
The Dark Side of Library Architecture: The Persistence of Dysfunctional Designs

FRED SCHLIPF

ABSTRACT

One of the most disappointing aspects of library architecture is the endless repetition of the same two or three dozen dysfunctional design ideas. Bad design ideas come from many sources, not only architects and interior designers, but also librarians, library consultants, and various governmental bodies. This article describes some of the most commonly repeated design errors in library architecture and provides suggestions on how to prevent them in advance or deal with them after they are committed.

INTRODUCTION

This article summarizes some of the most common design errors in library architecture and provides a few suggestions on how to prevent them in advance or deal with them after they are committed. Although problems with library designs are noted throughout the library literature, this article is based directly on my personal experience as a library building consultant, on visits to hundreds of library buildings, and on conversations I have had with hundreds of frustrated librarians over the past forty years. One of the most disappointing aspects of library architecture is the endless repetition of the same two or three dozen dysfunctional design ideas. Librarians grind their teeth in frustration, but architects (and everyone else involved in the library building process) eternally repeat the same design errors.

Actually, the architectural design needs of libraries are fairly simple. Libraries need to be strong, well-lighted, comfortable, safe and secure, flexible in use, expandable, and have low occupancy costs. The problems lie in the details.

Bad design ideas come from many sources, including architects, designers, librarians, library consultants, and various governmental bodies. Blaming all bad designs on any one group is unfair. But you still don't want bad designs. And unfortunately, once the building has been finished, it's often too late to change. Bad designs are often pushed with extraordinary vigor. Be prepared for seriously dysfunctional concepts that are beloved favorites of politicians, boards of trustees, architects, and others. Bad designs often seem to grow out of good intentions, which may suffer from a myopic pursuit of a single design element without regard to the undesirable functional impacts that may accompany it. A few of the features listed here are now banned by U.S. building codes, but they may be legal in other places.

COMMON DYSFUNCTIONAL ARCHITECTURAL DESIGN CONCEPTS

Skylights

Skylights are generally seductive in description, fetching in photographs, and alluring at first glance. They are also appealing in concept because they make use of natural light at a time when conserving energy is a constant concern. They are frequently popular with designers and with people who don't actually have to spend much time in libraries. But skylights almost always cause nothing but trouble (fig. 1). Here are some of the major problems they cause in real life:

- Because of their hard surfaces, skylights reflect noise, and areas under skylights are frequently unpleasantly noisy. This is particularly true because skylights are usually curved or peaked—shapes that increase problems with sound reflection. In many cases, skylights are paired with hard surfaced floors, which are also noisy. Even worse is the combination of skylight, hard floor, atrium, and lending desk. Sounds are endlessly reflected and magnified, then shared generously with other floors of the library.
- In addition to reflecting noise, skylights transmit noise laterally. If a long, roof-shaped skylight has a reference desk under one end and reading tables under the other, everything said at one location will be heard far too easily at the other.
- Areas under skylights (even those using translucent materials) are too bright by day.
- Because of the brightness, books and other materials under skylights tend to fade badly, and the many users who are blinded by the glare tend to seek other places to read.
- Users looking up at book spines on high shelves beneath skylights can be blinded by the light from the skylights and unable to read anything on the spines.

- Areas lighted by direct sun through skylights are so bright that adjacent areas are hard to see.
- Skylights cause problems with reflected glare (veiling reflectance). Distracting images of skylights are reflected in shiny surfaces such as computer screens.
- Direct glare from skylights can travel across library spaces as the sun crosses overhead, making areas of the library uninhabitable when they are in the direct light.
- Just as areas under skylights are too bright by day, they are too dark by night. If the library has a large skylight, some kind of lighting system needs to be suspended beneath it. To provide effectively even lighting, a lighting system under a skylight may involve a large number of suspended light fixtures that are unsightly during the day. Areas under skylights are usually illuminated by direct downlighting, with all of the dysfunction such lighting entails. Some libraries with skylights have relied on lamps on reading tables. This works, but the area under the skylight will be gloomy at night.
- Blocking unwanted light from skylights is difficult, since most curtains and blinds are engineered for vertical windows.
- Heavy rain falling on skylights can be amazingly noisy.
- In daylight hours skylights waste energy. The solar gain from any kind of skylights can lead to extra air-conditioning loads. At night skylights radiate energy to the outside world.
- Eventually, almost all skylights leak.
- Tiny skylights (such as “light tubes”) cause tiny problems, but they’re the same sort of problems. And the light they bring in is more symbolic than actually helpful.

A very common use of skylights is to connect new and old buildings. Architects faced with an historic library, for example, are tempted to build a modern library next door and bridge the two with a large skylight. Inevitably the result is dramatic. The space under the skylight is huge and bright and open, but it’s hard to find a use for it, and it’s expensive to heat and cool. The intensity of the sun fades everything. The hard surfaces of the skylight provide acoustics reminiscent of old railroad terminals, where reverberations made announcements loud but impossible to understand. Providing uniform illumination at the right level of brightness is pretty much impossible. The original library and the new are widely separated and poorly integrated. And water soon drips through the skylight. Because of the problems outlined above, many library areas under skylights end up as concourses or serve other nonassignable functions.

When you are preparing a building program or talking with your designers,

- always begin by saying, “No skylights.”



Figure 1. This library has a beautiful skylight, but as the sun crosses the sky during the day, a band of intense direct glare crosses the library. When the light falls on the service desk at midday, it's a terrible place to work, and the staff computers there are unusable. Source: Fred Schlipf.

- If people are determined to have windows in the roof, north-facing clearstories work far better in northern latitudes. (But watch out for high windows facing any other direction, including monitors without carefully calculated sunlight angles.)

If you are going to be stuck with a skylight and can't talk your way around it, here are some things you can do to reduce (but not eliminate) the pain:

- Be sure it is made of some translucent, insulated material like Kalwall.
- Be sure it's very small.
- Be sure it's in a place where a clearstory window is impossible, such as the top of a basement wall, where any other form of natural light is difficult to achieve without a window well.
- Be sure nobody has to do anything important under it.

If you inherit a building with a skylight, your options are a lot more limited:

- If you have impressive historical skylights, consider roofing them over and lighting them artificially. (A modern version of this is called an "artificial skylight." They work far better than real skylights, but it can be difficult to get up inside them to change the lamps.)
- If your skylights aren't works of art, you may be able to arrange to have them removed entirely.

Atriums

An atrium is a high-ceilinged space connecting two or more floors. Some atriums are massive, while others can be mere holes in the floor, sometimes with matching tiny skylights above. Atriums can create suitably grand spaces. They can also help with orientation. Patrons standing in the atrium may better understand where things are located elsewhere in the library. Atriums also make great pictures, pictures that grace library web pages and architects' advertising brochures.

However, most librarians who have to cope with atriums dislike them, often with great intensity. Here are some of the problems with atriums:

- Atriums take a lot of space. Although a hole in a floor is cheaper space than the solid floor that could replace it, it's by no means free.
- Atriums are inherently noisy. Unless the walls of upper floors are glazed (glassed in), sounds carry amazingly well between floors.
- When skylights are installed over atriums, which can be dramatic, the result is even more racket.
- And if the floor of the atrium is ceramic tile or terrazzo rather than carpet (which is often the case), the acoustical characteristics of the space are even more offensive.
- If they are not glassed in, upper stories overlooking atriums terrify people with acrophobia, particularly if the upper floors have narrow walkways around the atriums.
- Pedestrian bridges across atriums are even more unnerving.
- Atriums often get in the way. If an atrium is in the middle of the building, it usually interferes directly with traffic flow on all upper floors.
- Instead of helping with orientation, atriums can actually cause confusion if users can see places that they can't figure out how to reach.

- Atriums are notoriously difficult to light, and light fixtures in atriums can be amazingly hard to service.
- Atriums waste energy. In a time when green features are important, wasting energy heating and cooling a high, unoccupied space seems particularly inappropriate.
- Atriums can complicate air handling. It's easier to heat and cool a building when floors are separate.

Always start by saying "no atriums" in your building program. If you are going to be stuck with an atrium, and you can't talk your way out of it, here are some ways to make it less noxious.

- Be sure that it is glazed above ground level to simplify temperature control, keep people from dropping things over the edge, control racket, and make people with acrophobia less terrified.
- Be sure that the upper levels have opaque walls to above waist level. People with fear of heights are afraid to approach floor-to-ceiling glass partitions.
- Be sure all ceiling-mounted light fixtures are on electrically powered drops, so they can be lowered to floor level for servicing.
- Be sure that the atrium is on one edge of the building, such as above an entry foyer. If people don't have to circumnavigate the atrium to get from one side of the library to another on upper floors, this will reduce some of the negative impacts of the atrium.
- Be sure that crucial pathways through the library don't skirt the precipice of the atrium. Your designers may think pathways like this are a neat idea, but most of your staff and users won't.

Although it's possible to design atriums to limit the damage they cause, you'll be a lot better off without having one at all. But what do you do if you inherit an atrium?

- First, follow some of the suggestions above for the evil but inevitable atrium. Be sure the opaque wall sections on upper levels are tall enough to avoid spooking your users and staff, and glaze the rest of the walls. Put the light fixtures over the atrium on drops.
- Investigate completing the upper floors, bridging over the atrium and eliminating the multi-floor opening. The cost per square foot gained may be high, but the reduction in racket, bad floor layout, user discomfort, and wasted energy may be worth it.

Designer Staircases

Photographs of new libraries are filled with pictures of romantic and dramatic staircases. They sweep upward in atriums, accompany impressive vistas, and form artistic centerpieces of buildings. However, designer staircases provide special problems because all staircases are prone to

problems, even under the best of circumstances. People trip and fall on staircases with grim regularity, even on staircases that are designed with prime concern for safety. People also bump their heads on the undersides of staircases, and many designer staircases terrify people with acrophobia. Designer staircases can also absorb a lot of space. Over the years, a number of designer staircase ideas have proven their lack of merit and have been banned by building codes, but others continue to be created. Remember that a staircase is a means to move safely between floors on foot. If it is also a design statement, it needs to be a safe and functional and reasonably priced design statement.

Floating Staircases. These have been popular for years. Instead of being solidly filled in below, floating staircases are engineered to hang in midair, sometimes with no visible means of support except at their tops and bottoms. They may represent real tours de force of structural engineering.

The main problem with a floating staircase is making use of the open space beneath it. If the space beneath the staircase is left wide open, it offers people of every possible height someplace where they can crease their foreheads on the lower edge of the staircase. And there's nothing you can do with the space beneath, once the bottom of the staircase gets to less than about seven feet from the floor.

Buildings with floating staircases have sometimes had to install curbs or railings on the floor around the base of the staircases to keep people from wandering under the staircases and bumping their heads. Some libraries without adequate storage space end up storing things in the open areas under the stairs, creating permanent eyesores.

Staircases with Oddly-Shaped Steps. People have known for years that safe steps are rectangular, and that all steps in a staircase should be the same size. But odd steps keep turning up. Old Carnegie libraries often had basement stairs with pie-shaped steps at the corners, and even experienced staff members took tumbles now and then. A good modern example of oddly shaped steps is provided by curved staircases, where the treads are shallower on the inside of the curve than on the outside. Walking up and down on opposite sides of the staircase can provide very different experiences. By the same token, treads and risers should have standard dimensions. People are accustomed to a limited range of proportions in steps. Anything different can lead to awkwardness in climbing and descending, and it can encourage falling.

Handrails That Are Not Perpendicular to the Run of the Staircase. If a handrail runs diagonally to the steps, people using a staircase have to walk crabwise if they want to hold on to the handrail. For those people (like me) who are no longer young, being faced with the choice of going without a handrail or walking downstairs diagonally is not pleasant, and it's annoying to once more have to seek the elevator.

Staircases (and Balconies) with Handrails That Can Be Climbed Like Ladders. For a number of years, designers enjoyed creating balcony and staircase railings with horizontal rather than vertical balusters. The effect was a little like a split rail fence. The problem with these railings is that children can climb them like ladders. And they do. U.S. building codes now ban railings like this, but historic examples exist, and some new railings still offer footholds for climbing children.

Staircases with Open or Transparent Risers. One favorite design element that upsets many people is open or transparent risers. A stairway is made up of treads and risers. People step on the treads, which are connected by the vertical risers. In the past, some designers built staircases with open risers. As people climbed the stairs, they could look down between the treads and see whatever was going on many feet below. Not surprisingly, most people disliked this sensation, and people with acrophobia couldn't use the stairs at all. Building codes now limit the size of the opening to prevent small children from falling through, but stairs are still built with partial risers or even transparent risers. Tell your architects from the start that you want closed, totally opaque risers in all your staircases.

Overly Long Staircases. Even straight, crisp staircases can be unnerving if they continue too long in one direction. Many people dislike staring down a run of 30 or more steps. A staircase that has a landing half way up and reverses itself before it goes the rest of the way is far more comfortable than one that runs the entire distance between two floors in one line. One Illinois library has a second floor children's department reached by a long, straight staircase in an atrium. Library staff members had to install a kiddy gate at the top of the stairs.

Staircases with Light Fixtures That You Can't Reach. When your library is being designed, always find out how the lights will be changed over your staircases. Ask very specific questions, and don't accept vague answers. "Use a lift" is not a sufficient response. One of the problems with changing lights over staircases is finding a place to put the ladder. The world of public architecture is full of staircases where the lights were installed when construction scaffolding was in place, and once the scaffolding is removed there's no way to get at the fixtures without erecting a new scaffold.

What can you do to keep yourself sane when the time comes to service light fixtures over staircases?

- Have the fixtures on drops, so they can be lowered to the staircase below for servicing.
- Make sure that fixtures not on drops are located above landings that are large enough for tall stepladders, never above steps.
- Have railings at the top that are strong enough to support planks

stretched across the opening, so that people can stand on the planks while replacing lamps.

Glass Railings. On interiors, glass is too often used in railings. When your designers say “Climbing our staircase will be like floating in air,” be very afraid.

Wording for Building Programs. So many things go wrong with staircases that it’s hard to come up with a concise list to include in building programs. But here’s a start:

- Staircases will be designed to allow people to travel safely and securely between floors.
- Staircases will not be installed as central features of huge atriums.
- The undersides of staircases will be enclosed where multiple flights are not nested together.
- Staircases will proceed in straight lines, not diagonals or curves.
- Staircases will be designed to minimize the effects of acrophobia. They will not have open or transparent risers or treads. Side walls will not be completely transparent. Staircases will not make long, straight descents, but will reverse directions at landings half way down between each floor.
- To prevent injuries to children, staircase and balcony railings will not provide toeholds for climbing.

All in all, staircases offer major potentials for serious accidents. Any design that makes them even marginally less safe is a mistake.

Courtyards

Many libraries have been built with charming courtyards. Some are at one end of the structure, while others are buried in the center of the building. Courtyards can introduce daylight to otherwise dark interiors. They can also provide a glimpse of nature, not to mention sites for fountains or artwork. In communities with moderate climates, courtyards can provide pleasant places to sit.

In general, however, courtyards tend to cause trouble with circulation (moving from place to place in the building) and with effective room design. Here are a few standard problems caused by courtyards:

- Courtyards in the middle of libraries usually interfere with navigation. When people want to go from point A to point B, they frequently have to circumnavigate the courtyard.
- Courtyards can lead to user confusion. In some buildings, users circumnavigating a courtyard may lose track of how many times they have turned. If they make the wrong guess, they may end up walking three-quarters of the way around a building, looking for the door, when one-

quarter of the distance would have worked if they had started off in the other direction.

- Courtyards in the center of buildings can lead to beads-on-a-string room layouts. Because the building narrows beside the courtyard, the designer may provide traffic flow that leads through one room to another.
- Although courtyards look like great places for people to read out-of-doors, they appear not to function well for security reasons. They probably made more sense in the days before air conditioning.
- Courtyard plantings have to be maintained. If the courtyard is small, the amount of light actually reaching the plantings can be inadequate.

An impressive number of courtyards in libraries are simply kept locked. When you tour libraries with courtyards, try the doors.

The easy phrase to put into your building program is “no courtyard.”

Indoor Water Features

A “water feature” is any architectural ornament that employs water. Water features include fountains, reflecting pools, water walls, and similar ideas. Water features can be handsome and exciting and refreshing and musical. They photograph well and are fun to see. Given the choice of sponsoring a fountain or some bookshelves, donors will probably have little trouble deciding.

By and large, however, librarians find water features a remarkable pain:

- Water and library materials are a bad combination.
- People fall into water features. One major U.S. public library had a reflecting pool in an entry corridor, and people kept taking headers into it. Many libraries with fountains have to constantly watch small children.
- People throw things into water features. A fountain inside a library is a magnet for coins. Unless the drain is carefully maintained, sooner or later it will plug up, and water will flow over the edges.
- Water features can raise humidity to unwelcome levels.
- Running water has a powerful psychological impact. One Illinois public library has an attractive fountain near the lending desk. Unfortunately, the musically tinkling sound of running water has a strong psychological effect on staff members, and the library has to keep the fountain turned off to prevent staff from constantly running to the restroom.

The wording for building programs is simple: “No water features.” If you find yourself stuck with an unwanted water feature, the solution is simple, although fraught with potential complaints. Turn it off, drain it, and turn it into a planter.

Nonrectangular Interior Spaces

To create architectural interest, designers frequently create oddly shaped rooms. Some are triangular or trapezoidal. Some have oddly shaped alcoves. Portions of some rooms are designed to project at odd angles from otherwise rectangular buildings. Other rooms have unnecessary curves, ranging from simple sections of circles to strangely undulating, serpentine creations. Some of these spaces are inherently interesting and appeal to owners, who may find sweeping curves or jutting angles attractive during the design process. Curves on floor plans look neat from an aerial perspective. But nonrectangular spaces cause many problems in libraries:

- Everything we put in libraries is rectangular. Oddly shaped spaces are at best inefficient and awkward to use.
- Curved walls may also lead to the necessity of installing curved furnishings, which have the unfortunate ability to combine very high initial cost with long-term inflexibility.
- Book stacks fit very poorly into any shape of space except a rectangle.
- Curved or other oddly shaped walls are also a waste of construction funds. Curves are expensive to construct. Replacing glass walls on a curved structure is a budgetary adventure.
- Curved walls also make later expansion difficult or impossible. Adding on to a building with a straight wall is vastly easier than adding on to a building with a serpentine wall.
- Installing lighting in nonrectangular spaces is extremely difficult. By far the best way to light a modern library is by using strip fluorescent uplight fixtures set end-to-end in parallel rows. This is hard to accomplish in oddly shaped spaces.

Your written building program can have a bold-faced requirement that all internal spaces in the library will be rectangular, but what can you do if your architects or owners insist on curved or diagonal walls?

- Ask your engineers to conduct a value engineering study. The extra expense of nonrectangular spaces in terms of cost per usable square foot can be extraordinary.
- Ask for a very specific furniture layout. Remember that fan-shaped stacks don't work.
- Ask to see the proposed lighting scheme, including calculations of illumination levels. Reject lighting systems that involve oceans of round pendant lights, as well as schemes that result in uneven lighting levels.

What do you do if you inherit curved or diagonal walls?

- Curse and live with the situation

Bad Lighting

Most bad lighting sneaks up on libraries because it's difficult to spot in construction drawings. Only when the building is finished, the furniture is in place, and the lights are switched on do librarians realize that some truly bad ideas have come to pass. Bad lighting is also hard to spot in photographs of libraries. Photographs don't show glare and uneven illumination well, and many professionally made photographs of libraries involve lots of supplementary, portable lighting brought in to provide temporary illumination.

Downlighting. One major problem that pervades far too many library buildings is the extensive use of direct downlighting, particularly recessed downlights (commonly called "can lights"), which are cylindrical openings in the ceiling with lights pointing straight down. Why do downlights cause problems?

- Recessed downlights direct almost all of their light straight down. The result is horizontal surfaces that are too brightly lighted and vertical surfaces that are not lighted enough, making it difficult for users to read book spines or to hold books vertically while they read.
- The light from recessed downlights is spotty, and this becomes increasingly apparent near ceilings.
- Downlights cast harsh shadows.
- Looking up into downlights can be a particularly unpleasant experience. Since people in libraries frequently look up at high shelving, they are often blinded by any downlights.
- Buildings illuminated with downlights can look closed at night. People driving by a building realize that it is open because the walls and ceilings are lighted, not because the floors and tabletops are lighted.

The most effective way to light libraries always remains strip uplights with standard, four-foot fluorescent tubes. This requires ceilings a minimum of ten feet high. Your instructions to your architects could include something like the following:

- All lighting fixtures in public areas and staff workspaces will be pendant fluorescent strip fixtures reflecting light off the ceiling. Direct/indirect fixtures are not an acceptable substitute except in situations where ceilings of proper height are technically impossible.
- In particular, there will be absolutely no recessed downlights not specifically called for in this program.

Architecturally Fixed Task Lighting. Task lighting is lighting designed to provide particularly bright illumination in a specific area. Examples of task lighting are light fixtures attached to book stacks, light fixtures on reading tables, light fixtures on staff workstations, and similar equipment. As long as task lighting is mounted on furniture, it moves with the fur-

niture when you rearrange your library. (You may still run into serious problems, however, when you find there's no way to plug in the lighting once you've relocated things.) If task lighting is architecturally mounted, however, it's often impossible to relocate furniture, which severely limits the flexibility of spaces.

Quartz Halogen Lighting. Quartz halogen lighting is incandescent lighting that has extremely white light because the lamps operate at very high temperatures. This is made possible by a quartz glass envelope that resists heat and by the introduction of halogens into the lamp to extend filament life. Compared with other forms of lighting, quartz halogen lamps are extremely bright, extremely hot, and extremely short lived. If you visit libraries with quartz halogen lamps, you will usually see lots of them burned out. This is probably A Good Thing. Unless the light is badly needed, in which case it is An Annoying Thing.

Indoor Metal Halide Lighting. Metal halide lighting is a variety of high intensity discharge (HID) lighting. It's characterized by extremely concentrated light sources, excellent efficiency (similar to that of fluorescent), and funny colors. Metal halide lights also have problems with "restrike time," which means that they have to warm up before they are fully on, and that if you turn them off, it may be fifteen minutes before you can turn them on again. Metal halide is great for exterior lighting, where we need lots of light, we turn the fixtures on and off only once a day, noisy ballasts don't drive people up the wall, and funny colors are acceptable. And if a lamp blows up once in a while (the engagingly named "catastrophic end of service"), the shreds of hot glass are less likely to land on human flesh.

Unfortunately, metal halide fixtures have also been popular for indoor lighting, especially where designers want to produce a great deal of light from a very small fixture. In interiors, of course, the bad characteristics of metal halide lighting really make a difference. If people turn lights off, we want to be able to turn them on again without waiting fifteen minutes. Noisy ballasts disturb readers. Odd colors are disruptive. And who knows who will get what when things explode. Metal halide lamps are expensive, and often lamps and ballasts are matched. With four-foot fluorescent tubes, you may have an immense selection of lamps that will fit a specific fixture, but with metal halide you may be stuck with one specific product. Although metal halide lamps may be somewhat more efficient than fluorescent lamps, they're not efficient enough to justify their use inside a library. In addition, replacement metal halide lamps are far more expensive than fluorescent lamps. It's better to specify fluorescent and stand your ground.

What can you do to stop metal halide lighting?

- As usual, put the prohibition in the building program.
- When the building is being designed, check the schedules of fixture types

on the electrical plans. You can also insist on receiving cut sheets for all proposed lighting fixtures and check every sheet for lamp types.

What can you do if you've been handed metal halide lighting?

- If you're lucky, you may be able to replace only the guts of your light fixtures, but you will probably have to replace the entire fixtures.
- If the metal halide fixtures were selected because they're compact and round, you may find that this decision was driven by an oddly shaped room where strip fluorescent fixtures won't fit.
- You can replace the round metal halide fixtures with pendant fixtures that use biax fluorescent lamps, but the lamp cost and color rendering will probably be inferior to four-foot tubes.

Dark Ceilings. Libraries with dark ceilings are always difficult to light, because we can't bounce light off dark ceilings. In addition, dark ceilings make rooms seem low and gloomy. Coping with dark ceilings is sometimes unavoidable in historic buildings, but there is no excuse for recreating the problem today in modern construction. Even rooms with light-colored ceilings sometimes have dark soffits. If the underside of a soffit is painted any color but white, the area under it is likely to be unpleasantly dark.

If you have a historic library with a dark ceiling, the best approach is probably to do what libraries did a century or more ago in their huge, dramatic reading rooms. Provide chandeliers that supply sufficient ambient light for people to move about safely, and supplement this with task lighting on bookshelves, tables, and service desks.

Remember that historic dark ceilings should be as visible as possible. If you can't make the ceiling lighter, you can use angled lighting that increases the surface modeling. I've seen a number of libraries with dark ceilings that had retrofitted blazingly concentrated downlights, and I think this is a terrible mistake. If you look up at an historic ceiling and are immediately blinded by bright lights, why bother to have a historic dark ceiling at all?

What can you tell your architect?

- With the exception of historic ceilings that must be preserved, all ceilings and the undersides of all soffits will be white.
- All perimeter soffits more than eighteen inches deep will have built-in strip fluorescent downlights to illuminate the spaces beneath.

If you inherit dark ceilings,

- deal with historically dark ceilings as suggested above,
- replace dark acoustic tile with white acoustic tile,
- if any hard-surfaced soffits have dark undersides, paint them white.

Lighting That Displays Dead Bugs. Fixtures with transparent or translucent lenses provide a great collecting space for dead bugs. Some libraries have endless thousands on display. This is particularly true of translucent bowl chandeliers, which are popular with designers retrofitting modern lighting to historic libraries. (If you must have fixtures like this, some come with opaque central bosses that hide a lot of the dead bugs.) Another advantage of 100 percent reflected uplighting is that whatever bugs congregate in the fixtures are at least invisible.

Automatic Lights That Leave People in the Dark. Automatic lights are a major component of green architecture, and they're great when they work right. They're commonplace in restrooms, and are increasingly found elsewhere. There are two common problems:

- Lights that force people to enter pitch-dark areas.
- Lights that go out while people are still in the room. People in restroom stalls find this a particularly unhappy experience.

What can you do?

- Some detector systems work better than others. Talk with your engineers.
- Always provide a dim night light in any public space with automatic lighting.
- Make sure that lights go on when the door is opened, and that people aren't required to step into dark rooms.

Multiple Public Entrances

Libraries are frequently tempted to create multiple entrances, particularly if the access areas for pedestrians and drivers are on opposite sides of the building or if the building is in the center of a campus. Unfortunately, all entrances need to be watched, and multiple entrances almost inevitably lead to wasted staff time. The pressure for multiple entrances appears to come mostly from people in authority. Mayors want access from several directions. University boards of trustees see the library (correctly enough) as the center of the campus, and they want students to be able to enter it from any direction.

What can you do if people suggest multiple entrances to your library?

- If access to the library from two directions is essential, buildings can be efficient if both entrances lead to a single foyer, with a single door between the foyer and the library proper.
- If you are dealing with your funding authorities, you can explain to them the extra cost of supervising each additional entrance and ask how many additional entrances they are willing to pay to staff for eternity.
- If you are dealing with architects who are pushing for multiple entrances, tell your funding authorities exactly what the cost implications of multiple entrances are.

What can you do if you inherit multiple entrances?

- Do what lots of libraries have been forced to do and start converting them to alarmed emergency exits.

Architectural Solutions to Furniture Problems

Built-in features are fun to design, and when a library building is new, furniture that is literally part of the building can look neat and tidy and organic. Unfortunately, however, libraries and their services change frequently, and today's built-in feature may become an awkward white elephant in a few years. For example, some libraries in years gone by were outfitted with card catalogs or other card files that were structurally part of the building. When card files ceased to be used, libraries were left with special niches or supporting plinths that were difficult to alter (fig. 2). Another common error has been to create special spaces to house pieces of electrical equipment. Technical equipment changes frequently, and long before the building becomes worn with use, spaces created to hold special objects may become obsolete.

What can you do to prevent these problems?

- When you're preparing your building program, always ask yourself whether technical changes in the use of libraries may make a special-purpose space obsolete.
- In bold print in your building program, say, "**There will be no architectural solutions to furniture problems.**" Insist that you approve all shop drawings, and reject all of those with built-in gadgetry.

Non-Acoustic Ceilings

Except in the case of inherited historic ceilings of significant beauty or fixed stack units, all library ceilings need to absorb sound. The usual way to achieve this is by using acoustic tile, which has the advantage of easy removal for access to the increasing variety of mechanical systems we hide above ceilings.

Many acoustic problems in libraries are due to the omission of sound-absorbing surfaces on portions of ceilings that are not flat. These commonly include cathedral ceilings, barrel-vault ceilings, and the sloped portions of ceilings that combine flat and sloped elements. Cathedral and barrel-vault ceilings are notorious for their ability to transmit sound. A library with a reference desk and a soft seating area one hundred feet apart at the ends of a barrel vault without an acoustic surface may find that no conversations are private and that the conversations of people seated on armchairs far from the staff can be overheard with distressing ease. Sloped ceiling sections can also do an impressive job of transmitting sound, which rises vertically, is reflected ninety degrees by a sloped ceiling, travels horizontally, and then is reflected down by another section of sloped ceiling.



Figure 2. This library card catalog was completely obsolete when the picture was taken. It blocked the path from the lending desk to the reference desk, but it couldn't be moved because the plinth that supported it was not part of the catalog but ferroconcrete, and intended to be part of the building forever. Source: Fred Schlipf.

Luckily, the solutions are easy:

- If the slope of a ceiling is gentle, creating it from suspended ceiling components is straightforward. It's also easy to use acoustic tile on the undersides of soffits.
- For ceilings that cannot be constructed using suspended ceiling systems, spray-on acoustic surfacing is available that works well.

How do you prevent acoustic problems?

- Make very clear in your written program that the building will have no new hard-surfaced ceilings of any kind, either flat or sloped.

If you inherit a library where sloped ceilings lead to unwanted noise transmission, you can spray on an acoustic surface after the fact.

Inflexibility

One of the most basic truths about library buildings is that library needs change and buildings must adapt. Experts on nonlibrary buildings can be taken aback by the tendency of librarians to start moving the furniture around almost before the wall paint is even dry. What can you do to protect yourself and your library?

- Have the program clearly state that all spaces in the library will be planned with long-term flexibility of use in mind.
- List the features that will be avoided:
 - Task lighting that is not attached to furniture
 - Sections of floor that cannot carry the weight of library books
 - Public areas or staff offices without full access to 110-volt and data service. A library with a poured floor slab needs electrical outlets and data access at frequent intervals in the slab for long-term flexibility of use. Outlet covers must always be totally even with the slab, so that outlets do not limit placement of shelving and furniture.
 - Built-in furniture
 - Bearing walls. Bearing walls make remodeling and expansion extremely difficult.
 - Structural details that make expansion difficult or impossible. Remember that expanding a library usually means enlarging existing spaces.
 - Structural systems that meet codes for a library of a specific size but will not do so if it's expanded. Always specify that the systems used in your building will still meet building codes if the building is doubled in size. The cost of construction may be higher now, but long-term savings can be significant.
 - Curved or diagonal exterior walls.
 - Underground utilities installed in the path of future expansion.
 - Multistory buildings with exterior walls that step inward or outward, leaving no place to attach additions.

Bad Sightlines

All libraries—particularly public libraries and school libraries—rely on good sightlines to enable a limited number of staff members to supervise large areas. If a library has bad sightlines, it seldom can afford the extra staff necessary to keep an eye on hidden corners, and the result is constant problems with supervision of users (fig. 3). Some standard ways of preventing bad sightlines include the following:

- Orienting stack aisles so that staff members stationed at service desks can see down as many aisles as possible. (In the past, however, some libraries experimented with aisles that radiated like the spokes of a wheel from service desks. These turned out to be unworkable—almost always impressively unworkable.)
- Using glass walls to permit staff to supervise people using study rooms, quiet reading rooms, etc.
- Making sure that public computer workstations that offer Internet access have screens that face service desks.

However, there are also sightlines that no one really wants:

- Many libraries provide unwelcome views of toilets. Far too many libraries, for example, have single user restrooms leading directly from reading rooms—or even staff-room kitchens—with toilets on full public view whenever the restrooms are not in use. And many libraries provide unwanted views of multiuser restrooms in action whenever the door is opened. Remember that if you can see a wall of mirrors when the restroom door is open, you can probably see most of the restroom reflected in the mirrors.
- Special libraries may need computer workstations with screens that cannot be seen by passersby. Lawyers, for example, may be working on confidential materials. Physicians may need to consult patient records that are made completely private by HIPPA—the federal Health Insurance Privacy and Portability Act.

When you are reviewing building floor plans, always study sightlines carefully. It's amazing how many ill-considered features you'll discover.

Excessive Use of Soffits

Soffits are lowered sections of ceilings. They serve to break up what might otherwise be huge expanses of suspended ceiling tiles. Some soffits enclose pieces of equipment, such as air ducts. But many soffits cause problems:

- Soffits are very frequently used to define the location of desks. In almost all cases, this is a major error. It greatly limits the long-term flexibility of space organization, since desks cannot be moved without reconstructing the soffits.
- Many soffits are too low. Any portion of the ceiling that is less than ten feet high causes problems with lighting and book shelving.
- Because soffits are lower than the rest of the ceiling, they are a favorite place for the evil of can lights.
- Some interior designers paint the undersides of soffits dark colors to provide visual interest. This is a bad idea under any circumstances, but when dark soffits are combined with can lights, the result is almost inevitably a mixture of glare and gloom.



Figure 3. This photograph of unfortunate sightlines was made with a self-timer, with the camera balanced on shelving for romance paperbacks. Source: Fred Schlipf.

- A common problem in many libraries is dark perimeters in rooms. Perimeter soffits can add significantly to this problem.

Include something like the following in your program statement:

- Soffits will be used only to break up overly large expanses of acoustic tile ceilings. In such cases, they will be narrow and will hang down just far enough from the ceiling to be visible.
- Soffits will not be used to define the locations of objects below.
- The undersides of soffits will be white.
- Soffits will never be equipped with can lights.
- Perimeter soffits will stop at least ten feet above the floor and will have inset strip fluorescent fixtures to eliminate dark shadows around the edge of the room.
- Soffits will not be used to conceal ductwork. Space between floors will be sufficient to allow ductwork to be concealed above ceilings at least ten feet high.

Balconies

Balconies and mezzanines look romantic and fun, but balconies in libraries cause many problems:

- Whether interior or exterior, balconies offer a great opportunity for people to fall off.
- While some people find the view from balconies euphoric, other people completely panic when they get too close to the railings.

- The use of interior balconies often leads to dysfunctional ceiling heights. If a library consists of a large open space with a balcony around the edge, too often either the main ceiling will be high and hard to maintain, or the ceilings under the balcony and on the balcony will be less than the ten feet of clearance needed for workable lighting.
- Balconies, like atriums, are inherently noisy. Sounds carry from the room below up to the balcony and from the balcony to the room below.
- Balconies can screw up HVAC systems. In hot weather, convection movements can lead to cool air flowing like a waterfall off a balcony to the space below, replaced by warm air rising.
- In the winter, hot air rises from the center of the area below the balcony and produces stifling heat above.
- Access to balcony spaces is inherently awkward. For all practical purposes, a balcony that includes public space is similar in layout to a tunnel—a long, narrow area that must be accessed linearly, since users must follow the balcony rather than cut diagonally across to the other side.
- Building codes may limit the size of balconies in your library. What's legal today may be illegal after the next code revision.
- Unglazed balconies are unsafe.

What can you do to prevent this sort of thing?

- In your building program, always write, "There will be no balconies."
- Battle in particular any design where a narrow balcony provides the basic access to spaces around the perimeter of an atrium.
- If balconies seem inevitable, insist that all interior spaces have at least ten feet of vertical clearance, including both spaces on balconies and the spaces beneath them.
- Insist that interior balconies be separated from the areas below by walls with opaque parapets and glazing above.

And if you're stuck with existing balconies,

- consider glazing them to help people with fear of heights and to improve temperature control and acoustics, and
- raise the height of the parapets and make them opaque.

Unfortunately, there's nothing you can do to eliminate the low ceilings and awkward floor configurations that usually accompany balconies.

Features That Lead to Serious Maintenance Problems

Some popular design features lead to serious upkeep problems. Among them are ceramic tile with white grout (which can't be kept clean), permanently installed soap dispensers (which always corrode shut) that can't be replaced, flush tank toilets (which are hard to maintain), inexpensive

drywall with cheap latex paint (which is fragile), and colored metal door handles (because the finish comes off). But the two features that drive most librarians crazy are light fixtures that are hard to reach and an exterior surface material called EIFS.

Light Fixtures That Are Difficult to Reach. This is probably the most frequent upkeep complaint that librarians have about new library buildings. Some library buildings are full of light fixtures that cannot be reached with ordinary ladders (fig. 4). Among the worst are fixtures high above the floors and fixtures over staircases. If asked during the design process, designers usually suggest that mechanical lifts can be used, but this presupposes that suitable lifts can be found at a reasonable price, that they can be fitted through the entry doors of libraries, and that they can be moved into position without relocating shelving.

What can you do to prevent problems of this type?

- In your building program, specify that all light fixtures should be reachable from an eight-foot stepladder.
- Specify that fixtures over staircases must be located over landings.
- Specify that any fixture more than twelve feet above the floor must be on an electric drop. (This is not as vital for fixtures mounted on a wall, where you can lean a straight ladder against the wall next to the fixtures, but for fixtures over wide-open spaces, drops are essential.)
- Look carefully at spec sheets for proposed light fixtures (include alternates suggested by your contractors) to be sure that changing lamps while perched on a ladder will not be difficult. (This is a great time to show proposed designs to your custodians.)
- Watch in particular for any proposed use of incandescent lamps, since they burn out while you're at lunch.
- If you'll need a lift for changing lamps, be sure to have your designers specify the exact model, demonstrate you can place it where you need it without moving shelving or service desks, and provide a place to store it.

What can you do if you inherit a library with light fixtures that are almost impossible to reach?

- Look for long-life replacement lamps.
- Change all the lamps at the same time. (This is good advice for any building with widespread banks of fluorescent lamps.)
- Retrofit electric drops.
- Install new fixtures in reachable places and let the old ones rest unburnished rather than shine in use.

EIFS. EIFS stands for "external insulation finishing system." Basically, it's a skim coat of stucco (or a similar product) over a layer of plastic foam, sometimes with an intervening mesh of fiberglass. EIFS is popular with



Figure 4. The burned-out lamp in this light fixture at the University of Illinois has been changed only once because the university couldn't afford to build another scaffold to change it again. Source: Fred Schlipf.

some designers because the material is extremely plastic. It lends itself to interestingly complex shapes. But it also has a miserable track record with libraries (fig. 5). Among the common problems are the following:

- Water intrusion. Water sometimes gets behind EIFS and can't get out. The result can be mold, rot, or even entire exterior walls peeling off.
- Fragility. EIFS is not particularly resistant to being bumped. It's easily dented in collisions with bicycles and even less durable objects.
- Cost. Despite its fragility and its water problems, EIFS is not cheap. Some people claim that it costs nearly as much as face brick.



Figure 5. This photo of easily damaged EIFS reveals the layers of construction. Source: Fred Schlipf.

EIFS can be a practical choice for uses like storefronts, which are planned for frequent remodeling, but for buildings intended to last for a century or more, EIFS is an extraordinarily bad choice. If you are planning a library building,

- always say “No EIFS” in your building program. Insist that you mean *all* exterior surfaces, even if it’s just trim.

If you inherit a building covered with EIFS,

- have engineers check frequently for water intrusion.

- be prepared to patch and repaint.
- be prepared to have to replace the entire exterior surface of the building.

Buildings That Can't Be Expanded

Every time a new library is designed, self-assured people announce that it will never need to be expanded. Often this contention is used to support inflexible designs or the construction of libraries on undersized sites. These people could be right, of course, but history is not on their side. Somewhere there are no doubt libraries that are just too large, but in most cases libraries are either brand new, overcrowded, or both. In practical terms, libraries should always have expansion plans up their sleeves:

- Sometimes this involves having a master plan, one that shows specifically how the library will be expanded in the future. The problem with master plans tends to be vagueness. Too many involve dotted lines outlining a space that cannot actually be incorporated into the library. It's always fair to ask that your master plan include a Phase II floor plan that shows in serious detail what the building will look like when it's expanded, including furniture placement.
- Planning for expansion always includes controlling enough adjacent property.
- Cutting the size of a library to fit a limited site automatically insures that the need for expansion will come even sooner. What will you do if you can't buy adjacent land?

Libraries also need to be sure that the architecture of their buildings is compatible with expansion. Among things to remember are the following:

- Increasing the size of a building can easily place it in another construction code category.
- Flat walls are easier to expand than curved walls.
- Buildings are far easier to expand outward than upward.
- Walls intended to be knocked out for expansion should be adjacent to large open areas, not lined with staff offices.
- Be sure that Phase I construction does not include location of utility lines where Phase II will be located. (This sounds like a silly warning, but I've seen it happen.)

Problems with Glass

Glass is vital to good library design:

- Windowless rooms are depressing. Library users like to sit near windows when they read, in order to watch the world go by. When library staff members discuss their dissatisfactions with their current buildings, lack of natural light is one of the first things they mention.
- Internal glass is important. Windows between offices can bring borrowed light to what would otherwise be depressingly windowless spaces. Glass

walls on study rooms and similar spaces allow staff supervision of what could otherwise be troubled areas.

But it's all too easy to overdo glass exteriors:

- Unshaded exterior glass leads to serious problems with glare.
- Glass that faces any direction except north can lead to unwanted solar heat gain. The only way to prevent this is to shield the glass from sunlight, since even blinds don't solve the problem. When sun falls on internal blinds, it warms the blinds, and much of the heat is trapped indoors.
- Glass is hard to insulate as effectively as solid walls.
- Glass reflects sound. You can always cover solid walls with sound-absorbing materials, but glass is there for good.
- Remember that exterior glass fails for many reasons. Seals can leak, and multipane windows can fill with moisture. Hailstorms or vandalism can break windows. A few buildings have had problems with windows that simply fall out. Some esoteric glass units with inserts between the panes have disintegrated.
- Because of failures, it's essential that you have a practical way to replace exterior glass units that fail.
- The worst problems occur with esoteric glass that is manufactured overseas and cannot be replaced easily.
- Glass has to be cleaned.

What can you do to protect yourself?

- For any major installation, insist on being shown other buildings that use exactly the same type of glass in a similar installation.
- Insist on glass that can be duplicated domestically.
- Watch out for proposals that buildings be glass boxes. Consider the implications for energy use and maintenance.
- Beware of assertions that modern glass can cure all of the problems associated with excess use of glass in the past. Always insist on seeing a comparable installation using the same type of glass.
- Be particularly wary of proposed glass walls that are not straight. In addition to causing many problems associated with nonrectangular spaces, curved walls may have a variety of custom glass units.
- Require that your architects provide a projection of maintenance costs associated with the proposed glass exterior. What will it cost to clean it? What will replacement wall units cost?

What can you do if you're stuck with a problem-laden building with too much exterior glass or too much unusual glass?

- Check the warranties on your glass units. They may be longer than the typical one-year warranties on new buildings.

- When esoteric units fail for reasons of bad design, don't simply duplicate them. Find a less complex solution.
- Don't let your architects off the hook. Even if it's been a decade, if the building is failing, demand that your architects help solve the problem. (You may be stuck with paying for the replacement glass, but you should expect your architects to come up with a workable solution at their expense.)
- It may be possible to reduce total glass area by redesigning the building, but a building designed to be a glass box may look odd when glass units are replaced with opaque panels.

Dysfunctional Service Desks

A surprising number of libraries have service desks that cause problems. Some of the most common dysfunctional features are as follows:

- Fragile surfaces on lending desks. Everyday high-pressure laminates are not tough enough.
- Badly positioned book return slots. Many lending desks have book return slots located where people stand to have books checked out. Setting up a library that places users on constant collision courses is a really bad idea.
- Low book return slots. Book return slots need to be in counters about forty inches high in order to leave space for receiving bins.
- Difficult exit from behind the desk. Staff members need to be able to step out from behind desks, and this means exits at both ends.
- Lending desks too far from security gates. Anything more than about fifteen or twenty feet is too far, unless you can afford to hire a separate staff member to do nothing but guard the gates. Forever.
- Desk tops that are either white or very dark. Dark desk tops (like dark tops on reading tables) cause eye strain due to contrasts between paper and the desk top. White desk tops reflect too much light and create unpleasant glare.
- Lending desks that make it completely unclear which areas are for staff only.
- Lending desks with raised barricades between the library staff and users. This sounds like a great way to keep desks looking tidy, but barricades make it hard for staff and users to see each other. If there is no break in the barricade, staff members will have to hand books out at arm's length rather than simply pushing them across the counter top, and one can imagine the eventual problems with repetitive stress. Providing completely flat desk tops with small shields to hide the backs of the computers used for lending appears to be a very successful approach.
- Desks that cannot be expanded if you run out of space.
- Funny-shaped lending desks. Many historic libraries, for example, had

semicircular desks. Desks shaped like half-doughnuts take up a lot of floor space but have virtually no space inside for staff to work. To leave adequate space for both users and staff, lending desks work best if they are relatively straight.

- Reference desks that can't be relocated because of matching soffits or other permanent architectural details.
- Desks that leave staff no opportunity to do alternate work between customers.

How do you avoid problems?

- Never simply turn the design of service desks over to your architects or to anyone else who doesn't work in libraries.
- When desks are being planned, it's an important time for staff to list features needed and to be sure that the features are actually included.
- Make sure that surfaces and structural materials are sufficiently tough.
- If your building consultants have extensive real-library experience (and they should), have them help with the desk design.
- Visit other libraries and size up how their desks work.
- Make clear to the architects that while the front of the desk may be theirs to design, the top and guts of the desk are yours.

IN DEFENSE OF DESIGNERS

It's always important to remember that dysfunctional designs come from many places. Blaming them all on architects is easy but seriously unfair.

- Bad locations for new buildings are usually proposed by owners—universities, cities, and others.
- Undersized libraries seem usually the result of local political decisions.
- Undersized sites also have a strong political element. People recognize a good place for a library and are undeterred by the fact that the available land is too small, or that a library placed there can never be expanded.
- Decisions to convert unsuitable buildings to libraries are a matter of local politics.
- Design decisions can be made without any input from anyone who knows anything about library buildings.
- Sometimes governing bodies are eager to have dramatic, knock-your-socks-off buildings, structures with a tremendous wow factor, and they may guide their architects in that direction.

So while librarians tend to rail against what they see as foolishly—if not willfully—dysfunctional design choices, we need to sympathize with designers who can have really bad ideas thrust upon them. But you still need to cut this kind of thing off at the pass.

- If outside forces propose dysfunctional ideas, call upon your architects and consultants to explain why these ideas won't work.
- Include a solid list of forbidden design options in your building program and point it out firmly to your architects during the selection interview or at the first planning meeting.
- Beware the evil allure of charming dysfunction. Remember the occasional verse (variously attributed to Ogden Nash, P.J. O'Rourke, Dorothy Parker, and others), "It's always tempting to impute unlikely virtues to the cute."
- When you are calling architect references, ask the firms' previous clients whether they had to battle vigorously against unwanted design concepts.
- As part of the review process in selecting an architect, have your head of maintenance call the heads of maintenance at other libraries.
- Pick your battles. Some bad ideas are pernicious, but others are just wastes of money.
- Don't give in. You can have a building that is strong, well-lighted, comfortable, safe and secure, flexible in use, expandable, and with low occupancy costs. And it can still be attractive.

NOTE

Portions of this material will appear in expanded form in a planned book entitled *The Practical Handbook of Library Architecture*, by Fred Schlipf and John A. Moorman, forthcoming from ALA Editions.

Thanks to Joe Huberty of Engberg-Anderson architects, Milwaukee, for reading and commenting on this article.

Fred Schlipf has been a professor at the University of Illinois Graduate School of Library and Information Science since 1970. He currently teaches courses on library buildings. He was director of The Urbana Free Library for thirty-two years, and he has consulted on about 125 library construction projects. He can be reached at fschlipf@illinois.edu.

