings, then remove and store components as necessary.

Chimney Shaft Removal – employed in a substantial rehabilitation where plaster, lath and stud-wall enclosures are removed, allowing access to remove brickwork, floor-by-floor.

Adaptive Reuse of Chimneys and Chimney Shafts

Inactive chimneys are suited to adaptive reuse, including as interior space for closets or storage, or as chases for new plumbing or wiring. In some cases, with features like exposed brick, an undisturbed old chimney can add character and market appeal to the interior décor.

The extensive wiring needed for modern cable, satel-



The upper portion of this chimney was partially removed, then capped.

may save time and money in design and construction of rooftop solar hot-water systems that require direct plumbing connections.

While it may be less expensive to eliminate a chimney by dismantling it and capping it below the roof plane, most building owners recognize the intrinsic historic design value of chimneys, which in turn enhances property resale value. It's not usually a question of whether to preserve these features but, rather, whether to restore them to their original or a similar use; to conserve them as unused design elements; or to re-purpose them for an entirely new application. ■

The publication series *Preservation Briefs* prepared by the National Park Service, and particularly *Preservation Brief No. 2 Repointing Mortar Joints in Historic Masonry Buildings* <http://www.nps.gov/history/hps/tps/briefs/presbhom.htm> is helpful in working with historic masonry.

CHIMNEY CHECKLIST

Look at your chimney for signs of trouble.

- Cracked and missing bricks
- Loose or missing mortar joints
- Dark brown creosote stains
- Torn or raised flashings
- Leaning chimney

If you see any of the above, consult a mason to implement repairs.

the five original chimneys. Each was thoroughly documented and dismantled to roof level. Upper shafts were replicated, including seismic-retrofitting, with internal epoxy-coated, vertical steel reinforcing bars, and then

Field Services, a joint program of Greater Portland Landmarks and Maine Preservation in partnership with the National Trust for Historic Preservation



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