

A Guide to Maintenance and Repair

for tenants who manage their own buildings

Prepared by
The Urban Homesteading Assistance Board

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INTRODUCTION

Managing your own building is a little like having a baby. While everyone's rushing to congratulate you, you may begin worrying about chickenpox or mumps—or leaky roofs and broken boilers. Buildings are like babies in other ways too: the better they're cared for, the healthier they'll stay; they can't take care of themselves; and when something does go wrong, putting it right is often expensive.

This book can help you be better parents to your building. It was written to provide you—the building's owners and managers—with the information you'll need to take care of your building's regular maintenance and repairs, to handle emergencies, and to make the best possible use of your tenant association's resources. It's a guide to the care and handling of a very big baby: your building.

When you were just a tenant, your building began and ended, as far as you were concerned, with your apartment. Probably the only time you thought about the boiler was when your radiators went cold. You certainly never saw the boiler, unless you passed it on your way to the washing machines in your basement, and if your heat stopped you called the landlord. If your lights went out, you called the landlord. If your plumbing plugged up, you called the landlord.

Now you're the landlord. You are responsible for keeping the building working, for patching leaky roofs and mending broken boilers. And while you're at it you have to make sure there's enough money left in the budget to buy oil for the winter.

If you got in the habit of calling the landlord whenever anything went wrong, but your landlord wasn't in the habit of having anything fixed, then it's a safe bet that your building has a history of what's called deferred maintenance. Deferred maintenance generally means no maintenance at all, sometimes as far back as anyone living there now can remember. When a landlord defers maintenance and then abandons a building, it's roughly the same as refusing to feed a baby, then giving the child away. It makes the next owner's job a lot harder. You'll have to put a lot of your effort into simply keeping the building's basic systems alive: heat, light, water and shelter. You've likely been saddled with vacant apartments where vandals have torn out pipes and fixtures, and leaks are destroying the walls, floors and ceilings of the apartment below. There's a good chance that your building's in pretty sad shape.

Fortunately, almost anything can be fixed, and most buildings are tough enough to take a lot of abuse and still be brought back to life with some tender loving care. It won't be cheap, and it definitely won't be easy, but it **is** possible. It may be expensive and difficult, but the hassle will be more than repaid in the quality of life you enjoy there, not to mention the higher rent roll you'll have with newly occupied apartments.

Doing it right requires very careful management of time and money: both are precious, so you'll want to be sure that you make the best use of each. You'll need to know how your building is put together and how it works, what its parts are and what they do. You'll have to figure out what's wrong with your building, and what's right, so that you can concentrate on fixing what's wrong. You'll want to separate repairs from regular maintenance, but you can't do one and not the other. A comprehensive maintenance policy, from taking out the trash to tuning the heating system, is as valuable to your building's long-term health as one big repair—probably more so.

This book is a tool. It will explain your building's basic systems, and how they work. It will help you to troubleshoot problem areas and pick the best solution. It covers maintenance policy and general maintenance procedures that you should be able to do yourself. It also tells you what to do when you **can't** do something yourself: how to look for, negotiate with, hire and follow up on a contractor.

This book can't tell you everything. It can't even tell you much in any detail, so don't expect to become an expert from one reading. What it will provide is the information necessary for you to make informed decisions on how best to keep your building working well: when to do something yourself and when to hire a contractor; when regular maintenance can prevent a costly future repair; where to begin when you don't know where to begin.

WHAT'S IN THIS BOOK AND HOW TO USE IT

Chapter One: How A Building Works explains the big picture, how a building is put together, and from what. The basic building systems and components are discussed in detail, as well as the kinds of problems you should expect to encounter with each of them. Read through this chapter before you do anything else. It will give you a good overall sense of how your building works, something you'll find very useful later as you begin tracing problems back to their sources. When specific problems do turn up, you'll want to refer back to the first chapter as a general reference. This chapter is the foundation on which your maintenance and repair capabilities should be built.

Chapter Two: Keeping It Working will tell you what to do when you've learned enough to know that your building needs help. Maintenance is the most important part of maintenance and repair; repairs without regular maintenance are a waste of time and money. Chapter Two explains the uses and importance of a regular maintenance policy. It tells you how to judge your building's condition, how to decide what needs immediate attention and what can be put off for a while, and what you can do to keep problems that you can't solve immediately from getting any worse while you're focusing on something else. Finally, the chapter examines the same building systems discussed in Chapter One, this time from the point of view of regular maintenance: keeping them working.

Chapter Three: Help Yourself explores the kinds of things you can handle without having to hire help. It looks at a range of maintenance and repair chores that can be most efficiently done by a building's tenants, but suggests, as well, some things which should be left for experts or outside contractors. Chapter Three reviews low cost or no cost weatherization projects that can save you lots of money on heating bills. This chapter should be carefully considered before you proceed with a policy for repair or maintenance; it could save you money and simplify your job.

Chapter Four: Hiring Help explains how to choose, hire and use contractors. It will help you understand what contractors are saying, so that you can "speak their language." It suggests ways of getting the most for your money, and more importantly, tells you how to make sure you're getting what you pay for. Reading this chapter should prepare you to deal with a contractor from a position of strength.

Chapter Five: Fine Print is a collection of sample scopes of work for certain repair jobs. A scope of work is a document which lists the exact repair for which you've hired a contractor, the way in which you expect the repair to be carried out, and even the type and quality of materials that will be used. It's your assurance, when included in a contract signed by your repair person, of getting what you want. The scopes included at the end of Chapter Five cover several common and typical repairs. They will be especially useful for you if you're considering having one of these jobs done, but they're also good examples of what a scope of work for any job should contain.

How You Can Help

The UHAB staff has made this manual as complete and useful as we know how, but we realize that there may be things we've overlooked. On the other hand, you may find that we've told you more than you need to know about others. You can help make future editions of the manual better by telling us what you liked or didn't like about this one.

We'd also like to hear from anyone who has learned from experience about special problems or pitfalls in owning and managing a New York City building. The more this manual reflects the actual experience of building managers, the better it will be.

We need your comments.

CHAPTER ONE: HOW A BUILDING WORKS

To understand how your building works, and how to keep it working, you'll need to know first what a building is made of. A building is a whole assembled from parts. Each part has a specific job to do, and each is essential to the building as a whole. The parts of a building may be divided into groups according to their function. These groups of related parts are often called building systems.

This chapter will explore your building's eight primary systems. The two most obvious building systems are the weatherization and structural systems—your building's skin and bones. The others are the plumbing system, gas system, electrical system, heating system, and safety and security system, as well as your building's amenities.

Each system will be examined in detail in the following pages. The same format will be used for each: a brief introduction to the system and its overall purpose is followed by an explanation of its parts. Technical names will be used and defined, so that you'll be able to use those terms when you talk to a contractor or supplier. If you come across a term you don't understand, check the glossary in Appendix D.

The description of each of a system's component parts is followed by a discussion of the sorts of problems usually associated with that part. Use these as a trouble-shooting tool, to locate the causes of a repair problem. Often, just knowing where problems are likely to occur will save a great deal of money and effort, since a little bit of maintenance will frequently eliminate the need for extensive and expensive repairs.

No one manual, much less one chapter of a manual, can tell you all there is to know about plumbing and heating, or structure and weatherization, or any other building system. This chapter should provide as much information as most people will want or need, but if you want to go further check Appendix C: Further Resources.

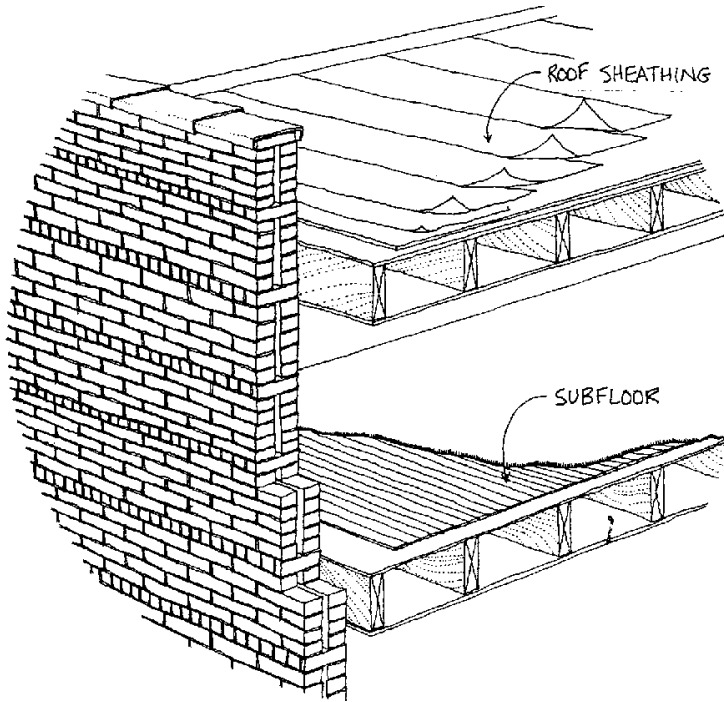
THE STRUCTURAL SYSTEM

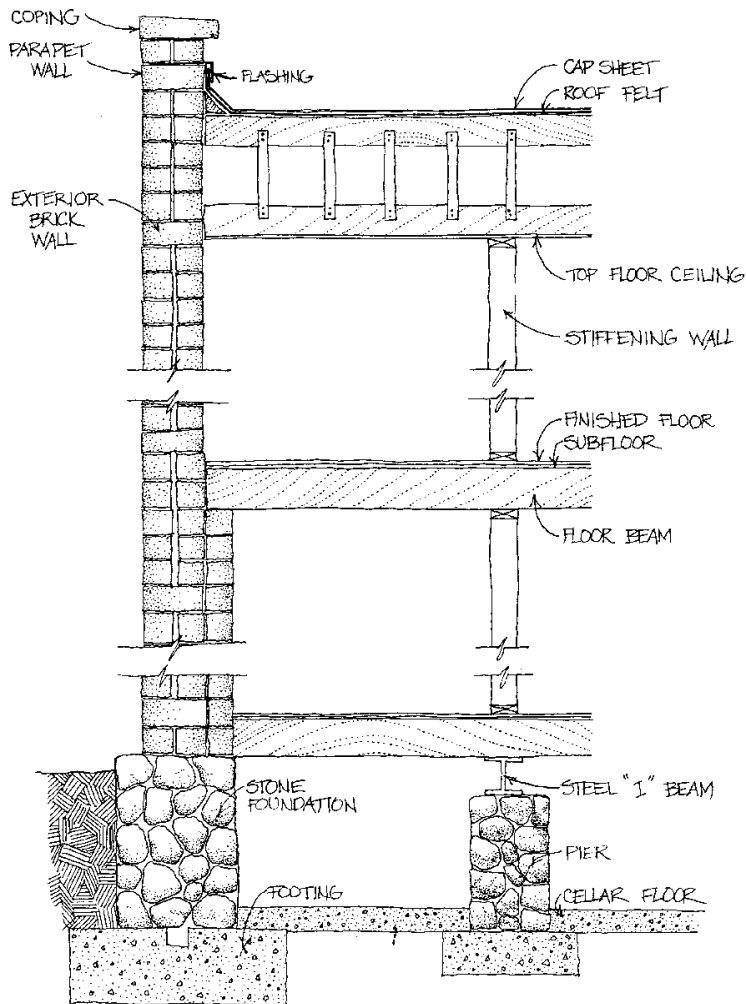
The structural system provides a building's strength. It disperses the weight of a building among its many parts, and transfers all that weight to the ground. The structural system must carry the entire weight of the building, of all the people in it and their belongings. It also has to hold the building upright against the wind or snow or, in some places, earthquakes. Because so much of it is invisible, hidden behind ceilings and walls, the structural system tends to be taken for granted. Without it, however, the building would fall down.

The illustration on the facing page is a section through a typical building, showing the overall structural system and its parts.

Subfloors and Roof Sheathing

Subfloors and roof sheathing, commonly made of 1" thick boards or plywood, provide the strength of your building's roof and apartment floors. Both are hidden, the roof sheathing under several layers of roofing material and tar, while the apartment subfloor is covered by whatever you walk on: a finish floor, linoleum or carpet—though in some older buildings the finish floor may be missing, leaving the subfloor as the floor you actually see. Both the subfloor and roof sheathing must carry the weight of what's on top of them onto the beams directly beneath them. The illustration below shows subfloor and roof sheathing in detail.



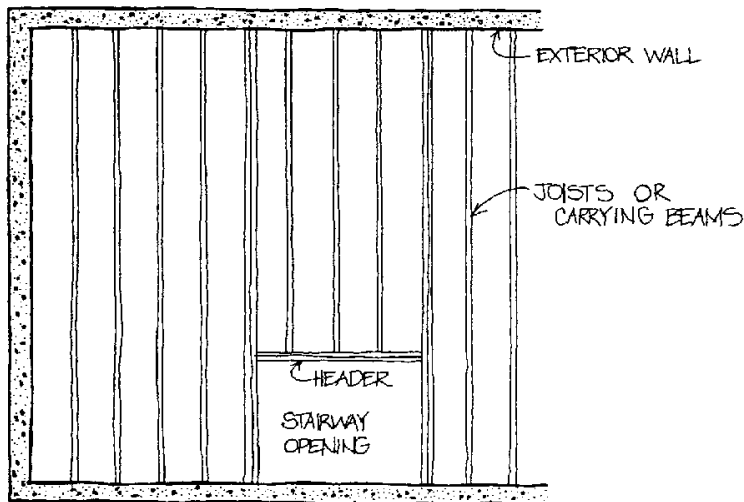


PROBLEM: Rotted Subfloor or Roof Sheathing

If your roof sheathing or subfloors have been exposed to water or weather, from a leaky roof, broken windows or plumbing leaks, they may have rotted. Rotted subfloors or roof sheathing must be replaced. When doing roof or floor repairs check for rot by cutting away the finish roof or floor and test the roof sheathing or subfloor with a knife or an icepick. If you are doing ceiling repairs underneath, check the subfloor or sheathing from below. If the wood is soft and easy to chip away, it's rotten. It is especially important to replace rotten wood as soon as possible, so that the supporting beams don't rot as well. It is much easier to replace your roof sheathing or subfloor than it is to put in new carrying beams.

Carrying Beams

Roof and floor carrying beams, called joists, transfer the weight of the roof or floor that rests on top of them out to the wall on either side. Steel beams are found in some residential buildings, but most carrying beams are made of wood—3" x 10" or 3" x 12" beams, spaced 16" On Center. In lumber sizing, the first number refers to a board's thickness and the second to its depth, so a 3" x 10" board would be 3" thick and 10" deep, with the length left unspecified. Measurements between beams, or between certain construction members, are taken from center to center. This is known as On Center spacing—written on plans as O.C.—and it is the standard method of construction measurement. Floor joists, for instance, are usually (but in older buildings by no means always) 16" O.C. The illustration below shows carrying beams, in plan, looking down from above.



Roof beams slope slightly, toward a drain in the center of the roof or toward gutters at the outside, so that water will run off the roof and not collect. Ceilings of top floor apartments will therefore be attached to spacers, rather than to the beams themselves. "Dropping" a ceiling as this is called, permits that ceiling to be level. On other floors the ceilings are usually fastened directly to the floor joists of the apartment above.

PROBLEM: Sagging Beams

Sagging beams may not be a real problem. Wood beams do have a tendency to sag over time. (You'd sag too, if you had to carry an apartment on your shoulders for seventy years!) Sagging doesn't weaken beams, though. Actually, natural drying and aging strengthens wood. In addition to the natural sagging of wood, settlement sometimes occurs. Settlement is when a building very slowly sinks or settles into the ground. When a building doesn't settle evenly, beams will often slope or sag. Since your floors are attached to the beams they'll naturally slope a bit too. Don't worry. You won't go crashing through to your neighbor's below for quite some time.

On the other hand, severely sloping floors may be a sign of trouble. Severely uneven settling can cause structural weakness. Removal of stiffening walls also can cause floors to sag and create structural problems (see page 12). The most common problems, however, occur in kitchens and bathrooms.

Long-term roof or plumbing leaks will eventually rot the roof sheathing or subfloor below, and then the beams that support them, causing floors to sink. Rotted beams feel very different from sagging beams. The floor above a rotted beam will feel soft and spongy, while over a sagging beam it should feel hard and firm.

In addition, plumbers have been known to notch or cut beams when installing plumbing systems that were not in the building's original plans. Cutting into a beam to make room for a pipe can weaken the beam considerably. When several adjacent beams have been cut, this creates an unsound and hazardous structural condition.

To check for rot or damage in a beam, you'll have to remove the floor or ceiling around it. If you do find rot or that a beam has been severely cut or notched, the beam will have to be replaced or repaired. This will be expensive, but a collapsed apartment floor will be a lot more expensive in the long run. It is a good idea to hire an engineer or architect to inspect when you suspect structural problems.

Stiffening Wall and Piers

Most building lots, and consequently most buildings, in New York City are 25' wide. A 3" x 12" carrying beam can span this distance unsupported without experiencing any noticeable vibration or deflection—the reaction of a beam to movement above it, or to an increase or decrease of the load it must carry. In many tenements, then, the interior walls of apartments have no structural function: they aren't holding anything up but themselves.

If the building is wider than 25' though, or if smaller carrying beams were used, a stiffening wall will have been built somewhere in the middle of the building to provide extra support for the beams. In fact, many buildings that are 25' wide and under do have stiffening walls, because smaller 3" x 10" beams were used in their construction.

The weight is carried by these stacked stiffening walls down to the basement, where it is transferred onto a pier set on a foundation. Piers may be made of steel, wood, masonry, or even old tree trunks.

If you suspect that a stiffening wall has been removed, check in apartments above and below yours to see if such a wall still exists there. Check in the basement for a foundation pier in that position, since the weight carried by a stiffening wall would have had to be transferred to the ground that way. See the illustrations on page 9 and opposite for views of a pier and stiffening wall.

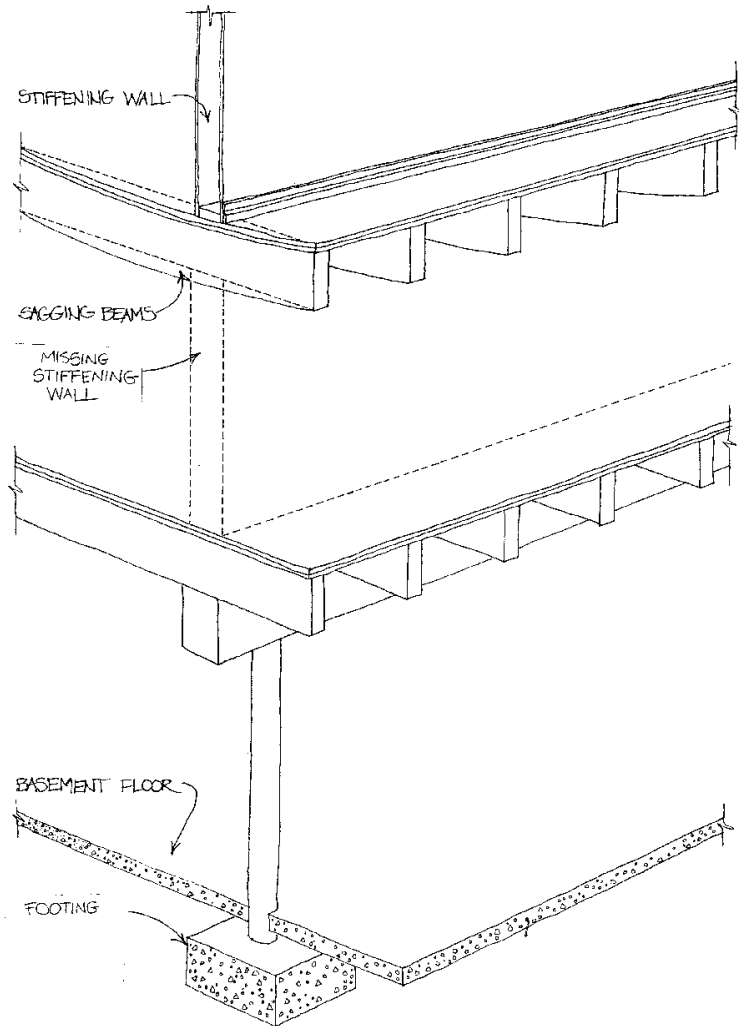
PROBLEM: Missing Stiffening Walls

apartments have been converted to a single unit or if hallway walls have been removed, a stiffening wall may have been taken out.

Beams are generally designed with a safety factor of three. This means that the expected load on the beam is $\frac{1}{3}$ as much as that beam can actually carry, so it is not likely that a beam or beams whose stiffening wall has been removed will collapse. You may feel some vibration or springiness as you walk across the floor, though, and even if you don't feel it your record player probably will.

If a missing stiffening wall causes serious problems, such as cracked ceilings, excessive floor sloping or constant vibration, you will have to replace the wall. This is not an easy job, since in some cases the wall will have to be replaced all the way down to the basement.

Girders and columns can be installed instead of replacement stiffening walls to preserve the effect of open space, but this may cause problems by concentrating weight instead of distributing it. It's best to consult an architect, an engineer or an experienced rehab specialist before replacing a stiffening wall.



An Historical Note:

Most New York City building lots are 25' x 100' because of the city plan of 1811. The planners at that time envisioned that the lots would have single-family houses built on them, perhaps with a garden in the back.

This standard lot size benefitted speculators, landlords and builders, who found that it made calculations and real estate deals fairly simple. Tenants suffered. In their quest for profits, landlords jammed tenants into tiny, lightless rooms with little or no outside ventilation. Tuberculosis was rampant in New York City at the time, and many doctors blamed the lack of light and air in tenement buildings for its spread. Until the late 1800s there were almost no legal restraints on what a landlord or builder could do.

A cholera epidemic in 1867 triggered the first Tenement Housing Law to give the tenants light and air. Landlords were forced to cut some 46,000 windows in existing tenement buildings, mostly railroads.

In an attempt to find a basic design that would admit some light and air into every apartment in a building set on the 25' x 100' lot, a group of reformers held a tenement-designing competition in 1878-9. The winning design was the "dumbbell," still very common on the Lower East Side.

The dumbbell was considered by many to be a failure, even at the time. The narrow airshafts between the buildings did not let in the light and air that the designer, James A. Ware, expected they would, and worse, they collected garbage and provided fires with a convenient route to travel from floor to floor and building to building. The failure of the dumbbell caused many people to believe that safe and healthy housing for 24 families on a standard New York City lot was an impossibility.

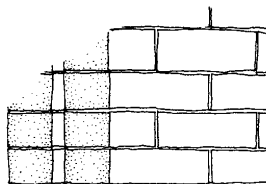
Still, the dumbbell was the basic pattern for working-class housing built between 1879 and 1901, the so-called "old-law" tenements. In 1901 another Tenement Housing Law was passed, commonly called the new law. New-law buildings were required to have a much larger airshaft than the dumbbells, a separate bathroom in each apartment (dumbbells had one bathroom for every two apartments), and fire escapes of a specified type and in a specified location. The Tenement House Commission, which drafted the new law and pushed it through the state legislature, considered the elimination of the dumbbell to be its major triumph.

Exterior Walls

Most smaller residential buildings in New York City are built with masonry construction. That is, they're made by stacking bricks or masonry blocks and bonding them with mortar. In masonry construction, the exterior walls serve an essential structural purpose: they accept the weight transferred to them from the carrying beams, and carry that weight to the ground. In other words, they hold the building up.

This isn't true for other types of construction. Very large residential or commercial buildings in the city are often built by the steel frame method, in which a steel skeleton supports the building's weight and the exterior wall is merely a skin fastened to this frame. Suburban single-family houses tend to be wood frame construction, using wooden studs inside the walls to carry the weight. Again, in this case the exterior wall simply covers the wooden frame, even if this exterior wall is brick.

But in masonry construction there is no structural frame. The exterior wall itself provides the building's structure. Most masonry exterior walls are made of two or three thicknesses of brick—essentially, two or three separate walls built with a small gap between them. The bricks are fastened together with mortar, a mixture of cement and lime that acts as a glue for masonry. A header course, in which one course is laid



across the others at a right angle to the two separate walls, is used to bind them together into one solid and very strong wall. A standard pattern is for every sixth layer to be a header course.

Exterior masonry walls may be thicker toward the bottom, sometimes using four thicknesses of brick instead of three, because that's where most of the building's weight will rest. The illustration at left shows a masonry construction exterior wall, in section.

PROBLEM: Cracks in Exterior Structural Wall

Cracks in the exterior structural wall occur when a building settles unevenly. If minor, they can simply be filled in with mortar. Larger cracks can be an indication of structural weakening, and should be examined by a knowledgeable person, preferably an engineer. If you notice a crack getting larger, don't delay action. Your structural wall is weakening rapidly, and could be hazardous.

PROBLEM: Missing Bricks or Mortar

The most common problem with exterior walls involves missing bricks or mortar. Bricks may be missing from a section of the wall where a doorway or window has been removed, or there may be gaps where the carrying beams from the building beside yours once fit into your wall. This shared wall, called a party wall, serves as the structural wall for both buildings. If the building next door has been torn down and your party wall is exposed, don't worry. The party wall is perfectly strong, unless so many bricks have been dislodged that it has been weakened. If your party wall has been exposed, the problem most likely to arise will not be related to missing bricks, but to the fact that the wall is probably not weatherproof (see the section on the weatherization system, starting on page 19).

However, any loose or missing bricks in any exterior wall should be replaced.

Another reason for loose or missing bricks may be loose or missing mortar, the glue that holds them together and in place. Mortar in an exterior wall tends to wash away over the years, especially on the side of the building which gets the most exposure to storms, or where a drainpipe is missing and water from the roof pours down the side of the building when it rains.

If mortar is badly eroded, or missing entirely, it should be replaced before the bricks loosen or fall out.

Parapet Wall

The exterior wall of your building generally extends three or four feet higher than the roof. This extra section is called a parapet wall (see the illustration on page 9), and it has no real structural function. The top of the parapet wall is covered by overlapping stones, like stone shingles, called coping stones. They may be made of stone, tile, or cement, and their function is to keep rain out of the inside of your exterior wall.

PROBLEM: Missing Coping Stones

Missing coping stones must be replaced as quickly as possible to prevent water damage to roof sheathing, beams, interior walls, and so that the exterior wall is not weakened by having water run down the inside.

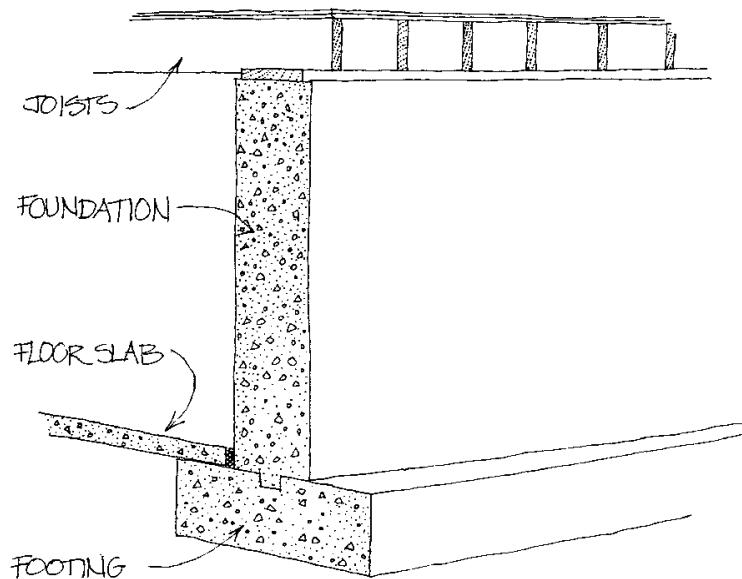
Coping stones are mortared into place like bricks. Coping stones and tiles are sometimes difficult to find, but the bigger lumber yards and building materials suppliers should have them.

Foundations

Your building's foundations are actually massive extensions of the exterior walls which support the load carried by the walls. Foundations, usually made of stone or concrete block, are often built below "grade"—below the surface of the earth or sidewalk. Besides carrying the building's weight, they must also prevent the surrounding earth from pushing into the basement. The stones or blocks of the foundation are held together with mortar, in the same way as are the bricks of the exterior walls.

The foundation in turn rests on a footing, made of concrete poured into a wide, deep trench, which distributes the weight of the building and its contents over a wider area of the ground. Footings are a building's feet. Without them, the foundation would sink into the ground.

The size of the footing necessary depends on the soil conditions where the building is built. In soft ground, to keep a building from sinking, a large footing is needed to spread the weight of the building over a wide area. In Manhattan, where much of the ground is solid rock, no footing at all may be required. The illustration below shows foundation and footing details.



PROBLEM: Cracked or Buckled Foundation Wall

Even with proper footings, buildings invariably settle a bit over the years. If they settle too quickly or unevenly—usually as a result of weakness in the footings or changes in the soil conditions—cracks may appear in the foundation walls, or even up into the exterior walls. If these cracks are especially wide, or seem to be spreading, they could cause structural weaknesses. Large cracks should be checked by an engineer. Small cracks may be patched with cement.

You may notice that your foundation walls appear to be bulging or buckling in the basement. This is normal in some cases; the walls weren't always built straight in the first place. Some bulging or slight buckling may occur without any damage to the wall's structural strength. However, if the foundation walls have caved in at any point, or have buckled to the extent that a large crack has opened, they should be examined by an engineer.

PROBLEM: Wet Basement

Other than sewer back-ups or plumbing leaks (which will be discussed in the plumbing system section starting on page 32) water in the basement can come from a number of sources. First, rain water can seep in through cracks in the foundation wall. Any cracks should be filled with cement, or the entire wall stuccoed or tarred; however, neither of these methods is always successful.

Water can also come from an underground stream which has shifted its course and is now flowing underneath your building (yes, there are streams, even in New York City). Redirecting the stream would be next to impossible; a sump pump should be installed to pump the water into the city sewer system as it collects. Still another source might be a nearby abandoned building whose pipes have been torn out, allowing water to flow constantly into the surrounding area. The city should be called to shut off the water, and any water accumulation should be pumped out.

THE WEATHERIZATION SYSTEM

As far as most of us are concerned, the most important job our building does is keep the outside out and the inside in. That's the function of the weatherization system, or systems—since a number of different methods and parts of the building are involved. Ideally, the exterior of your building would be completely sealed, preventing the penetration of wind, snow or rain. In fact, though, it can never be perfectly weatherproofed, so the weatherization system seeks instead to be weather resistant. A good weatherization system, in addition to keeping you dry, should help to keep you warm in the winter and cool in the summer, by keeping heat in or out depending on the season.

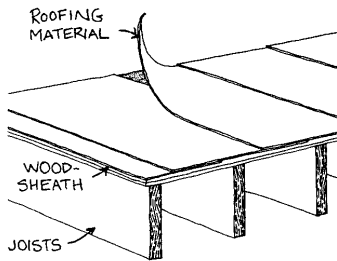
Some elements of the structural system—the roof and exterior walls—are also included in the weatherization system. They must shelter you from the elements as well as support the weight of the building and its contents. Walls and roofs in and of themselves would be fairly easy to weatherproof perfectly if they were simply flat vertical or horizontal surfaces. The job gets a lot more complicated, though, when the roof and walls must be opened up in spots to bring in light and air and let people in and out. As a result, the weakest and yet one of the most important parts of your building's weatherization system are its windows and doors.

A building without a good weatherization system is like a bucket with holes in the bottom. The faster the water leaks out of the bucket, the faster it must be refilled and when your building leaks heat it must be

reheated much more often. Repairing, maintaining and upgrading your building's weatherization system should be a real priority. There are few projects which will save as much money in the long run as weatherization improvements.

The Roof

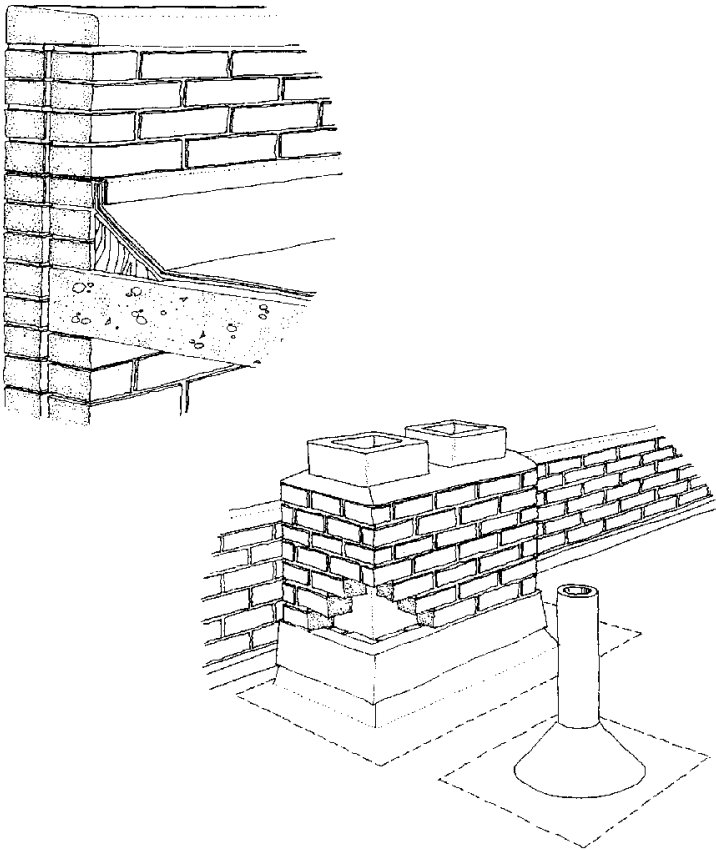
The "flat" roof found on most apartment buildings isn't actually flat. It slopes slightly toward a drain or downspout to let rain water run off.



The roof surface is composed of several layers of roofing material—strips of heavy felt impregnated with a water-proofing compound—which overlap one another and are bound together with waterproof roofing cement. The top layer should be a heavy mineral cap sheet. Because the strips of roofing material are relatively narrow—36" wide in most cases—and overlapped substantially, the roof's surface may expand and contract in response to changing temperatures without cracking, so that water won't penetrate, or will at least have a difficult time making its way through to the sheathing. The laps of roofing material face downhill, so that water will run over them, rather than against and under them. The illustration at left shows a typical roof composition.

Flashing is applied where the roof meets the parapet wall. Flashing is a flexible strip—often tin, aluminum, lead or even fabric, which gives a weathertight seal at seams, joints and corners. Flashing is applied over the roofing material to fit tightly against the bricks. It is sealed with the same roofing compound which is used between the layers of roofing felt.

Flashing is also used around skylights and around bulkheads which allow access to the roof. A flashing collar is applied around chimneys and plumbing ventilation stacks which protrude through the roof. Around pipes, a new sort of rubber collar is sometimes used to replace conventional tin flashing. The illustrations below show various flashing details.



FLASHING DETAILS

PROBLEM: Roof Leaks

The first thing to do when your roof starts to leak is figure out where the leak is. This isn't as easy as it sounds. If water is pouring into an apartment bedroom, it would seem logical to assume that the roof above that room has a hole in it. Unfortunately, that's not always the case. While the water is appearing in the bedroom, the actual leak may be somewhere else on the roof: the water gets under the roofing, then under the sheathing, and runs along a roof beam until it finds a convenient place to begin dripping into the apartment below.

The best way to find the leaks in a roof, then, is from on top rather than underneath. Look for:

- ✦ obvious cracks or blisters in the roofing materials, or places where the roof has been punctured or the seal between two overlapping layers of roofing material has broken;
- ✦ standing water in hollows or depressions. Water standing for short periods damages roofing materials, and standing water has more time to seep through the waterproofing in the roofing cement than it would if it ran off quickly;
- ✦ openings, gaps or cracks in the flashing where water could be slipping through between the object protruding from the roof—the parapet wall, for instance, or a plumbing stack—and the roofing material.

Any of these conditions is a sure sign of a leak, or a leak about to happen, and should be corrected as soon as it is found.

The severity of the leak, and the deterioration it has caused, will determine the extent of repairs you'll need to do. It's a safe bet that if enough water has gotten under the roof to leak regularly into an apartment, or ruin an apartment ceiling, you've got a pretty serious leak somewhere.

To eliminate leaks, you may:

- ✦ patch small cracks or gaps, where a slight leak has already begun or where you suspect a leak may begin soon;
- ✦ resurface the whole roof, putting down new layers of overlapping roofing material on top of the existing roof, if the existing surface isn't too rough;
- ✦ build a new roof, including new roof sheathing, after removing all the old roofing and sheathing, when the roof has suffered bad leakage and the sheathing or beams are damaged.

Obviously, patching the roof is the cheapest and easiest alternative, but you should never patch a roof which has serious leaks. The best idea is to patch in the spring and fall, to prevent cracks or gaps from getting out of hand and to make certain that the roof never develops bad leaks.

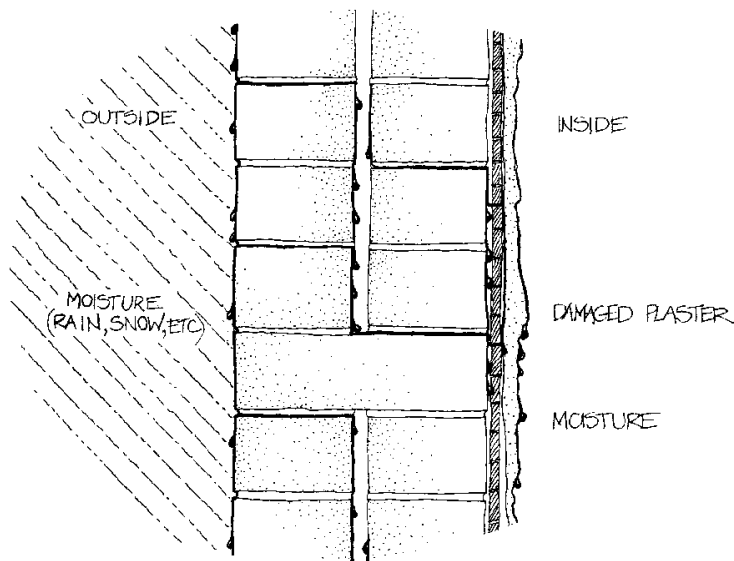
Chapter Five includes more information on having major roofing repairs done by contractors.

Exterior Walls

The exterior walls of most apartment buildings and tenements are made of brick sealed against the weather in some way. Some tenements may have a stucco or brownstone surface applied to the brick walls. Some larger buildings may have walls made of a glazed brick, while the bricks in others may have been painted or waterproofed.

In any event, your exterior walls will keep out wind and rain only so long as the mortar between them is intact, the weather seal is still effective, and the coping stones at the top of the parapet wall are still in place.

Mortar may crack or wash away over time, especially on walls which are fully exposed to the weather. Coping stones may have been removed by vandals, or knocked out of place by workers on the roof. The weather seal may wear out eventually—for instance, paint seldom lasts long on brick since bricks almost always retain a little moisture, just enough to blister paint—or may never have existed, as when an adjoining building is torn down and the party wall becomes an exterior wall. The illustration below shows an infiltration pattern of water through the bricks of an exterior wall.



PROBLEM: Leaky Walls

When you find leaks or water stains on the inside of a wall that faces out of the building, that is, on the interior surface of an exterior wall, first check to see that your windows close tightly and the window frames are not cracked or rotted. Water stains on interior walls, between apartments and hallways and so on, tend to be the result of plumbing leaks, not exterior wall leaks.

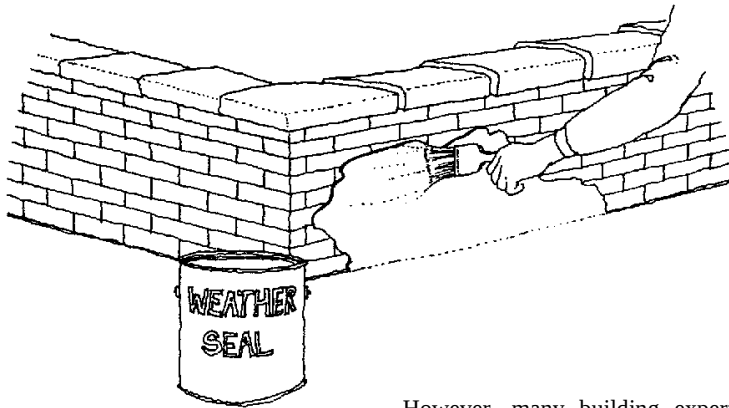
If you decide that the water is coming from a leak in the exterior wall, check for the following

conditions:

- ✧ missing coping stones, or unused and uncapped chimneys, which could allow water into the space between layers of brick where it can migrate through to the interior wall, and weaken the mortar in the exterior wall;
- ✧ loose, worn, or missing mortar between the bricks on the exterior walls which could let water in between the bricks;
- ✧ breaks in the roof-parapet line flashing;
- ✧ gutter problems.

The three principal means of attacking leaky walls are dampproofing, parging, and pointing. Each has a specific use; choose the right one for the job.

Dampproofing involves the application of a weather seal, usually a tar-like substance applied with a brush or roller or sprayed on by machine. It is usually painted onto parts of a wall which are heavily exposed to weather, such as the parapet or top floor. Dampproofing is also used on newly exposed party walls, where adjacent buildings have been demolished. Since these party walls weren't built to withstand exposure to weather, they're especially susceptible to leaking. The illustration below shows the application of a weather seal to dampproof an exterior wall.



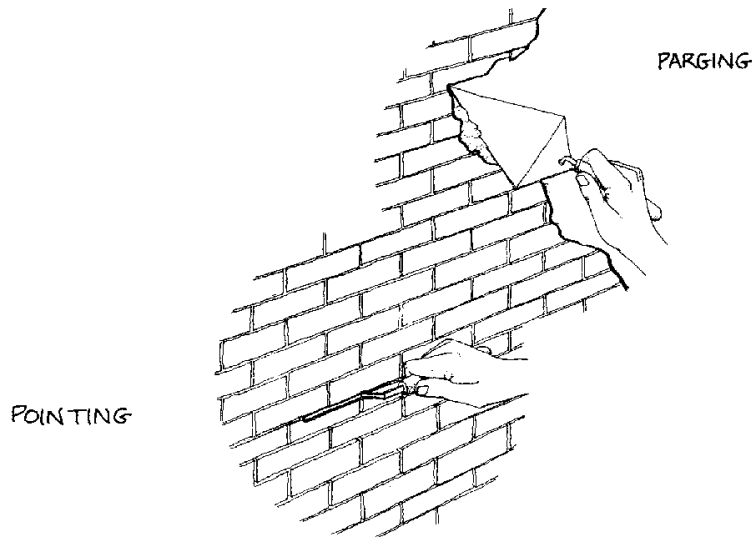
However, many building experts and engineers feel that dampproofing is harmful to masonry. Dampproofing seals completely and keeps moisture in the bricks as well as out of them, and this trapped moisture may erode the mortar over time.

Parging covers an exterior wall with a new surface. Loose mortar and dirt is scraped away from between the bricks, and then the whole wall is coated with a cement stucco which is applied with trowels. The stucco is squeezed into the cracks where the loose mortar had been, and adheres to the old wall in this manner. The new surface may be smooth or textured.

Parging is done with a mixture of cement and sand, with the accent on the sand. Another similar process, called cement wash, uses about 90% cement and 10% sand. Cement wash is applied with a brush or roller over a cleaned wall, and is considered by some to be the best sealing method for masonry walls. Various trade name products, such as Thoroseal, are available and considered by some to do a better job, although they are also more expensive. These products are essentially a cement/sand mix with bonding agents added.

Pointing is the process of replacing old, worn out mortar with new. The loose mortar is scraped out, as in parging, but rather than applying a new surface coat, new mortar is applied to each joint and the old wall is finished to look as it did when it was new. This is a very time-consuming process, because the work must be done very carefully, and consequently it's very expensive as well. The illustration below shows parging (above) and pointing (below).

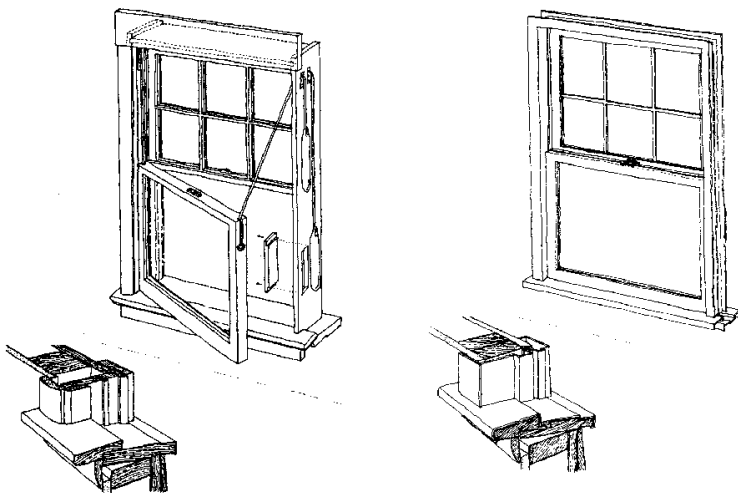
In all types of exterior wall treatments, one of the greatest expenses is scaffolding. Scaffolding is an exterior platform for workers to stand on which gives them access to the upper portions of a wall. It is either hung from the roof by thick ropes or built up from the ground with collapsible steel sections bolted together.



Windows and Doors

Windows and doors are the most vulnerable parts of your building's weatherization system. Not only are they deliberate gaps in a wall, but they may be left open by accident or broken. Even when they're in place and functioning, windows and doors are vulnerable because of the many parts that are moved and worn whenever they're opened or closed. Wood frames, left unpainted, rot very quickly from exposure to rain after the old paint has blistered and peeled. Windows and doors need careful and consistent maintenance.

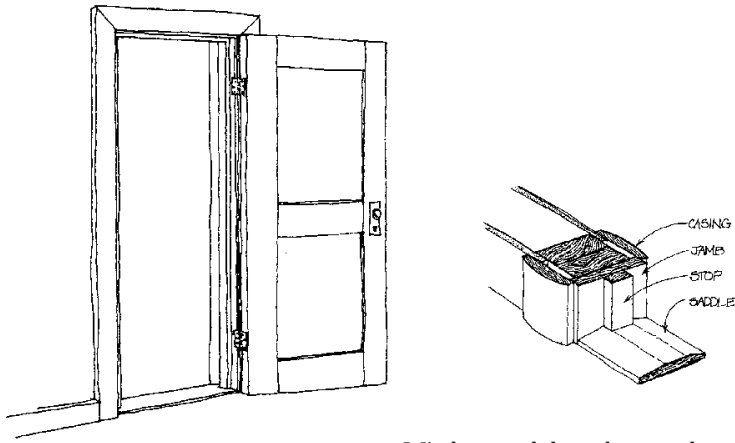
Most windows are double-hung: two windows, or sashes, are encased in a frame, which is fitted with channels that let the sashes slide past one another to open or close. The sashes are balanced by weights, called sash weights, which are hidden inside the frame on either side, and make the window easier to lift. Sash weights are attached to the sash by long ropes or chains that slide through pulleys built into the frame. Some newer windows are built without weights; the sashes fit snugly into aluminum channels and the friction alone keeps them in the desired position. The illustrations below show a weighted window unit (at left) and a non-weighted window unit (at right).



A door is hung on two or three hinges in a doorframe, or door buck. The doorframe is made of two uprights called jambs and an overhead piece called a lintel. The door closes against a strip that runs around the doorframe called the doorstop.

On exterior doors, the threshold, or doorsill will be fitted with a raised saddle which keeps rain from coming in under the door. Similar saddles are used on interior doors as well when good noise insulation is needed.

Self-closing doors have either hinges with springs inside or a hydraulic door closing mechanism, sometimes called a door check, at the top. Two-way doors, usually found in apartment kitchens if anywhere, have no doorstop so that they may swing in either direction. The illustration below shows a door and a hinge, with a detail section of the jamb.



Windows and doors have to do more than just keep the rain and snow out of a building. Probably their most common weaknesses have to do with heat loss. Your windows may still seem to be in reasonable condition, not in need of work, but because they are loose and old they may be costing you a lot of money in lost heat. Again, simple repair and maintenance is your best defense against such losses.

PROBLEM: Broken Windows or Window Frame Units

Broken, cracked or missing panes of glass in windows should be replaced as soon as possible to prevent further damage to the window frame and sashes.

Damaged window frames can often be repaired by a skilled carpenter, who will take the sashes out of the frame and fix the broken piece. However, if the frames are badly damaged, or very old or weathered, it may make sense to install new aluminum window units: this procedure, though expensive, may turn out to be a better investment than extensive patching and repairing of existing units.

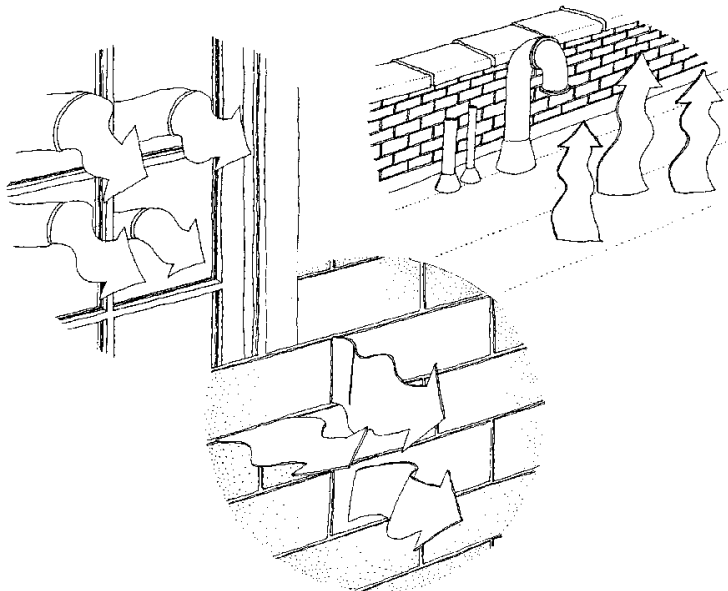
Conduction, Infiltration and Exfiltration

Much of a building's heat is lost through conduction, which means that the heat is transmitted to the outside straight through the walls, roof and windows themselves. Building materials are very good heat conductors, which means that they're lousy insulators. They transmit heat well but aren't very good at containing it.

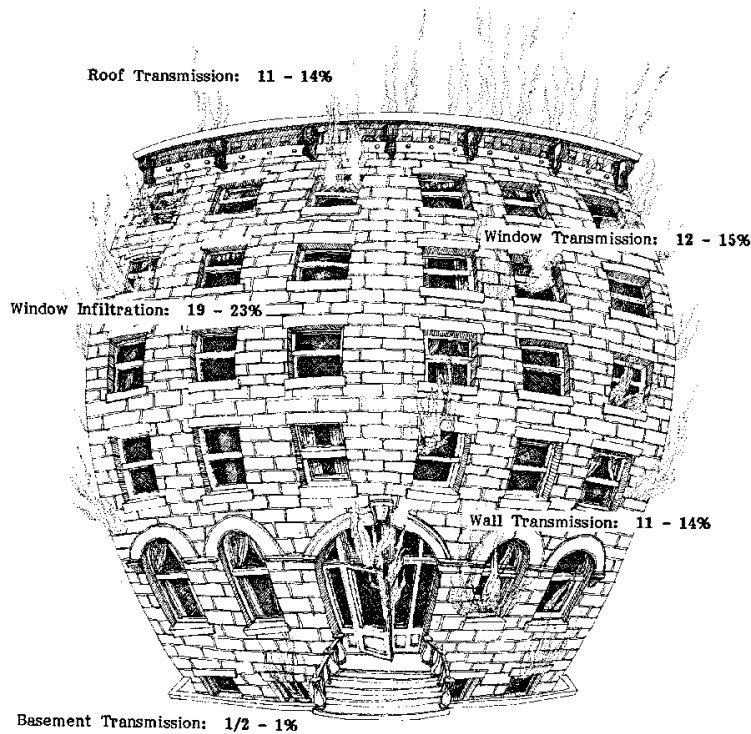
Glass is the best of a building's heat conductors and the worst of its insulators, so windows are the building's worst conductive heat leaks. Single-pane window glass is a terrible insulator, as you know if you've ever touched a window in the dead of winter.

Brick isn't much better. An 8" thick brick wall has only four times as much insulating power as a sheet of window glass.

Roofing materials are good conductors as well, and since heat rises, what's actually happening is that heat is rising to the roof, then being transmitted out of the building. The illustrations below and on the next page show different types of heat losses.



HEAT LOSSES

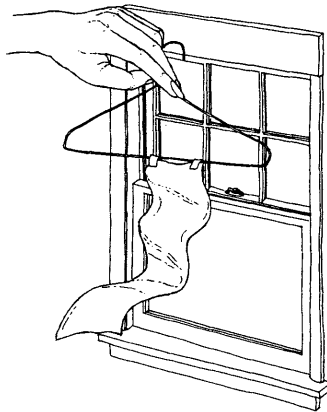


The best remedies for conductive heat loss are insulation and extra glazing—storm windows. Insulation may be quite difficult for typical New York apartments, since masonry walls seldom have space in them for insulation. But temporary plastic storm windows may be installed inside an apartment and some insulation may be added at key locations. Chapter Three discusses this work in more depth.

Despite conduction the main portion of a building's heat loss is through infiltration and exfiltration; cold air filtering into the building through cracks and holes, and warm air filtering out through the same holes and cracks.

Infiltration and exfiltration are two sides of the same coin. Together they may be costing you one-quarter of your total heating bill.

Poorly maintained windows and doors tend to develop large cracks around their frames, which invite the cold in. On windy days you may notice your windows rattling while you shiver; that rattle means that the freezing air outside is slipping into your apartment. One good method of finding your worst infiltration leaks is to hang a piece of toilet paper from a coat hanger and move it slowly around your window frame, holding it about two inches away from the wall or window while there's a breeze outside. Any infiltration will move the toilet paper. The illustration at left shows the toilet paper test for air infiltration.



Take the time to find heat leaks—it's not just heat escaping, it's money. Sometimes the obvious gets ignored. Keeping doors and windows tightly closed will often save an average apartment a great deal of heat. As the price of fuel continues to rise, energy conservation measures become more and more important and increasingly affordable. At this point, most of us just plain can't afford **not** to make our houses tighter. If your place was leaky to begin with and you do a good job of sealing it up, your savings can be very impressive: as much as a 50% reduction in heating costs. That will pay back your investment in energy conservation very quickly.

PROBLEM: Heat Leaks Around Doors and Windows

Short of replacing all windows and doors with new double-glazed energy conserving units—which may be far too expensive a job for most tenant associations to do immediately—there are a number of inexpensive energy conservation measures which should be done right away:

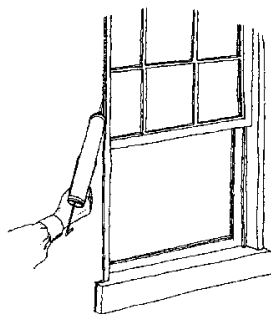
- ✦ Weatherstripping should be installed wherever the moving parts of a window or door come into contact with a stationary part. For example, your doorframe should be weatherstripped so that the door closes snugly.
- ✦ Caulking should be added where it is worn or missing around the outsides of window or door frames, to seal cracks on the exterior. During the wintertime, rope caulking can be installed between the sashes and frames. Rope caulking is a cross between caulking and weather-stripping—a soft, removable putty strip that will seal cracks between sash and frame absolutely tight. It may be removed during warmer months when you want to open the windows again.
- ✦ Door sweeps should be installed at the bottom of all doors to reduce the amount of air movement inside an apartment, so that warmer rooms may be kept warm. Door sweeps should be installed on exterior doors as

well, to keep the cold air out in the first place. Carpet strips, available free as scraps from carpet stores, can be tacked onto the bottom of doors as door sweeps.

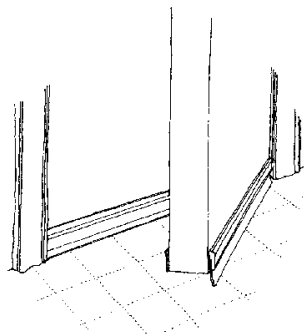
- Old, worn or dry window putty should be removed and replaced with new, so that the panes fit tightly against the wooden sashes.

The illustrations below show the application of caulking, a door sweep and the application of window putty.

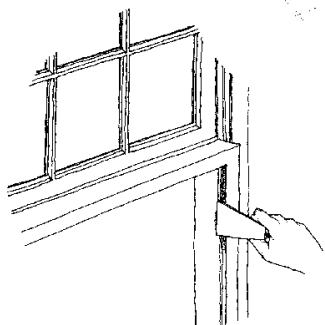
INFILTRATION REMEDIES



APPLICATION OF
CAULKING



DOOR SWEEP



APPLICATION OF
WINDOW PUTTY

Insulating ability—the ability of any material to prevent heat from passing through it—is measured using a scale of "R" values. The higher the "R" value, the better an insulator the material is. All insulation products will have an R value. The table below shows the "R" values for common building materials and types of insulation.

TABLE OF R VALUES

MATERIALS	R VALUE
Windows and Doors	
single glazed windows	0.9
double glazed windows	1.9
exterior door	2.2
Exterior Walls	
8" brick with lath and plaster	2.2
8" brick with 3½" fiberglass and sheetrock	12.8
8" brick with 2" styrofoam and sheetrock	12.2
Roofs	
Flat roof	3.1
Flat roof with 8" - 9" blown-in fiberglass	19.0
Flat roof with 10" blown-in fiberglass	22.0
Flat roof with 17" - 18" blown-in fiberglass	38.0
Flat roof with 5" blown-in cellulose	19.0
Flat roof with 6" blown-in cellulose	22.0

Flat roof with 10" - 11" blown-in cellulose	38.0
Pipe Insulation	
Steam pipe and condensate return:	
uninsulated	0.5
with 1½" fiberglass insulation (recommended for pipes up to 2" in diameter)	5.5
with 2" fiberglass insulation (recommended for pipes above 2" in diameter)	7.4
Domestic hot water:	
uninsulated	0.5
with 1" closed-cell polyethylene tube	3.7

Chapter Three of this book contains more complete information and instruction on low cost or no cost weatherization and energy conservation measures.

THE PLUMBING SYSTEM

Your building's plumbing system is composed of three distinct parts: the fixtures, the supply system, and the waste system. Everyone is familiar with the fixtures: sinks, showers, tubs and toilets. The supply system carries fresh water from a city water main outside the building to each fixture inside. The waste system (sometimes called the soil system) carries waste water from the fixtures to the city's sewers. Both the waste and supply systems are concealed inside your apartment's walls, so they're easy to ignore. But they are essential to the operation of your building.

Taking reasonable care of your fixtures will not only prolong their useful life, but may reduce the chances of serious problems occurring in either the waste or supply systems. (Work on either tends to be quite expensive, since it always involves tearing out walls to get at them.) What's reasonable care? Fixing slight leaks in faucets as soon as they appear; being careful not to crack or break the porcelain of sinks, tubs or toilet bowls; not forcing heavy waste foods, or other thick wastes, down the sink drain—simple things, mostly. They'll pay off.

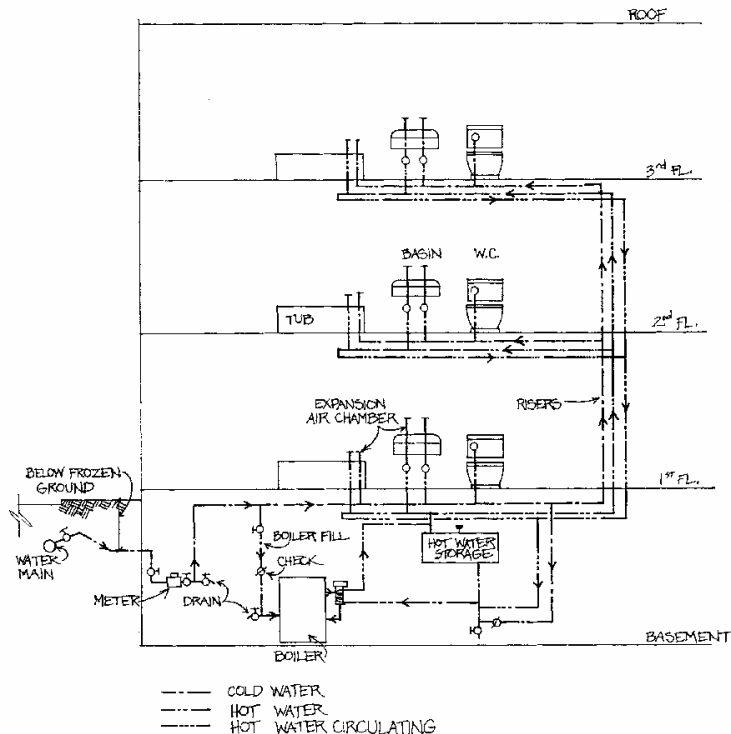
The Supply System

The supply system for your building's fresh water begins with a house main, where cold water enters the building from the city's water system. The house main is usually located at the front of the basement, near the street. A valve mounted on the house main may be closed to shut off the supply of water to the entire building. The illustration on the opposite page shows a water supply system schematic.

Horizontal pipes, called overheads, carry water from the house main through the basement. One overhead leads into the boiler, to provide the building's steam and hot water. Other overheads feed risers which carry cold water up to the apartments.

Hot water overheads extend from the boiler out through the basement, and a hot water riser parallels each cold water riser going up to the apartments above. In most buildings, apartments are identically designed and stacked one on top of another in lines, or wings of the building. This means that all the kitchens and bathrooms are in the same place, so that a pair of plumbing supply risers, carrying hot and cold water, can serve an entire line of apartments. The risers run up through the line and serve the kitchen and bathroom in each apartment, though in some larger or more complicated layouts there may be two sets of risers—one for the bathrooms and one for the kitchens. In every apartment, branches from the risers supply each fixture. Sinks and tubs receive hot and cold water branches, but the toilet gets only cold water.

WATER SUPPLY SYSTEM



In the basement, at the bottom of each riser, there should be a valve which can be used to shut off the water supply—hot or cold—to the apartments served by that riser. There should also be another valve, called a draincock, at the base of each riser which can be opened to drain the line. New York City law now requires that valve handles be color coded: red for hot water and blue for cold. If yours haven't been painted in this way, it shouldn't be too hard to figure out which is which. Just touch the pipes.

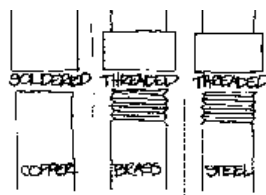
Unfortunately, figuring out which set of valves on which riser controls which apartments isn't so simple. So it's a good idea to figure out what leads where and, when you do so, hang tags from the valves identifying which apartments they control. If the valves are clearly marked, they can be turned off quickly in case of an emergency.

Some systems have valves on the apartment branches which control the flow of water to each fixture, so that the water can be cut off for repair. If these valves are missing on your building's supply system, as they sometimes are, there almost always are valves on the branches that supply each apartment, so that the water to the entire apartment must be cut off to repair a single fixture. Both these valves make it possible to repair one section of the plumbing system without having to cut off water to the entire building, or to a whole line of apartments.

Your plumbing supply system is essentially a collection of pipes and valves, fixtures and fittings. It would make things very easy if all those pipes and fittings were interchangeable, but they're not. The pipe in your plumbing supply system will probably be brass, copper or galvanized iron. All three perform the same functions but they are fastened together differently and vary in durability. Lead pipe has also been used and can still be found in some buildings as service mains, risers (or parts of risers) and branches for water supply. Lead pipe is now considered a health hazard and should be replaced as soon as possible. A fifth kind of supply pipe is made of a plastic called polyvinyl chloride (PVC). While generally cheaper and easier to install, PVC is illegal for use as supply pipe in New York City. It is thought that tiny plastic particles "bleed" into the drinking water and may cause cancer.

Brass pipe has been used longer than any other kind of plumbing supply pipe. The ends of pieces of brass pipe are threaded, and sections of pipe are connected to each other and to fixtures with various threaded fittings. It is the most durable pipe available and, as you know if you've ever gone out to buy it, by far the most expensive. The biggest problem with brass is that it gets stolen—ambitious thieves will actually tear down the walls of a building to get at the brass pipe inside.

If your brass pipe was stolen, it has probably been replaced with copper, the second best kind of pipe for plumbing supply. Copper is not cheap, but it costs a good deal less than brass, and will last almost as long. Copper pipe is the pipe most commonly used in New York City construction today. Two types of copper pipe are used: rigid pipe (also called sweat pipe) and soft pipe (also called compression pipe). Rigid copper pipe isn't threaded, it's left smooth on the ends, and sections are joined with fittings by soldering or "sweating." Soft copper pipe is flexible and is joined by special compression fittings which compress the soft metal to make it watertight. Special fittings make it possible to join threaded and non-threaded pipe—brass and

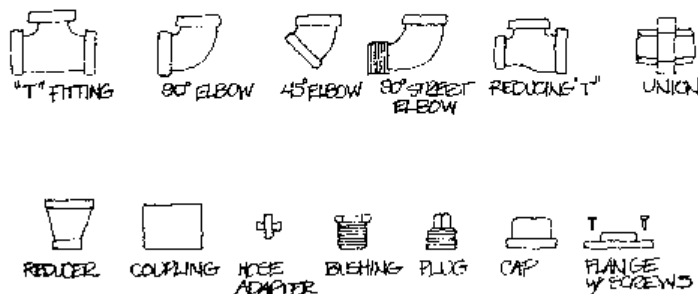


WATER SUPPLY

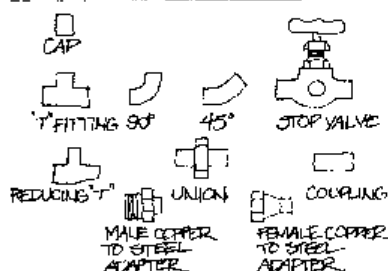
copper—or soft and rigid pipe, to each other.

Galvanized iron pipe was once quite popular, mostly because it was very cheap. The plain iron pipe was galvanized, or dipped in hot zinc, to keep it from rusting. As it turned out, this didn't quite work, and while the galvanized pipe usually will not rust, it will corrode. Badly. Galvanized supply pipes tend to "choke up" over time, filling with corrosion on the inside to the point where water has to squeeze through a tiny pinhole. Consequently, galvanized pipe is seldom used anymore. If your building is fitted with galvanized pipe, you'll eventually have to replace it with copper. The illustrations at left and below show copper, brass and galvanized iron pipes and typical fittings.

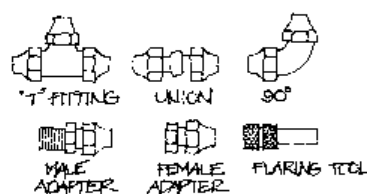
FITTINGS FOR GALVANIZED, BRASS, AND BRONZE PIPE



FOR RIGID COPPER PIPE



FOR SOFT COPPER PIPE



PROBLEM: Leaky Faucets

If a faucet drips constantly, nine times out of ten the small rubber washer inside needs to be replaced. If water leaks from around the faucet handle, a spindle inside the faucet probably needs repacking or replacing. Either repair is easily handled by most people. Both should be done as soon as the problem appears, to prevent further deterioration.

PROBLEM: Supply System Leaks

Leaks in the supply system may be caused by corrosion of pipes or fittings, punctures caused by sharp objects or splits caused by dislodging pipes during renovation, poor plumbing workmanship in installations or repairs, or freezing.

Damaged fittings or fixtures may be replaced, and they're often relatively easy to get at. Improperly joined pipes must be realigned and rejoined, and corroded or damaged pipe sections must be removed and replaced. Walls almost always have to be torn down, or at least opened up, to provide access to plumbing supply lines. Obviously, this becomes expensive fast.

For this reason, as much plumbing repair as possible should be conducted at one time. Tearing out walls and rebuilding them will be a significant part of your costs for plumbing repairs and replacement. When replacing a section of galvanized riser, for instance, you should replace the entire floor's galvanized branches with copper as well. A slightly higher investment now will save you a lot of money and hassle later.

PROBLEM: Low Water Pressure

Low water pressure can be caused by galvanized pipe corroding on the inside and choking up. If it shows up as a scattered problem, check the branches to the problem apartments. If it's consistent on the upper

floors, the problem is most likely in the risers, and if it occurs on the lower floors and not above, check the lower branches. Choked-up galvanized pipe should be replaced with copper pipe.

Copper and galvanized pipe together in the same line creates an electrolytic condition, somewhat like the chemical condition inside a battery, and makes the galvanized pipe corrode and choke up faster. It's a slow reaction, not a fast one, but you should bear in mind that replacing some galvanized pipe with copper should lead eventually to replacing all the galvanized pipe with copper.

The Waste System

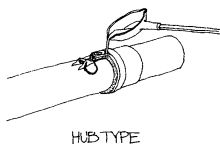
Waste line pipes are much wider in diameter than supply lines, and they're normally made of cast iron. Sections of waste pipe are joined by means of large overlapping flanges, or collars, which are packed with oakum, a sort of caulking, and then sealed and tightened with molten lead. There's a new method for joining waste pipe sections, called no-hub, which uses rubber and metal collars tightened onto the pipe with band clamps. The no-hub method is much easier and cheaper, and no-hub waste pipes are now used in almost all new installations or repairs.

Rigid copper pipe is sometimes used as waste pipe, but it is expensive. It is joined by soldering just as copper supply pipe is.

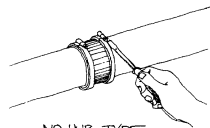
Some very old buildings will have waste pipes made of lead. Lead waste pipes were soldered at their connections. If you're doing a major rehab, lead pipes should be replaced with no-hub.

PVC waste pipe is available, but it is illegal for use in New York City in residential buildings over three stories high because when PVC burns, the fumes are deadly.

The illustrations on this page show various waste pipe fittings.

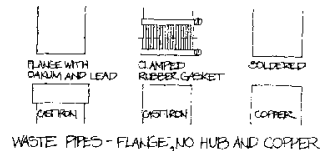


HUB TYPE



NO HUB TYPE

CAST-IRON PIPE (HUB) FITTINGS

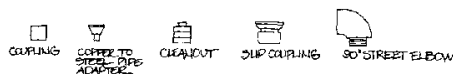
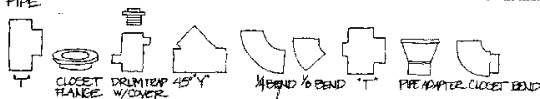


WASTE PIPES - FLANGE, NO HUB AND COPPER

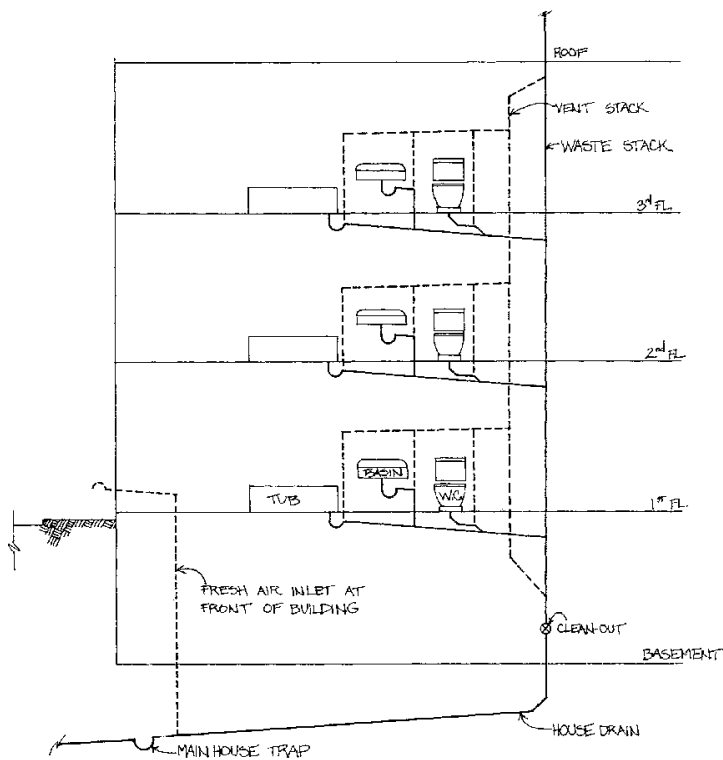
CAST-IRON PIPE (HUBLESS)



COPPER PIPE



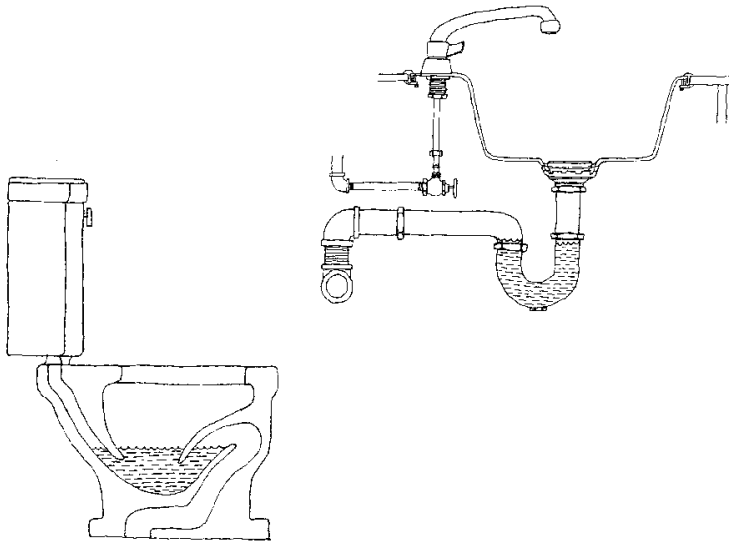
WASTE SYSTEM



A vertical waste stack, with a vent stack nearby, runs alongside the supply risers. Waste branches slope back from each fixture toward the waste stacks, and in the basement all the waste stacks feed into the building's waste main, which in turn connects to the city's sewer system. Above is a schematic of a waste system.

There is a trap beneath each plumbing fixture, connected to the waste pipe, to prevent sewer gases from rising back through the waste lines and escaping into people's apartments. There is a house trap as well, located toward the street end of your basement, just before the street connection to the sewer main, at the bottom of a small pit dug into the floor of the basement. The U-shaped or S-shaped section of pipe under your kitchen and bathroom sinks is a trap. Some water stays in the trap at all times, stopping sewer gases from passing into your apartment. Toilets have built-in traps: the water which remains in the base of the bowl after you flush.

Each sink trap has a clean-out plug, a large hexagonal fitting at the base of the U. The plug allows you to clean out the trap if it gets clogged and, if you're lucky, to retrieve the diamond ring that just slid off your finger and down the drain. The house trap has two clean-out plugs, which poke up above the surface of the basement floor. The house trap may have to be cleaned out occasionally, but it isn't much fun to do: try to imagine the contents of your kitchen sink trap multiplied by the number of apartments in your entire building. It's quite a mess. Also each waste stack should be fitted with one or more clean-out plugs, which can be removed to give the repair person access to the line. The illustrations below show a U-shaped sink trap and toilet bowl in section.



The water system is vented to allow the waste to drain freely. Vent branches are fitted between the waste branches and the vent stack. The vent stack and the waste stack will be joined above the highest fixture in the building, forming what is called the stack vent. The venting system allows air to enter the waste system. If there were no venting, a suction or vacuum might be created by the flowing water in the waste system that would draw the water out of the trap and allow sewer gasses to escape into the apartments.

The stack vent extends up through the roof. People who go up on the roof have a distressing tendency to drop things down the pipe, and the stack vent often becomes clogged as a result. You can help prevent this by installing a curved end, shaped like an upside-down U on the top of the stack vent. Air can still pass easily in and out of the pipe, but tennis balls, soda cans, and rubbish cannot.

A fresh air inlet is located in front of the building, drawing air into the waste system from a pipe opening on the sidewalk. Again, it often has an upside-down U to prevent objects from being forced into it.

PROBLEM: Waste Line Leaks

The cast iron pipe of the waste system is very durable, and very unlikely to leak. If corrosion does cause a leak, it is usually confined to a single section of pipe, which will have to be removed and replaced by a plumbing contractor. Temporary plugs and patches, available at hardware stores, can often stop leaks until you are able to replace a section.

PROBLEM: Stopped-Up Waste Lines

Small blockages in a fixture or trap may sometimes be unplugged with a plunger and a lot of work. More often, you'll need a small plumber's snake, a flexible spring device which plumbers use to clean out the insides of pipes. For larger stoppages in the waste stacks or main waste line, a much larger snake is required.

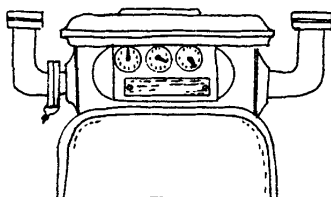
There is a device for unclogging drains which uses compressed air. You use a hand pump to build up pressure in a chamber, fit a rubber nozzle over the drain and pull the trigger, releasing a blast of compressed air into the pipes. Don't even think about using one of these to clear a waste pipe in an old building. If you have lead drain pipes, or old, corroded drain pipes, the compressed air will very likely blow a hole in the pipe, and you'll be faced with a major plumbing repair instead of just a clogged pipe.

If the basement backs up or floods with waste water, the house trap may be blocked and will have to be cleaned out. If the house trap is cleaned, but the waste still won't drain properly, the section of waste line between the building and the sewer may need to be snaked out.

THE GAS SYSTEM

Most New York City apartment buildings use natural gas for cooking fuel. Some buildings also use gas for heat, but oil is still by far the most common heating fuel. Gas is clean, efficient, plentiful and domestically produced. Until the recent government deregulation of natural gas prices, it was also a lot cheaper than oil. Soon it may equal or surpass the cost of oil. The gas which flows into your kitchen travels thousands of miles to get there, by pipeline from the Southwest or Canada. This makes it very convenient, as no deliveries need be scheduled.

An apartment building's gas system is quite simple. Natural gas enters the building through a large pipe from a gas main under the street outside. The street connection is almost always located in the basement. Before the gas goes on to individual apartments, it must pass through a meter which measures how much is being used. A gas meter records your usage in units of 100 cubic feet. If your building's burner/boiler is gas-fired, or if the building pays for its tenants' cooking gas, then there may be a master gas meter, located in the



basement. If tenants pay for their own gas, each apartment will have its own meter, which will be found either in the apartment somewhere or in the basement with all the others, near the street connection. The illustration at left shows a typical gas meter.

Gas travels to each apartment through a gas riser, and to your stove through a branch, in much the same way as water travels in the plumbing system. In fact, gas pipes often run alongside plumbing pipes inside your walls. If they've been painted they may look a lot alike, so be careful during renovations—especially demolition—that you don't damage your gas system.

Gas pipe is made of ungalvanized black iron. The ends of gas pipe sections are threaded, and connected to each other and to fixtures with a variety of fittings. The connection from the branch to your gas stove will usually consist of a length of ribbed, flexible pipe or hose which makes it possible for the stove to be moved somewhat without risk of breaking the pipe and causing a leak.

Nowadays a gas stove is probably your only gas appliance, but many New York City apartment buildings were once lit with gas. Gas branches to old light fixtures may still be found protruding from the walls in some places, looking like odd little faucets. When renovating, make sure that any old gas lines you encounter are plugged up or capped.

A valve in your apartment's gas branch, located just before the stove connection, allows the gas to be turned off if necessary—if your stove is leaking, or if you are installing a new stove, for instance. There is a main shut-off valve at the meter as well. Get to know where your gas meters are, and which meter belongs to which apartment, so that you can shut the gas off quickly in case of an emergency. The gas company has a valve at the street connection, so they can stop the flow of gas to your whole building.

PROBLEM: Gas Leaks

Gas leaks are extremely dangerous. This is a no-fooling situation. If you suspect there is a gas leak anywhere in your building, call your gas company **immediately**. The company has a 24-hour emergency number, which should be posted next to your telephone. It's listed on the inside front cover of the telephone book as well.

Your gas meter is equipped with two metal plates on its side, one of which turns to control the flow of gas. Each plate has a hole in it, and when the holes are lined up the gas is off. You can tell if the gas is off because the meter will no longer run.

If you do have a gas leak in your building or apartment and you can shut the gas off yourself, then you can call a plumber and have the leak fixed without calling the gas company. Keep in mind that gas leaks are dangerous, and if you're not going to call the gas company, be absolutely sure that the gas is off. Doing it this way saves you the delay of having the plumber verify to the gas company that the leak has been fixed, but if there is any doubt in your mind at all in a gas leak situation, don't hesitate to call the gas company.

Children should be taught about gas and its dangers. Let them smell the gas at your stove, so they'll know what it smells like in case of a leak while they're home. Also, make sure they understand not to play with the stove—ever.

The area of your building's basement surrounding the gas meters should be kept clean, uncluttered and well lit. The light switch should be well marked, so that nobody is tempted to light a match to see where it is.

Old gaslight pipes and valves remaining in the wall have a tendency to leak, especially at the light fixture valves, and really should be removed when possible and plugged up or capped at the risers.

THE ELECTRICAL SYSTEM

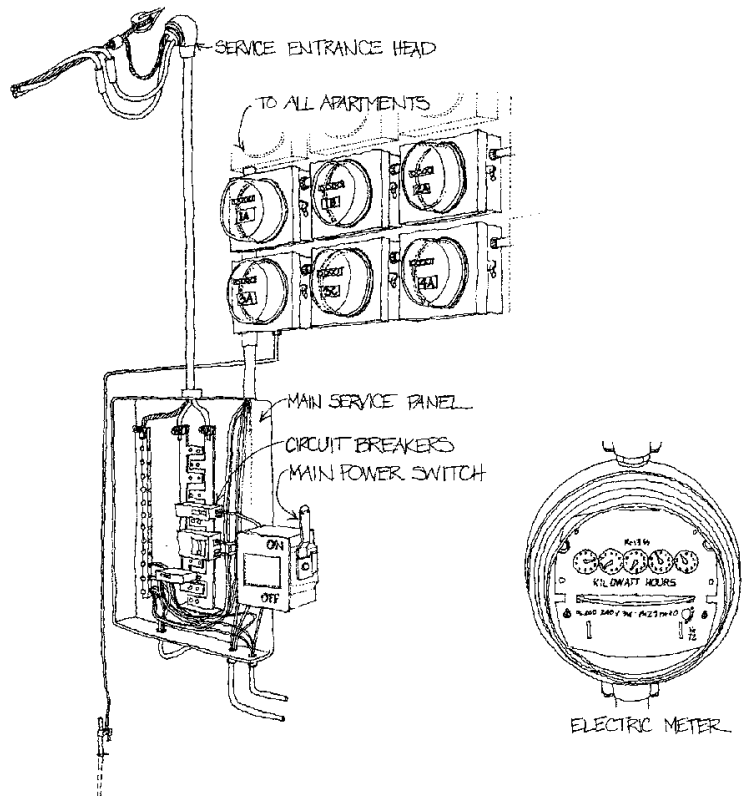
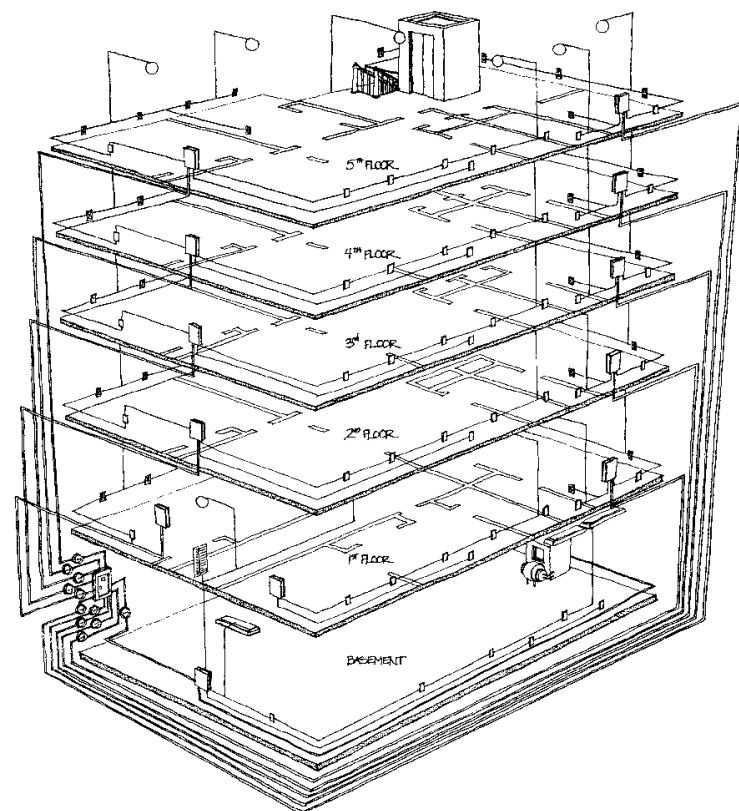
Electricity does hundreds of different things in an apartment building in the course of an average day, yet we hardly ever think about it unless something goes wrong, or we're paying the bill. We use electricity almost without realizing it. Electricity provides all of our artificial light. It provides energy for cooking—to toasters and blenders and the like, and for warming—to space heaters and electric blankets. It provides the power to run motors, from cake mixers to vacuum cleaners, from toy trains to window fans. Electricity provides cool air through air conditioning, and powers radios, televisions and stereos. And that's just the beginning.

Electricity seems mysterious to most of us because we can't see it like water, smell it like gas or feel it like heat. We don't understand it and we've been taught to fear it. Actually, your electrical system is similar to your other building systems in a lot of ways. It distributes a utility, electric power, from the street throughout the building to every apartment.

For electricity to be useful, it has to run in what are called circuits. In their simplest form, circuits are electrical loops. The current flows from one side of the source, through the circuit doing whatever work it's asked to do: toast bread, light a lightbulb, run a clock, and then returns to the source. In household wiring, the black wire will be the hot, or supply, wire and the white will be the grounded, or return, wire (sometimes mistakenly called a neutral wire).

Switches in a circuit act like doors in a wall; when the door is closed, the wall is unbroken, a complete line. In electricity, the term is the same. When a circuit is closed, it means that the circuit is complete and operating. When the door is open, the wall is broken, no longer a solid line, and the same goes for electricity. An open circuit is an incomplete circuit, one that is not working. In electricity, nothing passes through the wall when the door is open. The purpose of the switch is just to break the line, in this case a wire, and give

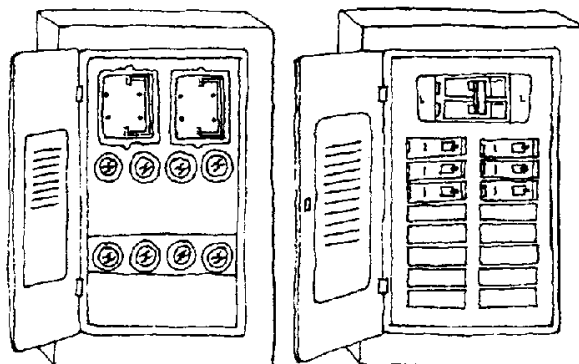
you the option of turning the circuit on and off, closed and open. The illustration below shows a building-wide electrical system.



Electricity enters your building from the street through a service entrance head into a service panel located in the basement. From the service panel, the electric current travels to meters, one for every apartment, which—like gas meters—measure the amount of electricity you're using. There will be another meter for the building's public service electricity: hall lights, exterior lights, boiler controls, etc. All these meters are normally located together in the basement. The above illustrations show a main service panel, a

bank of electric meters and a detailed close-up of an electric meter.

Electrical risers carry current from the apartment meters in the basement to each apartment. A separate electrical riser serves each apartment. A fuse or circuit breaker on the apartment side of the meter will protect each hot wire. Newer installations will also have a distribution panel in the apartment. The distribution panel contains a number of circuits, which channel and regulate the flow of electrical current through various branches to your apartment's fixtures and outlets. The circuits in your panel are equipped with either plug fuses or circuit breakers. Newer panels will have circuit breakers, but many older buildings that haven't been rewired will still be using the old style screw-in plug fuses. The illustration below shows a typical fuse box and circuit breaker panel.

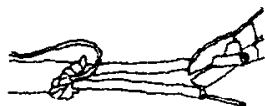


FUSE BOX

CIRCUIT BREAKER PANEL

Electric current is carried in wires. The wires are grouped together in cables. The number and thickness of the wires in a cable, and the size of the cable itself, is determined by the amount of electricity which must be provided. The main cable coming into your building is very big indeed. The cables carrying electricity from the service panel to each apartment's distribution panel are somewhat smaller. The cables which carry electricity from the distribution panel to your apartment's fixtures and outlets are smaller still, and the cords attached to your appliances, lamps or radios are the smallest.

Cables contain a specific combination of wires, depending on the application, each one individually wrapped in plastic insulation, all of them covered by a protective outer sheathing of metal or plastic. Plastic cable is often referred to as "Romex," the brand name of a popular manufacturer. Metal cable, sometimes called armored cable, is known as "BX" cable. Conduit is a rigid or flexible steel or plastic pipe used to enclose cables. Wire mold is a surface mounted metal casing through which cables are run. It is used to install wiring on the outside of walls. The illustration below shows Romex, BX, and conduit cables.



ROMEX CABLE



ARMORED BX CABLE

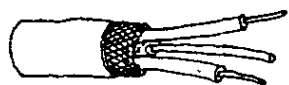


THIN WALL STEEL CONDUIT

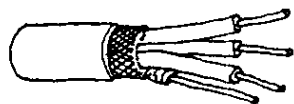
The New York City building code specifies the use of armored BX cable for any and all residential wiring which will be contained within finished walls. This generally includes all risers and apartment branches, or circuits. If the wiring will not be enclosed inside walls—wiring in basements is often left exposed, for example—the cables must be protected in conduits or wire mold.

The wire in BX cable is made of copper. There are either two or three wires in most cases, inside a spiral-wound flexible steel jacket. Two-wire cable is used to provide standard house current, 110 volts. The grounded wire carries the "spent" electricity back to the power source, completing a circuit. These wires are color coded by the manufacturer. If they have been properly wired, the black wire is hot and the white is grounded. In BX, the steel covering normally serves as a ground, channeling sudden power surges or bursts of electrical current down into the earth below your building. There is also a ground wire inside the BX cable which may be necessary in some applications. For example, if the BX is being mounted on a plastic outlet box there wouldn't be continuous metal to metal contact, so the ground wire is used. The ground prevents surges of current from blowing out appliances or causing fires.

some air conditioners, oil burners and heavy duty power tools, contains two hot wires, one black and one red; the third wire is white and grounded. Three-wire cable is often used in new risers to bring two hot wires up to an apartment. It is also used in three-way light switches or other special situations within an apartment. The illustration below shows two-wire and three-wire cables.



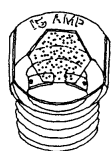
TWO WIRE CABLE



THREE WIRE CABLE

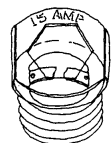


METAL STRIP



BLOWN FUSE

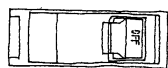
SHORT CIRCUIT
LEAVES DECOLORED
UNDER-SIDE AND MELTS
STRIP



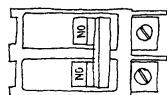
OVERLOADED CIRCUIT
MELTS STRIP BUT LEAVES
WINDOW CLEAR



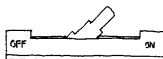
SINGLE CIRCUIT



DOUBLE CIRCUIT



MAIN BREAKER



Each circuit in an electrical system serves a certain number of fixtures, including receptacles or outlets, light fixtures, and switches. The number of fixtures that may be served by a circuit depends on building code specifications as well as the design of your apartment. A circuit is always designed to carry a specific maximum amperage, or volume of current. If the volume of current exceeds your circuit's rated amperage, the wires in the cable might overheat and could cause a fire. If, for instance, too many household appliances are plugged into a single outlet, their combined use might draw more current than the circuit can handle. To prevent fires or other problems caused by overloading circuits, each circuit passes through a fuse or circuit breaker which will interrupt the flow of electricity if the circuit's carrying capacity is exceeded.

A circuit breaker is a sort of automatic, reusable fuse. When the circuit is overloaded, the breaker "trips"—it actually moves from the on to the off position on the distribution panel. Power may be restored by moving the circuit breaker all the way over to the off position then back to the on position.

Fuses are small glass plugs which screw into sockets on a fuse box panel, like little lightbulbs. Standard fuses contain thin metal strips, through which the circuit's current must pass. When a fuse blows, the wire strip melts and leaves a gap so that electricity can no longer pass. To restore power, the fuse must be unscrewed and a new fuse of the same size installed. There are also fuses, called buss fuses, which can be reset by pressing a small button. Fuses are sized in amps.

Most circuits are designed to handle either 15 or 20 amps of electric current—so circuit breakers or fuses corresponding to each circuit should be the same rated amperage. The illustrations at left show fuse and circuit breaker details.

Adequate wiring, as defined in the building code, means that every room in an apartment must have a specified number of fixtures and outlets, and that each circuit may carry only a specific number of fixtures. HPD requires two (2) direct line duplex receptacles—meaning two separate circuits—in the kitchen. This is to accommodate the heavy power demands of modern kitchen appliances. If you blow a fuse or trip a breaker whenever you use two electrical appliances at the same time, your toaster and blender for example, your wiring is probably old and inadequate. Your only options are to use appliances one at a time, or rewire.

Never put in a larger fuse to try to increase the capacity of your wiring. Overloading your circuits deliberately by substituting a larger fuse than the one a particular circuit is supposed to have is an excellent way to burn down your building.

Fuses and circuit breakers are designed to do a job: to interrupt the flow of electricity through an overloaded circuit, so that the wires in that circuit won't overheat and cause a fire. If you blow fuses often, you may not have adequate wiring, and should look into having your apartment or building rewired.

Below is a chart showing the amperages of various electrical appliances that you may use in your apartment.

AMPERAGES FOR A VARIETY OF HOUSEHOLD APPLIANCES

Blender	4.5 - 9	Clothes dryer	36 - 54.5
Hot plate	5.5 - 9	Washing machine	4.5 - 7.2
Toaster	4.5 - 11	Iron	5.5 - 11
Refrigerator	2.7 - 5.5	Hair dryer	9 - 18
Air conditioner	7.2 - 22.7	Color television	1.4 - 3.6
Electric heater	9 - 13.7	Radio	0.4 - 1.4

PROBLEM: Blowing Fuses and Tripping Breakers

When too much demand for power is placed on a circuit, the fuse blows, or the circuit breaker trips, and the lights in your apartment go out.

A blown fuse must be replaced with another fuse of the same size. A circuit breaker can be reset by moving the breaker switch first to the off position and then to the on position.

If your building or apartment still has a fuse box rather than circuit breakers, you should be sure to keep a supply of fuses on hand.

Do not use too many extension cords, or multi-outlet plugs, to provide more outlets for appliances if there aren't enough in your apartment. The original circuit serving the outlets that are there was designed to

serve only that many outlets, and adding a lot of extras will overload it. Furthermore, extension cords are made of a very lightweight wire, which might melt and cause a fire **before** the circuit breaker or fuse trips the circuit.

Finally, years ago the copper wires in BX cable were insulated with cloth and grease instead of plastic. This old-fashioned insulation tends to dry up and break down, wearing thin and becoming brittle over time. This happens especially often near outlets, where the wires may have gotten wet or damp. When the insulation gets too thin, the wires can short circuit. A short circuit occurs when the neutral and hot wires come into contact with one another. This blows the fuse for that circuit, and may be the cause of intermittent blown fuses.

Often there's enough slack left in the cable at the fixture for an electrician to pull it out a bit and cut it off to provide a new and usable end.

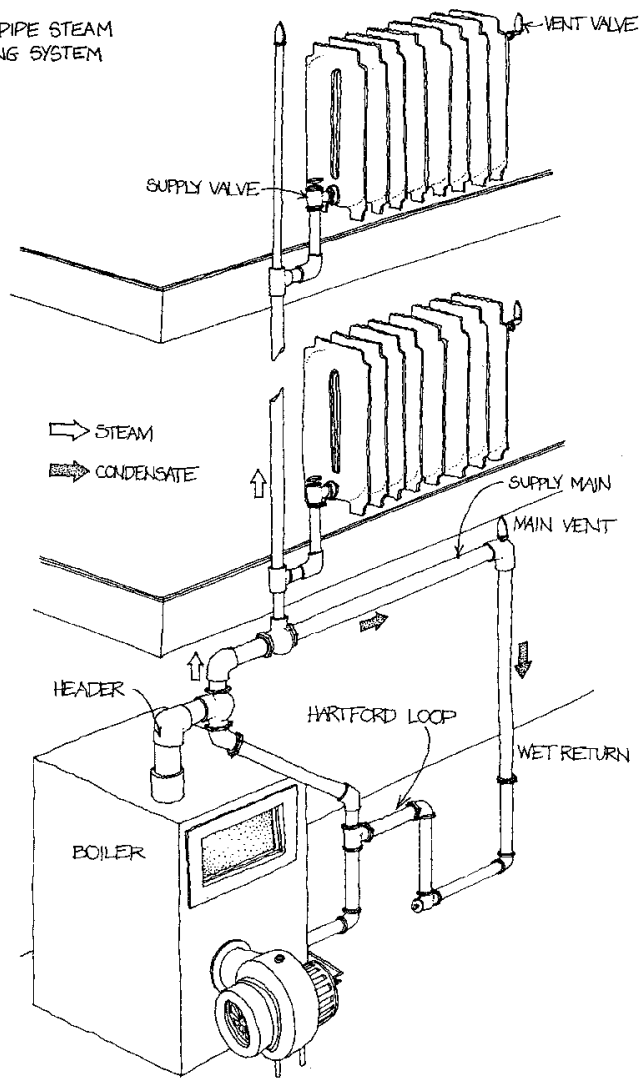
THE HEATING SYSTEM

Any heating system has three main components: the heating plant where heat is generated, the distribution system that gets the heat to where it's needed, and a control system to regulate the operation of the heating plant. The simplest home heating system is a fire in a fireplace, in which the fireplace is the heating plant as well as the distribution system, and the homeowner provides the control system by putting in more or less wood to burn. It works a little differently in large apartment buildings, and your building's heating system is a pretty complicated affair.

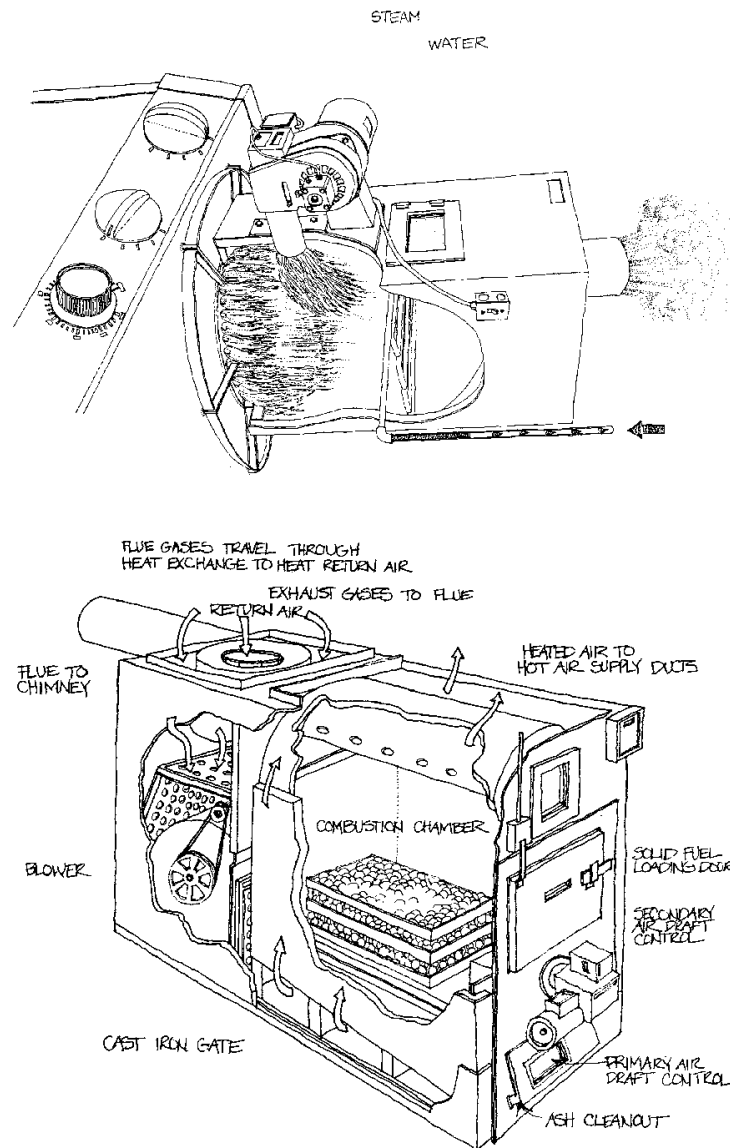
In modern heating systems heat is commonly generated by burning oil, coal or natural gas. This heat is usually distributed as hot air, hot water, or steam. Most modern apartment building heating systems are controlled by outdoor thermostats, devices which measure outside temperature and adjust heat production or distribution in response.

The most common heating system for New York City apartment buildings, and the one which will be covered in the greatest detail here, is a centralized one-pipe steam system. The heating plant, a boiler heated by a burner, is located in the building's basement. It produces steam, which is distributed through the building in pipes to radiators. The illustration on the facing page shows a single pipe steam heating system.

The best way to understand a heating system is by looking closely at its different parts, each of which plays an important role in making the whole thing work. The bottom line for a heating system is heat, so we'll begin where it's produced, with the burner and boiler.

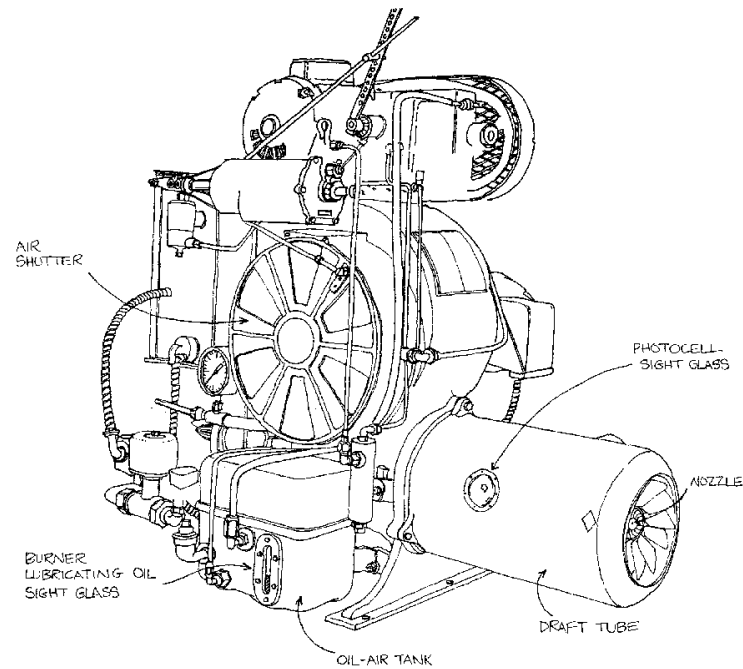
SINGLE PIPE STEAM
HEATING SYSTEM**The Burner/Boiler**

A steam heating plant consists of a burner, which produces heat, and a boiler, which uses the heat to turn water into steam. The burner/boiler combination is a lot like a terribly oversized stove and kettle. The boiler, full of water, sits on the burner, which produces a high, concentrated heat. When the water boils and becomes steam, the steam circulates through the building radiating heat. As the steam loses its heat it turns back (condenses) into water again and flows back to the boiler. The illustration below shows the burner/ boiler as a kettle on a stove.



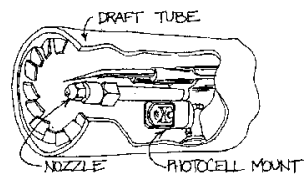
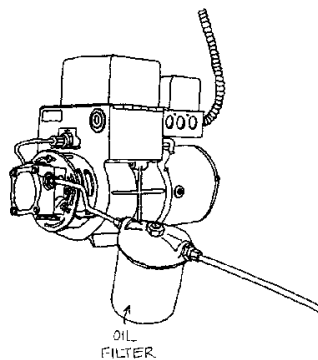
Coal burners are the most basic sort of burners, simple fireboxes in which coal is burned. Adjustable openings on the firebox door are used to regulate the amount of air taken into the firebox, and therefore the speed of combustion, since the more air a fire gets, the faster it will burn. Coal is relatively cheap and efficient as a heat source, but it requires a great deal of labor to shovel the coal and keep the fire going. In New York City a hundred years ago coal was practically the only heating fuel available, and every home and building had a coal chute leading into its basement. But coal creates terrible air pollution—if you can believe it, the air pollution a hundred years ago in the city was actually worse in many ways than it is today—and causes many respiratory problems. Air pollution devices are now required by law on coal burning systems, but because of their expense many people refuse to install or use them. The above illustration shows a coal burner firebox.

Today, oil burners are much more common than coal burners. Oil burners began to replace coal burners when oil became cheap and abundant. In an oil burner the oil is either pumped or gravity-fed to the burner from the tank. In a high-pressure oil burner, the oil is passed through a filter and then pumped at pressure through a tiny hole in a nozzle as a fine mist. The nozzle is located inside the draft tube, through which air is forced. The oil mist combined with air burns with a very hot continuous flame inside the combustion chamber. The combustion chamber is located underneath the boiler and is lined with firebrick, a special tan-colored brick made to withstand high heat without fusing or melting. The amount of air that comes in through the draft tube is not enough to burn the oil completely, so a motorized fan draws what is called secondary air into the chamber to make the combustion more complete. Below is an illustration of a typical oil burner.



There is another type of oil burner that does not rely on oil pressure to create an oil mist, called the rotary cup type burner. Rotary cup burners use a cone-shaped spinning cup to throw off a fine oil mist, which is then combined with air and burned. Generally, rotary cup burners are used with the heavier grades of heating oil.

In an oil burner, the proper mix of air and oil is very important. If there's too much air, the hot gases produced during combustion—which are needed to heat the boiler water—will cool, reducing the burner's efficiency. Too little air, on the other hand, will prevent the oil from being fully burned, which is also inefficient. Unburned oil causes another problem. Since it quickly deposits soot on the boiler surfaces, it cuts down on the amount of heat that can get through to the water inside. Periodic burner adjustment is essential to achieving the optimum oil to air ratio for maximum burner efficiency. A combustion efficiency test should be conducted at least once a year, preferably near the beginning of the heating season, to determine burner efficiency.



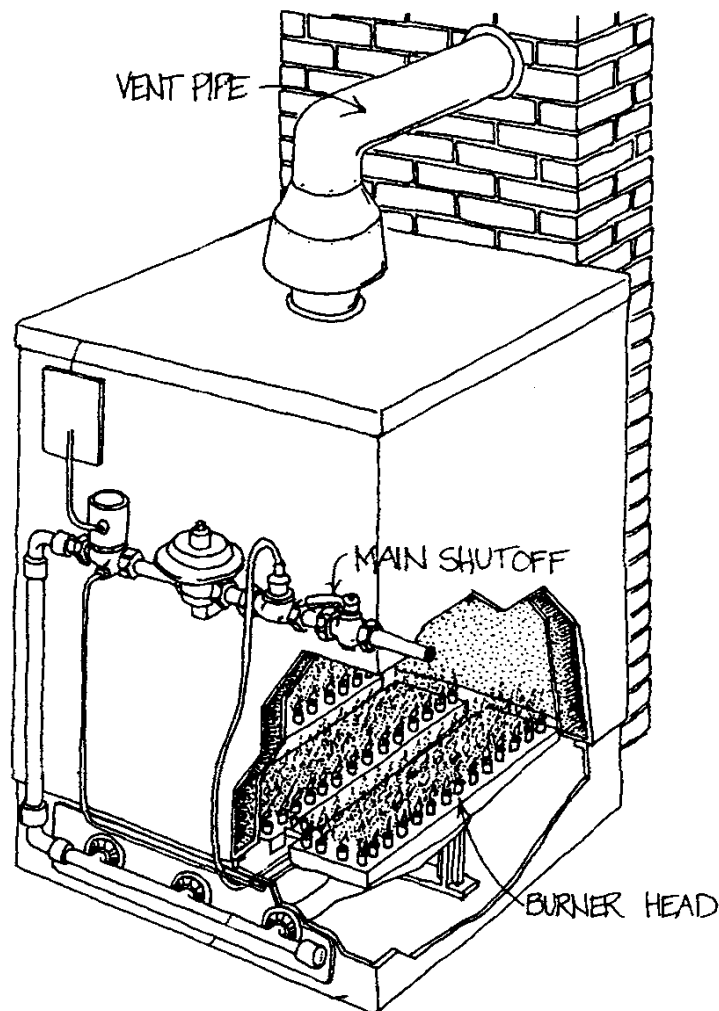
Heating oil is refined and sold in varying grades; #2, #4 and #6 grade oils are the most common. Each grade of oil must be used in a burner specifically designed to burn that grade of oil. A #2 burner, for example, will not burn #6 oil.

Number 6, the cheapest grade of heating oil, is the least refined, the thickest, and the dirtiest. A #6 oil burner preheats the oil to thin it out and make it easier to burn. Number 6 heating oil is usually used in the largest buildings, and persons who operate a #6 burner must have a Certificate of Fitness from the New York City Fire Department to run the boiler. To apply for a certificate, see Appendix A: Government Agencies and Professional Organizations, at the back of this book for the address and telephone number of the Fire Department.

All burners must be well maintained to prevent dirt and soot from accumulating and causing problems. The oil filter should be cleaned weekly, and the nozzle should be checked and cleaned monthly. (For more detailed information on this and other heating system maintenance procedures, check the section on Maintaining Your Heating System in Chapter Two, beginning on page 100.) The above illustrations show oil filter and burner nozzle details.

Most gas burners, instead of a single large flame, produce numerous smaller flames dispersed over a

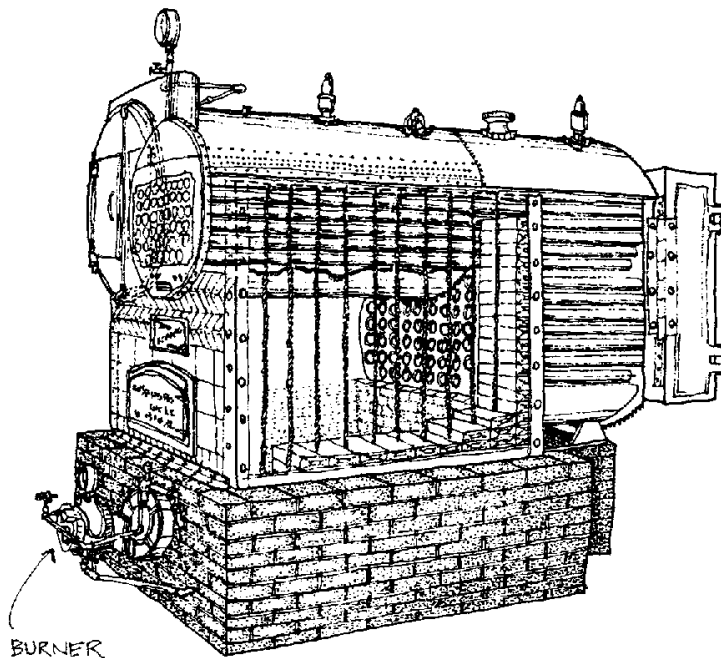
wide area, in much the same way as the burner in a gas kitchen oven does. In a gas burner, as in an oil burner, air is combined with the gas, and the air to gas ratio is important for the same reasons that the air to oil ratio is for an oil burner. Gas burners, however, do not slip out of adjustment nearly so easily as oil burners do, and gas burns cleaner than oil. As a result, gas burners do not need service as often as oil burners. For this reason, among others, many consumers have chosen to convert their oil furnaces or boilers to gas (this conversion is also discussed in Chapter Two). Below is an illustration of a typical gas burner.



Some gas burners do produce a single flame, similar to oil burners. Most often this type of gas burner is found in oil/gas combination burners—burners that can burn either type of fuel.

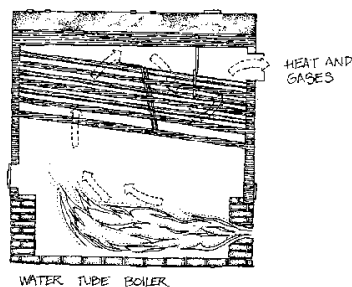
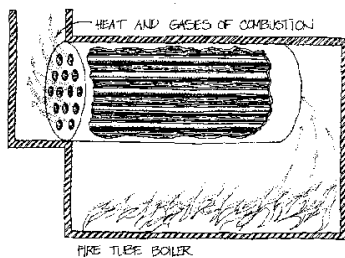
The boiler is the heating system's kettle, a steel or cast iron vessel placed above the burner combustion chamber and enclosed in an insulated outer jacket. Water in the boiler is heated less by the flame beneath it than by the very hot gases generated during combustion. These gases circulate through the boiler tubes, coming into contact with as much boiler surface area as possible. The larger this "heat exchange surface" is, the faster the water will turn to steam.

To increase the heat exchange surface area, boilers are laced with air passages. The inside of a cast iron boiler looks something like a radiator: it's a collection of identical repeating sections whose "pretzel holes" form the air passages. A radiator is designed as it is so that it will have the most possible surface area from which it can send out heat. A boiler is just the opposite: its large surface area allows for quick heat absorption.



Steel fire-tube boilers are simply huge tanks—cylinders through which hundreds of narrow tubes have been inserted. The tubes serve as the steel boiler's air passages, and as the combustion gases pass through them, the water inside the tank is heated into steam. The above illustration shows a steel fire-tube boiler, and the illustrations below show steel boiler interior sections.

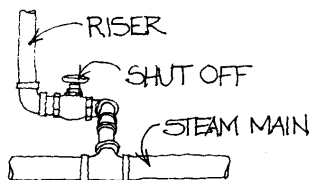
A water-tube boiler is the opposite of a fire-tube boiler. Where the tubes in a fire-tube boiler carry hot gases, the tubes in a water-tube boiler carry water. In either case, the tubes provide the largest possible heat exchange surface area.



The Distribution System

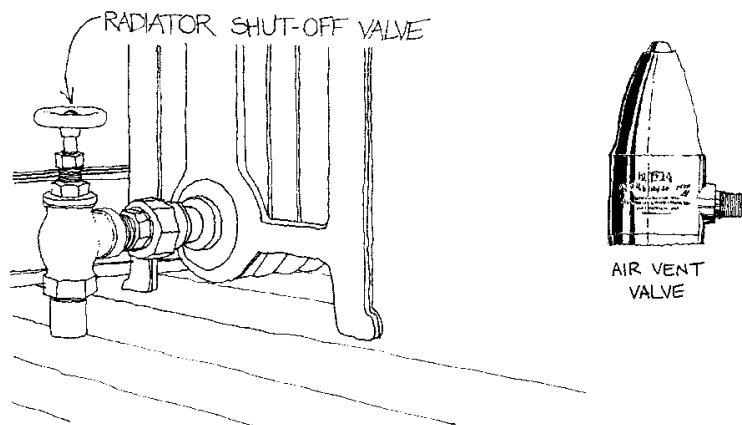
Once the heat has been generated by the burner and converted to steam in the boiler, it is circulated through the building by the distribution system. The type of distribution system covered here is a one-pipe steam system, the kind most often found in New York City apartment buildings. In this kind of system a single pipe carries the steam as it travels up to and through the radiators, and then the same pipe returns the condensate—steam that's cooled into water again—back down to the boiler. In a two-pipe system, also found in some residential buildings, but far less frequently, condensate returns to the boiler through a second, separate pipe. You can recognize a two-pipe system by radiators which have two pipes connecting to them, one at each end. Radiators in a one-pipe system will have a control or "shut-off" valve at one end and an air vent valve on the other end.

Steam pipes are made of iron, with threaded connections. A large steam main leaves the boiler and runs horizontally, just below the basement ceiling. The steam main soon branches into several smaller overheads, which carry the steam through the basement to risers. The risers carry the steam to radiators on the floors above. In the basement, at the base of each riser, there may be a shut-off valve which allows you to cut the steam supply to that particular line of risers. The illustration at left shows a riser shut-off valve.



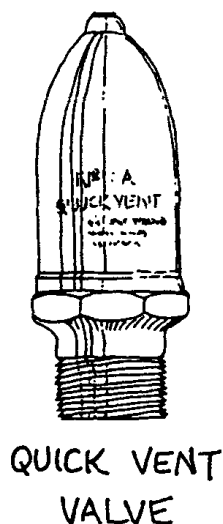
The number of risers in your distribution system, and their location in your building's basement, depends upon the layout of the apartments above. Most rooms will have one riser serving a single radiator. Larger rooms may have a second radiator served by the same riser, or even a second riser and radiator. Small rooms, like bathrooms, often receive enough heat from the riser alone—the hot pipe running up the wall in one corner—so they don't need any radiator at all.

can be used to prevent steam from entering that radiator. At the opposite end of the radiator, an air vent valve will always be found. The illustration at left shows the location of an air vent valve. The air vent is probably the most important part of your heat distribution system. When steam is not circulating, for instance during low heat-demand periods when the boiler is not operating, risers and radiators are filled with air, air that prevents steam from entering the radiator and heating the apartment. The air vent valve allows the air in risers and radiators to escape so that steam can enter. If your air vent valve is clogged, the air in your radiator won't be able to escape, and no matter how good your building's boiler happens to be, you won't get any heat. The air vent valve should allow air to escape, but not steam. If water or steam escapes from the valve, it's malfunctioning and must be replaced. The illustrations at the top of the next page show a radiator shut-off valve and air vent valve details.



Steam risers run straight up through your building, passing through the floor and ceiling of each apartment, from the basement to the top floor. These risers are usually exposed, but in some buildings they may be concealed inside the walls. Risers in top floor apartments may end at the radiators. In other cases they may extend past the topmost radiator and end near the ceiling, fitted at the top with a quick vent valve.

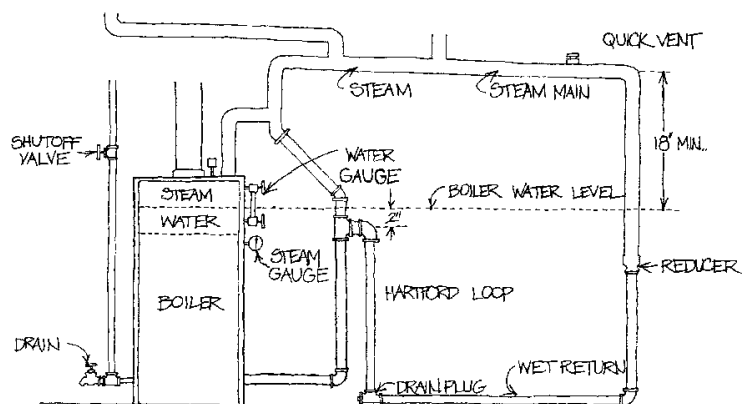
The quick vent valve at the top of the riser does the same job as the air vent valve on a radiator, allowing the air to escape from the riser so that steam can flow into it. If there's no quick vent valve, then the air in the risers and radiators must be vented through the radiators alone, which may take somewhat longer. Quick vent valves are also sometimes present at the end of steam overheads, venting air to allow steam to travel through the basement more quickly. Particularly on long overheads, large quick vent valves should be installed so that far risers will receive steam faster. The illustration at left shows a riser quick vent valve.



The speed with which steam travels to a radiator is determined by the amount of steam pressure produced by the boiler, the distance of the radiator from the boiler, and the size of the air vent and quick vent valves. Vent valves are available in a range of sizes, varying with the size of the hole in them which allows air out. Some vent valves are even adjustable to different sizes. The larger the hole in the valve, the faster air can escape, and the sooner steam will enter to heat up the radiator. If your heat distribution is uneven, meaning some rooms or apartments are cold while others are warm, then see Chapter Three for self-help instructions on heating system balancing.

After steam has circulated through your radiator, transferring its heat to the air in your room, it turns back into water, or "condensate." Radiators must tilt slightly toward the steam riser so that the condensate will flow back down to the boiler in the basement. Water trapped in incorrectly tilted radiators will take up space and prevent that part of the radiator from filling with steam and becoming hot. In some situations, water will block the shut-off valve and prevent steam from entering the radiator at all. Radiators are cast iron, and water left sitting in an iron radiator encourages rust. It's important that radiator shut-off valves be left all the way open or all the way closed or the valve will be worn out rapidly. If there's steam in the radiator and the shut-off valve is closed all the way down, condensate may become trapped in the radiator. Condensate ordinarily returns to the boiler while the steam is not circulating. If the valve is opened again when steam has begun circulating, condensate on its way back down to the boiler may run into steam on its way up. What happens then is a loud banging. Some banging is also caused by the shifting of the risers as they expand because of the heat.

In the basement, overheads tilt slightly downward, away from the steam main, so that condensate will return to the boiler through a separate return line, and not through the steam main. Before it can reach the boiler, though, condensate must travel up, over and through a pipe section called a Hartford Loop. The top of the Hartford Loop is located higher than the level of the boiler's water supply, which prevents boiler water from draining out into the condensate return line. The illustration below shows a Hartford Loop and condensate return line.



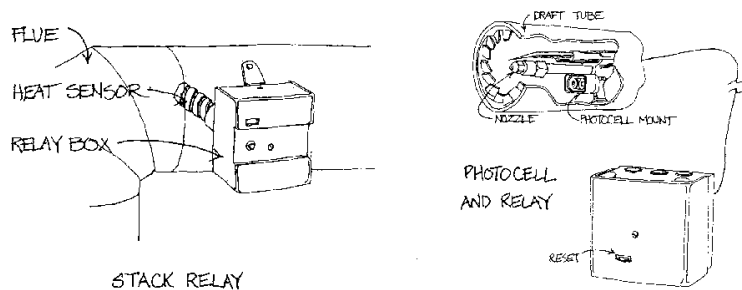
The Control System

The heating system is controlled in three ways: the burner fire is started and stopped in response to the outside temperature, boiler and burner safety conditions are monitored, and the flow of the heat distribution medium (steam, hot water or hot air) is regulated. These functions are carried out by a series of interlocking systems. Here we'll review the operation of the basic controls of a typical oil-fired steam system.

In single-family homes, a thermostat (temperature-sensitive switch) controls the heat by sensing the indoor temperature. In most New York City apartment buildings, a Heat Timer, or 24-hour clock, is connected to an outdoor thermostat to regulate the heat and to eliminate the problem of where in the building to place an indoor thermostat. Because of the importance and complexity of the Heat Timer, it is described in greater detail in the next section.

Thermostats operate on low voltage, not "line" voltage. When the temperature drops below the set minimum on the thermostat, the thermostat closes its circuit (switches on) and sends an electrical call-for-heat to the primary control. The call-for-heat is the signal to fire up the boiler and warm the building.

The primary control is the heart of the control system. As with all control components there are several types of primary controls, but all do the same things: they accept the call-for-heat from the thermostat, relay it to the burner motor and ignition system, and check that the burner flame has lit within a short period of time. If the burner flame has not lit, the primary control shuts the burner motor down to prevent a hazardous build-up of oil in the combustion chamber; this is called going off on safety. When the primary control goes off on safety, it must be reset manually before the ignition cycle can begin again. If this situation occurs often, the ignition system must be checked and repaired. Below are illustrations of two types of primary controls: a stack relay (left) and a photocell-type primary control (right).



The primary control, then, coordinates three circuits: the low-voltage thermostat circuit, the flame-sensing safety circuit, and the burner circuit.

An older but still common type of primary control called a stack-relay will be mounted on the boiler's exhaust flue. The safety-circuit sensor in this type of primary control is a temperature-sensitive metal rod extending into the flue. The heat from the lit burner causes the metal rod to expand and close its safety circuit, indicating to the primary control that the burner is operating. If it does not close, the burner circuit will shut down, cutting off the motor.

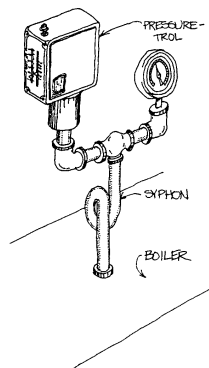
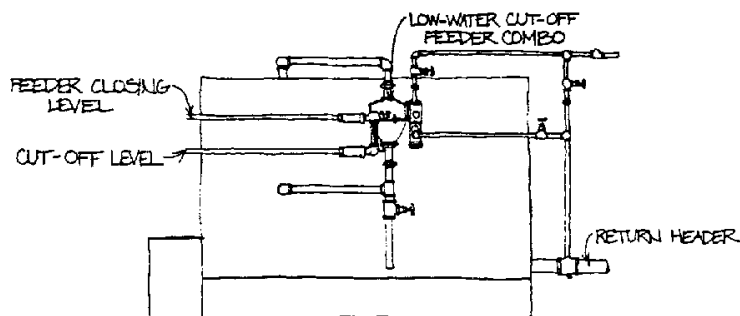
Newer primary controls use a light-sensitive photocell or cadmium cell mounted either inside the burner draft tube near the nozzle or outside the boiler looking in through a small window at the combustion chamber. In response to the light from the flame, these cells generate a small electric current which completes the safety circuit and allows the boiler to continue to work.

The burner circuit operates on line voltage, either the standard 110 volts that come out of your wall socket or the heavier-duty 220 volts used to run large machines. In some cases the burner will use 440 volts.

The line voltage comes through at a fuse or circuit breaker in the building's public service electrical panel, the same panel as for hallway lights, etc. It passes through an on/off remote switch, which New York

City law says must be located outside the boiler room, sometimes through another on/off switch located on the burner, and then through three limit controls before it reaches the primary control. These limit controls are safety devices which prevent the boiler from damaging itself or exploding from excessive steam pressure.

The first limit control is a low-water cut-off, a float-type switch somewhat like the float in a toilet tank, which monitors the water level in the boiler. Serious damage can be done to a boiler running with too little water in it. If the level of water in the boiler is too low, the switch will open and cut off the line voltage, preventing the burner from operating. The low-water cut-off control is often found in combination with an automatic water feeder, a device which adds water to the boiler when the water level falls below a certain point. If the feeder fails, the low-water cut-off protects the boiler. An illustration of a low-water cut-off feeder combination can be found below.



The second and third limit controls monitor pressure conditions in the boiler and are called pressuretrols. Most low-pressure steam systems, as residential ones are, operate from 2 to 7 pounds per square inch (psi) of steam pressure. The pressuretrols are set to maintain this range of pressure while there is a call-for-heat. Pressuretrols are extremely important. **A boiler running without pressure regulation can explode with considerable force.** The illustration at the left shows a pressuretrol.

The first pressuretrol is called the operating pressuretrol, and it acts as both a high and low limit switch. At the high limit, it opens a line-voltage switch and shuts off the burner, and at the low limit it closes the switch again and allows the burner to come back on.

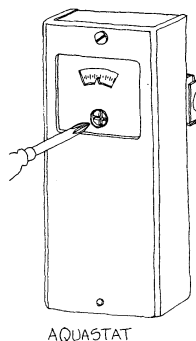
The settings on the operating pressuretrol are established by two screws mounted at the top of the control, and the settings are read on two scales on the front or side of the unit. One will be marked either "Hi" or "Low" and the other "Dif" for differential. The differential setting determines how far below the high setting or above the low setting the second limit will be reached.

The second pressuretrol is the manual pressuretrol, and has only a high setting. It will be set slightly above the high limit of the operating pressuretrol, and acts as a safety back-up if the operating pressuretrol malfunctions and allows the pressure to get too high. If the manual pressuretrol shuts the burner circuit down, it must be reset by pressing the red button on its front (or top or side). Whoever does so must realize that the manual pressuretrol shut down the burner for a reason, and that reason may be that the operating pressuretrol is malfunctioning.

Some boilers have a third pressuretrol. This is a common hook-up for the Heat Timer, and it tells the timer when full heat circulation to the building has begun, and that it should start its heating cycle (see the next section, on Heat Timers, for more about the heating cycle). This third pressuretrol will be wired to the Heat Timer rather than to the primary control as the other two are.

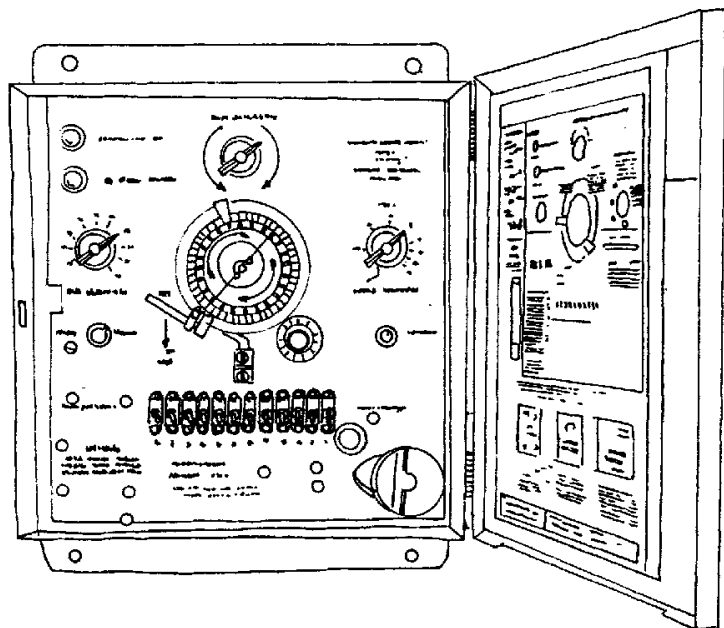
A smoke control or alarm is located at the rear of the boiler. Too much soot or smoke indicates an unsafe condition, so when the smoke control senses too much of either, it will shut the burner off. A common type has a transmitter bulb and receiver glass and works much like a photoelectric-type smoke detector (described on page 73).

There is one more control to be aware of. If your boiler produces your hot water, it will have an aquastat, an adjustable thermostat for water. The aquastat sensor sits in a well below the boiler's water line, and will send a call-for-heat to keep up your supply of hot water even if the building requires no heat. When you flip the Heat Timer switch to its summer setting, the aquastat alone will send signals to the Heat Timer, and the outdoor thermostat will be disconnected. At left is an illustration of an aquastat.



The Heat Timer

Most one-pipe steam heating systems have a master control called a Heat Timer. Heat Timer is a brand name, but they are so common in New York City we will use it to refer to this type of control. A Heat Timer is an electronic device that is actually a number of different controls in one, linked to work in conjunction with each other. The illustration below shows a Heat Timer unit.

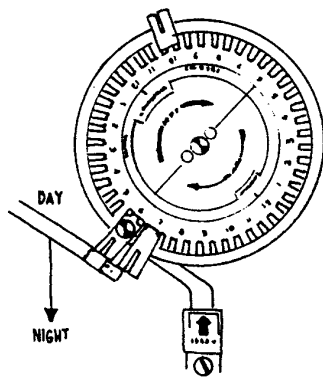


In buildings where the boiler produces the domestic hot water, the winter/summer switch on the Heat Timer allows the system to supply hot water only when it is on the summer setting, or heat as well as hot water, when it's set on winter. At left is an illustration of a Heat Timer winter/summer switch, detail.

The manual/automatic switch makes it possible for the system's operator to regulate the system by hand, on the manual setting, or to have the Heat Timer take control, on automatic. When the automatic setting is used, the heating system is fully controlled by the Heat Timer using a 24-hour program clock and a thermostat which measures the temperature outdoors.

The 24-hour program clock employs adjustable pins which are used to switch the primary control back and forth between two different settings on the outside thermostat, called day and night modes. Both settings will turn the heating system on when the outside temperature drops below a chosen minimum level.

Day and night modes don't have to correspond with actual day and night, they are just different thermostat settings. Most buildings program their clock for a night set-back, using the pins to switch the heating system into night mode between 10:00 p.m. and 6:00 a.m. The illustration at left shows a 24-hour clock with night and day switching pins.



If further fuel savings are desired, and the tenant association is in agreement about it, then the clock can be adjusted in different ways. You should check the operation manual for your particular Heat Timer to find out precisely how to do this on your model. Several sets of pins can be used, for example, to make your boiler's heating cycles correspond exactly with the high and low heat demand periods in your building. Some buildings reduce the heat during the day between 10:00 a.m. and 3:00 p.m. by going to the lower night setting while many residents are at work or school. At 3 p.m. they switch back over to the day setting to warm the building up before people return in the evening.

In that situation, the tenant association might provide small electric space heaters and assistance in paying higher electric bills to elderly tenants and others who have to stay home all day, rather than heat the entire building for just those few people.

At night, when everyone is asleep, the heat should be turned down low again since blankets cost less and last longer than heating fuel. Some tenant associations program their clock so that it shuts down the heating system altogether late at night in the interest of saving money on fuel. And remember that the better a building is weatherized and insulated, the longer it will retain heat.

The Law:

The law says that from October 1 through May 31, between the hours of 6:00 a.m. and 10:00 p.m. when the outside temperature is 55° or below, the inside temperature must be at least 68°. Between 10:00 p.m. and 6:00 a.m., when the outside temperature is 40° or below, the inside temperature must be at least 55°.

On the single-disk type clock as illustrated above, a maximum of two pins are legally allowed to switch the timer from day to night mode. You may not legally set the night thermostat to "off."

The other way the 24-hour program clock controls the heating system is by regulating the burner's cycle of operation—that is, how many minutes of every hour it will run—also called the schedule of operation or heating cycle. The cycle of operation adjustment varies with different types of clock, so again you'll want to check the manual for specific information on how to make this adjustment on your model.

Below is a chart of sample Heat Timer settings and cycles of operation. For example, at 30° on a

schedule C setting, the burner would operate for 34 minutes of every hour. On the warmer F setting, the burner would run for 43 minutes of every hour. On the energy-conserving A setting, the burner would run for just 28 minutes each hour.

HEAT-TIMER SETTINGS								
OUTDOOR TEMPERATURE								
HEAT ADJUSTMENT	20°	25°	30°	35°	40°	45°	50°	
	A-36	32	28	24	20	16	12	
	B-39	35	31	27	23	19	15	
	C-42	38	34	30	26	22	18	
	D-45	41	37	33	29	25	21	
	E-48	44	40	36	32	28	24	
	F-51	47	43	39	35	31	27	
	G-C	50	46	42	38	34	30	
	H-C	C	49	45	41	37	33	
	I-C	C	C	48	44	40	36	
	J-C	C	C	C	47	43	39	

The above chart shows the approximate number of minutes of heat per hour after heat circulation has been established (Red "ON" and Amber "ON"). "C" means continuous operation.

When the outdoor temperature drops below the thermostat setting and a call-for-heat comes through, a red light on the Heat Timer will go on. But the cycle of operation does not begin until after the heat begins to circulate fully in the system. The Heat Timer is signalled that full circulation has begun either by a third pressuretrol, as mentioned earlier in the section on the Control System, or by an indoor thermostat called an indoor element.

With a pressuretrol, a signal goes to the Heat Timer indicating that there is adequate steam pressure throughout the system.

If there is an indoor element, it will be located on the boiler or the steam main. It signals the Heat Timer to begin its cycle of operation when the temperature in its location reaches a certain level, also indicating that there is adequate steam pressure throughout the system. Adequate steam pressure means that the steam has reached the most distant radiator.

With either method, an amber light on the Heat Timer comes on indicating that the cycle of operation has begun. So even if your clock is set to run the burner for, say, 34 minutes every hour, the burner will actually operate a little longer than that, just to get the steam to all the radiators before the timing begins.

For steam distribution to work properly, the system must be balanced. Both the indoor element and the pressuretrol signal the Heat Timer that conditions are correct at their locations. As far as the control system is concerned, the building is being properly heated. If some apartments remain too cold, or some too hot, then balancing is the cure. See **page 126 in Chapter Three** for instructions on self-help heating system balancing.

The Heat Timer is a very important but quite complicated instrument. It must be properly adjusted by a knowledgeable service person to control the heating system at peak efficiency. But to do its job, it must be used. Switching off the clock and running the boiler on "manual" setting all the time not only wastes heating oil, it wastes the time of the person who has to run down to the basement and turn the boiler on and off.

Fire-Rated Enclosures for Boilers

The Multiple Dwelling Law states that boilers must be enclosed completely in a boiler room constructed to be fire-resistive for one hour, unless the basement is used solely to house the boiler. A fire-rated boiler enclosure usually consists of floor to ceiling cinderblock walls, a fireproof self-closing door and a metal-covered sheetrock ceiling. A telephone call to the Office of Code Enforcement will get you the precise details concerning materials and construction. See **Appendix A: Government Agencies and Professional Organizations**, for the addresses and phone numbers of the Office of Code Enforcement.

SAFETY AND SECURITY SYSTEMS

Most of us are not accustomed to thinking of safety and security as building systems. This is due in large part to the fact that the safety and security systems' components are less easily seen as interdependent elements of a building system than, say, the parts of the plumbing or electrical system.

A building would be worth little as a home if residents in it did not feel safe and secure. Though there are many ways of achieving this feeling, they all fall into one of three basic categories: interior and exterior

lighting, building and apartment security, and fire safety. These are the three parts of your safety and security systems.

Interior and Exterior Lighting

Decent lighting is a lot more than a pleasant amenity. Interior and exterior lighting are essential safety items. Dark hallways are perfect places for muggers or robbers to lie in wait for residents, and poorly lit hallways or entranceways increase the chances of tenants—especially elderly ones—tripping or falling. If the sidewalks, paths and courtyards outside your building aren't properly lit, it will encourage thieves to prey on residents and passersby, and will at the same time make it harder for you to see people attempting to break in.

PROBLEM: Inadequate Lighting

Inadequate lighting results from three conditions: insufficient or poorly located and aimed fixtures; bulbs too low-powered to light the desired area; and missing, broken, or burned-out bulbs.

Replace bulbs as soon as they're broken or burned out. This may be the super's responsibility, especially on exterior fixtures, but for hall lights a tenant on each floor may accept the responsibility. This will help ensure that bulbs are changed promptly.

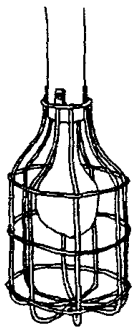
Incandescent bulbs—the pear-shaped lightbulbs used in most household lamps—are inexpensive but because of their home uses they are often "borrowed" or stolen. Which means that they're not so cheap in the long run. They also burn considerably more electricity than fluorescent fixtures—the long tube-type bulbs. Since you'll want to leave lights in hallways and outside your building on at all times, you may want to look into ways of reducing your electric bill. Adding fluorescent fixtures is one. The tubes are expensive, but they last almost indefinitely, and they're a lot less likely to "walk off" than regular incandescent bulbs.

Install new fixtures wherever they're needed. All hallways and entrances should be very brightly lit. Aim the fixtures so that they light up the darkest corners.

For exterior lighting, the best choice is probably mercury vapor lamps, which are the same ones used for street lights. They produce an extremely bright light, last nearly forever, and are quite inexpensive to operate. Like fluorescent lamps, though, they are expensive to purchase.

If you have a problem with vandalism of light fixtures, the solution isn't to ignore lighting needs but to protect the fixtures. Many exterior fixtures come fitted with wire shields. If yours are missing, or if your fixtures didn't have them in the first place, shields are easily constructed from heavy wire "hardware cloth," available at most building supply stores. The illustrations at left show shielded outdoor fixtures.

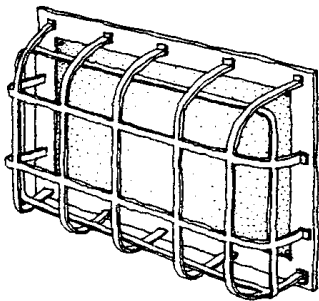
When you install new fixtures, or replace the bulbs in existing ones, be sure to put in bulbs of a high enough wattage to light the entire area covered by the fixture. Low wattage bulbs may be worse than nothing at all, since they can create shadowed areas that are very difficult to see into yet, because they're on, they provide a false sense of security.

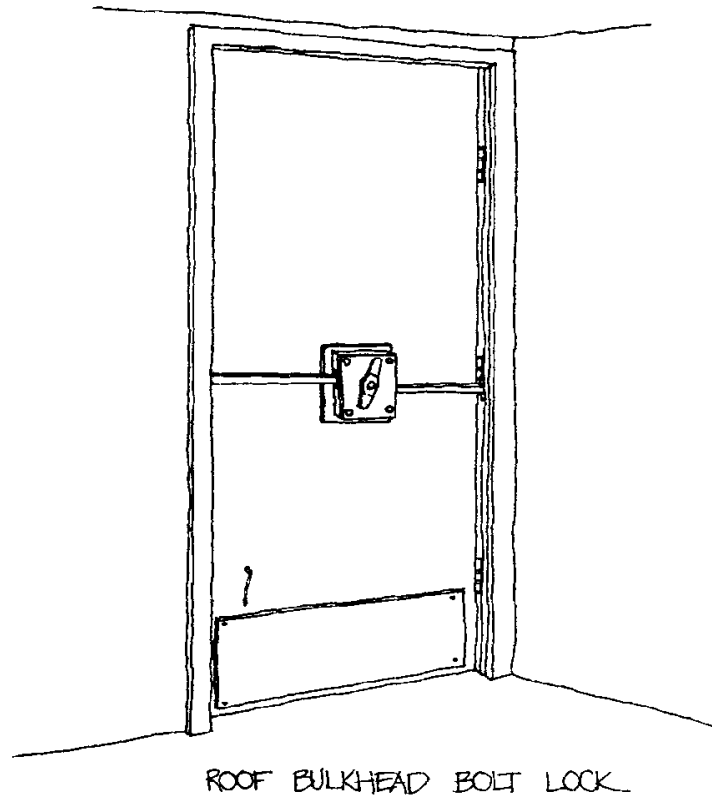


Building and Apartment Security

Lighting provides a good deal of security, but when most of us speak of security we generally mean locks and doors.

Locks and doors are an obvious but often neglected part of a building's security system. **All** points of access to the building must be fitted with locks: Make a complete survey, roof to basement. If your roof is at all accessible from other roofs, make sure that your bulkhead door—the one that leads to the roof—locks securely from the inside. The Multiple Dwelling Law and fire safety common sense require that the bulkhead door be openable from the inside without a key—a sliding bolt or two is a good choice here. The illustration below shows one type of roof bulkhead bolt lock.





Your building's front door gets quite a bit of wear and tear. The door and doorcloser must be very heavily built, tough enough to take constant use. The front door locking system must also be extremely rugged—a self-locking slam lock is required by law and is also a good choice, since it locks whenever it's shut. Being locked out once in a while is far preferable to having the front door regularly left unlocked. The lock will benefit from careful and regular maintenance, mostly lubrication and adjustment. Use graphite for lubricating the lock, since oil can gum the tumblers.

A front door buzzer system may seem convenient, but it's often a security risk. Too frequently, tenants buzz in people without knowing for sure who they are letting into the building. When a buzzer system is in place, it's a temptation to let people into the building without running downstairs to check first. Intercoms are better, at least you can hear the caller's voice. Your tenant association must weigh the issues of security and convenience and decide which type of system is best for you.

In many neighborhoods, window gates are essential for security. They may, however, pose a real fire safety hazard. More often than not, existing window gates haven't been opened in ages. They're locked with a rusted padlock, and nobody in the building can remember ever having had a key. In case of a fire, that window may be the only way out.

It is now legally mandated that window gates on fire escape windows be openable without a key. Having these openable gates installed is usually very expensive, but it's an expense that's well worth making for the security and safety it provides. The law does not make tenant associations or landlords responsible for installing window gates, but your tenant association might want to consider footing the bill anyway, since good gates can benefit the entire building.

If you do have window gates with locks, be sure to keep them lubricated (twice a year) and operable, and keep the key in an easily accessible place.

Vacant apartments are the biggest security gaps in many buildings. They invite break-ins and vandalism, because nobody pays close attention to them. Once they've been entered, vacant apartments act as an open door to the rest of the building. Not only do thieves tear the plumbing out of the vacant apartment, causing leaks and structural damage, they may well decide to go down the hallway and take money from another apartment, and a television from the next.

Vacant apartments are not nobody's responsibility, they're everyone's. Doors to vacant apartments should be securely locked, and easily accessible windows must be boarded over.

Fire Safety

Nobody wants to think about the possibility of a fire in the building, but it makes a good deal more sense to think about it ahead of time than after it's too late.

Many of the items considered in the interior and exterior lighting and building and apartment security sections apply as well to fire safety: lighting is one obvious example. The better your building is lit, the easier it will be to get out in case of a fire emergency.

The principal physical element of the fire safety system is the building's fire escape and ladder network.

Fire escapes must be strong, safe, clear, and well maintained. Maintenance mostly means painting, and the law specifies that fire escapes and ladders must be painted with two coats: a bright-colored rust-inhibiting undercoat, and a finish coat of any color you like. As the finish coat wears thin, the bright undercoat will show through, letting you know that it's time to repaint.

Fire escapes are essential and, once again, they offer ample opportunity to save money through good maintenance procedures. Properly kept up, they can last as long as the building itself. But if they deteriorate and rust, replacing them can be extremely expensive.

A smoke detector is required by law within 15 feet of each sleeping area. Two types are available, the ionization type and the photoelectric type.

The ionization type, also called the ionization chamber type, contains a small amount of a radioactive substance. The radiation electrically charges (ionizes) air molecules in a small area. Ionization allows an electrical current to flow across the chamber. The presence of smoke reduces the current flow and triggers the alarm. The Nuclear Regulatory Commission says that the radiation level from ionization smoke detectors is safe, but there is some debate about this.

The photoelectric-type smoke detector contains a small light source and a light-sensitive device called a photocell. Reflected light off the smoke particles triggers it. There is no radiation involved.

The ionization chamber type is quicker than the photoelectric type to register a fast-burning fire, but the photoelectric type is quicker in detecting a slow burning, smoldering fire.

Both types are available as battery operated units or 110-volt (house voltage) units. Unless there is heavy renovation in your building, battery operated smoke detectors are probably easier to install. During building renovation, the law says that smoke detectors must be wired into their own 110-volt line. In battery operated units, the batteries should be checked monthly and replaced about once a year.

It's a good idea to provide each apartment with a small chemical fire extinguisher, an expense for the tenant association, but one which will pay off quickly if the extinguisher is used to put out a kitchen or electrical fire before the flames get large enough to do real damage.

AMENITIES

Amenities are those parts of your building which, while not essential to its operation, like structure, weatherization or utilities, add to the overall comfort of your home. It's hard to define what amenities are, because to some degree they're different for everyone. New paint might seem terribly important to one tenant, but inconsequential to another.

The simplest description of amenities is that they include anything which might be considered finish work: floors, paint, plaster, shelving and kitchen counters, that sort of thing. This list is not likely to appear at the top of your maintenance and repair priorities. But attention paid to your building's amenities may have a quietly valuable effect. The better your amenities are, the more committed tenants will be to your building, and thus the more attention they'll pay to keeping everything in good shape and paying their rent. The amount of money and trouble this attitude could save in the long run shouldn't be underestimated.

Plaster and paint are the finish surfaces which do the most to define the atmosphere or feeling inside an apartment. But peeling paint or flaking, cracking plaster are more than unsightly: In some situations, they pose a real health hazard.

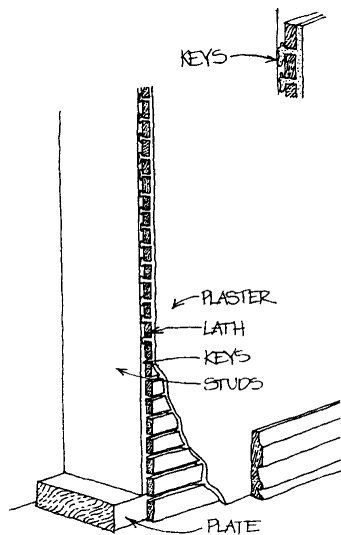
Old paint, especially if you suspect that it's lead-base, must be removed or adequately covered. Children sometimes put chips of lead-base paint in their mouths, or if the paint has crumbled into dust, put their fingers in the dust and then in their mouths. Lead poisoning in children can result in brain damage or cause learning disabilities. Lead poisoning in adults can cause permanent kidney and liver damage if the paint dust is inhaled or if chips fall into food. Any building built before 1960 is likely to have lead-base paint on the walls, but it has probably since been covered up with oil- or water-base paint.

In bathrooms and kitchens, paint protects the plaster from water damage. Plaster softens from contact with moisture. The contact can be direct, as from a leaky pipe or roof, or it can come from water vapor in moist air, as from a steamy shower or boiling water.

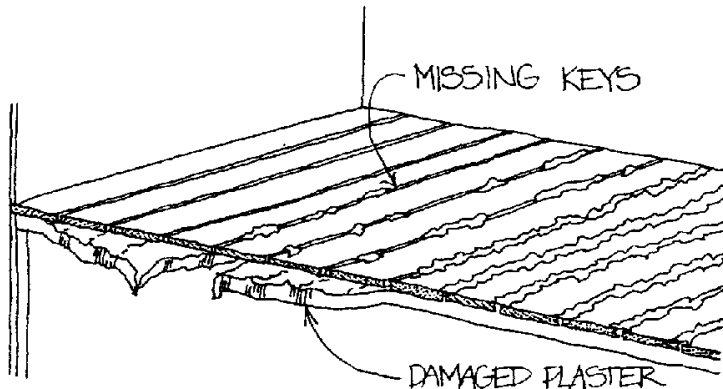
Loose plaster chunks can be extremely heavy and cause serious injuries if they fall on people. Plaster is not an adhesive. It's attached to the walls by being pushed through the gaps in wood or wire lath, where it spreads out and forms "keys" which anchor the plaster to the lath. The lath is nailed onto studs, vertical wood 2 x 4s, which in turn are nailed to top and bottom plates, horizontal 2 x 4s. Wood lath consists of thin strips of wood nailed horizontally, like stripes, to the studs parallel to the plates. Wire lath is made of sheets of wire mesh. Plaster is applied in two coats: a first, rough coat to anchor it to the lath, then a second, finish coat which is applied over the rough plaster surface and smoothed. The illustration at left is a section through a typical wall, showing plaster coats, wood lath, keys, studs and plates.

The plaster of any wall is held up by its keys. Over the course of time, parts of these keys will naturally loosen or break off. If moisture is trapped behind the wall, or if the wall is constantly banged into or disturbed during a renovation, keys will be lost. If too many keys fall off, the whole sheet of plaster that makes up a wall or ceiling may become weak, or "dead" as contractors call this condition. Dead plaster is very dangerous, because while it seems to be standing up fine, any little jolt could bring it down with a crash.

Cracks in walls or ceilings are a sign of weak or dead plaster. If the surface around a crack will move in and out from the wall or ceiling when pushed, the loose section should eventually be removed and replaced. Loose ceiling plaster is especially hazardous, and ceiling plaster loosens the fastest because of the weight the keys must carry and the vibrations caused by activity on the floor above. Ceiling plaster may sag or droop several inches off its lath. Loose sections of ceiling plaster must be removed immediately, even if you won't



get around to replacing them for a while. They are a real safety threat. The illustration below shows a ceiling in section with sagging plaster and missing keys.



PROBLEM: Loose, Cracked, or Falling Plaster

Old plaster may be patched with new plaster or with sheetrock. Small cracks or holes in sections which are still "live" are easily patched with plaster. Plaster is a dry powder which forms a thick paste when mixed with the right amount of water. One of the drawbacks to working with plaster is that it tends to dry very fast, and for this reason many plasterers add lime to the mix, which retards the plaster's drying and gives them more time to work. On the other hand, too much lime will result in plaster which never dries properly, so you have to know what you're doing when mixing plaster. Try to get advice from someone who has worked with plaster before tackling your own jobs.

Larger holes and sections of walls and ceilings which have become dead and must be replaced are more easily patched with sheetrock. Sheetrock, sometimes called wallboard, plasterboard, drywall, or gypsum board, is a rigid but brittle board made of gypsum—one of the ingredients of regular plaster. The chalky gypsum is protected on both faces of a by heavy paper, often a pale off-white on the finish side and a splotchy grey on the side which is to be turned in to the wall. Some sheetrock, which has been waterproofed for use in kitchens and bathrooms, has a blue or green finish surface and may be referred to as blueboard or greenboard. If it hasn't been waterproofed, sheetrock is very porous and easily damaged by exposure to moisture, so it must be carefully stored before use.

Sheetrock is available in various sizes: 4' x 8', 4' x 10', 4' x 12', etc., and in thicknesses of 1/4", 3/8", 1/2", and 5/8". The most common and easiest to handle is the 4' x 8' size. Sheetrock is now used in virtually all new construction or renovation. Even when a plaster finish is desired, it's often achieved by using a perforated sheetrock rather than much more expensive wire lath. Sheetrock requires no lath. It's nailed or screwed directly to the studs, and then finished with a skim coat of thin plaster or simply taped and compounded at the joints. In this second method, joint compound, a ready-mixed plaster-like substance is applied and smoothed over nail or screw holes, imperfections and joints which have been taped with a paper or fiberglass screen tape.

In some new construction or renovation, steel studs may be used for interior walls. Steel studs and sheetrock are fastened to one another with special sheetrock screws, rather than nails, driven in with an electric drill with a special bit or a special screw gun. Steel studs are not as strong as wood and should not be used, for instance, where doors will be hung. However, they are less expensive than wood and, for most people, easier to work with.

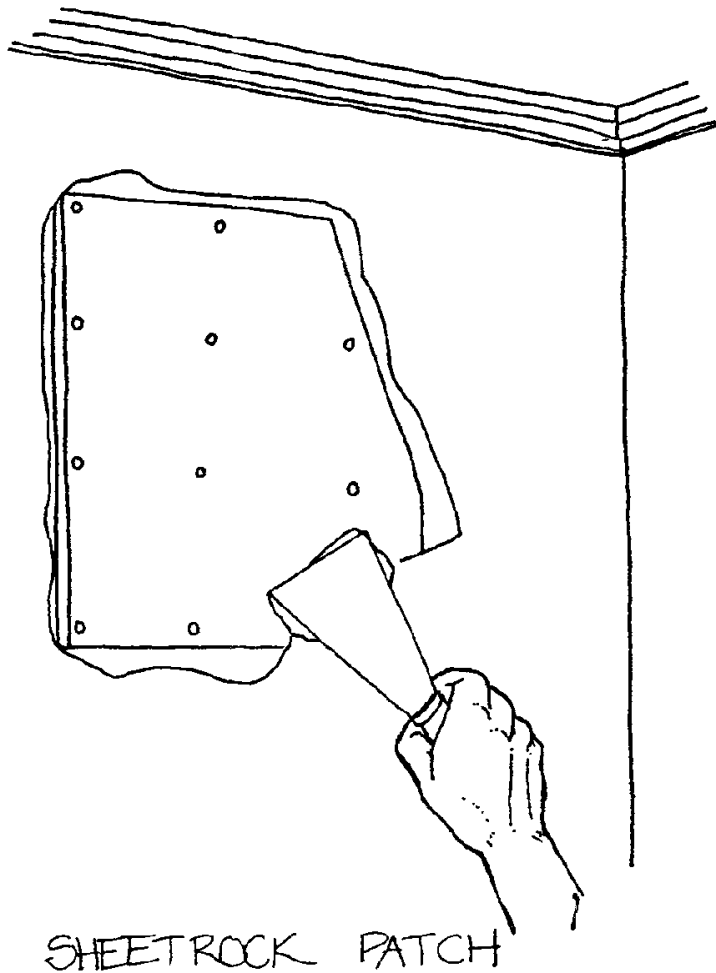
To repair a hole with sheetrock, cut a piece approximately the same size and shape as the hole left on your wall or ceiling after you have torn away all the dead plaster and weakened keys. Then nail the piece of sheetrock to the studs—not to the lath, since nailing on the flimsy lath will only loosen all the other keys on that wall—and finish the edges with plaster or joint compound. Some carpenters like to use steel-stud sheetrock screws to fasten sheetrock patches onto plaster and lath walls, since the action of screwing the sheetrock to the walls is less likely to cause further weakening of the existing plaster than the act of hammering. The illustration on the facing page shows a sheetrock patch in a plaster wall.

PROBLEM: Peeling Paint

Paint in kitchens and bathrooms should not be allowed to crack or peel, and should be repainted regularly with a water-repellant gloss or semi-gloss paint.

When painting any surface, proper preparation of the old surface will ensure that the new paint will look better and last longer. Old paint should be scraped and wire brushed off, so that any loose flakes or bubbles are removed. Then the entire surface should be cleaned and, if gloss or semi-gloss paint has been used previously, sanded a bit to roughen up the surface so that the new coat will adhere better.

If you suspect that you have lead-base paint in your apartment there are two recommended cures. One is to wire brush the surfaces down to bare plaster and repaint. Since the lead paint dust is harmful, particle masks must be worn while cleaning the walls and great care must be taken to remove all the dust from the apartment. The other cure is to sheetrock over the surfaces and start fresh.



CHAPTER TWO: KEEPING IT WORKING

BUILDINGS ARE NOT FOREVER

Consider, for a moment, the plight of your poor building. A building can't come in out of the rain or snow. It can't look for a patch of shade on a hot summer afternoon, or warm up inside during freezing winter weather. Twenty-four hours a day, 365 days a year, a building stands exposed to whatever comes along.

A building spends its entire life trying to fend off the weather. It will never be completely successful. The roof, suffering under extremes of heat and cold, will blister and crack and eventually let water in. Water, the archenemy of all buildings, creeps in elsewhere as well: into the basement, into the walls, into windows or doors left open. Wood, in walls or on windows or doors, rots when it's wet and then cracks when it dries out. Iron rusts.

Buildings have a rough time of it. The least we can do is make their life a little easier and longer, and the way to do that is through maintenance. Good, regular maintenance is the only way to keep a building working. Some deterioration naturally takes place over time, but it can be prevented or reversed with proper maintenance, and the useful life of your building will be greatly prolonged.

What's maintenance? Maintenance is many things, from the simple common sense of keeping things clean to the detailed servicing of a heating system. Maintenance is keeping up with repairs such as fixing the front door when it's sagging on its hinges and just barely closing. Ignoring it may mean replacing the door in the near future.

More than any single piece of work, maintenance involves an attitude. A building will be well maintained only if its residents care about it. Only if they keep themselves alert to the building's condition, and take responsibility for improving it, will their building receive quality maintenance.

It's not hard. It is often inexpensive. Almost without exception, it costs more to repair something after it has broken than it does to keep it regularly maintained. Maintenance and repair go hand in hand. In fact, the

distinction cannot be clearly made. Generally, minor repairs are a part of regular maintenance and more major repairs are needed when regular maintenance is neglected, or something goes wrong.

This chapter is about maintenance and repair from the general to the specific: what to do and how to get it done.

WHY BOTHER WITH MAINTENANCE?

Maintenance is important first because it protects the health and safety of a building's inhabitants. People have to have heat in the winter, a functioning plumbing system, and good security—all of which only maintenance of the building's systems can provide. Maintenance is important because it keeps a building free of hazardous conditions: a broken stair, for instance, frayed wires, or loose chunks of plaster. Maintenance is essential to keeping track of the building's condition, so that any major problems can be attended to right away.

Secondly, maintenance will prolong a building's life. Minor problems can sometimes mushroom into real nightmares, and expensive nightmares at that, if they are not caught early. A leaking pipe in a vacant apartment might not seem at first to be anybody's priority for repair, but the constantly flowing water will eventually rot out the floor and beams below, causing the ceilings to collapse in the apartment underneath, and that would surely be somebody's priority! Many maintenance procedures will be cheaper if they are done right away than if they are postponed. Loose door hinges might need tightening, or a couple of new screws—a few cents' expense and a couple of minutes' work. If the door is allowed to sag, the door itself could be damaged, or the frame might be pulled out of the wall, requiring a new door and frame.

Finally, decent maintenance promotes a comfortable, pleasant atmosphere—a real sense of home. Freshly painted hallways with clean windows and floors are a lot more pleasant to come home to than peeling, scruffy paint and broken glass.

Routine maintenance involves the cleaning, inspection, repair and renewal of various parts of the building and building systems. Some maintenance procedures should be done at regular intervals, as a matter of course, such as cleaning the hallways several times each week or painting fire escapes once every two years.

Other procedures will need to be done only when the conditions arise which demand them: fixing a loose handrail on the stairway, or patching a hole in the wall, for example. In very old buildings, especially those in which the landlord failed to do any regular maintenance, many repairs will have to be done right away simply to bring the building's condition up to a reasonable standard. In many city-owned buildings, windows and window frames have rotted after long exposure without paint, and need to be replaced. These buildings often need a new roof, a new boiler, new plumbing and new electrical wiring. These are buildings ready for the construction emergency ward, and just trying to figure out what needs to be done and how to do it can seem almost too much.

The best way to begin is by establishing a maintenance policy.

ESTABLISHING A MAINTENANCE POLICY

A thorough, comprehensive maintenance policy enables your tenant association to make the best possible decisions on how to spend the limited money available for maintenance and repair. The policy will make it possible for the association to handle repair and maintenance in an efficient and fair manner, anticipating, and with any luck avoiding, problems and conflicts. When a maintenance policy has been formulated with input from all of a building's tenants, it protects the residents as well as the building's managers. The building's managers, who in your case may also be tenants in the building, are not put in the position of having to make arbitrary decisions. Instead, they will be carrying out mutually accepted policy. Thus, when tenants demand new kitchen cabinets, or want to know when their hallways will be painted, the maintenance policy voted upon by the entire association allows you to point out politely that the tenant association has decided that repairing the roof, replacing the boiler, and upgrading the elevator will have to come first.

Getting a good policy together in the first place isn't easy. It requires a lot of thought and planning, and usually a great deal of discussion among members of the tenant association, but it's well worth the effort, and it ought to be one of the first things you do when you take over the management of your building.

Some of the questions to consider while establishing a maintenance and repair policy for your building are:

- ✦ What should the building's repair priorities include? What needs to be done immediately and what can wait? How will a repair's place on the priority list be determined, and by whom?
- ✦ Who will bear responsibility for making sure that necessary repairs are accomplished?
- ✦ Who will have the power to authorize the expenditure of tenant association funds for repairs?
- ✦ Who will be responsible for doing routine maintenance and upkeep?
- ✦ How will non-emergency repairs be handled, and by whom?
- ✦ What happens in an emergency? Who's responsible for taking action to begin work on an emergency repair? When must approval for an emergency repair be sought from the tenant association as a whole?

- ⚡ Who will be responsible for hiring contractors, and what sort of terms will any contracts contain?
- ⚡ Who will be responsible for supervision of both routine maintenance and repairs, and emergency repairs?

Asking yourselves these questions should help you to formulate a policy which fits your building's particular needs. When you begin discussing maintenance policies, try as often as possible to use test cases for examples: What if the boiler broke down? What if the floors weren't getting cleaned regularly? What if lightbulbs were not being promptly replaced? What if a contractor hired to fix the roof wasn't showing up at work on schedule? Asking these sorts of questions will force your discussions to be very practical, and the resulting policy will likely reflect that emphasis.

A committee should be formed to draft a maintenance policy in writing. Once this maintenance policy receives approval from the tenant association, give copies of the policy to all the tenants. This will defuse disputes before they have a chance to get started. The committee you form might remain as your building's maintenance and repair committee, or might be an ad hoc committee, formed just to draft this policy.

WHAT NEEDS TO BE DONE?

Equipped with a comprehensive maintenance and repair policy, you're ready to begin figuring out what needs to be done. Unfortunately, a lot of maintenance tends to be done only when the condition has become obvious. It's important to know the condition of your building as thoroughly as possible, so that you can begin early on to determine its maintenance needs and potential repair problems. Putting off repairs may be unavoidable, since there's seldom enough money to go around. But if you know your building well from the start you will be able to decide which repairs can be postponed without risking further damage to your building, and which, on the other hand, will end up costing you a great deal more in the long run if you put them off. As you continue managing your building and begin catching up with overdue repairs, fewer and fewer projects will have to compete for scarce repair resources.

Conducting a Building Condition Survey

You should establish a maintenance and repair committee to conduct a building condition survey. On the following pages we'll outline the parts of your building which need to be inspected, and what to look for. Your survey will cover the building's exterior and yards, as well as interior public spaces and individual apartments. The survey should be as detailed as possible, with everything you notice written down in full. The results will help in establishing priorities and budgeting repairs. They will also make it possible for you to keep an eye on things which don't need attention yet, but which might soon. The completed survey serves as a sort of master list; after that, a review should be conducted every year or so to update the information, and any reports of repair or maintenance problems that come into your maintenance and repair committee in the interim should be included with the updated surveys.

The building condition survey is to your building what the chart at the end of the bed is to a hospital patient: an essential record. To keep it complete and accurate, encourage all tenants to contribute the problems they notice. This may be easily accomplished by distributing standard repair report forms among tenants, which they can fill out and hand back in, perhaps to the building's super. A sample repair report form is shown on the following page.

Even if you can't begin to take care of many of the repairs which turn up as a result of your building condition survey and the standard repair reports returned by tenants, it's important to be aware of what needs to be done eventually. Collapsed plumbing or a broken elevator will be easier to deal with if you're prepared for them to happen. You may even have been able, if you knew about the possible problem early enough, to set some money aside in anticipation. And by having a good knowledge of your building's condition, you can at least initiate repairs and maintenance which may prevent disasters in the future.

REPAIR REPORT

Tenant's name _____ Apt. # _____

Phone # _____ Hours home _____

Description of problem(s)

1. _____

2. _____

3. _____

4. _____

I verify that the above repair was made on _____
Dateby _____
Name of contractor, super, etc.

Signature of tenant _____ Date _____

For the tenant association _____ Date _____

THE BUILDING CONDITION SURVEY

You won't need any particular expertise to conduct most of this survey, though for some parts—the technical parts—you may want to hire an expert to help out or, if possible, ask someone familiar with the system in question to assist you.

The most important thing is to be careful and thorough. At least two people should be present; you'll catch one another on items that one person might have missed. Bring a clipboard with plenty of plain and lined paper, so that you can keep a running list of what you find on the lined paper, and draw pictures of particular problems you encounter, if need be, on the plain paper. Bring pencils and pens of different colors, too—for highlighting problems, or numbering things—to keep the whole survey as easily understandable as possible. You'll want a flashlight or two, an ice pick and pocket knives for checking to see if wood is rotten, maybe a tape measure to help you locate a repair exactly when you write it down.

Be liberal. Write **everything** down. The better informed you are, the easier time you'll have managing your repair and maintenance schedule.

To simplify things, we've divided the building and its systems into smaller components. If nobody wants to take responsibility for the whole survey, different people could each take on one part—but be sure that everyone's report is done in the same way, so that you'll all understand the results.

We'll begin at the bottom and work our way up.

The Basement

- ✍ Corridors: Are they clean, clear and unobstructed?
- ✍ Exits: Are they clearly marked, unobstructed and operable?

- ⚡ Lighting: Are all areas of the basement well lit, even the corners? Are all fixtures working, and all bulbs still good? Are switches clearly marked and unobstructed?
- ⚡ Laundry Room: Are the machines in good working order? Are there any leaks? Is the room clean and well kept?
- ⚡ Garbage Room: Are the cans up off the floor on pallets? Are the cans in good shape, with tight-fitting lids? Are there rat or rodent problems? Is the room swept and clean? Are there odor problems?
- ⚡ Meters: Are the gas, electric and water meters easily accessible to meter readers and tenants? Are they clean and protected from damage? Are they well lit?
- ⚡ Storerooms: Are the storerooms cleaned up and well kept? Are they secure and safe? Are they well lit? Are the contents of storerooms all accounted for? Are there pallets and shelves to keep stored material off the floor in case of a flood?
- ⚡ Windows and Doors: Are all the windows and doors intact and in good shape? Do the locks work well? Are operable units still working? Are doors obstructed by piled junk? Are windows and doors tight in their frames so that there are no bad heat leaks? Are they freshly painted and puttied?
- ⚡ Ceiling, Walls and Floor: Are they clean and well kept up? How's the paint? Are there leaks of dirt or water around the foundation walls? Are the floors uncluttered, dry, and free of oil or grease?
- ⚡ Plumbing: Are there any obvious plumbing leaks? Are hot water overheads and risers insulated? Are all valves plainly marked, color coded and well lit? Are overheads fastened in place, not loose or dangling? Are floor drains and the house trap clear and clean? (You may want to bring along someone who's familiar with plumbing when you inspect this system.)
- ⚡ Wiring: Is the wiring intact and well protected? Is all the wiring accounted for, or are there dangling wires that don't seem to lead anywhere? Are the cables encumbered, by hanging junk for instance? Is the service panel unobstructed and well lit? Are there any signs or evidence of problems, such as scorch marks, or frayed wires or cables? (You may want to bring along an electrician when you inspect this system.)

The Heating System

- ⚡ Controls: Are all the controls clean, easily found and well marked? Are they operable?
- ⚡ Burner/boiler: Is the floor around the burner free of oil spills?
- ⚡ Water heater: Is the water heater dry, tight, and insulated?
- ⚡ Piping: Is all piping in good condition? Are valves clearly marked? Are risers and overheads insulated? Are all connections tight and without obvious leaks?
- ⚡ Water supply: If you have an automatic boiler-water supply, is it in good working order? If not, is there a faucet with a hose end in the boiler room?
- ⚡ Ventilation: Is the burner/boiler well ventilated to the outdoors? Is the boiler room properly vented, and are the vents open and unobstructed?
- ⚡ Fire-rated enclosure: Is the burner/boiler unit surrounded by an enclosure which meets fire rating standards?
- ⚡ Oil storage tank permit: Is the permit from the Fire Department current and displayed within sight of the boiler?

Note: You will probably want to have a heating system professional along to inspect your heating plant. At the same time she or he can help you inspect the radiators in apartments upstairs.

The Elevator (if your building has one)

- ⚡ Doors: Do elevator doors open easily, smoothly, and all the way? Do they close tightly, promptly and completely? Does the safety catch work to keep the doors from closing on a passenger in the doorway?
- ⚡ Leveling: Does the cab stop level with the floor at all stops?
- ⚡ Hall pushbuttons: Are call buttons on all floors operating? Are they clean and clearly marked? Does the cab respond promptly to calls?
- ⚡ Cab pushbuttons: Do all floor selection buttons work properly? Do "Door Open" and "Door Close" buttons function? Are emergency buttons well marked and in good working order?
- ⚡ Lighting: Is the cab well lit at all times?
- ⚡ Ceiling, walls and floor: Is the cab clean and in good repair? Are the interior surfaces freshly painted? Are there any loose edges or panels on ceiling, walls or floor?
- ⚡ Certificate of Inspection: Is the safety inspection notice from the Department of Buildings posted in its frame, and current?

Lobbies and Halls

- ⚡ Intercom: If you have an intercom, is it working well? Are voices heard over it easily understandable? Are names of tenants posted and readable?
- ⚡ Door release buzzer: If you have one, does it work properly? Does the lock release when buzzed? Does it lock again when the door closes?
- ⚡ Mailboxes: Are all mailboxes clean and in good condition? Do they open and close well? Do the locks work? Are tenant's names marked on them?
- ⚡ Stairways: Are stairs in good condition, without loose treads or pulled up carpeting that could cause accidents and falls? Are they well lit, clean and unobstructed? Are all handrails intact and securely fastened?
- ⚡ Apartment doors: Are all apartment entry doors well marked with either the apartment number or the

occupant's name(s)? Are the doors in good shape, without holes or broken locks or hinges?

- ✎ Lighting: Are all hallways, stairwells, lobby and any other public spaces brightly lit at all times? Are lightbulbs in place and all fixtures still working? Are switches easily located and well marked?
- ✎ Ceilings, walls and floors: Are all surfaces clean and in good repair, free of holes, cracks or peeling paint? Are walls and ceilings freshly painted? Is the finish floor safely fastened, without loose tiles, boards or carpet?

Individual Apartments

- ✎ Entrance Doors: Do entrance doors open and close easily? Do lock mechanisms work smoothly and solidly? Does the peephole provide a good view of visitors? Are hinges well fastened and oiled?
- ✎ Windows and window gates: Are the windows in good repair? Are all the panes in place? Are any cracked? Is the wood solid, free of rot and freshly painted? Is the window putty cracked or dried out? Do the windows slide smoothly and close tightly? Are the windows weather-tight? Are the window locks sufficiently secure and in good operating condition? If you have window gates, is the paint still good? If they're supposed to open, do they still work? If they're the key type, is the key easily accessible?
- ✎ Room doors: Do all room doors operate smoothly and close tightly? Are there doors in place where they're needed? Are there doorstops on the baseboards to prevent damage to the wall when the doors are opened? Do the doors have panels missing or holes in them?
- ✎ Bathroom: Does the bathroom have all its fixtures? Are all fixtures in good operating condition? Are faucets easy to use? Do they shut tightly, without dripping? Are there leaks around faucets, or around the toilet? Are drains clean and operable, free of obstructions? If there is a shower, is the surrounding area fully waterproofed? Is the bathroom well ventilated? If there is an exhaust fan, is it working?
- ✎ Kitchen: Is the kitchen clean and free of rodent or insect problems? Is the refrigerator working well? If there is a gas stove, is it in good working order, with all pilots operating and no smell of leaking gas? Does the sink fill and drain quickly? Are counters and cabinets in good shape, with tight water seals around the splash guard behind the sink? Is the formica well adhered to counters, with no cracking or bubbling? Are there any plumbing leaks?
- ✎ Ceilings, walls and floors: Are all painted surfaces freshly painted, or at least free of peeling paint? Is the plaster on ceilings and walls still live, free of bad cracking or loose sections? Do the ceilings show water staining from plumbing or roof above? Are the floors in good shape, with no holes or loose covering to cause accidents?
- ✎ Heating: Are all radiators in good operating condition, without leaks or rusty puddles beneath them? Do valves and controls on them work well? Do they provide sufficient heat to all rooms?
- ✎ Lighting: Are built-in fixtures in good shape and operating? Do switches work, and control the fixtures they're supposed to? Are all areas well lit, by built-in or mobile fixtures?
- ✎ Wiring and electricity distribution panel: Is wiring adequate for current needs? Are there sufficient outlets in rooms? Do the occupants blow fuses often, indicating overloaded circuits? Are fuses in adequate supply, and the fuse box or circuit breaker box well marked? Are occupants using appliances wisely, without overloading extension cords or multi-receptacle plugs? Are there any signs of trouble, such as scorch marks around outlet sockets, or warm spots behind outlets or switches which could suggest overloaded wiring?

The Building's Exterior

- ✎ Roofing and skylights: Is the roof in good condition? Are joints well sealed, and seams tight, without open cracks or bubbles where strips of roofing material overlap? Is the roof surface free of punctures or tears? Does water run off freely without puddling? Is the flashing around skylights well sealed? Is the roof clean and free of litter or debris?
- ✎ Roof drainage: Are all gutters and drains clean, unblocked by leaves or trash? Is the sealant around drains still intact? Does water collect around the drains in puddles that could lead to leaks?
- ✎ Downspouts: Do all gutters have downspouts where they're needed? Are downspouts in good condition, not rusted or broken? Do downspouts keep water away from the building facade, or does water leak down the side of the building?
- ✎ Parapet walls: Are all parapet walls intact and upright? Are all coping stones solid and in place, with no gaps or loose stones? Is the flashing around the base of the parapet wall solid and strong?
- ✎ Vents, stacks and chimneys: Are chimneys upright and intact, with all bricks and mortar in good condition? Is flashing around the chimneys, vents and stacks intact and well sealed? Are vents and stacks present, not broken off or bent? Are vents and stacks clear, not blocked with debris dropped or forced down them? Are vents and stacks protected from blockage by reverse curved ends or screens?
- ✎ Masonry facade: Is the brick and mortar on your building's outside walls in generally good shape? Are there any missing bricks, or sections where the mortar has washed out? If a wall was once a party wall with another building, is that wall solid and weatherproof?
- ✎ Windows: Are all windows in place, in reasonably good condition on the exterior, without missing panes? Are frames set tightly into the masonry opening, without gaps or cracks where water could get in? Is the window frame well caulked and weathertight? Is the exterior sill on every window solid, not rotten, and does it drain water away from the wall?
- ✎ Doors: Are all doors functioning? Are any missing? Are all hinges well oiled and fully fastened? Are all locks in good working order, fitted with keys that work? Are door stops and weather seals in good shape? Are doorways clean and unobstructed by debris? Are basement window wells empty, free of leaves or litter?

- ✧ Fire escapes: Are all fire escapes intact and freshly painted, with no bright undercoat showing through anywhere? Are escapes fastened solidly to the building wall? If the escapes have retractable sliding ladders, do these mechanisms work easily and quickly? Are fire escapes and ladders clear, unobstructed by plants, furniture, barbecues, or junk?
- ✧ Courtyards and airshafts: Are courtyards clear, free of litter and well paved? Are paths smooth and curbs in place? Are airshafts clean, not filled with garbage or debris?
- ✧ Sidewalks: Are sidewalks surrounding your building in good condition, with no bad cracks or missing pieces of pavement?
- ✧ Gates and fences: If your building has gates and fences around it, are they in good repair? Do the gates open and shut easily and tightly? Are the gates and fences freshly painted and free of plant growth or underbrush?
- ✧ Lighting: Is all exterior lighting in good working condition? Do all fixtures have bulbs in them and are they operating? Are fixtures well aimed? Are bulbs protected by screens? Is sufficient lighting provided in high danger zones, such as stoops and doorways? Are paths well enough lit to prevent accidents?
- ✧ Area drains: Are area drains in courtyards and airshafts and on paths outside your building clean, unblocked by debris, and draining well? Does water run toward them quickly, without pooling? Is the paving around them solid, not cracked? Are the drains well screened to keep obstructions from washing, or being forced, down them?
- ✧ Retaining walls: Are foundation and retaining walls in good shape, not buckled or badly bulging? Are plants kept well away from them, so that they can't tear mortar from between the blocks? Is the ground surrounding the building clear and solid, without deep holes which could indicate bad roof-water run-off and possible leakage into the basement and weakening of the walls?
- ✧ Stoops: Are front and back stoops in good shape? Are the steps to them solid, without broken or missing treads? Are all railings intact and strong? Are stoops well lit?

When you have completed the survey—and it may take a few weeks to do so—your tenant association's maintenance and repair committee should meet to review the findings. The point of the meeting is to figure out your repair priorities and make up a preliminary action list.

Then you'll want to hold a full tenant meeting, to let everyone in the building know the survey results. Present your tentative repair priorities at that time and take suggestions, then work out a final priority list.

Housing Code Violations

It's entirely possible that in the course of your survey you'll find one or more conditions in your building which do not meet the Housing Code. If you're living in a city-owned building, the city's Department of Housing Preservation and Development (HPD) maintains a list of code violations for your building, which you may obtain through your Tenant Interim Lease coordinator at HPD (if you are enrolled in the TIL program) or simply by contacting the Chief Inspector at the Division of Code Enforcement of the Office of Rent and Housing Maintenance. See Appendix A: Government Agencies and Professional Organizations for the address and phone number. A list of violations will cost you \$10.00, payable by check, made out to New York City Commissioner of Finance.

Why should you want more bad news, especially when you have to pay for it? For one thing, you'd probably want to take care of code violations anyway. And code violations can make you and your building ineligible for certain financial assistance programs, like Section 8 funding, 8A loans and J-51 tax abatements.

Code violations which are rent impairing may be used by some tenants as an excuse for not paying the rent. This may be reasonable enough, or it may simply be a way to avoid paying the rent. In either case it deprives your tenant association of money you badly need just to operate the building, much less improve it. For a list of rent-impairing code violations, see Appendix B at the back of this book.

Until you've corrected your rent-impairing code violations, tenants who choose to can still refuse to pay the rent, but keeping all the tenants abreast of what the tenant managers are doing and what the repair priorities are can help avoid this kind of conflict.

All code violations are classified in three categories:

- ✧ Classification A. This category includes non-hazardous violations such as lack of paint, no peep-holes in apartment doors, no mirrors in self-service elevators, and failure to provide tenants with rent bills or receipts. These violations should be removed within 90 days from the time they are reported.
- ✧ Classification B. This category includes hazardous violations such as lack of sufficient metal cans with covers to hold the building's garbage, inadequate lighting in the halls, and the presence of vermin. These violations should be removed within 60 days from the time they are reported.
- ✧ Classification C. This category includes immediately hazardous violations such as a defective gas appliance that is emitting carbon monoxide, the presence of rodents, a broken down central heating system, or an obstructed toilet. These violations should be removed immediately (within 24 hours) or within 30 days from the time they are reported.

Before you correct your violations, you may want to get a copy of the Office of Code Enforcement's pamphlet on Violation Order Numbers, a list of Housing Code violations in order number sequence which tells you what classification each violation is.

Violations are removed from the record after an inspector from the Division of Code Enforcement conducts an inspection. To request such an inspection, you must fill out a Dismissal Request form and submit it to the Chief Inspector at the Office of Rent and Housing Maintenance. See Appendix A: Government Agencies and Professional Organizations, at the back of this book for the address and phone number.

WHAT TO DO FIRST

Many buildings just starting out under tenant management will need extensive repair work, but during the first winter it's likely that the tenants' top priority will be simply keeping warm—keeping the boiler supplied with fuel. Whether they mean to or not, they've just established a repair priority: everything else waits until enough money is in hand to pay for heating the building.

This is, however, only a temporary priority. It should soon give way to a longer term analysis of what needs to be done and when. Emergency repairs put off during the first heating season will need to be taken care of as soon as possible the next summer, when fuel bills are far lower. After that, and after a building condition survey has been completed and evaluated, your tenant association should adopt a regular method of deciding the priority status of a needed repair.

Such a priority system might start with all repairs needed to ensure the health and safety of tenants, including most Class C violations. Second should come repairs which will upgrade the building's condition, and prevent further deterioration of any of the building's systems. Third, you'll eventually want to get to amenities and cosmetic repairs, but many of these may be left to individual tenants or volunteers.

Once you've established a repair priority system, share it with all tenants. It works in the same manner as the repair and maintenance policy, of which it is a part, as a way of avoiding conflicts later.

One good method for organizing your repair priority system uses 5" x 7" file cards, which are cheap and easily available. Small, inexpensive file boxes for such cards can be purchased with dividers, and the general category of repair priority can be written on the divider. Then repairs can be filed in order of their priority, behind the dividers, with a single repair job outlined on each card. As a repair is completed, that card can be moved to a section of the file for completed repairs. If your building decides to use a standardized repair report system, such as the one suggested on pages 83-84, those report forms could be copied and glued right onto the file cards. This system should be easy to use, flexible and efficient.

WHO'S RESPONSIBLE FOR WHAT?

Who is responsible for what in the day-to-day maintenance and operation of your building is a tricky question, and it must be addressed by your tenant association when you write a maintenance and repair policy. There should be no confusion about what people's responsibilities are. Some tasks will be done by the building super or paid maintenance staff. Some will be handled by hired help, either from within or outside the building. Some tasks may be left to individual tenants or volunteer tenants. But whatever is expected of any of these individuals or groups must be very clearly spelled out.

The various roles assigned will be determined by the size of your building, the amount of money you can afford to spend, and how much time tenants are willing to contribute. In some buildings the tenant association may hire tenants to do all necessary routine maintenance. Some buildings may even choose to hire no one, and use a rotating system of volunteers from among the tenants. On the other hand, a building may as easily decide to hire a super from outside the building to handle all routine upkeep.

Routine maintenance and repair includes keeping the public areas clean and well lit, maintaining the building's exterior appearance and overall condition, maintaining the burner/boiler, removing obstructions from the hallways, courtyards and roof, doing minor repairs such as replacing window panes, small painting and puttying jobs, fixing faucet leaks and so on. Which of these tasks will be the responsibility of the super and which will be the responsibility of the individual tenants must be well defined in your maintenance and repair policy. The super's contract should clearly state what his or her responsibilities are.

What the Super Does

There are two ways of describing the super's job. One is to describe the activity; for instance, "The super shall clear, sweep and mop the halls on Mondays, Wednesdays and Fridays." This is a clear enough statement of the super's duties, but it may be too restrictive. What happens if somebody drops a bag of garbage on Friday, soiling the hallway after the super has finished cleaning? Must you wait until Monday morning to have it cleaned up? It might be better to define the super's cleaning duties by saying: "The super shall keep the halls neat and clean and free of obstructions." The public areas of your building may require sweeping six times one week but only once the next. The super's job isn't so much sweeping them as it is keeping them clean.

The super's job description and contract must also define the limits of the super's authority, and who will supervise the super. If every tenant feels that he or she can order the super around, you'll have troubles. Your super's job description should be well understood by all tenants, so that no conflicts between the super and the tenants come up. Tenants need to know how to report repair and maintenance problems, and what they can expect the super to do.

What the Super Doesn't Do

Many of the regular maintenance and small repair items on your list will be part of the super's job. But what about those that aren't? You'll need a method for assigning those tasks and making sure they get done.

Self-help or "sweat equity" has worked very well in some buildings for many kinds of repairs and improvements. Tenants may work on group projects, like cleaning out the basement or painting the hallways. Individual tenants may take responsibility for cosmetic repairs inside their own apartments. Self-help not only stretches slim maintenance budgets, it encourages a feeling of pride and self reliance among the tenants, and pride helps cut down on vandalism and neglect. It's well worth considering if the tenants in your building are willing to do the work.

You may have no choice but to hire someone for many jobs. In these cases, you may decide to contract with the super to do extra work above and beyond his or her contract, for extra pay at a specified rate. Or you may hire skilled tenants who will do the work, again for a specified and agreed upon rate of pay. You might end up hiring an outside contractor, and in some cases this will prove to be your best option. In any event, a written contract should be drawn up whenever the tenant association hires anyone—super, tenant or contractor—which specifies the job to be done, the payment offered, and the schedule within which the work must be completed. See the section on Informal Arrangements, in Chapter 4: Hiring Help, for more information on this type of hiring.

Who Does the Hiring?

The tenant association must decide which repairs may be ordered directly by the building manager or super, and which must be considered and approved by the whole association.

Since the building manager or super is responsible for the day-to-day maintenance and operation of the building, it makes good sense to make that person responsible for ordering general maintenance services, minor repairs, and most emergency repairs as well. The extent of the building manager's authority to order repairs might include: ordering materials for small carpentry, plumbing or electrical repairs to be done by the super or tenants, and contracting for minor repairs to be done by contractors. Remember that in ordering such services, the building manager must abide by the guidelines and priorities established by the tenant association in its maintenance and repair policy.

The building manager, however, should probably not be authorized to call in a roofing contractor, for instance, or a general contractor or burner/boiler repair service for major work without receiving the tenant association's prior approval. Authorization for major repairs—such as jobs whose total cost will exceed \$200—should be made by the repair committee or the full tenant association, and at least two or three separate estimates should be sought for such jobs.

For a fuller discussion of hiring outside contractors, see Chapters Four and Five of this book.

EMERGENCIES

What is an emergency? What should be done when an emergency occurs? How will emergency repairs be ordered, supervised, completed and paid for? How will the building manager, super, or repair person get into individual apartments in case of emergencies?

Emergencies are situations in which the lives of the building's tenants, or the safety of the building itself, are in immediate danger: fires, sparking electrical wires, gas leaks, plumbing floods, structural collapses. Some understanding of and agreement on what constitutes an emergency must be reached by the tenant association and must be communicated to all the building's residents, since in an emergency it may be necessary both to spend a lot of money fast, and to enter individual apartments quickly and without prior notice. In emergency situations, the building manager should be authorized to take whatever action is necessary.

When a pipe bursts, or a gas leak occurs, the super or building manager may need immediate access to someone's apartment. In some buildings the super keeps keys to all apartments, while in others that would be unthinkable. But some sort of policy on access to apartments for emergency repairs must exist in the tenant association's by-laws, and it must be understood and abided by by all the tenants.

It may mean leaving keys with the super in a sealed, signed envelope which may be opened only in an emergency. Or it might involve a general agreement to pay for damage done if a key is not available, and the manager must force his or her way into the apartment.

Note: The law requires that a police officer be present if forced entry is used. In an emergency, call the police or fire department and ask for assistance in entering an apartment for an emergency repair. If you do enter a person's apartment to do a repair when he or she is not home, be certain that there are at least 3 or 4 people present when you do so, and that you lock up again when you leave.

REPAIR OR REPLACE?

Time and time again in the maintenance of your building, you'll have to decide whether to repair or replace something. This is as often a purely technical question as it is one of finances, but both must be

considered. One unavoidable factor in the decision is how much you can afford: you may have only enough money to repair your boiler, even though you realize that sooner or later it will have to be replaced.

For tasks that are labor intensive, that is, jobs that cost far more in labor than materials, it often makes sense to go ahead and replace rather than repair. Even if it costs a bit more, it will save you money in the long run. For instance, if the wood in your window frames is rotted, it would take a carpenter many, many expensive hours to carefully make new pieces that fit the old rotted frame; the end result would be just a half-new window. For slightly more money, you could buy and install a brand-new completely weathertight window unit, a far better choice.

Plaster work is another labor intensive job. It's often cheaper to tear down an old wall and put up sheetrock instead, rather than paying for painstaking patching of plaster whose useful life may only be a few more years anyway.

If the materials are the largest part of an estimated repair cost, then it probably makes sense to go ahead with the repair. Also, if a relatively simple and inexpensive repair becomes chronic—that is, it has to be done over and over—it may be cheaper in the long run to spend enough now to replace whatever it is that's breaking so often. If your oil burner needs constant tuning or service, for instance, not only will you have to pay for those service calls, but there's a good chance that the unit is inefficient as well, and using too much precious fuel. Scrape together the cash to buy a new burner. It's by far the better investment.

GENERAL MAINTENANCE GUIDELINES

The following check list might be used by the super, building manager, or whoever is delegated by the tenant association, for keeping track of the building's condition and doing routine maintenance and repair inspections. It's a list a lot like the one used for your building condition survey, and the results of these periodic inspections and repairs should be included with your building condition survey in a maintenance and repair file.

Roof

- ✍ Clean drains and keep them unobstructed.
- ✍ Replace or repair loose or missing coping stones.
- ✍ Check for cracks or blisters in the roofing, and repair as needed.
- ✍ Sweep off standing water after rains.

Exterior Walls

- ✍ Maintain gutters and downspouts so that water doesn't run down along the building's walls.
- ✍ Check condition of mortar between bricks, and repair as needed.
- ✍ Check condition of caulking and weatherseal around windows and doors, and repair as needed.

Windows and Doors

- ✍ Keep all wooden parts freshly painted.
- ✍ Check putty and replace as needed.
- ✍ Replace cracked or broken panes as soon as possible.
- ✍ Lubricate all hinge and lock mechanisms frequently, especially in wet or cold weather.
- ✍ Check operation of latches and locks, and repair and replace if necessary.

Plumbing

- ✍ Repair leaky faucets as they're reported.
- ✍ Check for plumbing leaks and repair immediately.
- ✍ Clean out sink traps and house trap if draining is slow.

Electrical

- ✍ Check operation of appliances and lighting.
- ✍ Inspect tenant wiring practices periodically to check for fire hazards.
- ✍ Make sure there is easy access to meters and switches.
- ✍ Replace fuses as needed, and keep a good supply of fuses available at fuse boxes.
- ✍ Keep meters clean and well-lit.
- ✍ Make sure that cables and conduits are firmly attached to walls or beams, and that nothing is hanging from them.

Security and Fire Safety

- ✍ Replace burnt-out lightbulbs immediately.
- ✍ Check to see that all valves and meters are marked for easy identification in an emergency, and keep all keys handy for the same purpose.

- ✧ Secure vacant apartments against entry, and check on them periodically to make sure that nothing has happened inside.
- ✧ Check fire escape condition, and maintain or repair as needed.

MAINTAINING YOUR HEATING SYSTEM

Your heating system requires more careful and regular maintenance than any other aspect of your building. However, an investment of time or money in the upkeep of your heating system will pay off faster than just about any other maintenance or repair. As fuel costs continue to go up, good maintenance procedures become even more important. Keeping your system running economically and efficiently will save money on repairs and fuel bills, and will help to prevent the possibility of dangerous and costly breakdowns.

For these reasons, we're including here a thorough maintenance checklist for an oil-fired boiler—the kind found in most New York City apartment buildings.

General Maintenance Guidelines

You can easily do many of the following procedures yourselves, but others require certain skills that people in your building might not have. If the boiler is still under warranty, many of the procedures may be left for the service company. In fact, some may have to be left for the service person, or the warranty will be voided, so you ought to ask your boiler service representative which procedures you may do on your own and which you must not do.

Even if you no longer have warranty coverage on your heating system, it is often worthwhile to pay for regular professional service, such as burner adjustments, because the savings in fuel will more than make up for what the service costs.

Check with your oil company to see if they offer special service plans, which many oil companies provide at a lower cost if a full year service contract is purchased. This will guarantee that you are getting the right service for your unit.

For those of you wishing to learn proper boiler maintenance procedures, there are several inexpensive courses offered for tenants and building supers. See Appendix C: Further Resources or check with your UHAB coordinator for more information.

One more thing: Probably the most useful bit of maintenance you can do is the simplest. Keep your boiler room in good shape. Make sure it's well lit. Clean and sweep it often. Whitewash it occasionally. Post the burner/boiler's operating instructions there, as well as the inspection notice. A clean boiler room will eliminate dirt and dust build-up in the combustion fan intake, making your fire burn more cleanly and efficiently. But, equally important in the long run, a clean and pleasant boiler room will make life a lot easier for whoever's responsible for maintaining and overseeing the heating system.

Daily Maintenance Procedures

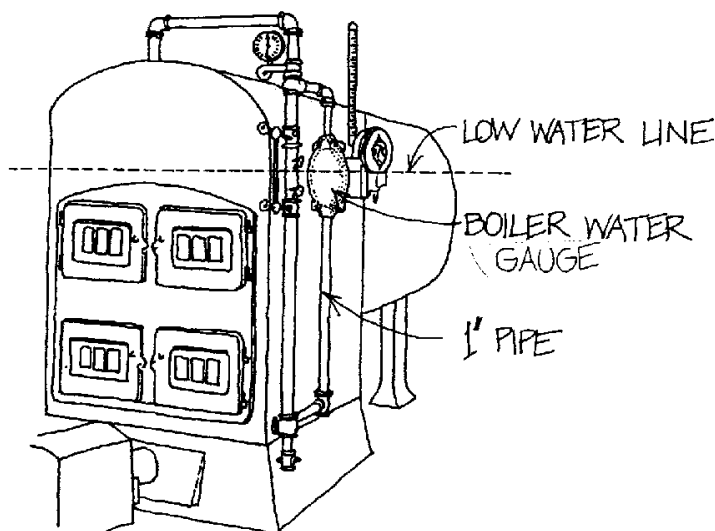
- ✧ Maintain daily log: Check the level in the oil storage tank daily and record it in a logbook, along with the pressure, temperature and any other readings from gauges installed on your burner/boiler. This is the best way of determining when your burner needs adjustment, since variations from the normal pattern will be easy to spot in the log. The illustration at left shows a fuel oil level gauge.

Also, to monitor the cost and consumption of fuel oil, a record of deliveries should be kept including the date of delivery, the amount delivered and the price.

- ✧ Check boiler water level: The boiler should be full. You can check this on the sight glass or gauge on the low-water cut-off. Add water as needed. Many burner/boiler service people recommend chemical boiler-water purifying compounds. If one has been specified for your boiler, add that at the same time as you add water to the boiler. The illustration below shows the water level gauge on a boiler.



FUEL GAUGE



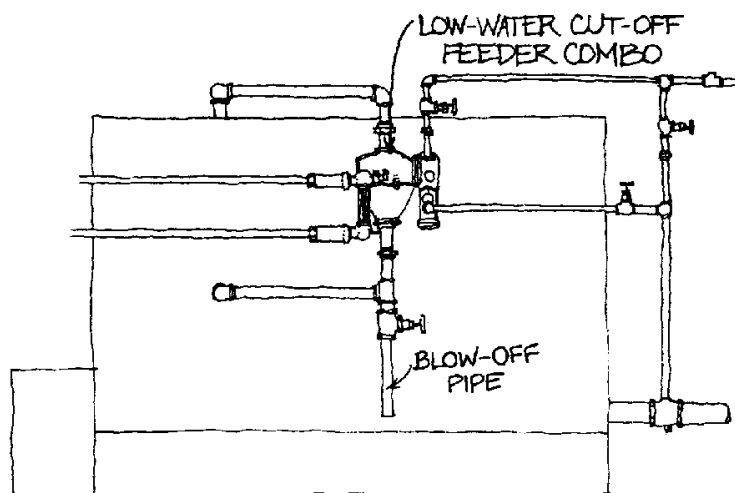
- Check lubricating oil level: Keep lubricating oil at the level marked in the oil cup. **Check the oil in the cup only when burner is shut off!** Add lubricant of the specified grade as necessary; SAE 10w oil is a commonly used grade. Do **not** use multi-grade automobile oils, such as 10w-40. The illustration at left shows a burner lubricating oil level indicator.



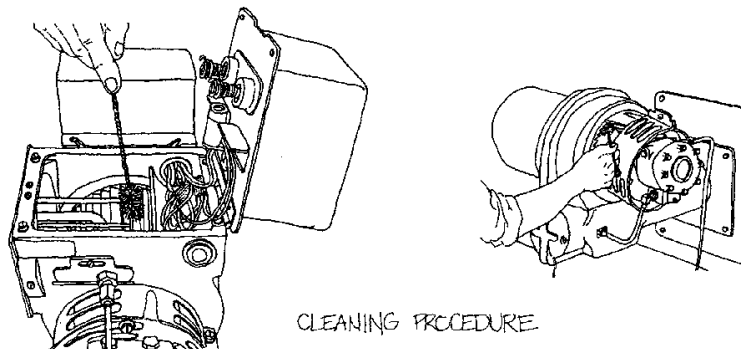
BURNER LUBRICATING LEVEL

Weekly or Bi-Weekly Maintenance Procedures

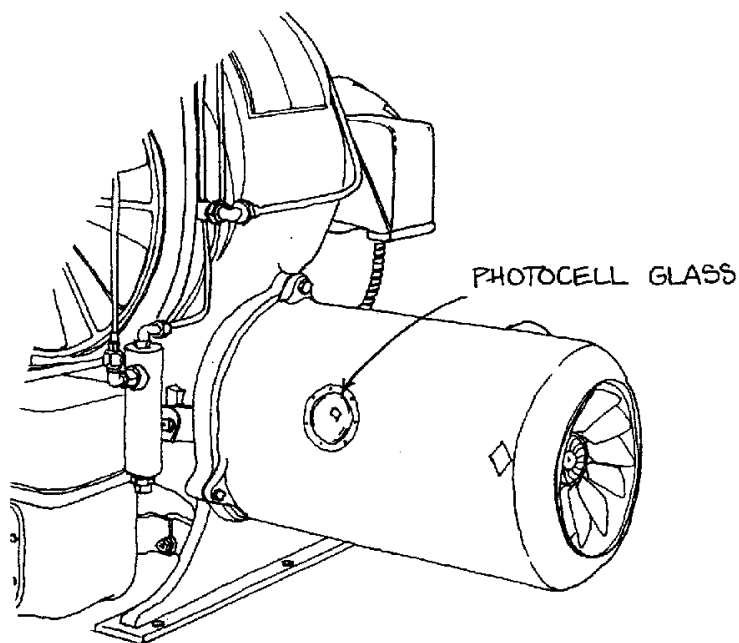
- Flush low-water cut-off: Sediment and impurities impair the working of the low-water cut-off. To flush it, place a bucket under the blow-off pipe, the open ended pipe that comes straight down from the cut-off, and open the valve on that pipe. Keep draining it until the water comes out clean. The illustration below shows a low-water cut-off.



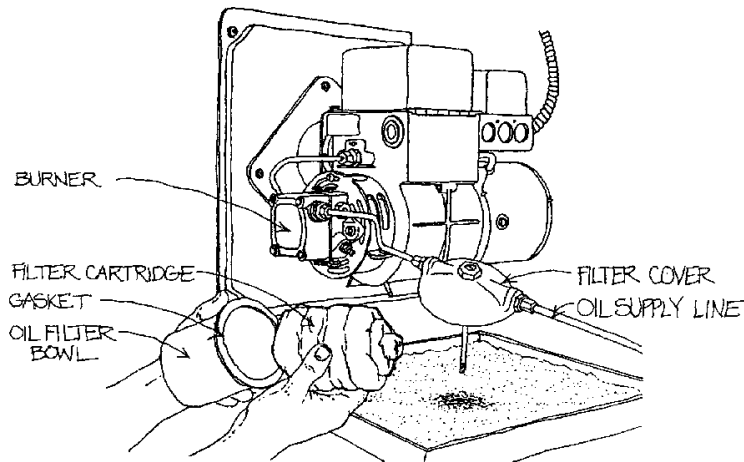
- Check secondary air passages: Don't allow sooty deposits to form in the secondary air passages. Clean them with a vacuum, brush or scraper. The illustration below shows the secondary air passages, with cleaning procedures.



- ✦ Clean photocell glass: If your boiler has a photocell, its glass lens must be kept clean in order for it to work properly. Wipe the lens clean with a rag. The illustration at left shows a photocell glass detail.

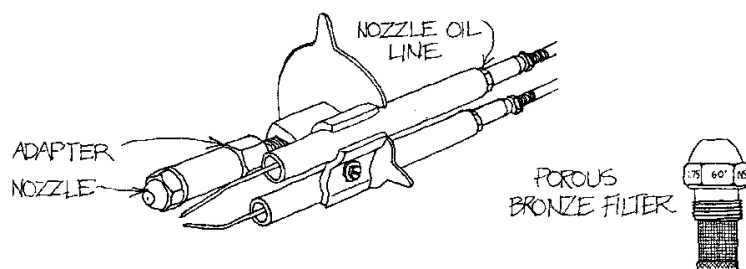


- ✦ Clean smoke control transmitter bulb and receiving glass: This device is very much like a large photoelectric-type smoke detector. For it to work at its best, it should be kept clean. Wipe the bulb and the receiving glass with a dry rag.
- ✦ Clean oil filter or strainer: The oil filter prevents dirt and debris in the fuel oil from getting into your burner and clogging it, and if the filter itself is clogged it will cause an insufficient flow of oil to the burner and unbalance the fuel to air ratio. If you have a filter, replace the cartridge. If you have a strainer, remove it and clean it with kerosene. The illustration below shows the procedure for disassembling the oil filter or strainer.



Monthly Maintenance Procedures

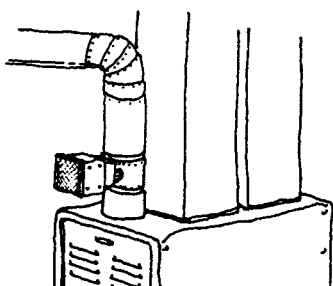
- ✦ Clean burner: Shut off the power to the burner, then use rags dampened in kerosene to wipe the outside of the burner clean of grime and soot.
- ✦ Clean rotary cup or nozzle: To be burned efficiently, fuel oil must be sprayed in a fine mist over the ignition flame or spark. The rotary cup or nozzle does this job. If it is dirty, scratched, clogged, or in any way damaged, oil will be injected into the burner in big drops that burn poorly and cause sooty build-up. Check your burner maintenance instruction manual, or ask for help from your burner service person before attempting to clean the rotary cup or nozzle. Always use a soft rag soaked in kerosene for the job, never a wire brush or hard object. The illustration below shows a burner assembly, with details of a nozzle.



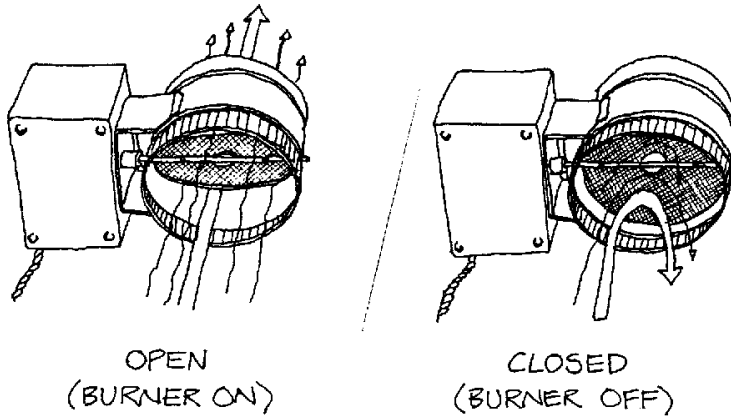
- ✦ Clean boiler tubes and combustion chamber: Soot is an insulator and retards the transfer of heat to the boiler water. One indication that the boiler needs to be cleaned is when you notice the readings on the stack temperature gauge beginning to climb. The stack temperature gauge is on the exhaust stack, and when the readings get higher, it means that more heat is escaping up the chimney and less is being transferred to the boiler water. An eighth of an inch of soot on the boiler surface will cause your burner to use 20% more oil to produce the same amount of steam! Even when stack temperatures remain steady, the boiler tubes should be cleaned monthly.

Clean all tubes with a boiler vacuum cleaner and a 3" tube brush. Remove soot from the walls of the combustion chamber and the bottom of the boiler. And while you're in there, check thoroughly for boiler leaks. Any leak should be repaired immediately.

- ✦ Check for fuel leaks in tank and feed line.
- ✦ Check operation of smoke control: The smoke control will sound an alarm when smoke gets between the smoke control transmitter bulb and the receiver glass. Slip a rag or a broom between the bulb and the glass. Wait one minute. The alarm should sound and the burner should shut down. If this doesn't happen, make sure that both the glass and the bulb are clean and try again. If it still doesn't work, have the unit serviced immediately.
- ✦ Check low-water cut-off operation: While the burner is operating, check the low-water cut-off by turning the boiler drain valve on and draining water out. When the water level drops below the indicator mark on the gauge or sight glass, the burner should stop running.
- ✦ Check operation of automatic flue damper: Downtime losses—the cooling down of the boiler between firings—must be kept to an absolute minimum. If the automatic flue damper malfunctions and leaves the damper open, cool air will be drawn through the boiler and out the chimney, taking with it any heat stored there between burner firings. This may cause as much as a 10% fuel waste! Check to make sure that the automatic damper closes shortly after the burner shuts off, and remains closed until shortly after the burner fires again. The illustrations at left and below show an automatic flue damper on a boiler stack and in detail.



Note: It is absolutely necessary that the flue damper be **open** during burner firing. Otherwise, exhaust gases may be discharged into the boiler room!



- ✧ Check operation of condensate return: Failure of the condensate return to bring condensate back into the boiler properly can cause inefficiency. Check condensate return to see that it holds the necessary vacuum. (A heating system service person can help you to do this the first time you try.)

Seasonal or Yearly Maintenance Procedures

- ✧ Check combustion efficiency.
- ✧ Adjust all automatic controls, or have them adjusted, to manufacturer's specifications.
- ✧ Have the burner/boiler serviced and tuned up by a qualified service person.

If you suspect that your burner is not operating at full efficiency at any time during the heating season, examine the flame. In most burner/boilers, there is a small window which you can look through at the end of the combustion chamber opposite the burner. After you have had a burner service person adjust the burner, look at the flame and get a feel for what it should look like when it's burning properly. If you suspect the burner is not working properly, check the flame for these signs:

- ✧ Are the edges of the flame contacting combustion chamber walls?
- ✧ Are the flame tips a smoky orange color?
- ✧ Are there bright droplets of burning oil in the flame?

All these signs indicate poor burner adjustment, and a repair person should be brought in as soon as possible.

In Case of Emergency

Before calling for a repair person:

- ✧ Check your fuel storage tank to make sure you haven't run out of oil.
- ✧ Check the burner/boiler's electrical system for blown fuses or tripped breakers.
- ✧ If your burner uses a gas pilot for ignition, check to see that the gas is on and flowing to a lit pilot.
- ✧ Check the boiler remote control switch to make sure it's on.
- ✧ Check boiler water level. If it has dropped too low, the low-water cut-off may have shut down the boiler.
- ✧ Check all controls and switches on the Heat Timer to make sure they're in the right positions.
- ✧ Reset motor overload button, if it has tripped.

If none of these operations corrects the problem, then it's time to call for help. But do as much of the inspection and checking as you can yourself before calling a service person. You may save money by avoiding needless service calls, and you may be able to restore service faster yourself.

MAINTAINING YOUR ELEVATOR

The key to good elevator operation is maintenance, plain and simple. And the way to keep your elevator maintained is by contracting with an elevator service company.

The type of maintenance service you get depends on the type of contract you have. Many types are available. At one end of the spectrum is the minimum service contract, where the company responds only to breakdowns and then performs only basic repairs needed to get the elevator working again. At the other end is the full service contract, which is like elevator breakdown insurance—the company takes full responsibility for all the elevator equipment. Full service contracts are expensive, because the company has to protect itself against major equipment failures.

The amount of money available, the condition of the elevator and the type of maintenance desired will determine what kind of contract you will want. The elevator company will come out to the building to inspect the equipment and recommend what immediate work should be done and what type of contract would be best. You should try to get bids and proposals from three different companies, and you might want to check

out the bids and proposals with a professional engineer who has elevator experience.

The minimum service contracts are not usually recommended because the equipment will only be repaired, not maintained, and it will deteriorate in time.

New York City law requires that all elevators be inspected three times a year. The Department of Buildings will do two of these inspections and the tenant association or cooperative is responsible for having the third inspection done by a private inspector, usually from your elevator maintenance company. The private inspection must be done by December 13 each year. The inspection record must be posted in the elevator car in a tamper-resistant frame. For inspections, contact the Department of Buildings listed in Appendix A: Government Agencies and Professional Organizations.

One aspect of elevator maintenance that you can and should do yourself is to keep the pit and the machinery room clean. Dirt and dust will hurt elevator machinery, as it hurts all machinery. If the machine room is ventilated, the fans and louvers should be kept in good operating condition. Cleaning these areas and taking care of the ventilating equipment is usually not in the maintenance contract, so it is the tenant association's responsibility.

CHAPTER THREE: HELP YOURSELF

Help yourself. Self-help is the best and most direct means of saving money on your building's maintenance and repair bills. In these times of tight budgets, self-help may offer the only opportunity you'll have to upgrade the physical condition of your building and your apartment. When it comes to quality of life, it's often the little things that count: freshly painted walls, clean and uncluttered public spaces, consistently comfortable heat. Having these things will make a house feel more like a home, but getting them is close to impossible if you're forced to buy the labor for them on the open market. There aren't a lot of tenant associations that can afford to hire skilled workers at \$10 - \$20 an hour to do cosmetic or minor repairs, so they often simply don't get done.

That needn't be the case. You can help yourself to a more pleasant place to live. It doesn't take much training or money. Using mostly energy and enthusiasm, a building's tenants can transform their environment from something that looks and feels a bit run down into bright and attractive housing. But there's more than abstract impressions of quality involved here. You can help yourself to substantial savings as well. Low-cost or no-cost weatherization will slash your fuel bills. Prompt attention to upkeep and basic maintenance may eliminate the need for expensive emergency repairs. For this reason alone, self-help ought to be encouraged. Tenants participating in self-help home repair and maintenance projects aren't really volunteering their time; they are paying themselves a decent wage, and their paycheck comes once a month in the form of eased or even reduced rents.

Help yourself to a quality of housing you couldn't otherwise afford. Help yourself to lower rents. Help yourself to something else, too: a sense of pride and community. Self-help projects bring tenants together, each working for his or her own benefit and for the benefit of the building as a whole. Self-help efforts in many buildings have resulted in sharply reduced rates of vandalism and deterioration; as tenants begin to feel personally responsible for newly painted hallways, they're a good deal less likely to sit idly by as someone—from inside or outside the building—drags a felt-tip marker across their handiwork. If self-help is the best way to save money while managing your building, it is also the best way to transform that building from a collection of tenants living one on top of the other into a proud and stable community.

Help yourself.

ORGANIZING SELF-HELP PROJECTS

Of course, it doesn't make much sense for everyone in the building to take part in collecting rents or keeping the books. Some jobs are better left to an individual, paid or unpaid. But anyone can help clean up the basement or back yard, or paint the public hallways. The degree of self-help practiced in a building may range from simply making tenants responsible for the painting of their own apartments to large group efforts on special projects, from sharing volunteer responsibility for simple maintenance chores to actually superintending and managing the building on a rotating basis. Some buildings use tenant labor and skills, along with funds put up by the tenant association out of rents collected, to renovate vacant apartments themselves. Other buildings, though, choose to do practically no self-help at all.

How much you decide to do, and how you plan and organize it, will depend on several conditions: the financial resources you have available to your tenant association (if you have very little money, self-help may be a necessity whether you like it or not), the willingness of tenants to participate, the skills of tenants in the building, and the general physical condition of your building—how much has to be done, and how fast.

Whatever you decide to do, it will need to be carefully thought out. Self-help maintenance and repair, on any level, should be incorporated into a building's regular schedule only after it has gained the approval of the members of the tenant association. Tenants should be made aware of the advantages and disadvantages of self-help, and must make a collective decision on what to do. That decision becomes the basis for a written

policy on self-help, which should be included in your association's by-laws.

While it is common for associations to require some self-help—from all tenants—usually maintenance and finish work inside individual apartments—it must be noted here that this practice is technically illegal, since it violates the Warranty of Habitability for buildings which are still city-owned. The Warranty of Habitability guarantees all renters an apartment that is fit to live in and not hazardous to the life, health or safety of the occupants. The tenant association in a city-owned building is legally responsible for providing each tenant with a habitable apartment and for removing code violations. Thus, if a tenant association relies on self-help to remove code violations, and a tenant in the building refuses to participate in the self-help efforts, that tenant may be within his or her rights, and if the code violations are rent-impairing, that tenant may also be within his or her rights in withholding rent until the violations are corrected.

What this means, for one thing, is that the clearer it is that your self-help policy is a written part of your association's by-laws, the more chance you'll have of persuading a judge to issue a dispossession order which will allow you to evict a non-paying—and non-cooperating—tenant. Some judges are sympathetic to the efforts of tenant associations to upgrade their buildings and will find in favor of a tenant association in a dispossession action. Again, having a tenant who withholds rent, even when it's legal to do so, takes money away from your building and hurts your tenant association's efforts to run and upgrade the building.

Obviously, the best solution to such a situation is to avoid it in the first place. Self-help shouldn't ever be forced on tenants, since the work which results will likely reflect the anger of the unwilling worker at having been made to do it, and the building could be better off in the long run leaving well enough alone. Early on in your management of your building, your tenant association should begin an effort to organize toward continuing self-help efforts. When and if you buy your building from the city, you may then legally specify a willingness to share in the responsibility for building maintenance and repair in the corporate papers of your cooperative. By then, hopefully, you'll have weeded out uncooperative tenants, and only those interested in working together for a better building will remain.

Group Projects

There are many ways to use self-help for building maintenance and repair, but one of the best and often most productive is a group project. Group projects come in all shapes and sizes. Some buildings schedule regular work days. One Saturday of every month, for instance, everyone living in the building leaves the day free to work in the building. They may clear out storerooms crammed with old junk, paint halls, do demolition in a vacant apartment, or plant window boxes in the spring. A surprising amount of work gets done this way, and people working together tend to have a lot of fun. Afterwards, a pot-luck supper or party can turn the day into a social event.

Certain tasks, like weatherization and energy conservation improvements, may take somewhat more skill. They aren't really difficult, though, and most people will catch on quickly with a little instruction. You may have tenants in the building with experience in carpentry, painting, or other building trades. They could volunteer to instruct others as their part of the project. If nobody in the building has the needed skills, check with local community organizations—they may be able to lend a hand by sending a technical assistant over to demonstrate and instruct. More difficult projects—such as major carpentry repairs, masonry, rehabilitation, or heating system maintenance—should be tackled only by really committed participants after careful planning. Sometimes a labor-intensive job like resurfacing the roof can be made much cheaper by simply hiring a professional to supervise the job, then supplying all labor and materials yourselves. Even complicated jobs generally provide sufficient work for those with fewer skills, and the basic knowledge needed for much of the work can be picked up pretty quickly by most people.

Do-it-yourself and how-to manuals are some of the best tools available to tenant associations who want to do their own maintenance and repair work. How-to manuals have been written on virtually every aspect of home repair. Some of them are very good, and with a manual and the appropriate tools and equipment, confident do-it-yourselfers have been known to take apart their oil burners one day and put them back together the next. Of course, you may not want to try that particular trick, but self-help instruction manuals are well worth investigating. A listing of several of these manuals is included in Appendix C: Further Resources, at the back of this book.

Self-Help Supers

In smaller buildings, the responsibilities of the super may be divided among the tenants themselves, on a rotating basis. This takes the idea of self-help maintenance and repair a step further, and it does involve a bit more work. On the other hand, doing without a hired super will save your tenant association the cost of the super's salary in addition to freeing up another apartment—the one traditionally given over to the super as part of his pay—to provide rental income. This arrangement can increase an association's operating income by several thousand dollars a year.

In a 10-unit building, for instance, the super's chores would be shared by each household. Every 10 weeks, a tenant or household would be responsible for normal upkeep and maintenance—whatever it is that you have assigned the super in your maintenance and repair policy: cleaning the hallways, taking out garbage, replacing burnt-out lightbulbs, taking care of the boiler.

Self-help rotating supers may be a very useful idea for your building, but you should be just as thorough in defining the duties of tenants who handle the super's job as you would be if you were hiring one. As with all other building policies, this ought to be spelled out and fully understood by everyone involved.

Every Apartment for Itself

When a rental building converts to a cooperative, the usual policy is to make tenants responsible for all work done inside their own apartments. There are exceptions, of course, such as major contracting, plumbing, heating or electrical work, which extends into the rest of the building and is necessary for the building as a whole. Tenants provide their own finish work; cabinets and shelves, walls, appliances and so on. In many cases the tenants also provide their own plumbing and electrical wiring within the apartment itself. Once you buy your building from the city, your cooperative corporation provides needed systems; electric cables, gas and water risers and waste stacks. And, of course, maintenance of the building itself. These are paid for out of monthly maintenance fees collected, instead of rent, from tenants who now own shares in the cooperative corporation.

A rental building can't go this far, obviously, but if your tenant association is planning to purchase your building from the city, you may want to start off by giving some of the responsibility for individual apartments to the tenants who occupy them.

Remember, though, that as always you'll want to clearly lay out beforehand what a tenant may or may not do. Painting and refinishing may be permissible, while large scale renovations may not—at least not without the prior approval of the tenant association as a whole. If you allow more than cosmetic changes, you may have to work out a way of compensating tenants who move out after having completed such projects. These are tricky issues, and will need to be discussed completely by the tenants, then written out as policy.

Finally, you should be aware that even if the responsibility for repairs in individual apartments is given to the tenants in them, and this is clearly written into your repair and maintenance policy, you may still have no legal recourse against tenants who choose to withhold rent if they have rent-impairing violations in their apartments and refuse to take care of those violations themselves.

Self-Help Rehabs of Vacant Apartments

Tenant cooperation on self-help projects can be the fastest, simplest, least expensive and all-around best way to transform troublesome vacant apartments into habitable, rent-producing units. There are several ways to do this.

Tenant volunteers might do the work, with materials purchased by the tenant association out of its rental income. Then, when the apartment is rented out, the increased rent roll will help keep everyone's rent down.

Or a vacant apartment might be rented "as is" to a tenant willing to accept responsibility for rehabilitating and renovating the unit. Depending on the prospective tenant's abilities, interest, resources and determination, an arrangement suited to both the tenant's and the building's needs might be worked out. The tenant might provide all labor and materials in return for an abatement of several months' rent. Perhaps the tenant association would provide demolition only, or demolition and rough wiring and plumbing, with the prospective tenant handling the rest. The association might in some cases simply provide materials and let the tenant handle the labor. If there is work going on elsewhere in the building this can be a good deal, since by buying in bulk the association can get far better prices than an individual could on most building materials.

Whichever plan you use, a written agreement should be executed and signed by both parties before any work begins. The agreement should spell out the responsibility of the tenant and the association, and it should establish a reasonable timetable for completion of the renovation, as well as a means of assuring quality control of the work and materials involved. In a sense, this contract is the same as a contract between your tenant association and any contractor hired by you to work on your building.

The form of "payment" in such an agreement generally comes through rent abatements. How much of the rent will be abated, and for how many months, will have to be defined in the agreement. The formula will be based on how much work the tenant has to do, but the tenant association should also take into account its own needs in operating the building. If a large number of tenants are on long-term abatements, the building may not be bringing in sufficient cash to pay its bills. Generally, it's a good idea to give a partial rather than full abatement, so that the tenant is paying **something** every month right from the start. Any work put into the apartment not paid off by the abatement might be included in the tenant's "equity," or worth, when the association buys its building. Careful records of all expenditures and hours of labor to be counted as "sweat equity" must also be kept.

Planning Ahead

The first rule of any maintenance or repair project is that good planning is the most important part of the job. The bigger and more difficult the project, the more thorough the planning has to be.

Before you begin, think the whole project through from start to finish. Pay special attention to what might go wrong, where problems could pop up unexpectedly, who might protest—anything that might happen to slow you down or stop you altogether.

Then make notes on each step of the planned project. What skills will be required? How much labor, and at what point in the job? What tools will you need? What materials? What preliminary steps have to be taken before anything else can happen?

As you plan the project, write everything out on a big sheet of paper, or on many sheets, or on file cards kept in order. What you want to do is a lot like the dress rehearsal for a play: you want to run through the job completely on paper before you actually do it. If you fail to do so, you may very well wind up knee-deep in plaster, and up to your neck in trouble.

Buying Materials

It's wise to order all materials well in advance; early ordering will eliminate delays in your work schedule as a result of back-ordered supplies or delivery lags. Budget carefully, and leave room for extras and emergencies. Allow for error: for instance, if you measure your walls and ceilings, and decide you'll need 28 4' x 8' sheets of sheetrock to cover them, order 30 sheets. After all, you might break one. (Often, if you have materials left over after a job, they can be returned to the supplier for credit.) Also, if you order a big load of materials, you may be able to get free delivery. But if you need just one piece of sheetrock, the delivery cost will be more than the price of the sheetrock itself.

You can save a lot of money by shopping around for materials or tools. Materials for construction, like lumber and sheetrock, will cost much less at lumberyards than at small hardware stores. Look in the yellow pages of your telephone book for large suppliers of whatever materials you need, and call them to get prices. When you're calling for prices, bear in mind that the clerks tend to be very busy. For your own good as well as theirs, have your list of needs as complete as possible and written out. Ask for prices one item at a time, then write in the price offered. This way, you'll be able to check the estimates of a number of suppliers and pick the best deal.

Paint is generally cheaper from paint suppliers. Cement, brick, and most construction materials are cheapest from big lumberyards. Plumbing and electrical supply wholesalers will often sell large orders to retail customers. Some power tool companies, such as Skill and Black & Decker, have dealer networks—not department stores, but independent dealers—who have reconditioned tools with new-product warranties, for sale at far lower prices than similar new tools.

If you need large quantities of supplies at once, it may be worth your while to look into dealers quite some distance from your building—sometimes there are much better prices available from lumberyards in the outer boroughs or New Jersey, many of which will deliver larger orders in the city. For smaller purchases, try to shop in neighborhood stores. It's a good idea to support local businesses, and if you develop a relationship with the proprietors you may be able to buy on credit from them.

Most big lumber and construction supply dealers have two quite different pricing systems. One is for retail buyers, and the other is "to the trade"—for contractors and builders. The prices charged to the trade are much cheaper—close to wholesale for some items. If you're doing a large renovation on your building, and expect to be buying significant quantities of materials, be sure to ask for the contractor's discount. **You** are the contractor! If you like a dealer's prices on most of the materials on your list, but think that one or two items are priced high, don't be afraid to bargain on the high items. If you're buying enough and it looks as though you'll be back for more, the dealer will often drop those prices for you.

Remember also that the price of anything drops in direct proportion to how much of it you buy. The price per stud when you buy a hundred 2" x 4" x 8' studs at once can be as much as 30% less than the price of a single stud. If you know that eventually you're going to need a lot of materials, try to buy as much of them as possible in one bulk order. If there are other buildings in your neighborhood doing self-help rehabilitation, get together with them on big purchases. UHAB has established a bulk buying program for weatherization materials and, by buying all at once for a number of buildings, is able to cut the cost of materials by 20 - 40%.

Doing a substantial renovation, or any construction project, especially if it's your first one, is a genuine educational experience. Try to learn as much as you can from your supplier's salespeople. They can fill you in on what the best buys are, and they rarely try to sell you bad merchandise or items you don't need because they're used to dealing with contractors—one bad load of material to a contractor and they'll never see that one again.

Tell them what you're doing and ask how they would go about doing it. Then listen to the answer. You will learn a lot about using and installing whatever you're in the process of buying. You might find out, before it's too late, that you're required to use 5/8" sheetrock on ceilings and walls between apartments, rather than the 1/2" sheetrock that you would use everywhere else. A plumbing salesman can give you hints on the easiest way to install a toilet. Not every salesperson will have the time or inclination to answer your questions, but keep trying. You'll eventually find someone who will.

SAMPLE SELF-HELP PROJECTS

There isn't room enough in this book to give step-by-step instructions for all, or even many, of the possible self-help projects your building might decide to attempt. After all, this is more of a guide to what should be done than a how-to manual. If you want to get specific information on something not covered in this book, or if you are simply interested in finding a place to acquire basic skills, call your UHAB coordinator and check Appendix C: Further Resources, at the back of this book.

The following sections contain detailed information on two self-help projects which we think will provide an immediate return in quality of life and money saved: a weatherization and energy conservation program for your entire building, and a program for balancing your heating distribution system.

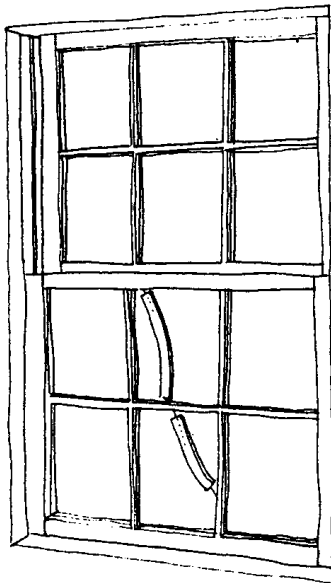
SELF-HELP LOW COST ENERGY CONSERVATION

The first step in planning your energy conservation program is to conduct an energy assessment to determine your building's heat losses. You might consider hiring someone to conduct a formal energy audit. An energy audit is a close look at heat losses throughout your building, recommendations for energy conservation measures to combat these losses and calculations of what fuel savings you could expect once these measures are put into place. If you cannot afford a formal audit, you may be able to get a "walk through" energy assessment from a knowledgeable energy specialist who can point out areas of heat loss without making actual calculations. You may also do an energy assessment yourself. Resources for learning about energy conservation are listed at the end of this section.

The following low cost energy conservation measures are a good start in cutting fuel costs. They require a minimum investment and will pay for themselves in fuel savings in less than one heating season. If you need additional instructions in the techniques described below, some good self-help manuals are listed in Appendix C: Further Resources, at the back of this book.

Low Cost Energy Conservation Measures

1. Repair all broken and missing glass in windows and doors
2. Seal and insulate basement windows
3. Replace old and missing putty around all glass
4. Caulk around windows and doors
5. Weatherstrip doors and windows
6. Install door sweeps
7. Install automatic door closers
8. Install plastic storm windows
9. Seal all roof and wall leaks
10. Install flow restrictors
11. Install pipe insulation

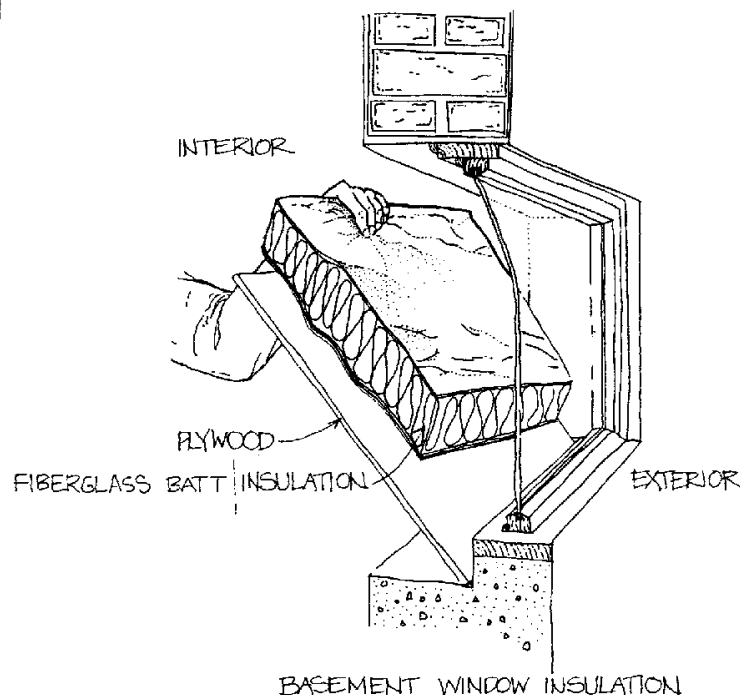


1. Repair all broken and missing glass in windows and doors

Cracked or broken glass allows air to leak into a building, and when cold air leaks in, it increases the heat load. Check all windows and doors for broken or cracked glass, and repair as needed. Sometimes it is easier to patch the glass if the hole is small or the glass is just cracked. Freezer tape or duct tape criss-crossed over the hole or taped along the crack works just fine. The illustration at left shows tape on cracked glass.

2. Seal and insulate basement windows

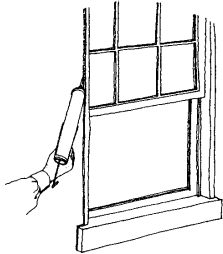
Except in the boiler room, where air and ventilation are needed, all basement windows can be sealed—keeping people out, and insulated—keeping heat in. Exterior grade plywood, cut to fit the exterior masonry opening, can be fastened to the window frame with screws or bolts. Insulate on the interior with pieces of fiberglass or foam insulation cut to fit and stapled or tacked in place. You can cover the insulation with wood or sheetrock if you wish. Paint the exterior plywood (with an attractive design, perhaps) to protect it against weathering. The illustration below shows basement window insulation.



3. Replace old and missing putty around all glass

Putty is used to hold glass in place and acts as a seal to prevent air leakage. Dried, cracked or missing putty has lost its sealing properties and should be replaced.

Remove old putty carefully with a putty knife or soldering iron, if necessary. Make sure glazier's points are still in place, and if not, replace. Form glazing compound into a rope about 3/8" in diameter. Press along edges of the glass. Using the putty knife, smooth it into a triangular bead. Let dry at least a week, and paint. The illustration at left shows how to replace window putty.



4. Caulk around windows and doors

On the exterior of the building, where the window and door frames meet the masonry, caulk with a butyl or silicone caulk. This type of caulk is expensive, but it will last far longer than other types because it's flexible and will expand and contract with changing temperatures. Be sure to caulk exterior surfaces when the temperature is above 45°F. Clean the joint of dirt or old caulking first, then apply the caulk with a caulking gun, available from any hardware store. Cut the tip of the caulk cartridge at a 45° angle and hold the gun so that the cut tip is flat against the joint and allows the caulk to squeeze in. The illustration at left shows the proper way to apply caulk.

On the inside, caulk where the window frame meets the wall, especially where gaps are visible or air movement can be felt. You do not need to use butyl or silicone caulk indoors. Fill large holes first with oakum, a rope-like material available from hardware stores. Very large holes may need to be plastered first.

5. Weatherstrip doors and windows

If your windows do not already have weatherstripping, they probably need it. Check for air leaks on a windy day. Place your hand near the windows, and feel if air is coming in, or hold a sheet of toilet paper taped to a coat hanger in front of the window. If the toilet paper moves, you need weatherstripping. Try shaking the window sash. If it moves you need weatherstripping.

If your windows are in poor condition and you are hoping to be able to replace them soon, you won't want to spend a lot of money on weatherstripping. However, if you won't get those new windows by next winter, some type of weatherstripping is advisable. The money it will save in lower fuel costs will more than pay for itself in just one heating season, and you will feel warmer too.

On windows, most of the air will come in through the cracks at the top, bottom and center where the window sash meets the frame. You can place folded cloth or newspaper in these areas. Then close and lock the window to make a tight seal. If you can still feel cold air at the sides of the window, use felt or tubular vinyl gasket weatherstripping along the edge where the window sash slides up and down.

For windows in poor condition, felt weatherstripping is an inexpensive type which is easy to install, but which doesn't last very long—only a year or so. It can be purchased at a local hardware store and requires only a staple gun or a hammer and tacks to install.

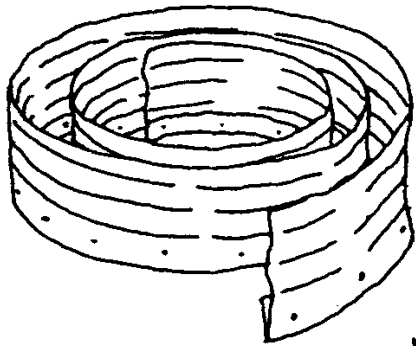
For windows in fair condition, or windows you won't be able to replace for at least 3 or 4 years, you may want to use tubular vinyl gasket weatherstripping. It is more expensive than felt but will last indefinitely. You can tack it along the sides, top and bottom, using a felt strip across the top of the bottom sash to seal the middle.

"Mortite" is an inexpensive brand of soft, rope-like caulk which is pushed into cracks and forms a good seal. You can use mortite as a permanent caulk around window sashes that you never open, and as a seasonal caulk around windows that will stay closed all winter. Mortite is easily removed in the spring.

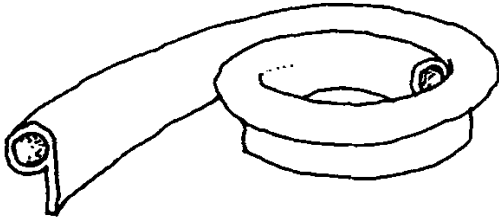
Windows in good condition, including new windows, still may need caulking or weatherstripping and should be checked for leaks. (New windows must be well caulked when installed.) With new or very good windows you may want to invest in spring bronze weatherstripping if you can afford it. Spring bronze is excellent and will last indefinitely.

On exterior doors, add molding at the top and sides if it isn't there already. Once this is in place, tack some tubular vinyl gasket or felt weatherstripping to the molding. The door should now make a good seal against the weatherstripping when it is closed. Adhesive-backed strips are available in 3/8" width which can be installed on the door stop on 3 sides so the door closes against it. For the crack between double doors, install a piece of molding as a door stop across the crack and install weatherstripping.

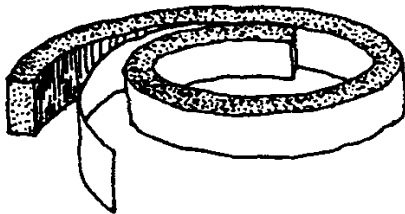
In addition to the building's front door and other exterior doors, interior apartment entry doors should be weatherstripped. This will prevent heat from escaping into the public hallways. Radiators should also be removed or turned off in the public hallways; there is no need to heat this unlivable space where people will be wearing their coats in the wintertime. The illustrations below and on the facing page show different types of weatherstripping and their applications.



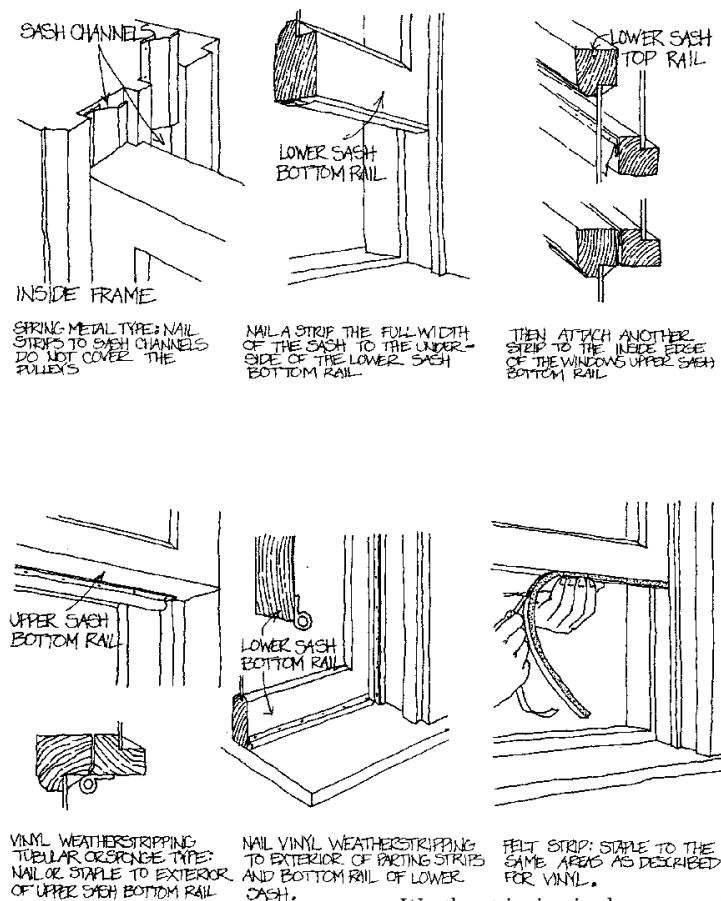
THIN SPRING METAL, $\frac{1}{8}$ " WIDE



VINYL, TUBULAR OR SPONGE FILLED



FELT, VARIOUS WIDTHS



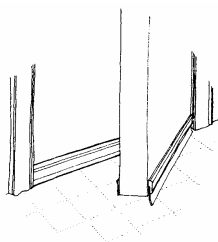
Weatherstripping is also a very effective noise insulator. Your apartment will be noticeably quieter after you weatherstrip.

Application tips:

- ✧ Make sure that the surface is smooth by removing old weatherstripping, dirt particles, loose paint, etc.
- ✧ Apply adhesive-backed weatherstripping to clean and dry surfaces only.
- ✧ Apply weatherstripping in one continuous strip along each joint of the door or window.
- ✧ Be sure that the weatherstripping is tight at corners.
- ✧ For both door and window applications, be sure that the applied weatherstripping makes contact with the fixed and moveable sections of the joint (for example, window sash and frame). In general, weatherstripping should be slightly compressed when the door or window is in a closed position.

6. Install door sweeps

Install a door sweep on the inside of all exterior doors and apartment entry doors so that the sweep fits against the threshold when the door is closed. The illustration at left shows a door sweep.



7. Install automatic door closers

Exterior doors should be equipped with heavy duty closers. Interior doors such as apartment doors and storage room doors opening into unheated spaces can be equipped with relatively inexpensive spring-type closers. Closers should operate quickly and close the door tightly. Door closers that use oil for operation should be adjusted for winter and summer temperatures.

8. Install plastic storm windows

Storm windows help stop air leaks and slow down the heat loss through windows. An inexpensive solution is to use clear plastic. Plastic comes in varying thicknesses—be sure to use a heavy one. A thickness of 4 to 6 mil is good. Get a roll of plastic wide enough to stretch across your windows.

The plastic can be put up easily on the inside of the apartment windows. Make sure you weatherstrip **before** you add the storm window. Weatherstripping will help create an air space which acts as insulation between the window and the plastic storm window.

The storm window must fit tightly to work. Fold the plastic several times around a thin piece of cardboard or wood at the edge, and tack or staple this "bunching" of plastic to the window frame. This bunching gives a good air-tight seal all around the window. Duct tape can be substituted, using a continuous



piece on each side to give a good seal. There are strips on the market that strap together with the plastic in between. One part of the strip is fixed to the window and the other is removable, making it easy to take the plastic storm windows down in the spring. The illustration at left shows a plastic storm window with duct tape.

9. Seal all roof and wall leaks

Look for holes in your roof and walls. One sure sign is the presence of water-stains on ceilings and walls. You can repair minor leaks and small holes with a "sealer compound," available in most hardware stores. You should patch larger roof holes with tarpaper or asphalt. Outside concrete and brick walls can be patched with mortar.

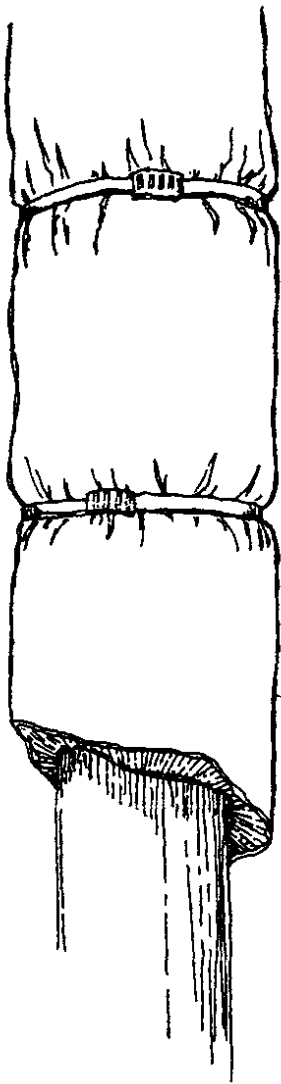
On the inside of your building, look for places where air movement can be detected. Electrical outlets on the inside of exterior walls can be sealed with special gaskets made to fit behind the cover plate. Repair all exterior walls where air can be felt coming in. Check along the baseboard on exterior walls and caulk if air movement is felt. Also caulk where anything goes through outside walls (water pipes, vent ducts, electrical conduits, etc.).

10. Install flow restrictors

Install flow restrictors in all faucets and shower heads to cut down on the amount of hot water usage. Common restrictors are thimble shaped or washer shaped and are inserted by removing the faucet or shower head and placing the restrictor inside. Special water-saving shower heads are also available from plumbing supply stores.

11. Install pipe insulation

Pipe insulation keeps heat in the steam and hot water pipes and keeps your fuel bills down. Install pipe insulation on all steam and hot water pipes in the basement. Measure the diameter and length of each pipe section to order the insulation. It is made to fit over the pipe and is held in place with straps or duct tape. Foam or fiberglass insulation is suitable for hot water pipes. Steam pipes require either fiberglass or asbestos type insulation. The illustration at left shows pipe insulation on a pipe.



SELF-HELP HEATING SYSTEM BALANCING

An efficient heat distribution system is as important as an efficient burner/boiler. The heat should reach all apartments quickly and evenly, without overheating some apartments or underheating others. Balancing the system will save fuel and make everyone more comfortable.

Air vent valves (for radiators) and quick vent valves (for risers), are necessary to allow air to escape from radiators and risers so that steam can enter. By varying the size of the valves you can control the speed with which the steam travels to various parts of the building and to some extent the amount of steam a radiator receives. Generally, small valves are used in radiators and risers closest to the heating plant, causing them to heat up more slowly, while larger valves are used in those farthest away, allowing steam to reach those apartments before the closest overheat. The best functioning boiler in the world can leave apartments stone cold if the vent valves are malfunctioning, and any valves which are plugged up must be replaced.

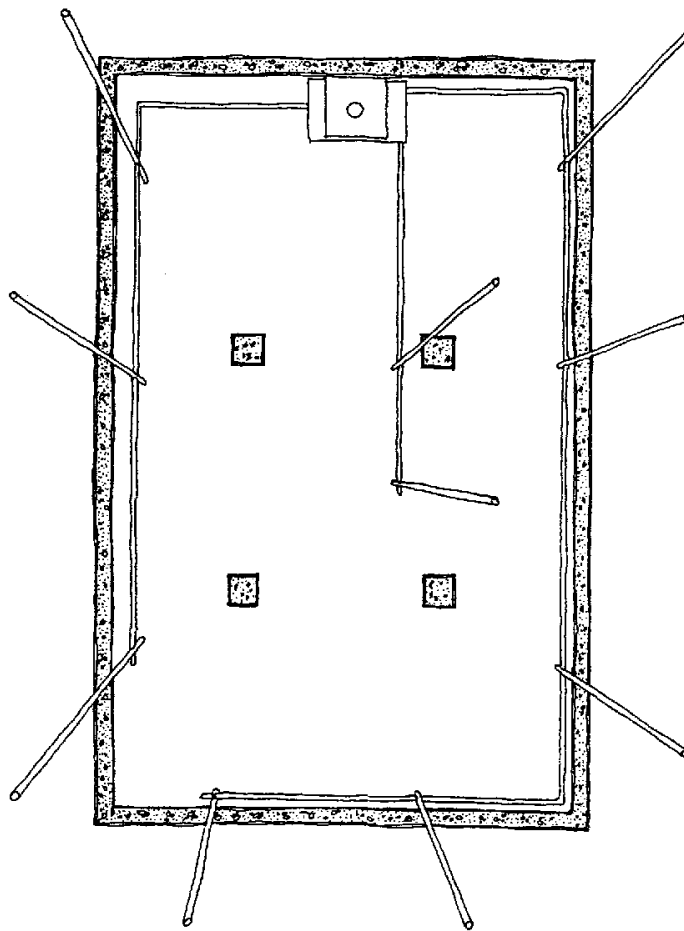
Sometimes it may be necessary to remove radiators or even entire risers in areas which are continually overheated. It is common to find that in the closest riser line the heat from the riser alone is sufficient to heat those rooms served by that riser. Individual radiators can be shut off (providing the valves are functioning properly), but sometimes they still heat up enough through conduction from the riser to cause overheating. Either entire radiators can be removed, or radiators can be switched around, putting larger ones in rooms which have not been getting enough heat.

It takes time to determine and map out the path which the steam travels, and then some trial and error to achieve the most even distribution, but this effort can help considerably in cutting down fuel consumption. Once the distribution system is well balanced and vents properly overall, the steam pressure can be reduced to 2 pounds or less and will still circulate to the farthest radiator in less than 20 minutes.

Determining Your Present Distribution Patterns

Riser and Radiator Location

You need to determine which riser lines and radiators are warmer and which are colder. The first step is to go down to the basement and trace the steam overheads. Make a map of the building layout and mark the location of each steam riser, determining which room in which apartment it services. Draw in the overheads to show the path that the steam travels from the boiler. This will take some time, some head scratching and a good flashlight. You can see from your map which risers are furthest from the boiler. Chances are these far risers are consistently colder. The illustration below shows a map of risers and overheads.



Solar Heat Gain

If the circumstances are right, the sun can help heat parts of your building and cut down on your fuel bills. Look at the orientation of your building. Which apartments, if any, have windows facing south? Are these windows shaded by surrounding buildings, or is there a lot of warm sun coming in on a clear day? If you have good southern exposure, those apartments on the south side of the building that leave their curtains open will be warmer on sunny days. We will discuss later how to balance your heating system to take advantage of solar heat gain.

Take A Survey of Individual Apartments

Finally take a careful survey of individual apartments and try to determine the relative amount of heat each room receives. This won't be easy, but sometimes the difference is obvious. Mrs. Beasley in 1A leaves her window open almost all the time. Mr. Henry in 5C is always complaining about being too cold. Because the boiler runs in cycles and sometimes no heat is circulating, you'll find that some tenants are cold some of the time and too hot at others. You want to know at a given point in the heating cycle how even the heat distribution is.

Synchronize watches with a number of tenants and go down to the boiler room. Send one person to the farthest radiator. Wait for a "call-for-heat" on the Heat Timer (when the red light comes on) and the for heat circulation to be established (when the amber light comes on). (For information on the Heat Timer, review the section on the Control System, included in Chapter One under the Heating System on page 63).

Note the time the amber light comes on, and find out how much later the farthest radiator got heat. Station people in various apartments in the building to see who gets heat when, and if possible, how much. Accurate fast-acting room thermometers are a big help here if you can get them (available for about \$10.00 at plumbing supply stores).

After several cycles you will have some idea of how long it takes steam to all the radiators in the building. Make a chart with your radiator and riser map, floor by floor. Label each one "cold," "warm" or "hot" if you don't have exact temperatures. It is the comparison that's important. You will probably notice that the closer risers and radiators are warmer and get heat faster than the more distant ones and that the radiators on upper floors are colder than those on lower floors. The occasional radiator which gets no heat at all probably has a clogged air vent valve. Those vent valves which leak or hiss need to be replaced.

Balancing

Now, with your chart before you, you can begin to plan your heating system balancing. It is a good idea to buy a generous supply of good quality air vent valves (for radiators) and quick vent valves (for risers) in varying sizes and keep those left over on hand for future fine-tuning and general replacement.

You want rapid venting throughout the building for a short heating cycle. Heat should reach the farthest radiators in 20 minutes or less, depending on the size of your building. You can do this by installing good quality air vent valves that vent more air than normal. The valves which vent more rapidly should go on the radiators and risers that have been the coldest, and these will generally be the ones farthest from the boiler. The slower-venting valves should go on the hottest radiators and risers, usually those closest to the boiler. You probably won't get it just right the first time, but keep changing the valves around and checking the heat distribution. Change and change again until you get it right. There's no magic secret, just plain old common sense and trial and error.

Replacing the Valve

Replacing a vent valve is almost as easy as changing a light bulb. The existing valve screws off and the new one screws back on. Sometimes it might be a little sticky—try a bit of penetrating oil or Liquid Wrench if it's really stuck. A little pipe-joint compound or Teflon joint tape on the new threads is a good idea to prevent leaks at the joint.

Air vent valves for radiators come with a 1/8" pipe thread fitting at a right angle to the valve itself. Quick vent valves have a straight fitting, usually 1/2" pipe thread. Pipe threads are slightly tapered so that they seal completely when screwed down tight. The size reflects the inside diameter of the pipe, not the thread size itself. Pipe thread sizes can be confusing at first, since a 1/8" pipe thread is more like 3/8" outside diameter, and a 1/2" pipe thread is closer to 3/4" outside diameter. If you are unsure about what thread sizes you have on your air vent or quick vent valves, take along some old ones when you shop for new ones. Gorton is a good quality valve and comes in the following sizes:

Air vent valves:

No. 4 is for use in buildings like single-family houses, that have an indoor thermostat. Effectively the standard valve.

No. 5 has a venting capacity equal to 4 times the ordinary air vent valve, for use in warm rooms.

No. 6 has a venting capacity equal to 8 times the ordinary air vent valve, for use in cold rooms.

No. C has a venting capacity equal to 15 times the ordinary air vent valve, for use in very cold rooms.

Quick vent valves:

No. 1 is made for use on short overheads and warmer risers. Can be used singly or in clusters.

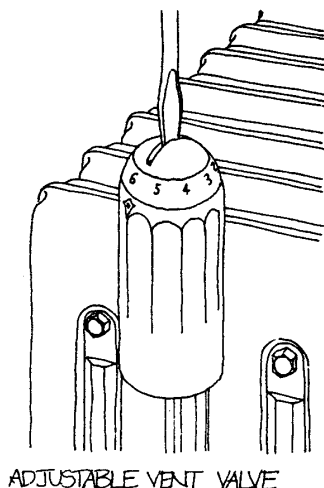
No. 2 is made for use on longer overheads and colder risers. Can also be used singly or in clusters.

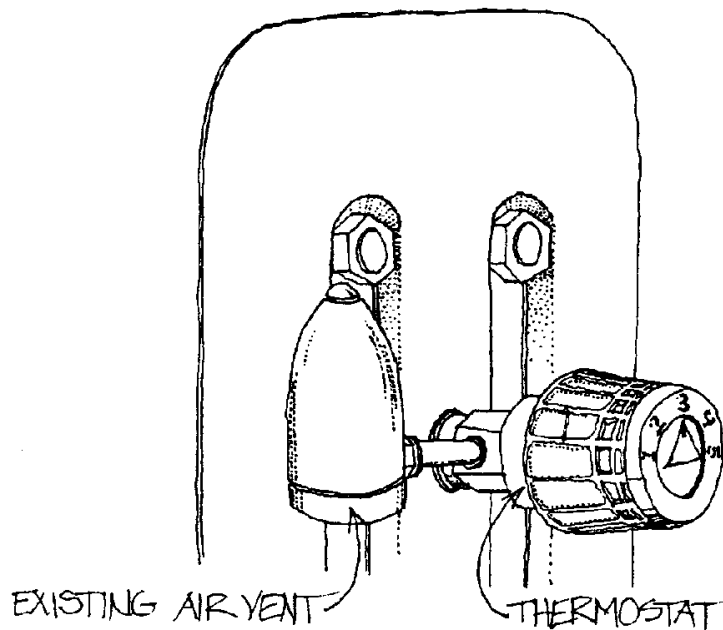
Adjustable air vent valves are also available. These valves are somewhat more expensive but make fine adjustments easier. However, they could cause more problems than they solve if individual tenants are constantly changing the valve setting in an attempt to regulate the heat. The illustration at left shows an adjustable vent valve.

Ask your distributor or plumbing supply store about other brands of valves.

Balancing for Solar Heat Gain

Lastly, what to do about those sunny apartments. It's a good idea to take advantage of the solar heat gain (free heat!) and encourage tenants who live in sunny apartments to pull back their drapes and let the sunshine in. However, some days are cloudy, and the sun most certainly goes down every night. Therefore you cannot simply put slow venting air vent valves in those rooms which sometimes get warmth from the sun. Thermostatically-controlled air vent valves will measure the room temperature and not allow air to escape (and steam to enter) that radiator if the temperature is above the setting of the thermostat. On sunny days when the room is heated by the sun, steam will by-pass those radiators. At night or on cloudy days they will receive steam as any other radiator in the building would. These valves are expensive, but are relatively easy to install, and are needed only for those radiators in rooms which receive a lot of sun. There are several brands available: Danfoss, Honeywell and ISTA, to name a few. You can get these thermostatic valves with built-in heat sensors—attached directly to the valve—or with remote sensors where the heat sensing element is placed away from the radiator and the signal is transmitted along a wire. The remote sensor type is a bit more expensive and only needed in situations where the valve location doesn't reflect general room temperature conditions. The illustration at the bottom of the page shows a thermostatic air vent valve.





Have Heating System Controls Adjusted

The controls which determine the temperature and pressure at which circulation begins and ends—the pressure-trols, and when the burner comes on and off—the Heat Timer, should be adjusted after heating system balancing to make the whole system operate more efficiently. These controls are complex, and should be adjusted periodically by a professional service person.

CHAPTER FOUR: HIRING HELP

No matter how much self-help you do, there will inevitably be times when you'll need to hire help. Self-help is a valuable and necessary part of any tenant association's maintenance and repair plan, but it can't do everything. Some highly skilled or particularly difficult jobs simply must be done by professionals. Some large scale jobs would take too much time and energy from tenants and can be better and more efficiently accomplished by hired help.

But hiring outside help can sometimes be a confusing, frustrating and, in the worst cases, financially devastating experience. If you're not familiar with the building trades, it's hard to know what you want in a contractor, much less how to get it. How do you decide what kind of job will be done best by a building trades professional, and what might be better undertaken by a skilled tenant, or the super working for extra pay? How can you find out what a job really ought to cost, as opposed to what a contractor says it will cost? How can you be sure you've gotten what you've paid for, and if you suspect you've been ripped off, what recourse do you have then?

In some key ways, hiring outside help involves an awful lot of trust—especially when you're hiring someone to do a job which you know very little about. You can ask for references, get competitive bids, look over a contractor's previous jobs, and seek the advice of a consultant, perhaps from a local community organization—all of which are important and useful steps to take, but when it comes right down to it, you have to take it on faith that the contractor will do good work and use good materials.

Well, not quite on faith. That's part of what this chapter is about. The more you know about hiring help, the better your experience will be when you do. Whether you're paying the super to hang a couple of doors, or bringing in a roofing company to do a full scale roof rebuilding, your preparedness will make a difference in how well the job goes. Being extremely specific about what you need done will reduce the chances of work being completed which you find you have to pay for, but don't really need. Learning to talk to building trades professionals—to understand the construction terms they use in describing the job they propose to do for you—will make you a lot more confident in dealing with them, and at the same time will make them respect you—it's a little bit like being able to order in Chinese at a Chinese restaurant!

Most of us have never had to hire a worker, to say nothing of supervising a major construction project. This chapter will provide an introduction to doing both, a sort of guide to what's what in the building trades. This should help you understand the outlines of what's involved in hiring help. The following chapter gets down to the nitty gritty, offering sample scopes of work for several major jobs which you can use as models

when you write your own.

For the moment, though, let's look into how you go about hiring help.

INFORMAL ARRANGEMENTS

Hiring help as a whole can be loosely broken into two parts: informal and formal hiring. Informal hiring covers most of the smaller, routine or slightly out of the ordinary, day-to-day sorts of repairs that will have to be done by someone, but are perhaps beyond the tenants' abilities or outside the super's contract. Formal hiring applies to the big stuff: large scale jobs costing substantial sums of money, where extremely careful contractual procedures will be required to protect the tenant association's investment. There is much that is similar about both kinds of hiring: a written agreement including terms of payment, schedule, and a description of the job should be executed before work begins on either, and on both some sort of supervision must be conducted to ensure that a good job is being done before payments are made. This section will review the process of informal hiring, while the following section will concentrate on formal arrangements.

Informal hiring occurs when you hire someone directly, without getting several written bids or drawing up a legal contract. It works well for simple jobs: an oil burner tune-up, patching a wall or ceiling, or replacing a worn out faucet. If your building regularly uses the services of repair people, say the oil burner service person, or a plumber or electrician, then you may not even bother with asking for a written price. After a while you'll get a good sense of what a job will cost, and if you build up a strong working relationship with your repair person, you'll know you can rely on him or her to do the job properly. Before you've developed such contacts, or on jobs you've not had done before, you may still want written quotes—even on small jobs. When you trust a contractor, you might get a verbal quote, either in person or over the phone, and there's not much point in writing up a formal contract.

You should, however, complete some sort of written agreement when you actually hire someone (unless it's someone with whom you have established a running account). This agreement might take the form of a letter of intent from the repair person to your tenant association, stating the outlines of the job, the expected completion date, and the estimated price. If you agree to these terms, both parties should sign the letter. It could work the opposite way as well, with the tenant association writing the letter, and submitting it to the worker. Should anything go wrong along the way, this agreement will protect both the tenant association and the person you're hiring. If you pay directly as well, it could also serve as an invoice or cash receipt for your records.

Remember that some member or members of the tenant association must take the responsibility for authorizing the work to be done, then checking its progress and assuring its quality before making any payment.

Hiring the Super

For some jobs, you may want to hire the super to do work that would not normally be included in his or her regular duties. For instance, the super's responsibilities aren't likely to include any renovation or rehab work, but your tenant association may want to hire him or her one day a week, or for a few hours a day when other chores don't need attention, to do basic demolition and clear out a vacant apartment in preparation for renovation.

Since the super often lives in the building, knows it and its tenants, the super is also a good choice to do small extra jobs for which he or she has the skills, such as plumbing replacements or repairs. These minor repairs can usually be fitted into the super's regular schedule, and they may get done quicker and cheaper that way than if an outside contractor were hired. Make sure, however, that any work asked of the super that is above and beyond the normal contract is clearly defined as such, specified in a written agreement between him or her and the tenant association. It's also worth remembering that the super already has a job to do. Don't load on extra work unless you're satisfied that both assignments can be completed. It won't do much good to have the super working for extra pay as a handyperson, while the building deteriorates around you because the super doesn't have any time left to be the super!

Hiring Tenants

Hiring tenants is another valuable option. There may be tenants in the building who do construction work, and want overtime or weekend work to supplement their incomes. There may be unemployed tenants with building trades experience. Hiring a tenant is particularly important as a means of encouraging and recognizing local talent: by keeping the building's money within the building, you can begin to develop a strong sense of self-reliance, in much the same way that self-help projects build community pride.

At the same time, there's a potential danger. You must be very careful not to pay one tenant for something you expect another tenant to do for free. Self-help and paid work don't mix well when they're applied to the same sorts of jobs. If, for instance, everyone in a tenant association is pitching in to get a vacant apartment ready for rental, then it may not be wise to pay one tenant for his or her specific skills. In such a situation, it may be better to hire an outside contractor, even if a tenant has the necessary abilities.

When hiring tenants, do not pay them by reducing or abating their rent. Rent reductions or abatements make it almost impossible to keep proper records of the building's rental income and maintenance and repair expenditures, since the two will be getting mixed up. Instead, write the tenant a check in payment, just as you

would pay anyone else.

Note: Many contractors expect to be paid in cash, not by check. Be sure to find out ahead of time what form of payment a contractor—or anyone else—expects to receive.

FORMAL ARRANGEMENTS

Hiring An Architect or Engineer

Hiring an architect or engineer may be advantageous or even necessary to assist you in getting work done. First, you might hire an engineer or architect to inspect your building to determine if a problem exists. This is recommended particularly in the case of suspected structural problems.

Second, you might hire an architect or engineer to prepare a scope of work, specifications and/or drawings which describe in detail the work to be done. Certain types of jobs require an architect to file drawings with the Department of Buildings before work can even begin.

Finally, you may want to hire an architect or engineer to supervise the work being done, to make periodic inspections to ensure that the contractor is performing adequately, and to let you know when a scheduled payment should be made.

If you think you need an architect or engineer to inspect or advise you about any part of your building, your best bet is to contact UHAB or some other technical assistance organization and use their list of professionals as a resource.

Hiring A Contractor

Many people worry when they're confronted with having to hire a contractor. They believe, with some justification, that an unscrupulous contractor may take their money and run—leaving a half-finished job or worse. Part of this nervous condition comes from being poorly prepared. The more you know about what you're doing, the more sure you'll be doing it.

Good contractors exist, plenty of them. The trick is finding one, negotiating a reasonable price for the job you need done, defining precisely what that job entails and then making certain that the end result matches the original definition. That's not as easy as it might sound, but on the other hand it isn't nearly as hard as some people make out. The suggestions which follow will help.

For any job too complex or costly to be done by self-help or by the super, you'll wind up wanting to hire a building trades professional—a contractor specializing in whatever it is you need done: electrical work, plumbing, heating systems, masonry construction and repair, roofing, ironwork or carpentry. Try to hire a contractor whose principal business is in the field you need help in. It's usually better to find a good electrician, for instance, than a good carpenter who happens to do some electrical work on the side. When you begin looking for a contractor, call around to people you know who've had similar work done, and ask for their recommendations. Ask for references from local community groups or tenant associations, or, if you've been using a plumber, say, ask if he or she knows a good roofer. Try to approach a contractor through some sort of reference, but if all else fails, there are always the yellow pages of your telephone book.

Write Up a Scope of Work

The first step in dealing with contractors is knowing exactly what you want done. When this description is put into writing, it serves as what's known as a "scope of work" or "specifications:" a formal job description on which a contractor can make a bid. The scope of work or specifications then become part of the contract documents, legally tying the contractor to a certain performance standard. A scope of work includes a general description of the job, materials to be used, guarantees, permits and more. A specification goes beyond this, spelling out in great detail the exact materials and method required. A specification leaves nothing to the imagination or discretion of the contractor. While not always necessary, it is recommended for complex jobs where very precise instructions are required to assure proper work.

Chapter Five of this book will examine what's involved in a scope of work, and will include several examples of scopes. This scope provides the basis for your relationship with the contractor. It's one of the most important means you have at your disposal to control what happens from the moment of hiring on: it helps you to determine clearly in your own mind what it is you expect, and it communicates this information to the contractor.

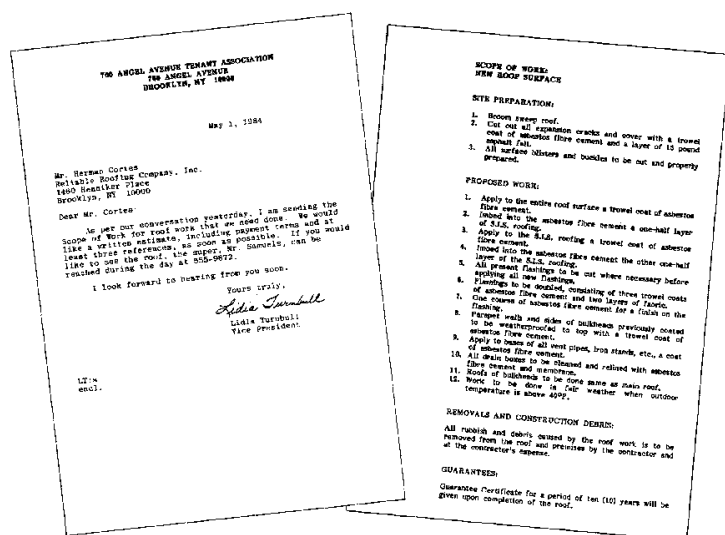
Specifications generally require the services of a professional architect, engineer, or construction manager. No samples of specifications are given in this book. You may, however, be able to write your own scope of work for basic jobs using the information in this book as a guide. If possible, have a professional help out, perhaps someone from a local community service organization, a representative of HPD, or an architect or engineer. You might have to pay a small fee for this service, but it will be well worth it in the long run.

Obtain At Least Three Written Bids

Having completed your written scope of work, you're ready to take bids on the job. If you're especially well prepared, the way most of us aren't, you will have been collecting the names of contractors referred or mentioned by friends and acquaintances, and you'll have a nice file of names to draw on. UHAB has a list of contractors you can use for reference, as well. Failing that, you may have to select at random. But whatever you do, be sure to have a minimum of three different contractors bid on the job. Most contractors will tend to take you more seriously if you seem to know what you're doing, take the job seriously, and take them seriously as well. They'll often give a better (lower) bid if they know you're sending the job out to bid to more than one contractor.

A sample letter requesting a bid appears in the illustration below. Note that the tenant association has asked for a written estimate, desired payment terms and references, and has included a scope of work for the job (see page 154 for the full roof resurfacing scope of work).

Payment terms will vary from contractor to contractor, but it's normal to pay 20 - 30% up front, for initial materials purchases. Under no circumstances should a contractor demand—or you pay—100% up front. You'll pay the balance of the account at specified points during the job, but you should withhold 10% as a retainer even after the job is finished until you're convinced that it has been properly done. A new roof may look just dandy, until it rains. Having retained the small balance may give you some leverage to get the contractor back for further work, if you need to. It is common to hold a retainer for one or two weeks. Longer would be unfair to the contractor (unless you discover something wrong with the work). But even that's not always enough. Unfortunately, a lot of contractors would rather risk their reputations than re-do a job.



A reply from a roofing contractor is illustrated below. The proposal itself is shown on the facing page. Note that in his cover letter, the contractor has provided the references requested, and in his proposal, he has indicated the total price estimated as well as the terms for payment.

Check the References

Don't just ask for references; check them out. Call a contractor's past clients. If at all possible, visit the sites of former jobs, to see for yourself what's been done and how. Ask if the overall quality of work and materials met the client's standards. Was the work completed according to the specified schedule? What sort of work habits did the contractor or his crew display—did they come to the job for a few hours one day, then promise to show up the next day, and not show for the rest of the week? Did they leave a mess behind them, or a clean job site? You'd be surprised how much you can tell by how clean a contractor leaves the job site.

What you're looking for in a contractor's references is some assurance that the person you hire will be conscientious in all aspects of his or her work. Look hard. It can make the difference between a good experience and a miserable one.

RELIABLE ROOFING



1460 Henniker Place • Brooklyn, New York 10000 • (212) 555-2442

May 5, 1984

Ms. Lidia Turnbull
Vice President
700 Angel Avenue Tenant Association
700 Angel Avenue
Brooklyn, New York 10000

Dear Ms. Turnbull:

Enclosed please find our proposal for roof resurfacing work to be performed at 700 Angel Avenue. I inspected your roof yesterday and found no unusual conditions.

The references you requested are as follows:

Franklin Realty Co.	Evergreen Tenant Association
260 Clarke Street	2460 Evergreen Avenue
Brooklyn, N.Y.	Bronx, N.Y.
Charles Franklin	Dana White
555-5665	555-1404

People's Community Housing Organization
777 St. Nicholas Avenue
New York, N.Y.
Judy Summers
555-6907

Please sign where it says "Accepted" if you would like us to do the work. Please contact me if you have any questions.

Sincerely,

Herman Cortes
Herman Cortes

HC:ms

RELIABLE ROOFING
 1480 Henninger Place • Brooklyn, New York 10000 • (212) 555-2441



May 5, 1984

700 Angel Avenue Tenant Association
 700 Angel Avenue
 Brooklyn, N.Y. 10000
 Attn: Lidia Turnbull

We will furnish all materials, labor and equipment to complete the following roofing work at 700 Angel Avenue:

Site Preparation:

1. Broom sweep roof.
2. Cut out all expansion cracks and cover with a trowel coat of asbestos fibre cement and a layer of 15 lb asphalt felt.
3. All surface blisters and buckles to be cut and properly prepared.

Proposed Work:

1. Apply to the entire roof surface a trowel coat of asbestos fibre cement.
2. Imbed into the asbestos fibre cement a one-half layer of S.I.S. roofing.
3. Apply to the S.I.S. roofing a trowel coat of asbestos fibre cement.
4. Imbed into the asbestos fibre cement the other-half layer of the S.I.S. roofing.
5. All present flashings to be cut where necessary before applying all new flashings.
6. Flashings to be doubled, consisting of three trowel coats of asbestos fibre cement and two layers of fabric.
7. One course of asbestos fibre cement for a finish on the flashing.
8. Parapet walls and sides of bulkheads previously coated, to be weatherproofed to top with a trowel coat of asbestos fibre cement.

Page 2

, etc., a coat

h asbestos fibre

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temperature

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ars will be given

Total Cost of above for roof surface of 1,172 square feet: \$1,465.00

To be paid as follows:

20% upon start of work	\$ 293.00
20% when work is 50% complete	293.00
20% when work is 75% complete	293.00
30% upon completion	439.50
10% retention for up to one week	146.50

Accepted:

 Authorized signature of Approval

 Printed name, title, company

Sincerely,

Herman Cortes
 Herman Cortes, President
 Reliable Roofing Company

Compare Bids

After at least three bids have been received, you'll want to compare them and choose one. You shouldn't simply pick the lowest bid—though it may look cheaper on paper, it is by no means always the best choice. In fact, some large building firms have a policy of throwing out the highest and lowest bids, and selecting their contractor from among the others! A contractor who comes in with a bid significantly lower than the others deserves special attention: how did he or she do it? Are the materials and work specified of the same quality as the others'? What about the time and schedule for the job? How do the references stand up?

If the low bid can withstand such careful scrutiny, then by all means go with it. But if the contractor who has the best references and has done the best job of preparing his or her bid—specifying exact materials to be used, for instance, rather than simply general types—is only a little more expensive than the others, then it may be well worth your while to hire that firm.

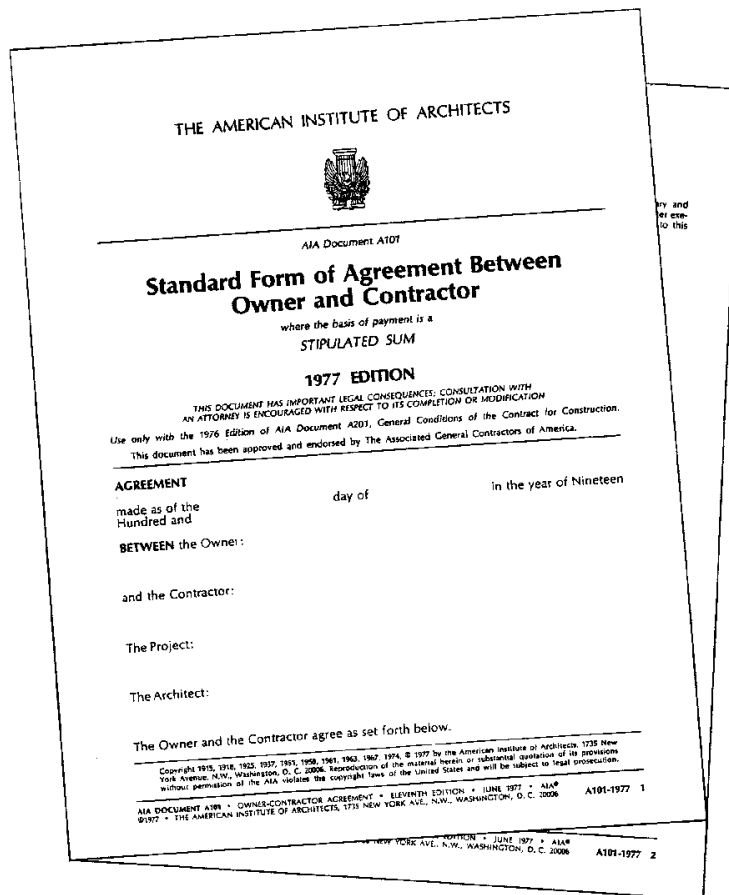
An unpleasant, half-finished or badly done job will leave problems that linger a lot longer than the pain of having to spend a bit more to get it right in the first place.

Entering Into an Agreement

There are four basic elements to any contract or agreement: (1) the action—what is to be done (the scope of work or specifications), (2) the consideration—the payment, (3) the time of completion, and (4) the signatures. In addition to the amount of consideration, a schedule of payment, tied to the work completed, should be spelled out. Include a 10% retainer, to be held for a specified period after the job is completed, to give you a chance to inspect the work thoroughly and to make sure that there are no bugs, before making the final payment. Some contracts include a penalty if the date of completion is not met. You may also want to include some general conditions such as when the work can be performed, access to apartments, when systems like the boiler or water may be shut off, and when they must be started again. Finally, the contract should be signed by both the contractor and a building representative. A copy should be retained by both parties.

It is common practice for the contractor's proposal to serve as the agreement, instead of a separate

contract. If you are satisfied with the proposal as written, then sign it, retain a copy and return the original to the contractor. If there are problems with the proposal, you can ask the contractor to submit a new one with specific agreed-upon changes. Sometimes you will want to draw up a contract yourself to ensure that it includes everything you want. Standard contract forms like the one on the facing page are available from the American Institute of Architects (see Appendix A: Government Agencies and Professional Organizations for the address and phone). It can't be stressed often enough that **this contract or agreement is your only legal protection** in the event that problems arise. You may even want to have a lawyer help you draw up the document or review the contractor's proposal before you sign it.



In New York City, all plumbing and electrical work must be completed by a licensed contractor. While this is meant to protect consumers from poor work by unskilled contractors, and it more or less does, it also raises the cost of having such work done. Licensed contractors charge labor fees in the range of \$20 - \$30 per hour, even for simple work. Despite the law, a large number of unlicensed plumbing and electrical contractors still work around the city. Many of them are highly skilled, and if they come to you well-recommended by people you trust, you may decide to hire an unlicensed contractor. However, you will have no legal protection if you should ever want to take him or her to court to recover losses caused by poor quality repairs or materials. Additionally, on major renovations or systems replacement, especially those which require dealing with a city agency or local utility, a licensed contractor **must** be used for filing and signing off.

Filing simply refers to the procedure for requesting a building permit, which is required for certain jobs. Signing off is providing verification that the job has been done to code specifications and, if the job is being done to remedy a code violation, filing a dismissal request with the Office of Code Enforcement. If the work that you need to have done requires a building permit or if it must be done "to code," then you must write this into the contract.

Supervise the Work

It's important that a member of the tenant association be delegated to supervise the contractor's work. This doesn't mean standing over the workers' shoulders all day (though if the work is being done in a tenant's apartment, you may want to keep someone there at all times, to protect both the tenant and the contractor).

Supervision, for the most part, is simply keeping track of the progress of the job. If the contractor hasn't been seen for weeks, and the work is half finished, someone from the tenant association should be responsible for finding out what's going on. Meet problems as they occur. Don't wait until the end of a job when work must be redone or the contractor has already been paid. Money is your greatest leverage in getting a contractor to perform. When the job is completed, the same person from your tenant association who has

been supervising the job should examine the work to make sure it meets the standards specified in the contract. If you have any doubts, you may want to ask another professional to come in and do an inspection with you before you pay the final 10% retainer on the contractor's fee.

PAYING FOR REPAIRS

So you've got great plans: you'll have a new roof put on, the exterior walls weatherproofed, and all the building's windows replaced with new, double-glazed energy conserving units. You'll set up a self-help project and buy the materials to rehab your vacant apartments. You'll convert the boiler to gas and rewire the building. You'll paint all the inside hallways, put in new mailboxes and an intercom system and, to top it all off, plant trees in the courtyard. You'll wind up with the best building on your block, maybe the best building in your borough. But there's just one little detail left to be worked out . . . how are you going to pay for it all?

Repairs and improvements don't come cheap. Materials are expensive and labor is more expensive still. Even just maintaining the building in the condition it's in is expensive, so how can you ever afford to transform it into something wonderful?

Carefully. Through careful planning, organization, and investigation you'll find it possible to accomplish a lot more work for a lot less money than you'd ever have thought possible. A well-planned self-help component, for example, can save thousands of dollars. Scrounging for used or cut-rate materials, where they're appropriate, can greatly reduce materials costs. Being bargain conscious—knowing what you need and buying it when the price is right—will help keep the budget in line. Searching for applicable aid and assistance programs may be frustrating and time consuming, but when an agency or community service organization finally does come through with a free load of weatherization materials, for example, that time and frustration will be well rewarded.

Plan, too, around your predictable budget needs. You'll want to schedule most maintenance and repair improvement projects for the late spring, summer and early fall—when fuel bills won't demand most of your financial resources. Summer is a good time to complete energy conservation projects, and the money spent in those months will be recovered during the following winter. Your list of repair priorities will help you do this sort of planning.

You may be able to work out credit arrangements with contractors or suppliers. Those who are sympathetic to your efforts to bring your building back to life may be quite generous, letting you pay them for work over a longer term, which will allow you to have work done that you could not otherwise afford. It's essential, though, that this generosity on their part be answered with responsibility on yours: work out the terms of credit in advance, then meet them. Most merchants would rather have a few dollars a month, and know they're going to get it every month, than be promised large payments that don't come on time. For the long-term financial health of your tenant association, good business relationships are crucial.

Financing Options

In some cases, the city will pay all or part of the cost of a repair to a city-owned building. In others, your tenant association may be able to borrow money from revolving loan funds set up by community service groups or organizations like UHAB. In a few buildings, tenants with a little extra to spare will loan money to the association at favorable terms.

The point is that you've got a lot of options. From the outside, it looks impossible: How would you ever get the cash together to pay for major renovations and rehabilitation of your building? When you get a bit further into the process, you'll find that there are ways. They're not always easy to uncover, but keep digging.

When the City Pays

If you live in a city-owned building and are enrolled in one of HPD's Alternative Management Programs, the city may be willing to pay for some major repairs, such as a new boiler, a new roof, or new plumbing and electrical services. When you signed your Tenant Interim Lease, you were asked to list any major repairs your building needed. The city might even have agreed to take care of some of the repairs on your list. But your building is in competition with hundreds of others for a very limited amount of HPD's time and money. Chances are you're still waiting in line.

The city wants very much to sell TIL buildings, and as you get closer to buying, they may become more willing to do repairs. If one large job is stopping you from purchasing your building—a leaky roof or a blown boiler, for instance—say so. The city's desire to sell the building gives you a little leverage.

But the bottom line, unfortunately, is that you shouldn't count on the city to make repairs.

Looking for a Loan

Another source of funding for repair work is loans. Most often, you won't be eligible for simple bank loans until after you've purchased your building—at which point you will have the building to use as collateral for the loan.

Once you own the building, you're also in a position to apply for state and federally funded low-interest loans. The requirements for these loans change often; check with UHAB to find out which ones are currently

operating and whether or not you're eligible.

Some tenant associations, as we mentioned earlier, will be able to borrow money from individual tenants—or even from friends or associates outside the building. These private loans will not have to wait until after you've bought the building. You won't be subject to bank credit scrutiny either. Still, you shouldn't take loans from tenants or friends lightly. They constitute a financial liability for both parties, and you should have a written agreement specifying the terms and conditions of any such loan. It's a good idea to consult a lawyer when drawing up this type of agreement.

Keep in mind that it's vital to the long-range financial health of your tenant association to maintain good business relationships.

Looking for Help

There are a number of programs in the city that have been established for the express purpose of helping tenants to upgrade the quality of their own housing. Like the low-interest loan programs, however, the services offered by community organizations change often. Check with UHAB to see what's currently available, and what you might qualify for.

Weatherization is a good example of this. There are a variety of community weatherization programs which will supply qualified buildings with everything from an energy audit to new windows, from expert advice to insulation. When planning your repair priorities, you should bear in mind the possibility of having much of your energy conservation work designed with such programs as models. With luck and effort, you'll end up with weatherization improvements worth thousands of dollars, which actually cost you little or nothing.

UHAB has set up the Dumpster Loan Program, with help from the Consumer-Farmer Foundation. This revolving loan program will lend buildings a dumpster, a container for construction debris, and allow the tenant association to take as long as four months to pay for it. Contact UHAB for further information.

The Neighborhood Work Project (NWP) is a prisoner release program which does a variety of different types of work in New York City neighborhoods. They'll clean out yards and basements, do demolition, sheetrocking, plastering, painting and debris removal. Check with HPD if you're interested in getting an NWP work crew for your building.

Bulk Buying

Finally, don't forget that careful purchasing can save a great deal of money. Especially for self-help rehab programs, where materials will be the largest part of your budget, look long and hard for bargains.

Some of the best bargains available come through bulk buying. In Brooklyn, the Brooklyn Energy Cooperative sells weatherization supplies at a discount to its members. In conjunction with UHAB, they have set up a similar program for TIL buildings. Even if a specific bulk buying cooperative or program doesn't exist, bulk purchasing is still a possibility. Look into linking up with other buildings in your neighborhood, so that together you can afford the cash outlay for a large order. It's also possible to collect smaller orders from tenants within your building, for paint or lumber for instance, and combine them when you go to the lumberyard. The savings from these efforts will be substantial.

The following chapter will acquaint you with the details of contracting for outside help in the maintenance and repair of your building. Read the sample scopes of work, and the introduction to the scopes, before doing any major hiring.

CHAPTER FIVE: FINE PRINT

In Chapter Four we strongly recommended the use of formal contractual procedures whenever you hire contractors for expensive jobs. The purpose of a legal contract is to protect both signing parties from any problems that might arise due to negligence, deliberate refusal to honor the agreement's terms, or simple misunderstandings. If for any reason a dispute between you and your contractor should ever find its way into a court of law, the contract that both of you have signed will provide the principal evidence for your claims.

Contracts often seem too time-consuming or too confusing to bother with. Frequently, the officers of a tenant association will hire a contractor to do work worth several thousand dollars on the basis of a verbal agreement alone. When everything goes well, this works fine. But as soon as some problem turns up, you'll wish you had a contract. Take the time to write one. It will be well worth it.

The central portion of a contract for building repairs or improvements is a scope of work—a detailed statement of the work that needs to be done. This chapter will help you to write a scope of work for repairs to your building. We can't tell you exactly what will be in every scope you write—that information will change for each situation, but we can tell you what general sorts of things a thoroughly written scope ought to contain, and how they should be presented. Three sample scopes are included, for major roofing repairs, burner overhaul and new plumbing supply. Use these for comparison, as examples, not for incorporation into a contract!

WHY BOTHER?

A scope of work or, for more complex jobs, specifications, defines the job you're hiring a contractor to do, sometimes in great detail.

A good scope will state clearly and exactly what the contractor will be responsible for doing and providing. The scope then gives you a basis for comparing two different bids. For instance, if you took bids from three contractors for replacement of a gas meter and installation of a new gas riser, you might get estimates of \$800, \$1,000, and \$1,200 (none of these numbers are accurate; they're just used for illustration). At first glance, the \$800 bid seems best, and you'd naturally be tempted to take it.

But precisely what is the contractor offering to do for your \$800? Who will file for a work permit? Who pays the filing fees? Who will test the new gas line and apply for a Blue Card—a certificate Con Edison requires before they'll turn on the gas? Who'll make sure Con Ed turns on the gas? Will the contractor patch plaster walls torn open to gain access to the line? and install a valve at the stove connection, so that the gas can be shut off for stove repairs?

If the contractor with the highest bid has taken into account all that work, and plans to do it, while the low bid will give you only what you asked for, a meter and riser and nothing more, then the high bid doesn't seem nearly as high. Which is the best price?

A scope of work can answer that question by answering all the ones that came before. If you've written a good scope of work, you won't wind up asking contractors for bids on "a gas riser and meter." You'll ask them to bid on the job described in the scope of work—nothing more and nothing less. That way, you can compare your bids strictly on price, since you've specified what each contractor is bidding on. What's more, you're setting the terms and limits of the job. You know before you get started what you're going to end up with.

When included with a signed contract, a scope of work constitutes a legal document establishing a contractor's responsibility under that contract.

It's convenient to look at what goes into a scope of work by dividing the document into its parts, each of which refers to a particular part of the job described in the scope. We'll go through them one at a time. Except for the category called "Proposed Work," which applies to every scope, the rest of the categories may or may not be necessary for the scope you need to write—depending on whether that activity will or will not be required to do the job you have in mind. "Site Preparation," for example, would be important to a scope of work for new foundation walls, but irrelevant to a scope for boiler repairs.

Site Preparation

For some jobs, a certain amount of site preparation will be needed before actual work can begin. If you expect the contractor to do this work, it must be specified in the scope. In painting, for example, cleaning the walls thoroughly before applying new paint is essential to a quality job. A scope for exterior wall weatherproofing should include removal of any loose mortar or bricks. If you're going to have the exterior of your building worked on, for example, there may be brush or bushes that have to be removed first. If you want the contractor to do this, and don't mind paying the contractor's labor prices for it, then include it in the scope. But you could specify no site clearance and do the work yourself to save money.

Proposed Work

The "proposed work" is the main part of any scope. It's a detailed, line by line itemization of each step of the job. When necessary or appropriate, the proposed work will list the precise type, brand name, or quality of materials to be used. In some situations, such as plumbing and electrical work, quality may be assured by beginning the proposed work section with the sentence: "All work shall be performed to comply with the standards of the Uniform Plumbing (or Electrical) Code of the City of New York." Because the city codes are extremely strict, this note alone will be enough to guarantee high standards of work and materials. The code contains specifications of materials and installation procedures for different situations, but you'll still have to define the conditions of your actual job.

To get an idea of what's needed, look over a number of sample scopes. Three are included in this chapter, and more are available from UHAB. Some scopes may include everything concerned with a job under a single title, "Proposed Work," while others will break it down into sections as we have here. What you do depends on what you need. It's worth noting, though, that listing each task under a title makes the scope very clear and easy to understand, and at the same time makes it harder for a contractor to ignore or fail to notice some part of the specifications.

Fees and Permits

Many repairs and improvements require special permits from the city before work can begin. Others also involve the filing of an application for certification when the job is done. Permits and certificates have to be filed for with the appropriate city agencies, and filing costs money. If the contractor is to be held responsible for all filing and filing fees, the scope should say so in no uncertain terms.

Restoration and Finish Condition

Certain jobs, particularly those which involve opening up walls or ceilings to get at pipes or wiring for repair, require considerable restoration afterwards. The scope should make specific mention of how the job is to be left. If you've got a plumber mending pipes, he or she may leave the pipes nicely mended and the walls torn apart. If you want the plumber to patch the walls, say so, and make sure you say that the walls are to be restored to "original condition or better." Not all plumbers are the best of carpenters!

You might decide, though, that as long as the wall's being ripped open anyway, it's a good time to go ahead and hire a carpenter to replace the plaster and lath with sheetrock. In that case, you'd note in the plumbing scope that the walls were to be left unfinished.

What's important is that the scope specify precisely what you expect the job to look like when it's done. The plumber who fixes the pipes and leaves the wall in pieces on the floor may think that the job is finished, but whoever lives in that apartment is likely to have a quite different idea.

Removals and Construction Debris

The scope also covers removal and reuse of materials involved. Some jobs, such as window or door replacement, obviously require removal of the original units before new ones can be installed. But in some situations—plumbing, for instance—you may want your contractor to keep much of what's already there and still good. The scope has to be quite specific about what should be reused and what should be removed.

When materials are removed, you'll have to do something with them. Construction and repairs tend to generate an awful lot of trash, whether it's old windows and doors, demolition debris, or discarded appliances. Getting rid of a dozen broken-down gas stoves stacked up in front of your building is no laughing matter, and if you expect the contractor to take care of them, you'd better write it out in the scope. If a dumpster must be rented, who pays? If you want debris removed and the area swept clean, that must be included in the scope.

And if you'd like to keep anything torn out of the building during the job—old doors or windows, for instance, that might still be used somewhere else—a note to that effect should appear in the scope.

Guarantees

If you expect a guarantee on the work done, your scope should ask for one. You may want to state the terms of such a guarantee, and then deal only with contractors who are willing to meet those terms. Or, you could simply say that a guarantee is expected, and see what sort of terms each contractor offers in his or her bid.

In roofing work, for example, the guarantee on a new roof is often determined by the type of materials used and the methods of installation. Contractors commonly speak of a 5 year, 10 year, or 15 year roof, referring to the length of time it will be guaranteed against leaks.

Guarantees may or may not be useful, and they may not always be easy to obtain. If you expect one, be very clear about it in the scope.

The following sections present three sample scopes of work. By reading them you ought to be able to get a sense of what needs to be included in a scope. If you don't find enough information here to help you write your own scope, try calling UHAB or HPD. Both have other sample scopes available for you to look at. Local housing organizations may also have scopes that were used by buildings nearby.

It's important, when writing the scope, to be as complete and specific as possible. Of course, that's pretty tough if you're attempting to describe a job you know nothing about. One way around this problem is to hire a professional—a contractor in whatever area you're looking for help in, or an architect or engineer—to assist you in writing a scope. Many contractors will come by for an hour, and for an hour's wages will go over a job with you and help you write the scope for it. They can be very useful if you're really in the dark about a job.

SCOPE OF WORK: NEW ROOF SURFACE

SITE PREPARATION:

1. Broom sweep roof.
2. Cut out all expansion cracks and cover with a trowel coat of asbestos fibre cement and a layer of 15 pound asphalt felt.
3. All surface blisters and buckles to be cut and properly prepared.

PROPOSED WORK:

1. Apply to the entire roof surface a trowel coat of asbestos fibre cement.
2. Imbed into the asbestos fibre cement a one-half layer of S.I.S. roofing.

3. Apply to the S.I.S. roofing a trowel coat of asbestos fibre cement.
4. Imbed into the asbestos fibre cement the other one-half layer of the S.I.S. roofing.
5. All present flashings to be cut where necessary before applying all new flashings.
6. Flashings to be doubled, consisting of three trowel coats of asbestos fibre cement and two layers of fabric.
7. One course of asbestos fibre cement for a finish on the flashing.
8. Parapet walls and sides of bulkheads previously coated to be weatherproofed to top with a trowel coat of asbestos fibre cement.
9. Apply to bases of all vent pipes, iron stands, etc., a coat of asbestos fibre cement.
10. All drain boxes to be cleaned and relined with asbestos fibre cement and membrane.
11. Roofs of bulkheads to be done same as main roof.
12. Work to be done in fair weather when outdoor temperature is above 40°F.

REMOVALS AND CONSTRUCTION DEBRIS:

All rubbish and debris caused by the roof work is to be removed from the roof and premises by the contractor and at the contractor's expense.

GUARANTEES:

Guarantee Certificate for a period of ten (10) years will be given upon completion of the roof.

SCOPE OF WORK: BURNER OVERHAUL AND ADJUSTMENT

PROPOSED WORK:

1. Time cycling pattern under pressuretrol operation (Heat Timer on manual). If cuts out on pressure in less than 15 minutes, reduce nozzle size by 0.5 gallons per hour (burner firing range permitting).
2. Dismantle drawer assembly; clean housing and blast tube interiors, fan, and combustion head. Replace electrodes and nozzle (as per #1 above) with new pieces.
3. Install new oil filter cartridge (or clean metal strainer basket, whichever is present).
4. Check lube oil level and fill as necessary.
5. Wipe photocell eye clean and check ignition safety cut-out for proper operation.
6. Check Heat Timer outdoor sensor calibration for both day and night settings; provide verbal report of findings and any required adjustment to job supervisor at time of overhaul for authorization to proceed with calibration.
7. Test-adjust burner, closing air shutter to minimum opening with #1 smoke spot at hi-fire; submit final smoke spot sample, CO₂, stack temperature, and draft readings.
8. Indicate (in writing along with combustion test data) any further poor operating conditions noted with estimates to remove such conditions; these shall be considered for separate work authorization.

SCOPE OF WORK: WATER SUPPLY PIPING INSTALLATION

PROPOSED WORK:

1. Water Services: Starting from street, contractor will use existing tap (presently on city main) and run a water service sized in accordance with Building Code requirements.
2. Piping: Overhead basement mains shall be exposed. Apartment risers and supplies (crotons) shall be concealed within the walls. Contractor will box water pipes due to structural conditions wherever necessary. Hot and cold water risers shall have a 6-inch separation. All overhead mains, risers and branches shall have hangers, straps, etc. properly secured and fastened.
3. Copper pipes shall be 99% Copper, Type L.
4. Cold Water Overhead (Basement): Cold water overhead will be _____ inches starting from outlet side of main valve and shall run through basement, reduced in accordance with load requirements and N.Y.C. approved water sizes.
5. Hot Water Overhead (Basement): Hot water overhead will be 2½" starting from new mixing valve, which contractor will provide at the boiler, and shall run through basement, reduced in accordance with load requirements and N.Y.C. approved water sizes. Hot water overhead lines will be covered with 1" thick fiberglass pipe insulation.
6. Hot Water Circulation: In buildings more than four stories in height and which are supplied with hot water, and in buildings where the developed length of the hot water piping from the source of hot water supply to the extreme fixture supplied exceeds one hundred feet, a hot water return circulation system shall be installed. The circulation return shall be ½" in diameter.

7. Riser Sizing:
 - a. Back to back kitchen lines will be _____ inches cold water risers and _____ hot water risers with ½" returns.
 - b. Back to back kitchen and bathroom lines will be _____ inches cold water risers and _____ inches hot water risers with ½" return.
 - c. Back to back bathroom lines will be _____ inches cold water risers and _____ inches hot water risers with ½" return.
8. Supply Sizing: All supplies (crotons) will be ½". All flush valves will have 1" connections. All showers will have ½" supplies up to and including shower heads.
9. Valves: To be American Standard or equal.
 - a. At the base of all risers there will be separate control valves for each riser, and a metal tag installed denoting location.
 - b. In every bathroom there will be separate control valves for the hot and cold water supplies.
 - c. In every kitchen there will be separate control valves except where there are back to back kitchens and bathrooms. In this case valves will be in the bathroom.
 - d. There will be a curb box valve in the building line near the curb, if water service is 2½" or larger. A separate control valve will be provided in the building for the street water service.
 - e. Cold water feed to the boiler and by-pass feed to mixing valve will each have a control valve.
 - f. A check valve will be installed in the return line before the boiler.
 - g. A new Holby hot water tempering valve will be installed.
 - h. A safety relief valve will be installed.
 - i. A new thermometer for accurate reading will be installed.
10. Air Chambers: All risers except the return lines will have air chambers of the same diameter as the riser at the top floors. These air chambers will be a minimum height of 18 inches, if space permits.
11. Swings: On every floor the hot water croton from the riser will have swings. All return lines off the hot water risers will have swings. Swings consists of 3 elbows or more.
12. Plumbing Fixture Trim: All trim will have removable seats:
 - a. Kitchen: A new deck faucet _____ or equal.
 - b. Bathroom: A new _____ or equal Basin cocks.
 A new 3 valve _____ shower body complete with head, arm escutcheons and tub filler.
 A new _____ flush valve (not applicable to bathrooms with low-down tanks).

All trim will be replaced in accordance with the type now existing.

FEES & PERMITS:

All permits are to be filed and obtained by the Contractor from all city departments having jurisdiction over this work. These permits will be paid for by the Contractor.

RESTORATION AND FINISH CONDITION:

Contractor will restore all surfaces damaged by installation. Contractor will match tiles to the best possible, or if replacement tiles are not available, a suitable match will be made.

APPENDIX A: GOVERNMENT AGENCIES AND PROFESSIONAL ORGANIZATIONS

NYC DEPARTMENT OF BUILDINGS

Manhattan

Municipal Building
1 Centre Street
New York, NY 10007

Elevators: (212) 566-2380
Inspectors: (212) 566-3130
Permits: (212) 566-2386

Brooklyn

Municipal Building
210 Joralemon Street
Brooklyn, NY 11201

Elevators: (718) 643-7815
Inspectors: (718) 643-7850
Permits: (718) 643-7943

Bronx

1932 Arthur Avenue
Bronx, NY 10457

For all inquiries:

(212) 583-5520

NYC DEPARTMENT OF HOUSING PRESERVATION AND DEVELOPMENT/OFFICE OF CODE ENFORCEMENT

Manhattan

39 Broadway
9th floor
New York, NY 10006
(212) 248-6355

Brooklyn

Municipal Building
210 Joralemon Street
Brooklyn, NY 11201
(718) 643-7884

Bronx

1932 Arthur Avenue
3rd floor
Bronx, NY 10457
(212) 583-5520

NYC FIRE DEPARTMENT/DIVISION OF FIRE PREVENTION

For Certificate of Fitness, #6 heating oil

250 Livingston Street
Brooklyn, NY 11201
(718) 403-1821 or 1822

AMERICAN INSTITUTE OF ARCHITECTS

New York Chapter

Publications Department (open from 1:00 - 4:00 PM)
457 Madison Avenue
New York, NY 10022
(212) 759-5485

APPENDIX B: RENT-IMPAIRING CODE VIOLATIONS

This list of rent-impairing code violations has been prepared by UHAB from the official list given out by the New York City Office of Code Enforcement. This list is more current than the city's regarding order numbers and citations of the law. In addition, this list tells you what class the violations are, which the city's list does not. Nonetheless, you should bear in mind that this is **not** the city's official list.

When a violation is classed as B/C, for example, this means that the violation is either Class B or Class C, depending on the severity of the condition and the opinion of the inspector. Buildings are classed as well. Apartment buildings are Class A buildings, while hotels, lodging houses and any residential building intended for transient occupancy is a Class B building. Some of these code violations apply to only one or the other class of buildings. A converted dwelling is a building that was originally intended to house one or two families living independently of each other that is now occupied as a multiple dwelling.

In reading the law citations, MDL means Multiple Dwelling Law and HMC means Housing Maintenance Code. If you want to read the laws, copies of the Multiple Dwelling Law (which contains the Housing Maintenance Code) are available for \$14.00 from:

City Books
Room 2213
Municipal Building
1 Centre Street
New York, NY 10007

On the last page of the Multiple Dwelling Law you'll find the city's list of rent-impairing code violations. The list alone is available free from the Office of Code Enforcement. See Appendix A: Government Agencies and Professional Organizations for the address and phone.

LIST OF VIOLATIONS CLASSIFIED AS RENT IMPAIRING

Order No.	Description of Violation	Section of the Law or Regulation	Class
51	Requires discontinuance of illegal storage of combustibles.	Sec. 12 MDL	B/C
65	Requires discontinuance of the unlawful use of lodging house until a certificate of occupancy is obtained for such use.	Sec. 66 MDL	B
69	Requires discontinuance of unlawful use for manufacturing until a certificate of occupancy is obtained for such use.	Sec. 61 MDL	A/B
72	Requires discontinuance of business use above second story of a non-fireproof multiple dwelling.	Sec. 61 MDL	B
80	Requires a legal second means of egress.	Sec. 231 MDL	C
81	Requires a second means of egress or a sprinkler system in converted dwellings.	Sec. 187 MDL	C
81B	Requires sprinkler heads in all Class B rooms.	Sec. 194 MDL	B
176	Requires the providing of a fire-proof passageway to street, or a gate in fence to adjoining premises.	Sec. 53, 187, 231 MDL	B
181	Requires a fireproof passageway to street where yard is less than 30 feet in depth and access to adjoining premises is not practical.	Sec. 53, 187 MDL	B
213	Requires the opening from place of business to public hall be sealed with fire-retarded material or with fireproof self-closing door and assembly.	Sec. 61 MDL	B
492	Requires the legalization or restoration of buildings illegally converted to multiple dwellings.	Sec. 9, 170, 171, 300, 301, 302 MDL	A/B
493	Requires restoration of a frame building illegally converted to a multiple dwelling.	Sec. 9, 56, 193, 300, 302 MDL	B
494	Requires the filing of plans and compliance with Section 67 of the Multiple Dwelling Law for heretofore erected existing multiple dwellings.	Sec. 4, 8, 25, 67 MDL	B
503	Requires repair of structural defects for safety.	Sec. D26-10.01 HMC	A/B
507	Requires repairing of leaky roof.	Sec. D26-10.01 HMC	B/C
511	Requires the repair of gas appliances to prevent carbon monoxide.	Sec. D26-10.01 HMC	C
520	Requires removal of the dangerous and inadequate supplemental fire escape.	Sec. D26-10.01 HMC	B/C
523	Requires removal of locking device from gate in fence at lot line.	Sec. D26-10.01, 10.05 HMC	B
524	Requires the removal of obstruction in fire passage.	Sec. D26-10.01, 10.05 HMC	B
551	Requires removal of sewage, etc., and cleansing and disinfecting to the satisfaction of this department.	Sec. D26-11.01, 11.03, 11.05 HMC	B/C
566	Requires removal of vermin.	Sec. D26-13.03 HMC	B
567	Requires premises to be free of rodent infestation.	Sec. D26-13.03 HMC	C
576	Requires adequate cold water pressure to fixtures.	Sec. D26-15.01 HMC	A/B/C
577	Requires adequate hot water pressure to fixtures.	Sec. D26-15.01 HMC	B
578	Requires the repair of defective water supply pipe.	Sec. D26-16.01 HMC	A/B/C
579	Requires repair of defective faucets.	Sec. D26-16.01 HMC	A/B/C
586	Requires a separate house sewer be provided.	Sec. 77 MDL, Sec. D26-16.01 HMC	A
590	Requires a separate water closet for each family within		

	old law tenement buildings.	Sec. D26-31.07 HMC	A
595	Requires removal of water closet obstructions.	Sec. D26-16.01 HMC	C
596	Requires replacing of defective plumbing lines.	Sec. D26-16.01 HMC	A/B/C
649	Requires removal of all obstructions and defects in plumbing facilities.	Sec. D26-16.01 HMC	B/C
665	Requires the providing of heating facilities.	Sec. D26-17.01 HMC	C
666	Requires adequate supply of heat to residential portions.	Sec. D26-17.03 HMC	B/C
668	Requires heating plants in good repair to prevent coal gas.	Sec. D26-17.05 HMC	C
669	Requires the providing of hot water facilities	Sec. D26-17.07 HMC	C
670	Requires hot water supply (as to temperature) to fixtures.	Sec. D26-17.07 HMC	B/C
675	Requires discontinuance of illegal space or hot water heaters.	Sec. D26-17.09 HMC	B
676	Requires discontinuance of room used for sleeping in which space heater is not provided with an air intake from outside the building.	Sec. D26-18.01 HMC	B
680	Requires adequate lighting for laundry room.	Sec. D26-19.01, 19.05 HMC	A
682	Requires adequate lighting facilities for public halls and stairs.	Sec. D26-19.03 HMC	B
684-87	Requires adequate artificial lighting for fire passages and cellar, public halls, yards and courts.	Sec. D26-19.01, 19.03, 19.05, 19.07 HMC	A/B
695	Requires removal of partition sash and sealing opening of same with fire retarded material in old law tenements 3 stories and basement or less in height.	Sec. D26-20.07 HMC	A
696	Requires the fire retarding of cellar ceiling in old law tenements 3 stories and basement or less in height.	Sec. D26-20.07 HMC	B
710	Requires the filing of yearly sprinkler test reports.	Sec. D26-21.07 HMC	B
716	Requires a manager be provided for Class B multiple dwellings.	Sec. D26-21.09 HMC	A
721	Requires a janitor or responsible person for janitorial service in multiple dwellings containing 9 to 12 apartments.	Sec. D26-22.03 HMC	B/C
723	Requires resident janitor on premises. Applicable to multiple dwellings with 13 or more families.	Sec. 83 MDL	*
741	Requires discontinuance of unlawful cooking space.	Sec. D26-32.01 HMC	B
742	Requires providing of an adequate supply of gas to fixtures.	Sec. D26-32.01 HMC	B/C
753	Requires discontinuance of unlawful use for single room occupancy.	Sec. D26-33.09 HMC	B
754	Requires unobstructed access to each required means of egress within each apartment.	Sec. D26-33.09 HMC	B
768	Requires a certificate of occupancy be obtained before a vacant or vacated building can be reoccupied for living purpose.	Sec. D26-35.01 HMC	B
772	Requires a registration and occupancy statement be filed with this department.	Sec. D26-41.03 HMC	A
774	Requires a written designation for change in managing agent on premises.	Sec. D26-41.09 HMC	A
775	Requires change in ownership, registration statement be filed with this department.	Sec. D26-41.05 HMC	B

APPENDIX C: FURTHER RESOURCES

Technical Assistance and Instruction

- ✦ The Urban Homesteading Assistance Board, (212) 749-0602 Class on maintenance and repair covers energy conservation techniques in both weatherization and heating system improvements.
- ✦ Housing Conservation Coordinators, (212) 541-5996 Course on burner/boiler maintenance is excellent and

very inexpensive. It includes a section on energy conservation techniques.

- ✦ Cornell Handivan, (212) 566-0673 Traveling classroom offers free instruction on a wide range of maintenance and repair skills, including energy conservation techniques. Will come to your building for workshops.
- ✦ Apartment House Institute, (212) 239-1661 Classes on energy conservation for multi-family buildings.

Reading

WEATHERIZATION

- ✦ **Energy Conservation Workbook for Multi-Family Housing**
published by the New York State Energy Office, (800) 342-3722

Free, a very thorough manual including how to conduct an energy survey, recommended energy conservation measures, estimating fuel savings.

- ✦ **Stay Warm Handbook**
published by the New York City Energy Office, (212) 566-4936; also available from UHAB, (212) 749-0602

Available for the cost of photocopying, this handbook includes information on a variety of energy conservation measures, including installation techniques. Nice drawings. Also available in Spanish.

- ✦ **From The Walls In**, by Charlie Wing
published by Atlantic-Little, Brown Books

Detailed discussion of energy saving techniques, including how to calculate heat losses. Written for "retrofitting" single family homes—renovating for energy conservation. Much of the information can be applied to multi-family buildings.

- ✦ **The Tighter House**, by Charlie Wing
published by Rodale Press

An excellent book geared to single-family homes, but with techniques and tips that can be applied to apartment buildings.

PLUMBING

- ✦ **Modern Plumbing**, by E. Keith Blankenbacker
published by The Goodheart-Willcox Company, Inc.

Designed as a textbook and quite thorough. Written to include apartment and industrial plumbing systems from a repair and maintenance standpoint, but it often doesn't take age into consideration. Has a fine step-by-step diagnostic and repair section with good illustrations. Covers tools and materials, with a glossary.

- ✦ **Plumbing: Installation and Design**, by James A. Sullivan
published by Reston Publishing Company

Another textbook, also quite thorough. Good illustrations.

ELECTRICAL

- ✦ **Wiring Simplified**, by H. P. Richter and W. C. Schwan
published by Park Publishing Company

- ✦ **House Wiring Simplified**, by Floyd M. Mix
published by The Goodheart-Willcox Company, Inc.

Apartments have been rewired using the information in these two books.

CARPENTRY

- ✦ **Residential Carpentry for the 1980s**, by John Caposoto
published by Reston Publishing Company

Covers tools and materials, and all phases of building a new single-family home. No repair

procedures, and the book is geared to professionals, but it does cover plastering, building concrete forms, drop ceilings, stair construction and cabinetry—all of which might be of assistance. Good photographs and illustrations.

- ⚡ **Against the Grain: A carpentry manual for women**, by Dale McCormick, published by Crossing Press

Contrary to the title, this book is not just for women—it is a clearly written and illustrated how-to manual for any novice carpenter.

- ⚡ **Modern Carpentry**, by Willis Wagner
published by Goodheart

Essentially an encyclopedia for carpenters. You could build a wood-framed house using this book. It has excellent diagrams for many different carpentry problems.

SECURITY

- ⚡ **The Complete Book of Locks, Keys, Burglar and Smoke Alarms**, by Eugene A. Sloane
published by William Morrow and Company

This is one of those books that come close to living up to its claim to be a complete book. Slightly tinged with paranoia, but it will tell you how to lock and alarm almost anything, including apartments.

AMENITIES

- ⚡ **The Complete Book of Floor Coverings**, by Robert Y. Ellis
published by Charles Scribner's Sons

A guide to buying and installing carpet, tile and linoleum. Good illustrations.

GENERAL

- ⚡ **Reader's Digest Complete Do-It-Yourself Manual**
published by the Reader's Digest Association

This thorough self-help instruction book includes detailed instructions on such things as weatherstripping, removing a double-hung window, replacing glass, puttying, etc. Good illustrations.

- ⚡ **The Use of Portable Power Tools**, by Leo P. McDonnell and Alson I. Kaumeheiwa
published by Van Nostrand Reinhold Company

A fine book on power tools which could be of great help. Good photographs.

- ⚡ **The Handbook of Do-It Yourself Material**, by Max A1th
published by Crown Publishers, Inc.

This is a great guide to what's available in just about every phase of building material. Highly recommended. You're way ahead when you know what kind of materials are available to do a job with, and this kind of knowledge saves standing around later wishing you had a different kind of baseboard molding because you just saw a better one and didn't know before that you could buy such a thing. The same goes for the power tools book above. Knowledge can save a lot of sweat.

Publications available from UHAB:

MANAGEMENT

A Guide For Tenants Who Manage Their Own Buildings *

A Guide to Cooperative Ownership *

A Guide to Cooperative Self-Management

A Guide to Payroll Bookkeeping

Managing Money and Keeping Records *

DEVELOPMENT

The Affordable Cooperative

Becoming a Cooperative *

A Borrower's Guide to the Section 312 Multifamily Rehabilitation Loan Program

A Guide to Buying a City-Owned Building

A Guide to Maintenance and Repair *

A Guide to Rehab Feasibility

CONSTRUCTION

Demolition Handbook/Vamos a demoler . . . para construir algo mejor

GENERAL INFORMATION

What Is a Cooperative?

* Available in Spanish

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