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Maintenance Programming Manual for Historic Buildings

John Leeke

Maine Historic Preservation Commission

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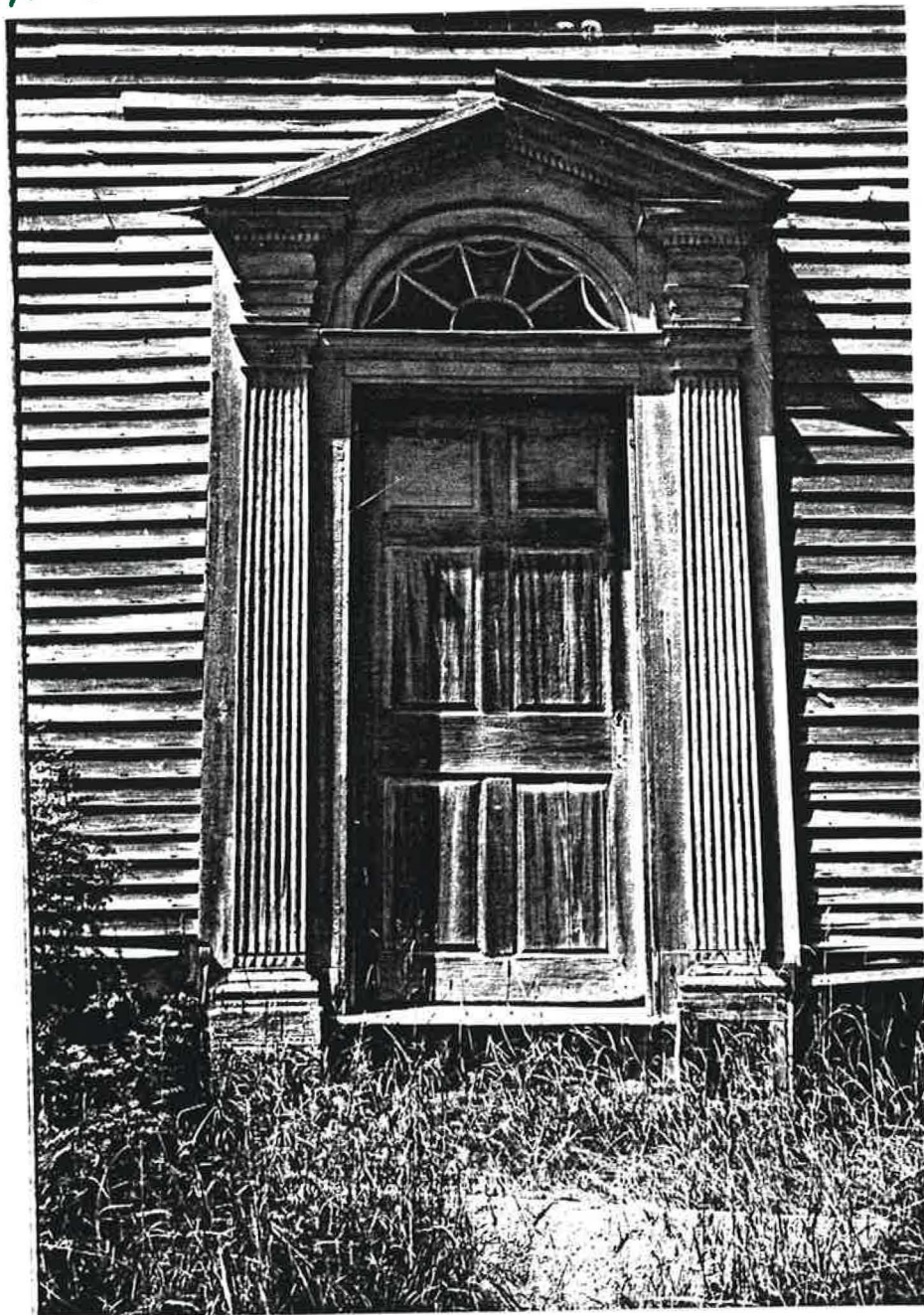
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**MAINTENANCE PROGRAMMING MANUAL
FOR HISTORIC BUILDINGS**

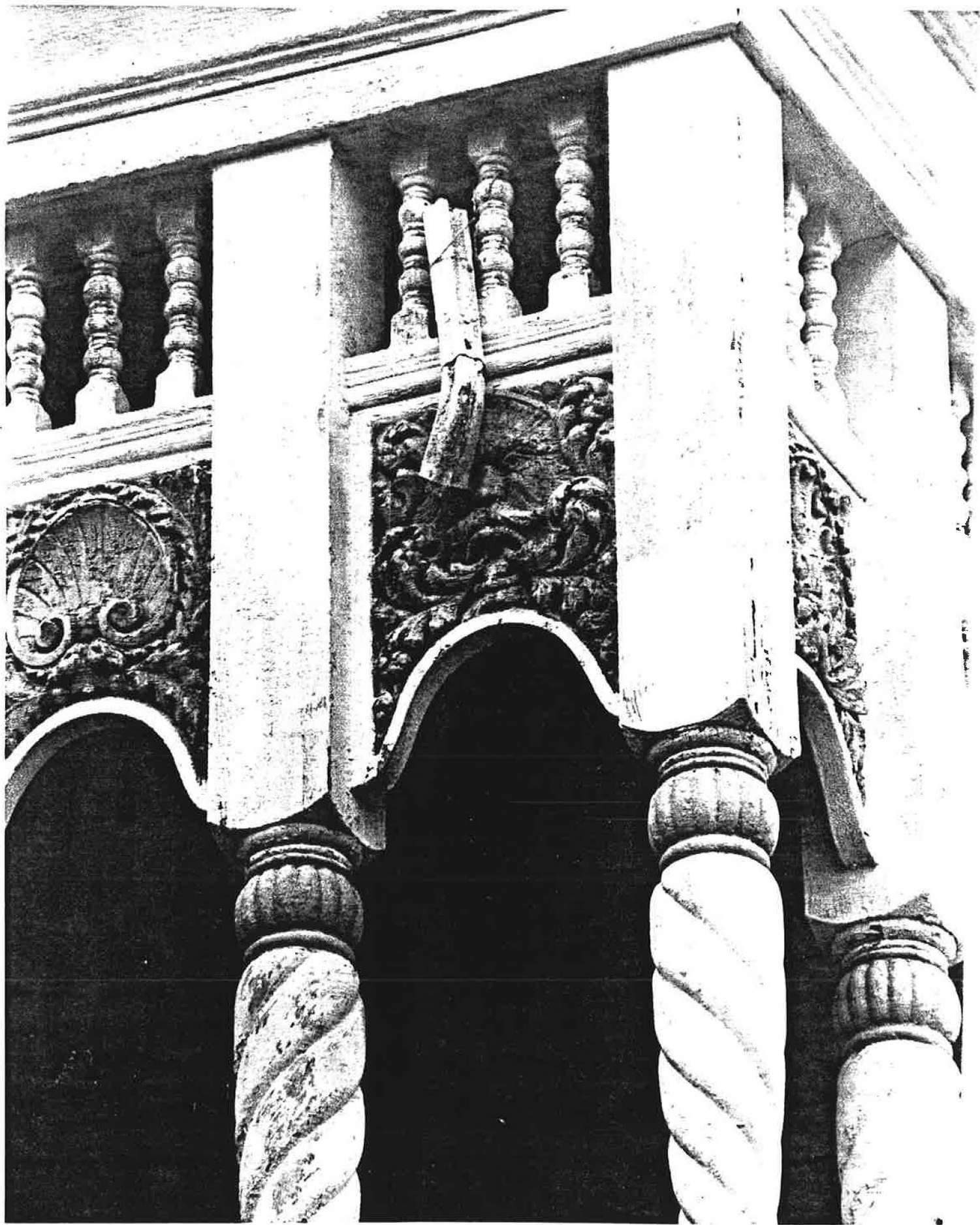
**By
John Leeke**

The Maine Historic Preservation Commission

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FOREWORD

Why develop a maintenance program for your historic building? Each year the Maine Historic Preservation Commission receives over one and one-half million dollars in requests for matching funds for restoration work on historic buildings, many of which are the result of "deferred maintenance," an innocuous sounding phrase which means that a building has been neglected until expensive repairs are inevitable. The cause is not so much willful neglect as a failure to understand how to maintain an historic building.

There are two basic reasons for developing a maintenance program. One is philosophical and the other is highly practical. Rarely in life does there exist such a convenient marriage between the two. It thus is ironic that this opportunity is frequently squandered.

The philosophical aspect is that historic buildings are an important part of our heritage. They are historic only insofar as the materials used in their construction are old. That is what distinguishes an historic building from a replica and why we maintain and preserve the historic fabric of a building for future generations. Few Americans appreciate that preservationists think in terms of hundreds of years. In Europe, where medieval structures still stand, this long-term approach is taken for granted.

The practical aspect is that maintenance is more effective. It saves money by limiting the need for future expensive work. It is less costly and more efficient to fix a window than it is to wait for it to become so deteriorated that wholesale replacement is needed. Moreover, replacement material is often inferior to the original. Wood, for example, is grown to be cut in a hurry and is generally inferior, unless you order premium quality wood from specialty saw mills. Maintaining the original fabric costs less and preserves the building's historic integrity.

This manual is intended to establish a procedure for developing a maintenance program for your building. Every building is different and no single program will suit everyone's needs. The staff and money available also varies. Churches, unlike house museums, are not

in the history business. Religion is their primary concern. Similarly, local governments have a primary concern of governing. But the less money an organization has for buildings, the more they need a maintenance program to spend precious resources effectively. In order to create your own program, it is essential to understand the procedures involved. That is the purpose of this manual.

Roger G. Reed,
Architectural Historian
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Author's Biography

John Leeke is a preservation consultant who lives in Sanford, Maine. He helps homeowners, museums, contractors, and architects understand and maintain their early buildings. He is a contributing editor for The Old-House Journal and writes a monthly column, Restoration Primer, for the Journal of Light Construction. (R.R. #1, Box 2947, Sanford, Maine 04073. Telephone 207/324-9597)



Gutter damage caused by ice on the George M. Harding House, Portland

Introduction

Imagine that you have been caring for this fine old house for several years now. It's like a comfortable old friend.

You amble down the fine wood-paneled hall to enjoy the newly restored parlor. But when you walk in, your heart sinks. Wall paper droops and peels off the wall. Water floods across the parquet floor. After a dash for mops and buckets and some cleanup you glance out the window where a big, long section of decayed and splintered wood lays in the yard. You make a quick jaunt out and around the building to investigate. Your heart sinks deeper--it's part of the house. Up by the roof a huge dark gash cuts across bright white paint and the whole cornice lays at your feet.

You are shocked until you realize that the water in the parlor and the cornice damage are related. After a little soul-searching you know that you never even thought of clearing

the gutters and that the water backed up, decayed the cornice, and poured into the parlor.

There are probably other details you've been missing. A visitor has mentioned the rather shabby looking paint and clapboards. The back screen door has been off its hinges for two months now, and you're not sure if you'll ever get it put back on.

If this sounds familiar, and you wonder if you can give your building the care it deserves with your limited resources, take a deep breath, and establish a maintenance program.

A maintenance program will enable you to develop a plan that will give you a fresh perspective and the confidence you and your organization need not only to put your building back in shape but to keep it that way.

What is a model maintenance program?

This is a model maintenance program. A model is something to study and emulate. The two-part maintenance program described here is a hypothetical one based on several real buildings. Part One provides a good background in maintenance programming, its theory, and how it applies to historic buildings; Part Two describes its four major steps.

In both parts you will follow the cornice, paint, and screen door examples mentioned above to see how they fit into the model. Along the way special sections are headed "Using the Maintenance Program." These explain how to develop your own program using the information provided in the text.

The appendices include sources for further information, an explanation of sample planning documents based on a hypothetical project, and blank forms for you to use in developing your own maintenance program.

Caution

Since every historic site is different the model plans and forms shown here probably will not meet your needs exactly. Do not depend on them to be complete or to give you accurate treatments for specific problems. These documents are intended to show you in a general way how to establish a maintenance program. Use them as a starting point, adapting them to meet your own specific needs. (For more specific information and details on actually

doing maintenance, use the resources listed in Appendix A.)

Using the Maintenance Program--Immediate Needs

You may be facing a maintenance problem right now and not want to set up an entire program just to deal with your particular problem.

Go ahead and use any part of the model that seems useful but understand that the real value of a maintenance program comes not from using parts of the program but from following it through in its entirety.

At the very least, do the overall assessment and evaluation to assure yourself that the solutions to your current problems do not damage other parts of the building.



Former Lutheran Church, Monson

PART ONE

Understanding a Maintenance Program

Background

The main principle behind a maintenance program is to control what happens to your building rather than to react to its deterioration. The trick is to notice the building's subtle conditions and then to take appropriate action. Consider the following two examples of how to deal with a screen door.

When a door is broken and doesn't work, it's time to repair it. For example:

In our example, the screen door falls off its hinges. One of the screens is ripped out and the frame is cracked. It looks like a major repair job. Now that its broken you take it to the repair shop and then re-install it.

This is a reaction to the broken condition of the door, but if a door is out of adjustment and still works, it's an even better time to fix it. For example:

You notice the screen door rubs a little when it closes. Later the door binds and at times it will not close. The condition is getting worse so you look for the cause and tighten a few loose hinge screws.

In this case you correct its condition, a minor task.

Of course it's easy to keep a screen door in working order. But with several other doors, forty windows, and two acres of lawn mowing, that back screen door is easily forgotten.

A comprehensive systematic approach to managing your building can assure attention to even the smallest detail. That may seem daunting at first, but don't worry. You don't have to think of or do everything at once. In fact, the two main tactics used in a maintenance program are (1) to divide the difficult into smaller, understandable, easy to do parts, and (2) to combine or spread those parts out, making them easier to do.

TYPES OF MAINTENANCE ACTIVITIES

PRESERVATION. Preservation is action taken to keep the form and extent of a building as it now exists. Essentially, preservation is maintenance.

RESTORATION. Restoration recovers the form and details of a building by removing later work and replacing missing original elements.

REHABILITATION. Rehabilitation returns a property to a state of utility by making possible an efficient contemporary use.

RECONSTRUCTION. Reconstruction is the authentic replication of historic features which have been completely lost with the aid of historic documentation.

Aspects of both preservation and restoration are present in the following definitions of corrective and preventive maintenance.

Corrective Maintenance

All too often historic buildings are neglected, so there is a backlog of deferred maintenance to be done. Corrective maintenance is recovery from this deferred maintenance. Its purpose is to bring the condition of the building up to an acceptable level. Review your goals and objectives to determine what is an acceptable level.

A corrective maintenance project can be considered "one-time only" as long as the elements involved subsequently receive regular upkeep.

Rehabilitation can include major corrective work such as improvements to structural elements to keep the building safe, habitable, and useful.

Since rehabilitation can involve changing the character of a building do not consider it a regular part of maintenance. However, if there is a restoration plan for the building, smaller corrective maintenance projects can lead toward rehabilitation while improving the condition of original elements and systems.

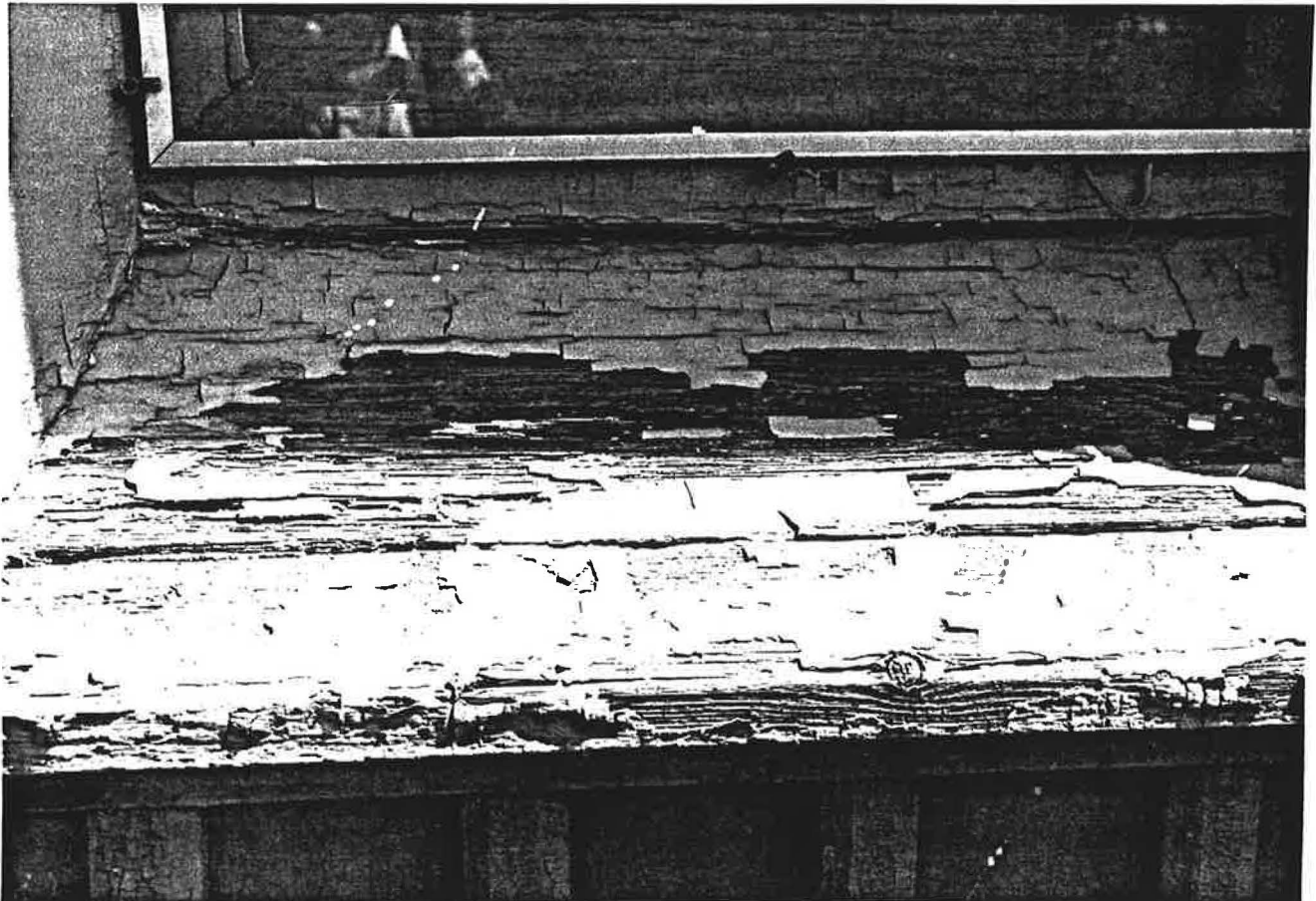
PREVENTIVE MAINTENANCE

Preventive maintenance is action to improve conditions before they become unacceptable. It is a continuous process. Activities like housekeeping are repeated at daily or weekly intervals and the pattern is easy to see. However, reglazing windows might only

be done every twenty or forty years so a pattern is more difficult to recognize and control.

Another aim of preservation is to slow down deterioration as much as possible. This is really what maintenance is all about. Exterior paint continues to weather away no matter what we do. The loss of the paint is acceptable because it prevents deterioration of the clapboards beneath. To preserve the clapboards you renew the paint every five to fifteen years.

Housekeeping. Housekeeping is removing dirt or other harmful deposits that build up on surfaces during the use of a building. It should be done frequently so the gentlest methods possible can be used, reducing damage from the cleaning itself.



Sill damage caused by lack of paint on area exposed to heavy weathering.

Repair. Refurbishing or replacing worn out elements that are uneconomic or impractical to save is a more pragmatic approach to maintenance. Materials and methods used are the same as the original if the element has historical significance.

If the element has no historical significance replacement with appropriate modern materials is acceptable. An example is replacing an undersized fuse-type electrical panel with a modern circuit-breaker type.

Unplanned Maintenance

Unplanned maintenance, as you might expect, covers everything that is not in the maintenance plan. This includes a range of situations progressively more difficult to address.

A condition overlooked in original planning can simply be added to the program. A previously undiscovered condition revealed during work in progress may require rethinking a major part of the remaining work. Bringing in needed help at the beginning will keep these situations to a minimum.

Methods

Historic buildings are made largely of materials that deteriorate. Some, like wood, decay rather quickly, and others, like stone, do so over long periods of time. Because these materials continue to deteriorate despite our best efforts at prevention they require continuing attention if a building's condition is to be maintained.

Many organizations caring for historic buildings already make a yearly review of building needs as part of their budget preparation. Build this same cyclic approach into your maintenance program.

Assess, plan, do, evaluate, and then begin again. It's never ending if your goal is to maintain the condition of your building. One final method used here needs to be mentioned: Write everything down. This relieves you of the burden of remembering the details. It will give your project a life of its own so continuity is maintained even if individuals leave the organization.

The Four Steps of a Maintenance Program

Step	Question	Example
Assess conditions	What have we got here?	A house exterior has a heavy buildup of many coats of oil-based paint with two recent coats of latex paint. Ninety percent of the entire surface has alligator cracking, 15% is peeled to bare wood, 25% is very loose.
	Why is it like this?	Moisture enters paint film through cracks, is trapped between wood and paint by heavy build up, and weakens the bond with wood. The stronger latex films shrink as they cure and age, pulling off lower layers of oil paint.
Plan the work	What treatment will be cost effective in the long run?	Remove all paint to bare wood, recoat with primer and two top coats.
	When can this be done?	Phase the project over the next five years to spread out the major expense.
Maintain	Is the work up to standards?	Set up sample panels to test workers' skills and to provide a reference during work. Approve prepared surfaces before recoating begins.
	What methods and materials are used?	Use a combination of heat and chemical strippers. Recoat with primer and one or two top coats.
Evaluate results	How did it work and why?	Paint removal went over budget due to lack of effective supervision and inefficient scaffolding. Stripped and repainted areas are not peeling; untreated areas continue to peel.

When these four steps are repeated over and over again they ensure effective results.

Written plans are a touchy subject. They remind people of their commitments. They tend to shift power and influence from individuals to the organization. No one likes to lose that power, but your organization may need it to maintain its building effectively. Address this issue with tact.

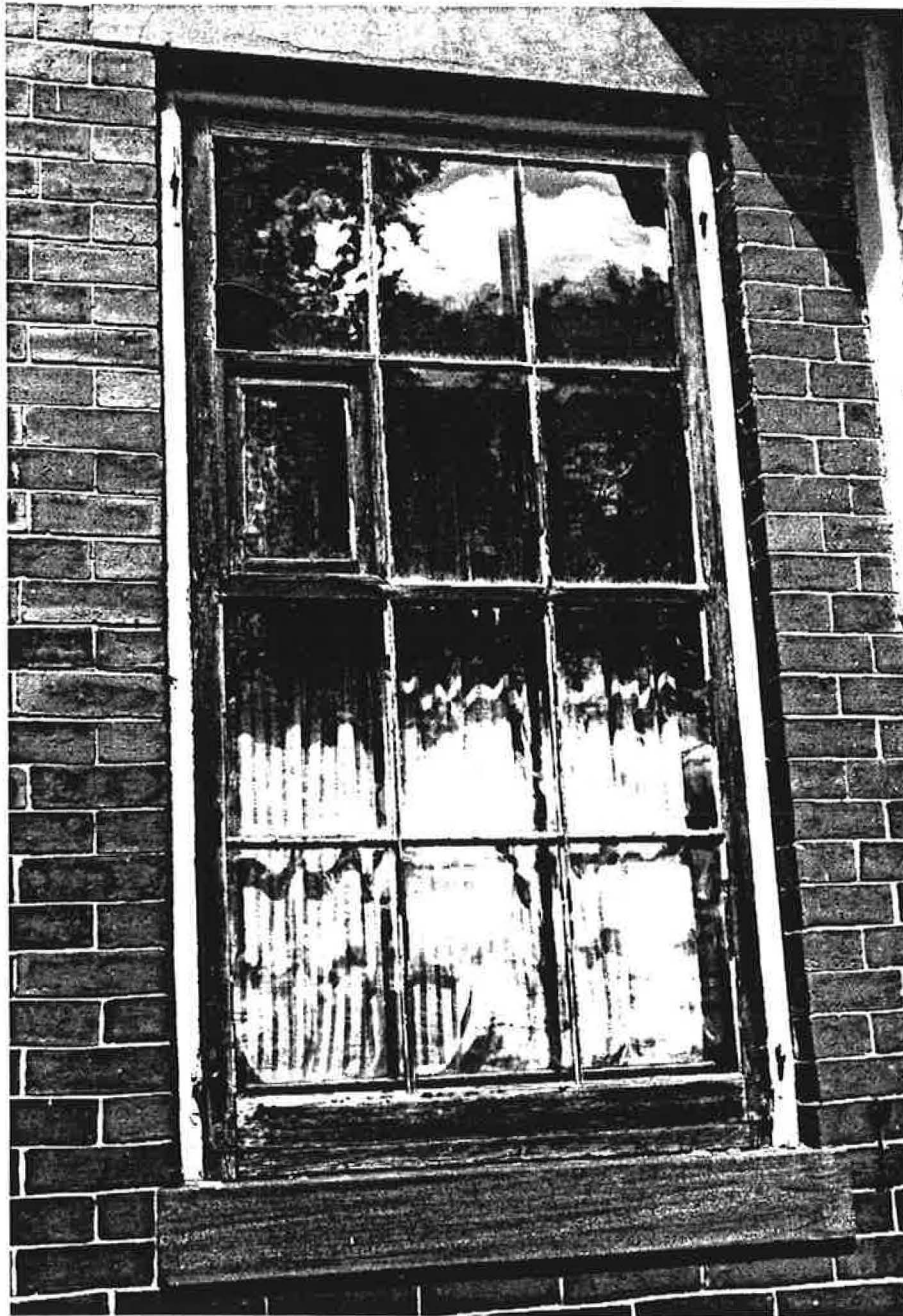
Caution

A complex paperwork system with obscure codes may end up only being useful to the person who devised it. The reason for having a written system in the first place is so that others can use it. Keep your system simple and use plain language.

Protection of Assets with Resources

The value of planning, writing, and dealing with people may not be evident at first. It takes time and money that could be used directly on the building. However, when done effectively the benefits of planning far outweigh the costs.

A business manager is responsible for operating a business efficiently enough to generate a profit. Although a nonprofit organization doesn't have to show profits it is still responsible for keeping costs low and benefits high. An important lesson can be learned from business management.



Historic Storm Windows With Ventilation Panel, Skolfield-Whittier House, Brunswick

Historic buildings and grounds are assets that you protect by spending resources. Resources, those sources of supply and support that you have available, include stockpiles of supplies and materials, money, staff time, volunteer time, and information. A maintenance program will help you to use these resources efficiently.

The cost of tightening up the screen door hinges is far less than that of major repairs on the door, even if you include the administrative costs of noting the condition of the door, planning the work, and checking to be sure it is done. Of course, the savings are small for one door. But consider the savings over a period of many years on all the doors, windows, and the rest of the building.

Saving the original fabric of an early window sash and conservation-sensitive repairs to window frames often cost much less than replacement with less appropriate modern window units.

Historic and Cultural Assets

The protection of historic and cultural assets is often the most important benefit of our efforts; however, the cost of broad policy decisions to preserve the overall architectural character of an historic building can be difficult to pin down. So during the planning phase take the time to relate costs to benefits. Often you can both save money and preserve the architectural character of a building.

Using the Maintenance Program

Information is an important resource. Sufficient information during planning and decision making can save many more times the cost of research.

Historic documents and photos relating to the property may already be catalogued and interpreted for your use. If not, find them and gather them together. The documents and drawings you develop will be useful for your maintenance program, but more importantly they will become the future's historic documents and thus deserve special care.

Make copies of all your building's documentation and store the originals elsewhere.

Beyond Emergencies

The need to get beyond emergencies is apparent. But the prospect of completely understanding and controlling your buildings can be overwhelming. Read on to learn specific management methods and techniques to help you regain or improve control over your buildings.

Initial Assessment

The purpose of the initial assessment is to get an overall and accurate view of the entire property. This will help you set the goals and objectives you need to begin the cycle of assessing, planning, doing, and evaluating.

Initial Inspection and Evaluation

An initial inspection provides a detailed critical review of all parts of the building and grounds. This inspection should encompass the entire property (see the Building Evaluation Checklist in Appendix B). The result is a written record and evaluation of the significance and condition of the property. Evaluation usually focuses on deteriorated areas and elements of particular historic importance.

The historic structure report format is appropriate for extensive and very significant properties when funding on a high level is available (refer to the Fort Johnson Historic Structure Report listed in Appendix A).

When funding is limited or the property a small one a lesser inspection and summary of conditions with recommended treatments may be adequate.

Because you may not find the expertise needed in your own organization, it is often useful to bring in an outside person to make this initial inspection. The benefit of this approach is that the evaluator will not be personally and emotionally involved and will thus have a clearer and more objective view. This could be a colleague from another institution or an outside professional who specializes in this type of work.

This initial evaluation must be done by one who has a detailed knowledge of the building trades, both past and present. Both an understanding of how the building was meant to work when it was built and a knowledge of past and modern technologies are necessary to develop effective treatments. Depending on the complexities of the building and the level of knowledge and experience required, this could be an architect, a preservation consultant, or a contractor.

The inspector needs to apply his knowledge to your building with an open mind, avoiding preconceived notions that might blind him to important evidence and unique solutions. You, in turn, must be able to assist him by providing historic documentation such as old photographs, drawings, and written accounts.

The ability to deal with people and communicate is essential. You and your planners must be able to understand your building through this person. Reports can be based on detailed inventories and technical testing, but must be presented in plain language, with drawings and photos that you can understand and use.

Goals and Objectives

Goals

Preserve the historic architectural character of the building

Maintain the building for use of the organization as offices and display areas

Upgrade condition of the building and grounds to reduce yearly maintenance costs

Objectives

Protect and preserve the the building by controlling and limiting further deterioration

Repairs: Conserve rather than replace

Replace in-kind rather than substitute with modern materials

Use modern materials only with complete understanding and knowledge

The maintenance director will implement a formal maintenance program that will provide a record of conditions and maintenance activities with a yearly evaluation of its effectiveness

Housekeeping: The staff will clean regularly without damage using methods and materials described in the maintenance program

The maintenance director will carefully record maintenance costs throughout the year and analyze and report on those costs by December 31st of each year

Reduce costs 10% each year until 1992 by cutting back contract work. Bring in a consultant to train staff to be more effective and to teach staff special preservation techniques

Add one more maintenance staff person in 1990

These goals and objectives are typical for a small house museum that is used for display of artifacts and office space. Note that each set of objectives supports the goal above it.

The purpose of the initial inspection and evaluation is to provide you with a fresh introduction to a building that may already be an old friend. This new view will give you a firm footing for the next step, goal setting.

Goals and Objectives

Goals are expressions of your values. They describe what you want and provide long-term guidance. Objectives are a step-by-step path to your goals. They support the goals with specific tactics. A tactic is the skill of employing available means to accomplish an end. Objectives must state clearly who will do what by a certain time and must provide

intermediate evaluation points.

Absolutely everyone who is expected to work toward the goals and objectives needs to be involved in developing and setting them. Goals and objectives must be acceptable to everyone involved.

And above all, use them. Refer to them when making even the smallest decisions. Frequently discuss goals and objectives with everyone involved. Post them on the wall in large type where everyone can see them daily. Your day-to-day actions and activities must be influenced by your objectives if you are to reach your goals.

Statement of Philosophy

Maintenance objectives should outline a philosophical approach that retains the form and detailing of architectural materials and features that define the historic character of the building.

Develop a statement of philosophy to provide your organization with guidance when facing unforeseen situations. This statement of philosophy should explain why your set goals and objectives are important and should also expand on these goals and objectives to better explain them.

For example, the "Repairs" objective above might be expanded:

Minimal Intervention

Protect and preserve building elements that are deteriorated but still functional. Repair, when preservation is not possible, by splicing in limited areas of an element with matching materials. Replace a whole element as a last resort only when damage to an element is so extensive that repairs are not economical. "Replacement in-kind" with the same material is preferable to substitution with modern materials. In some cases modern materials will be desirable if their performance over time is well known ~~and~~ if they will not cause deterioration of other building elements.

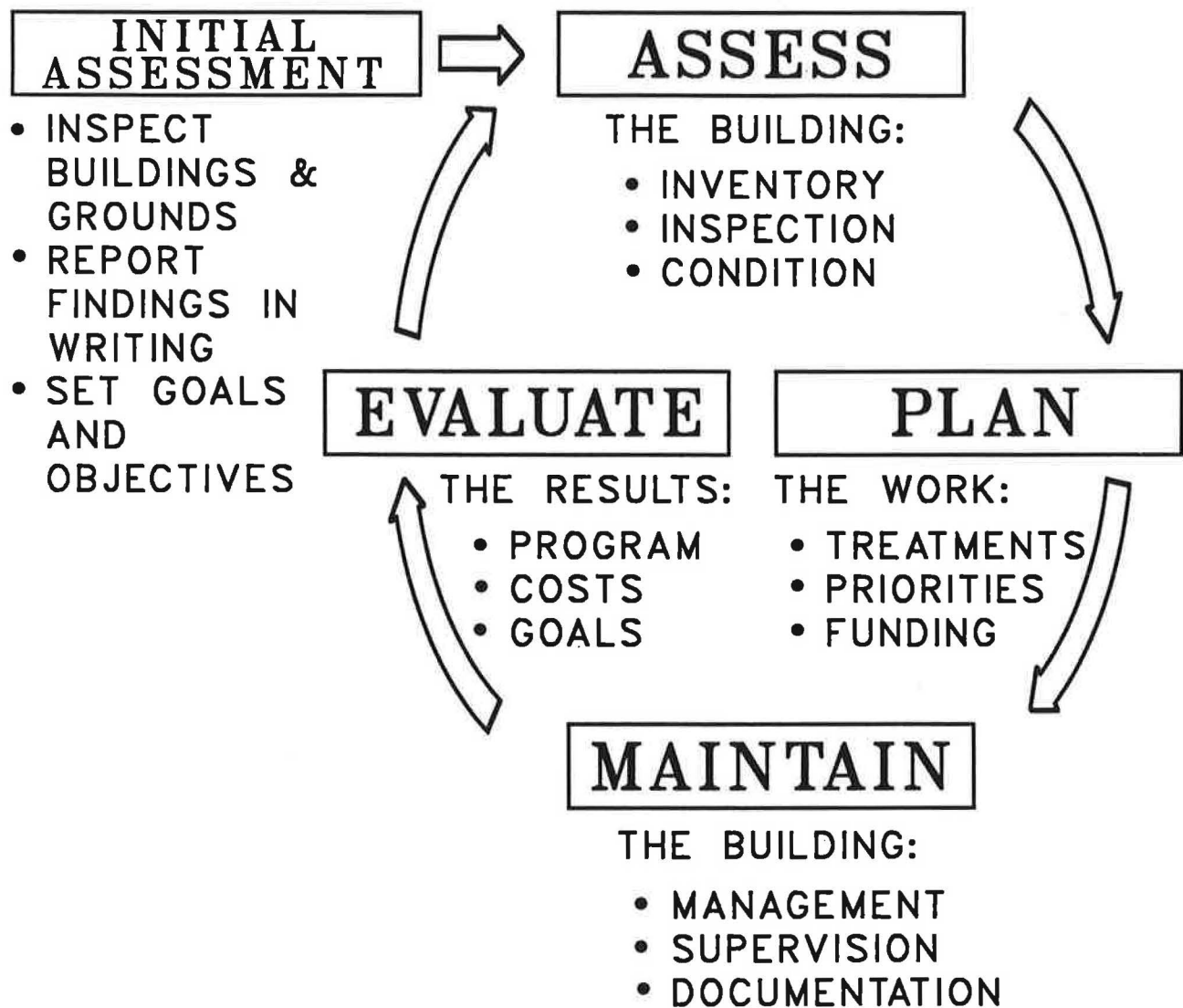
The purpose of this approach, known as "minimal intervention," is to do as little as possible and still meet your maintenance goals. This saves as much of the original physical building as possible for future study and analysis.

For more on the appropriate philosophical approach to historic buildings, refer to the Secretary of the Interior's Guidelines for Rehabilitation, listed in Appendix B.

Using the Maintenance Program

Now preparation is complete. Your written inspection report, goals, and statement of philosophy will help you know and remember where you, your organization, and your historic building stand.

The Cycle of Effective Maintenance



Part Two

The Four Steps of a Maintenance Program

This part of the manual describes the four simple steps of a maintenance program.

Each time you work through the following routine - assess, plan, do, evaluate - it will become easier and the benefits will grow.

Assess

The initial assessment may have provided enough guidance for you to skip this first routine assessment. But if you don't know where to begin or what to do you need to learn more about your building and its condition. Assessment gives you the information necessary to create an effective plan.

Assessment is the most critical step in a maintenance program. Bring in a qualified specialist if necessary.

Inventory - What have you got?

In your initial evaluation use the Building Evaluation Checklist as a guide to ensure that all parts of the building are considered (see Appendix B). To develop an inventory begin with this checklist. Refine and expand the list to include all of the systems and elements that make up your building. This listing must be broad in scope, but should only be as detailed as your understanding of the details of your building.

If your situation is unusual start your own list from scratch. Everyone knows buildings have

- Roofs
- Walls
- Foundations
- Interiors
- Grounds

and that is a fine beginning. Think of that list as an outline and then fill in a few details.

- A. Roofs
 - 1. Shingles
 - 2. Chimneys
 - 3. Flashing
- B. Walls
 - 1. Siding
 - 2. Windows
 - 3. Doors
- Et cetera

Carry the same level of detail through your entire list. Expand the list as you learn more about your building. If, for example, you learn more about the siding on your walls return to this basic list and add the new information:

Section	Area	Element	Description	Condition (cause)
B. walls	1. siding	shingles	sawn cedar	good
		clapboards	vertical grain pine	split (no paint)
		stucco	cement on wire lath	fair, major cracks
	2. windows	sash	wood, 6 over 1	loose glazing
		frame	wood	good
		sill	wood	cracked, decayed?

And so on.

Why bother writing up a long list like this?

An historic building is a complex system that is difficult to understand. The list can give you two views that lead to a more complete understanding of the whole building. First, thinking of the separate parts is easier than thinking of the whole building. Second, you can see your whole building at a glance. This helps you see areas where your knowledge is lacking and helps you connect seemingly unrelated facts.

Inspection - What shape is it in?

In a building inspection you view the building's parts closely and critically to determine what you have, its condition, and its value. Use the inventory list to be sure the inspection covers every element and system of the building (see Appendix A for books on methods and techniques of inspection).

During the inspections make a record of the findings (see Appendix B for an example of how to use the onsite inspection notes form). The results of the inspection will be a written description of each part and system of the building as well as of their value and condition.

Understanding Function

Understanding the building and how it functions is critical. While you focus on details and separate parts, it is important to know how the parts relate to each other and work as a system within the entire building.

In our example of the decayed cornice, it is easy to see that the wooden gutters are a physical part of the cornice. They are also part of the water drainage system that extends from the ridge of the roof, down the side of the building, and across the grounds. The water drainage system is only a part of the "weather envelope" that protects the building from the elements. The cornice is also a major decorative element of the building's exterior.

The gutters, then, serve three important and related functions - physical, functional and aesthetic - more than you might expect at first glance. Nearly all parts of a building are related in some way.

Description

The description of each element should include the material it is made of, whether it is original material, and how it is made (see Appendix B).

Architectural Character

Place a value on each element by determining how it contributes to the architectural character of the building.

For example, the cornice is an important decorative feature of the building that draws attention to the building's basic shape and size. Thus the value of the gutter is high because it is visually prominent, and it defines and outlines the building.

Condition

Determine the condition of each building element by considering its function and operation. Refer to your maintenance goals and objectives to determine what conditions are acceptable.

To help later planning, judge the element's expected life and relate its life to the planning period.

Standards to Determine Conditions

<u>Condition</u>	<u>Description</u>	<u>Example</u>
Excellent	Performs all functions and operations	Sash slides up and down easily
	Will continue to perform during period of concern	Will continue to do so for at least ten years
Good	Minor limits of function and operation	Sash doesn't open all the way, glass is cracked
	Will continue to perform within limits for one-half of period	Will continue to work for at least five years
Fair	Major limits of function and operation	Sash stuck closed, exterior screen ripped
	Limited life due to a condition that will worsen	Decay in sill due to debris and moisture trapped on sill between screen and sash that cannot be easily cleaned out
Poor	Not performing important functions and operations	Sash missing so weather comes in
	At or near end of useful life	Frame or sash could be easily pushed out of the way of the wall

Use these definitions as a start to develop standards that make sense for your project. Windows are used as an example, and the planning period is ten years.

With a knowledge of each element's function and standard definitions like these you can make quick, accurate, and consistent judgments about each element's condition.

Typical planning periods are five to ten years for private residences, twenty to thirty years for institutions, and fifty to one hundred years for buildings of historical importance and even more for "landmark" status buildings. Decide on the period of years for which you are concerned. Then you can note with a quick yes or no response whether the element will need attention within that period.

Is each element fit to perform its function? Set up standards and definitions so the basis for judgment remains the same throughout the entire assessment.

Causes

Find out why an element is in poor condition. Ask the five "W questions" (who, what, where, when, and why) at least five times. Begin with the obvious and let the questions lead you to the unknown.

<center these question and answer sections>

Why did the cornice fall off?

It was weak and the ice pulled it down.

Why was it weak?

Excessive moisture and decay caused the weakness.

Where was the moisture?

It was found in the cornice and the gutter.

Why was moisture in the gutter?

Debris buildup trapped it there.

Debris buildup is the cause, and the treatment is obvious - rebuild the cornice and be sure the gutters are cleaned out regularly.

But if you ask two more questions you will see effective treatment includes insulation, vapor barriers, and ventilation of the cornice.

Why was there moisture in the cornice?

Just inside the cornice, water condensed on the bathroom walls.

Why was there so much ice buildup?

The lack of insulation let heat rise to the roof, partially melting the snow, and forming an ice dam.

Because the first treatment was inadequate the problem would have cropped up again. Be sure to find the fundamental cause for poor conditions or you will only be treating the symptoms.

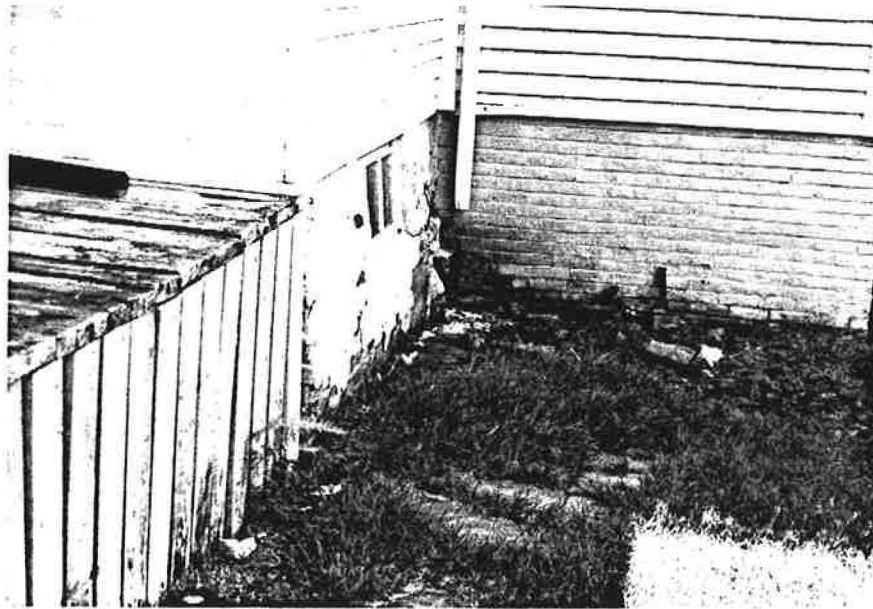
Usually the focus is on elements in only fair or poor condition. But if you have the time, consider why certain elements are in good condition. The answer can lead to effective treatments for similar elements in poor condition.

Keep a detailed record of all elements, even those in good condition, for this will be a useful reference as you note changing conditions.

Movement and Water

Make your search for deterioration more effective by focusing on movement and water.

Building elements like doors and windows are obvious places to look for wear and tear because they are meant to move. More subtle movements like shifting foundations are evidenced by crack patterns in plaster walls and can result in water leaks far above at the



Foundation Movement Exacerbated By Downspout Location

chimney and roof flashing.

Follow the movement of people through a building to learn where they leave deposits of dirt and where the flooring wears away.

Most important are places where water and movement combine. Gutters and plumbing pipes are common centers for deterioration.

Follow the flow of liquid water over and through the building. Go out in a rain storm to see how the water flows over the building. See which nooks and crannies collect water and how it drains away on the ground or stands in puddles.

Movement of water vapor through exterior walls is more difficult to trace. It can cause structural decay and peeling paint.

Conditions Versus Treatments

It is important to separate determining conditions from developing treatments.

It is tempting and common to look at an obviously damaged cornice and specify a treatment, without determining the cause. The danger is in treating single symptoms such as a decayed hole in the gutter rather than an underlying cause such as an overhanging tree that drops leaves in the gutter. Standard treatments that come to mind quickly may not be

adequate and can even cause harm such as treating wooden gutters with tar.

Give yourself a chance to find out what is happening with the entire building before deciding what to do about specific problems.

Using the Maintenance Program - Goals and Planning

Now you know the condition of your building in a detailed way. The goals developed in the initial assessment show you where you want to be. The next step, planning, will show you how to get there. During the planning phase use the inventory list as an index to the many detailed onsite inspection notes.

Plan

In planning you determine what needs to be done, when to do it, who will do it, and how much it will cost. Planning ahead gives you the lead time necessary to deal with the unusual situations so often encountered working on historic buildings.

Strategy - A basic plan

A basic strategy for maintenance is to bring the building up to a certain standard condition and then to maintain that condition. Standards of condition for a particular building can change to reflect the needs of new owners and uses.

Begin with a corrective maintenance project or a series of projects to improve conditions. Once corrective maintenance is under way, develop a continuing program of preventive maintenance to hold current conditions and improvements. If you do not maintain the improvements, the building will just deteriorate and need corrective maintenance again. Finally, follow through with the remaining corrective maintenance projects to maximize benefits of improved conditions and to reduce maintenance costs.

As always, the unexpected will occur. Allow for reserves to deal with emergencies, but remember that as conditions improve you will have fewer.

Planning Team - You need help

Planning effective maintenance for historic buildings is complex. Gather a planning team around you. Your planning team might include someone from your staff, an architect, a consultant, and the contractor. If you depend only on yourself or on one contractor to plan

a project, you limit the possibilities for effective problem solving.

Members of the team may come up with widely differing analyses and solutions to any given problem. This is good, since it gives you a choice of solutions and treatments. The architect and consultant serve in large part to provide these alternate solutions. But it is the staff and contractor who end up doing the work. Their "hands-on" experience provides them with valuable insight. If they participate in developing the solutions and making decisions, their performance on the project will be much better than if they are just told what to do.

Pet Projects and Volunteer Enthusiasm

Take care not to get carried away with pet projects--keep your maintenance objectives in mind during all aspects of planning.

The pressure of enthusiasm from lay volunteers can be difficult to direct, especially when a project is first announced. Involve volunteers in the planning process so they will understand its importance. They can help you determine how much volunteer effort will be available when the work gets under way.

Volunteers can be used early in a project for preliminary cleaning and as helpers for evaluation inspections. Remember that all volunteer efforts must be supervised by an experienced professional in order to prevent damage and removal of important parts of the building.

Highly visible projects, such as the conservation of a picturesque gazebo, can draw attention to your project and be valuable in fundraising. The value of that benefit must be carefully balanced with more pragmatic concerns such as stopping water leaks into a main building.

Treatments and Methods - What to do

To develop a treatment is to decide what to do about the condition of particular building elements. Treatments can range from simply scheduling a future re-evaluation of a single element, like roof shingles, to completely replacing decayed sills.

Emergency or catastrophic events require immediate attention and cannot be ignored. The only way to plan for them is to set aside contingency resources to deal with them as they

come up.

Over a period of years an effective maintenance program reduces unplanned maintenance to a minimum.

Minimal Intervention

Do as little as possible while still achieving your goals and objectives. For instance, with a leaking chimney, rework the flashing or add a cap. Then after a year re-evaluate before you consider more drastic steps such as waterproofing or rebuilding the chimney.

When you are uncertain about what to do, wait before proceeding with the work. Except for high priority situations involving life safety or water entry, you usually will have as much time as you need to plan effectively. Stop to think about how long your clapboards or windows have gone without paint. You will realize that they could go on for a few more months or years with relatively little damage. The delay is worthwhile if it means a more effective treatment in the end.

Do not confuse minimal intervention with doing nothing. Hopeful neglect is no substitute for action, even if that action is only to schedule a specific time for an inspection and re-evaluation.

Caution - Quick fix and miracle cure

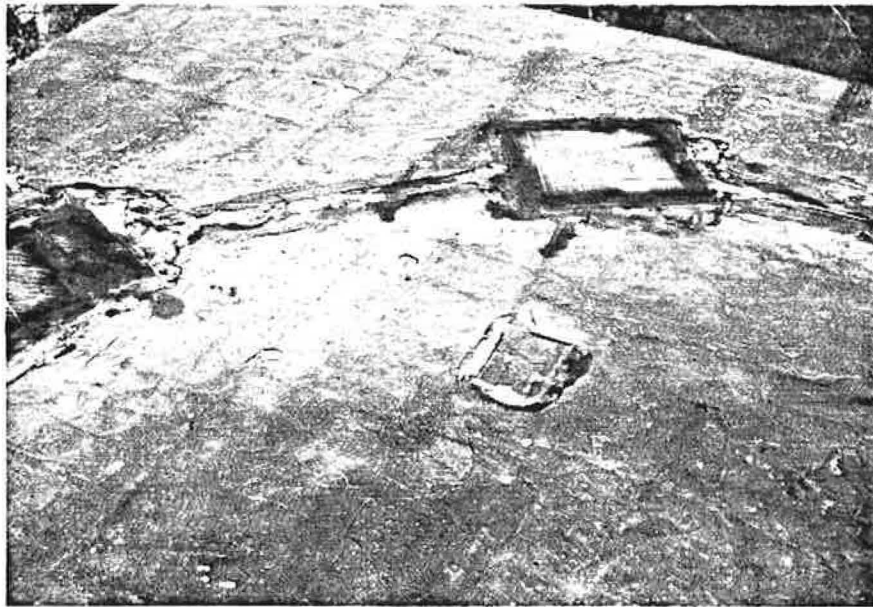
Certain common repair practices such as using tar patches on a metal roof can completely prevent more effective repairs methods like soldering. Moreover, they provide a false sense of security that the problem is cured and need no longer be a concern.

Regard modern materials and methods with guarded skepticism. Use them only with a complete understanding of how they work.

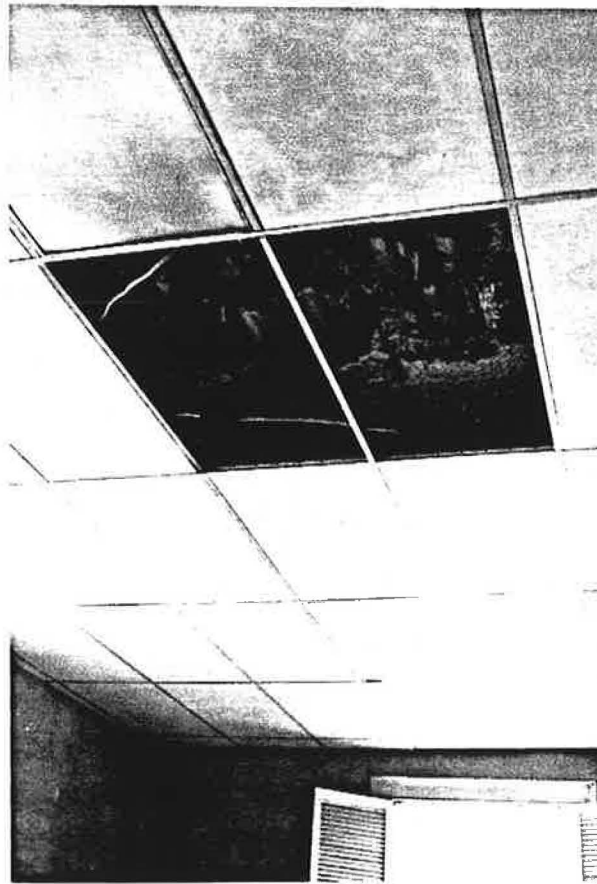
When in doubt use traditional materials and methods that have stood the test of time.

Using the Maintenance Program - Treatments

Develop treatments to address the conditions of each building element or system described in the inventory listing and on the inspection notes form. Focus on "poor" and then "fair" conditions if your resources are very limited.



Temporary Tar Patches Allowed to Remain As Long-Term Repairs



False Ceiling Hiding Severe Water Damage

It is beyond the scope of this manual to provide specific treatments for problems you might have (See Appendix A).

A Test for Proposed Treatments

Your maintenance will only be as effective as your ability to discover and treat root causes rather than symptoms.

Is the condition being treated a result of something else?

Has the condition changed for the worse?

Does the treatment address symptoms or causes?

Consider how proposed treatments will perform in the future. If they are reversible better treatments can be easily used in the future. Opt for treatments that will require less maintenance and fewer repairs.

Is the treatment reversible?

What maintenance and repairs will be needed in the future?

Use high-quality long-life treatments on areas like towers and high ceilings that are difficult to access. Balance the life of treatments so all the elements in an area will need future maintenance at about the same time.

How long will this treatment last?

Will this treatment make the element last a lot longer or shorter than neighboring elements?

Pull yourself up out of the details often enough to see where you are headed.

Does the treatment fit in with overall goals and objectives?

A particular treatment can be tested to determine its suitability. Ask the questions listed above to determine if a treatment is reasonable.

Logistics - Put it all together

As you begin to develop treatments group them into projects. Combine similar treatments to give each trade or contractor enough work to be efficient, such as rejuvenating all the windows at once. Or combine all the treatments of one area. For instance, to get triple use of scaffolding do clapboard repairs and exterior painting at the same time that extensive

cornice repairs are done.

Follow standard building sequences when possible. Do major structural work before finish work. Work on ceilings, then walls and floors last. Complete major building work before beginning the finish landscaping.

Using the Maintenance Program - Projects

Begin to outline each project on a separate project sheet, even if you do not yet know all the details. Use the sheet to collect notes whenever an important point about the project comes up.

Divide corrective maintenance work into several separate projects. Have enough different projects to easily establish priorities and schedules, but not so many that it is difficult to remember which is which. Most properties have three to ten active corrective maintenance projects.

Project Specifications

Once a project is clearly defined, write out the specifications. Architects or preservation consultants can provide invaluable professional assistance for projects as limited as replacing a roof. When your roof leaks and you get estimates from roofing contractors, the price may vary greatly because one firm bids for higher quality material or installs more effective flashing. Specifications not only give you a better chance of obtaining quality work, they ensure that estimates will be based on providing the same product and services.

The advantage of architectural specifications, such as drawings and written descriptions, is that they prevent confusion about exactly what you want done. Contractors and tradespeople often misunderstand verbal instructions and have their own strong views about what should be done. Moreover, a specification on paper provides an invaluable record to evaluate the efficiency of a particular treatment and is a record of what was done. This information will be valuable in the future. How many times have you wished for an accurate record of previous repairs?

Order of Priority

Priority	Description	Examples
Life safety	Protect occupant's life and limb	Rebuild front steps which have decayed stringers and loose treads Replace hazardous out-dated electrical system to prevent fire
Structure safety	Ensure structural systems will support maximum worst case loads	Monitor major crack in foundation wall for movement and evaluate Rebuild roof rafter/perlin system decayed by shingle leaks
Weather envelope	Keep water, wind, and sun out of building	Close hole where cornice fell off building Spot scrape, prime, and top-coat exterior paint
Utilities	Heating, electrical, and plumbing systems	Add grounded electrical outlets Replace leaking water heater
Interior finish	Ceilings, walls, and floors	Scrape peeling paint off bathroom wall and recoat Repair water damage to wall plaster
Grounds	Land, lawns, plantings, walks and drives, walls	Repair decayed posts of wooden fence Mow the lawn

 Classify projects according to the categories listed above from most urgent at the top to least urgent at the bottom.

Priorities - Where to begin

Setting priorities is the one part of planning that will lead you most directly to achieving your maintenance goals.

It will take real teamwork to balance the various aspects of maintaining your historic building. Once you have arranged your projects using the order of priority table, you may have to adjust them to reflect the concerns discussed below.

Emergencies cannot be avoided. Maintenance done on an emergency basis is very inefficient. In an emergency deal only with aspects of the situation that will continue to cause further damage or that severely limit use. Handle the rest with regular maintenance

procedures.

In the cornice example, the hole in the wall that still lets water in must be stopped, and water must be mopped off the parquet floor. But that is all that must be done immediately. Rebuilding the cornice can wait until skilled carpenters can be found. Repairing the interior water damage can be put off much longer since it doesn't limit use of the room and is less pressing than other paint and window work.

A Test for Lowering Priorities

Deterioration continues no matter what. Advanced deterioration can spread quickly to affect other elements that are now in good condition.

Before lowering the priority of a project answer the questions below.

What additional deterioration will there be if the project is postponed or eliminated?

Costs in the building trades continue to rise each year.

Will there be additional costs at a later time?

Keep your goals and objectives in mind.

Are these costs and deterioration acceptable?

Using the Maintenance Program - Preventive maintenance

Preventive maintenance tasks, such as cleaning gutters and vacuuming floors, can also be outlined on project sheets. There is no limit to how many project sheets you might develop. Have enough to provide your staff with the details they need to consistently meet the objectives and goals.

By now you have so many papers you need a filing system. Vertical files that divide the documents into a few categories should be adequate. A reference file could hold your initial evaluation reports, goals, and your philosophy statement. A planning file would include the evaluation checklist, inventory, and maintenance plan. Use separate files for inspection notes and project sheets since there will be many pages of each. Later you will need an archive file to hold completed projects and past inspection notes.

Personnel - Who does the work?

Staff

It usually makes economic sense to use your own staff for routine "on-going" work such as housekeeping and groundskeeping. For larger properties there may be enough seasonal or irregular work - such as snow removal in the winter and paint touch-up in the summer - to warrant a staff position.

You may have extensive work that can be spread out evenly over a few years or more. If so, enlarging your existing staff can both give you closer control and save you money.

The cost of hiring skilled specialists by the hour may be higher than that of your regular maintenance staff but will be lower than hiring a general contractor. Or, your existing staff could be trained in the special skills needed. Amortize the cost of training along with tools and equipment over the life of the project.

Specialists or Tradespersons

Your staff may not be able to handle the work due to lack of special skills or a temporary heavy work load. Then it's time to bring in help from the outside. Contracting with specialists and tradespersons makes sense if your need for them is limited.

General Contractor

When you have an extensive or complex corrective maintenance project that must be done all at once consider using a general contractor, especially if your own skills or time for project management are limited. The additional costs can be well worth it when the contractor has had a lot of experience with early buildings.

Scheduling - When to do the work

Effective scheduling improves the quality of the work and reduces costs.

Workers with the special skills and attitudes needed to work on historic buildings are in short supply, even though there are more schools and programs offering specialized training now than ever before.

Often these tradespeople are scheduled six to twelve months ahead. Begin talking with them as soon as you see your need for them. But don't expect them to reserve time for you until you

have a specific agreement with them that includes a schedule.

Special equipment and materials may take longer to find since they are not available through regular supply channels used by general contractors. Subcontractors and tradespeople who use special materials will have a more direct supply line.

In your planning be certain of who is responsible for obtaining special materials and equipment and that there is enough time to get them onsite when they are needed.

Some jobs are best done during certain seasons of the year. Exterior masonry work requires temperatures well above freezing, and while exterior spaces can be enclosed and heated, this adds to costs. Masonry costs will be lower during the warm season. Roofers blessed with cool spring or fall weather will do a better job than in the blazing heat of mid-summer.

Calendar

Even small projects will probably involve more than one trade and should have a written schedule or calendar that shows who will be doing what and when.

Large complex projects, requiring many different trades and crews, will need a schedule chart that shows how the various tasks relate to each other and to the project as a whole.

Using the Maintenance Program - Tools for understanding

The end result of planning should be a clear picture in everyone's mind about what is going to happen. The "tools" for understanding might be a set of drawings and specifications for a complex corrective maintenance project or project and task sheets for simpler housekeeping and routine chores. In any case, if there is a chance someone does not understand their part, use these tools before work begins. Go over the specifications verbally, point by point, to make sure everyone understands them.

Fiscal - How many dollars?

Make fiscal planning easier by separating maintenance costs from the other costs of building management. Typically, the costs of managing a building are divided into three categories: capital costs, operational costs, and maintenance costs. Capital costs are for projects that make new improvements and expand the size or use of the property. Operational costs

are for supplies that support the comfort and activities of the occupants, such as fuel oil and electricity.

All three cost categories should be part of your overall building management. But excluding operation and capital costs from your thinking for now makes maintenance planning easier.

Tactics

Develop a yearly budget to include all maintenance activities and costs. The budget might extend five, ten, or even twenty to thirty years into the future.

You may already have a yearly budget figure. If not, the following rule of thumb might be useful. Take five to fifteen percent of your property's current real estate appraisal value. Use that figure for each year of the first ten years of your plan. After the tenth year you can reduce the yearly value by twenty-five percent because the building will be in better condition. This gives you a place to start your planning.

As you develop your maintenance program you will add to and subtract from these yearly figures. These adjustments will modify the fiscal plan, the maintenance program, the building management goals, and your overall organizational goals.

If you are planning for more than a few years, be sure to adjust your final yearly figures for both inflation and the rising costs of construction work.

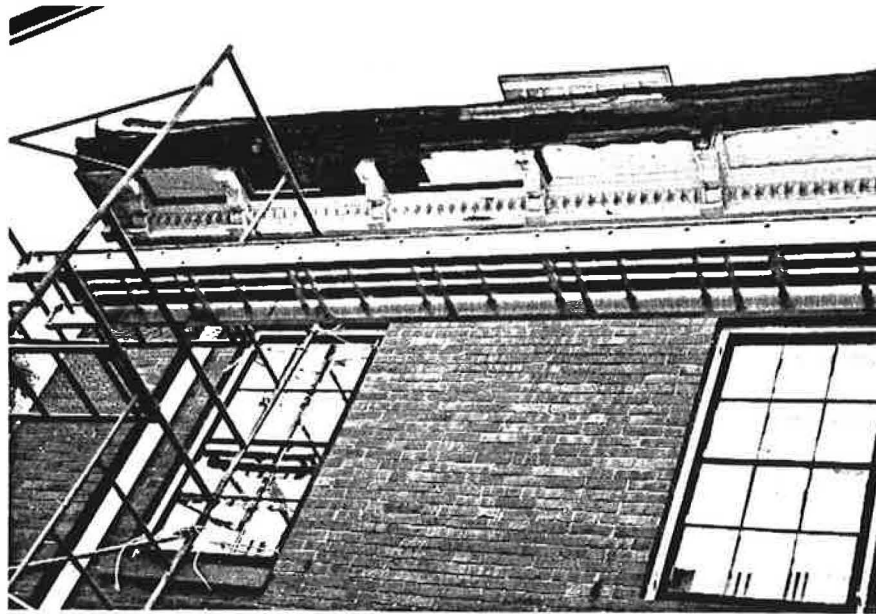
The result is a fiscal plan that you can afford and that will help your organization reach its goals.

Economy of Scale

The size and type of maintenance project will have a significant affect on costs. Economy of scale will reduce costs on large projects. Costs will be higher for smaller projects because of higher percentage overhead costs, minimum labor and equipment charges, and purchase of small material quantities.

Contingency Funds

The unexpected is bound to occur, especially when you are dealing with old or historic buildings. Account for the unknown by including a percentage of the known costs as



*The Need For Contingency Costs:
Gutter Damage Discovered In The Course Of Undertaking Roof Repairs*

contingency.

In general, allow for more contingency in the early years of a maintenance program. In later years you can allow less because you will know more about the conditions of the building and will do better planning.

For each project you plan multiply the expected costs by a contingency percentage. In the early planning stages a lot can change so allow a higher percentage. In later planning more details are known and a lower percentage is appropriate.

After you go through a few projects develop your own percentages. They will reflect your situation most accurately. You may find the following figures useful in getting started.

Conceptual stage (thinking about possibilities)	200% to 300%
Schematic stage (you know what you want)	200% to 100%
Specification stage (you know how to get it)	25% to 50%
Bids accepted (you know what it will cost)	20% to 25%

Costing in the conceptual and schematic stage is difficult at best. You do not know exactly what needs to be done, so exact costing is not possible. An architect or planner may come up with dollar figures based on similar projects. But your project may actually be quite different in ways not yet understood. The rather high contingencies indicated allow for the ambiguous and unknown.

By the time you reach the specification stage you shall have a clear idea of what work needs to be done, so a more exact costing is possible.

Allow at least twenty percent, even if you have fixed price bids for all the work.

Using the Maintenance Program - Cost planning

As you develop costs for corrective maintenance projects begin to fit them into your overall maintenance plan. See the sample house maintenance plan in Appendix B. List each project on the plan and put the cost under the year it needs to be done. Most corrective maintenance projects are one-time costs to be done in the first few years of the program.

Preventive maintenance figures are more stable from one year to the next. As conditions improve you should see a decline in preventive maintenance costs.

When you work with the plan, adding, deleting, and shuffling projects, you will see how each cost affects the yearly totals and the general trend over several years.

Maintain

Finally, after all this assessment and planning, it is time to actually get some work done.

Project Management - Control the work

Managing a project, whether it is a single corrective maintenance project or all of the maintenance work, requires regular attention.

Track dollars, time, and the quality of the work by comparing what is really happening with what is supposed to happen according to the plan. If you notice the work beginning to drift a little away from the plan, immediately take action to bring it back on track.

Be prepared to compromise. Perfection is not often achieved on construction projects. For example, if the wood shingles delivered for the roof have too many defects consider

culling out the poor ones and using them on a back wall or shed in a later phase of the work. If there is some aspect of your project on which you are not willing to compromise, be certain everyone knows about it from the start.

People and Supervision

It takes people to get the work done. You can do an excellent job of tracking dollars, materials, and the condition of your building, but if you ignore the people who will do the work, little will be accomplished.

Supervising maintenance work is to oversee or "look over" the workers and the work they do. This demands a certain technical knowledge about the work itself as well as the ability to direct and motivate the workers. For critical or important work an architect or preservationist should assist in this area. Direct supervision of your own staff is largely a matter of personal style in dealing with people. If you are having difficulties in this area there are books and seminars that can help with specific methods and techniques of supervision.

Contractors will usually supply their own direct supervision. Your role will be to get the work off to a good start. Then make sure they follow through on the plan, with satisfactory completion of the work.

Tradespeople and craftspeople are often described as "independent." You may be paying them by the hour, but they consider themselves self-employed. There is nothing more unnerving to a carpenter or painter than having the owner watching his every move. Respect their independence and experience by letting them get on with their work. Just make sure you selected the right person to begin with and that he has a clear understanding of what you expect.

Contact Person

Be certain any tradesperson you hire deals with just one person in your organization. Nothing is more confusing to a tradesperson than trying to satisfy more than one boss.

If there is a crew working for you insist that they have a lead worker with whom you will always deal.

Control extensive and lengthy projects with general contractors by having regular weekly meetings that include representatives from the active subcontractors.

Volunteers

Volunteers need supervision if their efforts are to fit into your plans. Professionals volunteering in their own field will, at a minimum, need to understand your plan and the desired result.

Amateur volunteers will probably need training and constant supervision to ensure that the quality of work is worthy of your historic building. The cost of hiring a professional to supervise several amateur volunteers can be very reasonable for the higher quality work that results.

To draw your people through more mundane work use popular and desirable projects as incentives. For example, once work on a rear porch is completed the restoration of a front entryway can be undertaken. This has the added advantage of learning from mistakes on less important work.

Documentation - Record what is done

While work is in progress you may be able to get at areas of your building that are usually not accessible. Hidden areas around chimneys and inside walls will contain important clues about the history and construction of your building. New conditions that may have significant impact on the work at hand may be revealed.

Record as much of this information as possible while it is available.

Photos

Probably the simplest way to document the work done on a building is with photography. Use black and white film. Put a ruler or measure in the picture so dimensions can be scaled directly from the print. Take notes as you expose the film and then attach the notes to the prints when they come back.

If the existing conditions of the work area were not completely documented during the assessment do so before work begins with "before" photos.

"Before and after" photos are important, but "in progress" photos are the most revealing.

"Step-by-step" photos show important relationships between materials and can be useful for training purposes.

Drawings and Samples

Measured drawings of elements that do not appear in the photographs may be needed. Collect and label samples of unusual materials.

Other documentation methods, such as taking impressions of details or surface features with paper, wax, or plaster, may be useful.

Evaluation

After a whole season of maintaining your historic building it's time to take a break to see just where you stand.

Costs - Are you on budget?

Compare actual overall costs with planned or budgeted costs. If there is a major difference, either over or under, break the costs down by type or project to determine the cause.

Carry your analysis further to determine the value of what was done and then compare it with the costs. If the value is greater than the costs, you have done an excellent job of managing the maintenance of your building. But if the value is lower than the costs, dig deeper to determine why. You will want to know the answers to make your efforts more worthwhile when you begin the maintenance cycle again.

Goals - Have you made it?

Consider the conditions you faced at the beginning of the maintenance cycle. After assessing, planning, and doing maintenance all season have you achieved your short-term objectives? Have you moved closer to your overall goals?

Program Performance - Is this worth it?

A key indicator of the performance of your maintenance program is the amount of unplanned or emergency maintenance. You should see a trend of declining unplanned maintenance from year to year.

Maintaining for the Future

The immediate benefits of effective maintenance are apparent. A building that functions well helps the people who use the building lead happy and productive lives. A building that looks good stimulates a sense of pride and is a positive contribution to the surrounding community.

But more important are the long-term effects. Making the most efficient use of resources means you have even more available to reach toward your goals. Effective maintenance makes a real contribution to the preservation of our cultural heritage.

Draw on your own feeling of stewardship, of caring for and passing this important part of our cultural heritage along to those who will follow.

Appendix A

Information Resources

Bibliography

This brief bibliography lists resources used to develop this maintenance program manual. You will find them useful for further information on maintenance topics.

Chambers, J. Henry.

Cyclical Maintenance for Historic Buildings. Washington, D. C.: National Park Service, United States Department of the Interior, 1976.

Maintenance techniques and planning. For administrators, architects, and others involved in the preservation and maintenance of historic properties. Covers supervision, programming, surveys, training, manuals, tools, materials, and techniques.

HUD Rehabilitation Guideline Series, Residential Building Systems **Inspection, No. 11, 1984.**

Helps evaluate the rehabilitation potential of existing one- to four-family residential buildings. Useful to anyone with a basic knowledge of building construction. APT Foundation Publications, 1200 15th Street, N.W., Washington, D.C. 20005.

McNeill, Joseph G. Principles of Home Inspection, New York: Van Nostrand Rienhold Company, 1979.

A guide to residential construction, inspection, and maintenance. Appendices include expected lives of house equipment, checklists, and cost estimates.

Mendel, Mesick, Cohen Architects

Fort Johnson Historic Structure Report, Washington, D.C.: Heritage Conservation and Recreation Service, United States Department of the Interior, 1978.

A model research study of Fort Johnson in Amsterdam, New York. A typical historic structure report that documents a building's initial construction, analyzes its current condition and structural stability, selects appropriate historic preservation treatments, and establishes priorities and projects costs.

Miller, Hugh C.

Preservation is Maintenance. APT Conference Tapes, AP8624a-b, Ottawa, Canada, 1986.

Old-House Journal, 69A Seventh Avenue, Brooklyn, New York 11217, Bi-monthly, \$21/year.

A wealth of detailed how-to information on just about every aspect of dealing with old buildings.

Secretary of the Interior's Standards for Rehabilitation.

Washington, D. C.: National Park Service, United States Department of the Interior, 1983.

Standards along with guidelines for interpreting them. Often used by a variety of governmental agencies to qualify the work done on historic buildings. Available from the Maine Historic Preservation Commission.

Professionals

Professionals who deal with historic buildings often have libraries and files with information on where to find special materials and on methods and techniques appropriate for the historic house. Directories of tradespeople and contractors who are sensitive to early buildings may also be available. Look for the following:

Architects who have managed preservation and restoration projects

Architectural historians with academic training

Architectural conservators with academic and practical background

Preservation consultants who offer a variety of services

To find these professionals ask the following organizations for references.

Organizations

Greater Portland Landmarks, Inc.
165 State Street
Portland, Maine 04101
Telephone: 207/774-5561

Programs include technical assistance on rehabilitation of old buildings, advice on everything from period paint colors to insulation, lectures and workshops, research services, and preservation easements.

Maine Citizens for Historic Preservation
50 Danforth Street
Portland, Maine 04101
Telephone: 207/775-3652

A private non-profit organization dedicated to the conservation and continued vitality of Maine's rich historic environment. Programs include information and referral services as well as preservation easements.

Maine Historic Preservation Commission
55 Capitol Street
State House Station 65
Augusta, Maine 04333
Telephone: 207/289-2133

The policy of the commission is to preserve the architectural, historic, and environmental heritage of the people of the state and to promote the cultural, educational, and economic benefits of those resources. Programs include referral of professional services and grants-in-aid for buildings open to the public.

Maine League of Historical Societies and Museums
c/o Mrs. Carleton F. Scott
Box 479
Wilton, Maine 04294

Encourages the preservation and interpretation of Maine's historic heritage. Contact the league to find local museums and historical societies.

Appendix B

Sample Documents

Here you will see how information about the house in our model maintenance program was collected and managed making it available when needed.

The purpose of these forms is to collect and format maintenance information. The reason to fill them in and keep track of them is to make the information easy to use by many people. When an information system like this is properly developed and maintained then its value greatly exceeds the cost of development.

Detailed explanations of each document are on following pages.

[illegible][illegible][illegible]

BUILDING EVALUATION CHECKLIST

This is a general listing of most parts, or elements, of a typical frame building. Each line shows an element with its description, its condition and a reference to a page number of the onsite inspection notes, where you will find more details about that element.

The list acts as an index to the on-site inspection notes.

ON-SITE INSPECTION NOTES

These notes record a detailed description of building elements. The detailed information collected here is used in planning projects.

Each page is numbered for reference from the building evaluation checklist and for reference to project sheets.

BUILDING EVALUATION CHECKLIST

This is a general listing of most parts, or elements of a typical frame building.

OUTLINE

The outline shows the elements and their location.

EACH LINE

shows an element, a brief description and its condtion.

USE THE CHECKBOX as a guide so you cover all of the building and grounds.

BUILDING EVALUATION CHECKLIST

BUILDING: MAIN HOUSE DATE: 1, 1, 87 WEATHER: CLEAR + COLD

PLANNING PERIOD: 10 years

EXPECTED USE OF BUILDING: OFFICES + ARTIFACT DISPLAY

DESCRIPTION is type of construction and materials used for each element.

CONDITION for each building element in the following chart is expressed in terms of function and operation, as well as expected life with no maintenance and normal use.

- Excellent - performing all functions and operations will continue to perform during planning period
- Good - minor limits of function and operation will continue to perform within limits for at least 1/2 of period
- Fair - major limits of function and operation limited life due to a condition which will continue to worsen
- Poor - not performing important functions and operations at or near end of useful life

☐ Only items checked off in the left column were evaluated.

REFERENCE to further details in Onsite Inspection Notes on page #

major system or section
location or subsection
element (description of element, and condition) E G F P

<input type="checkbox"/>	WEATHER ENVELOPE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	roof exterior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	ridge cap	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	covering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	flashing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	drip edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	cornice <u>WOOD FRAME W/ GUTTER, MISSING SECTION</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	siding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	doors <u>BACK SCREEN DOOR ONLY (SEE NOTES)</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	paint <u>EARLY LEAD, RECENT LATEX, HEAVY BUILDUP</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	drainage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	gutters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	downspouts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	flow at grade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	drains & lines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Use the checklist as a starting point for a specialized inventory adapted to your particular building. Add or delete items to tailor the list to your building. An inventory helps you see the whole building at a glance.

PAGE NUMBERS refer to onsite inspection notes where you will find more details

SUMMARY OF CONDITIONS

ON-SITE INSPECTION NOTES

These notes record a description of building elements. The detailed information collected here is essential in planning treatments and projects.

DESCRIPTIONS include the material, originality and how it contributes to the historic character of the building.

If you have the time, a detailed record of all elements will be useful for reference in future years to note changing conditions.

ONSITE INSPECTION NOTES,

date: 1, 1, 87 page 4 of

INSPECTOR: JOHN L.

HEADINGS: WEATHER ENVELOPE, STRUCTURAL, INTERIOR, UTILITY, EXTERIOR, GROUNDS, OTHER
LOCATION: #P100.23 means to look at Plan drawing # 100 for the number 23
letter keys (A, B, C...) in sketches refer to NOTES directly beneath

BUILDING: MAIN HOUSE

WEATHER: CLEAR + COLD, AFTER
BIG ICE STORM

ELEMENT NAME
LOCATION
DESCRIPTION

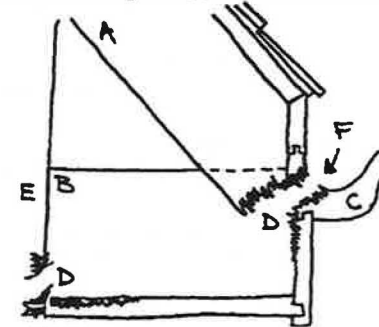
CONDITION (CAUSE)

CORNICE

- NORTH WALL

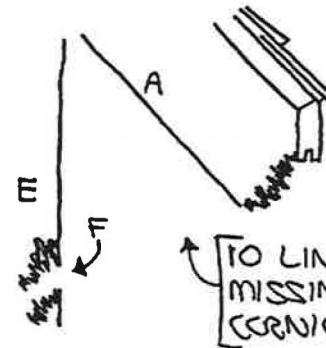
- ENCLOSED WOOD FRAME WITH LOOKOUT + INTEGRAL WOOD GUTTER.
- ORIGINAL MATERIAL
- HISTORICALLY SIGNIFICANT
- PART OF DRAINAGE SYSTEM

- CORNICE CROSS-SECTION:



NOTES

A - RAFTER D - DECAY
B - LOOKOUT E - WALL
C - GUTTER F - WATER



(DEBRIS IN GUTTER, CONDENSATION FROM BATH & ICE DAMMING)

CONDITION of each element is specific. Sketches and photos keyed to notes make the notes more concise and useable.

DETERMINE CAUSE of each condition for effective treatments.

PROJECT SHEET

This form outlines work to be done.

Each project might treat a single element like this broken screen door

A single project could also draw from several pages of inspection notes to include treatment of many elements; for example, all the windows.

Another way to organize a project is to include all work in a specific area, like an exterior wall that needs cornice repairs, siding repairs and repainting.

PROJECT SHEET, Project Name: <u>SCREEN DOOR</u> update: <u>3 / 15 / 87</u> , SHT#: <u>3</u>																							
prepared by:		refer to On Site Inspection Notes page #: <u>6</u>																					
Type of Work <input checked="" type="checkbox"/> preservation <input checked="" type="checkbox"/> corrective maintenance <input checked="" type="checkbox"/> one time <input type="checkbox"/> restoration <input type="checkbox"/> preventive maintenance <input type="checkbox"/> cyclic: ___ times per ___ <input type="checkbox"/> repair <input type="checkbox"/> unplanned maintenance <input type="checkbox"/> in-house, <input checked="" type="checkbox"/> contract <input type="checkbox"/> housekeeping																							
goal supported: objective supported:																							
Location & Element affected: <u>BACK PORCH SCREEN DOOR</u>																							
Treatment & Methods: - REMOVE SCREENING, SAVE SAMPLE - DISASSEMBLE FRAME, CLEAN OUT JOINTS - REPLACE ONE SIDE OF CRACKED JOINT WITH PINE - GLUE + CLAMP FRAME - NEW SCREENING - PAINT TOUCH UP ON PINE - HANG + ADJUST DOOR - ADD CHAIN-SPRING STOP TO KEEP WIND FROM RIPPING OFF DOOR AGAIN																							
<table border="1"> <thead> <tr> <th>Materials: description</th> <th>amount</th> <th>supplier</th> </tr> </thead> <tbody> <tr> <td>- EASTERN WHITE PINE</td> <td>.5 BF</td> <td>FROM STOCK</td> </tr> <tr> <td>- BRONZE INSECT SCREEN</td> <td>11 SQ. FT.</td> <td>MAING HARDW</td> </tr> <tr> <td>- "WELD WOOD" RESORCINOL GLUE</td> <td>.5 PT</td> <td>WOODWORK SUPP</td> </tr> <tr> <td>- CHAIN-SPRING STOP</td> <td></td> <td>MAING HARDW</td> </tr> </tbody> </table>				Materials: description	amount	supplier	- EASTERN WHITE PINE	.5 BF	FROM STOCK	- BRONZE INSECT SCREEN	11 SQ. FT.	MAING HARDW	- "WELD WOOD" RESORCINOL GLUE	.5 PT	WOODWORK SUPP	- CHAIN-SPRING STOP		MAING HARDW					
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<table border="1"> <thead> <tr> <th>Costs: description</th> <th>planned</th> <th>actual</th> </tr> </thead> <tbody> <tr> <td>- MATERIALS</td> <td>25.00</td> <td>23.45</td> </tr> <tr> <td>- LABOR AT \$18./HR (7.5 HR. REPAIRS)</td> <td>100.00</td> <td>135.00</td> </tr> <tr> <td>- LABOR AT \$10./HR (2 HR. HANGING)</td> <td></td> <td>20.00</td> </tr> </tbody> </table>				Costs: description	planned	actual	- MATERIALS	25.00	23.45	- LABOR AT \$18./HR (7.5 HR. REPAIRS)	100.00	135.00	- LABOR AT \$10./HR (2 HR. HANGING)		20.00								
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<table border="1"> <thead> <tr> <th colspan="2">People performing work:</th> <th></th> <th></th> </tr> <tr> <th>Task</th> <th>Name,</th> <th>phone</th> <th>Company, address, phone</th> </tr> </thead> <tbody> <tr> <td>- FRAME REPAIRS,</td> <td>BOB DALTON,</td> <td>555-1232,</td> <td>RESTORATIONS, INC.</td> </tr> <tr> <td>- NEW SCREEN,</td> <td>JACK,</td> <td>555-1234,</td> <td>MAING HARDWARE</td> </tr> <tr> <td>- HANGING DOOR,</td> <td>DAVE P.,</td> <td></td> <td>STAFF</td> </tr> </tbody> </table>				People performing work:				Task	Name,	phone	Company, address, phone	- FRAME REPAIRS,	BOB DALTON,	555-1232,	RESTORATIONS, INC.	- NEW SCREEN,	JACK,	555-1234,	MAING HARDWARE	- HANGING DOOR,	DAVE P.,		STAFF
People performing work:																							
Task	Name,	phone	Company, address, phone																				
- FRAME REPAIRS,	BOB DALTON,	555-1232,	RESTORATIONS, INC.																				
- NEW SCREEN,	JACK,	555-1234,	MAING HARDWARE																				
- HANGING DOOR,	DAVE P.,		STAFF																				

Routine preventive maintenance tasks like house-keeping can be outlined on task sheets with a similar format.

This sheet is also a record of what actually happened on the project, including methods and materials used, costs, and who did the work.

MAINTENANCE PLAN

UPDATE: 3/9/89

Project sheet #

Location description

COSTS

1989 1990 1991 1992 1993 1994 1995 TOTAL

CORRECTIVE MAINTENANCE

Steps (SAFETY HAZARD) #1
front door
restore

1800

Cornice (EMERGENCY) #2
north wall
cleanup, close hole
preserve, rebuild

120
2100

Screen Door #3
back porch
repair, rehang

125

Exterior Paint #4
strip, prime, 2 coat
North Facade
South Facade
West Facade
East Facade
Porches
TOTAL

6000 7500 4000 4000 3000 24500

Windows #5
sash: strip, repair,
reglaze, paint
frame: strip, epoxy
sill, repaint
10% Most Damaged
North Facade
South Facade
West Facade
East Facade
TOTAL

1500 1650 1650 1650 1650 8100

INTERIOR REPAIRS

Parlor Water Damage #6
parquet floor
preserve
plaster & paper
preserve

2200 1600

PREVENTIVE MAINTENANCE

Roof
repairs
Gutters & Downspouts
clean out
repairs
Drainage
clean out
repairs
trim trees, shrubs
Exterior Woodwork
repairs
Paint
scrape, touchup
Doors & Windows
adjust, maintain

400 100 100 100 100 100
120 120 120 120 120 120
200 100 50 50 50 50
50 50 50 50 50 50
100 100 100 100 100 100
1200 1000 1000 500 200 200
2000 1500 1000 800 600 400
800 500 400 250 100 100

Housekeeping

9000 7000 5600 5400 5200 5200

UNPLANNED MAINTENANCE

YEARLY TOTALS ('87 dollars)

14000 13000 12000 10000 8000 8000
0 43415 34270 26120 23070 17570 14370

MAINTENANCE PLAN

The maintenance plan is a summary of all the planned projects.

- Each project is listed at the left in order of priority. Each listing shows the project name, location, a brief description, and the project sheet number to which it refers.

To the right is a cost section that shows when each project will be done and what the cost is expected to be. If you do not know the cost just put an empty box in the appropriate column to show what year it is to be done.

- Projects phased over several years are totaled in the far right column.

- Each year's column of costs is totaled at the bottom of the sheet. This projects total maintenance costs for each year into the future. The projection could be refined to account for inflation and changes in the basic costs of construction work

Appendix C

Blank Forms

The building evaluation checklist, the onsite inspection notes, a project sheet, and a maintenance plan.

BUILDING: _____ DATE: ___/___/___ WEATHER: _____
PLANNING PERIOD: _____ years
EXPECTED USE OF BUILDING: _____

CONDITION for each building element in the following chart is expressed in terms of function and operation, as well as expected life with no maintenance and normal use.

- | | |
|-----------|---|
| Excellent | - performing all functions and operations
will continue to perform during planning period |
| Good | - minor limits of function and operation
will continue to perform within limits for at least 1/2 of period |
| Fair | - major limits of function and operation
limited life due to a condition which will continue to worsen |
| Poor | - not performing important functions and operations
at or near end of useful life |

REFERENCE to further details in Onsite Inspection Notes on page #

[illegible]

major system or section				
location or subsection				
element (description of element, and condition)	E	G	F	P
<input type="checkbox"/> STRUCTURAL SYSTEM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> roof & wall exterior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> alignment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> foundation exterior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> masonry units	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> mortar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> slope of grade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> foundation interior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> masonry units	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> mortar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> evidence of water entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> chimney	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> cellar framing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> vertical support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> piers in cellar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> posts in cellar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> horizontal support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> sills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> girts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> joists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> attic framing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> roof interior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> rafters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> perls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> roofers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> attic floor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> plates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> joists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> flooring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> INTERIOR DETAIL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> see Room Survey Forms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> stairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> railings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> treads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> structural	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> UTILITY SYSTEMS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> electrical	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> service drop	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> weather head	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> meter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> main panel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> system ground	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> branch circuit wiring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> outlets and switches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> fixtures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> security & fire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> service panel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> circuit wiring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> detectors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> annunciators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E G F P

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major system or section

location or subsection

```

element__(description of element, and condition)_____ E  G  F  P

```

[illegible]

ON-SITE INSPECTION NOTES,

date: / /

page of

INSPECTOR:

HEADINGS: WEATHER ENVELOPE, STRUCTURAL, INTERIOR, UTILITY, EXTERIOR, GROUNDS, OTHER
LOCATION: #P100.23 means to look at Plan drawing # 100 for the number 23
letter keys (A, B, C...) in sketches refer to NOTES directly beneath

BUILDING:

WEATHER:

ELEMENT NAME
LOCATION

DESCRIPTION

CONDITION (CAUSE)

PROJECT SHEET, Project Name:

update: / / , SHT#:

page #: (On Site Inspection Notes reference), prepared by:

Type of Work

☐ preservation ☐ corrective maintenance ☐ one time
☐ restoration ☐ preventive maintenance ☐ cyclic: times per
☐ repair ☐ unplanned maintenance ☐ in-house, ☐ contract
☐ housekeeping

goal supported:

objective supported:

Location & Element affected:

Treatment & Methods:

Materials: description	amount	supplier
------------------------	--------	----------

Costs: description	planned	actual
--------------------	---------	--------

People performing work:

Task	Name,	phone	Company, address, phone
------	-------	-------	-------------------------

UPDATE:

YEAR

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99

'89 '90 '91 '92 '93 '94 '95 '96 '97 '98 '99

[illegible]